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**A Framework
for Incorporating Environmental Issues
into the Evaluation of State Highway
Roading Projects**

**A thesis presented
in partial fulfilment of
the requirements for the degree of
Master of Philosophy (Environmental Planning)
at Massey University
New Zealand**

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Abstract

A framework for incorporating environmental issues into the evaluation of State Highway roading alternatives is developed. The steps taken in the research method included: a review of current valuation and evaluation techniques for incorporating environmental issues into the evaluation process; a review of the current State Highway evaluation framework in New Zealand; and a study of two State Highway roading projects.

Principal participants in the evaluation process of both case studies were interviewed and a comparative review of the case studies undertaken.

An "ideal" evaluation framework was developed during the study. This framework was based on the comparative review of the case studies and an analysis of current practice and techniques.

The "ideal" evaluation framework involves Regional Councils, rather than Central Government, controlling the evaluation process and Regional Land Transport Committees making the final decision as to the "best" alignment option.

Changes to the Resource Management Act 1991 are recommended to enable a more effective and integrated evaluation process. Such changes include clearly defining "consultation" and increasing the amount of information to be submitted by resource consent applicants. Specifically, applicants would be required to detail the type of evaluation technique used, evidence that the process had been independently reviewed and the findings of the independent review.

The "ideal" evaluation framework consists of a detailed planning process comprising 13 integrated phases within four contexts. These contexts are institutional, ecological, socio-economic and engineering. In the second phase of the planning process, community and organisational values are assessed using Focus Groups and Attitude Surveys. This phase determines the limits of each context prior to the evaluation of alternatives.

The research demonstrated that the most appropriate and effective evaluation technique for incorporating environmental issues into the evaluation of State Highway roading alternatives is the Goals Achievement Matrix (GAM).

Based on the findings of the case study reviews the formation of a Community Group and employment of an independent advisor(s) is recommended.

Provided that the "ideal" evaluation framework is based upon the criteria recommended in the study (including effective, appropriate consultation and a clear understanding of who is the final decision-maker), this framework could be used to successfully incorporate environmental issues into the evaluation of State Highway roading alternatives.

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List of Abbreviations

ARC:	Auckland Regional Council
CG:	Consultative Group
DOC:	Department of Conservation
HBRC:	Hawke's Bay Regional Council
LGA:	Local Government Act 1974
MfE:	Ministry for the Environment
RC:	Regional Council
RLTC:	Regional Land Transport Committee
RLTS:	Regional Land Transport Strategy
RMA:	Resource Management Act 1991
RPS:	Regional Policy Statement
Transit:	Transit New Zealand
TNZ:	Transit New Zealand
TNZ Act:	Transit New Zealand Act 1989
WRC:	Wellington Regional Council

Glossary

Alignment - The line that a State Highway takes horizontally and vertically across the landscape, ie, straight or curved alignment.

Anthropocentric - Human-centred.

Bypass - A route designed to avoid or detour from a specific area.

Designation - A provision made in a district plan to give effect to a requirement made by a requiring authority under Section 168 (or Section 168A) or Clause 4 of the 1st Schedule of the RMA.

Ecocentric - Environment-centred.

Effects - As defined in Section 3 of the RMA "in this Act, unless the context otherwise requires, the term 'effect' in relation to the use, development, or protection of natural and physical resources, or in relation to the environment, includes -

- (a) any positive or adverse effect; and
- (b) any temporary or permanent effect; and
- (c) any past, present, or future effect; and
- (d) any cumulative effect which arises over time or in combination with other effects -

regardless of the scale, intensity, duration, or frequency of the effect, and also includes -

- (e) any potential effect of high probability; and
- (f) any potential effect of low probability which has a high potential impact".

Environment - As defined in Section 2 of the RMA includes -

- "(a) ecosystems and their constituent parts, including people and communities; and
- (b) all natural and physical resources; and
- (c) amenity values; and
- (d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) of this definition or which are affected by those matters".

Environmental Issues - Those issues which are not easily measured in dollar terms.

Environmental Factors - For the purposes of this study this has the same meaning as environmental issues.

Evaluation - "The whole process of comparing plans: the framework devised for the analysis, the principles of assessment, the measures employed in the comparison, and the marshalling of evidence" (Lichfield et al, 1975). For the purposes of this study "evaluation process" means the evaluation of State Highway roading alternatives.

Externalities - The indirect effects of roading projects.

Intangibles - Costs and benefits of impacts which Transit has not developed methods for valuing in monetary terms.

Intrinsic - As defined in Section 2 of the RMA "in relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including -

- (a) their biological and genetic diversity; and
- (b) the essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience".

Iwi Authority - As defined in Section 2 of the RMA "the authority which represents an Iwi and which is recognised by that Iwi as having the authority to do so".

Kaitiakitanga - As defined in Section 2 of the RMA "the exercise of guardianship; and, in relation to a resource, includes the ethic of stewardship based on the nature of the resource itself".

Local Authority - As defined in Section 2 of the Transit New Zealand Act 1989 "any regional council or territorial authority within the meaning of the Local Government Act 1974".

Mana whenua - As defined in Section 2 of the RMA "customary authority exercised by an Iwi or hapu in an identified area".

Natural and Physical Resources - As defined in Section 2 of the RMA "includes land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced), and all structures".

Project - As defined in the TNZ Act "an individual land transport related activity and includes administration, planning, design, and supervision".

Realignment - Altering the alignment of a road or State Highway to reduce the number of accidents, reduce travel time and generally improve the nature of the State Highway.

Regional Council - A local authority established under the Local Government Act 1974 to sustainably manage the region's natural and physical resources.

Requiring Authority - Under Section 166 of the RMA, (a) Minister of the Crown or (b) a local authority or (c) a network utility operator approved as a requiring authority under Section 167 of the RMA.

Stake-holders - Individuals or a group of individuals who have an interest or concern in a project.

State Highway - As defined in the TNZ Act "a State Highway declared as such under Section 11 of the National Roads Act 1953 or by the Authority under this Act; and, for the purposes of any payments the Account, also includes any proposed State Highway".

Structures - As defined in Section 2 of the RMA "any building, equipment, device, or other facility made by people and which is fixed to land".

Taonga - Property; treasure; artefact or relic.

Tangata Whenua - As defined in Section 2 of the RMA "in relation to a particular area, means the Iwi, or hapu, that holds mana whenua over that area".

Territorial Authority - Has the same meaning as in Section 2 (1) of the Local Government Act 1974.

Transit New Zealand - A Central Government agency established under the Transit New Zealand Act 1989 to "promote policies and allocate resources to achieve a safe and efficient land transport system that maximises national economic and social benefits".

Treaty of Waitangi - Has the same meaning as the word "Treaty" as defined in Section 2 of the Treaty of Waitangi Act 1975.

Valuation - A stage in the evaluation of State Highway alternatives which derives the values of the effects of the alternatives, through objective, analytic or subjective approaches.

Waahi tapu - Cemetery or reserved ground.

Waka - A Maori canoe.

1.0 Introduction to Thesis

1.1 Background

The evaluation of State Highway alignment alternatives in New Zealand, and overseas, has in the past, focused on engineering aspects. Consideration of the effects on the environment (within both ecocentric and anthropocentric contexts) has often been minor or during the latter stages of the process.

When the New Zealand Government introduced the Resource Management Act in 1991 it increased the emphasis on the effects of activities, eg, roads on New Zealand's natural and physical resources. Prior to 1991 there had been a growing awareness of the effects of activities on the environment.

The authorities charged with sustainably managing New Zealand's natural and physical resources are Regional Councils. Regional Councils are the middle tier of Local Government in New Zealand which were formed in 1989 through the amalgamation of numerous ad hoc bodies. Despite this management role, Regional Councils do not have control over the consideration of environmental issues in the evaluation of State Highway roading projects until planning consent is sought for the final alignment.

Transit New Zealand (a Central Government authority) controls the evaluation and decision-making process which results in a recommendation to construct a specific alignment. Bound by the Transit New Zealand Act 1989, Transit (or its consultants) undertake the evaluation of the alignment options.

1.2 The Meaning and Purpose of Evaluation

This study focuses on the process of evaluating State Highway alignment options. The evaluation of alternatives involves four stages. The first and second stages structure the

alternatives for testing and determining the effects which will result from each alternative. The third (or valuation) stage, derives the values of these effects through objective, analytic or subjective approaches (Thomas et al, 1970). The fourth stage uses information on the relative value of different types of consequences to obtain the total value of all consequences of each alternative.

The purpose of evaluation is not to find a decision, but enable decision-making by producing results which will assist the decision-makers (Winfrey et al, 1971). The role of many evaluation techniques is to select an optimal or "best" option.

The distinction between "evaluation" and "valuation" is important. Evaluation "embraces the whole process of comparing plans: the framework devised for the analysis, the principles of assessment, the measures employed in the comparison, and the marshalling of evidence" (Lichfield et al, 1975). Valuation is but one part of the evaluation process.

1.3 Transit New Zealand

Having a mandate to achieve national, social and economic objectives, Transit (to date) has given limited early recognition to the local environmental impact of State Highway alternatives. Transit has recognised, however, the importance of achieving the purpose of the RMA by sustainably managing the State Highway network within New Zealand.

To this end, Transit has produced two documents in the last five years relating to the environment, (i) "Transit New Zealand and the Environment" and (ii) "Planning for a Safe and Efficient State Highway Network under the Resource Management Act 1991".

Transit has also recently employed consultants to investigate methods of incorporating environmental issues into the evaluation of State Highway alignments. These investigations have primarily focused on placing dollar values on intangibles.

The RMA has empowered affected individuals and groups to have more say regarding the effect that activities such as State Highways have on the environment. As yet, Transit has not developed an integrated evaluation process which incorporates at an early stage the values and goals of the community (including environmental values) in relation to State Highways.

1.4 Thesis Aim

This thesis aims to analyse the framework within which environmental issues are considered in the evaluation of State Highway roading projects in New Zealand.

1.5 Thesis Objectives

This study aims to achieve the following objectives:

- to examine current evaluation techniques (both overseas and within New Zealand) including techniques which incorporate environmental issues into the decision-making process;
- to document and analyse current evaluation practices within New Zealand; and
- to recommend the adoption of an "ideal" evaluation framework for incorporating environmental issues into the evaluation of State Highway roading projects.

1.6 Thesis Outline and Methodological Approach

The thesis contains eight chapters. Figure 1 (next page) illustrates each chapter and how it relates to other chapters in this thesis. Chapter 1.0 introduces the thesis including establishing the thesis aims and objectives.

