

## GLEN INNES TO TAMAKI DRIVE SHARED PATH PROJECT

### Summary of the process to assess the route options for Section 4 to establish a short list for investigation

May 2017

*This document is subject to review as at 17 May 2017*

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## **Summary of the process to assess the route options for Section 4 to establish a short list for investigation**

### **1. Purpose and Background**

This report focuses on Section 4 of the Glen Innes to Tamaki Drive Shared Path between Orakei Point and Tamaki Drive; it summarises a process to determine a short list of route options for this Section.

Previous work during the Investigation phase of the project identified a route north of the railway line across Hobson bay from Orakei Point over land owned by the Outboard Boating Club (OBC) and joining Tamaki Drive through the reserve or the mini golf site east of the OBC site.

In late 2016 it became apparent, due to a range of factors, including representations to find an alternative route, an appreciation of increased costs and planning factors relating to working in a marine environment, that it would be necessary to reconsider the option selection for Section 4.

The options selected for assessment are shown in the map in Appendix 3; they include the original four options considered as part of the Scheme Assessment, and three new options:

- Option B: south of the railway line through to Gladstone Road;
- Option E: north of the railway line but turning northwards to Tamaki Drive at the south eastern corner of the OBC site; and
- Option F: an eastern coast boardwalk option that would return to Ngapipi Road south of the boatsheds.

The full range of options are described in the table below, and detailed in Appendices 4 and 5:

<b>Option</b>	<b>Previous Reference</b>	<b>Option Description</b>
A	1	South of rail line skirting the private development at Orakei Peninsula and a new structure on the southern side of the rail line requires a rail over bridge to cross over the rail line to the Council reserve on Tamaki Drive
B		South of rail line skirting the private development at Orakei Peninsula and a new structure on the southern side of the rail line through to Gladstone Road via Judges Bay
C1	2aa	North of rail line at ground level through the Outdoor Boating Club and the Council reserve on Tamaki Drive.
C2	2ab	North of rail line at ground level through the Outdoor Boating Club joining Tamaki Dr via the mini golf / car park
D1	2ba	North of rail line and on an elevated structure through the Outdoor Boating Club and the Council reserve on Tamaki Drive
D2	2bb	North of rail line on an elevated structure through the Outdoor Boating Club and joining Tamaki Dr via the mini golf / car park
E		North of the rail line going around the OBC connecting to the Ngapipi Rd Bridge abutment
F		From the park and ride car park cutting across Hobson Bay joining Ngapipi Road before the boat sheds or at the Council reserve.
G	3	Ngapipi coastline bordering the outside edge of Hobson Bay requires a clip on structure on the Orakei Road Bridge and a boardwalk constructed around the bay.
H	4	Ngapipi Road option is a separated facility along Ngapipi Road

## **2. Process followed**

This section outlines the process followed to assess the route options.

MWH/Stantec is the design consultancy for the project; they were briefed to prepare an assessment of options B, E and F at a concept level, as these options had not been considered previously. The findings are contained in Appendix 4, Glen Innes to Tamaki Drive Shared Path: Additional Options Assessment for Section 4 (17/03/2017); this showed that each of the three options is feasible. The Project Control Group (PCG) for the project decided that no option should be rejected at this stage.

MWH/Stantec was instructed to prepare a summary evaluation of all the route options, an assessment of costs and a ranking of the routes in accordance with a multi-criteria analysis (MCA). The MCA was to use the same criteria as for the assessment of the routes assessed previously (i.e. A, C, G and H) for the purposes of consistency. The D options (C options but elevated over the OBC land) were added for assessment at this stage. MWH/Stantec produced:

- Appendix 5: Gi2td Section 4 Shared Path Summary of All Options (26/04/2017)
- Appendix 6: Criteria Description and Agreed Weighting
- Appendix 7: Scoring Definition of Criteria
- Appendix 8: Criteria comments and scores for Options A-H (02/05/2017)
- Appendix 9: Multi Criteria Analysis Preliminary (01/05/2017) (MWH)

This documentation was all assessed by the PCG; the MCA (Appendix 10) was reviewed by members of the AT project team and some scores were amended as shown in Appendix 9 and a revised MCA was produced (Appendix 10).

Appendices 5 to 10 were considered at a PCG meeting on 3 May 2017; the PCG meeting was arranged with the purpose of selecting a short list of options for consideration by the Project Control Board (PCB). The short list of options would be taken forward for further investigation. The meeting minute is at Appendix 1 where the discussion at the meeting is recorded. The outcome of this meeting was to agree the following options should be included on a shortlist to be decided by the PCB:

- Options C1, C2, D1 and D2 (C1 and D1 subject to no tree removal);
- Option E; and
- Options G & H to be considered as a hybrid.

The MCA at Appendix 11 was produced to reflect the decisions made by the PCG.

On 4 May 2017, the PCB met to consider the proposals of the PCG. The following documents were tabled at this meeting:

- Appendix 5: Gi2td Section 4 Shared Path Summary of All Options (26/04/2017)
- Appendix 8: Criteria comments and scores for Options A-H (02/05/2017)
- Appendix 12: MCA reflecting the PCG decision and including criteria descriptions

The PCB meeting minute is at Appendix 2. The outcome of this meeting was that the following options should be included on a shortlist for further investigation:

- Options D2;
- Option E; and
- Options G.

The MCA at Appendix 13 was produced to reflect the decisions made by the PCB.

The PCB specifically noted the following, as recorded in the minutes (item 5.7):

"The PCB records specifically that none of the options that are considered to be able to provide a suitable cycleway, and have been transferred to the short list, are affordable or within the budget available.

"However, we agree to continue to evaluate the three options selected for the short-list to see if these can be engineered to achieve a cost effective solution.

"We need to be clear that there is major budget issue with all three options as they stand and this needs to be communicated to the stakeholders."

### **3. Next steps**

- a. The following is to be added to this report:
  - AT Planning commentary about the process to identify gaps that may still need to be addressed;
  - Arborist report to comment on the trees that would have been impacted by options C1 and D1.
- b. Brief the key stakeholders
- c. Obtain feedback from the key stakeholders
- d. Publish the report on the project internet site
- e. Obtain public feedback about the options selected
- f. Progress work to assess the shortlisted options, or any revision thereof as a result of stakeholder and public consultation, to be able to identify a preferred option for approval
- g. Define a timeline for the work set out above
- h. Complete a review of the cost estimates and decide on whether the new information would require a review of the shortlisting process
- i. Complete an economic analysis of the short listed options

# APPENDIX 1

## Minutes



### Glen Innes to Tamaki Drive Shared Path

#### Project Control Group Special Meeting (Section 4 Options Assessment)

Date: 3 May 2017

Time: 10:00 am

Venue: Newmarket Room; Level 10; HSBC House

Attendees: Andrew Scoggins (AT)  
Mieszko Iwaskow (NZTA)  
Chris Jones (AT)  
Cameron Law (NZTA)  
Dean Ingoe (AT)  
Tarun Ahuja (AT)  
Richard Black (AT)  
Scott Winton (AT)  
Karen Bell (MWH)  
Matthew Turner (MWH)

Apologies: Kathryn King (AT)  
Matthew Ah Mu (AT)  
John Robson (NZTA)  
Rachel Turner (NZTA)  
Andrew McDonald (MWH)

Item	Topic	Update / Actions	Responsible
1	<b>Purpose of this special meeting of the PCG</b>		
1.1	This meeting was arranged specifically to deal with the assessment of the proposed options for Section 4 of the GI/Tamaki Shared Path.  The outcome of this meeting is to agree a short list of options for consideration and decision of the meeting of the Project Control Board on 04 May 2017.		
2	<b>Documents informing the assessment of options</b>		
2.1	Glen Innes to Tamaki Drive Shared Path: Additional Options Assessment for Section 4 (17/03/2017)  Appendix 4 to the report to which this minute is attached.		
2.2	Gi2td Section 4 Shared Path Summary of All Options (26/04/2017)  Appendix 5 to the report to which this minute is attached.		
2.3	Criteria Description and Agreed Weighting  Appendix 6 to the report to which this minute is attached.		

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2.4	Scoring Definition of Criteria Appendix 7 to the report to which this minute is attached.	
2.5	Criteria comments and scores for Options A-H (02/05/2017) Appendix 8 to the report to which this minute is attached.	
2.6	Multi Criteria Analysis Preliminary (01/05/2017) (MWH) Appendix 9 to the report to which this minute is attached.	
2.7	Multi Criteria Analysis Preliminary (02/05/2017) (AT amended) Appendix 10 to the report to which this minute is attached.	
<b>3</b>	<b>Assessment Process</b>	
3.1	Each route was assessed by the attendees to consider whether the route should be omitted from the long list of options to create a short list for further consideration and decision by the Project Control Board.	
3.2	Before the assessment commenced, Cameron Law, Senior Legal Counsel from NZTA, confirmed the process. At this stage, as for all projects at a concept level, it is sufficient that a high level assessment is carried out that looks for significant flaws in proposals that mean the option is no longer viable (and would therefore not be transferred to the short list for further consideration). However, in some cases, it may be necessary to carry out additional work to confirm assumptions.	
3.3	It was considered that the work (see 2.1 to 2.7) carried out by MWH in preparing the initial Multi Criteria Analysis spreadsheet, as reviewed by AT prior to this meeting, and the comments justifying each score were a sound start-point for the assessment.	
<b>4</b>	<b>Assessment Outcomes</b>	
4.1	Options A & B should be omitted because they are high cost and score poorly leading to a low ranking of 7 & 8 out of 10. There are CPTED issues due to the long length and inability to exit the path. Significant bridge structures are required for both options to cross the rail line or to make connections at the end-points. There is an effective “doubling of facilities” along part of Tamaki Drive in the case of option B because it runs in parallel for some length.	
4.2	The C1, C2, D1 and D2 options were retained because they were ranked high despite a relatively high cost. However, it was noted that the C options were less favoured than the D options because there was a greater impact on OBC facilities where the route was at grade (C) as opposed to elevated (D). As a consequence, the scores for Criterion 14 for Options C1 and C2 were changed to -2 from -1 because the impact on private	

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	<p>land is greater than for options D1 and D2 that are rated at -1. This provides a differential for these options for this criterion. Further, it was noted that the C1 and D1 options joined Tamaki Drive through the adjacent Council reserve and were likely to require the removal of some mature Pohutukawa; it was recognised tree removal would not be supported and that this impact should be quickly assessed with a view to remove these options from the short list if it was necessary to remove trees.</p>	
4.3	<p>Option E was retained for the short list because it retained the benefits of the C &amp; D options, reduced the impact on OBC land, made a connection that would facilitate east and west movement from the shared path onto Tamaki Drive and is of similar cost. It was seen to have a reduced visual impact as the raised section east of the OBC marina was in the vicinity of existing infrastructure.</p>	
4.4	<p>Option F gave rise to planning advice that all of the options would have to mitigate various impacts on the natural environment in this area. It was recommended that this option should not be taken forward as the planning challenges are seen as significant: there are considerable visual impacts, this is an ecologically sensitive area, we would be working in the Marine Coastal Environment; we would be obstructing the views of local residents; there could be impacts on view-shafts to volcanic cones. It would be difficult to defend the planning impacts given that alternative and viable options exist.</p> <p>The following scoring amendments were agreed:</p> <ul style="list-style-type: none"> <li>• Cr-3 reduced from -1 to -2 because there is seen to be significant impact on a public space through visual impact (structure in a place "it does not belong")</li> <li>• Cr-4 reduced from -1 to -2 because it is now understood that there are concerns about impacts on the marine reserve as part of the CMA</li> <li>• Cr-6 and Cr-7 reduced from -1 to -2 because of the impacts recorded for Cr-3 and Cr-4 and additionally feedback from iwi about the importance of this environment.</li> </ul>	
4.5	<p>Options G and H were assessed together.</p> <p>On its own, option H (Ngapipi Road), although the least expensive option and the only option that could be delivered within the current budget, gives rise to significant safety concerns, has impacts on private property and separation of cyclists from traffic cannot be adequately provided. It is the lowest ranked option of the ten options. Option G, ranked 9/10, it was felt, could be delivered at a lower cost and had recently received support from iwi.</p> <p>It was agreed to retain Option H on the short list as the do-minimum option, and that Option G should also be taken forward to consider whether a hybrid of these two options could be developed.</p> <p>Cr-14 for Option G changed from -1 to 0 because there are minimal impacts on private land (no land take required).</p>	

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4.6	<p>It was noted that the cost criterion contained errors, and the following corrections were made:</p> <ul style="list-style-type: none"> <li>• Option E: \$56m corrected from 0 to -1</li> <li>• Option F: \$43m corrected from -1 to 0</li> </ul>	
4.7	<p>As a result of the above, the following options were agreed for inclusion on a shortlist to be decided by the PCB:</p> <ul style="list-style-type: none"> <li>• Options C1, C2, D1 and D2 (C1 and D1 subject to no tree removal)</li> <li>• Option E</li> <li>• Options G &amp; H to be considered as a hybrid</li> </ul>	
<b>5</b>	<b>Actions</b>	
5.1	MCA: the MCA to be amended to reflect the decisions of the meeting and to be attached to these minutes. (Appendix 12 to the report to which this minute is attached.)	
5.2	The revised MCA, the map of the route options and the comments to justify the scoring would be the documents for presentation to the PCB.	
5.3	Arborist: obtain an arborist report on the impact on the reserve trees (affected by options C1 and D1).	
5.4	Cost estimates: some concerns were raised about the accuracy of the cost estimates, particularly as it appeared that some assumptions had been made around including elements that may not be necessary. The estimates are to be reviewed.	

## APPENDIX 2

# Minutes

## Glen Innes to Tamaki Drive Shared Path

### Project Control Board Meeting (Section 4 Options Assessment for Short List)

Date: 4 May 2017

Time: 08:00 am

Venue: Newmarket Room; Level 10; HSBC House

Attendees: Greg Edmonds (AT)(Chair)  
Andrew Scoggins (AT)  
Paul Glucina (NZTA)  
Andrew Allen (AT)  
Andrew Spittal (NZTA)  
Chris Jones (AT)  
Kathryn King (AT)  
Randhir Karma (AT)  
Tarun Ahuja (AT)  
Richard Black (AT)

Apologies: Brett Gliddon (NZTA)  
Mieszko Iwaskow (NZTA)  
Cameron Law (NZTA)  
Matthew Ah Mu (AT)  
Dean Ingoe (AT)

Item	Topic	Update / Actions	Responsible
1	Purpose of this meeting of the PCB		
1.1	The outcome of this meeting is an agreed short list of options for Section 4 of the Glen Innes to Tamaki Drive Shared Path.		
2	Documents informing the assessment of options		
2.1	Gi2td Section 4 Shared Path Summary of All Options (26/04/2017) Appendix 5 to the report to which this minute is attached.		
2.2	Criteria comments and scores for Options A-H (02/05/2017) Appendix 8 to the report to which this minute is attached.		
2.3	Multi Criteria Analysis PCG Recommendation (03/05/2017) Appendix 12 to the report to which this minute is attached.		
3	Points of clarification		
3.1	It was clarified that, while this project will deliver part of the Auckland Cycle Network to become an AT asset, and that each of NZTA and AT have specific payment and delivery functions in		

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Item	Topic	Update / Actions	Responsible
		terms of, for example design, construction and planning (and as further set out in the Heads of Agreement), this is a project where AT and NZTA are working as partners and all delivery decisions are made jointly.	
3.2		The total current projected project cost is \$45m with \$20m allocated to Section 4.	
3.3		It was clarified that a Metro standard route could be provided for all options except H (Ngapipi Road).	
3.4		It was explained that the current option for Tamaki Drive between Solent Street and the Tamaki/Ngapipi intersection is on the south side of Tamaki Drive; to the west and east of these points the cycling facilities would be on the north side of Tamaki Drive. Crossing points would be provided at the intersections.	
3.5		The demand to travel east on Tamaki Drive from the GI/Tamaki Shared Path comprises around 10% of the use.	
3.6		In due course, depending on the option selected, a decision will need to be taken about which project (Tamaki Drive Cycle Route, The Tamaki/Ngapipi Intersection Upgrade, or the GI/Tamaki Shared Path) would deliver the Ngapipi Bridge widening. It is currently part of the Tamaki/Ngapipi Intersection Upgrade project.	
<b>4</b>	<b>Assessment Process</b>		
4.1		For consistency of assessment, the criteria being used are the same as those used to assess the original options as part of the previous scheme assessment process that resulted in the selection of the option that ran north of the rail-line and over OBC land, reflected as options C1, C2, D1 and D2.	
4.2		The routes were presented in ranked order from best to worst based on the MCA recommended by the PCG.	
<b>5</b>	<b>Assessment Outcomes</b>		
5.1		<p>The top-ranked options C1, C2, D1 and D2 options were discussed.</p> <p>Noting that the C options were less favoured than the D options because there was a greater impact on OBC facilities where the route was at grade (C), the PCB decided that the C options would not be taken onto the short list.</p> <p>Further, it was noted the D1 option joined Tamaki Drive through the adjacent Council reserve and would require the removal of some mature Pohutukawa; tree removal would not be supported. The PCB decided that option D1 would not be taken to the short list.</p> <p>It was requested that clarification of the height of the proposed elevated section of path should be provided given that it is intended that the elevation should provide headroom for the storage of boats below.</p>	

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Item	Topic	Update / Actions	Responsible
		<p>A breakdown of the assumptions around land purchase and costs should be obtained.</p> <p>It was further noted that besides the need to conclude negotiations with OBC, there are likely to be additional planning matters to be clarified, such as the visual impact of the elevated path structure and the matter of volcanic view shafts, amongst others. This is not the preferred option of some iwi.</p> <p>Of the options C1, C2, D1 and D2 only Option D2 is to be taken forward to the short list.</p>	
5.2		<p>Option E was retained for the short list because it retained the benefits of the C &amp; D options, reduced the impact on OBC land, made a connection that would facilitate east and west movement from the shared path onto Tamaki Drive and is of similar cost.</p> <p>It was seen to have a reduced visual impact as the raised section east of the OBC marina would be in the vicinity of existing infrastructure.</p>	
5.3		<p>Options A &amp; B were considered together, having a long common length and both being south of the line.</p> <p>Because of the low scores and high costs, the PCG recommendation was agreed; therefore neither will be taken to the short list.</p>	
5.4		<p>Options G and H were assessed together.</p> <p>Option G (ranked 9/10), it was felt, could be delivered at a lower cost and had recently received support from iwi. Alternative connection locations to Ngapipi Road could be considered.</p> <p>Given the safety issues, compromise of standards, steep gradients and poor score, alongside the view that Option G could address the issues of an eastern coastal and road route, it was decided that Option H should not be taken to the short list.</p> <p>On this basis, it was decided that Option G should be taken to the short list.</p>	
5.5		The PCB considered the recommendation for Option F, and agreed that the planning issues would be significant. Therefore, the PCB decided that Option F would not be transferred to the short list.	
5.6		<p>As a result of the above, the PCB decided that the following options would make up the short list of options for further assessment:</p> <ul style="list-style-type: none"> <li>• Option D2</li> <li>• Option E</li> <li>• Option G</li> </ul>	
5.7		<p>It should be noted that the only affordable option (Option H – Ngapipi Road) has not been shortlisted. There will be challenges to value engineer the short listed options and there will be a need to consider how any budget shortfall will be covered.</p>	

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Item	Topic	Update / Actions	Responsible
		<p>The PCB records specifically that none of the options that are considered to be able to provide a suitable cycleway, and have been transferred to the short list, are affordable or within the budget available.</p> <p>However, we agree to continue to evaluate the three options selected for the short-list to see if these can be engineered to achieve a cost effective solution.</p> <p>We need to be clear that there is major budget issue with all three options as they stand and this needs to be communicated to the stakeholders (reference item 6.2).</p>	
<b>6</b>	<b>Actions</b>		
6.1		MCA: the MCA to be amended to reflect the decisions of the meeting and to be attached to these minutes.	
6.2		<p>A joint meeting of representatives from the Outboard Boating Club, Bike Auckland and Orakei Local Board is to be arranged within 10 days so that the decision of this PCB to shortlist options D2, E and G only can be conveyed at the same time. The information will also be provided to Cllr Simpson and Mr Simon O'Conner MP.</p> <p>A key message to the stakeholders noted above (5.7) and the public will be that none of the options are affordable or within the budget available.</p> <p>After this meeting, the information will be published on the project website.</p> <p>Following this, a public information engagement process will be initiated to invite feedback on the shortlisting decision.</p>	
6.3		<p>The communications team to begin working on preparing engagement materials including key messages.</p> <p>This should include graphics for the information meeting referenced in 6.2.</p>	
6.4		Each option to have a delivery programme developed for it.	
6.5		Early assessment of the geotechnical conditions relating to Option G should be carried out as soon as possible.	
6.6		Arborist: obtain an arborist report on the impact on the reserve trees (affected by options C1 and D1).	
6.7		The Harbour Master is to be requested to provide an opinion from his perspective about each option.	
6.8		An economic analysis to be calculated for each of the shortlisted options with a sensitivity analysis to identify the cost limit.	
6.9		Cost estimates: some concerns were raised about the accuracy of the cost estimates, particularly as it appeared that some assumptions had been made around including elements that may not be necessary. The estimates are to be reviewed.	

# APPENDIX E



## GLEN INNES TO TAMAKI DRIVE SHARED PATH: ADDITIONAL OPTIONS ASSESSMENT FOR SECTION 4

Prepared for Auckland Transport

17/03/2017





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This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval to fulfil a legal requirement.

## QUALITY STATEMENT

### PROJECT MANAGER

Tarhata Lacerna

### PROJECT TECHNICAL LEAD

Andrew McDonald

### PREPARED BY

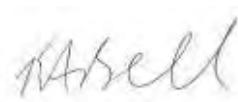
Umesh Easwarapadcham



17/03/2017

### CHECKED BY

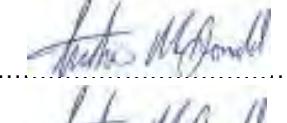
Sagar Kariya, Karen Bell



17/03/2017

### REVIEWED BY

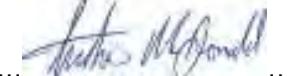
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20/03/2017

### APPROVED FOR ISSUE BY

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20/03/2017

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## REVISION SCHEDULE

Rev No.	Date	Description	Signature or Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
1	20/03/2017	Draft for Comment	UE	SK/KB	AM	AM

## Executive Summary

This report assesses three new options identified for Section Four of the Glen Innes to Tamaki Drive shared path. Once constructed it will be an important eastern link in the cycle network. This report investigates the feasibility of the options and identifies options for further investigation.

The proposed options are to be designed for a 100 year design life and all commence from the existing Section 3 shared path which ends under Orakei Road Bridge. The proposed route options are as follows;

- Option 1 (■) This crosses Hobson Bay on the southern side of the KiwiRail corridor and follows that alignment then climbs on to the Dove-Myer Robinson Park to connect to the existing cycleway on Gladstone Road
- Option 2 (- ■) This is a modified version of the current preferred option. This runs along the northern end of the rail corridor then turns right and continues along the southern side of Outboard Boating Club (OBC) and crosses the water access to the marina to end on the existing cycleway on Tamaki Drive.
- Option 3 (■, ■) This turns right away from the rail corridor and connects to the southern end of the boat sheds on Ngapipi Road. The path continues along Ngapipi Road and ends at the intersection with Tamaki Drive



**Figure i-1: Indicative Route Options**

The options are to be designed to cycle metro route standards such as an effective width of 4 m and a target gradient of less than 5%. The routes to be clear of the existing KiwiRail corridor to allow for KiwiRail future expansion and other relevant stakeholders such as Auckland Council, Auckland Transport, Iwi, Outboard Boating Club (OBC) and Equinox Group to be involved during the consultation process. The routes have been assessed based on the overall project objectives of the need to construct, operate and maintain an off road shared path. Some of the other key objectives are as follows

- Provides new opportunities for connections with public transport nodes and other destinations
- Provides for a Cycle Metro level of service for commuter cyclists in recognition of its function as part of the Auckland Cycle Network.
- Is cost effective whilst balancing the need to provide for a good standard of facility that is consistent with its function as a strategic component of the Auckland Cycle Network.
- Is safe, convenient and an attractive path for walking and cycling
- Supports a variety of user types and confidence levels
- Promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport.

The route options have been looked at from a usability, comfort, and personal safety point of view and cultural, community and environmental values have also been considered. All three options vary in length and direction and therefore may not be suitable for all commuters to utilise and for all stakeholders to approve.

### **Option 1**

This has some benefits and many key constraints compared to the other options. The benefits being that this will be the only route that takes commuters west and close to the Central Business District (CBD) and the shared path is separated from the road for most of the facility. The route provides new opportunities for connections with public transport nodes such as a connection from Orakei Road to the Britomart Train Station (via Quay Street) and nearby bus stops. The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive.

With a very high construction estimate of \$98 Million, Option 1 would need to be significantly better than other options to justify the additional cost. However this option has significant dis-benefits as outlined below:

- Poor connectivity with the existing cycle network, particularly Tamaki Drive.
- The poor connectivity limits user choice particularly for recreational users that want to travel to the eastern bays.
- The necessary connections at the intersection of Gladstone Road / The Strand and The Strand Bridge over the rail line will adversely impact the efficiency of the road network.
- Personal safety with users effectively trapped on the path for a minimum of approximately 2.2 km.
- Introduces unnecessary gradients.

