IDENTIFICATION AND ASSESSMENT OF POSSIBLE ROUTE OPTIONS – MULTI-CRITERIA ANALYSIS WITH COMMUNITY INVOLVEMENT

ŌTAKI TO NORTH OF LEVIN

PREPARED FOR NEW ZEALAND TRANSPORT AGENCY

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1. Introduction

1.1. Background

This report provides information on investigations undertaken in relation to the identification and evaluation of possible locations for a suitable route for a potential four-lane expressway between Taylors Road (to the north of Ōtaki) and State Highway 1 (SH1) north of Levin. The future route would also take into account and provide for State Highway 57 (SH57).

A number of reports have described the investigations undertaken to date on the Ōtaki to North of Levin project[1].

Previous investigations have involved extensive consultation over several years, including with stakeholders and the wider community[2]. They have also involved close liaison with Horowhenua District Council (HDC), and, as appropriate, Kāpiti Coast District Council (KCDC), Horizons Regional Council (HRC) and Greater Wellington Regional Council (GWRC). In 2015, HDC recommenced work on a Town Centre Development Strategy as part of its overall Growing Levin study[3]. As part of the information to assist the development of this strategy the NZ Transport Agency (the Transport Agency) has undertaken to work together with HDC to investigate possible long-term road transport options that would take traffic, particularly heavy vehicle traffic, away from the main town centre.

Earlier investigations as part of the Ōtaki to North of Levin (O2NL) project had determined that a four-lane expressway could not be practically accommodated within the existing town centre or nearby urban area for a number of reasons[4]. Similarly, any route option which would pass to the west of Levin urban area had also been largely ruled out in earlier investigations[5].

1.2. Objectives

The O2NL project comprised the northern-most section of the Wellington Northern Corridor, and will assist meeting its overall objectives.

The specific current objectives for the O2NL project are to:

- Reduce travel times on the state highway network;
- Reduce deaths and serious injuries on the state highway network;
- Enhance the resilience of the state highway network; and
- Provide appropriate connections that integrate the state highway and local road networks to serve urban areas.

These are influential in processes of route choice and concept design for a future expressway in the area and have been taken into account in the work documented in this report.

1.3. Process

This report sets out the most recent investigations to assist the NZ Transport Agency to determine route options for a four-lane expressway from Taylors Road to north of Levin. The investigations build on earlier options assessment work for this project.

As part of a 'refreshed' approach to community and stakeholder engagement, the Transport Agency wished to involve a broader range of people, particularly from community and

[1] A full list of previous reports is included as Appendix A in the report "Ōtaki to North of Levin – Taylors Road to Levin Northern Connection – Report on Identification and Assessment of Options", Stantec, APR, December 2016.
[2] Details and outcomes of public consultation are contained in the various consultation reports. The public consultation activity has been supplemented with meetings with key stakeholders, particularly with Iwi.
[3] Growing Levin seeks to leverage off the improved travel times to Wellington which will result from the completion of the sections of the Wellington Northern Corridor RoNS to the south, and to enhance the ability of the town to attract new residents, commercial and industrial activity, and visitors. Subsequent work undertaken by HDC has had a wider economic focus.
[4] See "Ōtaki to North of Levin RoNS – Corridor Stage Initial Considerations", MWH, July 2011.
[5] See "Scoping Report – Ōtaki to North of Levin Expressway", MWH, July 2012.

stakeholder groups, and Iwi representatives, in investigating route options[6]. To ensure that any process addressed community expectations, the options to be considered would need to involve a representative range of routes, including some that may have been removed from consideration earlier in the technical investigations. This was to include some options that individuals and groups had suggested as part of the most recent engagement processes.

The investigations described in this report can therefore be considered as a community-based review of route options. This review was undertaken at a stage when investigations had identified and indicated a number of route options for wider consultation through the established ACRE (Area, Route, Corridor, Easement) method which was being applied in the overall project. Figure 1-1 sets out the steps in the ACRE process and shows how the review described in this report relates to this method[7]. The community review ensures that the information about the area is up-to-date, that the range of values held by the community is recognised and will be taken into account in any Transport Agency decision, and the information on which route choice decisions are based are open to community input and critique[8].

The process described in this report had the benefit of information, comments and suggestions from the 2017 public engagement, wider engagement with Iwi, and also the participation of the Project Reference Group (PRG) which had been established for the project[9].

Having determined this general approach, a specific process was determined which would seek to meet both the Transport Agency's and the wider communities' (as expressed through the PRG processes) expectations.

The work followed four stages, broadly, as follows:

Stage 1: The project team, involving the Transport Agency and its consultant team, updated information on constraints and opportunities mapped for the initial Area stage in 2011. It also prepared maps of a range of broad routes for consideration and evaluation through the community-based process.

Stage 2: A community workshop (Workshop 1) was held to review and revise, as appropriate, the preliminary corridors and the route options evaluation criteria.

Stage 3: A community workshop (Workshop 2) was held to determine if any of the possible routes were fatally flawed, to score each option against the agreed criteria and to determine a 'community' weighting for the criteria.

Stage 4: The project team undertook analysis of the findings from the community workshop.

The remainder of this report describes the investigations, analysis and findings of these four stages of work. The investigations described cover work done in the period from July to September 2017. However, the wider range of earlier investigations and the information which had been gained at these earlier stages, contributed significantly to the ability to undertake the work described in this report over a relatively short period. Throughout, information from consultation and engagement processes have been taken into account as work proceeded.

The investigations have led to the identification of a short list of options. These options will be further shortlisted after undertaking transport modelling and continuing discussions with Tangata Whenua, and the shorter list will be the subject of future stakeholder and community

[6] Consultation and engagement on the project had recommenced in May 2017. The basis of the consultation undertaken between May and July 2017 reflected changes in the project scope from earlier consultation exercises. Details of the methods and outcomes of the most recent consultation, which provided a platform for the investigations described in this report, are provided in "SH1 Ōtaki to North of Levin: Engagement Summary Report – May-July 2017", NZTA, August 2017 https://www.nzta.govt.nz/projects/wellington-northern-corridor/Ōtaki-to-north-of-levin/publications

[7] Note that this figure is a considerable simplification. At all steps consultation was involved and detailed information was collected prior to decisions being taken. In particular, the Route (i) stage involved numerous complex investigations and analyses. The work undertaken in the various steps have been fully described in the project reports. The Executive Summary of the Scheme Report (July 2017) includes Figure 3-1 which provides a Project History flow chart.

[8] It is recognised that some aspects of the Area have changed considerably since the project commenced in 2011, that the community itself has changed with many new people living in the district, and that transport patterns have also changed.

[9] See 2017 consultation report, ibid, particularly sections 4.1(4) and 5.11 and Appendix D of that report.

consultation. The outcomes of the consultation processes will assist the Transport Agency in its identification of a preferred option or options.

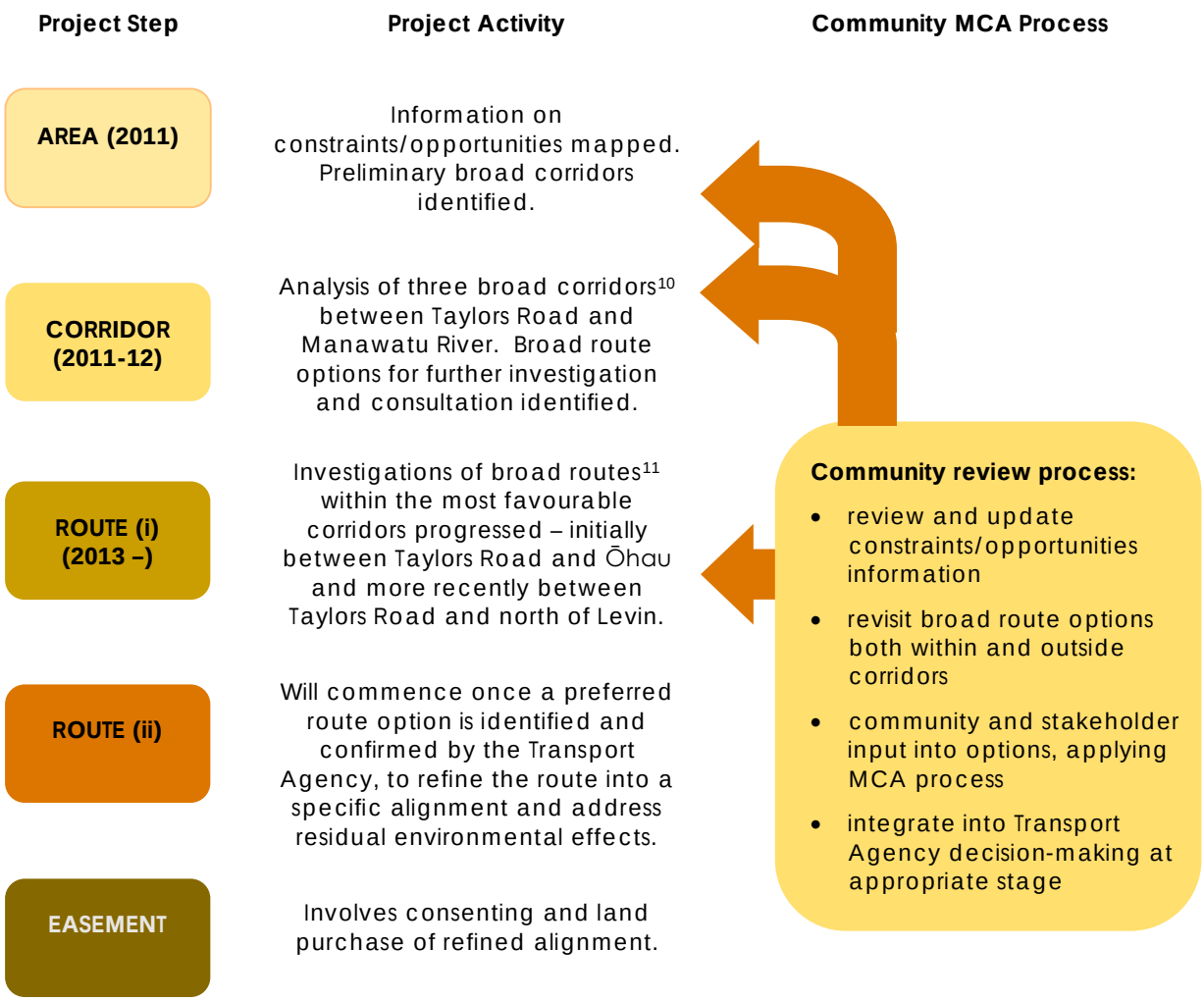

Figure 1-**1**: Schematic Diagram of Relationship between Overall O2NL Process and Community MCA Process

[10] Each several kilometres in width, to allow for route options to be investigated within the Corridors.
[11] Each 150-300m in width to allow for later refinement to avoid or mitigate adverse effects.

2. Updating Information on Constraints and Opportunities and Identification of Route Options

2.1. Area Map Update

Stage 1 focused on confirming the constraints and opportunities within the Area, and undertaking a preliminary identification of possible routes.

This work updated earlier investigation work undertaken at the Area Stage. The following section provides a brief summary of the investigation work.

Given that the Transport Agency has decided to consider an expressway from Taylors Road to north of Levin, this entire area was the basis for the updated constraints work. The study Area is shown in Figure 2-1.