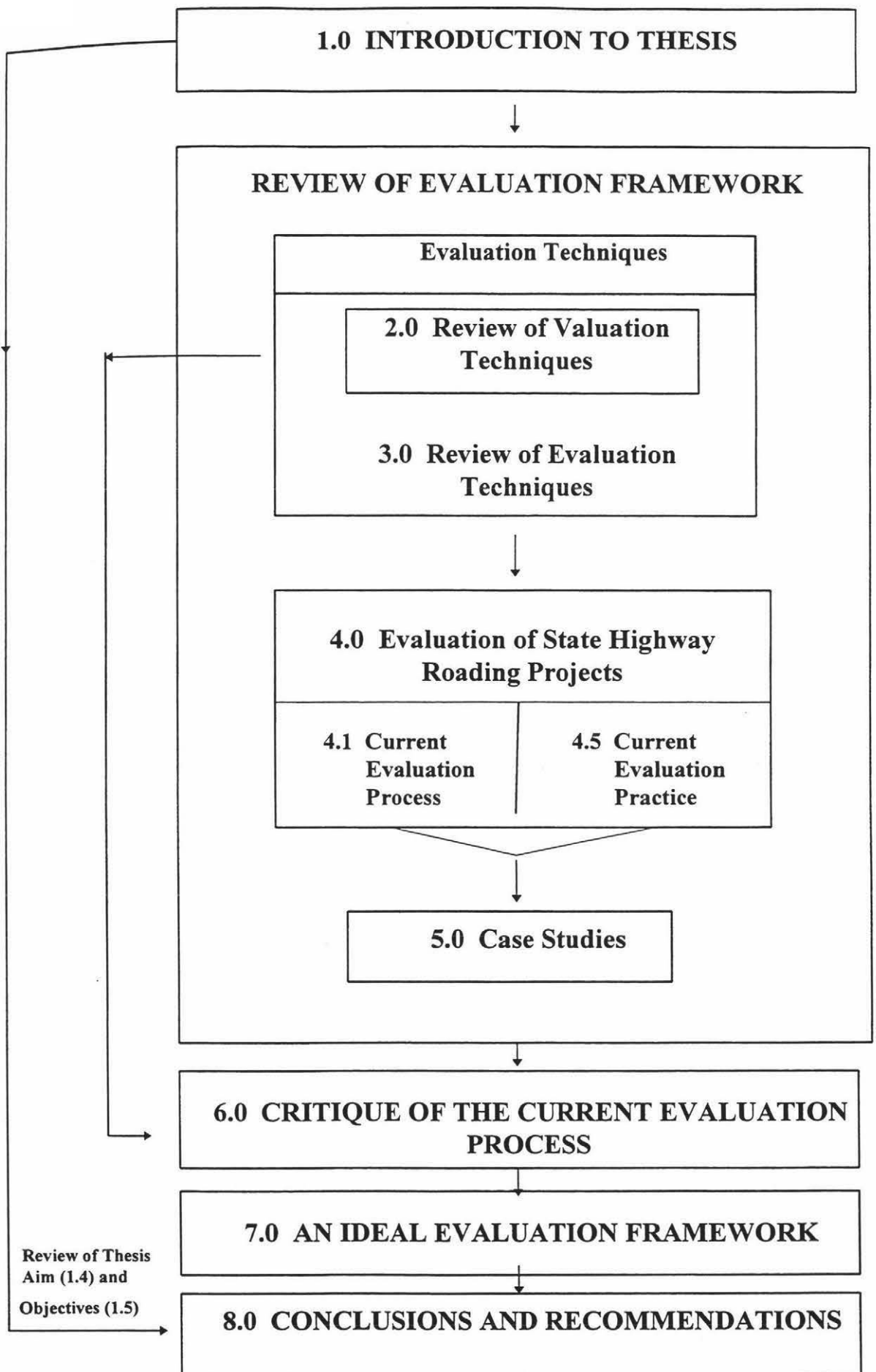


Figure 1: Thesis Outline

A review of the evaluation framework including theoretical and current techniques follows the introduction. This review comprises Chapters, 2.0, 3.0, 4.0 and 5.0. The thesis begins at the third stage of the evaluation process (valuation) and assumes that the alternatives have already been structured for testing and the effects which will result from each alternative determined.

The first part of the review examines the techniques available to incorporate environmental issues into the evaluation of State Highway roading projects. Chapter 2.0 discusses valuation techniques which are the first stage of the evaluation process. Chapter 3.0 then goes on to discuss evaluation techniques.

Chapter 4.0 establishes the current framework (both institutionally and legislatively) within which environmental issues are considered in the evaluation process. Chapter 5.0 then observes and examines the evaluation frameworks used by two Transit New Zealand Regional Offices.

The two evaluation frameworks (case studies) chosen were the Ahuriri Estuary Motorway (State Highway 2) Napier, and the Albany-Puhoi Bypass (State Highway 1) Auckland. These two frameworks were chosen for the following reasons:

- i they were recent projects, ie, within the last five years;
- ii the RMA was in force during the evaluation process; and
- iii the two case studies used different techniques to evaluate alignment options.

The evaluation process used for the Ahuriri Estuary Motorway project is considered to be typical of current Transit practice, whereas the Albany-Puhoi Bypass process (particularly the use of a Consultative Group) was a new initiative by Transit (Odams et al, 1994).

The main parties involved in each evaluation process were interviewed. For the Albany-Puhoi study a Consultative Group, comprising representatives of the community, was interviewed. Because no such group was formed for the Ahuriri

Estuary Motorway project, members of the public who attended public meetings and lodged submissions throughout the process were interviewed. Transit officers from both regions were also interviewed. For both case studies the same questions were asked of each interviewee.

Each interview was taped (with the interviewee's permission) and also recorded manually. Interviewing each participant face-to-face enabled questions to be explained and also provided the interviewer with a general impression of the participant's emotions towards each evaluation process.

The interviews were carefully transcribed so as not to express any personal comments or criticisms about other participants, or comments which claimed to express the views of other participants. Instead, a general comment was made regarding the opinion of the particular participant. To avoid bias, Transit staff were interviewed last.

Section 5.4 discusses and compares the main points emerging from the interviews. More detailed transcripts of each case study interview have been microfiched and are located inside the back cover of this thesis.

The outcome of the Review of the Evaluation Framework is a critique of the current evaluation process (Chapter 6.0). Conclusions drawn from Chapter 6.0 are then incorporated into an "ideal" evaluation framework proposed in Chapter 7.0. The framework outlines the institutional and legislative frameworks, as well as an "ideal" planning process to incorporate environmental issues into the evaluation process. Chapter 7.0 focuses on the "ideal" evaluation process and discusses the steps required to undertake evaluation within the "ideal" evaluation framework.

Chapter 8.0 summarises the main findings of this thesis including whether it has met the aims and objectives stated in Chapter 1.0. Further areas of research required to test the Ideal Evaluation Framework are also identified in Chapter 8.0.

It should be recognised that there are several limitations to this research. Firstly, the case studies focus on two State Highway roading projects. However, there are hundreds of projects considered each year by the Transit New Zealand Authority for funding. Therefore the two case studies chosen may not be truly representative of those throughout the country. Secondly, only the vocal minority were interviewed. The opinions of the silent majority were not studied. This may have lead to bias in the results and conclusions which could be overcome by undertaking an extensive survey of the general public to gain their views of the evaluation process.

2.0 Review of Valuation Techniques

A review of valuation techniques is essential because the valuing of issues is an integral part of the overall evaluation process.

The techniques for placing values on environmental factors vary with the type of value relationship and whether the costs and benefits of the effects of alternatives can be derived from a market. The theory of value relationships is discussed in the following sections.

2.1 Environmental Values

There are three main environmental value relationships underlying policy and ethics in industrialised societies: private preference value, public preference value and non-preference value (Transport & Road Research Laboratory (TRRL), 1992).

2.1.1 Private Preference Value

Private preference ("revealed preference") value is examined in terms of willingness-to-pay (WTP) or willingness-to-accept compensation (WTA) for changes in environmental status (Works Consultancy, 1993).

Three categories of private preference value have been recognised:

- i Use Value: This refers to all the ways a person derives benefit from the use of an environment. In relation to transport projects this can include the benefits of increased access to facilities or attractions, or of peace and quiet (Hopkinson et al, 1990).
- ii Option Values: Along with people who currently use an environment, there may be people who may wish to use it at some time in the future, or are unsure about whether they will want to use it. Those who are unsure are concerned about

damage or irreversible changes which would prohibit their future use (Hopkinson et al, 1990).

The amount people would be willing to pay to retain the option of using resources in the future is termed the "option value" (Works Consultancy, 1993). An extension of this is the "quasi-option value" which is the value people would be prepared to pay to delay an activity until more information is available to make a better decision (Works Consultancy, 1993).

- iii Non-Use Values: These values relate to the "non-preference value" or "intrinsic value" and are based on the argument that nature has an "intrinsic or inherent" value which exists whether or not humans are around to sense or experience it" (TRRL, 1992).

TRRL (1992) gives an example of non-use value as the pleasure or satisfaction which people obtain from seeing, via television, rare species, even though they may never witness these species directly. This examples contradicts the definition of non-use value given by TRRL (1992) as it introduces the element of people.

Further variants of these values are: "bequest value" which is an expressed preference to pass resources on to future generations, and "altruistic value" which is a desire to know that other people are benefiting from the provision of the good (Hopkinson et al, 1990, p111).

There are difficulties in measuring option and non-use values, the initial problem being that "most environmental effects are complicated and difficult to forecast" (TRRL, 1992, p6). However, it has been claimed by USA researchers that "the non-use valuation for nature conservation sites can be higher than use values and a similar order of magnitude to option-values" (Hopkinson et al, 1990, p111). This claim may be evidence of a growing awareness of the environment and the value placed upon protecting it for future generations.

2.1.2 Public Preference Value

Individuals are also argued to have public preference values. These values involve opinions and beliefs about what ought to be the case, rather than reflecting individual wants (TRRL, 1992). This value is reflected in the social provision or protection of quasi-public or pure public goods, eg, Local Authority provision of parks and play areas.

2.2 Direct Valuation Techniques

These techniques consider environmental gains and seek to directly measure the monetary value of those gains eg. an improved scenic view or better access to facilities.

The literature separates these techniques into two groups, (i) market or (ii) non-market. Market factors used in the valuation of State Highway roading projects include: the running cost of vehicles, the cost of accidents and travel time, whereas non-market factors such as visual, social and environmental consequences of State Highway roading projects are considered to be very subjective in their values and not easily priced in terms of the market (Winfrey, 1971).

The distinction between market and non-market is artificial because it assumes that goods or factors can be clearly identified by consumers, who can make a conscious decision to purchase these goods or factors.

This chapter focuses on non-market valuation techniques because New Zealand has a well established practice in valuing market factors (TNZ, 1991). This research does not presume that the established practice for valuing market factors is correct. However, non-market techniques have been chosen for study because the results of these techniques can vary from one evaluator to another. Three direct non-market approaches are the:

- Hedonic Pricing Method (HPM)
- Travel Cost Method (TCM) and
- Contingent Valuation Method (CVM).

Both the HPM and TCM are revealed preference techniques which "involve observing and examining peoples' actual behaviour or their revealed preferences for environmental protection of goods" (Hopkinson et al, 1990, p111). Because HPM and TCM measure only actual behaviour they do not measure option or non-use values.

Stated (or expressed) preference techniques (CVM) are the only means of estimating option and non-use values (Works Consultancy, 1993).

2.2.1 Hedonic Pricing Method (HPM)

This method usually involves examining variations in house prices in relation to characteristics of the property and the neighbourhood. Environmental attributes included are the level of visual intrusion or the level of access to outdoor recreation areas (Hopkinson, 1990).

Using statistical techniques the HPM attempts to

- "(a) identify how much of a property value differential is due to a particular environmental difference between properties and
- (b) infer how much people are willing to pay for an improvement in environmental quality and what the social value of the improvement is" (Pearce, 1989).

Multiple regression analysis is used to find the relationship between house prices and environmental attributes (TRRL, 1992). Data is taken either on a small number of similar residential properties over a period of years (time series), on a large number of diverse properties at a point in time (cross section) or on both (Pearce, 1989).

The regression analysis involves a number of variables which describe the sources from which differences in property values can arise, eg, property-describing variables; neighbourhood variables; accessibility variables; and environmental variables. Variables which statistically explain the differences in property values are found using multiple regression analysis.

2.2.1.1 Limitations of the HPM

There are a large number of explanatory variables which can affect house prices; therefore the main problem with HPM is that a large sample is required. When adequate variation in the explanatory variables is obtained, even then the results can be inaccurate (Hopkinson, 1990).

The HPM is also limited in that the relationship between the WTP curve and social cost/benefits is not clear, eg individuals may undervalue the benefits of reducing pollution because they are not fully aware of its impact upon their health (TRRL, 1992). This limitation is valid because the public, in general, are unaware or uneducated about the complexity of environmental issues.

Turner (1990) considers that the HPM has a low level of user-friendliness and requires specialised skills. These may be the reasons for Streeting's (1990) view that "the valuations of environmental goods obtained using the [HPM] technique will typically be approximate and subject to relatively large error bounds".

However, Reynolds (1992) supports the use of such techniques as "in this area of valuing attributes of the environment, all techniques are new and rather clumsy. Any knowledge gained ... should, at the minimum, be treated as useful information".

2.2.1.2 Advantages of the HPM

Where benefits are "clearly perceptible" the HPM can produce consistent "ballpark" estimates, eg, where noise or air pollution is localised (TRRL, 1992). Reynolds (1990) also considers that there may be a role for the HPM in ex-post analysis of property price changes before, and after, a road improvement scheme. In principle, Reynolds (1990) considers that the HPM could be incorporated into Cost Benefit Analysis (CBA) or the Manual of Environmental Appraisal (MEA).

Although there are limitations to the HPM, merit is seen by Hopkinson et al (1990, p111) "in combining elements of the HPM with a survey based technique". The merit of such a

combination is that the majority of people undertake searches and make decisions about where to live and how much to pay. Experiments could then be designed, based upon the current residence, by altering attributes and characteristics of the property, and the surrounding area and the value of the property. This approach was first established by Berrett (1975) but has since been ignored (Hopkinson et al, 1990).

2.2.2 Travel Cost Method (TCM)

This method is used to estimate the benefits of environmental improvements in recreational facilities such as parks, lakes etc (Pearce, 1989). The aim of the TCM is to "use information on the amount of money and time that people have spent in getting to a recreational site" (Pearce, 1989, p40) to estimate their willingness to pay for the facilities at that site. TRRL (1992, p14) postulates that "TCM is used to estimate consumer surplus [from the demand curve] ... that is, the amount of satisfaction gained from consuming a good or service in excess of payment".