### **Option 2**

The cost estimate for this route is approximately \$55 Million. The Option 2 benefits are that there is unlikely to be any direct impact to private land ownership and the path is separated from the road for most of the route. The route is not as direct to the CBD for commuters. The route is attractive for recreational users who are more likely to travel east from Tamaki Drive. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive.

The significant concerns for Option 2 are:

- It will likely be challenging to create safe connection with Tamaki Drive. The path structure will need to be high enough to allow boat access but will ramp down quickly to connect to Tamaki Drive. Managing cyclists speeds at this conflict point with a constrained environment will be difficult to achieve, or could add significant cost.
- The visual impact of the elevated structure at the marine entrance to the OBC.
- The route alignment and height could also come into the line of the view shafts from Tamaki Drive which is a significant social consideration.

### Option 3

The cost estimate for this route is approximately \$39 Million which is the lowest estimate of the three options considered in this report. There are many benefits with Option 3 compared to the other two options. Some of the key benefits are there are no direct impact to OBC reclamation and volcanic view shafts. This option is supported by Ngati Whatua and has the shortest extent of works and structures in the area identified in the AUP as being significant ecological area – which is beneficial in terms of the resource consent process / risks. The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive.

The significant concerns for Option 3 are:

- Option 3 is the least direct route to the CBD for commuters.
- The route will have visual impacts on the residents surrounding Hobson Bay as it bisects the bay through a previously unmodified section of the bay.
- There may be impacts on privacy on private property.
- The route could also affect access to the heritage boat sheds.
- The construction risk is high for this option as the bridge structure will cross the wide channel which could have high cost implications and constructability issues which could affect design and construction timelines.

### Options Summary

Option 1 has serious constraints that when combined at looked at in context of the other options does not meet the project objectives or those of the users. Therefore this is not considered to be a feasible option and it is recommended that this option does not proceed any further.

Options 2 and 3 both appear to be feasible, and are recommended for with further investigations with more detailed investigation into design, cost, benefits, dis-benefits and consenting implications.

## Auckland Transport

### Glen Innes to Tamaki Drive Shared Path: Options Assessment for Section 4

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## 1 Introduction

The Glen Innes to Tamaki Drive Share Path is an approximately 7 km route connecting to Merton Road in Glen Innes and connecting to Tamaki Drive near Parnell. For the purposes of stageing design and construction, the route has been split into four sections as shown in Figure 1-1 with the approximate route alignment shown for the first three sections.



Figure 1-1: Existing Section 3 shared path running to the south

MWH now part of Stantec has been commissioned by Auckland Transport (AT) to prepare a route options assessment report for three new additional options identified for Section 4 of the Glen Innes to Tamaki Drive shared path. This section is from Orakei Road to Tamaki Drive. Once constructed it will be an important eastern link in the cycle network. The assessment of these options will form the sections of this report where the route benefits, constraints, social and environmental considerations and cost estimates will be discussed. A site visit to the proposed routes was undertaken on the 10 March 2017. This report investigates the proposed options and identifies a recommended option.

## 2 Background

A Scheme Assessment Report (SAR) was completed in November 2015 for all four sections of the project. Of relevance to this report are the four options that were assessed for Section 4 which are shown in Figure 2-1 and summarised as follows:

- Red Option: A bridge structure / boardwalk across the Hobson Bay on the south side of the rail line. This requires a ramp down from Orakei Road to the structure / boardwalk and a rail over bridge to connect to Tamaki Drive.
- Blue Option: A bridge structure / boardwalk across the Hobson Bay on the north side of the rail line. This requires a ramp from Orakei Road down to the park and ride car park and crosses OBC land to connect to Tamaki Drive. This is likely to require land purchase from OBC. This was identified as the preferred option in the SAR.
- Yellow Option: A bridge structure / boardwalk around the northern edge of Hobson Bay. This requires a clip on bridge adjacent Purewa Bridge and a ramp down from Orakei Road to the

structure / boardwalk, a small ramp up to Ngapipi Road and a realignment of Ngapipi Road at the boat sheds.

- Green Option: A path alongside Ngapipi Road: This requires a clip on bridge adjacent Purewa Bridge, a cantilevered structure up to Ngaiwi Street, a realignment of Ngapipi Road north of Ngaiwi Street and realignment of Ngapipi Road at the boat sheds. This is likely to require land purchase from one private property owner to achieve the realignment at Ngaiwi Street.



Figure 2-1: Section 4 options from the SAR

Section 4 connects to the boardwalk widening under the Orakei Road Bridge. The proposed route options all commence at this point and end either on Tamaki Drive or on Gladstone Road. Figure 2-2 shows the existing start location of Section 4 that is to be upgraded as part of Section 4.



**Figure 2-2: Existing Section 3 shared path running to the south of the rail tracks**

### 3 Project Objectives

The objective of this assessment is to identify a preferred route for a shared path that meets the project objectives that are:

1. To construct, operate and maintain an off road shared path that:
  - Connects to the existing sections of the Auckland Cycle network between Glen Innes and Tamaki Drive
  - Provides new opportunities for connections with public transport nodes and other destinations
  - Provides for a Cycle Metro level of service for commuter cyclists in recognition of its function as part of the Auckland Cycle Network.
  - Is cost effective whilst balancing the need to provide for a good standard of facility that is consistent with its function as a strategic component of the Auckland Cycle Network.
  - Is safe, convenient and an attractive path for walking and cycling
  - Supports a variety of user types and confidence levels
  - Promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport.
2. To improve walking and cycling accessibility and connectivity for the Tamaki, Meadow bank and Orakei communities.

As section 3 has been consented and construction is about to commence an additional objective of this report is to identify a route that connects well to Section 3

## 4 Design Standards

This route is to be designed to cycle metro route standards. The definition adopted for a cycle metro route is as follows:

*"Cycle Metros take the highest priority as they target the highest number of potential users. They are high quality and traffic free segregated routes located within motorway corridors, rail corridors and on arterial or major collector roads. They offer a high level of safety connecting metropolitan/town centres, public transport interchanges and other key destinations. They can be shared off road paths along road corridors, rail corridors, through parks, reserves and esplanades or separated cycle facilities on road. The treatment is generally a 3 m wide shared path or a one/two-way protected cycle lane or a buffer cycle lane."*

Based on the above definition a design philosophy statement has been developed. The key design criteria are:

- Preferred path width of 4 m, with reduced widths to be adopted on a case by case assessment
- Structures to be 4.5 m wide to provide an effective width of 4 m
- Target gradient to be less than 5%, with a maximum of 8.3%. Steeper gradients to be adopted on a case by case basis where constrained by the existing topography
- Path surface to be concrete, with Glass Reinforced Plastic (GRP) surfacing adopted where necessary
- Sections near the KiwiRail corridor will adopt the minimum fence offset of 2.75 m from the centre of the track or outside the high voltage masts whichever is further.
- Lighting to P3 standards

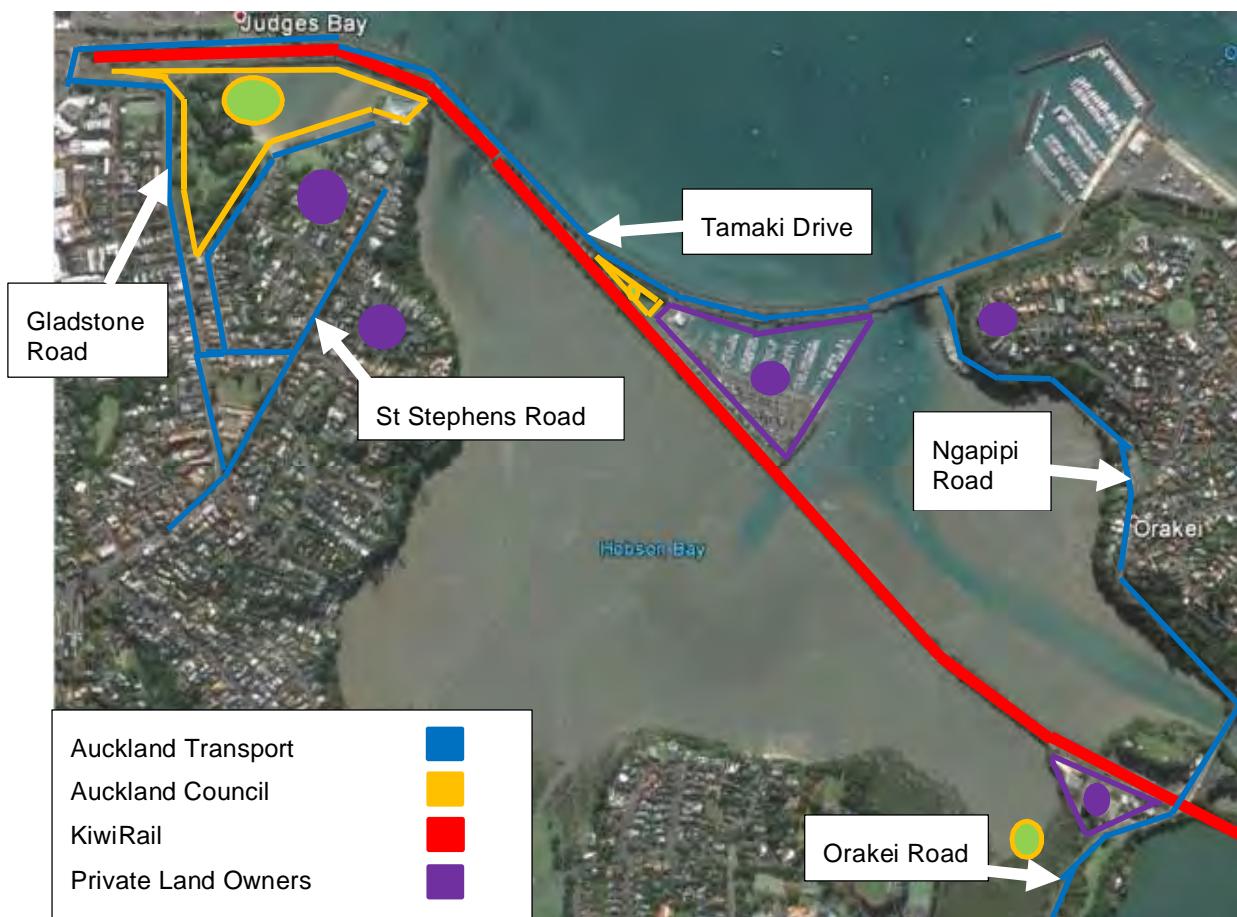
## 5 Land Ownership

A large part of each of the options is located in the coastal marine area as it is below mean high water springs (MHWS). Existing structures in the coastal marine area (bridges, boat sheds) and reclamations (rail corridor) have either an existing resource consent (coastal permit) or may be lawful as it has a title of some kind and/or is an estate in fee simple.

A large proportion of the coastal area is given a special legal status and is called the "common marine and coastal area" (CMCA). Neither the Crown nor any other person owns, or is capable of owning, the CMCA. Specific provisions in the Act protect customary, recreational, commercial, and conservation uses in this area.

A number of titles have been issued in relation to the coastal marine area within Hobson Bay. These are held by KiwiRail and OBC as outlined below.

The indicative land ownerships relevant to consider for the proposed route options is shown below in Figure 5-1. The route options will cross a combination of private land, coastal marine area occupied by KiwiRail and OBC and Auckland Council roads and reserves / property. Auckland Transport manage the roads for Auckland Council. The works within the land owners' areas may include connections to existing cycleways, new structures, ramps, relocation of existing structures and services, earthworks and realignment of roads. All stakeholders will need to be consulted and work collaboratively to achieve the best outcomes for this project.



**Figure 5-1: Indicative Land Ownership**

1. Auckland Transport will need to be consulted for all works that occur within the road corridors. The roads that are of concern are shown on Figure 5-1. The works within the road corridor may include connections to existing cycleways, ramps, relocation of existing structures, relocation of services, earthworks and realignment of roads.
2. Auckland Council will need to be consulted for works that happen within public areas owned by the Council. The public areas of concern are as follows;
  - Hobson Bay
  - Judges Bay
  - Parnell Baths
  - Dove-Myer Robinson Park
  - The Fred Ambler Lookout (owned by the Crown and subject to a treatment settlement redress process).
  - Reserve at 3 Tamaki Drive
  - Paritai South Reserve
  - Orakei Basin West Reserve
  - Boat Sheds along Ngapipi Road
3. A KiwiRail corridor runs through the area that is being assessed. The rail corridor of concern is between Orakei Station and Britomart Station. KiwiRail have a rail embankment of around 20 m and have 'legal title to the area of water and land on both sides (totalling approximately 30m). At Orakei Point, Kiwi Rail's area of legal access 'is considerably wider than the rail corridor as shown by the lines marked on Figure 5-2'



**Figure 5-2: KiwiRail Corridor at Orakei Point (Source Auckland Council Geo Map)**

4. The private land owners that are likely to be affected by the route options will need to be consulted. Some of the private owners that may be affected are listed below;
  - Equinox Group
  - Outboard Boating Club- who has title to the reclamation and the area of water around it as shown on Figure 5-3 and Figure 5-4 below.



**Figure 5-3: OBC reclaimed land (Source Auckland Council Geo Map)**



**Figure 5-4: OBC titled area of water (Source Auckland Council Geo Map)**

In addition it is noted that each of the 17 boat sheds on Ngapipi Road is leased

This is not an exclusive list of private land owners. There may be others such as individual home owners and tenants that express concerns during public consultations.

5. There are at least six Iwi that are actively involved in the consultation with AT & NZTA on the overall Glen Innes to Tamaki Drive project. All six including Ngati Whatua O-Orakei will need to be involved in the consultation process.

## 6 Options Considered

The current preferred option is the route which runs from the existing boardwalk under the Orakei Road Bridge then along the northern side of the KiwiRail corridor and continues through private land and council reserve prior to connecting with Tamaki Drive. Three further options have been looked at and these options need to be assessed together with the current preferred option. The options have been numbered according to the scope of service and shown in Figure 6-1.

- Option 1 (■) This crosses Hobson Bay on the southern side of the KiwiRail corridor and follows the alignment then climbs on to the Dove-Myer Robinson Park before it joins the existing cycleway on Gladstone Road.
- Option 2 (- ■) This is a modified version of the current preferred option as mentioned earlier. This runs along the northern end of the rail corridor then turns right and continues along the southern side of Outboard Boating Club (OBC) and crosses the water access to the marina to end on the existing cycleway on Tamaki Drive.
- Option 3 (■, □) This turns right away from the rail corridor and connects to the southern end of the boat sheds on Ngapipi Road. The path continues along Ngapipi Road and ends at the intersection with Tamaki Drive



**Figure 6-1: Indicative Route Options**

The following sections will undertake a feasibility level analysis of each of the route options with respect to connectivity, constraints, social, environmental and financial considerations.

## 7 Option 1

This option is a route on the southern side of the rail line. An indicative alignment of the route is shown on the image in Appendix A. The design life of the shared path including the bridge structures to be 100 years. A cost estimate of this route option is given in Appendix B.

The route starts from under the Orakei Road Bridge then travels south on Orakei Road before turning right into the Orakei Basin Reserve and heads onto Hobson Bay. There is an existing shared path walkway along Orakei Road which will need to be upgraded to meet design standards as the path is currently not wide enough. The proposed path will connect onto this prior to bridging across Hobson Bay. The path then runs south of the railway corridor passing OBC, Lilliput Mini Golf, Parnell Baths, and Judges Bay. It then ramps up onto Dove- Myer Robinson Park and connects onto the existing cycleway on Gladstone Road.

### 7.1 Site Photos

This route is the longest of the three options at approximately 3.4 km. A site visit of this proposed route was carried out and the following photos were taken from accessible points along the network.



**Figure 7-1: The proposed shared path will need to cross the access road to the garden centre**



**Figure 7-2: Existing shared path on Orakei Road**



**Figure 7-3: Entranceway to shops on Orakei Road**



**Figure 7-4: Existing on road opposing cycleway and guardrail on Orakei Road**



**Figure 7-5: Existing shared pathway bridge**



**Figure 7-6: The indicative launch point of proposed shared path bridge**



**Figure 7-7: The existing rail corridor**



**Figure 7-8: Existing Point Resolution pedestrian bridge near Parnell Baths**



**Figure 7-9: The existing rail corridor past Parnell Baths**



**Figure 7-10: The indicative landing point of proposed path on Dove -Myer Robinson Park**

## 7.2 Route Benefits

The proposed route connects well to the end of Section 3 and provides an option for commuters into the city from east Auckland. It provides a direct link from the shared path on Orakei Road to Gladstone Road. This connects well with the Gladstone Road route currently being investigated.

The route is expected to cater for commuter cyclists and pedestrians travelling into the CBD.

The route consists of a separated off-road facility for pedestrians and cyclists which provides continuity of existing Cycle Metro connections, eliminates conflict points between the users and vehicles. The route supports a variety of user types and confidence levels and promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport.

This route may encourage cyclists currently using Tamaki Drive for part of their route to change and use this shared pathway. The route is also likely to attract less confident cyclists to ride to the city.

Part of the route near the Orakei Train Station runs through a section that is under KiwiRail's legal control. KiwiRail have a rail embankment of around 20 m and have 'legal title to the area of water and land on both sides (totalling approximately 30m). At Orakei Point, Kiwi Rail's area of legal access 'is considerably wider than the rail corridor. This may mean the consenting process may be easier along this section as other stakeholders do not need to be consulted.

## 7.3 Route Constraints. – Design & Construction

As highlighted above this route provides a direct option for users into the CBD, however this would require improvements to the intersection of Gladstone Road / The Strand, and to The Strand Bridge over the rail line to create a continuous route to Quay Street that is safe. These improvements would have significant impacts to the efficiency of the road network at that location resulting in increased vehicle delays.

Connectivity is poor for users that want to travel east toward the eastern beaches. This will primarily affect recreational and tourist users particularly at the weekend when demand is high. The lack of connectivity to one of Auckland's busiest walking and cycling routes is a significant concern and fails to meet the project objectives 1 and 4 of connecting to Tamaki Drive and the cycle network. Options to address the lack of connectivity are to provide a rail over bridge to Tamaki Drive, although this is already considered as part of the red route from the SAR. The other option would be to connect to the Point Resolution Bridge. But even if it connected to the Point Resolution Bridge, there are three significant concerns:

1. It provides a connection, but it does not achieve the cycle metro standard or meet disability standards. Cyclists would have to dismount and walk their bikes down the stairs.
2. Users would be confined on the route for approximately 2.2 km. This presents a personal safety risk as there are no escape routes and users may be reluctant to turn back over 2 km if they feel uneasy approaching a potential threat, thus placing themselves in potential danger.
3. East bound users would need to travel an additional 1.5 km to head towards the bays. While directness is less important to recreational users than for commuters, an additional 1.5 km would be viewed as a low level of service.

The route connects onto the existing shared path that comes from under Orakei Bridge. As shown on Figure 7-1 the proposed route will need to cross the private access road off Orakei Road which goes to the garden centre. AT / the NZ Transport Agency will need to ensure access over this road and there needs to be a crossing installed on this road to allow for the continuation of the path. During the site visit a medium amount of vehicle traffic was observed to be using this road so a signalised intersection 'toucan' may need to be installed for pedestrians and cyclists. A 'toucan' crossing is recommended as the path has been almost fully separated from traffic and the only other road crossing was signalised, so this is consistent with the level of service and separation from traffic provided throughout the rest of the route.

The route then connects to an existing shared path on the western side of Orakei Road as shown on Figure 7-2. The users of the proposed shared path will come into conflict with users that currently use the Orakei Road shared path. This will be more prominent in the mornings when work commuter cyclists travelling to the city could be heading in the opposite direction to commuters using the existing path to

travel towards the Orakei Train Station. This will need to be upgraded to match the widths achieved elsewhere on the path.

There is a vehicle entrance to shops as shown on Figure 7-3. The guardrail on Orakei Road as shown on Figure 7-4 is limiting the allowable space for the shared path. Consideration should be given to deviate the shared path away from the guardrail and widen for safety. There may need to be land acquisition from the private land owner Equinox Group.

An existing shared path bridge commences past the shops on Orakei Road as shown on Figure 7-5 and Figure 7-6. This existing structure needs to be widened to meet the design standard. The launching of the bridge for the proposed route will need to be connected to this existing structure. The proposed shared path bridge will then run along the south of the rail corridor (to the left of the rail corridor as seen on Figure 7-7). The founding conditions on the bed level across Hobson Bay may be unstable for a bridge structure and needs to be investigated further. Obtaining geotechnical information may be difficult at some locations. There are already short rail bridges across Hobson Bay which means constructing a bridge is not impossible. The loads allowed for pedestrian bridge structures is much lower than the loads that road and rail structures are designed for according to the New Zealand Transport Agency (NZTA) Bridge Manual V3.2.

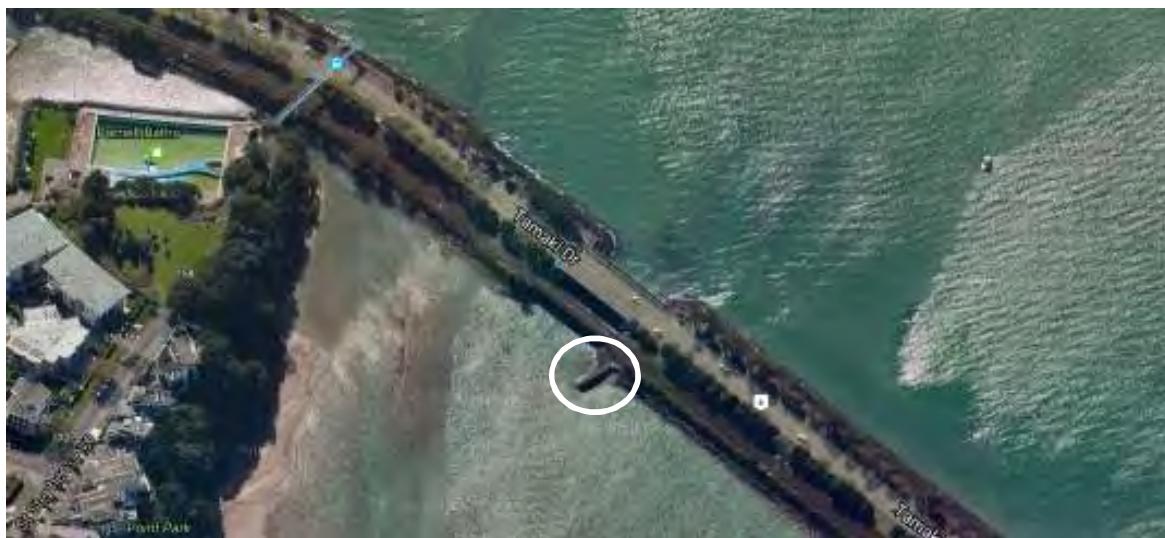
There may be some tree removal required if the path aligns close to the KiwiRail corridor. Consultation with KiwiRail will need to be carried if this is required.

The ‘continuous’ bridge will likely need breaks for the two channel openings to allow for three separate bridges with longer spans to be constructed. These three bridges will be connected with the ‘continuous’ bridge via joints. The reason for having to separate the bridge structures is to ensure that these bridges have long spans to minimise the number of piers that are required to be constructed and therefore reduce the number of barriers for the existing channels. The bridges have been identified on the drawing in Appendix A.

The bridge structures will be exposed to saltwater so the durability of the structure and its foundations will need to meet the design codes relevant for the respective elements used. The durability of the elements need to be considered for the saltwater environment that the structure will cross. To meet the 100 year design life, it’s likely that a concrete structure will be required. The concrete deck units can be made of T-sections to increase spans or hollow core units. The benefit of concrete is that it requires minimal maintenance and likely to meet the design life if detailed and constructed well. The difficulty with concrete is associated with construction and how concrete pouring will be managed across Hobson Bay and Judges Bay. Other elements such as the use of steel beams and/or timber decking is not beneficial from a maintenance point of view although the construction costs will be less than a full concrete structure. The handrails can be made of either timber, steel or other type of element determined in the design process.

A floating pontoon option will be considered for the shared path. This is likely to take the form of a series of floating concrete pontoons held in place by vertical guide piles provided along the length of the structure. The pontoons are formed as concrete structures with an extruded polystyrene core. The units are typically transported from the precast concrete fabrication yard to an appropriate launching ramp and then floated to the site and connected together via structural walers and through bolts. The guide piles could be either screw piles or driven piles. A guide collar provides connection between the floating pontoon and the guide piles and allows the pontoon to move up and down with the tide. At low tide some sections of Hobson Bay have exposed mud flats. To avoid the pontoon structure coming to rest on the mud flats, structural support collars would be provided at set levels on the guide piles to support the pontoon in a safe and level position and allow the shared path to remain fully operational. Moveable gangways hinged at one end onto a fixed landing structure and able to slide along guides provided on the floating concrete pontoons will be required in the areas where a waterway needs to remain clear to allow access for recreational users and also waterway discharge. It is noted that there are challenges to implementing this option, particularly the fact that the tide fully goes out leaving exposed mud flats.

There is a short protruding structure from the southern embankment of the rail corridor which may need to be avoided by the proposed route. The protruding structure has been circled in white on Figure 7-11 below. Consultation with the relevant stakeholder will be required if this option proceeds further.