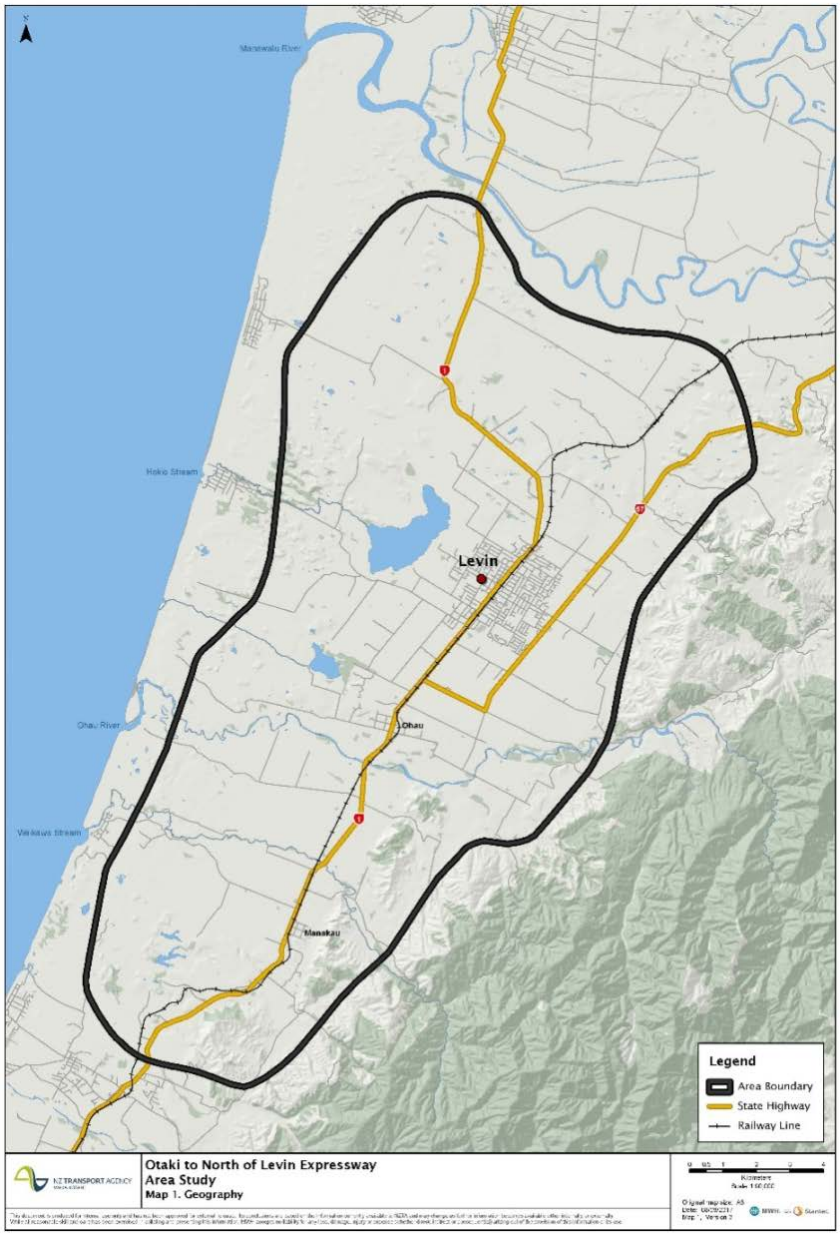

Figure 2-1: Study Area

Constraints information for this area had been gathered initially at the Area stage of the project, and reviewed as necessary for subsequent stages[12]. The current phase of work involved a review and update of the various constraint maps based on more recently available information. Table 2-1 summarises the updates made to the constraint maps[13].

Table 2-1: Summary of Update to Constraint Maps

Constraint Map	Description of further work
1 Geography	No changes
2 Landscape\Urban Design Quality	No changes following a review
3 Landscape\Urban Design Capability	No changes following a review
4 Landscape\Urban Design Features	No changes following a review
5 Heritage Areas	Updated from current notable tree and heritage site data (HDC) and known archaeological sites (NZ Archaeological Association)
5A Archaeological Risk	New map based on current understanding of risks of encountering archaeological sites
6 Tangata Whenua Areas of Significance	Updated based on parcel areas of Māori Freehold Land 2017 (initial assessment only)
7 Lifelines	Reviewed and updated National Grid lines
8 Population Distribution	Updated based on Land parcel data July 2017 (LINZ)
9 Geological Constraints	No changes following a review
10 Natural Hazards	No changes following a review
11 Flooding	Updated with some limited new flood hazard information (Horizons)
12 Ecological Areas of Significance	Updated following a review
12A Protected Areas	New map recording protected areas of Crown Land (NaPALIS[14])
13 Land Use Capability	Updated based on LUC data July 2017 (MfE)
14 Land Ownership	Additional reserve and Māori Land parcels added. Designations updated
15 District and Regional Plans	Updated based on information from HDC
16 Contaminated Land	Updated based on information from HDC
17 Contours	No changes

[12] Details of the original Area mapping and the associated set of 17 maps are provided in the report "Area Analysis Report", MWH August 2011. As the subsequent stages had focussed on Corridor investigations and specific route options, it was considered appropriate to revisit the Area maps and comprehensively update them.

[13] Full details of the review and update process and the complete set of replacement maps are provided in the report "Ōtaki to North of Levin – Area Mapping Update", Stantec, August 2017

[14] Information from the National Property and Land Information System – received late in the workshop process and used as a check of other information.

2.2. Identification of Preliminary Route Options

As the recent consultation and engagement had indicated community interest in a wide geographic spread of routes across the Area, the Transport Agency wished to revisit a number of earlier route options which had not been proceeded with at the start of the Route (i) stage in Figure 1-1. Through the PRG, it also sought to examine some entirely new options.

The preliminary routes for the analysis are shown on Figure 2-2. They were developed from the sources set out in Table 2-2, and involved a review of aerial photographic information as well as the constraints mapping to ensure that major constraints were avoided as far as possible, and, in general terms, the most practicable route through each locality was mapped.

Each option is shown on Figure 2-2 as a 300 metre wide band. This width allows flexibility to locate an expressway alignment within the band, and to leave room to avoid any particular features and address other adverse effects that may come to light during the detailed work of developing an alignment. The broad routes as shown provide for the minimum geometric standards appropriate for an expressway.

The corridors are split into southern and northern sections. The southern and northern sections join south of Ōhau or in the vicinity of SH57/Arapaepae Road. The southern and northern sections can be combined in various ways to create multiple whole-of-route options.

Table 2-2: Preliminary Route Sources

Section No.	Source
S1	Based on Corridor 46 from 2012 Scoping Report – initially not shortlisted but retained for consultation
S2	Based on Option T02 from 2013 - 2016 investigations (Further Options Report/Draft Scheme Report) but cut short to tie into western options to the north.
S3	Based on Option T02 from 2013 - 2016 investigations (Further Options Report/Draft Scheme Report).
S4	Based on Option T015 from 2013 - 2016 investigations (Further Options Report/Draft Scheme Report).
S5	Based on Option T017 from 2013 - 2016 investigations (Further Options Report/Draft Scheme Report).
S6	Based on Corridor 76 from 2012 Scoping Report – initially not shortlisted but retained for consultation
S7	Based on Corridor Section J from 2012 Scoping Report
N1	Based on historical option from 2000 Himatangi to Waikanae Study
N2	New option, developed to link southern options to N1 east of Lake Papaitonga.
N3	Based on Corridor 46 from 2012 Scoping Report – initially not shortlisted but retained for consultation
N4	Based on Option NC4 from 2016 investigations (Further Options Report/Draft Scheme Report).
N5	Based on Option NC5 from 2016 investigations (Further Options Report/Draft Scheme Report).

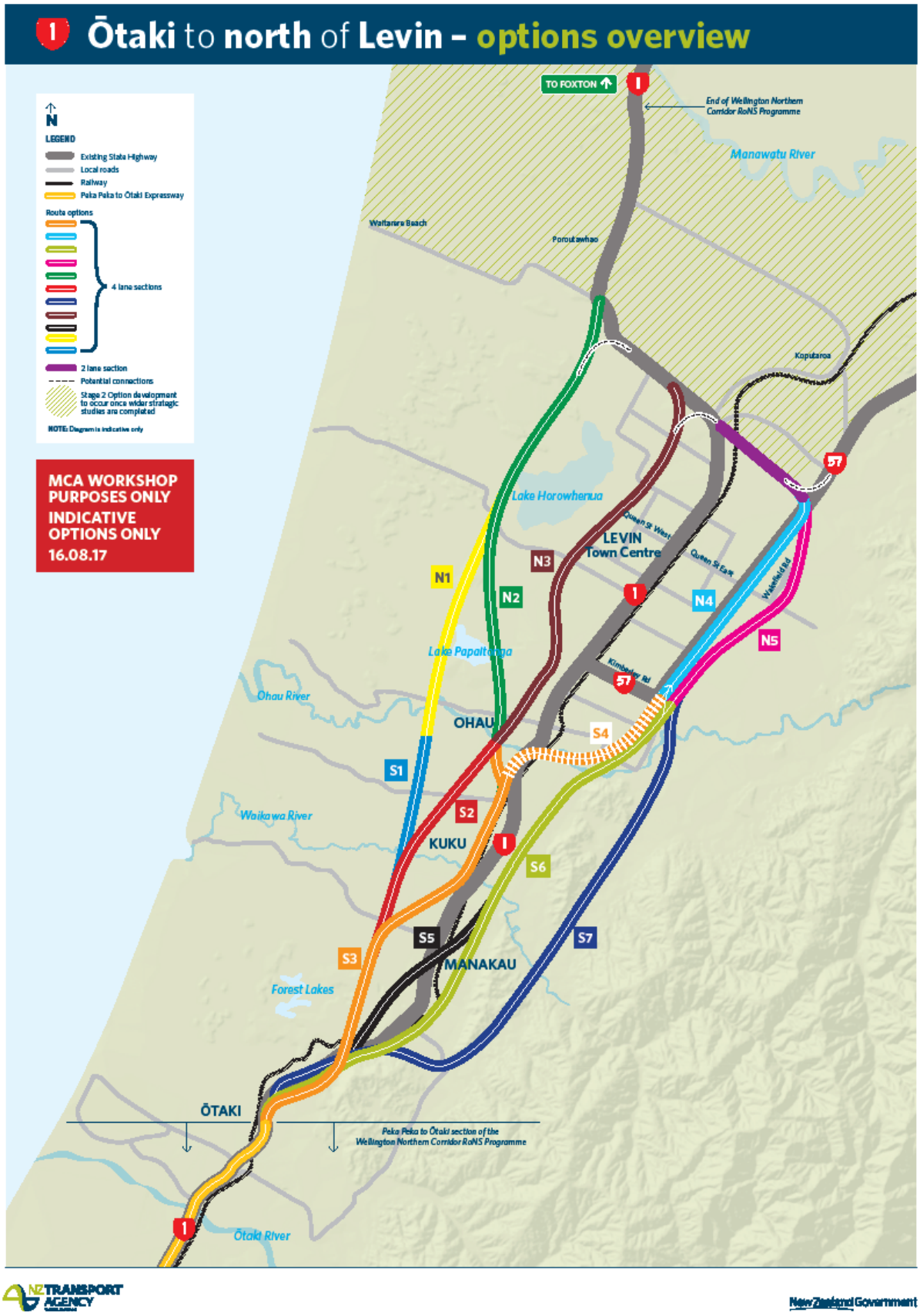

Figure 2-1: Preliminary Route Options

3. Workshop 1

3.1. Introduction

The Transport Agency sought to ensure that both Iwi and the PRG were able to take part in the community-based MCA process. It was considered important firstly that there should be a good understanding of the purpose, approach, and method of MCA and secondary that as many Iwi representatives, stakeholders and community representatives were able to be involved as possible.

At the PRG meeting prior to the first workshop[15] a presentation was made and discussion held on the background and methodology of MCA. The powerpoint presentation is included as Appendix A.

Two workshops, one including a site visit for the participants to inspect the route options, were considered necessary and appropriate for the overall process. It was recognised that community and Iwi participants would have limited time to be involved in the process. The two workshops were therefore timed as afternoon and evening sessions as close together as practicable in August 2017. Further details of the workshops are provided in the following sections.

For both workshops a draft agenda and briefing paper were provided in advance. For Workshop 1, this is included, along with the workshop notes[16], in Appendix B. Material for Workshop 2 is provided in Appendix C.