These two purposes of TCM deal with two separate values. Pearce's purpose of TCM focuses on use, option and non-use values, whereas TRRL focuses only on use values. Pearce's interpretation of the purpose of TCM is the favoured interpretation.

Hopkinson et al (1990) concur with Pearce. They believe that the travel cost method is a revealed preference technique which "relies on finding situations in which consumers have a choice between incurring monetary expenditure or suffering the ill effect in question".

2.2.2.1 Limitations of the TCM

Deriving the demand curve requires including a large number of variables in the estimation, eg, household income, duration and purpose of visit and availability of alternative facilities to the household.

The other drawbacks of this method relate to its statistical application in that:

- i there is a problem in specifying a function relating the number of trips made to the travel cost and income of visitors (TRRL, 1992);
- ii the number of visits made is a discrete variable, ie, how to "handle travel costs incurred jointly by visiting more than one site" (Works Consultancy, 1993, p47); and
- iii the method has a truncation bias in that surveys cannot take account of those who do not visit the resource. The inclusion of non-visitors would significantly affect the consumer surplus (TRRL, 1992).

2.2.2.2 Advantages of the TCM

Despite its drawbacks, the TCM can be used as a cross-check for (or with) the Contingent Valuation Method (TRRL, 1992).

Pearce considers that TCM is an important method for evaluating the demand for recreational facilities and for valuing changes in these facilities (Pearce, 1989). Turner et al (1990) support Pearce to a limited extent, saying that TCM "is a long-established method and in the right context, can produce reasonable lower-bound approximations for isolated recreation site value". However, they further their hesitation about this technique by commenting that "it has intermediate reliability in a very limited range of contexts and its user-friendliness is intermediate to low" (Turner et al, 1990).

This method could be used for assessing the impact of a roading development in an area which is used specifically for recreational purposes. However, this is provided that there is adequate data on the characteristics of the site and the user (Pearce, 1989).

Use of the TCM in New Zealand may be limited because there are few roading developments located in areas specifically used for recreational purposes. Many roading developments in New Zealand pass through a combination of residential, commercial or farming areas, eg, Ahuriri Estuary Motorway, Napier, Albany-Puhoi Realignment and

Wellington Urban Motorway Extension. Therefore it would be difficult to isolate specific parts of a journey and the benefits associated with that part.

2.2.3 Contingent Valuation Method (CVM)

This method is used to determine the amount that individuals are willing to pay to prevent the destruction of, or to improve an environmental asset (Hopkinson, 1990). Also known as an “expressed (or stated) preference” technique, CVM is a survey approach based on the direct questioning of individuals in a structured format (Reynolds, 1990).

The CVM assumes that individuals will behave in the same way in a real market as they do in an experimental or hypothetical market.

2.2.3.1 Limitations of the CVM

The accuracy of this method depends on how various biases are overcome. Pearce (1989, p36) classifies these biases as:

Strategic

Incentive to "free ride", ie, by not telling the truth, individuals may still secure a benefit in excess of the costs they have to pay.

Design

- a) starting point bias - who makes the first bid, and at what level, may influence the respondent;
- b) vehicle bias - this refers to the instrument of payment, ie, changes in local taxes, entrance fees or higher prices for goods. Respondents may be sensitive to the vehicle chosen;
- c) informational bias - the sequence, amount and quality of information supplied to the respondent may influence response.

Reynolds (1990) comments that results of bias tests have found little evidence of strategic bias but starting point and instrument (vehicle) bias have been detected. Reynolds does

not mention whether any tests have been carried out to establish evidence of informational bias. This could be a significant area for bias because individuals are influenced by the information provided to them, particularly if they are uneducated in areas such as environmental issues. Individuals may not question what they read.

Hypothetical

Studies have found that hypothetical and actual valuations differ significantly, with the hypothetical WTA being less than actual WTA (Bishop et al, 1983). This suggests that the hypothetical measures are "unreal" and subject to bias (Pearce, 1989 and Reynolds, 1990, p119).

Operational

This bias may be described in terms of the extent to which the actual "operating conditions" in the CVM approximate actual market conditions. Established conditions include the requirement that respondents be familiar with the good they are valuing, and that they have either prior experience of varying the quantities of the good, or can "learn" how to do this through repeated bids (Pearce, 1989).

Methods of overcoming (or minimising) these biases include good survey design and the "right" choice of environmental good for valuation (TRRL, 1992, and Reynolds, 1990).

Both TRRL (1992) and Hopkinson (1990) discuss the problem of behaviour and attitudes in relation to the accuracy of the CVM. Hopkinson (1990) holds reservations regarding this method in that "what people say is not always what they do". This comment is backed up by the studies discussed by Bishop et al, 1983.

TRRL (1992, p17) and Reynolds (1990, p119) state that "the accuracy of the CVM might be improved if social psychology was incorporated in the studies". Some psychologists stress that individuals are not always "rational maximisers". The reason for this is that they are influenced by conflicts, doubts and social pressures linked to moral and ethical concerns. An example of this problem is that people are unwilling to express a willingness-to-pay (WTP) for environmental goods which they consider theirs by right

(TRRL, 1992). Harris et al (1989) suggest the use of attitude theory to overcome these problems.

2.2.3.2 Advantages of the CVM

A significant advantage of the CVM is that it can elicit current use, option and non-use values for environmental goods (Pearce, 1989, and Works Consultancy, 1993). Reynolds (1990) considers that the quality of the existence (non-use) value estimate obtained from the CVM is doubtful. However, because of the nature of this value, many other techniques may also have doubtful results.

Overall, the CVM is considered to be a "valid and reliable technique" (TRRL, 1992, p17) but further work is required on developing the method and overcoming the aforementioned biases.

Works Consultancy (1993, p49) believes that (apart from the problems with CVM) it has the "widest potential application to transport externality effects", particularly in relation to seeking WTP measures for environmental gains.

2.3 Direct Valuation Techniques - Conclusions

These techniques assume that affected individuals have the ability to accurately place monetary values on environmental issues. Valuing environmental issues in dollar terms can integrate market and non-market factors in the decision-making process but the relevance or accuracy of some values, ie, those required to be placed on intrinsic factors, may not be based on the same scale as the actual costs of constructing a State Highway.

2.4 Indirect Monetary Valuation Techniques

Indirect valuation techniques do not seek to obtain a value for an environmental good but calculate a "dose-response" relationship. This approach tends to be used when

individuals are unaware of the full effects of changes in environmental effects (in particular the effects of pollution) when useful values for WTP/WTB would not be obtained (TRRL, 1992).

2.4.1 Dose-response Techniques

Two stages are involved in determining the relationship between pollution and some effect:

- i the general relationship between physical damage and the level of pollution is identified; and
- ii the specific level of pollution is used to estimate the physical damage (TRRL, 1992).

The cost of pollution is obtained by multiplying the level of pollution by the price per unit of damage.

A wide range of studies have used indirect techniques, such as pollution and health studies; materials corrosion; vegetation damage and transportation impact studies which identified the social costs of traffic (TRRL, 1992).

2.4.2 Mitigation Costs Technique

The cost of the effects of a roading project can be determined by calculating the cost required to mitigate the effects. This cost relates to "the cost of restoring the environmental damage so that, at least, the situation is no worse than before" (Goodwin, 1991, p113).

2.4.3 Shadow Project Technique

An extension of the mitigation technique involves costing "shadow projects". Shadow projects can include creating a substitute natural asset when one is threatened, eg,

recreation of a habitat or improving a degraded habitat in compensation for a loss elsewhere (TRRL, 1992).

The cost of a shadow project may have no connection with the value of the impact it removes, therefore its cost cannot be included in the CBA if the shadow project is not implemented (TRRL, 1992).

There is doubt whether recreating a natural habitat is possible within a reasonable time-frame, if at all. This comment was raised by environmental groups involved with the Ahuriri Estuary case study. Hopkinson et al (1990) appear to support the view that damage to the environment should be avoided in saying that "the environment should act as a binding constraint on project development at any cost and the scheme should be adjusted to avoid damage to the environment".

2.5 Indirect Monetary Valuation Techniques - Conclusions

These techniques are a low-cost method of obtaining values for environmental issues but they do not involve any input from affected groups. The values placed on environmental issues are obtained by the designers or engineers rather than members of the community.

2.6 Indirect Non-monetary Valuation Techniques

These techniques seek to obtain subjective values rather than monetary values.

2.6.1 Team Rating Technique

A useful technique to evaluate alignment alternatives is to use teams to rate the importance of specified criteria (Winfrey et al, 1979). Eckenrode (1965) has used this technique by setting up three hypothetical situations in which the sets of criteria were tested by judges. The methods used by the judges included: ranking; rating; partial and complete paired comparisons; and successive comparisons.

2.6.1.1 Limitations and Advantages of the Team Rating Technique

A limitation of this technique in evaluating highway locations is that it may be difficult to obtain a group of judges representative of the affected community (Winfrey et al, 1971).

Eckenrode (1965) found that, using the ranking method, judges who were qualified in a particular area would find high agreement on their rankings, but this situation may be infrequent and difficult to achieve.

No specific advantages were discussed in the literature but it appears that this technique is reasonably low-cost, gives quick results (limited analysis involved) and can act as a guide for further detailed discussion on the higher-ranking alternatives.

2.6.2 Focus Group and Rating Panel Techniques

Variations of Team Ratings are Focus Groups and Rating Panels. Focus Groups use a group of people who have common backgrounds and interests to explore a particular subject with which they are familiar (Voorhees, 1965). These groups are an effective way to determine major issues, select values and ascertain the kind of language that best describes the issues (Voorhees, 1965).

Rating Panels can effectively evaluate individual values in relation to alternative plans (Voorhees, 1965). Although the results of Rating Panels represent only the members' values, and not those of the community at large (the same could also be argued for Focus Groups and Team Ratings), there are times when it is useful to know the values of a particular group.

Rating Panels have an advantage over Focus Groups, in that a statistical evaluation of the results can be made (Voorhees, 1965).

2.6.3 Impact Matrix Technique

There are various forms of matrices which have been developed for environmental assessment (Harris, 1994, and Works Consultancy, 1992). Matrices generally have several common characteristics: they force consideration of impacts and they consider both the magnitude and importance of impacts (Mitchell, 1989).

The matrix (first developed by Leopold et al (1971)) is formed by identifying all actions which are part of the proposed development and indicating (on a scale of 1-10) the magnitude and importance of the impact (Mitchell, 1989). In the Leopold matrix the numbers are not added, but in the Harris (1994) and Works Consultancy (1992) matrices the magnitudes of impacts have been totalled.

2.6.3.1 Advantages of the Impact Matrix Technique

Impact matrices serve as checklists for issues and identify first-order interactions. Magnitude and importance values are important considerations in respect of State Highway roading projects because although an impact may be significant in magnitude it may not be important overall, eg, the removal of or damage to an entire wildlife habitat that is not classified as nationally, regionally or locally significant.

The introduction of impact matrices was the first technique to relate project actions to environmental alterations (Mitchell, 1989). The advantage of this is that decision-makers are aware of the implications of project actions.

2.6.3.2 Limitations of the Impact Matrix Technique

According to Mitchell (1989, p207) and Thompson (1988, p239) there are several significant disadvantages to Impact Matrices. These disadvantages or limitations can be categorised as (i) the composition of the matrix; (ii) evaluation of matrices; (iii) the level of public input; and (iv) the decision-making process.

- i Composition of Impact Matrices
 - a. the matrix suggests a direct cause-and-effect relationship which rarely exists;
 - b. immediate and long-term impacts are not differentiated - although different matrices could be compiled for different time periods;
 - c. the list is heavily biased towards the physical-biological environment and should be expanded to include the human environment, ie, social impacts; and
 - d. there are no guidelines as to how the significance of an impact should be determined.

- ii Evaluation of Impact Matrices
 - a. the scoring of magnitude and importance is left to the judgement of the assessor; and
 - b. different assessors could produce different appraisals (Mitchell, 1989, p107);

- iii Public Input
 - a. there is no input of public opinion (Thompson, 1988, p238);

- iv Decision-Making Process
 - a. there is no attempt at aggregation of impacts - this would assist the decision-makers in assessing which was the "best" option; and
 - b. there is no guidance on how to incorporate the matrix into the decision-making process.

Many of these limitations are significant, but their significance is less relevant if the matrices are used to value impacts rather than evaluate different options.