**Figure 7-11: Protruding structure circled in white near Parnell Baths south of rail corridor**

There is an existing pedestrian bridge over the rail tracks at the Parnell Baths connecting Point Resolution and the Parnell Baths to Tamaki Drive as shown on Figure 7-8. The shared path bridge design needs to meet the following requirements;

- Have adequate clearance from the soffit of this pedestrian bridge.
- Meet estimated sea levels rise requirements (discussed in more detail in the environmental considerations section)
- Be clear of the Parnell Baths public swimming pool
- Continue to be clear of the rail corridor.

Alternative options will need to be looked at if these requirements are not able to be met. These options may be one of the following;

- Crossing over the railway tracks just after OBC and ramping down onto the existing cycleway on Tamaki Drive.
- Ramping over the existing pedestrian bridge
- Ramping up prior to Parnell Baths and connecting St Stephens Avenue.

The ramp from the existing shared path on Orakei Road and the ramp to Gladstone Road Cycle lanes shown on Figure 7-10 will need to be graded so that people using wheelchairs are able to use them without difficulty. The grade will need to comply with maximum grades stated in the design standards.

- The ramp down from the existing shared path bridge down to the required levels across Hobson Bay will need to meet the maximum grade requirements.
- The ramp up to Gladstone Road will likely need to start at the east end of Judges Bay just past the Parnell Baths. A desktop study of the contours of the area to land down found that there is a 14 m difference between an assumed structure height of 3.5 m and the level of Gladstone Road at 17.5 m. This will result in approximately a 200 m ramp length.

There will need to be consideration made on the location of existing services and street lights within close proximity to the proposed route. These may need to be relocated after consultation with the relevant service providers.

There is a Watercare wastewater tunnel as shown on Figure 7-12 that crosses under Hobson Bay. This tunnel is about 15 m to 20 m below bed level. The depth of piles for the new structure is unlikely to be in conflict with this tunnel but it is something that will need to be considered with Watercare.

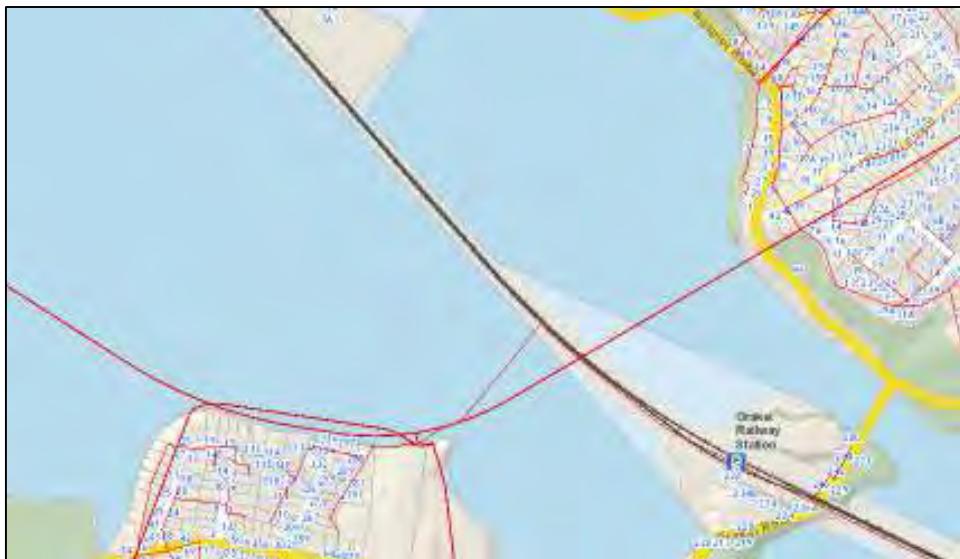


Figure 7-12: Watercare Wastewater Tunnel (Source Auckland Council Geo Map)

## 8 Option 2

The proposed shared path runs along the northern side of the rail corridor. An indicative alignment of the route is shown on the image in Appendix A. The design life of the shared path including the bridge structure is to be 100 years. A cost estimate of this route option is given in Appendix B

The path starts from under the Orakei Road Bridge then travels north on Orakei Road before turning left into the Orakei Train Station car park. The shared path will be ramped up onto a bridge structure at the western end of the car park and this continues parallel to railway corridor across Hobson Bay before turning right to run south along OBC. The bridge will connect to the eastern end of the Tamaki Drive Bridge with a ramp down to the existing cycleway on Tamaki Drive.

### 8.1 Site Photos

A site visit of the proposed route was carried out and the following photos were taken from accessible points along the network.



**Figure 8-1: Existing car parking on the left of the access road to the garden centre**



**Figure 8-2: Existing guardrail and shared path on Orakei Road Bridge**



**Figure 8-3: Intersection of Orakei Road and Orakei Train Station car park access**



**Figure 8-4: Orakei Train Station car park accessway**



**Figure 8-5: Existing footpath and car park adjacent at Orakei Train Station**



**Figure 8-6: Indicative launch point of proposed shared path bridge for Option 2 and Option 3**



**Figure 8-7: Shared path bridge to run along rail corridor and along OBC boundary**



**Figure 8-8: The indicative landing point of proposed shared path bridge**

## 8.2 Route Benefits

The proposed route connects well to end of Section 3 and provides an option for commuters into the city from east Auckland. It provides a link from the shared path on Orakei Road to Tamaki Drive. The route is expected to cater for commuter and recreational cyclists and pedestrians as well as for recreation purposes such as walking and jogging. Tourists are also likely to use this route for good viewing points to look towards the city and to cross a scenic waterfront location.

The route consists of a separated off-road facility for pedestrians and cyclists which provides continuity of existing Cycle Metro connections, eliminates conflict points between the users and vehicles. The route supports a variety of user types and confidence levels and promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport.

Part of the route near the Orakei Train Station runs through a section that is under KiwiRail's legal control. KiwiRail have a rail embankment of around 20 m and have 'legal title to the area of water and land on both sides (totalling approximately 30m). At Orakei Point, Kiwi Rails' area of legal access 'is considerably wider than the rail corridor. This may mean the consenting process may be easier along this section as other stakeholders do not need to be consulted.'

## 8.3 Route Constraints – Design & Construction

The proposed shared path will go along the private access road shown on Figure 8-1 and connect onto the existing shared path on Orakei Road. There is an existing guardrail on Orakei Road Bridge as shown on Figure 8-2. The design should consider the existing guardrail on this bridge which protrudes into the likely route of the new shared path.

The existing shared path on Orakei Road Bridge narrows at the intersection with the accessway into Orakei Station car park as shown on Figure 8-3 and continues through this accessway Figure 8-4 and across the car park Figure 8-5. There are several considerations that are needed to be made in this part of the design to ensure that the minimum design standards are met as stated in Section 4. These considerations are as follows;

- The route will need to ramp down from Orakei Road to the existing car park to be the same as the park ‘n’ ride level. The ramp to be meet grade requirements according to the design standards.
- Conflict with pedestrians moving from car park to Orakei Train Station
- The bus stop in the car park
- New bridge structure ramping down from Orakei Road to park ‘n’ ride level
- Removal of car parks to achieve 4.0m wide path width
- Tree removal just after the car park
- Security of parked cars

The proposed shared path bridge will run to the north of the rail corridor (to the right of the rail corridor as seen on Figure 8-6). The founding conditions on the bed level across Hobson Bay may be unstable for a bridge structure and needs to be investigated further. Obtaining geotechnical information may be difficult at some locations. There are already two short rail bridges across Hobson Bay which means constructing a bridge is not impossible. The loads allowed for pedestrian bridge structures is much lower than the loads that road and rail structures are designed for according to the New Zealand Transport Agency (NZTA) Bridge Manual V3.2.

The route will need to have sufficient offset from the rail corridor to allow for a future third rail track to be installed by KiwiRail north of the existing two tracks. Therefore the design route will require the minimum fence offset of 2.75 m from the centre of the proposed third track or outside the high voltage masts whichever is further.

The design of the bridge structure at the entrance to the OBC marina will need to allow for their boats to travel underneath at high tide. At a minimum this is required at the entry and exit points and should at least match the height of the Ngapipi Estuary Bridge. Consultation with OBC and coordination with the potential upgrade of the Ngapipi Estuary Bridge will be important to future proof the design. An arch structure can be looked at for this short section to allow for boats to go underneath. The challenge is to ensure that this section matches with existing Ngapipi Estuary Bridge levels. Immediately after this the structure will need to ramp down and connect onto the existing cycleway on Tamaki Drive as shown on Figure 8-8. The ramp down to Tamaki Drive will need to be graded so that people using wheelchairs are able to gown down without difficulty. The grade will need to comply with maximum grades stated in the design standards. The length of the ramp connecting to Tamaki Drive is likely to be about 40 m. The arch bridge and ramp may need to be reconstructed if the Ngapipi Estuary Bridge is upgraded.

The design of the connection of the proposed shared path to the existing cycle path on Tamaki Drive will need to be looked at carefully as there may be width constraints along Tamaki Drive. There will need to be a safe junction designed for the users.

The full length of the bridge structure will need to meet estimated sea level rises over its design life (discussed in more detail in the environmental considerations section) or be the same height as the existing Tamaki Drive Bridge, whichever is higher.

The bridge structures will be exposed to saltwater so the durability of the structure and its foundations will need to meet the design codes relevant for the respective elements used. The durability of the elements need to be considered for the saltwater environment that the structure will cross. To meet the 100 year design life, it's likely that a concrete structure will be required. The concrete deck units can be

made of T-sections to increase spans or hollow core units. The benefit of concrete is that it requires minimal maintenance and likely to meet the design life if detailed and constructed well. The difficulty with concrete is associated with construction and how concrete pouring will be managed across Hobson Bay. Other elements such as the use of steel beams and/or timber decking is not beneficial from a maintenance point of view although the construction costs will be less than a full concrete structure. The handrails can be made of either timber, steel or other type of element determined in the design process.

A floating pontoon option can be looked at for the shared path. This is likely to take the form of a series of floating concrete pontoons held in place by vertical guide piles provided along the length of the structure. The pontoons are formed as concrete structures with an extruded polystyrene core. The units are typically transported from the precast concrete fabrication yard to an appropriate launching ramp and then floated to the site and connected together via structural walers and through bolts. The guide piles could be either screw piles or driven piles. A guide collar provides connection between the floating pontoon and the guide piles and allows the pontoon to move up and down with the tide. At low tide some sections of Hobson Bay have exposed mud flats. To avoid the pontoon structure coming to rest on the mud flats, structural support collars would be provided at set levels on the guide piles to support the pontoon in a safe and level position and allow the shared path to remain fully operational. Moveable gangways hinged at one end onto a fixed landing structure and able to slide along guides provided on the floating concrete pontoons will be required in the areas where a waterway needs to remain clear to allow access for recreational users and also waterway discharge.

There will need to be consideration made on the location of existing services and street lights in the way of or within close proximity to the proposed route. These may need to be relocated after consultations with the relevant service providers.

There is a Watercare wastewater tunnel as shown on Figure 8-9 that crosses under Hobson Bay. This tunnel is about 15 m to 20 m below bed level. The depth of piles for the new structure is unlikely to be in conflict with this tunnel but it is something that will need to be considered with Watercare.

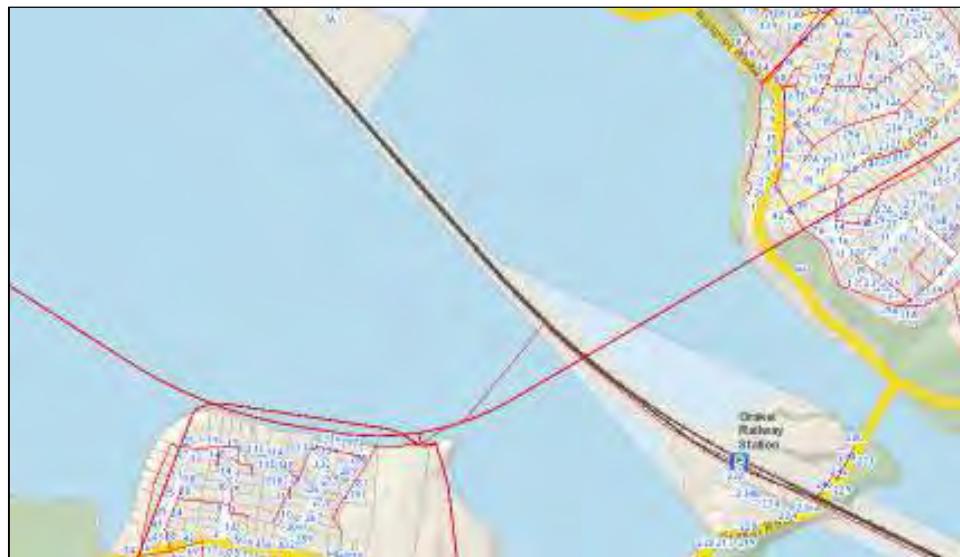


Figure 8-9: Watercare Wastewater Tunnel (Source Auckland Council Geo Map)

## 9 Option 3

This option is a route on the northern side of the rail line. An indicative alignment of the route is shown on the image in Appendix A. The design life of the shared path including the bridge structures to be 100 years. A cost estimate of this route option is given in Appendix B.

The path starts from under the Orakei Road Bridge then travels north on Orakei Road before turning left into the Orakei Train Station car park. A bridge structure commences at the western end of the car park well clear of the rail corridor and continues across Hobson Bay towards the boat sheds on Ngapipi Road. The bridge structure ends just to the east of the boat sheds by ramping down onto Ngapipi Road. It connects onto a shared path on the seaward side of this road. This existing shared path will need to be upgraded to meet the design standards stated in this report. This path continues along this road and then connects up with the existing cycleway on Tamaki Drive.

### 9.1 Site Photos

A site visit of the proposed route was carried out and the following photos were taken from accessible points along the network.



**Figure 9-1:** Existing car parking on the left of the side access road to the garden centre



**Figure 9-2:** Existing guardrail and shared path on Orakei Road Bridge



**Figure 9-3:** Intersection of Orakei Road and Orakei Train Station car park access



**Figure 9-4:** Orakei Train Station car park access



**Figure 9-5: Existing footpath and car park adjacent at Orakei Train Station**



**Figure 9-6: Indicative launch point of proposed shared path bridge for Option 2 and Option 3**



**Figure 9-7: Indicative landing point on Ngapipi Road of proposed shared path bridge**



**Figure 9-8: Existing shared path and parking along Ngapipi Road**



**Figure 9-9: Existing bus stop and shared path on Ngapipi Road**



**Figure 9-10: T-intersection of Ngapipi Road and Tamaki Drive (to be upgraded to a signalised intersection)**

## 9.2 Route Benefits

The proposed route connects well to end of Section 3 and is expected to cater for recreation purposes such as walking and jogging. This is ideal for recreational users who will more likely want to head east towards Mission Bay and beyond. Tourists are also likely to use this route for good viewing points looking towards the city. The route will improve the continuity of existing Cycle Metro connections, and reduces conflict points between cyclists, pedestrians, and vehicles. The separation from vehicles and trains will reduce noise and make a more pleasant journey for users.

The route may be used by commuters into the city from Glen Innes as the only other option is the road network or to catch a train. Commuters from the east such as Mission Bay can use this route to access Orakei Station to catch the trains going south

The route consists of a partial separated off-road facility between Orakei Road and Ngapipi Road for pedestrians and cyclists which provides continuity of existing Cycle Metro connections, eliminates conflict points between the users and vehicles in this section of the route. It supports a variety of user types and confidence levels and promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport.

- This option is closest to the option preferred by Ngati Whatua
- No view shafts affect this option
- There is no additional private land affected
- This option avoids potential impacts on shell fish beds
- This is the option with least direct contact with the coastal floor
- This option has the shortest extent of works and structures in the area identified in the AUP as being significant ecological area – which is beneficial in terms of the resource consent process/risks

## 9.3 Route Constraints – Design & Construction

There is a guardrail on Orakei Road Bridge as shown on Figure 9-2. The proposed shared path will go along the private access road shown on Figure 9-1 and connect onto the existing shared path on Orakei Road. The design should consider the existing guardrail on this bridge which protrudes into the likely route of the new shared path.

The existing shared path on Orakei Road Bridge narrows at the intersection with the accessway into Orakei Station car park as shown on Figure 9-3 and continues through this accessway Figure 9-4 and across the car park Figure 9-5. There are several considerations that are needed to be made in this section of the route design to ensure that the minimum design standards are met. These considerations are as follows;

- The route will need to ramp down from Orakei Road to the existing car park to be the same as the park 'n' ride level. The ramp to meet grade requirements according to the design standards.
- Conflict with pedestrians moving from car park to Orakei Train Station
- The bus stop in the car park
- New bridge structure ramping down from Orakei Road to park 'n' ride level
- Removal of car parks to achieve 4.0 m wide path width
- Tree removal just after the car park
- Security of parked cars

The proposed shared path bridge will run to the north of the rail corridor as seen on Figure 9-6. The founding conditions on the bed level across Hobson Bay may be unstable for a bridge structure and needs to be investigated further. Obtaining geotechnical information may be difficult at some locations. There are already short rail bridges across Hobson Bay which means constructing a bridge is not impossible. The loads allowed for pedestrian bridge structures is much lower than the loads that road and rail structures are designed for according to the New Zealand Transport Agency (NZTA) Bridge Manual V3.2.

The shared path structure will end to the south of the existing boat sheds on Ngapipi Road shown on Figure 9-8. The ramp down for this structure should not be an issue as there is sufficient length to meet the grade requirements stated in the design standards. The boat sheds are a heritage site so the ramp will need to be clear of this. There is an existing guardrail along Ngapipi Road as shown on Figure 9-7. The design of the ramp will also need to consider this guardrail and how the alignment of Ngapipi Road will connect with the ramp.

The bridge structures will be exposed to saltwater so the durability of the structure and its foundations will need to meet the design codes relevant for the respective elements used. The durability of the elements need to be considered for the saltwater environment that the structure will cross. To meet the 100 year design life, it's likely that a concrete structure will be required. The concrete deck units can be made of T-sections to increase spans or hollow core units. The benefit of concrete is that it requires minimal maintenance and likely to meet the design life if detailed and constructed well. The difficulty with concrete is associated with construction and how concrete pouring will be managed across Hobson Bay. Other elements such as the use of steel beams and/or timber decking is not beneficial from a maintenance point of view although the construction costs will be less than a full concrete structure. The handrails can be made of either timber, steel or other type of element determined in the design process.

A floating pontoon option can be looked at for the shared path. This is likely to take the form of a series of floating concrete pontoons held in place by vertical guide piles provided along the length of the structure. The pontoons are formed as concrete structures with an extruded polystyrene core. The units are typically transported from the precast concrete fabrication yard to an appropriate launching ramp and then floated to the site and connected together via structural walers and through bolts. The guide piles could be either screw piles or driven piles. A guide collar provides connection between the floating pontoon and the guide piles and allows the pontoon to move up and down with the tide. At low tide some sections of Hobson Bay have exposed mud flats. To avoid the pontoon structure coming to rest on the mud flats, structural support collars would be provided at set levels on the guide piles to support the pontoon in a safe and level position and allow the shared path to remain fully operational. Moveable gangways hinged at one end onto a fixed landing structure and able to slide along guides provided on the floating concrete pontoons will be required in the areas where a waterway needs to remain clear to allow access for recreational users and also waterway discharge.

The full length of the bridge structure will need to meet estimated sea level rises over its design life (discussed in more detail in the environmental considerations section) or be the same height as the existing Tamaki Drive Bridge, whichever is higher.

Subject to the final design, additional land and tree removal may need to be required along Ngapipi Road to meet the design requirements. The existing shared path will need to be upgraded to meet the width requirements which could mean the existing car parking as shown on Figure 9-8 and the existing bus stop shown on Figure 9-9 may need to be removed or relocated. Another option will be to change the road alignment to allow additional space for the shared path and to meet the design standards. As the coast line is adjacent to the road and the boat sheds are a heritage site this might mean acquiring land from Paritai South Reserve and result in effects on the cliff and vegetation located on the reserve.

There will need to be consideration made on the location of existing services and street lights in the way of or within close proximity to the proposed route. These may need to be relocated after consultations with the relevant service providers.

There is a Watercare wastewater tunnel as shown on Figure 9-11 that crosses under Hobson Bay. This tunnel is about 15 m to 20 m below bed level. The depth of piles for the new structure is unlikely to be in conflict with this tunnel but it is something that will need to be considered with Watercare.



Figure 9-11: Watercare Wastewater Tunnel (Source Auckland Council Geo Map)

## 10 Social Considerations

The route options will need to be looked at from a usability, comfort, and personal safety point of view and consider cultural and community values. All three options vary in length and direction and therefore may not be suitable for all commuters to utilise. This section will assess all three options from this point of view.

### Option 1

This route is approximately 3 km long and is the longest of the three options. Therefore once the users get onto this section from Orakei Road there is no exit point until they arrive onto Gladstone Road. This could create a risk for commuters and other users as they may encounter situations where they require an emergency exit from the shared path due to a health concern or a personal safety concern. As the proposed route has no intermediate exits this is not very ideal from this point of view and would rank the lowest of the three options. If this is the chosen route then exit options should be looked at being provided along the path. Possible exit locations could be at OBC / 3 Tamaki Drive and at Parnell Baths.

The route is not ideal for recreational users who will more likely want to head east towards Mission Bay and beyond from the south. The users will have to exit at the proposed location on Gladstone Road and head back west along Tamaki Drive. It could be an attractive route for recreational users from the north who want a long safe scenic route. If additional exit points are provided along the route then this option will be more viable and attractive for recreational users.

The height of the bridge structure across Hobson Bay may affect protected view lines from Tamaki Drive looking towards the volcanic forms of Mt Eden and Mt Hobson. This could be a significant constraint for the design of the handrails as a continuous timber rail could block these view lines. The proposed height of the bridge and the design of the handrails should give consideration to the view lines.

Parnell Baths has been refurbished a number of times, most recently in 2010. In 2011, Auckland Council redeveloped Judges Bay to become a public recreational park, creating a bayside plaza and providing seating for events. As a result and in conjunction with the Parnell Baths, Judges Bay is a popular recreational area but has limited access (from Tamaki Drive and from local roads). People travel for great distances to use the salt water baths and the Judges Bay beach in the summer with local roads heavily congested and a connection both from Gladstone Road and from the south via Orakei Train Station may also assist in reducing reliance on cars. Further investigation of an early connection at Judges Bay for the Option 1 shared path would appear to be justified given the level of recent public investment. Not connecting to Judges Bay is potentially going to be perceived as a missed opportunity by stakeholders.

The structure could also impact on cliff Pohutukawa trees located around Point Resolution. It is noted that the area of Point Resolution is identified as a heritage place protected under both the Auckland Unitary Plan (RMA) and Heritage New Zealand Pouhere Taonga Act 2014 as it is the site of Fort Resolution, built in 1885. Any works would need to take the heritage feature into consideration.

The ramp up to the Dove-Myer Robinson Park could impact on privacy of residents living near the structure as well as impact on the privacy of the users of Parnell Baths. Consultations should be undertaken with local residents and Parnell Bath operator (as it is Council owned) with regards to the impacts it could have on the privacy of residents and bath users. Given concerns of residents at Northcote Point with Skypath this could be an issue in terms of obtaining resource consent.

Iwi have not identified any specific cultural values in relation to Hobson Bay but have identified that there is the potential that the seabed in Hobson Bay could be subject to pending Treaty Settlement claims, however any part of this option inside the legal title that rail have across the seabed is not likely to be affected.

### Option 2

This route is approximately 1.2 km long and is the second longest of the three options. Once the users get onto this section from Orakei Road there are no exit points until they arrive onto Tamaki Drive and

vice versa. This could create a risk for users as they may encounter situations where they require an emergency exit from the shared path due to a health concern or a personal safety concern. As the proposed route has no intermediate exits it is not ideal from this point of view and would rank second of the three options. If this is the chosen route then an exit option should be looked at being provided along the path. One exit option could be at the turn off at OBC.

The height of the bridge structure across Hobson Bay may affect protected view lines from Tamaki Drive looking towards the volcanoes and Pohutukawa trees located on Tamaki Drive. This could be significant constraint for the design of the handrails as a continuous timber rail could block these view lines. The proposed height of the bridge and the design of the handrails should give consideration to the view lines. Any pending Treaty Settlement claims would impact on the part of this option that is outside the rail legal corridor.

### Option 3

The route is approximately 0.8 km long and is the shortest of the three options. Once the users get onto this section from Orakei Road there are no exit points until they arrive onto Ngapipi Road and vice versa. Similar to other routes there are personal health and safety risks associated with this route. However, the risk of being alone is lower than other routes as the off road bridge structure is shorter. The overall distance into the city is longer than the other routes and therefore not as desirable as the city is the main commuter destination.

This option utilises the on road shared path on Ngapipi Road to get to Tamaki Drive and to go through that intersection. The intersection currently has one of the highest collision rates for cyclists in Auckland. An upgrade of the priority T-intersection to a signalised intersection is proposed as part of another project. The proposed upgrades indicate an on road cycle lanes and cycle boxes at the intersection and the provision of pedestrian crossings. The safety and comfort of the users is something to consider as this option proposes the use of the on road cycleway and the T-intersection. The safety of the users may be compromised in this short on road section.

