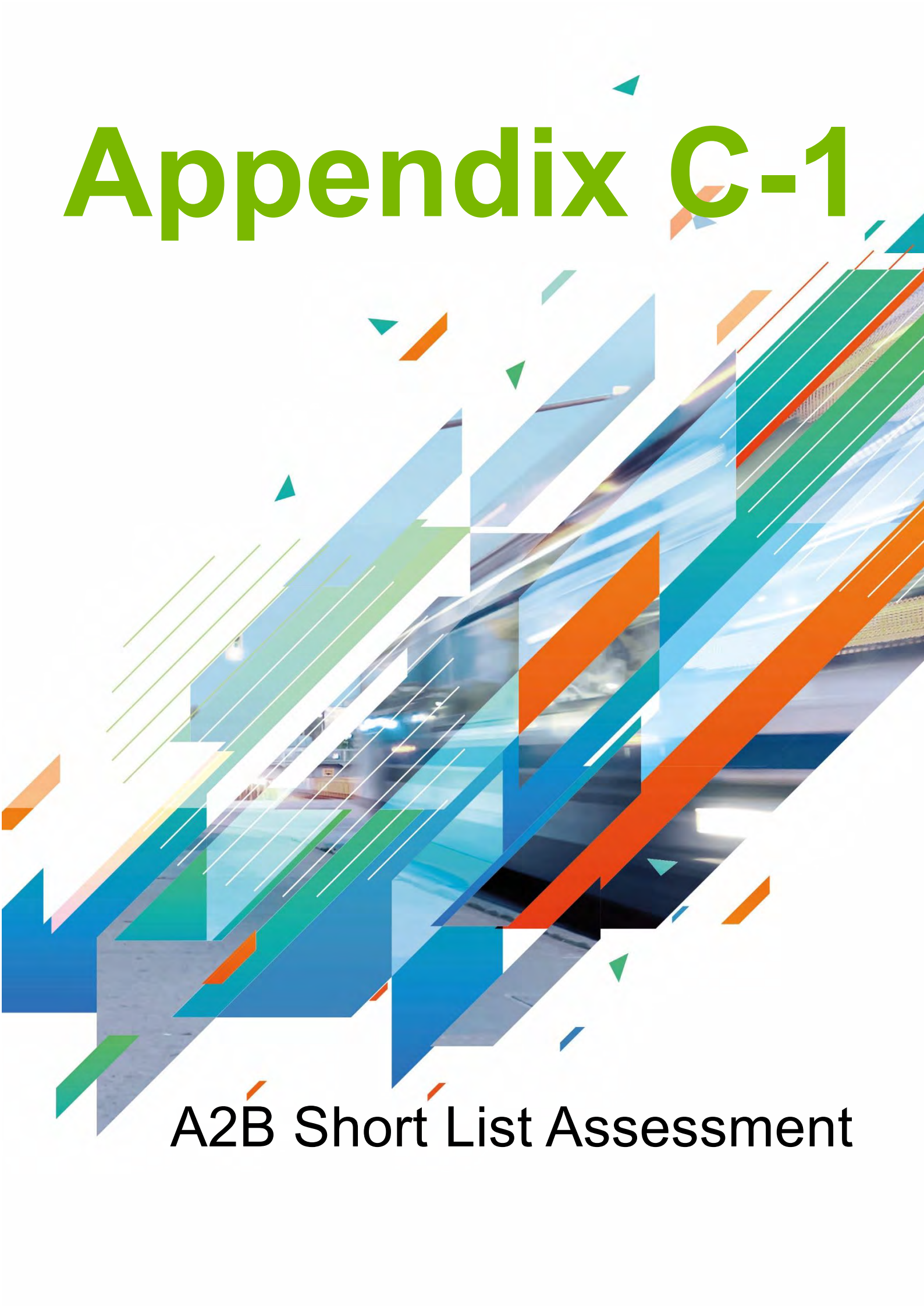


Appendix C-1



A2B Short List Assessment

Appendix C-1

A2B Short List Assessment

Technical Note

To	Auckland Transport	From	
Copy		Reference No.:	502334-6000-TEC-JJ-0003
Date	2019-04-10	Pages (including this page)	19
Subject	Short List Options Assessment and Preferred Option		

This note describes the process followed to execute the multi-criteria analysis (MCA) for the short list options for the Airport to Botany (A2B) Mass Rapid Transit (MRT) project. The MCA used problems, benefits and investment objectives established during the investment logic mapping (ILM) exercise carried out prior to the long list assessment. Key performance indicators (KPIs) were also carried forward from the ILM, with minor refinement to fit within the limits of available data sources and analysis methods.

The assessment of the A2B short list was integrated with the parallel assessment of the 20Connect project, which proposes upgrades of State Highways 20, 20A and 20B and motorway interchanges between them. 20Connect and A2B are closely related as they both aim to provide additional transport capacity for different modes along similar corridors. It is anticipated that the demands and preferred solutions for each project will affect the other project, and as such, each short list option includes components from both A2B and 20Connect options.

The short list assessment for A2B is comprised of three groups of assessment: transport planning, planning and environmental effects, and engineering feasibility.

The rest of this technical note describes the options that were assessed, what assessment was conducted, how scoring was applied, and how the short list MCA leads to the emerging preferred option.

1 Short list options

The short list options are based on the results of the long list assessments for both A2B MRT and 20Connect. Two primary options for the A2B MRT were identified, along with three options for 20Connect. Six formal short list options were assessed, with each A2B MRT option paired with each 20Connect option.