TRRL (1990) considers Impact Matrices to be presentational tools (rather than valuation techniques) for identifying impacts that need to be evaluated. Contrary to this view, Mitchell (1989) considers that because Impact Matrices identify the importance

[significance or value] of effects, they are in a sense valuation techniques. Impact Matrices are valuation techniques only if magnitude and importance of effects are identified in the matrix.

2.6.4 Role Playing (Delphi Techniques)

Role playing and other simulation techniques such as Delphi can aid in determining community values (MSJ Keys, 1977). The Delphi technique consists of a series of questions directed to a selected group. Feedback from individuals within the group is controlled and free from group and individual pressure. Participants are able to modify their views in response to total group views.

2.6.4.1 Advantages and Limitations of the Delphi Technique

The Delphi technique has the advantage that road impacts can be investigated "within a dynamic framework, with people allocating resources in response to particular situations arising from road improvements" (MSJ Keys, 1977, p17).

Although this technique has considerable potential for exploring the crucial issues of roading proposals, so far it has been given limited application (MSJ Keys, 1977). Possible reasons for this reluctance could be the difficulty in selecting a representative group and the amount of time required to organise and run the technique.

2.6.5 Attitude Survey Technique

Voorhees (1965, p16) believes that "a well-conceived survey is probably the best way we have to determine values. If the questions are well developed and if there is an adequate sample, a great deal can be determined about community values ...".

Attitude surveys (which tend to "get at the deeper, more permanent feelings of an individual .. rather than his [or her] more transitory opinions .." (Thomas et al, 1970, p51)) are conducted by interviewing a random sample or specific sector of the community.

It is important that the people surveyed represent "all sections of society, including the 'silent majority'; this therefore rules out a survey which purely invites interested members of the public to express their views" (Gregory, 1975, p64).

Subjects can be asked a series of questions, or asked to rank in order of importance a number of factors (MSJ Keys, 1977). These factors can relate to various aspects of a proposal, eg, alternative alignments in the themes of: convenience; aesthetics; cost; and community advantage (Fielding, 1972).

2.6.5.1 Limitations and Advantages of the Attitude Survey Technique

An area of weakness in Attitude Surveys is how individuals respond to the surveys because:

- i intra-personal inconsistencies are often brought to light;
- ii people have difficulty making decisions about abstract goals (Thomas et al, 1970, MSJ Keys, 1977, and Gregory, 1975); and
- iii the results of attitude surveys do not necessarily indicate whether people have a sound basis for their preference whether they were looking at the statements from the viewpoint of the community as a whole, or from their own individual situation (Winfrey, 1971, p128).

A further weakness of Attitude Surveys is that the majority of the public are willing to take part on socially important issues, but a minority are completely uninterested (Gregory, 1975). State Highway roading projects are socially important issues and would get a reasonable response from the public, but in general only the vocal minority responds to surveys or requests for public opinion. Gregory's statement therefore does not run true in reality.

The final area of weakness is how to use the results of Attitude Surveys. These techniques do not resolve differing attitudes to a point where the development of goal weights is made simple and the aggregation of different attitudes of many individuals is still a problem (Thomas et al, 1970, and MSJ Keys, 1977).

To overcome these weaknesses, survey questions should be worded very clearly and confined to specific issues (Gregory, 1975). More sophisticated survey techniques should be developed to allow respondents to rank a number of objectives, and include the cost of achieving each objective in the survey (MSJ Keys, 1977).

The advantages of Attitude/Opinion surveys have been discussed in the introduction to this technique.

2.6.6 Interview Processes - Repertory Grid Technique

Hopkinson et al (1992) consider that in order to obtain people's preferences between alternative road schemes, and to understand the basis for those preferences, the Repertory Grid technique should be used.

The grid shows linkages between different attributes and therefore makes it possible to map out those aspects of the physical environment which appear to be important to people.

2.6.6.1 Advantages of the Repertory Grid Technique

The advantages of this technique are that:

- i it gives an explicit account of how to elicit individuals' conceptualisations;
- ii the grid can be constructed with the subject's own inputs (or in association with the interviewer);
- iii the grid allows the subject to operate at his/her own level of complexity; and
- iv the method can be used to obtain a person's thinking about unfamiliar, new or different types of situations (Hopkinson, 1992, p103).

2.6.6.2 Limitations of Repertory Grid Technique

No specific limitations were discussed in the literature but one possible limitation could be the potential for interviewer bias. To avoid this the interviewer would have to ensure

that he/she did not "lead" the interviewee into answers or prompt him/her. The interviewer should also ask the same questions of each interviewee.

2.7 Indirect Non-monetary Valuation Techniques - Conclusions

These techniques are more effective than the previous techniques discussed, mainly because they attempt to obtain the values of the affected community and attempt to value all issues at the same time on the same basis.

2.8 Valuation Techniques - Conclusions

The objective of valuation techniques is to establish the value of issues involved in the construction of a State Highway in such a way that these values can be incorporated into the decision of which is the "best" alternative.

The following principles should be kept in mind when choosing an appropriate valuation technique:

- i the types of values to be measured must be taken into account;
- ii environmental, social and engineering issues must be considered together;
- iii any group formed to discuss or analyse issues must be representative of the community affected by the project;
- iv all issues must be included in the valuation and assessed on the same basis;
- v the values of the non-vocal majority must be captured; and
- vi the technique chosen must be acceptable to the affected public.

These same principles also apply to choosing the most appropriate evaluation technique and will be discussed in Chapter 3.0.

2.9 The Choice of Valuation Technique

Although direct valuation techniques (specifically the CVM) meet principles (i) to (v) they do not meet (vi) because people may be uncomfortable (and therefore less accepting of the technique) at the thought of placing dollar values on issues which they do not consider to have measurable values, eg heritage sites, wildlife habitats or scenic views.

Indirect monetary valuation techniques do not meet principles (i), (iii), (v) and (vi), the most significant of which is (iii) because issues are not valued by the affected community but calculated by engineers or other professionals "behind closed doors". The community may not accept the values resulting from these techniques mainly because they had no input into the process.

Indirect non-monetary valuation techniques meet all of the aforementioned principles because they attempt to obtain the values of the affected community by asking the community, and attempt to value all issues at the same time on the same basis.

In general the public understands monetary values, but may doubt the methods for derivation. Consequently the public has a greater acceptance of non-monetary indirect valuation techniques (TRRL, 1992) and is more likely to accept the values resulting from these techniques because they have "ownership" of the process.

The choice of indirect non-monetary valuation technique will require the group to be representative of the community affected and enable members to make informed decisions on the value of effects. Focus Groups may be a useful method to initiate discussion on issues, followed by Attitude or Opinion Surveys.

3.0 Review of Evaluation Techniques

3.1 Objectives of Evaluation Techniques

The main objective of the evaluation process is to provide decision-makers with information to find the "best" overall alternative (Winfrey, 1971, p124, and Works Consultancy, 1991). Works Consultancy (1991, p10) discusses four objectives of an evaluation process:

Objective 1: The identification of a preferred project option (as discussed above).

Objective 2: The establishment of a common comparative framework

The evaluation framework should allow the performance of different options in different areas to be compared and critical trade-offs to be identified and examined.

Objective 3: Transparency

The technique should be easily understood by interested parties, in that conclusions should be justifiable at each stage of the process. It should also be possible to involve individuals and incorporate their judgements of trade-offs when and where appropriate.

The "best" option should also stand up to rational debate. If the evaluation process is complex or too subtle, decision-takers may ignore conclusions in favour of simplistic arguments and miss key matters affecting the choice.

Objective 4: Maximise directly comparable information

The technique should aim to maximise the amount of information that can be put into a directly comparable form. This makes evaluation easier as it enables factors to be compared directly. In practice, however, this is very difficult to achieve because unless all factors are, eg, monetarised, direct comparisons are limited.

A common comparative framework (as outlined in Objective 2) is necessary for this objective to be achieved because it would be pointless comparing factors which have

been put into a comparable form, eg, dollars, against different criteria for different options, eg, including criteria for community severance but excluding criteria for the loss of bird-life habitats.

Works Consultancy (1991) comments that this objective aims to minimise the number of performance measures used in achieving Objective 2. This comment does not appear correct because if all factors are made directly comparable the criteria against which they are compared for each option should not change.

3.2 Types of Evaluation Techniques

Evaluation techniques fall into two categories:

- i Techniques which monetarise or place \$ values on effects; and
- ii Techniques which use other units or rankings (non-monetary) to measure effects. Effects which can be measured in units are termed “tangible” and those which cannot easily be measured in units are termed “intangible”.

Winfrey et al (1971, p18) reject the term “intangible”, commenting that non-market consequences are tangible because they can be seen, felt, described, mentally realised, enumerated and specifically located. No other literature reviewed made this observation, which at first glance appears logical. The difficulty is that, even if it is agreed that intangibles are tangibles, there is still no easy or accurate method of measuring them.

The terms “monetary” and “non-monetary” are noticeable in their absence from the Transit New Zealand Act 1989¹. The Resource Management Act 1991² (RMA) does not discuss these terms either. Section 32(1)(b) of the RMA requires that an evaluation

¹ Transit New Zealand Act 1989: This Act is the controlling legislation for roading in New Zealand. Transit New Zealand is the central government organisation responsible for roading in New Zealand.

² Resource Management Act 1991: This legislation has the purpose of promoting sustainable development of natural and physical resources.

of the "likely costs and benefits of the principal alternative means ..." be undertaken. The first edition (Section 2) of the RMA contained the definition of costs and benefits which included "costs and benefits of any kind whether monetary or non-monetary". However, this definition has since been repealed.

The requirement to evaluate benefits and costs applies only to persons specified in s32 of the RMA, namely: the Minister for the Environment; the Minister for Conservation and every local authority. Therefore TNZ is excluded from this requirement.

This is a significant defect with the TNZ Act but TNZ does measure effects which can be easily monetarised in its evaluation technique (extended cost benefit analysis). If the TNZ Act clearly required assessment of benefits and costs in monetary and non-monetary terms, then TNZ would need to place more emphasis on developing an improved evaluation technique.

The following sections discuss overseas and New Zealand literature on evaluation techniques.

3.3 Monetary Evaluation Techniques

3.3.1 Cost Benefit Analysis (CBA)

Cost Benefit Analysis (also known as 'Social Cost-Benefit Analysis') attempts to determine the social worth, or value to society as a whole, of particular proposals (Bureau of Transport Economics, 1984).

CBA analyses initial investment costs and returns to the community, thereby adopting a national viewpoint. This national viewpoint is maintained by Transit New Zealand because "roading projects are undertaken on behalf of the general community and funded from the public purse" (Project Evaluation Manual, 1991, p2-1). In analysing

initial investment costs and returns, the Cost Benefit Ratio (CBR) is a measure of cost efficiency.

The ratio of benefits to costs is obtained by dividing the benefits by the costs and if the CBR is greater than 1, then the project is considered to be a worthwhile investment. Project proposals are compared with the option of "do-minimum" which involves maintaining the highway in its present state (TNZ, Project Evaluation Manual, 1991). Factors currently included in the CBR are:

Benefits	Costs
savings in travel time	project planning and design costs
savings in vehicle operating costs	property purchases
savings in road accident costs	construction
	maintenance after construction

Table 1 : List of Benefits and Costs used in CBA
Source: Transit New Zealand, Project Evaluation Manual, 1991.

The costs of damage to the environment, eg, loss of habitat are not included in the CBR. However, TNZ is improving this situation by reviewing its PEM. A recent update of the PEM incorporates values for carbon dioxide emissions and the effects of dust on agricultural land.

CBA discounts benefits and costs occurring in future years to present values. The purpose of discounting is to render benefits and costs accruing at different periods into "present values", and hence comparable terms (Bureau of Transport Economics, 1984, p60).

The practice of discounting is "at odds with the principle of sustainable development" (Jenkins, 1991, p115). Although "sustainable development" (the concept of future generations) is the purpose of the Resource Management Act, Transit New Zealand still

discounts future benefits and costs to present values, thus placing more value on present benefits and costs than those in the future. This is a difficult issue to resolve because it is important to compare values over similar time periods.

3.3.1.1 Strengths of CBA

CBA is "perhaps the best known criterion for measuring the efficiency of a plan" and is based on sound economic theory (Thomas et al, 1970, p47).

CBA aims to maximise economic well-being for society as a whole (Weiner et al, 1972) and takes on a national viewpoint. Although this is a major strength of CBA, it is also a significant weakness which is discussed further in Section 3.3.1.2.