The boat sheds along Ngapipi Road are a heritage site. Initial measurements have indicated that the path would narrow to approximately 2.5m at this pinch point and doesn't meet the preferred path width of 4m as stated in the design standards. This may create a safety risk for users through this section. If a road realignment is done to meet the preferred requirements then this may mean taking out part of Paritai South Reserve which could create risks of its own such as landslides and could impact on Pohutukawa trees located on the cliff. Considerations needs to be made on how the risks will be managed during the design/construction process and trees protected.

Despite the presence of a council reserve along the coast, the structure across Hobson Bay and the ramp down could potentially impact on the privacy of residents living along the coastal section of Ngapipi Road (7-31 Ngapipi Road). Consultations should be made with the local residents with regards to the impacts it could have on their privacy. The height of the structure in Hobson Bay would still potentially need to enable the movement of small boats.

Ngati Whatua indicated a preference for the Ngapipi Coastline option (of the four initial options assessed) and this option is the closest to that option. This option is likely to be affected by pending Treaty Settlement claims in relation to the seabed.

## 11 Environmental Considerations

The effects of the design and construction of the proposed route on the Coastal Marine Area (CMA) need to be considered. Hobson Bay is a shallow water body with sand and mud flats exposed at low water levels. This and Judges Bay are identified as significant ecological areas.

In terms of coastal processes there is substantial exchange of waters with the sea on each tide. The considerations to make during the design process is to ensure the soffit of the shared path structure is above the 100 year estimated sea level rise. The consideration to make during the construction process is the effect of the generated turbidity and the effects on the ecology.

The design needs to consider sea level rises over the design life of the structures. Sea levels in Auckland have been rising at 30mm to 40mm per decade as indicated in a memo by Hume Consulting Ltd. Sea level rises may increase to 50mm to 60mm by 2050. This is expected to rise further if important actions are not taken to reduce future greenhouse gas emissions. The design needs to allow for at least 0.5m to 1.0m higher deck levels than what is required now in order to meet the higher sea levels and storm swell events.

The construction activities that are undertaken in Hobson Bay will generate water turbidity and reduce water quality. However, this is only during the construction process and these effects will be minor with ways available to reduce or mitigate the effects. There will be no permanent effects on water turbidity and quality post construction. The effects will occur when the piles are being inserted into the bed of Hobson Bay. The soft sediments will be disturbed and result in turbid plumes. The turbidity will likely be localised in the construction area and level of turbidity will depend on the construction method.

During outgoing tides the turbid plumes will exit Hobson bay at the Tamaki Drive Bridge tidal outlet. Some turbid water is likely to enter the OBC and marina basin. This may cause discolouration of the boat hulls for short periods of time. Although this impact needs to be considered for all three options, it is more of an issue for Option 1 and Option 2 as the routes are closer to OBC. For Option 3 this is less likely to be an issue for OBC but the plume generated might be visible from the houses on high ground along Ngapipi Road and properties with views over Hobson Bay at Remuera and Parnell, and so public expectations may need to be managed with regards to this.

During the incoming tide the turbid plumes generated with either Option 1 or Option 2 will likely travel towards the Point Resolution tidal outlet and might impact on the water intake for the Parnell Baths. The effect of Option 3 will be similar to the effects created by the outgoing tide.

The affected parties during the construction and especially during outgoing and incoming tides will need to be consulted. The effects of turbidity and water quality during construction process can be mitigated by the following options;

- Silt curtains could be used to contain sediment
- During high wave events the waves that disturb the seabed could be reduced
- No construction undertaken near tidal culverts in the embankment during high tides
- Option 1, construction work near Parnell Baths to not coincide with water intake for Parnell Baths if there is confirmation that turbid plumes will go near the water intake

According to the memo produced by Coast & Catchment Ltd, the alignments for Option 1 and Option 2 both cut through shell banks, shellfish beds and estuarine channels. The area has high ecological values and contains a variety of Kaimoana species such as oyster beds, crab burrows, marine snails, cockle beds and mangroves. There is potential for these ecological values to be affected during construction and once the pathway is complete. The potential mitigation measures can be the following;

- Routing the path around high value habitats;
- Using the pathway as a construction platform
- Minimising the number and size of piles
- Avoiding designs that have large footings
- Screening options could be considered to reduce the noise and visibility to the birds.

All options potentially involve works affecting trees. There are mature Pohutukawa on the cliffs at Point Resolution and above Ngapipi Road and planted Pohutukawa along the coastal side of Ngapipi Road and Tamaki Drive and the OBC land. The cliff areas at Point Resolution and Ngapipi Road are also identified as significant ecological areas- terrestrial. All options potentially require removal and or substantial works in close proximity to Pohutukawa either due to the route of the path or the need to provide access to construct the path.

Stormwater effects have not been considered in this feasibility assessment.

## 12 Cost Estimates

The cost of the route options have been worked out from estimated costs for the at-grade pathways, bridge structures, and traffic management and temporary works. They have been determined based on past projects of similar nature with allowances in there for the assessed section's uncertainties such as ground conditions and extent of environmental mitigation. The cost estimates prepared for each of the options are shown in Appendix B.

**Table 12-1: Summary of Cost Estimates**

	Option 1	Option 2	Option 3
<b>Base Estimate</b>	\$70 Million	\$39 Million	\$25 Million
<b>Contingency</b>	40%	40%	40% (50% for bridges due to increased uncertainty over wide channel)
<b>Expected Estimate</b>	\$98 Million	\$55 Million	\$39 Million

## 13 Summary of Options

The following table gives a summary of the three options by listing the benefits and constraints along with an estimated cost.

**Table 13-1: Summary of Options**

	Benefits	Dis-benefits / Risks	Discussion
<b>Option 1 \$98 Million</b>	<ul style="list-style-type: none"> <li>Connects well to end of Section 3.</li> <li>This option takes commuters closer to the CBD on a direct off road path.</li> <li>The route consists of a separated off-road facility for pedestrians and cyclists which provides continuity of the existing Cycle Metro connections and eliminates conflict points between the users and vehicles.</li> <li>Most of the route is Crown owned.</li> </ul>	<ul style="list-style-type: none"> <li>Smaller sections of the route may be subject to existing and or pending treaty settlement claims</li> <li>Height of some structures may be caught between need to address sea level rise and need to avoid obstructing volcanic view shafts originating from Tamaki Drive - both may be consenting risks</li> <li>Upgrades and signalised crossing for existing garden centre accessway and Orakei Road intersection</li> <li>Extensive length of path with no ability for users to exit (personal safety issue).</li> <li>Potential impact on Point Resolution (heritage and vegetation).</li> <li>The option has the longest extent of works and structures in the area identified in the AUP as being significant ecological area.</li> <li>Reduced user comfort along ramp structure to Gladstone Road.</li> <li>Poor connectivity through the route and onto Tamaki Drive.</li> <li>Likely adverse effects (delays to road users) on the road network near the intersection of Gladstone Road / The Strand.</li> <li>The construction duration is likely to be two-three times as long as the other options due to the extent of the route.</li> <li>Visual impact to other commuters, to the residents living around Judges Bay and users of Parnell Baths.</li> <li>Very high construction cost.</li> </ul>	<p>The route provides new opportunities for connections with public transport nodes such as a connection from Orakei Road to the Britomart Train Station and nearby bus stops. The route is a convenient and direct route to the CBD for commuters and promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive.</p> <p>This option however falls through in terms of cost, connectivity, safety of users, and desirable grades. The cost of constructing this route is approximately \$98 Million which is the highest of the three options. This doesn't meet the project objectives of connecting well with the existing cycle network (particularly Tamaki Drive) and providing a cost effective option whilst balancing the need to provide for a good standard of facility. Poor connectivity as there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 2.2 to 3 km.</p> <p>The end section of the route may not meet desirable grade requirements as stated in the design standards. Therefore this route is unlikely to provide for all user types and confidence levels which is one of the objectives of the assessment.</p>
<b>Option 2 \$55 Million</b>	<ul style="list-style-type: none"> <li>Connects well to end of Section 3.</li> <li>No direct impact on OBC.</li> <li>The route consists of a separated off-road facility for pedestrians and cyclists which provides continuity of the existing Cycle Metro connections and eliminates conflict points between the users and vehicles.</li> <li>Most of the route is Crown owned.</li> <li>Connectivity for users travelling west and east.</li> </ul>	<ul style="list-style-type: none"> <li>Sections of the route may be subject to pending treaty settlement claims.</li> <li>Height of some structures may be caught between need to address sea level rise and need to not obstruct view shafts originating from Tamaki Drive - both may be consenting risks.</li> <li>The length of path with no ability for users to exit (personal safety issue).</li> <li>Need to ensure structure is high enough to provide ongoing access to the OBC marina and facilities.</li> <li>Creating a safe connection teeing into Tamaki Drive within a constrained location will be difficult to achieve, particularly with the potential of cyclist speeds as the bridge ramps down to Tamaki Drive. Creating a safe connection may add significant cost.</li> <li>Not as direct a route to the CBD as Option 1.</li> <li>Visual impact to other commuters along Tamaki Drive, OBC and effect on volcanic view shafts from Tamaki Drive.</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive.</p> <p>This is not as direct as other existing options to the CBD and cost of constructing this route is approximately \$55 Million which is in the middle range of the three options. This option introduces gradients which reduces the comfort level of cyclists. At the intersection with Tamaki Drive suitable gradients may not be able to be met due to the short length (approx. 40 m) available to ramp down to road level from the bridge structure that will allow boats to access the marina. The users coming out of this facility may also come in conflict with existing users along the Tamaki Drive cycle path due to constrained widths along Tamaki Drive to provide a safe junction for users to exit / enter. These issues can be resolved through design, but could have cost implications.</p> <p>The route alignment and height could come into the line of the view shafts from Tamaki Drive which is a significant social consideration.</p>

	<ul style="list-style-type: none"><li>• High construction cost.</li></ul>	
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	Benefits	Dis-benefits / Risks	Discussion
<b>Option 3</b> <b>\$39 Million</b>	<ul style="list-style-type: none"> <li>Connects well to end of Section 3.</li> <li>No direct impact to OBC</li> <li>This option is closest to the option preferred by Ngati Whatua which is the Hobson Bay coastline option from original scheme assessment.</li> <li>No view shafts affect this option.</li> <li>This option avoids potential impacts on shell fish beds and with least direct contact with the coastal floor.</li> <li>This option has the shortest extent of works and structures in the area identified in the AUP as being a significant ecological area.</li> <li>Minimises gradients for all user types and confidence levels.</li> <li>Scenic route across Hobson Bay for commuters.</li> </ul>	<ul style="list-style-type: none"> <li>Sections of the route may be subject to pending treaty settlement claims</li> <li>Not a direct route to CBD compared to the other options</li> <li>The length of path with no ability for users to exit (personal safety issue)</li> <li>Access to the heritage boat sheds could be affected with potential user conflict.</li> <li>High risk construction across the wide channel that could have cost implications and constructability issues.</li> <li>Visual impacts on the residents surrounding Hobson Bay.</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. The option does provide an option for recreational users. The cost of constructing this route is the cheapest of the three options at \$39 Million and provides a cost effective solution whilst balancing the need to provide a good facility. This option has the shortest extent of works and structures in the area identified in the AUP as being significant ecological area– which is beneficial in terms of the resource consent process/ risks.</p> <p>Of the three options this is the least direct route to the CBD for commuters. However it provides a good connection for recreational cyclists that are prominent in the weekends travelling to the eastern bays. The route may have visual impacts on the residents surrounding Hobson Bay. This is the most significant visual impact and is a dis-benefit that needs to be looked at further. The route could also affect access to the heritage boat sheds as the connection to Ngapipi Road is adjacent to them.</p> <p>The construction risk is high for this option as the bridge structure will cross the wide channel and be more exposed to variable water flows, storm surges and scouring issues. This could have cost implications and constructability issues. As a result there will be uncertainties with estimated programme timeframes.</p>

## 14 Conclusions

With a very high construction estimate of \$98 Million, Option 1 would need to be significantly better than other options to justify the additional cost. However this option has significant dis-benefits as outlined below:

- Poor connectivity with the existing cycle network, particularly Tamaki Drive.
- The poor connectivity limits user choice particularly for recreational users that want to travel to the eastern bays.
- The necessary connections at the intersection of Gladstone Road / The Strand and The Strand Bridge over the rail line will adversely impact the efficiency of the road network.
- Personal safety with users effectively trapped on the path for a minimum of approximately 2.2 km.
- Introduces unnecessary gradients.

The proposed routes for Option 2 and Option 3 are more aligned with the project objectives. The cost for Option 2 is still high due to the extent of structure required, however Options 2 and 3 are more cost effective at \$55 Million and \$39 Million respectively.

The significant concerns for Option 2 are:

- It will likely be challenging to create safe connection with Tamaki Drive. The path structure will need to be high enough to allow boat access but will ramp down quickly to connect to Tamaki Drive. Managing cyclists speeds at this conflict point with a constrained environment will be difficult to achieve, or could add significant cost.
- The visual impact of the elevated structure at the marine entrance to the OBC.
- The route alignment and height could also come into the line of the view shafts from Tamaki Drive which is a significant social consideration.

The significant concerns for Option 3 are:

- Option 3 is the least direct route to the CBD for commuters.
- The route will have visual impacts on the residents surrounding Hobson Bay as it bisects the bay through a previously unmodified section of the bay.
- There may be impacts on privacy on private property.
- The route could also affect access to the heritage boat sheds.
- The construction risk is high for this option as the bridge structure will cross the wide channel which could have high cost implications and constructability issues which could affect design and construction timelines.

## 15 Recommendation

Option 1 has serious constraints that when combined at looked at in context of the other options does not meet the project objectives or those of the users. Therefore this is not considered to be a feasible option and it is recommended that this option does not proceed any further.

Options 2 and 3 both appear to be feasible, and are recommended for with further investigations with more detailed investigation into design, cost, benefits, dis-benefits and consenting implications.

## Appendices

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## Appendix A Map of Route Options



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## Appendix B    Cost Estimates of Route Options

# Project estimate

## Form A

**FE**

Feasibility Estimate

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option 1

Item	Description	Base estimate	Contingency	Funding risk
A	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
B	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	4561476	1824590	6386067
	- the NZTA-managed costs	Nil	Nil	Nil
C	<b>Total design and project documentation</b>	<b>4561476</b>	<b>1824590</b>	<b>6386067</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	2736886	1094754	3831640
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>2736886</b>	<b>1094754</b>	<b>3831640</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	2000000	800000	2800000
2	Road furniture and at grade concrete path	513000	205200	718200
3	Bridges	49000000	19600000	68600000
4	Traffic management and temporary works 10% of bridges and road furniture	5151300	2060520	7211820
5	Preliminary and general 15%	8499645	3399858	11899503
6	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
D	<b>Total construction</b>	<b>65,163,945</b>	<b>26,065,578</b>	<b>91,229,523</b>
E	<b>Project base estimate</b>	(A+D)	<b>65,163,945</b>	
F	Contingency (Assessed/Analysed)		(A+D)	<b>26,065,578</b>
G	<b>Project expected estimate</b>		(E+F)	<b>91,229,523</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			6,386,067
	Construction expected estimate			97,615,590
H	<b>Funding risk (Assessed/Analyser)</b>		(A+D)	<b>91,229,523</b>
I	<b>95th percentile project estimate</b>		(G+H)	<b>182,459,046</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			10,947,543
	Construction 95th percentile estimate			193,406,589
	<b>Date of estimate 17/03/2017</b>		<b>Cost index (Q1/2017)</b>	
	Estimate prepared by Umesh Easwarapadcham	Signed		
	Estimate internal peer review by Andrew McDonald	Signed		
	Estimate external peer review by	Signed		
	Estimate accepted by the NZTA	Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Feasibility Estimate

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option 2

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	2532264	1012906	3545170
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>2532264</b>	<b>1012906</b>	<b>3545170</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	1519359	607743	2127102
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>1519359</b>	<b>607743</b>	<b>2127102</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	1515000	606000	2121000
2	Road furniture and at grade concrete path	732000	292800	1024800
3	Bridges	26350000	10540000	36890000
4	Traffic management and temporary works 10% of bridges and road furniture	2859700	1143880	4003580
5	Preliminary and general 15%	4718505	1887402	6605907
6	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
<b>D</b>	<b>Total construction</b>	<b>36,175,205</b>	<b>14,470,082</b>	<b>50,645,287</b>
<b>E</b>	<b>Project base estimate</b>	(A+D)	<b>36,175,205</b>	
<b>F</b>	<b>Contingency (Assessed/Analysed)</b>	(A+D)	<b>14,470,082</b>	
<b>G</b>	<b>Project expected estimate</b>	(E+F)	<b>50,645,287</b>	
	Project property cost expected estimate			
	Investigation and reporting expected estimate		Nil	
	Design and project documentation expected estimate		3,545,170	
	Construction expected estimate		54,190,457	
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>	(A+D)	<b>50,645,287</b>	
<b>I</b>	<b>95th percentile project estimate</b>	(G+H)	<b>101,290,574</b>	
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate		Nil	
	Design and project documentation 95th percentile estimate		6,077,434	
	Construction 95th percentile estimate		107,368,008	
	Date of estimate 17/03/2017	Cost index (Q1/2017)		
	Estimate prepared by Umesh Easwarapadcham	Signed		
	Estimate internal peer review by Andrew McDonald	Signed		
	Estimate external peer review by	Signed		
	Estimate accepted by the NZTA	Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option 3

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	1807985	723194	2531179
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>1807985</b>	<b>723194</b>	<b>2531179</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	1084791	433916	1518707
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>1084791</b>	<b>433916</b>	<b>1518707</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	1300000	520000	1820000
2	Road furniture and at grade concrete path	788000	315200	1103200
3	Bridges	17350000	8675000	26025000
4	Traffic management and temporary works 10%	1943800	777520	2721320
5	Preliminary and general 15%	3207270	1282908	4490178
6	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
<b>D</b>	<b>Total construction</b>	<b>24,589,070</b>	<b>11,570,628</b>	<b>36,159,698</b>
<b>E</b>	<b>Project base estimate</b> (A+D)	<b>24,589,070</b>		
<b>F</b>	<b>Contingency</b> (Assessed/Analysed) (A+D)		<b>11,570,628</b>	
<b>G</b>	<b>Project expected estimate</b>		(E+F)	<b>36,159,698</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			2,531,179
	Construction expected estimate			38,690,877
<b>H</b>	<b>Funding risk</b> (Assessed/Analyser) (A+D)			<b>36,159,698</b>
<b>I</b>	<b>95th percentile project estimate</b> (G+H)			<b>72,319,396</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			4,339,164
	Construction 95th percentile estimate			76,658,560
	<b>Date of estimate</b> 17/03/2017		<b>Cost index</b> (Q1/2017)	
	Estimate prepared by Umesh Easwarapadcham	Signed		
	Estimate internal peer review by Andrew McDonald	Signed		
	Estimate external peer review by	Signed		
	Estimate accepted by the NZTA	Signed		

Note: (1) These estimates are exclusive of escalation and GST.

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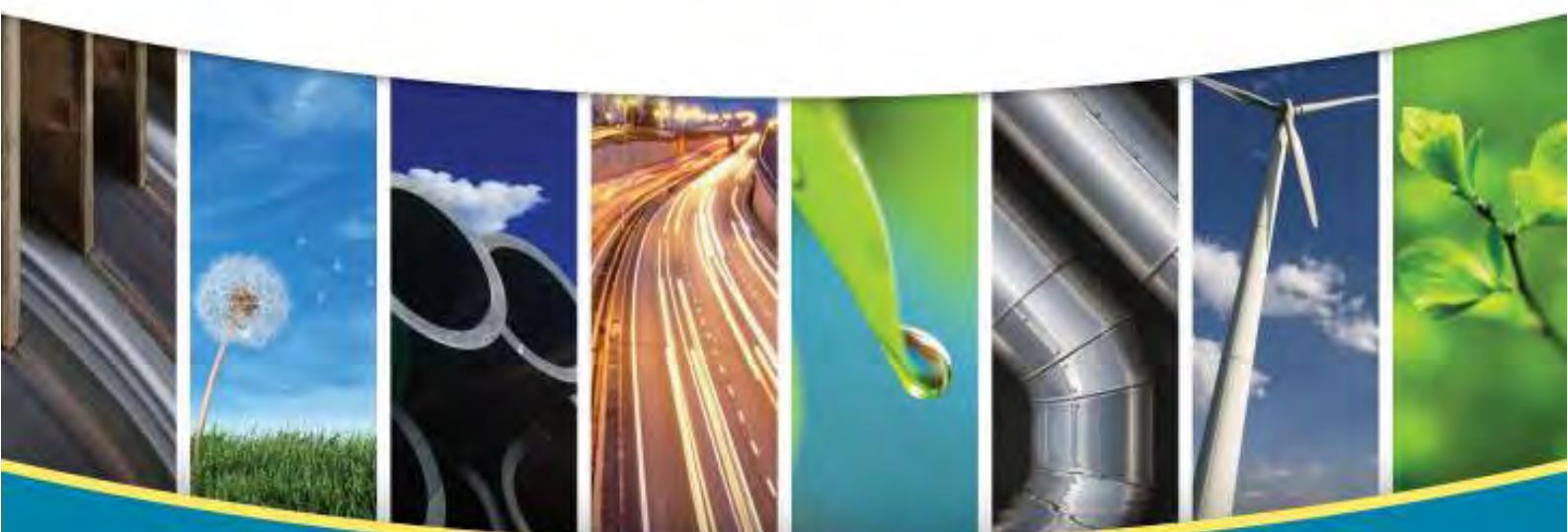




## **GI2TD SECTION 4 SHARED PATH SUMMARY OF ALL OPTIONS**

**Prepared for Auckland Transport**

**26/04/2017**





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26/04/2017

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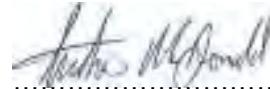
Karen Bell/Sagar Kariya



26/04/2017

### REVIEWED BY

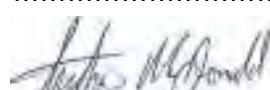
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26/04/2017

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## REVISION SCHEDULE

Rev No.	Date	Description	Signature or Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
1	26/04/2017	Draft for Comment	UE	SK/KB	AM	AM

# Auckland Transport

## GI2TD Shared Path Options Assessment

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## 1 Description of Options

Option A	The route starts from under the Orakei Road Bridge then travels south on Orakei Road before turning right into the Orakei Basin Reserve and heading onto Hobson Bay. The proposed path will connect onto this prior to bridging across Hobson Bay. The bridge will then continue across the Coastal Marine Area (CMA) running south of the railway corridor passing OBC and crossing over the rail tracks before ramping down to connect to Tamaki Drive.
Option B (Formerly Option 1)	The route starts from under the Orakei Road Bridge then travels south on Orakei Road before turning right into the Orakei Basin Reserve and heads onto Hobson Bay. The proposed path will connect onto this prior to bridging across Hobson Bay. The bridge will then continue across the Coastal Marine Area (CMA) running south of the railway corridor passing OBC, Lilliput Mini Golf, Parnell Baths, and Judges Bay. It then ramps up onto Dove- Myer Robinson Park and connects onto Gladstone Road.
Option C	The path starts from under the Orakei Road Bridge then travels north on Orakei Road before turning left into the Orakei Train Station car park. The shared path will be ramped up onto a bridge structure at the western end of the car park and this continues parallel to railway corridor across Hobson Bay (north side of the rail line). The route then crosses OBC land at ground level to connect to Tamaki Drive via the council reserve.
Option D	The path starts from under the Orakei Road Bridge then travels north on Orakei Road before turning left into the Orakei Train Station car park. The shared path will be ramped down via a bridge structure to the western end of the car park and this continues parallel to railway corridor across Hobson Bay, north side of the rail line and continues across OBC land on a 3.5 m high structure before ramping down to connect to Tamaki Drive.
Option E (Formerly Option 2)	The path starts from under the Orakei Road Bridge then travels north on Orakei Road before turning left into the Orakei Train Station car park. The shared path will be ramped up via a bridge structure to the western end of the car park and this continues parallel to railway corridor across Hobson Bay before turning right to run south along the OBC boundary. The bridge will then continue across the CMA before connecting to the western abutment of the Ngapipi Bridge by ramping down onto the existing cycleway on Tamaki Drive.
Option F (Formerly Option 3)	The path starts from under the Orakei Road Bridge then travels north on Orakei Road before turning left into the Orakei Train Station car park. The shared path will be ramped up via a bridge structure to the western end of the car park and continues across Hobson Bay Coastal Marine Area (CMA) towards the boat sheds on Ngapipi Road. The bridge ends to the south of (before) the boat sheds by ramping down onto Ngapipi Road. The route connects onto an existing shared path on the seaward side of this road before ending north of (past) the boat sheds. The second part of the route is a short section across Ngapipi Bridge which will likely be upgraded to have 2.5 m wide clip on structures on both sides. This short section then connects up with the existing cycleway on Tamaki Drive.
Option G	The path starts from under the Orakei Road Bridge then travels north on Orakei Road, along a clip on bridge or adjacent bridge to Purewa Creek Bridge and continues around the boundary of Hobson Bay before ramping down to Ngapipi Road and ending just to the north of the boat sheds. The second part of the route is a short section across Ngapipi Bridge which will likely be upgraded to have 2.5 m wide clip on structures on both sides. This short section then connects up with the existing cycleway on Tamaki Drive.
Option H	The on-road path starts from under the Orakei Road Bridge then travels north along Orakei Road then along a clip on bridge or adjacent bridge to Purewa Creek Bridge. The path then turns right and travels west along Ngapipi Road via a cantilevered structure up to Ngaiwi Road, and ending just to the north of the boat sheds. The second part of the route is a short section across Ngapipi Bridge which will likely be upgraded to have 2.5 m wide clip on structures on both sides. This short section then connects up with the existing cycleway on Tamaki Drive.