1.1 Base case option

The base case option for the short list assessment is largely the existing 2018 transit network and road infrastructure, with the following variations included from the preferred option for the short-term intervention package:

- A new short-term “pre-rapid transit” bus route supported by targeted infrastructure upgrades:
 - An A2B MRT bus service between the Airport and Manukau Station, via Puhinui Station with 5/10-minute headways and long service hours.
 - Puhinui Station upgraded to a high-quality bus-rail interchange.
 - The addition of bus priority lanes between the Airport and Manukau Station, on SH20B and Puhinui Road.
- Some corresponding changes to the surrounding public transport network in the modelling:

- Bus route 380 truncated from the Airport-Papatoetoe-Manukau corridor (replaced by the A2B MRT service), remaining in operation only on the northern section between Onehunga and the Airport.
- Additional *Frequent Service* crosstown bus route (“Route 36”) on a more direct alignment between Onehunga, Māngere, Papatoetoe and Manukau (replacing part of the former route 380).
- Additional *Connector Service* bus route (“New Lynn Express”) between New Lynn Interchange Station and the Airport.
- Increased frequencies and small route adjustments to some Māngere area bus routes.
- Upgraded road network and bus routing within the airport precinct.
- No further road, highway or bridge improvements.

1.2 Transit options

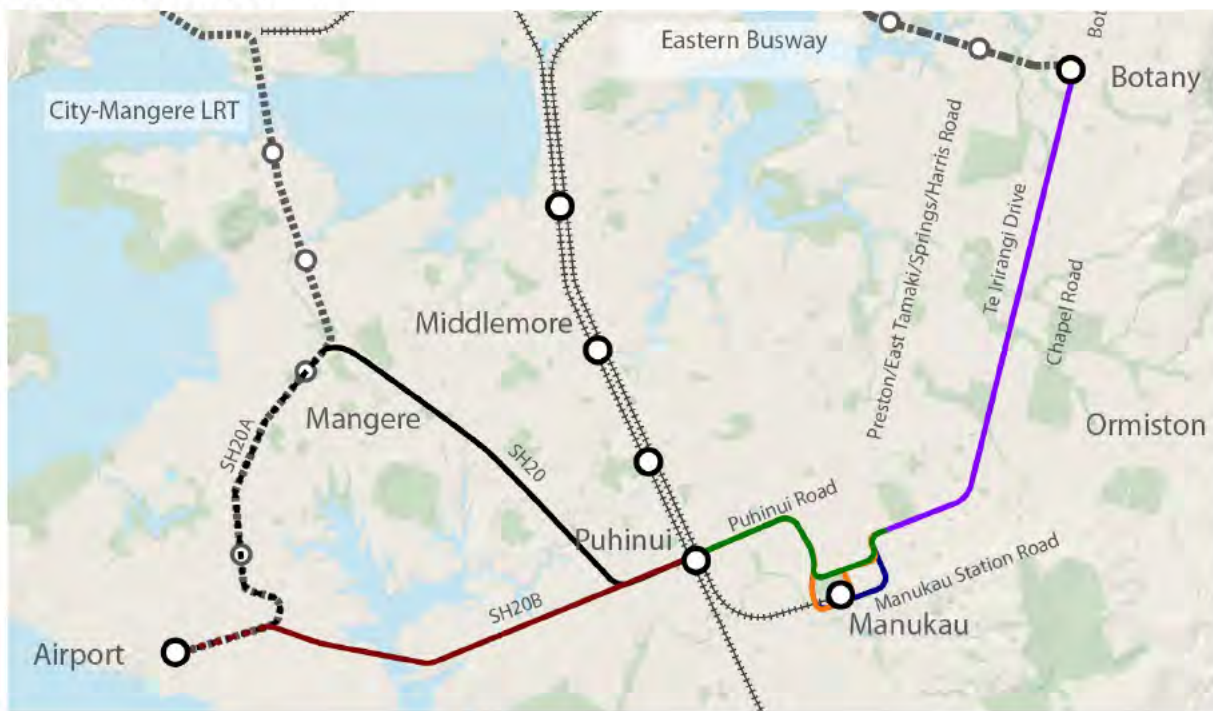
Following the long list assessment, two segments of the alignment for the A2B MRT were unresolved: the alignment through Manukau, and the routing between the Airport and Puhinui. The alignment through Manukau was not formally considered in the short list options, however it was assessed separately. Therefore, the A2B MRT options differed only in the routing between the Airport and Puhinui. The two options were:

- A. Airport to Puhinui via SH20B, and
- B. Airport to Puhinui via SH20A and SH20.

These two alignments are shown in Figure 1. The Manukau options were assessed separately to the full corridor using out-of-model assessments. It is noted that the MSM model has limited utility for discriminating between sub-options at a local scale with town centres such as Manukau. The Manukau options are:

- B3. Ronwood Avenue,
- B5. Manukau Station Road, and
- B6. Hybrid: Manukau Station Road, Davies Avenue, Ronwood Avenue.

Figure 1: A2B short list options



1.3 20Connect options

The 20Connect short list comprised of three options, each with a different set of investments to the SH20, SH20A and SH20B corridors. The 20Connect short list options, and their key attributes are as described in Table 1-1.

Table 1-1: 20Connect short-list option key attributes

Components	Option 1	Option 2	Option 3
SH20B widening	Offline	Online	Online
SH20B south-facing ramps onto SH20	Yes	No	No
SH20A south-facing ramps onto SH20	No	Yes	Yes
SH20 widening (Māngere Bridge to interchange with...)	SH20A	SH20B	SH20B
Pukaki Creek Bridge lanes	4	4	2

1.4 Combined options for assessment

Each of the 20Connect short list options was combined with the A2B short list options, resulting in six short list options: 1A, 1B, 2A, 2B, 3A, 3B.

The A2B MRT Manukau alignment was assessed separately.