3.2. Overview

The agenda for Workshop 1 involved:

- Introductions/purpose of day
- Quick MCA refresher
- Route presentation and discussion
- Specialists introduction to their subject area
- Site visit/field trip
- Discussion on criteria (based on ideas in Background and Briefing Note plus site visit)
- Questions throughout.

The updated constraints maps described in section 2.1 were put up on the walls at the start of this workshop and were referred to during discussions.

The key questions that were canvassed at this workshop were:

- Are the preliminary route options the right ones? Are there any that should be removed? Are there additional routes that should be included?
- Are the draft criteria suggested in the briefing note the right ones? Has anything important been overlooked? Are things that don't matter included?

3.3. Review of Preliminary Route Options

The meeting notes from Workshop 1 (see Appendix B) describe the discussion on the options more fully. In summary the following changes were requested by the workshop attendees to the options:

- Add an option to the west of corridor S1/N1, which may avoid some of the values impacted by S1N1

[15] PRG meeting 17th August 2017. Hard copies were made available to all participants.

[16] The Transport Agency issued invitations to PRG members and Iwi. The list of those who attended each workshop is provided in the workshop meeting notes in Appendix B and C.

- Add a western route in the north which runs to the west of Lake Papaitonga on the alignment of N1 and then heads east to go east of Lake Horowhenua on the alignment of N3, again in an attempt to avoid some the values impacted by other options
- Add an option to the east of the Gladstone Greenbelt area, to avoid or mitigate potential effects on that area
- Add a northern option aligning with existing transmission line through the Gladstone Greenbelt Area, to utilise the existing the utility corridor.

It was agreed that new route options should be added in response to these requests at Workshop 1, as shown in Figure 3-1. The options that were added at this point for evaluation at Workshop 2 are:

- S8 / N6 – a far western, whole-of-route option
- N7 – a western option which connects in the south to S1 and which follows the N1 alignment to the west of Papaitonga and then crosses to the east of Lake Horowhenua joining the N3 alignment
- N8 – a far eastern option which connects to any of S4, S5, S6 and S7 in the south
- N9 – an eastern option which broadly follows the existing transmission line[17] and connects to S7 in the south.

3.4. Review of MCA Criteria

An important part of Workshop 1 was to review a draft set of criteria to be used in the evaluation of the options in Workshop 2.

Before Workshop 1, preliminary criteria had been developed taking the following factors in account:

- The MCA process needs to include criteria that are relevant in terms of the decision that the Transport Agency needs to make
- Criteria should relate to:
    - The overall project objectives;
    - The ability to obtain RMA and other approvals to proceed with the project;
    - Impacts on the community which will be affected by the project; and
    - Practical aspects such as the ability for the project to be constructed, long-term exposure to natural hazards etc.
- Costs need to be taken into account.

Based on these considerations the following preliminary criteria were developed and circulated to workshop attendees prior to the workshop[18]:

- **Landscape/Visual Impact** – this takes into account existing landscape character (including degree of modification and presence of structures) and the likely impact that a particular route option would have. It includes potential landscape and urban design effects when passing through or near to townships or lifestyle areas, but not the direct visual effects on dwellings (which came into the category of impacts on dwellings).
- **Ecological Impacts** – this criterion covers ecological values, including indigenous vegetation areas that are nationally, regionally or locally significant in terms of habitat values or the presence of species, and the potential effects on waterways (lakes, rivers and streams) and wetlands.

[17] Note that this line no longer comprises part of the National Grid, and is technically now part of the electricity distribution network.
[18] Note that these criteria were generally consistent with criteria applied in the various MCA analyses undertaken at earlier stages of the project – see earlier reports.

- **Archaeological Risk** – this criterion takes into account known archaeological and heritage sites and features, and also the risk of encountering archaeological features, or areas of significance.

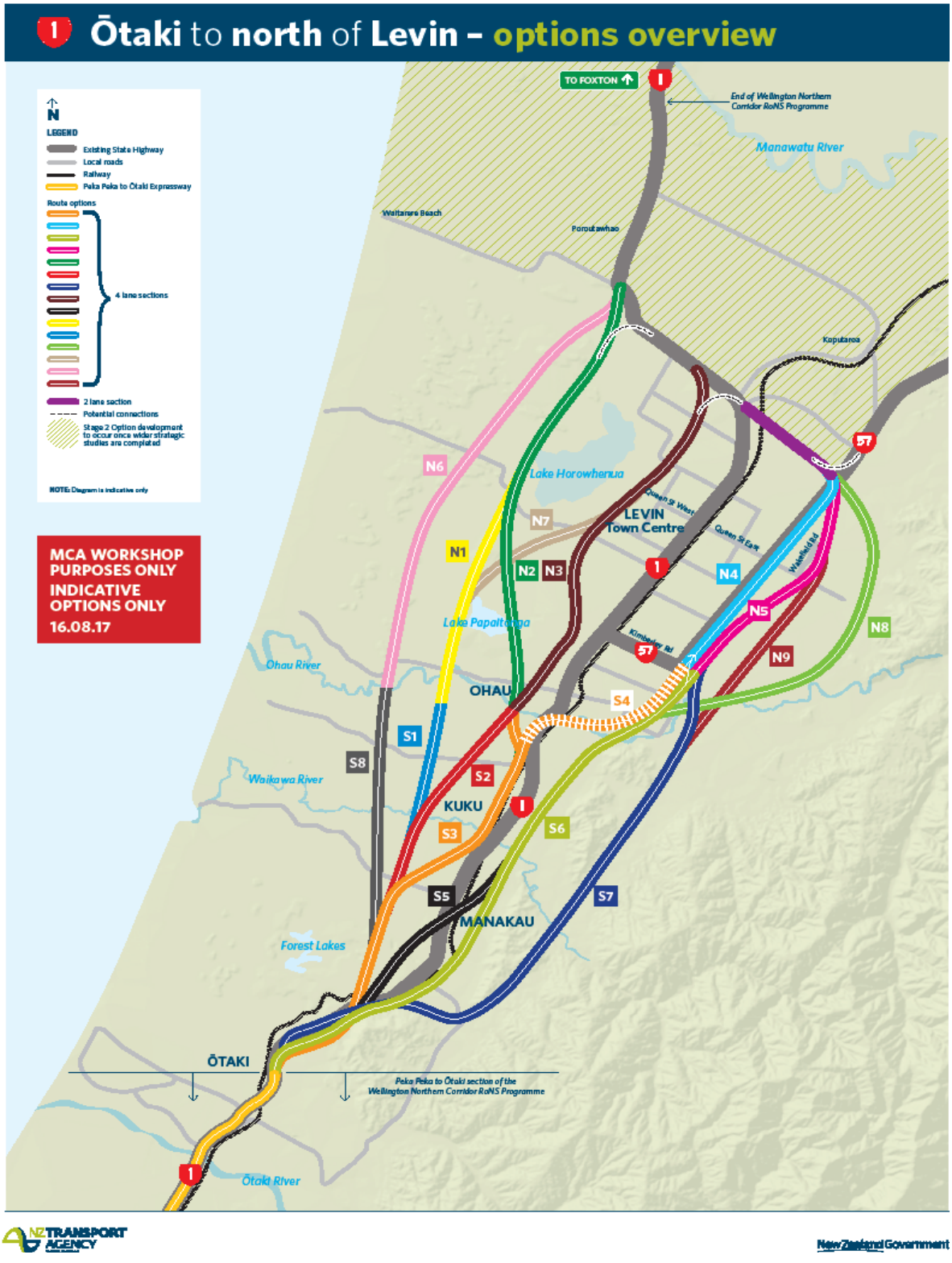

Figure 3-1: Route Options Following Workshop 1

Cultural Values – this takes into account the range of values that Tangata Whenua are likely to associate with the area, including past and present associations, key areas of settlement (marae and papakianga), waahi tapu (if known) and other cultural value, areas of use (e.g. food gathering) current ownership, and important elements of the natural environment such as waterways and wetlands.

Productive Land Values – this criterion takes into account the inherent productive values of Classes I to III soils, and the current productive land use pattern.

Social/community impacts – this incorporates a range of considerations such as severance, general urban amenity, recreation impacts, and construction impacts.

Impact on Dwellings – this criterion takes into account direct effects on existing dwellings, including the need to remove dwellings or the potential need for mitigation of adverse effects associated with an expressway route option.

District and Regional Plan and Consentability– this criterion includes consideration of both zoning and plan objectives and policies, and any major impediments through plans to a route option.

Fit to Project Objectives – this criterion covers travel time, safety and long-term resilience.

Property Degree of Difficulty – this included the number of properties, extent of severance of existing properties, the general ability to align a route option with property boundaries, potential for effect on farming/business operations, and any known land tenure issues.

Engineering Considerations – this criterion addressed expected difficulties with construction of a route option (constructability), including matters such as likely geotechnical considerations, extent of structures needed, and potential flooding and groundwater issues.

Cost – indicative order of cost of options.

During the workshop the relevance of 'fit to project objectives' was questioned. It was agreed that this should be retained as it incorporated matters such as access to Levin, which is an important factor for the community. The scope of the 'District and Regional Plan and Consentability' criterion was questioned. It was agreed that this criterion overlaps with other criteria and also does not cover the full breadth of relevant plans and strategies. The scope of the social/community impact criterion was also questioned. Some at the workshop considered that this criterion should be split into multiple criteria.

The Workshop 1 discussions also identified a range of possible additional criteria:

- Noise
- Amenity
- Safety
- Fit with economic development, and future urban and rural development proposals (including urban and rural development)
- Urban design impacts & urban form
- Impact on land value
- How does each option constrain / facilitate options at the north end of the study area (long term strategic thinking)
- Travel cost of longer routes, not just travel time
- CO_2 emissions
- Access to Levin

This feedback was to be taken into account in a revision of the criteria in advance of Workshop 2.

3.5. Site Visit

A key aspect of Workshop 1 was a comprehensive site visit. This enabled all workshop participants the opportunity to view all routes, including the new route localities identified earlier in the workshop, from roads and other public viewpoints prior to the discussion on criteria. Prior to the site visit, the specialists for the project had briefed the workshop on the scope and aspects of general importance for their specialist aspect within the Area. The specialists also attended the site visit to point out features, answer questions and learn any new information from community participants.

4. Workshop 2 and Subsequent Analyses

4.1. Overview

Following on from Workshop 1, the agenda for Workshop 2 involved:

- The presentation of the revised route options (Figure 3-1)
- Discussion on whether any of the options were fatally flawed
- Confirmation of the criteria
- Scoring of the options
- A discussion on the weighting to be applied to each criteria in the analysis of the scoring.

Again, a briefing note had been precirculated along with the draft agenda prior to the workshop (see Appendix C).

4.2. Fatal Flaws

At Workshop 1 it had been agreed that, before scoring the options against the criteria, it should first be identified if any of the options has a "fatal flaw" that is so significant that the option should be removed from further consideration.

A 'fatal flaw' was described as a condition or circumstance that means the option (in this case a route section) will not be able to be achieved. It can include an element of risk – a risk that is so great that the option is not worth pursuing. Fatal flaw analysis involves a high bar. Options that are highly difficult but not fatally flawed should remain in the mix and be scored adversely in the MCA process.

During discussion on this matter at the workshop, broad agreement was reached that identifying and removing any route section from further consideration on the basis of a fatal flaw was not appropriate. This conclusion was reached by the workshop because it was considered that most of the options had a significant adverse impact on some key criteria, which might be considered to be a fatal flaw by some at the workshop. Choosing not to run any option through the MCA process as a result of this would not allow the overall pros and cons of each option to be understood and assessed. It was also suggested that through more detailed discussion on the criteria relatively minor alignment adjustments may be identified which could potentially avoid a fatal flaw. It was also noted that the MCA evaluation is not the end of the process. Options can be further investigated, and alignment adjustments assessed, if there would be benefit in doing so.

As a result of this, it was agreed that potential fatal flaws would be identified and recorded through the MCA process by a score of 5*.