## 2 Section 4 – Summary Analysis of Route Options

Table 2-1: Option A - Summary of benefits and dis-benefits

	Benefits	Dis-benefits / Risks	Discussion
<b>Option A</b> <b>\$65 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>Connects well to end of Section 3.</li> <li>Promotes sustainability through the encouragement of walking and cycling</li> <li>The route consists of a mostly separated off-road facility for pedestrians and cyclists.</li> <li>Most of the route is council/ Crown owned/controlled.</li> <li>The first section of route across Hobson Bay will be within the KiwiRail area of legal access but well clear of the rail corridor.</li> <li>No direct impact on OBC</li> <li>Connectivity for users travelling west and east.</li> <li>Provides attractive views of Waitemata Harbour and beyond for users from the elevated structure</li> </ul>	<ul style="list-style-type: none"> <li>Short section of on-road cycleway along Orakei Road heading south prior to commencing off from bridge structure south of the rail corridor.</li> <li>Small sections of the route in the CMA may be subject to existing and or pending treaty settlement claims</li> <li>Height of some structures may be caught between need to address sea level rise and need to avoid obstructing volcanic view shafts originating from Tamaki Drive - both may be consenting risks</li> <li>This option is not as direct as Option B in taking commuters closer to the CBD.</li> <li>Upgrades and signalised crossing required for existing garden centre accessway and Orakei Road intersection that may be complicated by fact that access is private</li> <li>An existing shared path walkway along Orakei Road which will need to be upgraded to meet design standards as the path is currently not wide enough.</li> <li>Length of path with no ability for users to exit (personal safety issue).</li> <li>The option has a long extent of works and structures in the area identified in the AUP as being significant ecological areas.</li> <li>Likely opposition from OBC for the section of route that will be through their land.</li> <li>Need to think about measures to increase security and address privacy issues for the boating club for the short section that will through their land</li> <li>Requirement for a safe connection teeing into Tamaki Drive that may require removal of trees from the reserve and Tamaki Drive.</li> <li>Reduced user comfort along ramp structure that goes over rail tracks and down onto Tamaki Drive.</li> <li>There are significant shellfish beds (cockle beds) close to the rail embankment which will be affected, particularly during construction.</li> <li>High construction cost</li> </ul>	<p>Promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. Allows for users travelling west to the CBD although it is not a direct connection. It provides a good connection for recreational cyclists travelling east that are prominent in the weekends travelling to the eastern bays.</p> <p>Provides continuity of the existing Cycle Metro connections but poor local connectivity and there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 1.7 km between Orakei Road and Tamaki Drive. The cost of constructing this route is high at approximately \$65 Million.</p> <p>The structure through OBC land retains potential income streams from the club related to lease of land for boat / trailer parking and may reduce the need to think about measures to increase security. The loss of any income for OBC is excluded from the cost estimate. The privacy issues for OBC is still a concern that needs to be addressed.</p> <p>The end section of the route which is the ramp over railway tracks and down onto Tamaki Drive is approximately over 50 m which may not be enough to meet desirable grade requirements as stated in the design standards. Therefore this route is unlikely to provide for all user types and confidence levels which is one of the objectives of the assessment. The ramp structure over the rail tracks in a constrained location will be difficult to achieve, particularly with the potential of high cyclist speeds as the bridge ramps down to Tamaki Drive through the Mini Golf Club. Creating a safe connection may add significant cost.</p> <p>Some sections of the route may be at risk with delays / legal issues in relation to consenting relating to potential treaty claims and due to potential effects on shellfish beds and trees and visual effects of the raised structure. There will likely be opposition from residents living in Parnell overlooking the raised structure over the rail line. If this is chosen as the preferred option then this needs to be looked at further.</p> <p>It is recommended that this option is discounted due to its high construction cost and the requirement to cross the rail corridor via an over-bridge. The over-bridge and ramp down from the over-bridge to Tamaki Drive is likely to be difficult to achieve.</p>

**Table 2-2: Option B - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option B</b> <b>\$98 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• Promotes sustainability through the encouragement of walking and cycling</li> <li>• The route consists of a mostly separated off-road facility for pedestrians and cyclists.</li> <li>• This option takes commuters closer to the CBD on a direct off road path.</li> <li>• Most of the route is council/ Crown owned/controlled.</li> <li>• The first section of route across Hobson Bay will be within the KiwiRail area of legal access but well clear of the rail corridor.</li> <li>• No direct impact on OBC</li> </ul>	<ul style="list-style-type: none"> <li>• Short section of on-road cycleway along Orakei Road heading south prior to commencing off from bridge structure south of the rail corridor.</li> <li>• Small sections of the route in the CMA and at Gladstone Road may be subject to existing and or pending treaty settlement claims</li> <li>• Height of some structures may be caught between need to address sea level rise and need to avoid obstructing volcanic view shafts originating from Tamaki Drive - both may be consenting risks</li> <li>• Upgrades and signalised crossing for existing garden centre accessway and Orakei Road intersection that may be complicated by fact that access is private</li> <li>• An existing shared path walkway along Orakei Road which will need to be upgraded to meet design standards as the path is currently not wide enough.</li> <li>• Extensive length of path with no ability for users to exit (personal safety issue).</li> <li>• Potential impact on Point Resolution (heritage and vegetation).</li> <li>• The option has the longest extent of works and structures in the area identified in the AUP as being significant ecological areas.</li> <li>• Reduced user comfort along ramp structure to Gladstone Road.</li> <li>• Poor connectivity through the route and no connectivity onto Tamaki Drive and may be perceived negatively as not connecting to existing bridge over Tamaki Drive from Point Resolution</li> <li>• Likely adverse effects (delays to road users) on the road network near the intersection of Gladstone Road / The Strand.</li> <li>• The construction duration is likely to be two-three times as long as the other options due to the extent of the route.</li> <li>• Visual impact, to the residents living around Judges Bay and users of Parnell Baths may increase consenting risks.</li> <li>• There are significant shellfish beds (cockle beds) close to the rail embankment which will be affected, particularly during construction</li> <li>• Very high construction cost.</li> </ul>	<p>The route provides new opportunities for connections with public transport nodes such as a connection from Orakei Road to the Britomart Train Station and nearby bus stops. The route is a convenient and direct route to the CBD for commuters and promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport. The route meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and CBD but does not connect directly to Tamaki Drive.</p> <p>This option however falls through in terms of cost, connectivity, safety of users, and desirable grades. The cost of constructing this route is very high at approximately \$98 Million. This doesn't meet the project objectives of connecting well with the existing cycle network (particularly Tamaki Drive) and providing a cost effective option whilst balancing the need to provide for a good standard of facility. Poor local connectivity and there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 2.2 to 3.0 km (between Orakei Road and Gladstone Road).</p> <p>The end section of the route may not meet desirable grade requirements as stated in the design standards. Therefore this route is unlikely to provide for all user types and confidence levels which is one of the objectives of the assessment.</p> <p>Some sections of the route may be at risk with delays/ legal issues in consenting relating to potential treaty claims, due to potential effects on shellfish beds and trees and potential visual effects. If this is chosen as the preferred option then this needs to be looked at further.</p> <p>It is recommended that this this option is discounted due to its very high construction cost. No further investigations of the benefits and dis-benefits is required.</p>

**Table 2-3: Option C - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option C</b> <b>\$40 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• Promotes sustainability through the encouragement of walking and cycling.</li> <li>• The route consists of a mostly separated off-road facility for pedestrians and cyclists.</li> <li>• The first section of route across Hobson Bay will be within the KiwiRail area of legal access but well clear of the rail corridor.</li> <li>• Connectivity for users travelling west and east.</li> <li>• Minimises gradients for all user types and confidence levels.</li> <li>• This was identified as the preferred option in the SAR.</li> <li>• Low construction cost</li> </ul>	<ul style="list-style-type: none"> <li>• Short section of on-road cycleway along Orakei Road heading north prior to turning into Orakei Station car park.</li> <li>• Likely clip on structure required along the existing Orakei Road Bridge</li> <li>• Sections of the route in the CMA may be subject to pending treaty settlement claims.</li> <li>• Height of some structures may be caught between need to address sea level rise and need to not obstruct view shafts originating from Tamaki Drive - both may be consenting risks.</li> <li>• This option takes commuters close to the CBD, but this is not as direct as Option B.</li> <li>• The length of path with no ability for users to exit (personal safety issue).</li> <li>• Likely opposition from OBC for the section of route that will be at-ground level through their land.</li> <li>• The section of the route which is at ground will be prone to sea level rise.</li> <li>• Need to think about measures to increase security and address privacy issues for the boating club for the short section that will at-grade,</li> <li>• There may be tree loss within the reserve at Tamaki Drive and Tamaki Drive.</li> <li>• There are significant shellfish beds (cockle beds) close to the rail embankment which will be affected, particularly during construction.</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport and meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. Allows for users travelling west to the CBD and provides a good connection for recreational cyclists travelling east that are prominent in the weekends travelling to the eastern bays.</p> <p>Provides continuity of the existing Cycle Metro connections but poor connectivity as there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 1.0 km between Orakei Station car park and OBC at-grade path. The cost of constructing this route is moderate at approximately \$40 Million. This route mostly eliminates conflict points between cyclists and vehicles. The users coming out of this facility may come in conflict with existing users along the Tamaki Drive cycle path due to constrained widths along Tamaki Drive to provide a safe junction for users to exit / enter.</p> <p>The route alignment and height needs to allow for future sea level rises and consideration should also be made on the effect to the line of the view shafts from Tamaki Drive which is a significant social consideration. If the structures are no higher than the existing rail embankment then the consenting risks are not considered to be increased. Travelling at-grade through OBC land removes potential income streams from the club related to lease of land for boat /trailer parking and requires the need to think about measures to increase security and address privacy issues for the boating club. The loss of income for OBC is excluded from the cost estimate.</p> <p>Some sections of the route may be at risk with consenting (delay / legal challenge) relating to potential treaty claims, due to effects on OBC and due to potential effects on shellfish beds and trees. If this is chosen as the preferred option then this needs to be looked at further.</p> <p>It is proposed that this option is taken to the scheme assessment stage as further investigation is needed on the benefits and dis-benefits and the cost effectiveness of this option.</p>

**Table 2-4: Option D - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option D</b> <b>\$55 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• Promotes sustainability through the encouragement of walking and cycling</li> <li>• The route consists of a mostly separated off-road facility for pedestrians and cyclists</li> <li>• The first section of route across Hobson Bay will be within the KiwiRail area of legal access but well clear of the rail corridor.</li> <li>• Connectivity for users travelling west and east.</li> <li>• This was identified as the preferred option in the SAR.</li> <li>• Views from elevated structure over OBC land may be seen to add to values for users</li> <li>• Elevated structure has opportunity for OBC to retain income and potentially improves security rather than an at-grade option.</li> </ul>	<ul style="list-style-type: none"> <li>• Likely clip on structure required along the existing Orakei Road Bridge</li> <li>• Short section of on-road cycleway along Orakei Road heading north prior to turning into Orakei Station car park.</li> <li>• Sections of the route in the CMA may be subject to pending treaty settlement claims.</li> <li>• Height of some structures may be caught between need to address sea level rise and need to not obstruct view shafts originating from Tamaki Drive -</li> <li>• This option takes commuters close to the CBD, but this is not as direct as Option B.</li> <li>• The length of path with no ability for users to exit (personal safety issue).</li> <li>• Likely opposition from OBC for the section of route that will be through their land.</li> <li>• Need to think about measures to increase security and address privacy issues for the boating club for the short section that will through their land</li> <li>• Requirement for a safe connection teeing into Tamaki Drive within a constrained location will be difficult to achieve, particularly with the potential of cyclist speeds as the bridge ramps down to Tamaki Drive. Creating a safe connection may add significant a cost.</li> <li>• Reduced user comfort along ramp structure over OBC land and down onto Tamaki Drive.</li> <li>• There may be tree loss within the reserve at Tamaki Drive and / or Tamaki Drive.</li> <li>• There are significant shellfish beds (cockle beds) close to the rail embankment which will be affected, particularly during construction.</li> <li>• Moderately high construction cost</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport and meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. Allows for users travelling west to the CBD and provides a good connection for recreational cyclists travelling east that are prominent in the weekends travelling to the eastern bays.</p> <p>Provides continuity of the existing Cycle Metro connections but poor connectivity as there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 1.5 km between Orakei Station car park and Tamaki Drive. The cost of constructing this route is moderately high at approximately \$55 Million.</p> <p>This option introduces gradients which reduces the comfort level of cyclists as compared to Option C. At the intersection with Tamaki Drive suitable gradients may not be able to be met due to the short length (approx. 50 m) available to ramp down to road level from the bridge structure. The users coming out of this facility may come in conflict with existing users along the Tamaki Drive cycle path due to constrained widths along Tamaki Drive to provide a safe junction for users to exit / enter. These issues can be resolved through design, but could have cost implications.</p> <p>The route alignment and height needs to allow for future sea level rises. Consideration should also be made on the effect to the view shafts from Tamaki Drive which is a significant social consideration. Height of structure over OBC land may increase consenting risk due to a possibility that residents from Parnell overlooking the raised structure may be opposed due to visual impact. The structure through OBC land retains potential income streams from the club related to lease of land for boat / trailer parking and may reduce the need to think about measures to increase security. The loss of any income for OBC is excluded from the cost estimate. The privacy issues for OBC is still a concern that needs to be addressed.</p> <p>Some sections of the route may be at risk with consenting (delay / legal challenge) relating to potential treaty claims, ecological effects related to loss of shell fish, visual effects and privacy effects. If this is chosen as the preferred option then this needs to be looked at further.</p> <p>It is proposed that this option is taken to the scheme assessment stage as further investigation is needed on the benefits and dis-benefits and the cost effectiveness of this option.</p>

**Table 2-5: Option E - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option E</b> <b>\$56 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• No direct impact on OBC.</li> <li>• Promotes sustainability through the encouragement of walking and cycling</li> <li>• The route consists of a mostly separated off-road facility for pedestrians and cyclists.</li> <li>• Most of the route is Crown owned / controlled</li> <li>• The first section of route across Hobson Bay will be within the KiwiRail area of legal access but well clear of the rail corridor.</li> <li>• Connectivity for users travelling west and east.</li> </ul>	<ul style="list-style-type: none"> <li>• Likely clip on structure required along the existing Orakei Road Bridge</li> <li>• Short section of on-road cycleway along Orakei Road heading north prior to turning into Orakei Station car park.</li> <li>• Sections of the route in the CMA may be subject to pending treaty settlement claims.</li> <li>• Height of some structures may be caught between need to address sea level rise and need to not obstruct view shafts originating from Tamaki Drive - both may be consenting risks.</li> <li>• The length of path with no ability for users to exit (personal safety issue).</li> <li>• Need to ensure structure is high enough to provide ongoing access to the OBC marina and facilities.</li> <li>• There are significant shellfish beds (cockle beds) close to the rail embankment which will be affected, particularly during construction.</li> <li>• Creating a safe connection teeing into Tamaki Drive within a constrained location will be difficult to achieve, particularly with the potential of cyclist speeds as the bridge ramps down to Tamaki Drive. Creating a safe connection may add significant cost.</li> <li>• Not as direct a route to the CBD as Option B</li> <li>• Visual impact to other commuters along Tamaki Drive, OBC.</li> <li>• Moderately high construction cost</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport and meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. Provides continuity of the existing Cycle Metro connections and eliminates conflict points between the users and vehicles. Allows for users travelling west to the CBD but it is not a direct connection. It provides a good connection for recreational cyclists travelling east that are prominent in the weekends travelling to the eastern bays.</p> <p>Poor connectivity as there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 1.4 km between Orakei Station car park and Tamaki Drive. The cost of constructing this route is moderately high approximately \$56 Million.</p> <p>This option introduces gradients which reduces the comfort level of cyclists. At the intersection with Tamaki Drive suitable gradients may not be able to be met due to the short length (approx. 40 m) available to ramp down to road level from the bridge structure that will allow boats to access the marina. The users coming out of this facility may also come in conflict with existing users along the Tamaki Drive cycle path due to constrained widths along Tamaki Drive to provide a safe junction for users to exit / enter. These issues can be resolved through design, but could have cost implications.</p> <p>The route alignment and height need to allow for future sea level rises but consideration should also be made on the effect to the line of the view shafts from Tamaki Drive which while not as impacted as in Options A or D is a significant social consideration.</p> <p>Some sections of the route may be at risk with consenting (delay / legal challenge) relating to potential treaty claims, ecological effects on shell fish and the potential that the structure may impede OBC future aspirations to increase the marina size If this is chosen as the preferred option then this needs to be looked at further.</p> <p>It is proposed that this option is taken to the scheme assessment stage as further investigation is needed on the benefits and dis-benefits and the cost effectiveness of this option.</p>

**Table 2-6: Option F - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option F</b> <b>\$43 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• No direct impact to OBC</li> <li>• This option is closest to the option preferred by Ngati Whatua which is the Hobson Bay coastline option (Option G).</li> <li>• No view shafts overlay this option.</li> <li>• The route consists of a mostly separated off-road facility for pedestrians and cyclists.</li> <li>• The first section of route across Hobson Bay will be within the KiwiRail area of legal access but well clear of the rail corridor.</li> <li>• This option avoids potential impacts on shell fish beds and with least direct contact with the coastal floor.</li> <li>• This option has the shortest extent of works and structures in the area identified in the AUP as being a significant ecological area.</li> <li>• Minimises gradients for all user types and confidence levels.</li> <li>• Scenic route across Hobson Bay for commuters.</li> <li>• Attractive route for recreational users travelling east.</li> <li>• Low construction cost</li> </ul>	<ul style="list-style-type: none"> <li>• Likely clip on structure required along the existing Orakei Road Bridge</li> <li>• Short section of on-road cycleway along Orakei Road heading north prior to turning into Orakei Station car park</li> <li>• Sections of the route may be subject to pending treaty settlement claims</li> <li>• Not as direct a route to CBD compared to Option A, B, C, D or E</li> <li>• The length of path with no ability for users to exit (personal safety issue)</li> <li>• Access to the heritage boat sheds could be affected with potential user conflict.</li> <li>• High risk construction across the wide channel that could have cost implications and constructability issues.</li> <li>• Need to allow for future sea level rises.</li> <li>• Visual impacts on the residents surrounding Hobson Bay.</li> <li>• The use of an on road cycleway along Ngapipi Road and the T-intersection (upgraded as part of another project) and the clip on shared path running adjacent to the road traffic. The safety of the users may be compromised in this short on road section.</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport and meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive.</p> <p>The cost of constructing this route is low at approximately 43 Million and provides a cost effective solution whilst balancing the need to provide a good facility. This is not a direct route to the CBD for commuters but it provides a good connection for recreational cyclists that are prominent in the weekends travelling to the eastern bays. This option has the shortest extent of works and structures in the area identified in the AUP as being significant ecological area- which is beneficial in terms of the resource consent process/ risks.</p> <p>Poor connectivity as there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 0.8 km between Orakei Station car park and Ngapipi Road. The route may have visual impacts on the residents overlooking Hobson Bay. This is the most significant visual impact and is a dis-benefit that needs to be looked at further. The route could also affect access to the heritage boat sheds as the connection to Ngapipi Road is adjacent to them.</p> <p>The on-road cycleway along Ngapipi Road, the T-intersection and along the clip on shared path running adjacent to the road traffic may compromise the safety and comfort of users and may not be attractive to all user types and confidence levels. The safety and comfort of the users and the need to support a variety of user types and confidence levels are important objectives of this assessment.</p> <p>While this route is closest to the Ngapipi Coastline route that Ngati Whatua have advised AT is preferred, sections of the route may be at risk with consenting relating to potential treaty claims by other iwi and effects on access to the boat sheds. If this is chosen as the preferred option then this needs to be looked at further.</p> <p>The construction risk is high for this option as the bridge structure will cross the wide channel and be more exposed to variable water flows, storm surges and scouring issues. This could have cost implications and constructability issues. As a result there will be uncertainties with estimated programme timeframes.</p> <p>It is proposed that this option is taken to the scheme assessment stage as further investigation is needed on the benefits and dis-benefits and the cost effectiveness of this option.</p>

**Table 2-7: Option G - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option G</b> <b>\$42 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• Geotechnical conditions are better around the coastline.</li> <li>• No direct impact to OBC</li> <li>• This is the option preferred by Ngati Whatua</li> <li>• No view shafts affect this option.</li> <li>• The route consists of a mostly separated off-road facility for pedestrians and cyclists</li> <li>• This option avoids potential impacts on shell fish beds and with least direct contact with the coastal floor.</li> <li>• This option has the shortest extent of works and structures in the area identified in the AUP as being a significant ecological area.</li> <li>• Minimises gradients for all user types and confidence levels.</li> <li>• Attractive route for recreational users travelling east.</li> <li>• Lower construction cost</li> </ul>	<ul style="list-style-type: none"> <li>• Likely clip on structure required along the existing Orakei Road Bridge</li> <li>• Short section of on-road cycleway along Orakei Road heading north prior to entering the coastal route bridge structure with some encroachment by local businesses.</li> <li>• Instability of slopes is a concern depending on the proximity of any construction work to the base of the slope especially as there are several moderately steep slopes along this route.</li> <li>• Allowance for future sea level rises.</li> <li>• New bridge required alongside or clipped onto the existing Purewa Creek Bridge.</li> <li>• The area is highly modified with rip rap along the coastline.</li> <li>• There could be visual privacy issues with the option as there are private properties on Ngapipi Road that face out onto the Bay over the public reserve accessed from Ngapipi Road.</li> <li>• The path would reduce the ability to provide access for boats to the public land along Ngapipi Road.</li> <li>• Adverse landscape, visual and natural character effects on coastal environment. Could be lessened by sensitive design of structure</li> <li>• Sections of the route may be subject to pending treaty settlement claims</li> <li>• Not a direct route to CBD compared to Option B</li> <li>• The length of path with no ability for users to exit (personal safety issue)</li> <li>• The use of an on-road cycleway along Orakei Road and Ngapipi Road</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport and meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. The cost of constructing this route is low at approximately \$42 Million.</p> <p>The route minimises gradients as there are distances available to ramp down structures to the grades recommended in the design standards and the route is mostly off-road. This allows for all user types and confidence levels along these sections. The on-road cycleway along short sections of Orakei Road and Ngapipi Road may compromise the safety and comfort of users and may not be attractive to all user types and confidence levels. The safety and comfort of the users and the need to support a variety of user types and confidence levels are important objectives of this assessment.</p> <p>This route is not convenient for users travelling west to the CBD but it provides a good connection for recreational cyclists travelling east that are prominent in the weekends travelling to the eastern bays. Poor connectivity as there are no exit points for pedestrians and cyclists to leave the path if they are compromised in terms of safety. Users are effectively trapped on the route for approximately 1.0 km between Orakei Station car park and Ngapipi Road. The route may have visual impacts on the residents surrounding Hobson Bay. This is a significant visual impact and is a dis-benefit that needs to be looked at further. The route could also affect access to the heritage boat sheds as the connection to Ngapipi Road is adjacent to them.</p> <p>This route is the preferred option by Ngati Whatua whom have already advised Auckland Transport, but sections of the route may be at risk with consenting relating to potential treaty claims by other iwi. If this is chosen as the preferred option then this needs to be looked at further.</p> <p>It is difficult to comment on evidence of slope instability or scour because of the existing dense vegetative cover. There is no evidence in the historical aerial photographs that would suggest any recent movement in the vegetation. However it is possible that there are areas of slope instability that are obscured from view.</p> <p>It is proposed that this option is taken to the scheme assessment stage as further investigation is needed on the benefits and dis-benefits and the cost effectiveness of this option.</p>