The use of CBA in highway construction has been traced back to the late 1930s, at which time it was considered to provide "an extremely scientific and useful tool to aid in the investment decision-making process" (Weiner et al, 1972). The acceptance of CBA is still apparent because it is the main analysis used in the evaluation of roading projects.

By taking a "national viewpoint" CBA recognises that a policy (or project) may generate good or bad effects beyond those which accrue to the individual or decision-maker (Bureau of Transport Economics, 1984). This issue is very relevant to transport issues because the "social implications of investment, pricing and regulatory decisions frequently extend well beyond the supplier and purchaser of the transport service in question" (Bureau of Transport Economics, 1984).

CBA (like many other evaluation techniques) is used to aid decision-makers in choosing between alternatives rather than providing the final decision.

According to Prest and Turvey (1965) an advantage of CBA is:

".... that it forces those responsible to quantify costs and benefits as far as possible rather than rest content with vague qualitative judgements or personal hunches. ... Even if cost-benefit analysis cannot give the right answer, it can sometimes play the purely negative role of screening projects and rejecting those answers which are obviously less promising. ... The case for using cost-benefit analysis is strengthened, not weakened, if its limitations are openly recognised and indeed emphasised".

Recognising the limitations of CBA is pertinent but they need to be addressed, rather than (as suggested by Prest and Turvey) accepted.

Jackson (1972) also comments that CBA has proved most effective in appraising projects which are variants on the same theme, eg, whether it is best to use a bridge or a tunnel, and at which location, to cross an estuary. For this reason, CBA can be applied on a single project, multi-project or transportation system-wide basis (Winfrey et al, 1971).

CBA is widely accepted by engineers and economists and when undertaken correctly, and the results used to aid in a final decision, it is applicable to both government and private sector activities (Winfrey et al, 1971).

3.3.1.2 Limitations of CBA

There are many critics of CBA such as those identified in the literature search undertaken for this study: Heggie, 1979; Thomas et al, 1970; The Bureau of Transport Economics, 1984; Bruck et al, 1966; and Beca Carter Hollings & Ferner Ltd, 1992. The following are the problems or weaknesses identified by these critics:

Spill-Over Effects: These effects, which are also known as "externalities", are the indirect effects of projects, ie, when and where do the ripples in a pool stop from a new

investment decision (Jackson, 1972). Examples of externalities are noise and the transfer of users from public transport to private motor vehicle as a result of a roading improvement.

CBA does not take account of "externalities" because it only includes direct benefits and dis-benefits to non-road users (TNZ, Project Evaluation Manual, 1991). Externalities could be calculated using multiplier-analysis but this would be data-intensive and time-consuming.

Sectors of the Community for Consideration: CBA is mostly concerned with gainers compensating losers, ie, the project goes ahead if benefits (gainers) outweigh costs (losers), and less concerned with the distributional or equity effects of decisions (Bureau of Transport Economics, 1984).

The issue here is: "Should all members of a society be regarded as equal, or should benefits be weighted if the gains are to the low-income, under-privileged, unemployed, aged or unhealthy sub-groups of the population?" (Jackson, 1972). In contrast, evaluation techniques such as the Planning Balance Sheet and Goals Achievement Matrix indicate and consider the impacts on sectors of the community.

Rates of Return: CBA includes a discount rate which represents the rate at which future benefits and costs can be exchanged for present benefits and costs (TNZ, Project Evaluation Manual, 1991). The current discount rate (10% per annum) was established by Treasury to be used on all public sector project evaluations (TNZ, Project Evaluation Manual, 1992).

Jackson (1972) comments that "rates of interest should vary according to the financial security of the project". Peters (1968) goes on to say that the choice of an appropriate rate is "purely a value-judgement ... but if this is so, does it not reduce the whole procedure from an exact science to an art dependent on personal judgement, preferences and perhaps prejudice?"

New Zealand rates of return do not vary for each project and although the standard rate established may be based on personal judgement, it is used consistently "across the board" in New Zealand.

Construction Costs: The actual costs of construction are difficult to ascertain with precision because of unexpected technical difficulties or the requirement of additional planning approval. Jackson (1972) also comments that the further a project is into the future, the less likely that its assumed costs will be valid. This could be due to many reasons including: technological innovation, new legislation, eg, RMA, or an increase in property values.

Treatment of Intangibles: Many effects of roading proposals cannot be objectively monetarised. These intangibles are evaluated using techniques separate from CBA, but "the most common treatment for intangibles is to simply ignore them" (Thomas et al, 1970, p47). This is an extreme view. In New Zealand intangibles are not "ignored"; however, they are not given the same emphasis as tangibles.

The main weakness of CBA is that it requires a number of sweeping assumptions to be made in regard to intangibles (Heggie, 1979).

A further criticism of CBA is that in times of limited resources, "projects which are dissimilar in nature, eg, the construction of a new bridge versus a seal extension, have to be compared on the same ranking system to determine which project is economically more desirable" (Moss 1979, p139, and Thomas et al 1970). This is a frequent criticism by local authorities in New Zealand which are competing for roading funds each year.

Thomas et al (1970) suggest that to overcome this weakness, alternatives should be separated according to the tasks they perform, eg, the reduction of accidents, increasing local tourism or construction of a strategic route. The values of the tasks would then be compared, in addition to considering the efficiencies of the alternatives. Essentially, Thomas et al (1970) consider that the evaluation of efficiency and effectiveness should be combined.

This suggestion has merit. However, the assignment of "tasks performed by alternatives" would need to be consistently applied, ie, only the main task performed by the project should be considered. Projects would then be prioritised by their CBR within each of these task groups. This technique would increase the comparability of projects but it would also increase the number of projects for funding.

3.4 Monetary Evaluation Techniques - Conclusions

Although CBA is founded on sound and well-established economic theory, it has several significant weaknesses which have not been addressed over time. These weaknesses (lack of equity/distributional consideration, no emphasis given to future benefits and costs or intangibles) should be addressed in this technique or another technique used to evaluate alternatives.

3.5 Semi-monetary Evaluation Techniques

These techniques combine elements of monetary and non-monetary evaluation techniques.

3.5.1 Extended Cost Benefit Analysis - Planning Balance Sheet

Planning Balance Sheet analysis is not a distinct evaluation technique, but a variation in the method of presenting social cost benefit analysis (Bureau of Transport Economics, 1984, p6). The Planning Balance Sheet (first postulated by Lichfield et al) "groups the community into homogeneous sectors, distinguished by the kind of operations they wish to perform. It then evaluates the alternatives from the point of view of the advantages (benefits) and disadvantages (costs) accruing to every sector from each alternative, to see which provide the maximum net advantages" (Jackson, 1972, p240).

The Planning Balance Sheet (PBS) extends CBA by including a statement of effects on issues which cannot be easily monetarised. No attempt is made to place weights on the effects stated in the PBS or combine them with the monetary benefits to provide a single value for the worth of the proposal (Bureau of Transport Economics, 1984).

3.5.1.1 Strengths and Limitations of the PBS Technique

The greatest strength of the PBS "lies in its full explicit tabulation of all the significant costs and benefits, against the groups to which they relate. It provides a useful tool, but one which diminishes in value as the operations increase in scale, magnitude and complexity" (Jackson, p259).

Both Moss (1979) and Heggie (1979) support the use of the PBS (particularly in conjunction with CBA) and believe that although the PBS is a less formal decision-making process and may look less scientific, "it may lead to better decisions by not postulating firm relationships where none exist" (Heggie, 1979, p65).

An appraisal of rail-road separation schemes in Australia by Jenkins et al (1981), p44, identifies further advantages of the PBS:

- i there is a clear definition of the major issues considered for evaluating alternatives;
- ii the balance sheet form ensures a consistent basis for comparison;
- iii the balance sheet forms a multiple check list to ensure that issues are considered for each alternative and that these are compared to existing conditions;
- iv the balance sheet forces quantification of information for comparative purposes;
- v trade-offs between different evaluation criteria are made explicit; and
- vi the balance sheet presents a summary of the important information at one glance.

Many of these advantages are similar to those expressed by Jackson (1972) and Heggie (1979). In respect of (v) above it is not clear how trade-offs between different evaluation criteria are made explicit using the PBS. Although effects are made clear,

the process by which the criteria are traded off is often left to the decision-makers and not explicitly expressed to the decision-takers.

The Bureau of Transport Economics (1984, p6) adds a further strength of the PBS which is that it "permits greater consideration of the distributional and equity aspects of proposals by emphasising the incidence of gains and losses on the various groups within the community". Extending CBA with the PBS therefore alleviates a significant weakness in CBA.

3.5.2 Cost-effectiveness Technique

Another form of economic analysis is cost-effectiveness analysis. Although the costs of a proposal can be presented in dollar terms, the effectiveness of these costs in producing desirable goals can only be described in qualitative statements (Winfrey et al, 1971). Prior to evaluating proposals using the cost-effectiveness technique, policy goals are formulated so that the level of goal achievement can be evaluated for each proposal (Bureau of Transport Economics, 1984).

The cost effectiveness technique presents the evaluation in the form of a matrix. The matrix identifies monetary costs and contributions to non-monetary goals are recorded in terms of achievement points. The goals receive a weighting and an overall cardinal ranking of the options is obtained with respect to their contribution to the non-monetary goals (Bureau of Transport Economics, 1984, p9).

Thomas et al (1970, p48) note that in the past the use of cost-effectiveness as an evaluation technique was "virtually ignored ... resulting in a heavy reliance on benefit cost analysis".

Very few weaknesses of the cost-effectiveness technique were identified in the literature review apart from Winfrey et al (1971, p18) who comment that the greatest disappointment with this technique is the lack of input data of the quantity and quality necessary to carry out an analysis. In place of quality data, Winfrey et al (1971) suggest using estimates, seeking expert opinions and using trial values of factors. Although

these are only substitutes for the facts, they will still provide the decision-makers with more information on which to base their decision.

3.6 Semi-monetary Evaluation Techniques - Conclusions

Both the Extended CBA and Cost-effectiveness techniques improve the weaknesses of monetary techniques by introducing equity and distributional issues and intangibles, but these issues are still not combined into one single analysis or value. In conclusion, these techniques attempt to address the weaknesses of monetary evaluation techniques but they do not go far enough.

3.7 Non-monetary Evaluation Techniques

The purpose of non-monetary techniques is to evaluate alternatives which have a range of non-comparable criteria. Evaluation is achieved by describing scheme impacts in similar terms, so that trade-offs and comparisons can be made. Non-monetary techniques either reduce the information about impacts to a set of single number scores ("grand index methods") and determine the "best" solution, or produce a complete or partial ranking of alternatives, following a series of pair-wise comparisons (TRRL, 1992, p29).

TRRL (1992, p29) classifies five principal groups of non-monetary evaluation techniques or "multi-criteria decision-making techniques" as:

1. Lexicographic (Conjunctive and Disjunctive);
2. Consensus-maximising;
3. Aggregational (Sieve Analysis, Goals Achievement Matrix)
4. Graphical (Factor Profiles, Key Issues); and
5. Concordance.

3.7.1 Lexicographic Techniques

These techniques assume that "evaluation criteria can be ordered in terms of importance" (TRRL, 1992, p30). Two types of model exist: *conjunctive* and *disjunctive*. Conjunctive techniques reject schemes which do not achieve a minimum standard, whereas disjunctive models select the scheme with the highest score for the most important criterion and all other criterion scores are ignored (TRRL, 1992).

TRRL (1992, p30) believes that disjunctive models are inappropriate for roading schemes because it is not possible to clearly order criteria in terms of importance, when one criterion dominates. However, this may not be correct because many techniques, eg, the Goals Achievement Matrix or Factor Profiles enable the community to place weights on various criteria or goals, thus identifying an order of importance.

Conjunctive techniques may be used as a partial evaluation technique by rejecting those alternatives which have unacceptable impacts (TRRL, 1992). This would reduce the resources required for evaluation and decision-making, as there would be a smaller number of alternatives to be evaluated.

3.7.2 Consensus-maximising Techniques

These approaches identify the priorities and views of different groups in society based on perceptions of important criteria. As such, these approaches are limited in their application to road schemes to where the magnitude of impacts is known to some degree of certainty (TRRL, 1992). These approaches may be of value in deriving weights or priorities to be attached to criteria (TRRL, 1992).

3.7.3 Aggregational Techniques

These techniques score each criterion for every proposal. These scores are then standardised (usually by reducing the impact score to a value between 0 and 1), multiplied by the weight of the criterion and then aggregated to provide a grand index (TRRL, 1992).