2 Analysis methodology

The MCA process is a way of distinguishing how each option performs against the investment objectives of the project by assessing the options against a set of key performance indicators related to the investment objectives and benefits. The benefits of the A2B and 20Connect projects are included in Figure 2. The benefits for the A2B MRT project are:

1. More equitable access to jobs, learning, social activities (25%)
2. Travel is easier and more affordable (25%)
3. Economic potential and opportunity increased for all (30%)
4. Local taonga enhanced (10%)
5. Healthier, safer people (10%)

Whilst some metrics can be assessed quantitatively through calculations, others must be assessed qualitatively by experts in the field. The section describes the metrics that were considered in the long list assessment for A2B.

Figure 2: A2B and 20Connect benefits, investment objectives and MCA indicators

Benefit	Investment Objective	Key Performance Indicator	A2B Measure	20Connect Measure
A2B: More equitable access to jobs, learning, social activities (25%)	More equitable access and travel choices to jobs, learning, cultural and social activities in the south and east of Auckland.	Population accessible to key destinations	Population within 45-minute PT trip from: Airport, Manukau, Botany	
		Jobs accessible from key locations	Jobs within 45-minute PT trip from: Ormiston, Otara, Botany, Manukau, Papakura	
		Access to education and social opportunities	Tertiary institutes, hospitals, government offices within walking distance of MRT route	
		Access to resources and places of customary practice	Marae and sites and places of value to mana whenua within walking distance of MRT route	
		Cost of travel in south and east Auckland	Generalised cost (incorporates cost and time) of PT travel in south and east Auckland	
A2B: Travel is easier and more affordable (25%) 20Connect: More reliable and resilient transport system (40%)	Reliable and resilient transport system in south and east Auckland that is easy to use.	Capacity and resilience of the option to meet demand	Assessment of demand and capacity of MRT option	Total demand serviced on A2B and 20Connect corridors
				Degree of saturation of key links and intersections
		Travel time reliability, including separation of road space	Separation of road space and vehicle interactions	Number and performance of grade separations and at-grade junctions and intersections
				Assessment of travel time reliability for key journeys
		Ability for high priority trips to have reliable journeys		Length of separated rights of way for freight, PT, HOVs and special uses
				Volume/capacity of key routes and special purpose lanes
		Directness and ease of use	Transfers for key journeys: City-Airport, Botany-Airport, Papakura-Airport, Botany-Manukau	
		Travel time for key journeys	PT travel time for key journeys (as above)	
				Vehicle travel time for key journeys: City-Airport, Papakura-Airport, Botany-Airport, Albany-Airport, Westgate-Airport
A2B: Economic potential and opportunity increased for all (30%) 20Connect: A more prosperous Airport Precinct area, Auckland and New Zealand (40%)	Transport network that enables the efficient movement of goods and people.	Population accessible to key destinations	Population within 45 minute PT trip from: Airport, Manukau, Botany	Population within 30 minute drive from the Airport (peak hours, 2048)
		Jobs accessible from key locations	Jobs within 45 minute PT trip from: Ormiston, Otara, Botany, Manukau, Papakura	Jobs within 30 minute drive from the Airport (peak hours, 2048)
	Urban regeneration and improved built environment.	Improved access to Local, Town and Metropolitan Centres	Local, Town and Metropolitan Centres within walking distance of MRT	
		Land development around stations	Extent of Housing NZ and Panuku land within 1km of stations	
A2B: Local taonga enhanced (10%) 20Connect: Local environment is protected and enhanced (10%)	Minimal impact of the transport system on the environment and taonga.	Air emissions from transportation	Particulate and carbon dioxide emissions from vehicles in Auckland region	Vehicle emissions in and around the Airport, Manukau and Māngere
		Water quality effects of transport system	Quantity and quality of stormwater around the transport system	
		Effects on places of heritage	Effects on sites/buildings/places of heritage value, and sites and places of archaeological significance	
		Māori communities and wellbeing	Effect on relationship with ancestral lands, water, sites, waahi tapu, and other taonga	
		Te Taiao (air, land, water, taonga):	Effect on air, land, water and other resources including on Mātauranga Māori	
			Relationship with culture, traditions, ancestral lands, water, sites, waahi tapu, and other taonga	
		Effects on culture and traditions	Recognition of sites of significance	
A2B: Healthier, safer people (10%) 20Connect: Healthier, safer people (10%)	Safe and secure transport facilities in south and east Auckland.	Air emissions from transportation	Particulate and carbon dioxide emissions from vehicles in Auckland region	Vehicle emissions in and around the Airport, Manukau and Māngere
		Walking accessibility to PT stations	Population within 500m walk of frequent PT stops or 1km walk to RTN stations	
			Additional distance walked due to mode shift	
		Extent of local walking and cycling connections	Technical assessment of walking and cycling links	
		Amenity function of activity areas and town centres		Reduction in through traffic and freight
		Safe walking and cycling conditions		Volume and speed appropriateness along walking and cycling corridors

2.1 Transport planning

The transport planning metrics aim to assess the effect of each option on public transport users and the accessibility to key destinations and opportunities using public transport. The assessment of the transport planning KPIs included both the quantitative and qualitative assessment of various metrics.

A seven-point scale (-3 to 3) was used to assess the transport planning metrics. Negative scores indicate worse performance than the base case, whilst positive scores indicate better performance and a score of zero represents similar performance to the base case option.

2.2 Planning and environmental effects

The potential effects of each option on the environment were also assessed. Specialist assessments were undertaken in the topic areas including ecology, arboriculture, stormwater, landscape, visual and urban design, social, noise and vibration, archaeology, contaminated land and air quality.

Each of the specialists assigned each option a score ranging between -3 (unmitigable adverse effect) to 3 (significant positive benefit).