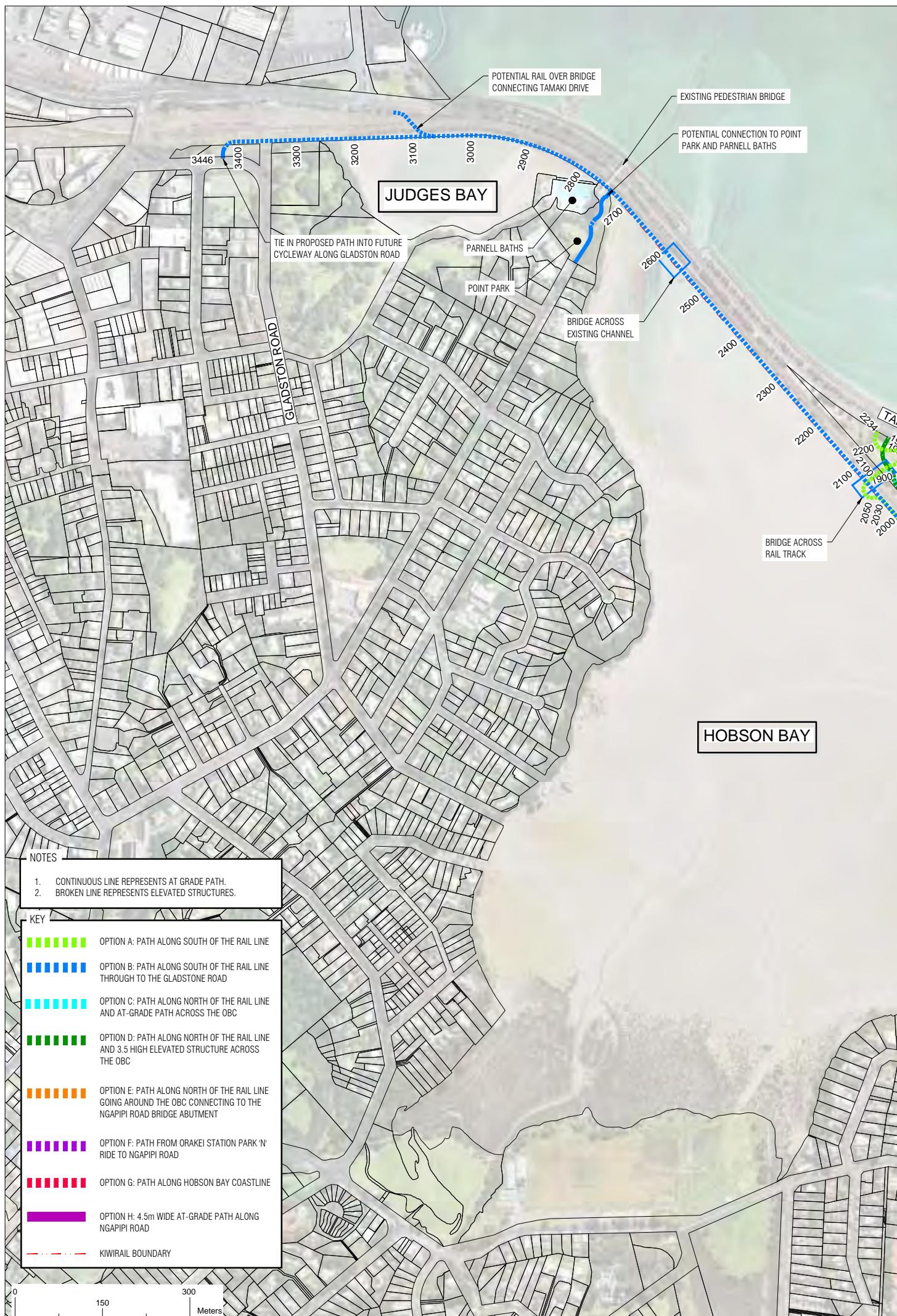
**Table 2-8: Option H - Summary of benefits and dis-benefits**

	<b>Benefits</b>	<b>Dis-benefits / Risks</b>	<b>Discussion</b>
<b>Option H</b> <b>\$18 Million</b> <b>(Loss of any income from business has been excluded)</b>	<ul style="list-style-type: none"> <li>• Connects well to end of Section 3.</li> <li>• No direct impact on OBC</li> <li>• No view shafts affect this option.</li> <li>• Avoids potential impacts on shell fish beds and no direct contact with the coastal floor.</li> <li>• The shortest extent of works and structures in the area identified in the AUP as being a significant ecological area.</li> <li>• The path enables users to exit at multiple points</li> <li>• As an on road option the consenting issues are few.</li> <li>• Very low construction cost</li> </ul>	<ul style="list-style-type: none"> <li>• The route is not separated from the road corridor for pedestrians and cyclists to provide continuity of the existing Cycle Metro connections.</li> <li>• Provides a lower level of service to pedestrians that don't currently have to share the footpath.</li> <li>• Likely clip on structure required along the existing Orakei Road Bridge</li> <li>• New bridge required alongside or clipped onto the existing Purewa Creek Bridge.</li> <li>• Several moderately-steep gradients evident along Ngapipi Road that will reduce user comfort</li> <li>• There are a high number of conflict points between the users and vehicles due to driveways from adjacent properties and access to boat sheds. Due to gradients cyclist speeds could be unexpectedly high increasing the severity risk.</li> <li>• Access to the heritage boat sheds could be affected</li> <li>• Short section of the road (approximately 50 m) supported by a concrete crib wall may be a constraint for any potential road widening to allow for the shared path.</li> <li>• Presence of dense vegetation around the western side of Ngapipi Road may obscure areas of the slope instability from view.</li> <li>• Road users coming from other parts of the route will find this section constrained, the extent of constraints will be more significant at the boatsheds.</li> <li>• This is likely to require land purchase from one private property owner to achieve the realignment at Ngaiwi Street.</li> <li>• Construction noise for road users and residents along Ngapipi Road.</li> <li>• A realignment of Ngapipi Road north of Ngaiwi Street and realignment of Ngapipi Road at the boat sheds. Not as direct a route to CBD compared to Option B and others. The realignment also increases the gradient of an already steep section of footpath.</li> <li>• Impacts on Pohutukawa trees.</li> </ul>	<p>The route promotes sustainability through the encouragement of walking and cycling as an alternative to motorised transport and meets the critical project objective of providing a connection between existing cycle paths from Section 3 and other existing sections of the Auckland Cycle Network between Glen Innes and Tamaki Drive. This route is not convenient for users travelling west to the CBD but it provides a good connection for recreational cyclists travelling east that are prominent in the weekends travelling to the eastern bays. The cost of constructing this route is the lowest at approximately \$18 Million.</p> <p>The path running through the road corridor (along Orakei Road and Ngapipi Road) may compromise the safety and comfort of users and may not be attractive to all user types and confidence levels. The safety and comfort of the users and the need to support a variety of user types and confidence levels are important objectives of this assessment. There will be a high number of high risk conflict points between motorists coming out of driveways and the pedestrians and cyclists on the shared path which does not meet the project objective of providing a safe route. This reduces the safety of the users and is a significant disbenefit.</p> <p>The route will require the widening of the existing path on Orakei Road, a clip-on to Purewa Creek bridge or a separate structure across Purewa Creek, and widening along the western side of Ngapipi Road which will need to be supported out over the existing steep bank on Ngapipi Road until Ngaiwi Street. From Ngaiwi Street the shared path utilises the existing pathway with some sections being widened.</p> <p>The route could affect access to the heritage boat sheds as the connection to Ngapipi Road is adjacent to them. The consenting issues are primarily related to the removal of street trees and the need to acquire land (and potential use of a Notice of Requirement for this purpose).</p> <p>The very low cost of this option is offset by a major disbenefit which is that the shared path is not completely separated from the road traffic and from accessways. The route is through a very different environment to the rest of the route. It is recommended that this option is discounted and not taken to the scheme assessment stage.</p>

## Appendices

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## Appendix A Map of Route Options



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## Appendix B Cost Estimates of Route Options

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option A

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	3042667	1217067	4259733
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>3042667</b>	<b>1217067</b>	<b>4259733</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	1825600	730240	2555840
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>1825600</b>	<b>730240</b>	<b>2555840</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	2200000	880000	3080000
2	Road furniture and at grade concrete path	511000	204400	715400
3	Bridges	31650000	12660000	44310000
4	Traffic management and temporary works 10% of bridges and road furniture	3436100	1374440	4810540
5	Preliminary and general 15%	5669565	2267826	7937391
6	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
<b>D</b>	<b>Total construction</b>	<b>43,466,665</b>	<b>17,386,666</b>	<b>60,853,331</b>
<b>E</b>	<b>Project base estimate</b>	<b>(A+D)</b>	<b>43,466,665</b>	
<b>F</b>	Contingency (Assessed/Analysed)		<b>(A+D)</b>	<b>17,386,666</b>
<b>G</b>	<b>Project expected estimate</b>		<b>(E+F)</b>	<b>60,853,331</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			4,259,733
	Construction expected estimate			65,113,064
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>		<b>(A+D)</b>	<b>60,853,331</b>
<b>I</b>	<b>95th percentile project estimate</b>		<b>(G+H)</b>	<b>121,706,662</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			7,302,400
	Construction 95th percentile estimate			129,009,062
Date of estimate	26/04/2017	Cost index (Q1/2017)		
Estimate prepared by	Sagar Kariya & Umesh Easwarapadcham	Signed		
Estimate internal peer review		Signed		
Estimate external peer review by		Signed		
Estimate accepted by the NZTA		Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Feasibility Estimate

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option B

Item	Description	Base estimate	Contingency	Funding risk
A	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
B	<b>Total investigation and reporting</b>	Nil	Nil	Nil
	Design and project documentation:			
	- consultancy fees 5%	4561476	1824590	6386067
	- the NZTA-managed costs	Nil	Nil	Nil
C	<b>Total design and project documentation</b>	4561476	1824590	6386067
	Construction			
	<i>MSQA</i>			
	- consultancy fees 3%	2736886	1094754	3831640
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<i>Sub-total base MSQA</i>	2736886	1094754	3831640
	<i>Physical works</i>			
1	Environmental compliance, path lighting & services relocation	2000000	800000	2800000
2	Road furniture and at grade concrete path	513000	205200	718200
3	Bridges	49000000	19600000	68600000
4	Traffic management and temporary works 10% of bridges and road furniture	5151300	2060520	7211820
5	Preliminary and general 15%	8499645	3399858	11899503
6	Extraordinary construction costs		0	0
	<i>Sub-total base physical works</i>			
D	<b>Total construction</b>	65,163,945	26,065,578	91,229,523
E	<b>Project base estimate</b>	(A+D)	65,163,945	
F	<b>Contingency (Assessed/Analysed)</b>	(A+D)	26,065,578	
G	<b>Project expected estimate</b>	(E+F)	91,229,523	
	Project property cost expected estimate			
	Investigation and reporting expected estimate		Nil	
	Design and project documentation expected estimate		6,386,067	
	Construction expected estimate		97,615,590	
H	<b>Funding risk (Assessed/Analyser)</b>	(A+D)	91,229,523	
I	<b>95th percentile project estimate</b>	(G+H)	182,459,046	
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate		Nil	
	Design and project documentation 95th percentile estimate		10,947,543	
	Construction 95th percentile estimate		193,406,589	
	<b>Date of estimate 26/04/2017</b>	<b>Cost index (Q1/2017)</b>		
	Estimate prepared by Sagar Kariya & Umesh Easwarapadcham	Signed		
	Estimate internal peer review by Andrew McDonald	Signed		
	Estimate external peer review by	Signed		
	Estimate accepted by the NZTA	Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option C

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	1850252	740101	2590353
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>1850252</b>	<b>740101</b>	<b>2590353</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	1110151	444061	1554212
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>1110151</b>	<b>444061</b>	<b>1554212</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	1700000	680000	2380000
2	Road furniture and at grade concrete path	195000	78000	273000
3	Bridges	17500000	7000000	24500000
4	Possible clip-on structure to Orakei Road Bridge	1500000	600000	2100000
5	Traffic management and temporary works 10% of bridges and road furniture	2089500	835800	2925300
6	Preliminary and general 15%	3447675	1379070	4826745
7	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
<b>D</b>	<b>Total construction</b>	<b>26,432,175</b>	<b>10,572,870</b>	<b>37,005,045</b>
<b>E</b>	<b>Project base estimate</b>	<b>(A+D)</b>	<b>26,432,175</b>	
<b>F</b>	<b>Contingency (Assessed/Analysed)</b>	<b>(A+D)</b>	<b>10,572,870</b>	
<b>G</b>	<b>Project expected estimate</b>		<b>(E+F)</b>	<b>37,005,045</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			2,590,353
	Construction expected estimate			39,595,398
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>		<b>(A+D)</b>	<b>37,005,045</b>
<b>I</b>	<b>95th percentile project estimate</b>		<b>(G+H)</b>	<b>74,010,090</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			4,440,605
	Construction 95th percentile estimate			78,450,695
<b>Date of estimate 26/04/2017</b>		<b>Cost index (Q1/2017)</b>		
Estimate prepared by Sagar Kariya & Umesh Easwarapadcham		Signed		
Estimate internal peer review		Signed		
Estimate external peer review by		Signed		
Estimate accepted by the NZTA		Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option D

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	2553693	1021477	3575171
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>2553693</b>	<b>1021477</b>	<b>3575171</b>
	Construction			
	<i>MSQA</i>			
	- consultancy fees 3%	1532216	612886	2145102
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<i>Sub-total base MSQA</i>	<b>1532216</b>	<b>612886</b>	<b>2145102</b>
	<i>Physical works</i>			
1	Environmental compliance, path lighting & services relocation	1700000	680000	2380000
2	Road furniture and at grade concrete path	139000	55600	194600
3	Bridges	25500000	10200000	35700000
4	Possible clip-on structure to Orakei Road Bridge	1500000	600000	2100000
5	Traffic management and temporary works 10% of bridges and road furniture	2883900	1153560	4037460
6	Preliminary and general 15%	4758435	1903374	6661809
7	Extraordinary construction costs		0	0
	<i>Sub-total base physical works</i>	<b>36,481,335</b>		
<b>D</b>	<b>Total construction</b>	<b>36,481,335</b>	<b>14,592,534</b>	<b>51,073,869</b>
<b>E</b>	<b>Project base estimate</b>	<b>(A+D)</b>	<b>36,481,335</b>	
<b>F</b>	<b>Contingency (Assessed/Analysed)</b>	<b>(A+D)</b>	<b>14,592,534</b>	
<b>G</b>	<b>Project expected estimate</b>	<b>(E+F)</b>	<b>51,073,869</b>	
	Project property cost expected estimate			
	Investigation and reporting expected estimate		Nil	
	Design and project documentation expected estimate		3,575,171	
	Construction expected estimate		54,649,040	
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>	<b>(A+D)</b>	<b>51,073,869</b>	
<b>I</b>	<b>95th percentile project estimate</b>	<b>(G+H)</b>	<b>102,147,738</b>	
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate		Nil	
	Design and project documentation 95th percentile estimate		6,128,864	
	Construction 95th percentile estimate		108,276,602	
<b>Date of estimate 26/04/2017</b>		<b>Cost index (Q1/2017)</b>		
Estimate prepared by Sagar Kariya & Umesh Easwarapadcham		Signed		
Estimate internal peer review		Signed		
Estimate external peer review by		Signed		
Estimate accepted by the NZTA		Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Feasibility Estimate

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option E

Item	Description	Base estimate	Contingency	Funding risk
A	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
B	<b>Total investigation and reporting</b>	Nil	Nil	Nil
	Design and project documentation:			
	- consultancy fees 5%	2635248	1054099	3689347
	- the NZTA-managed costs	Nil	Nil	Nil
C	<b>Total design and project documentation</b>	2635248	1054099	3689347
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	1581149	632460	2213608
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	1581149	632460	2213608
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	1520000	608000	2128000
2	Road furniture and at grade concrete path	740000	296000	1036000
3	Bridges	26000000	10400000	36400000
4	Possible clip-on structure to Orakei Road Bridge	1500000	600000	2100000
5	Traffic management and temporary works 10% of bridges and road furniture	2976000	1190400	4166400
6	Preliminary and general 15%	4910400	1964160	6874560
7	Extraordinary construction costs	0	0	0
	<b>Sub-total base physical works</b>	37,646,400	15,058,560	52,704,960
D	<b>Total construction</b>	37,646,400		
E	<b>Project base estimate</b>	(A+D)	37,646,400	
F	<b>Contingency (Assessed/Analysed)</b>	(A+D)	15,058,560	
G	<b>Project expected estimate</b>	(E+F)	52,704,960	
	Project property cost expected estimate			
	Investigation and reporting expected estimate		Nil	
	Design and project documentation expected estimate		3,689,347	
	Construction expected estimate		56,394,307	
H	<b>Funding risk (Assessed/Analyser)</b>	(A+D)	52,704,960	
I	<b>95th percentile project estimate</b>	(G+H)	105,409,920	
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate		Nil	
	Design and project documentation 95th percentile estimate		6,324,595	
	Construction 95th percentile estimate		111,734,515	
	<b>Date of estimate 26/04/2017</b>	<b>Cost index (Q1/2017)</b>		
	Estimate prepared by Sagar Kariya & Umesh Easwarapadcham	Signed		
	Estimate internal peer review	Signed		
	Estimate external peer review by	Signed		
	Estimate accepted by the NZTA	Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option F

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	2001617	800647	2802264
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>2001617</b>	<b>800647</b>	<b>2802264</b>
	Construction			
	<i>MSQA</i>			
	- consultancy fees 3%	1200970	480388	1681359
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<i>Sub-total base MSQA</i>	<b>1200970</b>	<b>480388</b>	<b>1681359</b>
	<i>Physical works</i>			
1	Environmental compliance, path lighting & services relocation	1300000	520000	1820000
2	Road furniture and at grade concrete path	788000	315200	1103200
3	Bridges	16000000	8000000	24000000
4	2.5 m wide clip on structure along both sides of Ngapipi Bridge	2000000	1000000	3000000
5	Possible clip-on structure to Orakei Road Bridge	1500000	600000	2100000
6	Traffic management and temporary works 10% of bridges and road furniture	2158800	863520	3022320
7	Preliminary and general 15%	3562020	1424808	4986828
8	Extraordinary construction costs		0	0
	<i>Sub-total base physical works</i>			
<b>D</b>	<b>Total construction</b>	<b>27,308,820</b>	<b>12,723,528</b>	<b>40,032,348</b>
<b>E</b>	<b>Project base estimate</b> (A+D)	<b>27,308,820</b>		
<b>F</b>	<b>Contingency (Assessed/Analysed)</b>		<b>(A+D)</b>	<b>12,723,528</b>
<b>G</b>	<b>Project expected estimate</b>		<b>(E+F)</b>	<b>40,032,348</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			2,802,264
	Construction expected estimate			42,834,612
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>		<b>(A+D)</b>	<b>40,032,348</b>
<b>I</b>	<b>95th percentile project estimate</b>		<b>(G+H)</b>	<b>80,064,696</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			4,803,882
	Construction 95th percentile estimate			84,868,578
<b>Date of estimate</b> 26/04/2017		<b>Cost index (Q1/2017)</b>		
Estimate prepared by Sagar Kariya & Umesh Easwarapadcham		Signed		
Estimate internal peer review		Signed		
Estimate external peer review by		Signed		
Estimate accepted by the NZTA		Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option G

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	1941692	776677	2718368
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>1941692</b>	<b>776677</b>	<b>2718368</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	1165015	466006	1631021
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>1165015</b>	<b>466006</b>	<b>1631021</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	1300000	520000	1820000
2	Road furniture and at grade concrete path	430000	172000	602000
3	Bridges	15000000	6000000	21000000
4	Clip on structure along Purewa Creek Bridge	1500000	750000	2250000
5	2.5 m wide clip on structure along both sides of Ngapipi Bridge	2000000	1000000	3000000
6	Possible clip-on structure to Orakei Road Bridge	1500000	600000	2100000
7	Traffic management and temporary works 10% of bridges and road furniture	2173000	869200	3042200
8	Preliminary and general 15%	3585450	1434180	5019630
9	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
<b>D</b>	<b>Total construction</b>	<b>27,488,450</b>	<b>11,345,380</b>	<b>38,833,830</b>
<b>E</b>	<b>Project base estimate</b>	<b>(A+D)</b>	<b>27,488,450</b>	
<b>F</b>	<b>Contingency (Assessed/Analysed)</b>		<b>(A+D)</b>	<b>11,345,380</b>
<b>G</b>	<b>Project expected estimate</b>		<b>(E+F)</b>	<b>38,833,830</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			2,718,368
	Construction expected estimate			41,552,198
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>		<b>(A+D)</b>	<b>38,833,830</b>
<b>I</b>	<b>95th percentile project estimate</b>		<b>(G+H)</b>	<b>77,667,660</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			4,660,060
	Construction 95th percentile estimate			82,327,720
<b>Date of estimate 26/04/2017</b>		<b>Cost index (Q1/2017)</b>		
Estimate prepared by Sagar Kariya & Umesh Easwarapadcham		Signed		
Estimate internal peer review		Signed		
Estimate external peer review by		Signed		
Estimate accepted by the NZTA		Signed		

Note: (1) These estimates are exclusive of escalation and GST.

# Project estimate

## Form A

**FE**

Project name: Glen Innes to Tamaki Drive Share Path Section 4 Option H

Feasibility Estimate

Item	Description	Base estimate	Contingency	Funding risk
<b>A</b>	<b>Nett project property cost</b>			
	Investigation and reporting:			
	- consultancy fees	Nil	Nil	Nil
	- the NZTA-managed costs	Nil	Nil	Nil
<b>B</b>	<b>Total investigation and reporting</b>	<b>Nil</b>	<b>Nil</b>	<b>Nil</b>
	Design and project documentation:			
	- consultancy fees 5%	851641	340656	1192297
	- the NZTA-managed costs	Nil	Nil	Nil
<b>C</b>	<b>Total design and project documentation</b>	<b>851641</b>	<b>340656</b>	<b>1192297</b>
	Construction			
	<b>MSQA</b>			
	- consultancy fees 3%	510985	204394	715378
	- the NZTA-managed costs	Nil	Nil	Nil
	- consent monitoring fees	Nil	Nil	Nil
	<b>Sub-total base MSQA</b>	<b>510985</b>	<b>204394</b>	<b>715378</b>
	<b>Physical works</b>			
1	Environmental compliance, path lighting & services relocation	1300000	520000	1820000
2	Road furniture and at grade concrete path	2620000	1048000	3668000
3	Land Purchases	500000	200000	700000
4	Clip on structure along Purewa Creek Bridge	1500000	750000	2250000
5	2.5 m wide clip on structure along both sides of Ngapipi Bridge	2000000	1000000	3000000
6	Possible clip-on structure to Orakei Road Bridge	1500000	600000	2100000
7	Traffic management and temporary works 10% of bridges and road furniture	942000	376800	1318800
8	Preliminary and general 15%	1554300	621720	2176020
9	Extraordinary construction costs		0	0
	<b>Sub-total base physical works</b>			
<b>D</b>	<b>Total construction</b>	<b>11,916,300</b>	<b>5,116,520</b>	<b>17,032,820</b>
<b>E</b>	<b>Project base estimate</b>	<b>(A+D)</b>	<b>11,916,300</b>	
<b>F</b>	<b>Contingency (Assessed/Analysed)</b>		<b>(A+D)</b>	<b>5,116,520</b>
<b>G</b>	<b>Project expected estimate</b>		<b>(E+F)</b>	<b>17,032,820</b>
	Project property cost expected estimate			
	Investigation and reporting expected estimate			Nil
	Design and project documentation expected estimate			1,192,297
	Construction expected estimate			18,225,117
<b>H</b>	<b>Funding risk (Assessed/Analyser)</b>		<b>(A+D)</b>	<b>17,032,820</b>
<b>I</b>	<b>95th percentile project estimate</b>		<b>(G+H)</b>	<b>34,065,640</b>
	Project property cost 95th percentile estimate			
	Investigation and reporting 95th percentile estimate			Nil
	Design and project documentation 95th percentile estimate			2,043,938
	Construction 95th percentile estimate			36,109,578
	<b>Date of estimate 26/04/2017</b>		<b>Cost index (Q1/2017)</b>	
	Estimate prepared by Sagar Kariya & Umesh Easwarapadcham		Signed	
	Estimate internal peer review		Signed	
	Estimate external peer review by		Signed	
	Estimate accepted by the NZTA		Signed	

Note: (1) These estimates are exclusive of escalation and GST.