Aggregational techniques developed include: Lassiere's (for transport projects); the Environmental Evaluation System; mathematical matrices, map overlays and Goal Achievement Matrices (GAM) (TRRL, 1992). The most well known of these are map overlays (Sieve Analysis) and GAM.

3.7.3.1 Map Overlays (Sieve Analysis)

This process involves breaking the alternatives down to small parts and comparing the performance of each pair. From these comparisons, indices are produced allowing the selection of the "best" alternative. Sieve Analysis has been used successfully to determine preliminary corridors for transport routes (Simpson, 1977, and Sharpe et al, 1973).

A strong proponent of Sieve Analysis is McHarg (1969) who considers that "due to the interactive nature of environmental issues, evaluation methods should incorporate resource values, social values and aesthetic values, in addition to physiographic, traffic and engineering issues".

Sieve Analysis ranks processes which represent values in the area of concern, from the most valuable to the least. Each map is superimposed, identifying least cost (social, environmental and economic) as the lightest areas, and the areas of most value or cost have a darker tone.

The main weakness with this technique is that it is very time-consuming and cumbersome (Sharpe, 1969).

3.7.3.2 Goals Achievement Matrix (GAM) Technique

This technique (proposed by Hill in 1966) measures the achievement of objectives in relation to various proposals and could be regarded as a type of Cost-effectiveness Analysis (Bureau of Transport Economics, 1984). The total matrix includes:

- i Goals (ideals), eg, increase economic welfare, increase happiness;

- ii Objectives, eg, reduce noise, reduce rate of accidents and increase resource use; and
- iii Policies, eg, modes of transportation and aesthetic design standards.

GAM relies on identifying goals and the values placed on them by particular sectors of the community (Winfrey et al, 1971). For each goal in the matrix, a benefit-cost account is produced. Costs and benefits are expressed as:

- i Tangible costs and benefits, expressed in monetary terms;
- ii Tangible costs and benefits which cannot be expressed in monetary terms, but can be expressed quantitatively; and
- iii Intangible costs and benefits which are noted (Moss, 1979, p139).

3.7.3.3 Advantages of GAM Technique

There are several significant advantages of the GAM technique which overcome the weaknesses of previous techniques discussed in this study. Derived from the concept of rational planning theory, GAM formulates and weights goals, objectives or criteria, in advance of the design of planning alternatives and analysis of their consequences. This technique is the first to be discussed in this research that is based on rational planning theory.

The design of this technique, more particularly its internal consistency and the organisation of impacts into categories, enables it to be easily understood by interest groups, professionals and politicians. Comparisons of the advantages and disadvantages of different policy alternatives can also be undertaken easily because of the detailed categorisation of impacts.

A further important advantage of this technique over monetary evaluation techniques is that it can be used in evaluating certain problems in terms of the community's values, rather than those of a few individuals (Valdez, 1993, p85) which occurs in techniques such as CBA.

The Bureau of Transport Economics (1984, p8) recognises that GAM is "distinguished by the attention given to equity considerations". Equity issues are addressed by GAM when it records the occurrence of gains and losses on community groups, and seeks to weigh these effects according to community preference.

3.7.3.4 Limitations of GAM Technique

The limitations of this technique are common to other non-monetary evaluation techniques in that a large amount of time and money is required to obtain a large enough sample of community values (Rothman, 1973, p117); and the subjective nature of community weights and assessment of the matrix (Winfrey et al, 1971, p132).

Valdez (1993) considers that GAM is unable to determine whether or not a policy or alternative should be executed, because it is designed for the comparison and ranking of planning alternatives, rather than testing their absolute desirability.

Winfrey et al (1971, p130) also criticises the GAM by commenting that it does not set forth anything new as it is "still the question of evaluating alternative plans for achieving certain objectives in the light of how well the plans achieve the goals".

Both these criticisms, however, could be applied to all current evaluation techniques.

Aggregational techniques have been used with some success in the assessment of road schemes in the USA and France (TRRL, 1992, p31). Although the weaknesses of these techniques are significant, they are not uncommon to other techniques. TRRL (1992) comments that aggregational techniques obscure qualitative data, values and assumptions. However, CBA hides assumptions in relation to intangible effects.

Aggregational techniques (due to their aggregational nature) are sensitive to changes in criterion weights and ignore the interdependence of criteria. This can be avoided by decision-makers being shown the components of the aggregated score and the impacts of changes in weights.

The process of assigning weights and gaining political acceptance of them is a weakness of this technique because it can be a difficult, sensitive and time-consuming process.

The final weakness raised by TRRL (1992) of these techniques is that the public has limited understanding of the meaning of the indices produced. This may well be correct. However, it is more likely that the public will understand the results and method used by aggregational techniques compared with the economic and highly complex method of CBA. The steps within aggregational techniques have the ability to be separated and the public could be guided through each stage; this would be very difficult to achieve using CBA.

3.7.4 Concordance Techniques

Concordance Analysis uses a multi-criteria type of analysis for dealing with multi-dimensional problems. Analysis is undertaken in several stages: criteria are determined; weighted; compared pair-wise; and then calculated into matrices to determine concordance and discordance indexes of alternatives (Works Consultancy, 1991, p24).

Criticisms of these techniques are their susceptibility to changes in weights; the use of ordinal measure scales; and the variety of methods available which have the potential to produce different results (TRRL, 1992, p33). Works Consultancy (1991, p24) also comments that the process is "somewhat confusing and therefore unlikely to be transparent to the decision-taker and general public".

TRRL (1992) suggests that this technique is most useful in analysing a large number of competing schemes which need to be reduced to a smaller number, rather than selecting the single best alternative. The outcome of this technique is therefore similar to that of conjunctive techniques.

3.7.5 Graphical Techniques

Graphical approaches assume that the attributes of alternative proposals can be plotted on multi-dimensional graphs and compared to an "ideal scheme".

3.7.6 Factor Profile Techniques

Community Factor Profiles are a graphical description, based on the factors that have been identified for each alternative. Factor profiles can be prepared from the viewpoint of each interest group or all communities and groups (Oglesby et al, 1970).

For each factor, the alternative with the greatest +ve or -ve impact is assigned 100% +ve or -ve and all other alternatives are assigned relative to that alternative. The scale therefore ranges from 100% negative to 100% positive. The points for each alternative are then joined together for the various factors.

3.7.8.1 Advantages and Limitations of Factor Profile Techniques

Oglesby et al (1970, p13) suggests several advantages to this technique. The central theme of these advantages is that the process is clear and easily understood, mainly due to the graphical nature of this technique. Factors leading to choices are evident and incremental differences in community factors and economic factors can be compared.

Because Factor Profiles can be prepared from different viewpoints, they show the incidence of community effects on community groups; bring out points of agreement/disagreement among those groups; and serve as a mechanism in resolving those conflicts.

Factor Profiles can also be a useful tool during the planning process to define factors important to the community and community groups; establish goals and objectives; and serve as a basis for discussion during the development of alternatives and in the evaluation and decision-making process.

MSJ Keys (1977, p11) suggests that a further advantage of this technique is that it can be used for suggesting areas for further research.

The principal weakness of this technique is that the process of assigning the percentage of impacts (-ve and +ve) is very subjective and could change depending on who prepares the profile. The scale of the profile may distort impacts of factors; therefore care would need to be taken to ensure that impacts are assessed on the same basis and that small percentage differentials are detectable.

3.7.7 Key Issues Techniques

Developed in the 1970s by Green (1991) the Key Issues technique aims to guide decision-makers, while allowing them to apply their own criteria, value judgements and priorities.

A very simplified matrix or comparison chart is used to enable the trading-off of key issues. Green (1991) considers that weighting and aggregating scores can be dangerous if used in presenting a report to decision-makers because although the numbers are meaningful to the study team and analysts, they are difficult for others to understand. In Green's (1991, p42) view "the real issues become lost in the codings and the decision-maker is back to relying on whim or prejudice".

3.7.9.1 Advantages and Limitations of Key Issue Techniques

By avoiding aggregate scoring, this technique involves and assists decision-makers, rather than taking over their role. Green (1991) considers that a further advantage of this technique is that assumptions can be varied by any reader and the conclusions altered accordingly. However, this could also be a significant disadvantage because the final decision could be based on individual opinions and open to challenge.

The process of sifting out the key issues includes clearly stating assumptions and trade-offs and the comparison chart also highlights the trade-offs. This technique could be very useful to enable decision-takers to understand the trade-offs which have occurred.

Green (1991) does not discuss how each alternative can be assessed, ie, disadvantage or major disadvantage, and does not indicate how the resource costs are brought into the comparison. Despite these inadequacies, this technique deserves further consideration.

3.8 Non-monetary Evaluation Techniques - Conclusions

Weaknesses of monetary and semi-monetary evaluation techniques are resolved by non-monetary techniques in that comparisons of different proposals are explicit, all issues are considered in an integrated manner and assessed on the same basis. By involving the community (specifically in determining goals and weights) these techniques are more likely to gain public acceptance and ownership. Although these techniques still contain elements of subjectivity the detailed involvement of the affected community and its ability to understand the process are reasons for accepting this subjectivity.

3.9 Evaluation Techniques - Conclusions

3.9.1 Monetary and Semi-monetary Evaluation Techniques

Cost Benefit Analysis is supported as an evaluation technique because it provides an established theory but there is growing concern over its limitations. Table 2 analyses whether each of the three monetary and semi-monetary evaluation techniques achieve the evaluation objectives:

Technique	Objectives of Evaluation Techniques			
	1	2	3	4
CBA	Yes	Yes, partially, for alternatives of individual projects.	Transparent to engineers and economists but not the public.	No, inadequate in respect of intangibles.
Extended CBA (PBS)	Yes	Yes, partially, for alternatives of individual projects.	No, effects explicit but trade-offs and weights unclear. Public unlikely to accept unless present whole process to group (only relates to PBS).	Yes, partially, still compares \$ with text.
Cost-effectiveness	Yes	Yes, because the underlying goals are formulated prior to evaluation.	Yes	Yes

**Table 2: Achievement of Evaluation Objectives
(Monetary and Semi-monetary Techniques)**

NOTE: **Objective 1.** Identifies a preferred project option. **Objective 2.** Common comparative framework. **Objective 3.** Transparent. **Objective 4.** Maximises directly-comparable information.

Table 2 (previous page) demonstrates that CBA achieves the least number of objectives, followed by Extended CBA. Cost-effectiveness analysis appears to meet all the objectives.

Despite the weaknesses of Cost-effectiveness Analysis it may be an appropriate evaluation technique to integrate monetary and non-monetary effects in the evaluation process.

3.9.2 Non-monetary Evaluation Techniques

Table 3 analyses whether the non-monetary evaluation techniques discussed previously achieve the evaluation objectives:

Technique	Objectives of Evaluation Techniques			
	1	2	3	4
Lexicographic	Yes	Yes	No, public unlikely to accept priorities (TRRL, 1992).	No
Consensus Maximising	No, provides group's or individual's weights for range of criteria (TRRL, 1992).	Yes	No, public unlikely to accept weights if conclusions differ from own (TRRL, 1992).	No
Concordance	No, provides subset of non-dominant alternatives based on all criteria (TRRL, 1992).	Yes	No, complicated, hidden impacts on groups, public unlikely to accept (TRRL, 1992).	Yes
Graphical (Factor Profiles and Key Issues)	No, provides order of alternatives on basis of all criteria (TRRL, 1992).	Yes	Yes	Yes
Aggregated (Sieve Analysis and GAM)	No, provides order of alternatives on basis of all criteria (TRRL, 1992).	Yes	Yes, partially, if public/groups presented with whole matrix and process (TRRL, 1992).	Yes

**Table 3: Achievement of Evaluation Objectives
(Non-monetary Techniques)**

NOTE: **Objective 1.** Identifies a preferred project option. **Objective 2.** Common comparative framework. **Objective 3.** Transparent. **Objective 4.** Maximises directly-comparable information.

The most successful techniques in achieving the evaluation objectives are Graphical and Aggregational (GAM and Sieve Analysis). The most well documented but least used evaluation technique for roading projects is the GAM.

Although the GAM has several disadvantages relating to subjectivity it has distinct advantages over other techniques. Namely: that it can be easily understood by interest groups and politicians if they are shown the individual steps relevant to that particular group; it can be used in evaluating certain problems in terms of the community's values; it is derived from rational planning theory; it is comparable; it presents a "preferred" option; and it encourages community input (and consequently community ownership) into the process.

3.9.3 The Choice of Monetary or Non-monetary Evaluation Techniques

A proportion of the literature researched for this study (particularly that prior to the late 1980s) considers that to undertake an integrated evaluation process it is essential to monetarise environmental issues.