Table 2-1: Scoring scale for planning metrics

3 (Significant positive)
2 (Moderate positive)
1 (Minor positive)
0 (Neutral)
-1 (Minor/moderate adverse)
-2 (Significant adverse)
-3 (Unmitigable adverse)

2.3 Engineering feasibility

The feasibility of implementation was assessed according to the criteria in Table 2-2.

Table 2-2: Criteria for assessing feasibility

Criterion	Description
Constructability	The level of complexity of implementing the solution, with consideration of construction methodology and staging, and constraints
Safety in design	General assessment of hazards and level of complexity in risk management during construction
Operation and maintenance	Assessment of maintenance and operational implications over the projected life
Construction disruption	Impacts of construction on people and businesses
Property	The extent of impacts on properties; primarily the necessary acquisition of properties

Criterion	Description
Construction cost and risk	Estimated construction costs, including complexity and risk in construction

The rating scale for the feasibility of implementation of options uses a five-point scale with no negative values (1 to 5). Unlike other categories, the feasibility is not measured against a do minimum or base case approach. A descriptive rating for each criterion was specified against the five-point scale for clarity and transparency; the descriptions of the scores are included in Table 2-3.

Table 2-3: Feasibility rating scale

Implementability						
Rating	Constructability	Safety in design	Operation and maintenance	Construction Disruption	Property	Construction Cost and Risk
1	Construction of this kind has not been done before or often in NZ. The work is highly specialised. There are significant and/ or multiple physical constraints.	Significant / extreme H&S design and construction risks. Significant level of risk management through safety in design. Significant hazards associated with the option which pose a significant H&S risk in design, build and final product. Safety highly difficult to be developed into the design process to control H&S and operational risks.	Significant maintenance and operation costs. Significant level of maintenance activities required and ability/ capacity to carry out maintenance activities. Significant factors that affect the ability to operate or maintain the option over its projected life with major additional costs.	Significant amounts of construction impact on people and businesses.	Impacts significant land holdings, whole or parts of communities and large, well established businesses. 100+ parcels. Extreme level of anticipated risk for property acquisition (e.g. significant risk of appeals, objections). Difficult to meet project programme timeframes. Significant constraints on property titles impacting acquisition under PWA e.g. reservation land / covenants.	Significant costs for construction of option.
2	The work has been done before in NZ but is not common. Resource to carry out the work is scarce but available. There is at least one significant constraint.	High level of H&S design and construction risks. High level of risk management through safety in design. Hazards associated with the option which pose a high H&S risk in design, build and final product. Safety is challenging to be developed into the design process to control H&S and operational risks. However, is achievable.	Moderate to high maintenance and operation costs. Moderate to high level of maintenance activities required and ability/ capacity to carry out maintenance activities. Some factors that affect the ability to operate or maintain the option over its projected life with moderate to high additional costs.	High amounts of construction impact on people and businesses.	Impacting a large number of residential and business properties. 40-100 parcels. High level of anticipated risk for property acquisition (e.g. high risk of appeals, objections). May be able to meet project programme timeframes with active management of risk. High level of constraints on property titles impacting acquisition under PWA.	High costs for construction of option.
3	Major construction works but nothing unusual. May involve some traffic and local management issues.	Moderate to high level of H&S design and construction risks but nothing unusual. High level of risk management through safety in design. Hazards associated with the option which pose a H&S risk in design, build and final product. Safety can be developed into the design process to control H&S and operational risks.	Moderate maintenance and operation costs. Moderate level of maintenance activities required and ability/ capacity to carry out maintenance activities. Some factors that affect the ability to operate or maintain the option over its projected life with moderate additional costs.	Moderate construction impact on people and businesses.	Impacting a moderate number of residential and business properties. 10-40 parcels. Moderate level of anticipated risk for property acquisition (e.g. moderate risk of appeals, objections). May be able to meet project programme timeframes with active management of risk. Moderate level of constraints on property titles impacting acquisition under PWA.	Moderate costs for construction of option.
4	Moderate works.	Low to moderate level of H&S design and construction risks but nothing unusual. Low to moderate level of risk management through safety in design. Low to moderate hazards associated with the option which pose a H&S risk in design, build and final product. Safety can be developed into the design process to control H&S and operational risks.	Minor to moderate level of maintenance and operation costs.	Minor amounts of construction impact on people and businesses.	Minimal land requirement. <10 parcels. Minor level of anticipated risk for property acquisition (e.g. minor risk of appeals, objections). Likely to meet project programme timeframes. Minor constraints on property titles impacting acquisition under PWA.	Minor costs for construction of option.
5	Straightforward and minor works.	Low level of H&S design and construction risks but nothing unusual. Low level of risk management through safety in design. Low level hazards associated with the option which pose a H&S risk in design, build and final product. Safety can be developed with ease into the design process to control H&S and operational risks.	Negligible/ minor level of maintenance and operation costs.	Negligible amounts of construction impact on people and businesses.	No land requirement. No property acquisition required. Minimal level of anticipated risk for property acquisition (e.g. minimal or no risk of appeals, objections). Likely to meet project programme timeframes. No constraints on titles.	Minimal costs for construction of option.

3 Short list MCA results

Table 3-1 contains the investment objectives for both the A2B MRT and 20Connect projects, and the relevant KPIs from each project. Refer to tech note 501094-4401-TEC-KK-019 for more information.