4.3. Finalising the MCA criteria

Prior to Workshop 2 changes to the MCA criteria at Workshop 1 had been reviewed. It was found that a number of the requested changes were captured in the criteria presented at Workshop 1 or could readily be included within a criterion. Table 4-1 indicates how the various issues raised in Workshop 1 are addressed in the criteria.

Table 4-1: Response to Workshop 1 Feedback on Criteria

Point to Include	Included in Criterion
Noise	Social/community/recreational impacts (as part of amenity)
Development of urban areas	District development
Ability to adapt to future option further north	Fit to project objective
Recreational values	Social/community/recreational impacts

Point to Include	Included in Criterion
Length	Fit to project objectives
Paris agreement/greenhouse gases	Fit to project objectives
Architectural heritage values	Impact on heritage
Local cultural values (non-Tangata Whenua)	Social/community/recreational impacts; Landscape/visual impacts; Impact on heritage; District development
Safety	Fit to project objectives
Amenity	Social/community/recreational impacts
Urban design and urban form	Landscape/visual impacts; District development
Impacts on land value	Not specifically included as a separate criterion as too uncertain and not an RMA consideration. Taken into consideration in social and property criteria

Some modifications to criteria were proposed as a result of comments made at Workshop 1. Therefore the following revised criteria descriptions were proposed.

Landscape/Visual Impact – this takes into account existing landscape character (including degree of modification and presence of structures) and the likely impact that a particular route option would have. It includes potential landscape and urban design effects when passing through or near to townships or lifestyle areas. It excludes direct visual effects on dwellings, effects of severance, and amenity considerations.

Ecological Impacts – this criterion covers ecological values, including indigenous vegetation areas that are nationally, regionally or locally significant in terms of habitat values or the presence of species, and the potential effects on waterways (lakes, rivers and streams) and wetlands.

Impact on Heritage – this criterion takes into account known archaeological and heritage sites and features, and also the risk of encountering archaeological features, or new areas of significance.

Tangata Whenua Cultural Values– this takes into account the range of values that Tangata Whenua are likely to associate with the area, including past and present associations, key areas of settlement (marae and papakianga), waahi tapu (if known) and other cultural value, areas of use (e.g. food gathering) current ownership, and important elements of the natural environment such as waterways and wetlands.

Productive Land Values – this criterion takes into account the inherent productive values of Classes I to III soils (present and future), and the current productive land use pattern.

Social/Community/Recreation Impacts – this incorporates a range of considerations such as severance, general amenity (including exposure of communities to noise), recreation impacts, and impacts during the construction phase.

Impacts on Dwellings – this criterion takes into account direct effects on existing dwellings, including the need to remove dwellings, and the potential need for mitigation of adverse effects on dwellings near an alignment.

District Development – this criterion includes consideration of impacts on current district plan provisions, and likely future growth areas.

Fit to Project Objectives – this criterion covers travel time, safety, long-term resilience and the ability to connect effectively to Levin[19].

Property Degree of Difficulty– this includes the number of properties, extent of severance of existing properties, the general ability to align a route option with property boundaries, potential for effect on farming/business operations, and any known land tenure issues.

Engineering Considerations – this criterion addresses expected difficulties with construction of a route option (constructability), including matters such as likely geotechnical considerations, extent of structures needed, and potential flooding and groundwater issues.

Cost – indicative order of cost of options.

These revised criteria were applied by the Workshop 2 attendees.

4.4. Multi-Criteria Analysis of Route Options

4.4.1. Scoring System

The general approach to scoring used at Workshop 2 is set out in Table 4-2. This was discussed at both workshops and it was confirmed that much less was understood about benefits than adverse effects. While the project would not proceed unless there were benefits, these are not understood at the level of individual criteria. Therefore the focus in scoring would be on the adverse effects and difficulties within the criteria.

Table 4-2: Basis for Scoring used in the MCA

Score	Description
1	The option presents few difficulties on the basis of the criterion being evaluated, taking into account reasonable mitigation proposals. There may be significant benefits in terms of the attribute.
2	The option presents only minor areas of difficulties on the basis of the criterion being evaluated, taking into account reasonable mitigation proposals. There may be some benefits in terms of the attribute.
3	The option presents some areas of reasonable difficulty in terms of the criterion being evaluated. Effects cannot be completely avoided. Mitigation is not readily achievable at reasonable cost, and there are few or no apparent benefits.
4	The option includes extensive areas of difficulty in terms of the criterion being evaluated, which outweigh perceived benefits. Mitigation is not readily achievable.
5	The option includes extreme difficulties in terms of achieving the project on the basis of the criterion being evaluated.

As already noted the workshop group elected to use a score of 5* where it was considered that an adverse effect in relation to a criterion may be a fatal flaw.

4.4.2. Scoring Process

Workshop 2 applied the decision conferencing process in accordance with earlier discussions and briefing notes[20]. The overall process was facilitated and, despite the large and diverse group[21], it was possible to get through most of the extensive agenda set out. Most attendees at Workshop 2 had also been present at Workshop 1, and community and stakeholder participants

[19] Note that operating costs, which had been included in the criterion in the briefing note, were removed during the Workshop 2 process.
[20] See information in Appendices A and C.
[21] See Workshop 2 notes in Appendix C. The MCA process was facilitated by Sylvia Allan.

had attended earlier PRG meetings so were familiar with both the processes and the routes involved.

Specialists briefed to lead off discussion did so after the discussions on criteria and scoring system. The criteria were described and discussed by the relevant specialist, identifying issues relevant to each route option. Following this, the workshop attendees raised any questions or matters relating to the implications of a particular route option, and the score proposed by a specialist for each route option. Extensive use was made of aerial "fly-overs" and other materials during the explanations and discussions.

Each criterion was scored for the southern options first, and then for the northern options. In most cases a single agreed score was awarded. However in a few cases the workshop process did not reach a single score. In such circumstances, both scores were recorded (see Table 4-3 and Table 4-5). The various Iwi representatives present provided separate scores for the sections relevant to them (see later discussion for northern and southern section discussions and Appendix G).

The specialists' background notes and assessments of the route options are included in Appendices D to M.

The MCA scores and the basis for scoring is summarised below. Where more than one score was recorded, this is explained[22].

4.4.3. Scoring of Criteria – Southern Sections

The outcomes of the scoring of the southern sections are set out in Table 4-3, with key points from the discussion leading to the scores outlined below.

The following paragraphs of the report include a summary of the introduction made by the relevant specialist. To avoid unnecessary repetition in the report, this summary is not repeated in those paragraphs of the report which set out the assessment of the northern sections. Notwithstanding, the specialist introductions apply equally to how the northern sections were assessed.

Table 4-3: Scoring of Southern Route Options

Criteria	Landscape/Visual Impact	Ecological Impacts	Impact on Heritage	Tangata Whenua Cultural Values	Productive Land Values	Social/Community/ Recreation Impacts	Impact on Dwellings	District Development	Fit to Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
S1	2	1	4	5/4	3	2	3	1	3	5	3	2
S2	2	2	4	5/5	3	2	3	1	1	5	3	2
S3	3	3	4	5/5	3	2	3	1	1	5	3	2
S4	4	5	4	3/5	4	3	5	2	2	5	3	4
S5	4	4	4	4/4	4	5	5	3	1	5	2/3	4
S6	2	2	2	2/2	4	5	5	3	1	4	2	3
S7	3	5	2	3/3	4	2	4	1	3	4	3	4
S8	2	1	4	5/5	2	1	3	1	3	5	3	2

[22] Note that in some cases the workshop process resulted in scores which were different from those proposed by the specialists who provided the base case information. The specialists have each been asked to indicate as part of the relevant Appendix where they have any disagreement with the workshop score. This ensures the professional independence of those workshop participants, while not affecting the outcomes of the workshop process.

Table notes:

1. Cells containing two scores are reflective of different views at the workshop.
2. Separate scores for Tangata Whenua Cultural Values were provided by representatives of Ngāti Wehi Wehi (noted first) and Ngāti Tukorehe (noted second).

Landscape/Visual Impact –The specialist introduction at the workshop noted that landscape and visual assessment considers three things: physical matters, aesthetic qualities and cultural meanings. Broadly landscape can be thought of as what we would see if we knew the full story about an area. Part of the assessment is to consider how well an option fits with a landscape, i.e. better options follow the patterns of the landscape, rather than cutting across them.

In this context Options S1, S2, S6 and S8 are considered to fit reasonably well with landscape patterns. However each of these options was scored 2, as they all contain some components which represent a minor difficulty in terms of landscape and visual impact. For example, the proximity of S6 to Manakau township counts against this option from a landscape perspective[23]. Option S3 was scored 3 (reasonable difficulty) because the fit to landscape patterns is not as good as in Options S1, S2, S6 and S8. Option S7 was also scored a 3 because of the extent of earthworks (landform modification) that are expected with this option. Options S4 and S5 were identified as having extensive areas of difficulty (score 4) because they criss-cross and bisect plains and therefore have the worst fit to landscape patterns.

While there was general agreement at the workshop, some of the scores differed from those initially proposed by the specialist. This is noted in Appendix D.

Ecological Impacts – The specialist introduction for this criterion noted that the assessment used desktop sources (Department of Conservation, Land cover, QEII covenants, Regional Council, Horowhenua District Council and iwi) to develop a related constraint layer. This information had been supplemented by local knowledge and site visits undertaken over many years. Various indigenous systems have been considered including terrestrial and aquatic systems. Consideration has also been given to impacts on species and sites with special status. In general terms, the recommended scoring was based on the physical extent of encroachment on areas with ecological value, ecological significance of the areas and the degree to which affected areas can be avoided by refining the alignment within the 300m corridor.

Route options S1 and S8 are considered to have no or few impacts on ecological values and were therefore scored a 1. Options S2 and S6 were scored 2 (minor difficulty) as each encroaches only to a limited extent on areas with ecological value and it is expected that the significance of these effects can be mitigated by refining the alignment within the 300 m wide corridor. Option S3 was scored 3 (reasonable difficulty) because three areas of ecological potential are within the corridor, although the effects on two of these areas are expected to be able to be mitigated through route refinement. Option S5 was scored 4 (extensive difficulty) because three ecological areas of regional significance are encroached upon. Due to the orientation and proximity of these ecological areas the effects of Option S5 on these areas will be difficult to mitigate. Both Options S4 and S7 scored 5 (extreme difficulty) because these options encroach on multiple, significant ecological areas, with very limited or no opportunity to mitigate the effects.

Some modifications to the scoring from the specialists' original proposals were made as a result of new information at the workshop. See Appendix E.

Impact on Heritage – The specialist introduction noted that the forest line from 1872 is key to the distribution of sites with significant heritage value. Prior to 1872, land east of the forest line was mainly covered in forest, although there were some larger clearings for cultivation, occupation or other purposes. The forested areas were less densely occupied than the dune lands closer to the coast and the clearings. The coastal and clearing areas that were more densely occupied are those areas where the highest number of archaeological sites have been found and can be expected to be uncovered in the future. In general terms archaeological risk increases further west, except in main clearing sites where early pākehā traces, as well as Tangata Whenua traces, are expected.

In this context the western options (Options S1-S4 and S8) were scored a 4 (extensive difficulty) as they cross various clearings in the 19th century forest pattern, with a corresponding high risk of disturbing archaeological sites. S5 was also scored a 4 because of its expected impact on known and unknown sites west and north of Manakau. Options S6 and S7, which are entirely to

[23] It is noted that the effects of this proximity are given most direct consideration in relation to the Social/Community/Recreation and Impact on Dwellings criteria.

the east of State Highway 1 were scored 2 (minor difficulty). These routes have lowest identified archaeological risk.

Tangata Whenua Cultural Values – Representatives of local iwi (Ruakawa represented by the two marae south of Levin – Ngāti Wehi Wehi and Ngāti Tukorehe) provided the specialist role for this criterion. Their introduction noted that all options west of the current State Highway 1 are very difficult from a Tangata Whenua perspective due to the numerous urupā and other sites of significance in the area, and the extent of Māori land ownership. Eastern options raise fewer issues. While there are areas of concern in the east, these tend to be more readily mitigated than is the case west of State Highway 1.