Cole (1987, pp190-91) also considers it necessary to monetarise environmental issues because "experience has shown that the environment has become a secondary consideration in transport expenditure because it has no monetary value". He further comments that "an absence of monetary values prevents the environment being given the importance some sections of the community think it deserves". This comment may well be valid. However, conversely sectors of the community may not consider it possible to place monetary values on environmental issues because this would "belittle" these issues.

Support for evaluating environmental issues using non-monetary techniques has decreased over the last 5-10 years with the trend being to monetarise environmental issues. However the points made by Evans (1977) and Winfrey et al (1971) are still applicable today. Winfrey et al (1971) believe that non-user factors (aesthetic, social, economic and welfare) must be evaluated on a subjective basis because non-user values

depend on an individual's viewpoints which change with time, place, situation, quantity and quality of factors.

A comment made by Winfrey et al (1971, p124) sums up the dilemma: "Although engineers and decision-makers have talked about combining market and non-market factors into a single numerical index, the only way is to express market factors in the same terms as non-market factors, or vice versa".

Despite the trend to monetarise environmental issues, the strengths and ability of the GAM to maintain the objectives and principles of evaluation outweigh those of monetary techniques.

4.0 Evaluation of State Highway Roding Projects

4.1 Current Evaluation Environment

This section outlines the legislative and institutional framework within which State Highway roding projects in New Zealand are evaluated.

4.2 Legislative Framework

State Highway roding projects are evaluated under the rules specified within the Transit New Zealand Act 1989 (TNZ Act), Resource Management Act 1991 (RMA) and Local Government Act 1974 (LGA).

4.2.1 Transit New Zealand Act 1989

This Act established the Transit New Zealand Authority whose principal objective is to "promote policies and allocate resources to achieve a safe and efficient land transport system that maximises national economic and social benefits" (Section 5 TNZ Act). Transit is responsible for implementing the TNZ Act.

4.2.2 Resource Management Act 1991

The purpose of the RMA is "to promote the sustainable management of natural and physical resources" (Section 5, RMA). The RMA differs substantially from the previous legislation (Town and Country Planning Act 1974) in that it focuses on the "effects of activities" rather than activities themselves. Regional Councils and Territorial Local Authorities are responsible for implementing the RMA.

4.2.3 Local Government Act 1974

The functions of Regional Councils are defined under this Act. Section 6 of the LGA specifies these functions which include the duties and powers of a Regional Council

under the Resource Management Act 1991, Transit New Zealand Act 1989 and Transport Services Licensing Act 1989.

4.3 Institutional Framework

4.3.1 Central Government

Transit New Zealand (a Central Government agency) is responsible for land transport in New Zealand. Although Local Government is not directly responsible for the evaluation of State Highway projects it does play an important role in the process.

Figure 2 (next page) details the relationships between Central and Local government in relation to transport planning in New Zealand.

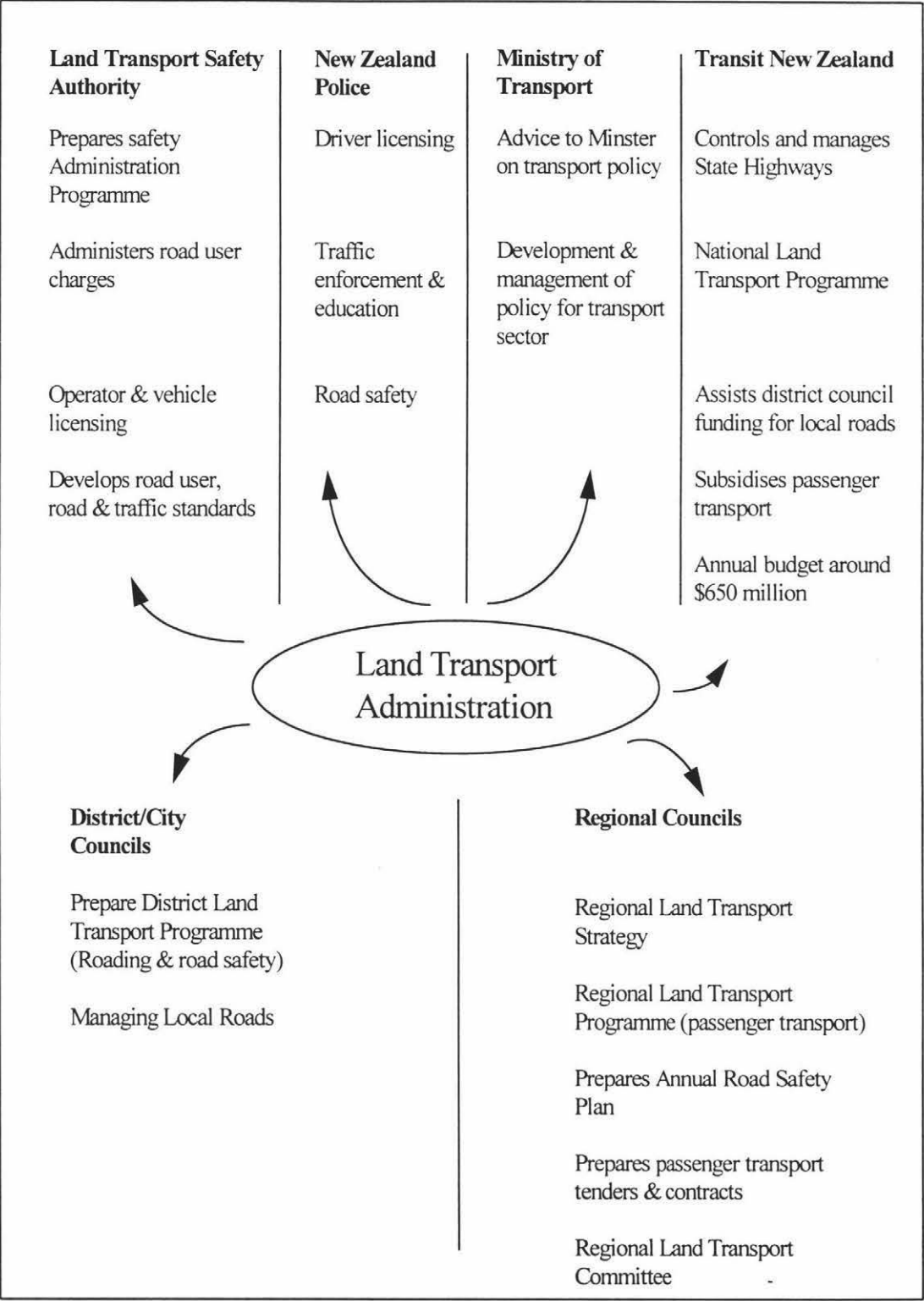


Figure 2: Land Transport Organisational Roles

Source: Auckland Regional Council, 1993, p4

4.3.1.1 Transit New Zealand

Created in 1989, "Transit New Zealand is a Crown agency responsible for the control and management of State Highways and providing financial assistance for local roads, and public passenger transport" (TNZ, Transit New Zealand Profile, 1991, emphasis added).

Transit is responsible for preparing an Annual National Land Transport Programme, managing the implementation of State Highways and controlling the State Highway system (s6(1)(f) TNZ Act).

Structure

The Transit structure comprises seven autonomous regional offices and a head office in Wellington.

Bound by the Transit New Zealand Act 1989, Transit is defined as the "Authority" in s4(1) of that Act. The Authority is comprised of 7-10 Board members who are responsible for ensuring that:

"... the Authority achieves its objectives, and shall be appointed by the Governor General on the recommendation of the Minister of Finance and the Minister of Transport" (s4(2) TNZ Act).

Funding

Transit requests funds for roading annually through the National Land Transport Programme, and the Minister of Transport approves the funding level. The funds are derived from private motor vehicle petrol tax and heavy vehicle "road user charges".

The TNZ Act gives Transit the ability to make payments from the Land Transport Fund to fund roading projects which include: local roads; safety (construction and maintenance); public transport; State Highways; research; industry training; and administration.

Transit regional offices submit roading projects (including district roading projects) to the Land Transport Programme for funding. The projects submitted from all regions are then combined to form the National Land Transport Programme.

Distribution of Central Government Funds

To maximise national benefits, each roading project is ranked according to its Cost/Benefit Ratio (CBR) (Bailey pers com, 1994). Those projects which will give the greatest benefits are given priority of funding (Transit New Zealand, Transit New Zealand and the Environment, 1993).

After the Minister of Transport has set the funding level for land transport a "cut-off CBR" is nominated by Transit. A cut-off CBR is established because in the past there have been insufficient funds in the Land Transport Fund to fund all projects with a CBR greater than 1.

The current cut-off CBR is 5.5, ie, all projects with a CBR of less than 5.5 will not receive Central Government funding for that particular year. However, if surplus funds become available during the year, Transit can lower the cut-off CBR, enabling projects previously considered as insufficiently beneficial to obtain Central Government funding.

4.3.1.2 Role of Transit in the Evaluation Process

Improvements necessary to State Highways are identified by Transit through various avenues (Bailey, 1994):

- monitoring of accident histories;
- Transit staff;
- public comment;
- route strategy studies (including Regional Land Transport Strategies (RLTS));
- transportation studies; and
- Transit's consultants or contractors.

Transit does not evaluate State Highway roading projects itself, and before funds can be obtained from the Land Transport Fund, projects are required to be competitively tendered. The successful tenderer can undertake the evaluation or the evaluation can be sub-contracted. Transit regularly reviews or audits evaluations carried out by its contractors.

4.3.1.3 Transit's Legislative Responsibilities During the Evaluation Process

Transit New Zealand Act 1989

Although Transit does not evaluate projects itself, it is ultimately responsible for the evaluation process. Under the TNZ Act, Transit is required to consult with Iwi. Transit actively consults with "all interested parties [including Regional Councils] to reduce the effects of the motor vehicle on the environment" (TNZ, Function Sheet, 1993).

Resource Management Act 1991

In response to the RMA, Transit recently published a document titled "Transit New Zealand and the Environment" (1993). This document expresses new environmental initiatives to be taken in the future which relate to sustaining: the natural environment; energy use; and human well-being.

Several important issues are not covered in this document, namely: matters of national importance, Kaitiakitanga, intrinsic values (Section 6 of the RMA) and the Treaty of Waitangi (Section 8 of the RMA). The document does state that Transit proposes to consult more effectively with Iwi authorities in the future.

Transit New Zealand identifies the roading infrastructure as a "physical resource" (as defined by the RMA) and has linked the TNZ Act to the RMA. This approach is not shared by Gow (1994), who comments that "transport cannot be planned through the RMA the RMA provides constraints and limits on roads". In other words, "the RMA sets environmental bounds for transport" (Gow, 1994). However, Transit does not appear to be planning transport through the RMA but in fact using it to establish the

framework within which transport planning takes place. This appears to address the comments made by Gow.

4.3.1.4 Role of Minister for the Environment in the Evaluation Process

The Minister does not have a statutory role in the evaluation process. However, if there are impacts on a significant ecosystem or significant political pressure, then the Ministry may become involved in the evaluation process (Gow, 1994).

Although s140 of the RMA allows the Minister for the Environment to call in projects of "national significance", to date this section has not been enforced in respect of State Highway roading projects (Gow, 1994). Because roading projects have a local and regional focus the involvement of the Ministry for the Environment is not considered relevant.

4.3.2 Local Government

The current system of local government in New Zealand is vastly different from that prior to 1989 during which, substantial reform and devolution occurred. Prior to the reforms in 1989, local government comprised many multi-purpose local authorities such as city, county and borough councils, along with a larger number of single-purpose local authorities (Horner, 1989).

The Government in office at the time of the reforms believed that district and regional functions should be allocated to achieve a separation of policy, service delivery and trading functions. Policy was seen as the primary role of Regional Councils, with functions and activities being contracted out to the private sector or to the districts, and service delivery being the main role of District Councils.

The Local Government Amendment Act 1988 allocated functions to Regional Councils of: water resource management; regional planning (including transport); civil defence; and maritime planning. Regional Councils were expected to play a major role as neutral brokers in relation to resource management (Memon, 1989).

Under the Local Government Act 1989 the establishment of unitary authorities (those having the combined functions, duties and powers of a Regional Council and a Territorial Authority) was restricted to exceptional circumstances. However, an amendment to this Act in 1992 relieved this restriction and two unitary authorities have been established since this legislation was amended.

4.3.2.1 Regional Councils

The key functions of Regional Councils relate to the "management and protection of the environment and its resources, such as air, land and water" (Hawke's Bay Regional Council, 1994). Regional Councils also have the general functions of establishing, preparing, implementing and reviewing (objectives, policies and methods) to achieve integrated management of the natural and physical resources of the region.