Table 3-1: MCA results for assessment against investment objectives

Investment objective	Key Performance Indicator	Measure	A2B or 20Connect metric?	1A	1B	2A	2B	3A	3B
A2B: To provide more equitable access and travel choices to jobs, learning, cultural and social activities in the south and east of Auckland	Population accessible to key destinations	Population within 45-minute PT trip from: Airport, Manukau, Botany	A2B	3	1	3	1	3	1
	Jobs accessible from key locations	Jobs within 45-minute PT trip from: Ormiston, Otara, Botany, Manukau, Papakura	A2B	3	2	3	2	3	2
	Access to education and social opportunities	Tertiary institutes, hospitals, government offices within walking distance of MRT route	A2B	1	2	1	2	1	2
	Access to resources and places of customary practice	Marae and sites and places of value to mana whenua within walking distance of MRT route	A2B	0	1	0	1	0	1
	Cost of travel in south and east Auckland	Generalised cost (incorporates cost and time) of PT travel in south and east Auckland	A2B	2	1	3	2	3	2
A2B: To provide public transport for south and east Auckland that is easy to use, reliable, fast, resilient and affordable 20Connect: To improve the reliability and resilience of the transport system	Capacity and resilience of the option to meet demand	Assessment of demand and capacity of MRT option	A2B	2	2	2	2	2	2
		Total demand serviced on A2B and 20Connect corridors	20Connect	1	2	2	2	3	1
		Degree of saturation of key vehicle links and intersections	20Connect	1	1	2	2	2	2
	Travel time reliability, including separation of road space	Separation of road space and vehicle interactions	20Connect	3	3	1	1	1	1
		Number and performance of grade separations and at-grade junctions and intersections	20Connect	2	2	2	2	1	1
		Assessment of vehicle travel time reliability for key journeys	A2B	3	3	3	3	3	3
	Ability for high priority trips to have reliable journeys	Length of separated rights of way for freights, PT, HOVs and special uses.	20Connect	1	1	3	3	2	2
		Volume/capacity of key routes and special purpose lanes	20Connect	2	2	2	2	1	1
	Directness and ease of use	Transfers for key journeys: City-Airport, Botany-Airport, Papakura-Airport, Botany-Manukau	A2B	2	2	2	2	2	2
	Travel time for key journeys	PT travel time for key journeys (as above)	A2B	3	1	3	1	3	1
		Vehicle travel time for key journeys: City-Airport, Papakura-Airport, Botany-Airport, Albany-Airport, Westgate-Airport	20Connect	2	2	3	3	1	1

Investment objective	Key Performance Indicator	Measure	A2B or 20Connect metric?	1A	1B	2A	2B	3A	3B
A2B: To promote urban regeneration, improved built environment, and economic opportunities 20Connect: To improve economic performance of the airport area, Auckland and New Zealand	Population accessible to key destinations	Population within 45-minute PT trip from: Airport, Manukau, Botany	A2B	3	1	3	1	3	1
		Population within 30-minute drive from the Airport (peak hours, 2048)	20Connect	1	1	3	3	1	1
	Jobs accessible from key locations	Jobs within 45-minute PT trip from: Ormiston, Otara, Botany, Manukau, Papakura	A2B	3	2	3	2	3	2
		Jobs within 30-minute drive from the Airport (peak hours, 2048)	20Connect	1	1	3	3	1	1
	Improved access to Local, Town and Metropolitan Centres	Local, Town and Metropolitan Centres within walking distance of MRT	A2B	2	3	2	3	2	3
	Land development around stations	Extent of Housing NZ and Panuku land within 1km of stations	A2B	1	2	1	2	1	2
A2B: To reduce the effects of the transport system on the environment and taonga 20Connect: Reduce the effects of the transport system on the environment and taonga.	Air emissions from transportation	Particulate and carbon dioxide emissions from vehicles in Auckland region	A2B	-1	-1	-2	-2	-2	-2
		Vehicle emissions in and around the Airport, Manukau and Māngere	20Connect	2	2	3	3	2	2
	Water quality effects of transport system	Quantity and quality of stormwater around the transport system	Both	-1	-1	-1	-1	-1	-1
	Effects on places of heritage	Effects on sites/buildings/places of heritage value, and sites and places of archaeological significance	Both	-2	-2	-2	-2	-2	-2
	Māori communities and wellbeing ¹	Effect on relationship with ancestral lands, water, sites, waahi tapu, and other taonga	Both	-2	-2	-2	-2	-2	-2
	Te Taiao (air, land, water, taonga) ¹	Effect on air, land, water and other resources including on Mātautanga Māori	Both	-2	-2	-3	-3	-3	-3
	Effects on culture and traditions ¹	Relationship with culture, traditions, ancestral lands, water, sites, waahi tapu, and other taonga	Both	-2	-2	-2	-2	-2	-2
		Recognition of sites of significance	Both	1	1	1	1	1	1
A2B & 20Connect: To improve health, safety, and security of people	Air emissions from transportation	Particulate and carbon dioxide emissions from vehicles in Auckland region	A2B	-1	-1	-2	-2	-2	-2
		Vehicle emissions in and around the Airport, Manukau and Māngere	20Connect	2	2	3	3	2	2

¹ Note that at the time of issue, mana whenua had not validated these scores.

Investment objective	Key Performance Indicator	Measure	A2B or 20Connect metric?	1A	1B	2A	2B	3A	3B
	Walking accessibility to PT stations	Population within 500m walk of frequent PT stops or 1km walk to RTN stations	A2B	1	2	1	2	1	2
		Additional distance walked due to mode shift	A2B	2	2	1	1	1	1
	Extent of local walking and cycling connections	Technical assessment of walking and cycling links	Both	2	2	2	2	2	2
	Amenity function of activity areas and town centres	Reduction in through traffic and freight	20Connect	0	0	3	3	2	2
	Safe walking and cycling connections	Volume and speed appropriateness along walking and cycling corridors	20Connect	-1	-1	2	2	1	1

Table 3-2 contains the planning and environment considerations scoring for both the A2B MRT and 20Connect projects. Refer to tech note 501094-4401-TEC-NN-0022 for more information.