Key considerations for all sections were the potential for adverse effects on the cultural landscape and environment, on wāahi tapu, and on Māori land. These were rated separately and an overall score indicated for each route section.

Southern sections were scored separately by Ngāti Wehi Wehi and Ngāti Tukorehe, leading to two scores in some sections because of the different implications for each group.

Options S2, S3 and S8 were scored 5 by both Ngāti Wehi Wehi and Ngāti Tukorehe, indicating high degrees of difficulty across all aspects for these route sections. Option S1 was scored 4 by Ngāti Wehi Wehi, but 5 by Ngāti Tukorehe due to the potential for direct effects on land ownership and cultural sites. Option S5 was scored 4 by both groups; but Option S4 scored 3 by Ngāti Wehi Wehi but 4 by Ngāti Tukorehe. Option S6 was regarded as least adverse by both groups and scored a 2, while Option S7 was awarded 3 by both due to some risk to cultural sites.

Productive Land Values – The specialist introduction noted that the assessment of this criterion has focussed on the Landuse Capability Classification System (LUC). In terms of LUC, categories 1-3 are of interest in terms of land productivity, particularly classifications 1 and 2. Scoring was based on the area of encroachment on these more productive land categories.

At the workshop Option S8 was scored 2 (minor difficulty) because this option impacts on less class 1 and 2 land than the other southern options. Options S1, S2, S3 scored 3 (reasonable difficulty) because these options impact on a moderate amount of class 1 and 2 land. Options S4, S5 S6 and S7 scored 4 (extensive difficulty) because the area of class 1 and 2 land impacted by these options is greater.

During discussion at the workshop it was noted that the assessment of productive land value as presented did not consider the current subdivision pattern. The presence of rural residential subdivision significantly reduces the productive potential of land. As a result of this discussion and subsequent comments from workshop attendees, further work on the implications of current subdivision and zoning patterns has been undertaken. See section 5.1 of this report and Appendix P. This section of the report applies the scoring from Workshop 2.

Social/Community/Recreation Impacts - The specialist introduction noted that impacts on three factors need to be considered under this criterion. These are:

- Severance - interruption of physical and social coherence of a community
- Amenity values -as defined in the RMA, including noise effects
- Opportunities for active and passive recreation.

Each of these factors was first assessed using an impact rating of low, moderate and high. An overall criterion score was then applied.

This criterion was of high importance to many of those in the workshop, and there was considerable discussion as to localities and scoring.

Option S8 was scored 1 (few difficulties) because of its relative isolation from dwellings and relative lack of special amenity and recreation values along the route. Options S1, S2, S3 and S7 were scored 2 (minor difficulty) because of their proximity to only limited number of dwellings and also because of the limited special amenity and recreation values along the route. Option S4 was scored a 3 (reasonable difficulty) because of its proximity to the clusters of dwellings south of Ōhau and impact on high amenity values, such as those at Bishops Vineyard. Options S5 and S6 were scored 5 (extreme difficulty) because of their impacts on, and around, Manakau.

Modifications to proposed scores were made during the workshop and some proposed scorings remained unresolved (with two scores recorded). See Appendix I.

Impacts on Dwellings – The assessment of this criterion considered dwellings directly in the alignment of the routes. In terms of scoring, scores 1 and 2 were not used because all options were recognised as having considerable adverse effects through direct effects on individual dwellings. The scores given were based on the following ranges of numbers of dwellings directly impacted: 1-30 (score 3 – reasonable difficulty), 31-50 (score 4 – extensive difficulty), more than50 (score 5 - extreme difficulty).

In this respect, Options S1, S2, S3 and S8 scored 3 (reasonable difficulty), Option S7 scored 4 (extensive difficulty) and Options S4, S5 and S6 scored 5 (extreme difficulty).

District Development –The assessment against this criterion is mainly based on the 2015 District Plan zones. It also considered the Council review of these zones, although it is acknowledged that this review process is at an early stage and there was little hard information. It was noted that there is flexibility in how areas with development potential are designed and developed, and that this flexibility could be used to mitigate the impact of the route options.

Options S1, S2, S3, S7 and S8 were scored 1 (few difficulties) because their impact was on rural zoned land. The impact on the productive capacity of this land is assessed under the Productive Land Value criterion. Option S4 scored 2 (minor difficulty) to reflect the impact this route would have on the small development capacity remaining in the Ōhau Greenbelt Residential Area. Options S5 and S6 scored 3 (reasonable difficulty) because of the effect on the future development potential that has been identified north of Manakau.

Fit to Project Objectives - The specialist introduction recommended that the assessment of this criterion start with the consideration of the combined whole-of-route corridors. This was recommended because southern or northern options on their own cannot achieve the project objectives. Most of the southern and northern options can form a half of multiple whole-of-route options. Because of this the criterion score given to each of the southern and northern sections was proposed to be based the best performing whole-of-route option which it forms part of.

The assessment of the whole-of-route options was against the four project objectives, which are:

- Reduce travel times on the state highway network
- Reduce deaths and serious injuries on the state highway network
- Enhance the resilience of the state highway network
- Provide appropriate connections that integrate the state highway and local road networks to serve urban areas

The assessment of travel time was based simply on the calculation of journey length and volume of traffic expected on the route.

In relation to safety, it was noted that the key issue is how many people transfer to the new, safer expressway. How many vehicles do this will be contingent on how attractive the route is from a travel time perspective. Therefore the options assessment against the safety objective is the same as for travel time objective. In terms of resilience, it was noted that there are not a lot of hazards in the study area compared to other parts of New Zealand. All options duplicate current highway. The only option which stands out as being less resilient is S7, due to its location on a fault line. For local connectivity a broad consideration was undertaken based on the distance of the route from Levin.

Based on these considerations the following scores were awarded to the southern options:

- Options S2, S3, S5, and S6 were scored 1
- Options S4 was scored 2
- Options S1, S7 and S8 were scored 3.

Property Degree of Difficulty – The specialist introduction noted that the assessment of this criterion needs to consider the requirement for property reconfiguration, business relocations, the difficulty associated with acquiring Māori land, difficulties arising from the presence of easements on Māori land and large farming severances.

Options S1, S2, S3, S4, S5 and S8 scored 5 primarily due to the significant amount of Māori freehold land and the significant number of easements registered against titles. There were also specific additional issues associated with purchase of Tatum Park for Options S3 and S4, and Allied Concrete and the Bishops Vineyard land for Option S4. Options S6 and S7 scored 4 due to the

presence of a quarry and also the number of Māori freehold properties. However it was considered that these options do not contain the easement issues associated with options such as Options S1 and S2.

Engineering Considerations – The specialist introduction noted that in assessing this criterion four sub-attributes need consideration. These are described briefly below with the weighting of each sub criteria provided in brackets:

- The number of structures expected on the route, i.e. how complex the construction will be and the long term maintenance liability/resilience risk of more structures (10%)
- Geometry – whether a route is a high standard or includes a multitude of curves with minimum standards (20%)
- Geology and geotechnical considerations (50%)
- Flooding risk – based on constraint maps from Horizons Regional Council (20%)

Options S1, S2, S3, S4, S5 and S8 scored 3 given they all have a relatively high number of structures and are subject to some flood risk. Option S7 was also scored 3 due to the number of low standard curves on the route and the presence of some geotechnical issues. Option S6 scored a 2 given that there would be minor issues with all four sub-attributes.

Cost – The specialist introduction noted that this criterion was assessed by splitting each option into sections of normal construction and sections of complex construction, and by considering the number of structures required on each route. The outcome was a relative construction cost.

The southern options scored as follows:

- Options S1, S2, S3 and S8 were scored 2
- Option S6 was scored 3
- Options S4, S5 and S7 were scored 4.

4.4.4. Option 7A Consideration

During the second workshop, the possibility of a further route that followed Option S7 from the south but then cut back across onto Option S6 north of Manakau was raised.

Following Workshop 2 the Transport Agency requested that this should also be considered, so a plan was prepared and each of the specialists were asked to provide a score for this particular option. This is included below in Table 4-4 alongside scores for Option S7.

Table 4-4: Scoring of Option S7A

Criteria	Landscape/Visual Impact	Ecological Impacts	Impact on Heritage	Tangata Whenua Cultural Values	Productive Land Values	Social/Community/ Recreation Impacts	Impact on Dwellings	District Development	Fit to Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
S7	3	5	2	3/3	4	2	4	1	3	4	3	4
S7A	4	5	2	3	3[24]	1[25]	5	1	3	4	4	5

[24] Note that the specialist indicated this could be scored either 3 or 4, as could Option S7 which the workshop had accorded a 4 as shown. The current score provides a more favourable basis for this option.

[25] The specialist for this criterion had also proposed Option 7 as a 1, but the workshop participants considered this to be a 2. In the specialist's opinion there is little difference between Option 7 and 7A. As with the Productive Land criterion score, this score provides a more favourable basis for the analysis of this route.

Table 4-4 shows that the differences between Option 7 and Option 7A are as follows:

- Landscape/Visual – worse than S7 in that the route is only partly confined to the valley and that it would include dog-legs to negotiate both the Waiauti and Kuku Stream valleys.
- Impact on Dwellings – Option 7A is worse than Option 7 due to more dwellings being directly affected
- Engineering Considerations and Cost – Option 7A is worse than Option 7 due to a greater number of lower radii curves and also there are significant constructability issues with the route heading back onto route Options S6 from S7 in the Waiauti valley. These difficulties are also reflected in costs.

In addition to the above, it is noted that the Option S7A corridor is some 800m longer than Option S7 and therefore would have significantly fewer benefits in transport terms when compared to Option S7.

Option 7A appears to provide no benefits over Option 7 but additional impacts and dis-benefits[26] and therefore this option has not been included in any further analysis. Further investigations and analysis could, however, be undertaken.

4.4.5. Scoring of Criteria – Northern Sections

The outcomes of the scoring of the northern sections from Workshop 2 are set out in Table 4-5, with key points from the scoring discussion set out below.

Table 4-5: Scoring of Criteria – Northern Sections

Criteria	Landscape/Visual Impact	Ecological Impacts	Impact on Heritage	Tangata Whenua Cultural Values	Productive Land Values	Social/Community/ Recreation Impacts	Impact on Dwellings	District Development	Fit to Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
N1	5	4	4	5*	2	3	3	1	3	4	3	2
N2	5	5*	4	5*	2	3/4	4	1	3	4	3/4	3
N3	4	2	4	5*	3	5	5	4	1	5	2/3	2
N4	2	4/5	4	3	3	4	5	4	1	3	2	1
N5	2	1	2	3	3	3/4	5	4	1	3	2	1
N6	2	5	4	5	2	2	3	1	3	4	3/4	4
N7	5	4	4	5*	3	5	4	4	3	4	3/4	2
N8	4	1	2	3	4	4	5	3	3	3	2	2
N9	1	5	2	3	4	3/4	5	4	1	3	2	2

Table notes:

1. Cells containing two scores are reflective of different views at the workshop, or lack of workshop resolution.

[26] This was despite its scoring being shown as technically more favourable under two criteria (see earlier explanation in previous footnotes).

2. Single scores under Tangata Whenua Cultural Values were provided by representatives of Muaupoko.

The following discussion focuses on the reasons for the scores above. For a more general discussion on how the scoring for each of the criteria was approached see Section 4.4.3.

Landscape/Visual Impact – Option N9 scored 1 (few difficulties) as it fits well with landscape patterns, including being square to current cadastral patterns and has the potential to follow the transmission line. Options N4, N5 and N6 scored 2 (minor difficulties) because they generally fit with the landscape patterns, but each had a specific factor which warranted a more adverse score than Option N9, e.g. for N6 this relates to the cultural connections with the landscape. Options N3 and N8 scored 4 (extensive difficulties). This score was given to N3 because of the impact of the option on the outskirts of Levin and on Lake Horowhenua. It was given to N8 because of its impact on the significant Tararuas landscape and likely impacts on two reserves.