**Christchurch**

Hazeldean Business Park, 6 Hazeldean Road

Addington, Christchurch 8024

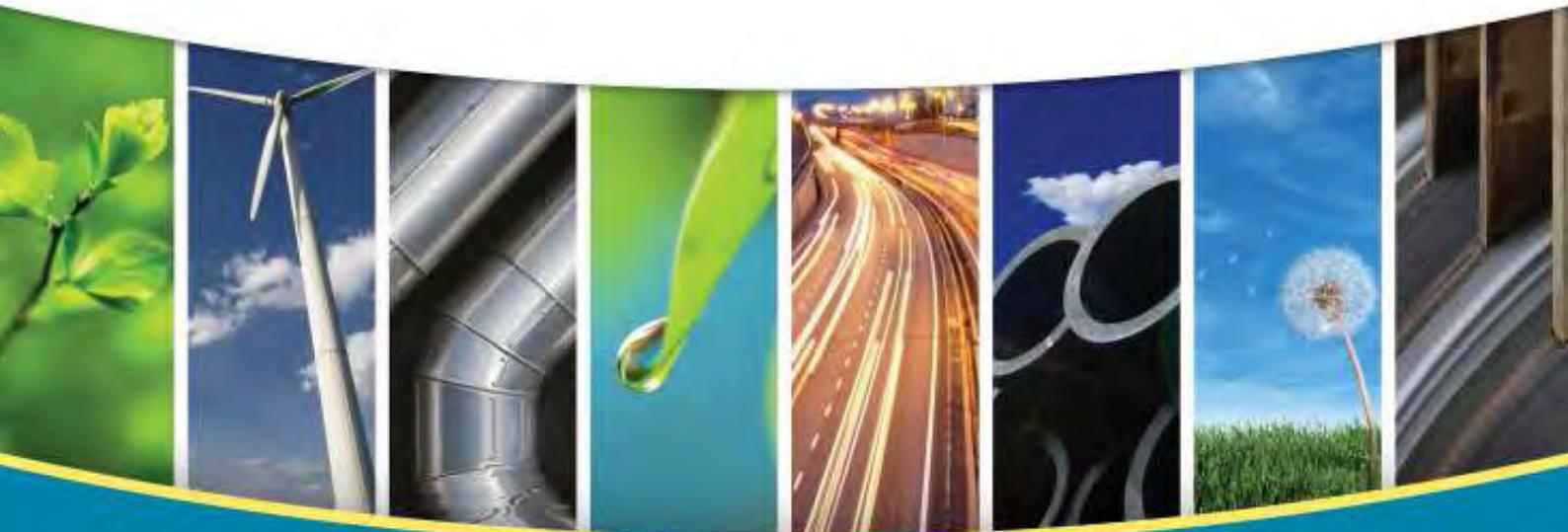
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# APPENDIX 6

## Criteria Description and Agreed Weighting

#	Criteria	Description	Weighting	Discussion
1	Extent of amenity effects	The number of third party properties (residential, commercial etc.) and people potentially affected by the Project.	2	The weight of amenity effects was lowered as the collective view was that we should not let this adversely affect a preferred design option
2	Scale of amenity affects	The scale of effects on amenity values for residents of third party property. Effects include: - Noise - Vibration - Visual - Dust - Privacy	5	The scale of amenity effects is weighted higher than the extent as it had a wider impact. But as above should not adversely affect a preferred design option
3	Effects on community facilities (inc. public open space) and on public infrastructure	The effects on people's ability to use and enjoy: • existing community facilities, including private facilities • areas of public open space  The effects on existing and known future infrastructure and services	7	An important part of the project is creating facilities for the public and community to enjoy
4	Effects on waterbodies including coast / CMA or any sites of ecological significance	Whether the proposed route passes through and/or affects waterbodies or any sites of ecological significance. *Refer to District Plan and PAUP planning maps	5	Considered likely that any potential adverse effects will be able to be adequately avoided or mitigated
5	Effects on vegetation	The amount and significance of any vegetation alteration/removal required for the proposed route	5	Considered likely that any potential adverse effects will be able to be adequately avoided or mitigated.
6	Effects on sites of cultural significance / effects on cultural value	Whether the proposed route passes through and/or affects sites of cultural significance / effects on cultural value *Refer to District Plan and PAUP planning maps	6	Important to demonstrate significance of cultural sites and understanding of cultural values in Section 4 area.
7	Effects on sites of natural and historic heritage/archaeological value	Whether the proposed route passes through and/or affects sites of natural / heritage /archaeological significance *Refer to District Plan and PAUP planning maps/NZAA database	5	Considered likely that any potential adverse effects will be able to be adequately avoided or mitigated.
8	Cost	The likely financial cost of the proposed route.	6	Important to demonstrate a financial feasibility although acknowledging the strategic importance of the route.
9	Safety	Whether the proposed route provides a safe environment for pedestrians and cyclists by for example, minimising interaction with roads. The degree to which the proposed route implements Crime Prevention Through Environmental Design principles. Includes personal and perceived safety. • User conflict • Cyclist speeds • Non-slip surface • Visibility • Road crossings • Good lighting • High level of user activity • Options to avoid • confrontation	9	The overall safety of the route was deemed to be of high importance
10	Comfort	The degree to which the proposed route avoids significant slopes, complicated manoeuvres and exposure to the elements. • Surface • Gradients • Complicated manoeuvres • Protection from the elements	7	The comfort of the route will be important for both commuter and recreational cyclists so was weighted slightly higher than directness and attractiveness
11	Directness	The degree to which the proposed route constitutes a direct path for users wanting to travel to a destination	6	Directness is likely to be more important for commuter cyclists and attractiveness more important for recreational cyclists. Therefore, both criteria were weighted the same and slightly lower than comfort
12	Attractiveness	The degree to which the proposed route constitutes an attractive alternative route for potential users to get from A to B. • Variety of experiences / environments • Variety of views • Integrates with the surrounding environment • Contributes to social interaction (e.g. ability to ride 2 abreast) • Passes places of interest	6	See comment above
13	Connectivity	The degree to which the proposed route provides opportunity for connections to residential areas, public open spaces, commercial areas and other land uses.	8	Important to provide connections or to create the opportunity for future connections to potential users, and destination.
14	Impact on private land	The impact on use (scale, extent, severance) on use of private land – in terms of their direct use of land	4	There is a public works act process in addition to the RMA process to address this impact

A set of 14 criteria was developed to assess the routes. Each criterion has a different weighting, the weighting reflects the importance of the criteria in the assessment. Criteria with a higher weighting will have a greater influence on the final rating score. The criteria used to evaluate the routes and the weighting assigned to each is listed above.



The criteria and the weightings were established prior to the first workshop and then refined during the first workshop on 29/8/2014 after feedback from workshop attendees. The table below sets out the final set of criteria and weightings from that workshop. It is proposed to utilise these for consistency with the rest of the project.

# APPENDIX 7

## Scoring Definition of Criteria

Evaluation	Rating
1. Strongly supports criteria or 2. Significant Potential Positive Effect 3. Less than \$15M	2
1. Supports criteria or 2. Potential Positive Effect 3. \$15M to \$30M	1
1. Limited support of criteria or neutral to this criteria or 2. No more than Minor Potential Adverse Effect (with opportunities to remedy or mitigate) 3. \$30M to \$45M	0
1. Not supportive of criteria or 2. Potential Adverse Environmental Effect (with limited opportunities to remedy or mitigate) 3. \$45M to \$60M	-1
1. Strongly not supportive of criteria or 2. Significant Potential Adverse Effect (with little or no opportunities to mitigate) 3. Greater than \$60M	-2

Each option needs to be rated between +2 and -2 depending on how positively or negatively the option supports the criteria or the how positive or negative the effect is.

## APPENDIX 8

Criteria Section 4: Option Rating											Common Discussion
Option Number (May 17)	A	B	C1	C2	D1	D2	E	F	G	H	
Previous Reference	1	new	2aa	2ab	2ba	2bb	New	New	3	4	
Option Description	South of rail line skirting the private development at Orakei Peninsula and a new structure on the southern side of the rail line requires a rail over bridge to cross over the rail line to the Council reserve on Tamaki Drive	South of rail line skirting the private development at Orakei Peninsula and a new structure on the southern side of the rail line through to Gladstone Road via Judges Bay	North of rail line at ground level through the Outdoor Boating Club and the Council reserve on Tamaki Drive	North of rail line at ground level through the Outdoor Boating Club joining Tamaki Dr via the mini golf / car park	North of rail line and on an elevated structure through the Outdoor Boating Club and the Council reserve on Tamaki Drive	North of rail line on an elevated structure through the Outdoor Boating Club and joining Tamaki Dr via the mini golf / car park	North of the rail line going around the OBC connecting to the Ngapipi Rd Bridge abutment	From the park and ride car park cutting across Hobson Bay joining Ngapipi Road before the boat sheds or at the Council reserve.	Ngapipi coastline bordering the outside edge of Hobson Bay requires a clip on structure on the Orakei Road Bridge and a boardwalk constructed around the bay.	Ngapipi Road option is a separated facility along Ngapipi Road	Three additional options were added in May 2017 – B, E and F
1. Extent of amenity effects	-1	-2	-1	-1	-1	-1	0	0	-1	-2	
	Change in view with potential visual impacts for OBC, Council reserve, future residents Orakei Point, distant residents on Remuera and Parnell slopes) noise neutral even though it goes past potential future residential area on Orakei Point as zoned in the PAUP, as these units will be well insulated to mitigate the train noise effect.	Change in view with potential impact on more private properties looking out on to this option ( Hobson Bay and Judges bay) and as passes Judges bay, Parnell Baths and lookout at Gladstone road more members of the public	Change in view( , noise neutral OBC, Council reserve, future residents Orakei Point, residents on Orakei slopes, Tamaki Drive users), noise neutral	Change in view(OBC, Council reserve, future residents Orakei Point, mini golf, coffee cart, Tamaki Drive users), noise neutral	Change in view(OBC, Council reserve, future residents Orakei Point, Tamaki Drive users) , noise neutral noting that trees blocking view of elevated structure from Tamaki Drive	Change in view(OBC, Council reserve, future residents Orakei Point, mini golf, coffee cart, Tamaki Drive users) , noise neutral	Change in view but As part of the route is perpendicular (parallel to OBC marina the impact is minimised )	Change in view but further way from Ngaipipi Coastline	change in view (Recreational users of Hobson Bay, residents in Ngapipi Road fronting shared path, future residents Orakei Point, boatshed owners, distant residents on Remuera and Parnell slopes) New Noise introduced for receivers on Ngapipi Road as will be trapped between two noise sources (operational effects from path and road). The vegetation will mitigate the visual effects, could mitigate noise with barriers.	impacts on more third parties(Ngapipi Road residents, boatshed owners' commuters) as the number of private resident's is greater, as well as road users, bus stops, people walking and a larger number of people which could cause conflict.	

Criteria											Common Discussion
Section 4: Option Rating											
Option Number (May 17)	A	B	C1	C2	D1	D2	E	F	G	H	
Previous Reference	1	new	2aa	2ab	2ba	2bb	New	New	3	4	
<b>2. Scale of amenity effects</b>	-1	-1	+1	0	-1	-1	0	0	-1	-1	
	Adverse visual effects of railway crossing bridge, ramps leading up to it, ramps leading up to bridges along shared path to basin outlets, impact for future residential audience at Orakei Point (Kings Plant Barn site) privacy and overlooking	No ramp over the rail line but path longer and has structure closer to public spaces at Judges bay	Northern side higher coastal amenity values, direct route, no railway crossings, ramps leading up to bridges along shared path to basin outlets	Dust from disturbance of contamination at OBC however this can be mitigated as the effects will only be during construction. The effects of contamination are unknown as we aren't sure the extent of contamination mitigation of dust etc	Visual impact of elevated structure when viewed from Tamaki Drive, impact on views of pohutukawas, impact on trees.	Visual impact of elevated structure when viewed from Tamaki Drive, impact on views of pohutukawas, impact on trees.	Raised structure but not as high as the others distance means reduced construction effects	Raised structure but not as high as the others, distance means reduced construction effects	Adverse landscape, visual and natural character effects on coastal environment. Could be lessened by sensitive design of structure as per Orakei Basin design – timber boardwalk, recessive handrailing etc depending on outcomes with structure and minimise noise from structure operation and stopping for travellers - but noise could come from decking	Only construction noise but this cannot be mitigated	
<b>3. Effects on community facilities (inc. public open space) and public infrastructure</b>	+1	0	+1	+1	+1	+1	0	0	0	-1	
	provide for future proofing of rail track, impacts on the reserve, the positive impact of changing from no use of the reserve to a use, opening up a space	Effect could be potential loss of parking at Fred Ambler lookout where path accesses Gladstone Road	Impacts on the reserve, but there is the positive impact of changing from no use of the reserve to a use, opening up a space.		impacts on the reserve, but there is the positive impact of changing from no use of the reserve to a use, opening up a space		Effect only on any OBC aspirations to enlarge marina	No direct effects on community facilities	services and bus shelters unlikely to be affected on section on Ngapipi Road	- services and bus shelters may need to be shifted along whole route	Recognise future Reverse sensitivity risk – from users re rail noise
											Opens reserve for public access and activates reserve (noting that boat club and mini golf) are picked up as private land / activities directly affected . was not considered that the boat club is a community facility –as need to pay to be member

Criteria											Common Discussion
Section 4: Option Rating											
Option Number (May 17)	A	B	C1	C2	D1	D2	E	F	G	H	
Previous Reference	1	new	2aa	2ab	2ba	2bb	New	New	3	4	
<b>4.Effects on coast/cma/waterbodies or any sites of ecological significance</b>	-2	-2	-2	-2	-2	-2	-2	-1	-1	0	
	Work along the south side of the railway will cause fine sediment to travel into the boating area. Water will look dirtier than normal so visual effect on OBC areas and boats will potentially end up with a tide line. Shell fish present adjacent to rail line	Similar effects as Option A increased by distance	shell fish present adjacent to rail line	shell fish present adjacent to rail line	shell fish present adjacent to rail line	shell fish present adjacent to rail line	Structure in water for longer so effect similar to Options C and D	Based on feedback on option G it was considered that the effects may be similar but it was felt that this needs to be confirmed.	slightly better as the other options have greater ecological significance - lighter sediment is located along the coast line so not as good for shelf fish	Neutral as doesn't go through coast/CMA	
<b>5.Effects on vegetation</b>	0	0	0	0	0	0	+1	0	0	-1	
	In the reserve – mitigations could potentially avoid /minimise the effects on trees	Vegetation on Judges Bay cliff and above rail line at Gladstone may be affected	In the reserve – mitigations could potentially avoid the trees	Mini golf option might be better for trees	In the reserve – mitigations could potentially avoid the trees	Mini golf option might be better for trees	No vegetation	Small section on Ngapipi Road if curb realigned	Small section on Ngapipi Road if curb realigned	more pohutukawa and changes to the curb alignment which makes this option potentially affect trees	
<b>6.Effects on sites of cultural significance / effects on cultural value</b>	-2	-2	-2	-2	-2	-2	-2	-1	-1	0	
	shell fish present and have seen shellfish gathering	shell fish present and have seen shellfish gathering	shell fish present and have seen shellfish gathering	shell fish present and have seen shellfish gathering	shell fish present and have seen shellfish gathering	shell fish present and have seen shellfish gathering	shell fish present and have seen shellfish gathering	Deeper water and lighter sediment not as good for shell fish/gathering	lighter sediment not as good for shell fish/gathering		It was recognised that there was a need to consult iwi .Consultation prior to new options identified that Ngati Whatua preferred option G. Other iwi had not preference indicating CMA subject to pending treaty claims

Criteria											Common Discussion
Section 4: Option Rating											
Option Number (May 17)	A	B	C1	C2	D1	D2	E	F	G	H	
Previous Reference	1	new	2aa	2ab	2ba	2bb	New	New	3	4	
<b>7.Effects on sites of natural and historic heritage / archaeological value</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>	
	Limited earthworks at Orakei Point (landform)	Limited earthworks at Orakei Point (landform) and not expected to affect Point Resolution	Best as in area of geological feature already modified and aren't within the PAUP outstanding natural feature/landscape overlay	Best as in area of geological feature already modified and aren't within the PAUP outstanding natural feature/landscape overlay	Best as in area of geological feature already modified and aren't within the PAUP outstanding natural feature/landscape overlay	Best as in area of geological feature already modified and aren't within the PAUP outstanding natural feature/landscape overlay	None	boat sheds are protected heritage features – need to consult a heritage specialist. Path from station to Ngapipi Road Located on significant outcrop and could involve earthworks on tuff ring , also will need works in surrounds of scheduled boat shed	boat sheds are protected heritage features – need to consult a heritage specialist . Path from station to Ngapipi Road Located on significant outcrop and could involve earthworks on tuff ring , also will need works in surrounds of scheduled boat shed	boat sheds and protected heritage features – need to consult a heritage specialist . Path from station to Ngapipi Road Located on significant outcrop and could involve earthworks on tuff ring , also will need works in surrounds of scheduled boat shed	All routes pass on heavily modified areas but extent of effects depends on extent of earthworks - no option compromises the overlay geological value -
<b>8.Cost</b>	<b>-2</b>	<b>-2</b>	<b>0</b>	<b>0</b>	<b>-1 ( was -2)</b>	<b>-1 ( was -2)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>+1</b>	Costs were revisited and a new matter included in criteria rating process for May assessment and the other options were rescored as a result
<b>9.Safety</b>	<b>+1</b>	<b>0</b>	<b>+2</b>	<b>+2</b>	<b>+2</b>	<b>+2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>-2</b>	
	The beginning of this route has some driveways and potential conflict between pedestrians and cyclists. This area may become residential in the future due to the zoning. Option has long ramp with possible high speeds	Similar as A to start with but longer off road path with no connections which increases CPTED concerns	Off road for all of the route	Off road for all of route but potential issue at connection to Tamaki Drive	Off road largely until joining to Ngapipi Road and deal with conflict at boat sheds	The path has to cross the park n ride. This area may become residential in the future due to the zoning.	The path has to cross the park n ride to get to Ngapipi Road. Private driveways and vehicles accessing from these would be unsafe as drivers would need to look both ways and were likely to be on the shared path to be able to see due to the grade change in the driveways	High level of design work required to address issues. Options 1 and 3 and 4 where conflict with other movements. Option 4 is poor environment generally. Safety on Tamaki Drive is a huge issue ,people don't like it and 3 and 4 have greater length on Tamaki Drive			

Criteria Section 4: Option Rating											Common Discussion
Option Number (May 17)	A	B	C1	C2	D1	D2	E	F	G	H	
Previous Reference	1	new	2aa	2ab	2ba	2bb	New	New	3	4	
<b>10.Comfort</b>	-1	-1	+2	+2	+1	+1	+1	0	-1	-2	
	Due to the gradient change with rail bridge height cyclists will have to climb for a length of 100m with no breaks and there are more complicated manoeuvres needed than the option 2s. The winds will be side on for cyclists on and cyclists will be buffeted.	Gradient at rise to Gladstone similar to Option A but is higher	The big winds will be side on and cyclists will be buffeted.	The big winds will be side on and cyclists will be buffeted.	Change in grade with elevated structure at OBC. The big winds will be side on and cyclists will be buffeted.	Change in grade with elevated structure at OBC. The big winds will be side on and cyclists will be buffeted.	Expect rise in grade to get to Tamaki Drive from rail and some wind effects	Not expected to be any grade issues	Grade changes and ramps at both ends for users. constrained environment by boat sheds	Change in grade along the road would impact on comfort. constrained environment by boat sheds	Having new path designed for cyclists will ensure comfort. It was noted that the prevailing winds on the Bay are southwesterlies and that big north easterlies are also common
<b>11.Directness</b>	+2	+2	+2	+2	+2	+2	0	-1	-1	-1	
	has to loop back if going to the city centre but still direct for most of the route	direct route to CBD	Largely Direct	Largely Direct	Largely Direct	Largely Direct	Not as direct as Options A-D	Not as direct – maybe perceived as similar to Options G and H	Travel via coast would be perceived as being indirect and is longer more convoluted route	Would be perceived as being indirect and is longer more convoluted route	There was discussion about whether directness is given too much emphasis, maybe add it into another criteria. Could add directness into comfort, however these are quite different. It was concluded that directness is an important criteria for commuters. This criteria has always been there for the other sections. Assumption – that the destination is the city centre, not mission bay. Supplying a service for commuter traffic, who predominantly go to the city
<b>12.Attractiveness</b>	+1	+2	+1	+1	+2	+2	+1	+2	+1	-2	
	Noise from trains Ramp up to and railway	While shares some of Option A there is a greater	Attractive route on northern side of embankment,	Attractive route on northern side of embankment,	Attractive route on northern side of embankment,	Attractive route on northern side of embankment,	Route will be of interest to those who enjoy maritime	Novelty of traveling through marine environment	Attractive coastal landscape away from	Harsh road environment users coming from other	all options that have train tracks adjacent affected by noise - The train volumes will

Criteria											Common Discussion
Section 4: Option Rating											
Option Number (May 17)	A	B	C1	C2	D1	D2	E	F	G	H	
Previous Reference	1	new	2aa	2ab	2ba	2bb	New	New	3	4	
	crossing, southern side not as high in visual and landscape amenity values, more enclosed views, has long ramps and high bridge so less attractive for users,	potential for more spectacular views on rise to/from Gladstone Rd	higher coastal values, largely on grade	higher coastal values, largely on grade,	higher coastal values, elevated through OBC, views are more pleasant and less noise when a path is elevated	higher coastal values, elevated through OBC, views are more pleasant and less noise when a path is elevated	activity – no elevated views	with section of route with water over both sides	traffic but section on the road is not as attractive (includes part of Ngapipi and Orakei Road), but is convoluted and constrained at boatsheds	parts of the route will find this section worse, however this path is better than no path although doing nothing is not an option. constrained at boatsheds	increase with the CRL however noise effects are just one part of this criteria. Cyclists want an easy to ride and easy to follow direct route 1 and 2 offer this but 3 and 4 don't
13. Connectivity	+1	0	+1	+1	+1	+1	+1	+1	+1	+2	
		No connection to Tamaki Drive								accessible from more roads and links to local housing area	there has to be an overall improvement with all options on basis it provides a link between CBD and Glenn Innes
14. Direct Impact on private land and includes mini golf	0	0	-1	-1	-1	-1	0	0	-1	-2	
	Avoids direct effect	Avoids direct contact	A direct impact on the boat club.	A direct impact on the boat club and includes mini golf.	A direct impact on the boat club.	A direct impact on the boat club and includes mini golf.	Avoids direct impact on the boat club	Avoids direct impact on the boat club	Check that the encroachments on Orakei Road don't have a license, issue with boat shed access	Check if the encroachments on Orakei Road have a license, impacts on property at Ngapipi/Ngaiwi intersection as well , issue with boat shed access and impacts on access for Ngapipi road sites	

# APPENDIX 9

## Section 4 : Multi-Criteria Analysis Decision Making Process

Criteria Weight Determination Matrix															
Refs:	Cr-1	Cr-2	Cr-3 Effects on community facilities (inc. public open space) and public infrastructure	Cr-4 Effects on coast/cma/waterbodies or any sites of ecological significance	Cr-5 Effects on vegetation	Cr-6 Effects on sites of cultural significance / effects on cultural value	Cr-7 Effects on sites of natural and historic heritage / archaeological value	Cr-8 Cost	Cr-9 Safety	Cr-10 Comfort	Cr-11 Directness	Cr-12 Attractiveness	Cr-13 Connectivity	Cr-14 Direct Impact on private land (includes mini pit)	
Criteria	Extent of amenity effects	Scale of amenity effects	Effects on community facilities (inc. public open space) and public infrastructure	Effects on coast/cma/waterbodies or any sites of ecological significance	Effects on vegetation	Effects on sites of cultural significance / effects on cultural value	Effects on sites of natural and historic heritage / archaeological value	Cost	Safety	Comfort	Directness	Attractiveness	Connectivity	Direct Impact on private land (includes mini pit)	
Weight >	2	5	7	6	5	6	6	6	9	7	6	6	8	4	

Unit Weighting: 0.024 0.060 0.084 0.072 0.060 0.072 0.072 0.072 0.072 0.108 0.084 0.072 0.072 0.096 0.048

83

1.000

### MCA Option Performance Matrix

Scoring is between -2 to +2. Refer to the 'Scoring Def' tab for the definition of the scoring range

Options	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14
A	-1	0	0	-1	0	-2	0	-2	-1	-2	-2	-1	-2	0
B	-1	-1	1	-2	0	-2	0	-2	1	-1	2	1	1	0
C1	-1	1	1	-2	0	-2	0	0	2	2	2	1	1	-1
C2	-1	0	1	-2	0	-2	0	0	2	2	2	1	1	-1
D1	-1	-1	1	-2	0	-2	0	-2	2	1	2	1	1	0
D2	-1	-1	1	-2	0	-2	0	-2	2	1	2	1	1	-1
E	-1	-1	1	-1	0	-2	0	-2	0	0	0	0	0	0
F	-1	-2	1	-2	0	-2	0	-1	0	1	1	0	1	0
G	-1	-1	0	-1	0	-1	0	0	0	-1	-1	1	1	-1
H	-2	-1	-1	0	-1	0	-1	1	-2	-2	-1	-2	2	-2

Option Rank	Weighted Sum of Scores
	-1.07
	-0.10
	0.48
	0.42
	0.18
	0.13
	-0.36
	-0.17
	-0.27
	-0.76

1 = Best, 10 = Worst

Score changes made during AT review to provide some closer alignment between the relative performance against criteria between similar options

A	-1	-1	1	-2	0	-2	0	-2	1	-1	2	1	1	0
B	-2	-1	0	-2	0	-2	0	-2	0	-1	2	2	0	0
C1	-1	1	1	-2	0	-2	0	0	2	2	2	1	1	-1
C2	-1	0	1	-2	0	-2	0	0	2	2	2	1	1	-1
D1	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1
D2	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1
E	0	0	0	-2	1	-2	0	0	1	1	0	1	1	0
F	0	0	0	-1	0	-1	-1	-1	1	0	-1	2	1	0
G	-1	-1	0	-1	0	-1	-1	0	0	-1	-1	1	1	-1
H	-2	-1	-1	0	-1	0	-1	1	-2	-2	-1	-2	2	-2

# APPENDIX 10

## Section 4 : Multi-Criteria Analysis Decision Making Process

Criteria Weight Determination Matrix															
Refs:	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14	
Criteria	Extent of amenity effects	Scale of amenity effects	Effects on community facilities (inc. public open space) and public infrastructure	Effects on coast / cma / water-bodies or any sites of ecological significance	Effects on vegetation	Effects on sites of cultural significance / effects on cultural value	Effects on sites of natural and historic heritage / archaeological value	Cost	Safety	Comfort	Directness	Attractiveness	Connectivity	Direct Impact on private land (includes mini put)	
Weight >	2	5	7	6	5	6	6	6	9	7	6	6	8	4	

83

Unit Weighting:	0.024	0.060	0.084	0.072	0.060	0.072	0.072	0.072	0.108	0.084	0.072	0.072	0.096	0.048
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1.000

MCA Option Performance Matrix															
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Scoring is between -2 to +2. Refer to the 'Scoring Def' tab for the definition of the scoring range