Table 3-2: Scores for each option against planning and environmental considerations

Environmental indicator	Measure	1A	1B	2A	2B	3A	3B
Ecology	Aquatic ecology	-1	-1	-1	-1	-1	-1
	Terrestrial ecology	-1	-1	-1	-1	-1	-1
	Marine ecology	-1	-1	-1	-1	-1	-1
	Arboriculture	The arboriculture measure was not scored in detail for the short list assessment, due to the initial screening indicating that there would be no differentiation between the options.					
Coastal processes	Construction effects on Coastal Marine Area (CMA)	-2	-2	-2	-2	-2	-2
	Geomorphology/ sedimentation and tidal flows	-1	-1	-1	-1	-1	-1
	Sea-level rise and costal climate change	-1	-1	-1	-1	-1	-1
Stormwater	Stormwater quality	-1	-1	-1	-1	-1	-1
	Stormwater quantity	-1	-1	-1	-1	-1	-1
Landscape, visual and urban design	Natural character and landscape	-2	-2	-2	-2	-2	-2
	Visual	-1	-1	-1	-1	-1	-1
	Extent, nature and degree of effects on urban design, including open space	2	2	1	1	1	1
Social/ community impact	Accessibility	2	3	2	3	2	3

Environmental indicator	Measure	1A	1B	2A	2B	3A	3B
	Community	-2	-2	-2	-2	-2	-2
	Health and safety	-1	-1	-1	-1	-1	-1
Noise and vibration	Operational noise and vibration	0	-1	-1	-1	-1	-1
	Construction noise and vibration	-1	-1	-1	-1	-1	-1
Archaeology and built heritage	Archaeology and built heritage	-2	-2	-2	-2	-2	-2
Contaminated land	Construction management (contaminated soils)	-2	-3	-1	-2	-1	-2
	Construction management (groundwater)	-1	-1	-1	-1	-1	-1
	Passive discharge	-1	-1	0	0	0	0
	Potential for new or cross contamination	-2	-2	-2	-2	-2	-2
	Built environment risk	-1	-1	-1	-1	-1	-1
	Health and safety of construction workers	-2	-2	-1	-1	-1	-1
	Acid sulphate soil	-3	-3	-3	-3	-3	-2
Air quality	Operational air quality	0	0	0	0	0	0
	Construction air quality	-1	-1	-1	-1	-1	-1

Table 3-3 contains the engineering feasibility scoring for both the A2B MRT and 20Connect projects. Refer to tech note 501094-4401-TEC-CC-0016 for more information.

Table 3-3: Scores for each option against engineering feasibility indicators

Feasibility indicator	1A	1B	2A	2B	3A	3B
Constructability	4	2	2	2	2	2
Construction disruption	3	3	2	2	2	2
Construction cost and risk	2	2	3	2	3	2
Safety in design and construction	3	3	3	3	3	3
Operation and maintenance	3	3	3	3	3	3
Property	2	2	2	2	2	2
Consentability	2	2	2	2	2	2

4 Manukau options MCA results

Table 4-1 details the MCA scores for the assessment of the Manukau options. This assessment is not affected by the 20Connect project; therefore, it excludes the 20Connect investment objectives and metrics. Refer to 502334-6000-TEC-KK-0012 for more information.

Table 4-1: MCA results for assessment against investment objectives

Investment objective	KPI	Measure	B3 (Ronwood Avenue)	B5 (Manukau Station Road)	B6 (Hybrid of B3 & B5)
To provide more equitable access and travel choices to jobs, learning, cultural and social activities in the south and east of Auckland	Population accessible to key destinations	Population within 45-minute PT trip from: Airport, Manukau, Botany	2	3	3
	Jobs accessible from key locations	Jobs within 45-minute PT trip from: Ormiston, Otara, Botany, Manukau, Papakura	2	2	2
	Access to education and social opportunities	Tertiary institutes, hospitals, government offices within walking distance of MRT route	1	1	1
	Access to resources and places of customary practice	Marae and sites and places of value to mana whenua within walking distance of MRT route	0	0	0
	Cost of travel in south and east Auckland	Generalised cost (incorporates cost and time) of PT travel in south and east Auckland	Not formally assessed due to no models for Manukau, however there would be negligible differences between the options.		
To provide public transport for south and east Auckland that is easy to use, reliable, fast, resilient and affordable	Capacity and resilience of the option to meet demand	Assessment of demand and capacity of MRT option	2	1	2
	Travel time reliability, including separation of road space	Assessment of vehicle travel time reliability for key journeys	2	2	2
	Directness and ease of use	Transfers for key journeys: City-Airport, Botany-Airport, Papakura-Airport, Botany-Manukau	2	2	2
	Travel time for key journeys	PT travel time for key journeys (as above)	3	1	2
To promote urban regeneration, improved built environment, and economic opportunities	Population accessible to key destinations	Population within 45-minute PT trip from: Airport, Manukau, Botany	2	3	3
	Jobs accessible from key locations	Jobs within 45-minute PT trip from: Ormiston, Otara, Botany, Manukau, Papakura	2	2	2
	Improved access to Local, Town and Metropolitan Centres	Local, Town and Metropolitan Centres within walking distance of MRT	3	2	3
	Land development around stations	Extent of Housing NZ and Panuku land within 1km of stations	0	1	1
To reduce the effects of the transport system on the environment and taonga	Air emissions from transportation	Particulate and carbon dioxide emissions from vehicles in Auckland region	Not formally assessed due to no models for Manukau, however there would be negligible differences between the options.		
	Water quality effects of transport system	Quantity and quality of stormwater around the transport system	-1	-1	-1