Options N1, N2 and N7 scored 5 (extreme difficulties). For all three options this score was awarded because of their impact on Lake Papaitonga, and in the case of Options N2 and N7 also because the option cuts across landscape patterns.

It is noted that some of the scores agreed at the workshop differ from those recommended by the relevant specialist. These differences are detailed in Appendix D.

Ecological Impacts – Options N5 and N8 scored 1 (few difficulties) as there are no identified ecological constraints on these corridors. Option N3 was scored 2 (minor difficulty), which reflects that while there are bush areas and wetlands potentially impacted by the route it is expected that these can be avoided through route refinement within the 300 m wide corridor. Options N1 and N7 were scored 4 (extensive difficulties). In the case of Option N1 the effects are on the fringe of Lake Papaitonga and also duneland. In the case of Option N7 this score was awarded due to impacts on multiple small forest areas which are likely to be difficult to avoid. Options N2, N4, N6 and N9 all scored 5 (extreme difficulty) because of their impacts on multiple high value ecological areas. Within the workshop group there were some views that the effects of N4 may be able to be mitigated through route refinement and therefore a score of 4 may be more appropriate. The score for Option N2was 5*, signalling that the effect may be close to a fatal flaw because of the route's impact on Lake Papaitonga.

Impact on Heritage – Options N1, N2, N3, N4, N6 and N7 all scored 4 (extensive difficulty). For Options N1, N2 and N6 this score was because the route traverses the archaeological high risk area. Options N3 and N7 are largely east of this area but proximity to Lake Horowhenua also introduces a high archaeological risk. Option N4 was awarded a score of 4 due to the impact of the route on the Prouse homestead and curtilage. Options N5, N8 and N9 were scored 2 (minor difficulties) because all three routes are through low risk areas.

Tangata Whenua Cultural Values – The scores for the northern route options were provided by a representative of the Muaupoko Tribal Authority applying the same considerations as had been applied for the southern sections. Options N4, N5, N8 and N9 were scored 3 as they all lie to the east of Levin which is considered as having less cultural associations and less risk (including little or no remaining Māori land ownership. Option N6 scored 5 (extreme difficulty) because of its western location and conflict with cultural values. Options N1, N2, N3, and N7 were scored 5* (extreme difficulty / potential fatal flaw) because of their route locations within areas of significant Māori land and proximity to features and areas with significant value to Muaupoko, including Lakes Horowhenua and Papaitonga.

Productive Land Values – Options N1, N2 and N6 were scored 2 (minor difficulty) due to low amounts of class I and II land impacted by the route. Options N3, N4, N5 and N7 scored 3 (reasonable difficulty) given the moderate level of class I and II land impacted. N8 and N9 scored 4 (extensive difficulty) as these options impact the greatest area of class I and II land.

As reported for the southern route options, some concern was expressed as to the veracity of the scores for this criterion so a review was undertaken post-workshop as reported in section 5.1 of this report.

Social/Community/Recreation Impacts – Option N6 scored 2 (minor difficulty) given the relative lack of constraints along the route. Option N1 scored 3 (reasonable difficulty) due to the impact on the golf course and proximity to Lake Papaitonga. Scoring of Options N2, N5 and N9 was fully resolved. Scores of both 3 and 4 were applied to these options, reflecting that some thought the impact of the options was more significant than others. N2 was given these scores due to proximity to the golf course and Lake Papaitonga and because of anticipated severance effects on the Ōhau township extension. Options N5 and N9 were given these scores because of the severance of Gladstone from the remainder of Levin. Options N4 and N8 scored 4 (extensive

difficulty) due again to the severance effects on the Gladstone community and in the case of N8 due to impacts on the recreation facilities east of Gladstone. Options N3 and N7 scored 5 (extreme difficulty) due to the severance of Levin from Lake Horowhenua and also due to the amenity impacts of the routes.

Impacts on Dwellings – Options N1 and N6 would impact between 1-30 dwellings and therefore scored 3 (reasonable difficulty). Options N2 and N7 would impact between 31-50 dwellings and therefore scored 4 (extensive difficulty). Options N3, N4, N5, N8 and N9 would impact on greater than 50 dwellings and therefore scored 5 (extensive difficulty).

District Development – Options N1, N2 and N6 scored 1 (few difficulties) as they cross rural land. The productive potential of rural land is addressed through the Productive Land Value criteria. Option N8 was scored a 3 (moderate difficulties) because the option impacts on the development potential in the far eastern part of the Gladstone area. Options N4, N5 and N9 scored 4 (extensive difficulty) due to the impact of these options on the central and western part of the Gladstone area. Options N3 and N7 also scored 4 (extensive difficulty) due to the impact on the development potential of the residential and industrial areas on the western edge of Levin.

There was some debate in the group that the impacts of Options N4, N5 and N9 warranted a score of 5. This score was not adopted because of the potential to mitigate effects on the development potential of Gladstone through structure planning and good urban design. It was therefore considered that the difficulties of these options could not be described as 'extreme'.

Fit to Project Objectives – Options N3, N4, N5 and N9 were scored 1 (few difficulties) which reflects the expected reduction in travel times of these options and the safety benefits arising from the resulting high transfer of traffic onto the safer expressway route. Options N1, N2, N6, N7 and N8 scored 3 (moderate difficulties) due to lower travel time reductions and the lower attractiveness of the route, which is expected to mean fewer vehicles will use the safer expressway. Options N1, N2, N6 and N8 are also further from Levin, therefore impacting on their accessibility to that centre.

Property Degree of Difficulty – Options N1, N2, N6 and N7 scored 4 (extensive difficulty). All options will require the purchase of a large amount of Māori land. Options N1 and N2 have the added difficulty of the golf course purchase. Option N3 was scored a 5 (extreme difficulty) due to the need to purchase the Alliance Group site, the presence of Māori land and the presence of recreation reserves along the alignment. Options N4, N5, N8 and N9 scored 3 (reasonable difficulty) mainly because there is currently no Māori land identified along these alignments.

Engineering Considerations – Options N4, N5, N8 and N9 scored 2 (minor difficulty) which reflects the limited number of structures and the very limited number of curves at minimum geometric standards. Options N1, N2 and N6 were scored 3, reflecting slightly more structures. Options N3 and N7 also scored 3 because of their poorer geometry.

During group discussion questions were raised about whether the geometry of Option N3 could be improved through further design. It was noted that if this did occur it may improve the score for this option to 2. Both scores were applied. Group discussion also questioned whether the scores for Options N2, N6 and N7 reflect the true geotechnical risk in the area, which arises from the presence of peat materials. It was agreed that the scores for these options should be recorded at 4 as well as 3, and addressed as part of sensitivity testing.

Cost – This criterion assesses the relative construction cost of the options. Options N4 and N5 were scored 1 and would be the least expensive options. Options N1, N3, N7, N8 and N9 were scored 2; Option N2 was scored 3. As the most expensive option, Option N6 scored 4.

4.5. Weighting Systems

4.5.1. Workshop Weighting

It was recognised by the workshop that all criteria are not of equal importance and that different people may accord them different importance. There was acceptance that the criteria did not represent a "base case" and there was no benefit in an analysis with all criteria accorded equal

weight. This approach has been consistent with all earlier MCA exercises undertaken in relation to the project[27].

A "Workshop" weighting was sought, and led to considerable discussion and some debate at the end of Workshop 2. The weights for the various criteria arrived at are presented in Table 4-6. This can be regarded as the community workshop weighting as it was performed as part of the workshop process and in the context of the comprehensive scoring exercise which had just been undertaken.

The workshop participants determined that the most important aspects were ecological impacts, impacts on heritage, Tangata Whenua cultural values, social/community/recreation and fit to project objectives. The first four of these were identified as key and enduring issues for the community. Fit to project objectives was considered of equal importance because it includes access to Levin which is also a key and enduring issue for the community.

The next most important criteria were identified to be impacts on dwellings and property degree of difficulty. Both were noted to address factors which directly affect members of the community. However these were of less weight than the social, community and recreation criterion as it was recognised that financial compensation would be available to dwelling and property owners. Productive land was considered the next most important criterion. While this issue is considered very important, its slightly lower rating reflects the relatively small extent of land involved.

District Development and Landscape/Visual Impacts were rated lower. Landscape was given this rating because the workshop attendees considered that landscapes change anyway and any effects can be mitigated. District Development was rated lower because the group accepted that there is flexibility in how future development patterns can adjust to the presence of an expressway. The two criteria identified as being of lowest importance were Engineering Considerations and Cost. Both were considered to be of limited importance to the local community.

The workshop attendees were made aware that additional weighting systems would also be applied along with sensitivity analysis. The next section explains the basis for these alternative weighting approaches.

Table 4-6: Workshop Weighting

Weighting of Criteria (out of 10)	Landscape/Visual Impact	Ecological Impacts	Impact on Heritage	Tangata Whenua Cultural Values	Productive Land Values	Social/Community/ Recreation Impacts	Impact on Dwellings	District Development	Fit to Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
Workshop	6	10	10	10	8	10	9	6	10	9	2	2

4.5.2. Additional Weighting Systems

A range of additional weighting systems was developed. These are shown alongside the workshop weighting in Table 4-7and are described in general terms below. The RMA and Quadruple Bottom Line systems have been developed by Allan Planning and Research on the basis of understanding a range of possible relevant considerations[28].

[27] Weighting systems are usually much more challengeable than scoring, as they can be readily developed from a range of different perspectives. Thus a single result is always vulnerable to criticism that the weighting system is wrong. An alternative means of investigating the robustness of a preference is to subject the scoring to a range of weightings and review the outcomes in terms of their consistency and range of differences.

[28] This type of process has been applied in similar analyses on the O2NL project to ensure overall robustness in analysis. The weighting systems generally reflect those used earlier, as well as on other infrastructure projects.

RMA Section 6 Weighting – This weighting system is related to the Resource Management Act approvals regime that will eventually be applied. Section 6 matters are those of national significance which must be recognised and provided for in all decisions. The weighting places emphasis on three of the four section 6 RMA aspects potentially at play in respect of the project (ecology, heritage and Tangata Whenua values) but recognises that other values also have a place. Natural landscape values have not been elevated to the same level as the other section 6 matters in this analysis, as few "outstanding" qualities and elements were identified in the area affected by the route options by the specialist involved, and it would thus be inappropriate to elevate them to a very high weight. Some weight is placed on the district plan analysis in this case, as this can be considered reflective of section 6 matters, but other criteria are left at low levels.

Four further weighting systems are related to quadruple bottom line considerations. The analysis on this basis is relevant to matters to be taken into account under the Land Transport Management Act and other national infrastructure policy approaches. They are also pertinent to RMA and Local Government Act considerations[29].

Social – all criteria have a social component, so all are given some weight. The highest weighting is given to Social/Community Recreation and direct impact on dwellings, followed by Tangata Whenua and archaeological risk aspects (which have a high social component in this area), to property effects and to district plan considerations. All other criteria have some social relevance in this productive rural area, with productive land and engineering aspects least relevant.

Environment – this places the highest weight on the physical environmental element of ecology, with other criteria which integrate physical environmental considerations with social/community values also given some weighting. Criteria without a physical environment component are omitted.

Cultural – this highly weights Tangata Whenua cultural values and archaeology/heritage, followed by ecological and Social/Community/Recreation, but also acknowledges cultural significance in the established rural landscape and its settlement pattern, and its remaining ecological values, all of which have a cultural dimension.

Economic – this excludes a number of criteria which have little or no direct economic bearing on the project or the local economy. It emphasises cost and effects on property, but applies some weighting to other criteria with an economic component.

The Transport Agency then sought further weighting systems to be applied. These are shown at the end of Table 4-7.