Options	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14
A	-1	-1	1	-2	0	-2	0	-2	1	-1	2	1	1	0
B NEW	-2	-1	0	-2	0	-2	0	-2	0	-1	2	2	0	0
C1	-1	1	1	-2	0	-2	0	0	2	2	2	1	1	-1
C2	-1	0	1	-2	0	-2	0	0	2	2	2	1	1	-1
D1	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1
D2	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1
E NEW	0	0	0	-2	1	-2	0	0	1	1	0	1	1	0
F NEW	0	0	0	-1	0	-1	-1	-1	1	0	-1	2	1	0
G	-1	-1	0	-1	0	-1	-1	0	0	-1	-1	1	1	-1
H	-2	-1	-1	0	-1	0	-1	1	-2	-2	-1	-2	2	-2

Option Rank	Weighted Sum of Scores
7	-0.10
8	-0.34
1	0.48
2	0.42
3	0.28
3	0.28
5	0.13
6	-0.01
9	-0.34
10	-0.76

1 = Best, 10 = Worst

Description	Cost \$
South of line to beyond OBC then north over line	\$ 65
South of line to Judge's Bay	\$ 98
North of line on OBC land to Tamaki via reserve	\$ 40
North of line on OBC land to Tamaki via mini golf	\$ 40
As C1 but elevated over OBC land	\$ 55
As C2 but elevated over OBC land	\$ 55
North of line up to OBC then marine boardwalk to Tamaki	\$ 56
Marine boardwalk from Orakei Point to boatsheds on Ngapipi	\$ 43
Ngapipi Coastline	\$ 42
Ngapipi Road	\$ 18

## Section 4 : Glen Innes to Tamaki Drive Shared Path Multi-Criteria Analysis Decision Making Process

## APPENDIX 11

Refs:	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14	
Criteria	Extent of amenity effects	Scale of amenity effects	Effects on community facilities (inc. public open space) and public infrastructure	Effects on coast/ cma / waterbodies or any sites of ecological significance	Significance	Effects on vegetation	Cultural significance / effects on cultural value	Effects on sites of natural and historic heritage / archaeological value	Cost	Safety	Comfort	Directness	Attractiveness	Connectivity	Direct impact on private land (includes mini put)
Weight >	2	5	7	6	5	6	6	6	9	7	6	6	8	4	

Unit Weighting:

0.024	0.060	0.084	0.072	0.060	0.072	0.072	0.072	0.108	0.084	0.072	0.072	0.096	0.048
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### MCA Option Performance Matrix

Scoring is between -2 to +2. Refer to the 'Scoring Def' tab for the definition of the scoring range

Options	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14	Shortlist Y/N/?	Weighted Sum of Scores	Rank 1 = Best 10 = Worst	Description	Route Cost \$m	Property Cost \$m	Total Cost \$m	Length Km	Reason for shortlist selection
A	-1	-1	1	-2	0	-2	0	-2	1	-1	2	1	1	0	N	-0.10	6	South of line to beyond OBC then north over line	\$ 65.0	\$ -	\$ 65.0	\$ 1.7	The option is a high cost and scores relatively poorly; CPTED issues; "doubling" of facilities west of OBC.
B	-2	-1	0	-2	0	-2	0	-2	0	-1	2	2	0	0	N	-0.34	9	NEW South of line to Judge's Bay	\$ 98.0	\$ -	\$ 98.0	\$ 3.0	The option is a high cost and scores relatively poorly; CPTED issues; "doubling" of facilities west of OBC.
C1	-1	1	1	-2	0	-2	0	0	2	2	2	1	1	-2	?	0.43	1	North of line on OBC land to Tamaki via reserve	\$ 40.0	\$ 5.0	\$ 45.0	\$ 1.0	The option scores well; however, if it requires removal of significant trees in the reserve, it will be removed from the shortlist.
C2	-1	0	1	-2	0	-2	0	0	2	2	2	1	1	-2	Y	0.37	2	North of line on OBC land to Tamaki via mini golf	\$ 40.0	\$ 5.0	\$ 45.0	\$ 1.0	The option scores well and is retained on the shortlist
D1	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1	?	0.28	3	As C1 but elevated over OBC land	\$ 55.0	\$ 1.5	\$ 56.5	\$ 1.5	The option scores well; however, if it requires removal of significant trees in the reserve, it will be removed from the shortlist.
D2	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1	Y	0.28	3	As C2 but elevated over OBC land	\$ 55.0	\$ 1.5	\$ 56.5	\$ 1.5	The option scores well and is retained on the shortlist
E	0	0	0	-2	1	-2	0	-1	1	1	0	1	1	0	Y	0.06	5	NEW North of line up to OBC then marine boardwalk to Tamaki	\$ 56.0	\$ -	\$ 56.0	\$ 1.4	The option is retained as it keeps the benefits of the C & D options but avoids the impact on the OBC land.
F	0	0	-2	-2	0	-2	-2	0	1	0	-1	2	1	0	N	-0.33	8	NEW Marine boardwalk from Orakei Point to boatsheds on Ngapipi	\$ 43.0	\$ -	\$ 43.0	\$ 0.8	Likely to be difficult to obtain a consent for this option as the visual and ecological effects are significant and there are alternatives.
G	-1	-1	0	-1	0	-1	-1	0	0	-1	-1	1	1	0	Y	-0.29	7	Ngapipi Coastline	\$ 42.0	\$ -	\$ 42.0	\$ 1.0	Iwi support this option; possibility a hybrid of this and the Ngapipi Road option may be viable - investigation needed.
H	-2	-1	-1	0	-1	0	-1	1	-2	-2	-1	-2	2	-2	Y	-0.76	10	Ngapipi Road	\$ 18.0	\$ 1.5	\$ 19.5	\$ 1.0	Retained as do-minimum and lowest cost; possibility a hybrid of this and the Ngapipi Road option may be viable - investigation needed.

### Scoring amendments 03 May 2017:

1 C1 and C2 for Cr-14 changed to -2 from -1 because the impact on private land is greater than for options D1 and D2 that are rated at -1. This provides a differential for these options for this criterion.

2 Option F, the following scores have been changed:

Cr-3 reduced from -1 to -2 because there is seen to be significant impact on a public space through visual impact (structure in a place "it does not belong")

Cr-4 reduced from -1 to -2 because it is now understood that there are concerns about impacts on the marine reserve as part of the CMA

Cr-6 and Cr-7 reduced from -1 to -2 because of the impacts recorded for Cr-3 and Cr-4 and additionally feedback from iwi about the importance of this environment.

3 The following corrections made for Cr-8 (Cost)

Option E: \$56m corrected from 0 to -1

Option F: \$43m corrected from -1 to 0

4 Cr-14 for Option G changed from -1 to 0 because there are minimal impacts on private land (no land take required)



## APPENDIX 12

### Section 4 : Glen Innes to Tamaki Drive Shared Path Multi-Criteria Analysis Decision Making Process

Criteria Weight Determination Matrix

Ref:	Cr-1 Criteria	Cr-2 Extent of amenity effects	Cr-3 Scale of amenity effects	Cr-4 Effects on community facilities (inc. public open space) and public infrastructure	Cr-5 Effects on waterbodies or any sites of ecological significance	Cr-6 Effects on vegetation	Cr-7 Effects on sites of cultural significance / effects on cultural value	Cr-8 Cost	Cr-9 Safety	Cr-10 Comfort	Cr-11 Directness	Cr-12 Attractiveness	Cr-13 Connectivity	Cr-14 Direct impact on private land (includes mini put)
Weight >	2	5	7	6	5	6	6	6	9	7	6	6	8	4

Unit Weighting:

0.024	0.060	0.084	0.072	0.060	0.072	0.072	0.108	0.084	0.072	0.072	0.096	0.048
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Options	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14	Shortlist Y/N?	Weighted Sum of Scores	Rank 1 = Best 10 = Worst	Description	Route Cost \$m	Property Cost \$m	Total Cost \$m	Length Km	Reason for shortlist selection
C1	-1	1	1	-2	0	-2	0	0	2	2	2	1	1	-2	?	0.43	1	North of line on OBC land to Tamaki via reserve	\$ 40.0	\$ 5.0	\$ 45.0	1.00	The option scores well; however, if it requires removal of significant trees in the reserve, it will be removed from the shortlist.
C2	-1	0	1	-2	0	-2	0	0	2	2	2	1	1	-2	Y	0.37	2	North of line on OBC land to Tamaki via mini golf	\$ 40.0	\$ 5.0	\$ 45.0	1.00	The option scores well and is retained on the shortlist
D1	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1	?	0.28	3	As C1 but elevated over OBC land (via reserve)	\$ 55.0	\$ 1.5	\$ 56.5	1.50	The option scores well; however, if it requires removal of significant trees in the reserve, it will be removed from the shortlist.
D2	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1	Y	0.28	3	As C2 but elevated over OBC land (via mini golf)	\$ 55.0	\$ 1.5	\$ 56.5	1.50	The option scores well and is retained on the shortlist
E	0	0	0	-2	1	-2	0	-1	1	1	0	1	1	0	Y	0.06	5	NEW - North of line up to OBC then marine boardwalk to Tamaki	\$ 56.0	\$ -	\$ 56.0	1.40	The option is retained as it keeps the benefits of the C & D options but avoids the impact on the OBC land.
A	-1	-1	1	-2	0	-2	0	-2	1	-1	2	1	1	0	N	-0.10	6	South of line to beyond OBC then north over line	\$ 65.0	\$ -	\$ 65.0	1.70	The option is a high cost and scores relatively poorly; CPTED issues; "doubling" of facilities west of OBC.
G	-1	-1	0	-1	0	-1	-1	0	0	-1	-1	1	1	0	Y	-0.29	7	Ngapipi Coastline	\$ 42.0	\$ -	\$ 42.0	1.00	Iwi support this option; possibility a hybrid of this and the Ngapipi Road option (H) may be viable - investigation needed.
F	0	0	-2	-2	0	-2	-2	0	1	0	-1	2	1	0	N	-0.33	8	NEW - Marine boardwalk from Orakei Point to boatsheds on Ngapipi	\$ 43.0	\$ -	\$ 43.0	0.80	Likely to be difficult to obtain a consent for this option as the visual and ecological effects are significant and there are alternatives.
B	-2	-1	0	-2	0	-2	0	-2	0	-1	2	2	0	0	N	-0.34	9	NEW - South of line to Judge's Bay	\$ 98.0	\$ -	\$ 98.0	3.00	The option is a high cost and scores relatively poorly; CPTED issues; "doubling" of facilities west of OBC.
H	-2	-1	-1	0	-1	0	-1	1	-2	-2	-1	-2	2	-2	Y	-0.76	10	Ngapipi Road	\$ 18.0	\$ 1.5	\$ 19.5	1.00	Retained as do-minimum and lowest cost; possibility a hybrid of this and the Ngapipi Coastline option (G) may be viable - investigation needed.

#	Criteria	Description	#	Criteria	Description	#	Criteria	Description
1	Extent of amenity effects	The number of third party properties (residential, commercial etc.) and people potentially affected by the Project.	6	Effects on sites of cultural significance / effects on cultural value	Whether the proposed route passes through and/or affects sites of cultural significance / effects on cultural value *Refer to District Plan and PAUP planning maps	11	Directness	The degree to which the proposed route constitutes a direct path for users wanting to travel to a destination
2	Scale of amenity affects	The scale of effects on amenity values for residents of third party property. Effects include: - Noise, Vibration, Visual, Dust, Privacy	7	Effects on sites of natural and historic heritage/archaeological value	Whether the proposed route passes through and/or affects sites of natural / heritage /archaeological significance *Refer to District Plan and PAUP planning maps/NZAA database	12	Attractiveness	The degree to which the proposed route constitutes an attractive alternative route for potential users to get from A to B. • Variety of experiences / environments, Variety of views, Integrates with the surrounding environment, Contributes to social interaction (e.g. ability to ride 2 abreast), Passes places of interest
3	Effects on community facilities (inc. public open space) and on public infrastructure	The effects on people's ability to use and enjoy: • existing community facilities, including private facilities • areas of public open space <u>The effects on existing and known future infrastructure and services</u>	8	Cost	The likely financial cost of the proposed route.	13	Connectivity	The degree to which the proposed route provides opportunity for connections to residential areas, public open spaces, commercial areas and other land uses.
4	Effects on waterbodies including coast/CMA or any sites of ecological significance	Whether the proposed route passes through and/or affects waterbodies or any sites of ecological significance. *Refer to District Plan and PAUP planning maps	9	Safety	Whether the proposed route provides a safe environment for pedestrians and cyclists by for example, minimising interaction with roads. The degree to which the proposed route implements Crime Prevention Through Environmental Design principles. Includes personal and perceived safety. • User conflict, Cyclist speeds, Non-slip surface, Visibility, Road crossings, Good lighting, High level of user activity, Options to avoid confrontation	14	Impact on private land	The impact on use (scale, extent, severance) on use of private land – in terms of their direct use of land
5	Effects on vegetation	The amount and significance of any vegetation alteration/removal required for the proposed route	10	Comfort	The degree to which the proposed route avoids significant slopes, complicated manoeuvres and exposure to the elements. • Surface, Gradients, Complicated manoeuvres, Protection from the elements			

## Section 4 : Glen Innes to Tamaki Drive Shared Path Multi-Criteria Analysis Decision Making Process

Ref:	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14
Weight >	2	5	7	6	5	6	6	6	9	7	6	6	8	4
Unit Weighting:	0.024	0.060	0.084	0.072	0.060	0.072	0.072	0.072	0.108	0.084	0.072	0.072	0.096	0.048

## MCA Option Performance Matrix

Options	Cr-1	Cr-2	Cr-3	Cr-4	Cr-5	Cr-6	Cr-7	Cr-8	Cr-9	Cr-10	Cr-11	Cr-12	Cr-13	Cr-14	PCG Shortlist Y/N?	PCB Shortlist Y/N?	Weighted Sum of Scores	Rank 1 = Best 10 = Worst	Description	Route Cost \$m	Property Cost \$m	Total Cost \$m	Length Km	Reason for shortlist selection	
																								As per PCG recommendation of 03/05/2017	
A	-1	-1	1	-2	0	-2	0	-2	1	-1	2	1	1	0	N	N	-0.10	6	South of line to beyond OBC then north over line	\$ 65.0	\$ -	\$ 65.0	2.20	The option is a high cost and scores relatively poorly; CPTED issues; "doubling" of facilities west of OBC.	PCB agrees PCG recommendation
B	-2	-1	0	-2	0	-2	0	-2	0	-1	2	2	0	0	N	N	-0.34	9	NEW South of line to Judge's Bay	\$ 98.0	\$ -	\$ 98.0	3.40	The option is a high cost and scores relatively poorly; CPTED issues; "doubling" of facilities west of OBC.	PCB agrees PCG recommendation
C1	-1	1	1	-2	0	-2	0	0	2	2	2	1	1	-2	?	N	0.43	1	North of line at grade on OBC land to Tamaki via reserve	\$ 40.0	\$ 5.0	\$ 45.0	2.20	The option scores well; however, if it requires removal of significant trees in the reserve, it will be removed from the shortlist.	Option C1 removed from short list because its impact on the OBC land does not recognise the requirement for OBC to continue being able to store boats in this area (which the equivalent D1 option does recognise); further, the removal of trees on the reserve will be required and AT wishes to avoid this as they are mature specimens.
C2	-1	0	1	-2	0	-2	0	0	2	2	2	1	1	-2	Y	N	0.37	2	North of line at grade on OBC land to Tamaki via mini golf	\$ 40.0	\$ 5.0	\$ 45.0	2.20	The option scores well and is retained on the shortlist	Option C2 removed from short list because its impact on the OBC land does not recognise the requirement for OBC to continue being able to store boats in this area (which the equivalent D1 option does recognise).
D1	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1	?	N	0.28	3	As C1 but elevated over OBC land	\$ 55.0	\$ 1.5	\$ 56.5	2.20	The option scores well; however, if it requires removal of significant trees in the reserve, it will be removed from the shortlist.	Option C1 removed from short list because the removal of trees on the reserve will be required and AT wishes to avoid this as they are mature specimens.
D2	-1	-1	1	-2	0	-2	0	-1	2	1	2	2	1	-1	Y	Y	0.28	3	As C2 but elevated over OBC land	\$ 55.0	\$ 1.5	\$ 56.5	2.20	The option scores well and is retained on the shortlist	PCB agrees PCG recommendation
E	0	0	0	-2	1	-2	0	-1	1	1	0	1	1	0	Y	Y	0.06	5	NEW North of line up to OBC then marine boardwalk to Tamaki	\$ 56.0	\$ -	\$ 56.0	1.90	The option is retained as it keeps the benefits of the C & D options but avoids the impact on the OBC land.	PCB agrees PCG recommendation
F	0	0	-2	-2	0	-2	-2	0	1	0	-1	2	1	0	N	N	-0.33	8	NEW Marine boardwalk from Orakei Point to boatsheds on Ngapipi	\$ 43.0	\$ -	\$ 43.0	1.80	Unlikely to be difficult to obtain a consent for this option as the visual and ecological effects are significant and there are alternatives.	PCB agrees PCG recommendation
G	-1	-1	0	-1	0	-1	-1	0	0	-1	-1	1	1	0	Y	Y	-0.29	7	Ngapipi Coastline	\$ 42.0	\$ -	\$ 42.0	1.80	Iwi support this option; possibility a hybrid of this and the Ngapipi Road option may be viable - investigation needed.	PCB agrees PCG recommendation.
H	-2	-1	-1	0	-1	0	-1	1	-2	-2	-1	-2	2	-2	Y	N	-0.76	10	Ngapipi Road	\$ 18.0	\$ 1.5	\$ 19.5	1.80	Retained as do-minimum and lowest cost; possibility a hybrid of this and the Ngapipi Road option may be viable - investigation needed.	Option H removed because it has significant safety issues and requires some land purchase; it would not meet cycle Metro standards; it is the lowest scoring option although its cost is within budget. The "hybrid" option referred to in the PCG assessment can be delivered through design amendments to option G.

### Amendments 03 May 2017 resulting from PCG meeting for recommendation to PCB:

1 C1 and C2 for Cr-14 changed to -2 from -1 because the impact on private land is greater than for options D1 and D2 that are rated at -1. This provides a differential for these options for this criterion.

2 Option F, the following scores have been changed:

Cr-3 reduced from -1 to -2 because there is seen to be significant impact on a public space through visual impact (structure in a place "it does not belong")  
 Cr-4 reduced from -1 to -2 because it is now understood that there are concerns about impacts on the marine reserve as part of the CMA  
 Cr-6 and Cr-7 reduced from -1 to -2 because of the impacts recorded for Cr-3 and Cr-4 and additionally feedback from iwi about the importance of this environment.

3 The following corrections made for Cr-8 (Cost)

Option E: \$56m corrected from 0 to -1

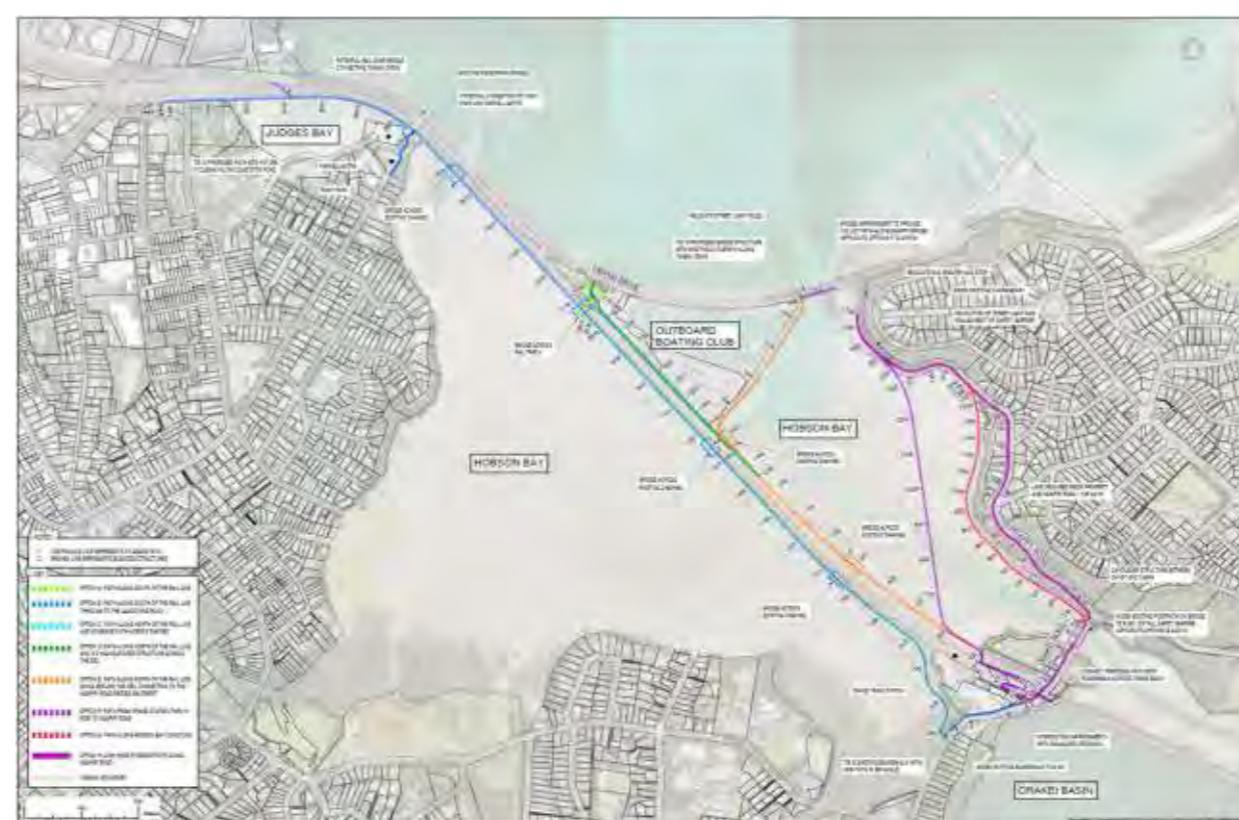
Option F: \$43m corrected from -1 to 0

4 Cr-14 for Option G changed from -1 to 0 because there are minimal impacts on private land (no land take required)

### Amendments 04 May 2017 resulting from PCB meeting to agree shortlist of options

1 Path lengths corrected.

## APPENDIX 13



# APPENDIX 14

## Comment from the Harbourmaster

**From:** Andrew Hayton (AT)  
**Sent:** Monday, 8 May 2017 8:41 a.m.  
**To:** Tarun Ahuja (AT) <[Tarun.Ahuja@at.govt.nz](mailto:Tarun.Ahuja@at.govt.nz)>  
**Subject:** RE: Printing for GI/Tamaki

Hi Tarun,

Thanks for the message.

From the Harbourmasters perspective:

The purple dotted line option that crosses Whakatakata Bay passes to the east of all of the moorings in the bay and will therefore no impede navigation of vessels using the moorings. Kayaks occasionally transit the bay and proceed up Purewa Creek. With the present redevelopment of area adjacent to Orakei railway station, there may be a future increase in recreational boat traffic to and from the development. As such, any crossing must have sufficient clearance to allow small vessels to transit beneath.

The yellow dotted option across the mouth of the OBC would need to have as a minimum the same clearance that the Tamaki Road bridge provides. The span piers would need to be suitably placed for safe transit and the pillars adequately fendered if in the water. The proposed bridge appears to be on a tight corner for vessels entering the marina so would need to be assessed further to ensure that vessels can safely make the turn. One problem that may be encountered is people fishing off the bridge and thereby hindering vessels transiting beneath. We often encounter this issue on the Tamaki Drive bridge. Any lighting on the bridge must not interfere with the safe navigation of vessels.

The other options do not appear to impact navigation. The bridges across Hobson Bay channels would need to provide no less clearance than the existing bridges on the embankment.

Please don't hesitate to ask if you need any more information.

Regards

Andrew

**Andrew Hayton**

**Auckland Harbourmaster**

Marine Rescue Centre, 3 Solent Street

Mechanics Bay, Auckland

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**From:** Tarun Ahuja (AT)  
**Sent:** Thursday, 4 May 2017 12:27 p.m.  
**To:** Andrew Hayton (AT) <[Andrew.Hayton@at.govt.nz](mailto:Andrew.Hayton@at.govt.nz)>  
**Subject:** FW: Printing for GI/Tamaki

Hi Andrew

This relates to the Glen Innes to Tamaki cycle way project which is a 7.2 km off road cycleway. This project is an AT/NZTA joint venture and funded on the Urban cycleway fund (UCF) and is being delivered in four sections (please refer attached overall map).

We are presently working on the option selection process for the section 4 i.e. section between Orakei Station and Tamaki Drive. The long list of 8 options have been evaluated using a high level multi-criteria analysis (MCA) approach. The Project Control Board (comprising Greg Edmonds, Andrew Scoggins, Andrew Allen, Chris Jones, Kathryn King + colleagues from NZTA) considered this information today morning to provide some direction to the project team. Please refer to the MCA map attached showing the various route options being considered. The various routes are briefly described in the legend provided at the bottom left corner of the plan and further in the attached document named "Options description".

One of the recommendations from the PCB was to seek comments/input from you on the options that traverse across the Hobson Bay and the coastal routes i.e. options G, E and F from the perspective of any adverse impacts on marine navigation.

Can I please request you to provide brief comments as above to enable us use this information for the evaluation process? We are intending to complete this process by tomorrow and conclude the assessment report early next week.

It would be greatly appreciated if you are please able to provide your comments to us by mid-day tomorrow. Please email or call me if you need any further information.

Regards

**Tarun Ahuja | Manager  
Investigation and Design (Central)**

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