Investment objective	KPI	Measure	B3 (Ronwood Avenue)	B5 (Manukau Station Road)	B6 (Hybrid of B3 & B5)
	Effects on places of heritage	Effects on sites/buildings/places of heritage value, and sites and places of archaeological significance	-1	-1	-1
	Māori communities and wellbeing ²	Effect on relationship with ancestral lands, water, sites, waahi tapu, and other taonga	-1	-1	-1
	Te Taiao (air, land, water, taonga) ¹	Effect on air, land, water and other resources including on Mātautanga Māori	-1	-1	-1
	Effects on culture and traditions ¹	Relationship with culture, traditions, ancestral lands, water, sites, waahi tapu, and other taonga	0	0	0
		Recognition of sites of significance	0	0	0
To improve health, safety, and security of people	Air emissions from transportation	Particulate and carbon dioxide emissions from vehicles in Auckland region	Not formally assessed due to no models for Manukau, however there would be negligible differences between the options.		
	Walking accessibility to PT stations	Population within 500m walk of frequent PT stops or 1km walk to RTN stations	1	1	1
		Additional distance walked due to mode shift	Not formally assessed due to no models for Manukau, however there would be negligible differences between the options.		
	Extent of local walking and cycling connections	Technical assessment of walking and cycling links	2	2	2

Table 4-2 contains the planning and environment considerations scoring for the assessment of the Manukau options. Refer to tech note 502334-6000-TEC-NN-0013 for more information.

Table 4-2: Scores for each option against planning and environmental considerations

Environmental indicator	Measure	B3 (Ronwood Avenue)	B5 (Manukau Station Road)	B6 (Hybrid of B3 & B5)
Ecology	Aquatic ecology	0	0	0
	Terrestrial ecology	0	0	0
	Marine ecology	The options are not located near the coastal marine area or any marine ecology.		
	Arboriculture	-2	-2	-2
Stormwater	Stormwater quality	-1	-1	-1
	Stormwater quantity	-3	-2	-3

² Note that at the time of issue, mana whenua had not validated these scores.

Environmental indicator	Measure	B3 (Ronwood Avenue)	B5 (Manukau Station Road)	B6 (Hybrid of B3 & B5)
Landscape, visual and urban design	Natural character and landscape	-1	-1	-1
	Visual	-1	-1	-1
	Urban design	1	2	1
Social/ community impact	Accessibility	1	1	1
	Community	-1	-1	-1
	Health and safety	-1	-1	-1
Noise and vibration	Operational noise and vibration	0	-1	-1
	Construction noise and vibration	-1	-1	-1
Archaeology and built heritage	Archaeology and built heritage	-1	-1	-1
Contaminated land	Waste management	-1	-1	-1
	Health and safety during construction works	-1	-1	-1
Air quality	Operational air quality	Not assessed because the information required to differentiate between options is unavailable.		
	Construction air quality	Not assessed because the information required to differentiate between options is unavailable.		

Table 4-3 contains the engineering feasibility scoring for the assessment of the Manukau options. Refer to tech note 502334-6000-TEC-NN-0001 for more information.

Table 4-3: Scores for each option against engineering feasibility indicators

Feasibility indicator	B3 (Ronwood Avenue)	B5 (Manukau Station Road)	B6 (Hybrid of B3 & B5)
Constructability	3	3	3
Construction disruption	3	2	2
Construction cost and risk	3	3	3
Safety in design and construction	3	3	3
Operation and maintenance	3	3	3
Property	1	3	1
Consentability	3	3	3

5 Preferred option

The output of the short list assessment is the identification of the preferred option that will be progressed in detail to inform the recommended option. This section defines the preferred option for the A2B project. The MCA assessment of the two projects was conducted in a single assessment, however it was found that the preferred option for the A2B project was the same for each of the 20Connect short list options.

The preferred option selection for the A2B MRT alignment is discussed in two components: the connection between the Airport and Puhinui, and the alignment through Manukau. (The preferred option for the third component between Manukau and Botany was already confirmed in the previous long list assessment). Figure 3 shows the preferred alignment for the A2B MRT service.

5.1.1 Alignment between the Airport and Puhinui

The short list assessment for the A2B and 20Connect options indicated very strongly that option A was preferable to option B. Within each 20Connect option, option A (MRT alignment via SH20B) scored significantly higher than option B (MRT alignment via SH20A and SH20). There were some individual metrics where option B did score higher, however upon reviewing the assessment overall, option A was preferred.

The primary strength of option A compared to option B is the more direct link between Puhinui and the Airport, reducing travel times for all journeys between the Airport and east and south Auckland. These shorter travel times result in faster passenger trips, better regional network connectivity with greater catchment area, and lower operating and fleet costs.

The strength of option B, in comparison, results from the diversion from the Airport north to Māngere and then south to Puhinui. This connects more local residents *directly* to the A2B MRT route, however it comes at the expense of longer overall travel times between the Airport and regional demands across east and south Auckland. Additionally, as Māngere will be served by the City Centre to Māngere (and the Airport) light rail service, Māngere will already have good access to the RTN with easy transfers to the A2B MRT line at the Airport.

The faster travel times between Puhinui and the Airport will benefit all travellers to the Airport from east and south Auckland, for which there are no other existing or planned rapid transit options. Improving those connections is therefore deemed more beneficial than providing a slower direct-access service that also connects to Māngere, which already has better (existing and proposed) service connections.

The preferred option for the A2B MRT alignment is therefore option A (routing via SH20B); this conclusion holds true for all short-listed 20Connect options.