Table 4-7: Weighting Systems Applied (Includes Workshop Weighting)

Weighting of Criteria (out of 10)	Landscape/Visual Impact	Ecological Impacts	Impact on Heritage	Tangata Whenua Cultural Values	Productive Land Values	Social/Community/ Recreation Impacts	Impact on Dwellings	District Development	Fit to Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
Workshop	6	10	10	10	8	10	9	6	10	9	2	2
RMA Sec 6	6	10	10	10	2	5	3	5	3	2	2	2
Social	5	5	8	8	3	10	10	8	5	8	3	5
Environment	5	10	3	3	3	0	0	3	0	0	0	0
Cultural	5	3	10	10	0	5	3	0	0	0	0	0
Economic	0	0	1	0	5	5	5	5	5	8	5	10

[29] This quadruple bottom-line weighting is a different type of evaluation from the Benefit Cost Ratio (BCR) evaluation normally undertaken by the Transport Agency.

Draft MCA Guide	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	10	3.33	3.33	3.33
PRG 1	5	8	6	5	9	10	9	9	8	5	0	0
PRG 2	5	8	9	10	9	10	9	9	8	5	0	0

Draft MCA Guide - NZ Transport Agency has recently released a draft guideline on MCAs. Whilst there are a number of outstanding issues raised by submitters on this draft, a weighting system based on this has been developed for comparative purposes. This distributes weightings of one third to criteria relating to project objectives, one third to those relating to implementability (in this case spread between property degree of difficulty, cost and engineering) and one third towards impacts (in this case allocated equally across the remainder of the criteria).

Additional Community Weightings - At the PRG meeting following the workshops a number of community representatives[30] stated that they felt rushed developing the Workshop Weighting system during the second workshop[31]. Accordingly, the attendees of that PRG meeting were offered an opportunity to develop a new weighting system which reflected their further consideration since the workshop. There were however differing opinions within the group as to the importance of heritage and historic cultural values; some thought they were fundamental considerations, while others thought that more weight should be applied to current communities. Accordingly two further weighting systems were added. These were not considered to replace the workshop weighting system developed at the second workshop.

These are shown in Table 4-7 as:

- **PRG 1 –** with a relatively lower weighting of heritage and cultural values
- **PRG 2 –** with a relatively higher weighting of heritage and cultural values

These three alternative weighting systems can provide a form of sensitivity analysis, and a check on the robustness of the outcome.

4.6. Analysis

4.6.1. Northern and Southern Sections

An initial analysis was undertaken looking at the raw scores for each of the southern and northern sections to determine if any stood out performing particularly poorly or particularly well. To do this the number of high scores (scores of 1s and 2s) and low scores (scores of 4 and 5) were determined for each option. This is shown for the southern sections in Table 4-8, and for the northern sections in Table 4-10 later in this report.

Southern Sections

As noted above Tangata Whenua values scores were provided separately by Ngāti Wehi Wehi and Ngāti Tukorehe for the southern options. Where these differed, the score shown in Table 4-7 (and used in the analysis in Table 4.9) is the lower score indicating less significant difficulty. This situation applied to the scores for Options S1 and S4. The alternative, higher, scores were also considered as part of sensitivity analysis as discussed below.

The scores were also run through the weighting systems provided above to obtain weighted scores for each option, as shown in Table 4-9.

[30] It is noted that not all attendees from the MCA workshop were present at the subsequent PRG meeting.
[31] The weighting was developed after the original finish time following a long day of participation.

Table 4-8: Southern Scores

Option	Landscape and Visual	Ecology	Heritage	Tangata Whenua Values	Productive Land	Social/Community	Impacts on Dwellings	District Development	Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
S1	2	1	4	4	3	2	3	1	3	**5**	3	2
S2	2	2	4	**5**	3	2	3	1	1	**5**	3	2
S3	3	3	4	**5**	3	2	3	1	1	**5**	3	2
S4	4	**5**	4	3	4	3	**5**	2	2	**5**	3	4
S5	4	4	4	4	4	**5**	**5**	3	1	**5**	2	4
S6	2	2	2	2	4	**5**	**5**	3	1	4	2	3
S7	3	**5**	2	3	4	2	4	1	3	4	3	4
S8	2	1	4	**5**	2	1	3	1	3	**5**	3	2

Table 4-9: Analysis of Southern Route Sections (Scores x Weights for Different Weighting Systems)

Option	Workshop Weighting	RMA Part 2	Social	Natural Environment	Cultural	Economic	Draft MCA Guide	PRG1	PRG2
S1	2.87	2.68	2.82	2.07	3.11	2.84	2.94	2.62	2.76
S2	2.87	2.92	2.86	2.56	3.47	2.63	2.36	2.58	2.78
S3	3.04	3.18	2.99	3.11	3.69	2.63	2.44	2.76	2.94
S4	3.72*	3.70*	3.69*	4.04*	3.75*	3.65*	3.25*	3.64*	3.61*
S5	3.87*	3.87*	3.99*	3.89*	4.22*	3.76*	2.93	3.88*	3.89*
S6	2.97	2.60	3.15	2.33	2.67	3.35	2.38	3.16	3.05
S7	3.17	3.07	3.03	3.52	2.83	3.24	3.22*	3.07	3.02
S8	2.78	2.73	2.76	2.07	3.25	2.63	2.90	2.43	2.65

As can be seen from Table 4-8, all the southern route sections involve difficulties which have resulted in scores of 5 under one or more criteria. In particular, it can be noted that Option S5 has been awarded scores of 5 in three criteria (productive land, social/community, and property degree of difficulty). While these criteria carry less weight than some others, particularly in the RMA section 6 weighting, they are found in association with scores of 4 for all but three other criteria. Option S4 similarly has scores of 5 in terms of ecology, impacts on dwellings and property degree of difficulty, and three additional scores of 4. These indicate significant hurdles overall for these route sections. Options S2, S3, S6 and S8 each have two scores of 5, but scores of 4 are less

frequent in these options, as they also are in Options S1 and S7 which have only one score of 5 each.

Table 4-8 has applied the most favourable score in circumstances where two scores were awarded (as in the Tangata Whenua cultural values criterion). If the alternative scores (shown in Table 4-3) had been allocated, Option S4 would have included four scores of 5, including Tangata Whenua cultural values, and Option S4 would have equalled most other routes with two scores of 5.

Table 4-9 provides a comparative score for each of the southern options, applying the weighting systems from Table 4-7[32]. In each column of the table the smallest number indicates the most favourable options and the largest number the least favoured. Asterisks mark the two "worst" options under each weighting system.

Based on the above analysis, it is clear that Options S4 and S5 perform less adequately than the others. These options have the highest number of 4s and 5s in the raw score analysis, and almost consistently perform worst under all weighting systems. It is therefore considered that options S4 and S5 should be discounted.

In terms of the alternative scores awarded for the southern route sections (see Table 4-3), a sensitivity test was undertaken taking into account the larger (more adverse) scores as below:

- S1 Tangata Whenua Values – could be a 5 rather than a 4 – this test was run and it did not make a significant change to the results
- S4 Tangata Whenua Values – could be a 5 rather than a 3 – this option is being discounted so no further evaluation is needed
- S5 Engineering Considerations – could be a 3 rather than a 2 –this option is being discounted so no further evaluation is needed

The same analysis was performed without the cost criterion scores. This did not change the order of options in Table 4-9 above.

Northern Sections

Table 4-10: Northern Scores

Option	Landscape and Visual	Ecology	Heritage	Tangata Whenua Values	Productive Land	Social / Community	Impacts on Dwellings	District Development	Project Objectives	Property Degree of Difficulty	Engineering Considerations	Cost
N1	**5**	4	4	**5**	2	3	3	1	3	4	3	2
N2	**5**	**5**	4	**5**	2	3	4	1	3	4	3	3
N3	4	2	4	**5**	3	**5**	**5**	4	1	**5**	2	2
N4	2	4	4	3	3	4	**5**	4	1	3	2	1
N5	2	1	2	3	3	3	**5**	4	1	3	2	1
N6	2	**5**	4	**5**	2	2	3	1	3	4	3	4
N7	**5**	4	4	**5**	3	**5**	4	4	3	4	3	2
N8	4	1	2	3	4	3	**5**	3	3	3	2	2
N9	1	**5**	2	3	4	3	**5**	4	1	3	2	2

[32] Note that, as in Table 4-8, the most favourable scores have been applied where the workshop awarded more than one score.

Table 4-11: Analysis of Northern Route Sections (Scores x Weights for Different Weighting Systems)

Option	Workshop Weighting	RMA Part 2	Social	Natural Environmental	Cultural	Economic	Draft MCA Guide	PRG 1	PRG 2
N1	3.42	3.67	3.29	3.74	4.19	2.67	3.13	3.16	3.30
N2	3.65	3.92*	3.55	4.11*	4.36*	2.98	3.32*	3.39	3.51
N3	3.70*	3.68	3.90*	3.26	4.33	3.35*	2.67	3.73*	3.82*
N4	3.24	3.30	3.29	3.41	3.53	2.71	2.21	3.41	3.40
N5	2.59	2.38	2.77	2.07	2.58	2.57	1.96	2.78	2.77
N6	3.27	3.52	3.17	3.56	3.72	2.98	3.22	2.93	3.10
N7	4.02*	4.17*	4.03*	4.19*	4.56*	3.39*	3.42*	4.04*	4.10*
N8	3.09	2.75	3.15	2.44	3.00	3.08	2.86	3.27	3.21
N9	3.07	3.02	3.06	3.48	2.78	2.88	2.24	3.27	3.21

As for the southern route section options, all northern options include aspects which have been identified as of extreme difficulty for the location of a route. In some cases, these have been noted as potentially a fatal flaw (see Table 4-5). The route sections which may be fatally flawed and the criteria under which this conclusion was reached are:

Option N1 – Tangata Whenua cultural values

Option N2 – Tangata Whenua cultural values and ecological values

Option N3 – Tangata Whenua cultural values

Option N7 – Tangata Whenua cultural values

In terms of the cumulative degree of difficulty as expressed through the number of scores of 5 awarded, Option N3 would seem to be the most problematic with four scores of 5, Option N2 and N7 the next each with three scores of 5, followed by Options N1, N6 and N9 each with two. Only Options N4, N5 and N8 have one 5 and these are all in the criteria of impacts on dwellings[33]. Options N4 and N7 both have a large number of 4s (four and five respectively).

As with Table 4-8, Table 4-10 applies the lowest workshop score and the dual scoring in Table 4-5 should be inspected. The differences in the main are in the score of 3/4 category, but with Option N4 being awarded an alternative 5 in the ecological criterion. This would potentially put it in the same grouping as Options N1, N6 and N9.

Table 4-11 provides a comparative score under each of the weighting systems for each of the northern route options. As can be seen, Option N7 consistently scores most adversely, with either Options N2 or N3 the next most adverse.

Based on the above analysis it is clear that Options N2, N3 and N7 perform worse than the others. As shown these options have the highest number of 4s and 5s in the raw score analysis, and consistently have the worst outcomes in the analysis in the overall analysis in Table 4-11. It is therefore considered that options N2, N3 and N7 should be discounted.

In terms of the alternative scores recorded for the northern route sections (see Table 4-5), a sensitivity test was undertaken applying the larger (more adverse) scores, as set out below:

[33] Where mitigation through compensation is possible.

- N1 Engineering considerations – could be a 4 rather than a 3 – this test was run and it did not make a significant change to the results
- N2 Social/Community/Recreation – could be a 4 rather than a 3 – this option is being discounted so no further evaluation is needed
- N2 Engineering considerations – could be a 4 rather than a 3 – this option is being discounted so no further evaluation is needed
- N3 Engineering considerations – could be a 3 rather than a 2 – this option is being discounted so no further evaluation is needed
- N4 Ecology – this could be a 5 rather than a 4 – as noted later in this report, this particular aspect will be subject to further investigation in order to confirm the most applicable score.
- N5 Social/Community/Recreation - this evaluation was carried out and was still the most preferred across all weighting scenarios
- N6 Engineering considerations – could be a 4 rather than a 3 – this evaluation was carried out and did not make a significant change to the results
- N7 Engineering considerations – could be a 4 rather than a 3 – this option is being discounted so no further evaluation is needed
- N9 Social/Community/Recreation – could be a 4 rather than a 3 – this evaluation was undertaken and it resulted in this option dropping a couple of places in preference under the Social Weighting system.