5.1.2 Alignment through Manukau

The sub-option for the alignment of the A2B MRT service through Manukau was also assessed in detail. Two primary options (B3 Ronwood Avenue, and B5 Manukau Station Road) were considered from the long list assessment, and a third option (B6) was introduced.

The Ronwood Avenue option (B3) is a more direct alignment that serves the north side of the Manukau Metropolitan Centre well but does not directly connect to the existing Manukau rail and bus station. Conversely, the Manukau Station Road option (B5) provides a direct connection to the existing rail and bus interchange but bypasses the north side of the Metropolitan Centre.

Option B6 was developed as a hybrid of B3 and B5, with an alignment (west-east) along Manukau Station Road but continuing along Davies Avenue to Ronwood Avenue. This hybrid option was

developed during the assessment process with the aim of combining the primary benefits of the two initial options, with a slightly longer route that serves both the rail-bus interchange and the northern side of the Metropolitan Centre.

Options B3 and B6 via Ronwood Ave also avoid routing the MRT through the congested and constrained intersection of Great South Road, Manukau Station Road and the adjacent SH1 Southern Motorway ramps.

The two initial sub-options of B3 and B5 scored similarly across many of the metrics, however there were several metrics where one scored higher than the other. The hybrid option B6 mostly scored similarly to B3 and B5, however on the metrics where there was a difference between B3 and B5, B6 generally scored the same as the higher of the other two options. The metrics where B3 or B5 scored higher than B6 was the travel time metric, whereby B3 scored highest as it would be slightly more direct than the B6 hybrid option. Nonetheless, the slightly slower travel times through Manukau with option B6 is considered to be a reasonable trade off compared to the benefits of providing a more connected service through Manukau, connecting to both Manukau Station and the Metropolitan Centre.

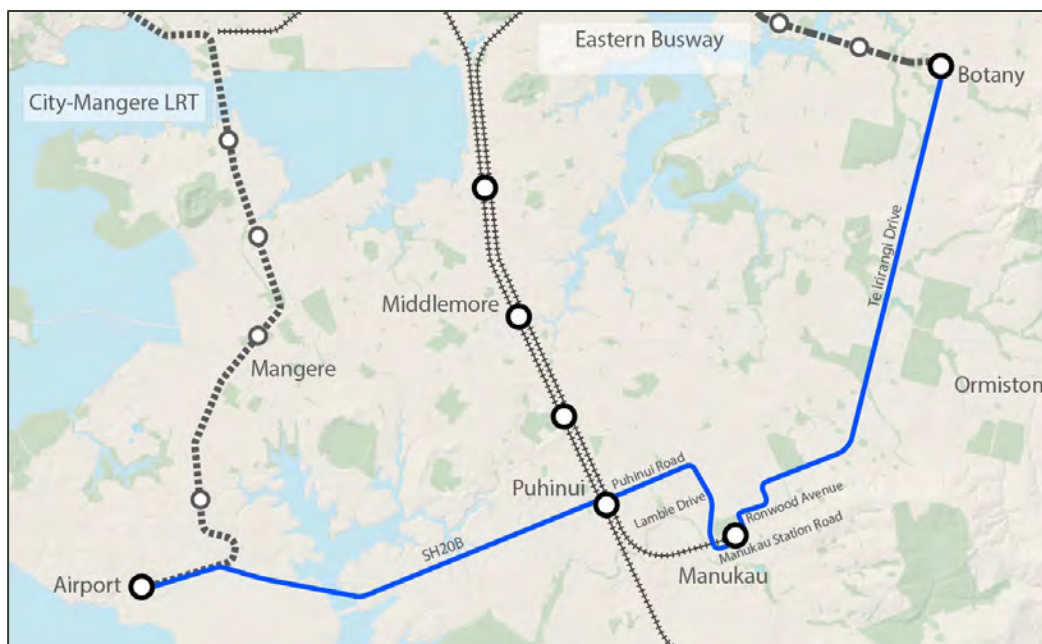
Therefore, option B6, using Manukau Station Road, Davies Avenue and Ronwood Avenue is the preferred option for the Manukau alignment of the A2B MRT service.

Although option B6 came out as the preferred option, it did score poorly on three metrics being stormwater quality, arboriculture and property for the following reasons:

- There is very limited space along Ronwood Avenue to provide any peak flow attenuation which may result in the increased flooding of the immediate downstream receiving environment.
- A substantial number of mature street trees would be required to be removed, however out of the options, option B6 has more opportunity for the relocation of trees and replacement planting.
- There are likely to be direct property impacts to commercial properties that are considered to be high risk.

Opportunities to mitigate these impacts will be focused on as the preferred option is developed.

Figure 3: A2B MRT preferred option



6 Summary

This note has described the process followed to execute the MCA for the short list options for the A2B MRT project, noting that this assessment was joint with 20Connect, however more detail related to the 20Connect project can be found in a separate technical note. Each of the options consisted of components from each project, to generate six options for comparison. Additionally, three sub-options were considered for the Manukau alignment of the A2B MRT.

The results of the MCA process are included, as well as a discussion on how those results transpired into the preferred option, to be developed in more detail.

The preferred option for the A2B MRT project involves an alignment of the MRT service via SH20B between the Airport and Puhinui, and through the Manukau Metropolitan Centre and the Manukau bus and rail interchange using (west to east) Lambie Drive, Manukau Station Road, Davies Avenue and Ronwood Avenue. This is shown in Figure 3.

The preferred option for the A2B MRT project is the same regardless of the preferred option for the 20Connect project. More detail on the preferred option for 20Connect is available in a separate technical note.

Approved by:

Title	Name	Position	Signature	Date
Author	[REDACTED]	Transport Planner	[REDACTED]	10/04/2019
Reviewer	[REDACTED]	Associate		10/04/2019