The overall analysis was also performed without the cost scores included. This did not change the order of options in the tables above.

4.6.2. Combined Routes

The remaining northern and southern sections (excluding those discounted from the analysis above) were then combined to form complete routes where possible. Appendix N provides more detail of all potential combinations of south and north route sections and their combined scores.

With the worst performing individual sections removed (Options S4, S5, N2, N3 and N7), ten potential combined route options remain. These remaining routes comprise two western options (S8N6 and S1N1), and eight eastern options; four with S6 in the south (referred to as S6 options) and four with S7 (referred to as S6 options), as shown in Figure 4-1. An analysis of their favourability in terms of the MCA is presented in more detail under the various weighting systems as set out in Table 4-12.

Table 4-12: Analysis of Combined Route Options

Combined Options	Workshop Weighting	RMA Part 2	Social	Natural Environment	Cultural	Economic	Draft MCA	PRG1	PRG2
S8N6	6.1	6.3	5.9*	5.6	7.0	5.6*	6.1	5.4*	5.7*
S1N1	6.3	6.4	6.1	5.8	7.3	5.5*	6.1	5.8*	6.1
S6N4	6.2	5.9	6.4	5.7	6.2	6.1	4.6*	6.6	6.5
S6N5	5.6*	5.0*	5.9*	4.4*	5.3*	5.9	4.3*	5.9	5.8*
S6N8	6.1	5.4*	6.3	4.8*	5.7	6.4	5.2	6.4	6.3
S6N9	6.0	5.6	6.2	5.8	5.4*	6.2	4.6	6.4	6.3
S7N4	6.4	6.4	6.3	6.9	6.4	6.0	5.4	6.5	6.4

Combined Options	Workshop Weighting	RMA Part 2	Social	Natural Environment	Cultural	Economic	Draft MCA	PRG1	PRG2
S7N5	5.8*	5.5	5.8*	5.6	5.4*	5.8	5.2	5.9	5.8*
S7N8	6.3	5.8	6.2	6.0	5.8	6.3	6.1	6.3	6.2
S7N9	6.2	6.1	6.1	7.0	5.6	6.1	5.5	6.3	6.2

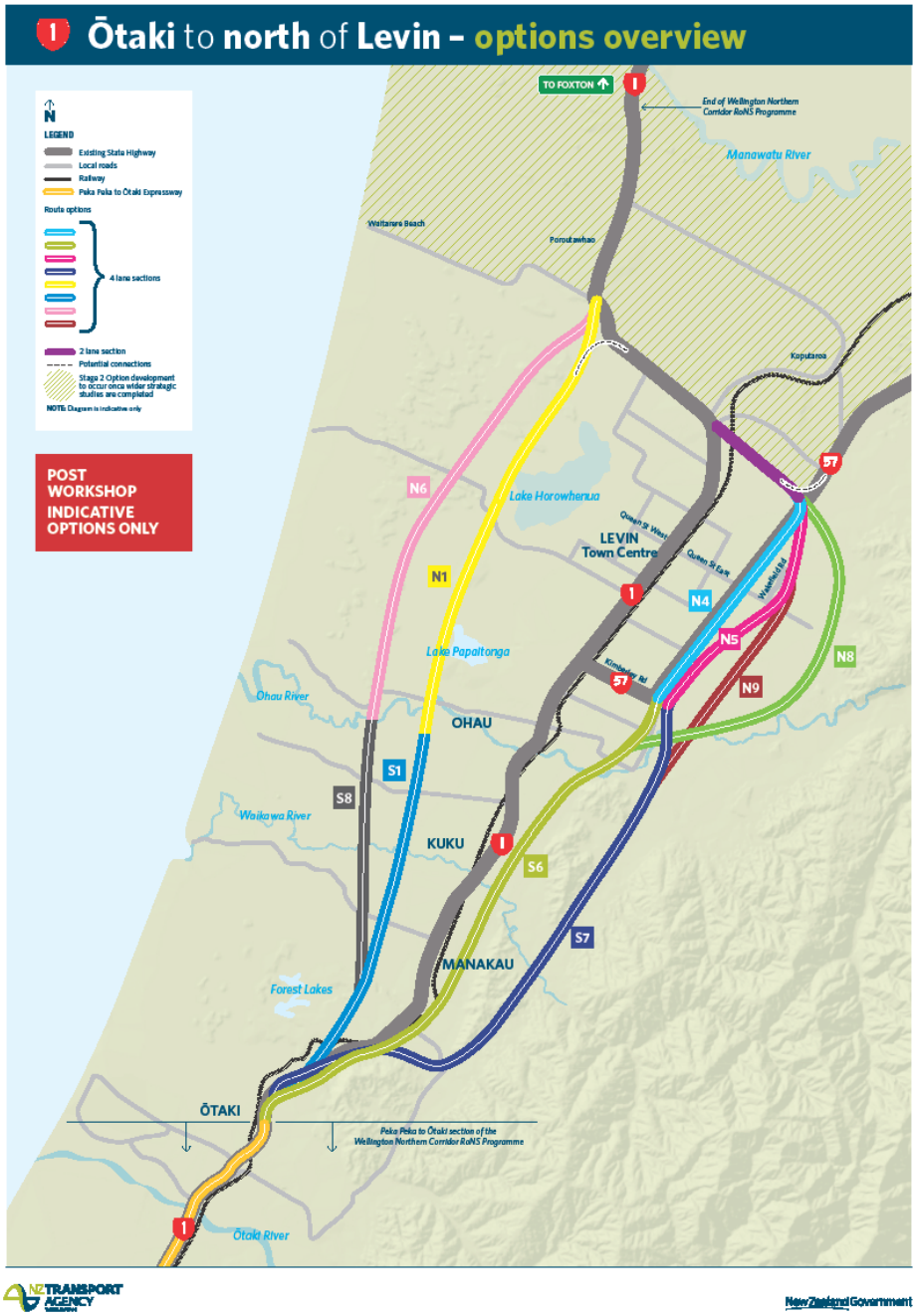

Figure 4-1: Options shortlisted for further investigation

The scores shown for each combined route in Table 4-12 are the sum of the relevant route sections from Tables 4-9 and 4-11, rounded to one decimal place. Lowest scores indicate best performing options overall, and highest scores worst. Asterisks indicate the two best performing options under each weighting system, including a number where there were equal "second" scores.

The scores shown in Table 4-12 are presented in graphical form in Appendix O.

The implications of the information in Table 4-12 is set out in Table 4-13. This indicates overall how each option ranked under each weighting system. A rank of 1 represents the option which performed the best under a particular weighting, while a rank of 10 represents the worst performing option under that weighting.

Table 4-13: Summary of rankings

Combined Option	Workshop Weighting	RMA Part 2	Social	Natural Environment	Cultural	Economic	Draft MCA	PRG1	PRG2
S8N6	4=	8	2=	3=	9	2	8=	1	1
S1N1	8=	9=	4=	6=	10	1	8=	2	4
S6N4	6=	6	10	5	7	6=	2=	10	10
S6N5	1	1	2=	1	1	4	1	3=	2=
S6N8	4=	2	8=	2	5	10	4=	7=	7=
S6N9	3	4	6=	6=	2=	8	2=	7=	7=
S7N4	10	9=	8=	9	8	5	6	9	9
S7N5	2	3	1	3=	2=	3	4=	3=	2=
S7N8	8=	5	6=	8	6	9	8=	5=	5=
S7N9	6=	7	4=	10	4	6=	7	5=	5=

Table 4-13 indicates that there are some routes that perform better than others under most weighting scenarios.

Of the western options S8N6 generally rates better than S1N1 in all bar one weighting system, however both perform poorly under RMA Part 2 and cultural weightings (as well as the Transport Agency's draft MCA weighting).

Of the S6 options, the variant with N5 as the northern section performs best in all weighting systems. The same is true of the S7 options.

There are, however, some differences between the western, S6 options and S7 options when comparing under the different weighting systems, which can be summarised below:

- **Workshop Weighting:** Under this weighting S6N5 and S7N5 perform best. Options S7N4 and S7N9 (along with S1N1) perform poorly under this weighting.
- **RMA Part 2:** Under this weighting, S6N5 again performs well, as do S7N5 and S6N8. The western options as well as the N4 and N9 variants however perform poorly.
- **Social:** the options again perform similarly but S8N6, S6N5 and S7N5 perform slightly better than the others
- **Environmental**: This has the largest spread in scores with the S7 options generally performing poorly. Option S7N5 is an exception to this being the third best scoring option. Option S6N5 is clearly the best performing, and Options S6N8 is the second best option under this weighting.
- **Cultural**: Again there is a large spread in scores in this weighting system, with the western options being the worst performing.. Options S6N5, S6N9 and S7N5 perform well.

- **Economic**: The western options perform best in this weighting system.
- **Draft MCA Guidelines**: The S6 options perform best in this weighting system, with the exception of N6N8.
- **PRG 1**: The western options score best in this scenario, particularly Option S8N6.
- **PRG 2**: The scores are more even in this scenario with Options S8N6, S6N5 and S7N5 being the best performing.

From the earlier discussion of the scoring outcomes, it is clear that there is no option which is free of issues, problems or environmental impacts. This analysis has provided a formalised, transparent and structured means of comparing the various options.

The process has identified some considerations that require further detailed analysis before the options are shortlisted further. These are:

- **Tangata Whenua implications**: Some of the routes were considered to be fatally flawed from the workshop analysis due to their potentially significant impact on sites of significance, areas of previous occupation and because they involve extensive areas of Māori land. Further discussions with local Iwi are needed to better understand these impacts and whether western options should proceed to public engagement processes.
- **Linkages to key areas**: Some of the routes did not appear to have the potential to provide adequately for access from the expressway to the key destinations of Levin or SH57 north of the study area. The combined routes need to be modelled using the Ōtaki to north of Levin Traffic Model to confirm this assessment and to determine if the routes would meet the project objectives.
- **Constructability**: Some of the alignments go through parts of the project area which have not been considered in detail previously. Further information on these routes will need to be collected and the engineering and constructability aspects considered to ensure that a road can be built along the route sections indicated.
- **Additional Ecological Advice**: Further investigation will also be undertaken on bush areas along corridor N4 due to uncertainty as to the appropriate scoring[34].
- **Review of Productive Land Criterion**: Subsequent to the workshop, as a result of concerns raised with the Transport Agency, the basis of and scoring for the productive land criterion were reviewed. This is the subject of a separate brief report, included as Appendix P.

The outcomes of the proposed actions above and the MCA outcomes will provide information to assist the Transport Agency to make a decision on which options should proceed to public and stakeholder consultation.

[34] This has subsequently been undertaken and is provided as an Addendum to Appendix E.

5. Conclusion

This report has summarised the techniques and analysis of possible broad routes for a continuation of the Wellington Northern Corridor from Taylors Road through to north of Levin. The process described in this report can be described as a community-based review of route options, using MCA techniques. Subsequent analysis has been undertaken by the project team, but has also been subject to reporting to the established CRG. This report explains the analyses undertaken, which will assist the Transport Agency in making decisions on options for further investigation and the phase 2 engagement process.

The investigations to date have assumed a four-lane expressway standard. The routes identified can be described as largely greenfield, impinging to at specific locations on existing settlements and urban areas. The present SH1 is assumed to remain as a continuous route available for local traffic.

The findings of the analysis have highlighted that all routes have issues that would need to be addressed through route refinement and mitigation.

Whist the MCA analysis has indicated a number of options which do perform well overall, a number of additional actions are recommended before a short list of routes can be chosen for public and stakeholder consultation.

It is noted that the level of analysis during the community-based MCA, whilst founded on a very good knowledge of the study area, is still at a high level and based on broad route areas rather than a designed alignment. Accordingly a short list of feasible options should form the basis for consultation before undertaking further refinement of one or more identified routes. Further refinement of alignments within the broad routes, as well as interchange options, may require additional analyses after the next round of consultation.