4.3.2.2 Role of Regional Councils in Transportation Planning

Under Section 25 of the TNZ Act, Regional Councils may prepare Regional Land Transport Programmes (RLTPs), including passenger transport and administration projects. Regional Councils have very limited control over the ranking or prioritising of projects in their region.

The common ranking process is that Transit calls a meeting of representatives from each district within the region (including representatives of the Regional Land Transport Committee) to discuss the rankings. The Regional Land Transport Committee has an input at these meetings but does not make the final decision. Transit has control of the prioritising of projects at these regional meetings. Watson (1994) considers that, to be effective, the prioritising of projects (before lodging the final RLTP) should be decided by a Regional Land Transport Committee (RLTC) strategy group.

Section 23 of the TNZ Amendment Act 1992 requires Regional Councils to prepare a Land Transport Strategy for their region identifying:

- the future land transport needs of the region;

- the most desirable means of responding to such needs in a safe and cost-effective manner (having regard to the effect the transport system is likely to have on the environment);
- an appropriate role for each land transport mode in the region/district; and
- the best means of achieving the aforementioned objectives.

Appendix 1 is an excerpt from the Wellington Regional Land Transport Strategy relevant to the evaluation of State Highway roading projects. Regional Land Transport Strategies (RLTS) cannot be inconsistent with any Regional Policy Statement or Plan in force under the RMA (s23(6)).

The effect of Regional Land Transport Strategies is that Regional or District Land Transport Programmes (DLTPs) shall implement any Regional Land Transport Strategy (relevant to that region or district), unless implementation of that strategy is clearly impracticable (Section 24(1) TNZ Amendment Act, 1992).

Transit has to have regard to all Regional Land Transport Strategies (Section 24(2) TNZ Amendment Act, 1992). If Transit decides not to approve a project from the Regional Land Transport Programme (RLTP) or DLTP (which is in accordance with the RLTS) it has to provide advice of this in writing, giving reasons for non-approval (s4 TNZ Act).

The important point to note is that Transit is only directed to have regard to Regional Land Transport Strategies. Effectively this means that Transit is not bound to any Regional Land Transport Strategy.

All Regional Councils are required by the RMA to produce a Regional Policy Statement for their region. These statements outline each region's policies in relation to natural and physical resources. The issue of transport has been addressed differently throughout New Zealand, with some Regional Councils producing Regional Transport Plans (under the RMA) or including transport as a physical resource in their Regional Policy Statement. Some Regional Councils have included transport as a natural resource issue, eg, air pollution and water pollution.

4.3.2.3 Role of Regional Councils in the Evaluation Process

Regional Councils are not responsible for the evaluation of State Highway roading projects. However they are involved in related areas, namely:

- i the prioritising of projects by the Regional Land Transport Committee (as discussed in Section 4.3.2.2);
- ii consultation during the evaluation process as an interested and/or affected party; and
- iii approving resource consent applications.

There have been cases where Regional Councils have become involved in the evaluation process, in particular the Wellington Regional Council (WRC) in the Transmission Gully project. In this case the WRC was asked by Transit to review the CBR for Transmission Gully (Watson, 1994). This detailed involvement in the evaluation process by Regional Councils is rare.

The final area of Regional Council involvement in State Highway roading projects is during the resource consent process. Applicants must detail the alternatives considered; why the preferred option was chosen; the measures proposed to mitigate any adverse effects on the environment; the consultation undertaken and the response; and monitoring of any significant effects (Fourth Schedule, RMA). This is a minor involvement because the Council has no control over the evaluation technique used. However, when considering an application for consent under Section 104 of the RMA Regional Councils:

" shall have regard to -

- (a) any actual and potential effects on the environment of allowing the activity"

Therefore if any submissions are lodged by affected or interested parties in opposition to the application, the Council shall consider these impacts. This clause does not

specifically give the Council the ability to question the evaluation technique used but can highlight weaknesses in the technique.

4.3.2.4 Territorial Local Authorities

The functions of Territorial Authorities under the RMA are the same as for Regional Councils except that they relate to the effects of the use, development, or protection of land and associated natural and physical resources of the district (s31). This includes the control of any actual or potential effects of the use, development, or protection of land; the control of subdivision; and noise emission and activities in relation to the surface of water in rivers and lakes.

Territorial Authorities are also precluded from the evaluation process unless they are consulted during the consideration of alternative routes. However, consent to build a State Highway or alter its designation is required from the relevant Territorial Authority. Section 171 of the RMA (emphasis added) requires that when considering a requirement for a designation the Territorial Authority:

"shall have regard to -

.... (b) whether adequate consideration has been given to alternative sites, routes, or methods of achieving the public work or project or work ..."

As Requiring Authority, Transit can accept, modify or reject the recommendation of the Territorial Authority. The consultation and evaluation process may be considered under (b) above. However the clause is not specific.

4.4 Current Environment - Conclusions and Discussion

The preceding discussion has established that Transit has principal control over the evaluation of State Highway roading projects. One primary question comes to mind -

does this control over the evaluation of alternatives rest with the most appropriate body or level of government?

Regional Land Transport Committees (which are elected by the community) have no control over the evaluation technique used by Transit and its contractors, except after the preferred alignment has been chosen and planning approval sought.

The Transit Authority is appointed indirectly by the citizens of New Zealand through the Governor-General on the recommendation of the Ministers of Finance and Transport. Therefore New Zealand citizens do not have a direct right of recourse if they believe that the Transit Authority members are not representative of the community at large, except at the next election.

To be accountable to the community, decision-makers of State Highway roading projects must be representative of and elected by the community in which the decision-takers reside. Two possible means of improving this situation are:

- i to change the way in which the Transit Authority is appointed; or
- ii to change the responsibility for evaluation of State Highway roading projects to a body closer to the affected community, eg, Regional Councils.

Because there are national issues involved in these types of projects (including funds derived from the "public purse") representatives of Central Government should still be involved in the evaluation process. These representatives are already sitting on Regional Land Transport Committees for each region.

A further issue for debate is the link which Transit has created between the TNZ Act and the RMA. Transit has used the RMA as a basis for reviewing its mandate, which has been well overdue. However, this was not the specific intention of the RMA legislation.

4.5 Current Evaluation Practice

This section outlines prescribed Transit New Zealand practice in evaluating State Highway roading projects. Actual Transit practice is discussed in Chapter 5.0.

4.5.1 Pre-valuation

Before alternative proposals are evaluated, roading projects must progress through Transit's project development requirements. Figure 3 (next page) details the requirements for all new roading projects.

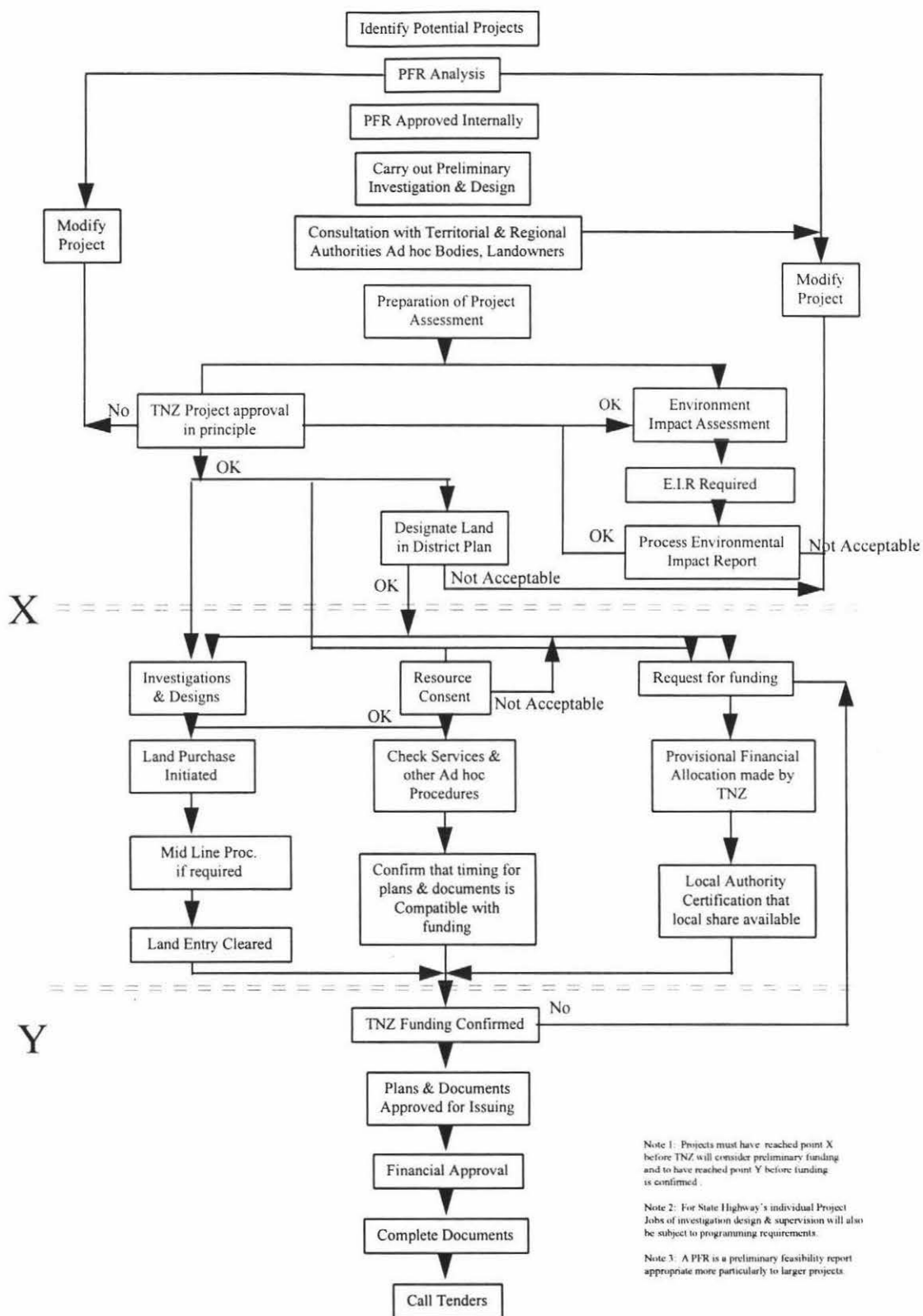


Figure 3: Chart of Project Development Requirements for all New Projects

Source: Transit New Zealand, 1994, pp6-18

The Project Feasibility Report calculates a provisional CBR (Transit New Zealand, Project Evaluation Manual, 1991, pp4-38) and indicates whether it is worthwhile investing more time into a particular project. Value judgements determine what intangible factors may be worth and how they might affect a project. At this stage, no indication of the magnitude of effect on intangible factors is provided.

A "Project Assessment" evaluates the necessity, cost and general impacts of the project on the environment. Preliminary funding is provided once the project has been approved by Transit in principle. It is at this stage that the various options for alignment are evaluated by Transit.

4.5.2 Valuation of Intangibles

For effects which are unable to be physically measured "a more subjective assessment will be required, ... specialists should be employed for the assessment of significant intangible effects" (Transit New Zealand, Project Evaluation Manual, 1991, p7-3).

For projects of major impact, public consultation and opinion surveys are required (Transit New Zealand, Project Evaluation Manual, 1991). However, the Project Evaluation Manual (PEM) does not mention any allowance for impact duration, ie, permanent or medium-long term duration.

Transit has identified several intangible factors which are currently quantified: noise; vibration; community severance; local air quality; water quality; dust; visual; and overshadowing. It is interesting to note that environmental effects such as the loss of a wetland or damage to cultural sites are not included in this list.

4.5.3 Evaluation

Transit's evaluation procedure is detailed in its "Project Evaluation Manual" (Transit New Zealand, 1991). Projects and the environment they impact upon vary, which leads to different evaluation techniques. Consequently the PEM is not prescriptive in relation

to the evaluation of intangibles. The PEM is, however, prescriptive in respect of tangibles.

Transit's evaluation procedure comprises two techniques:

- i monetary - in the form of Cost Benefit Analysis (CBA); and
- ii semi-monetary - in the form of a Planning Balance Sheet (PBS).

These techniques, along with their strengths and weaknesses, have been discussed in Chapter 3.0.

Transit's PBS describes the intangible and tangible effects of projects separate from the CBA. The Balance Sheet "provides for a concise presentation of intangible and tangible effects without disguising their nature or scale, and in a way that shows those who benefit and those who lose from a project" (Transit New Zealand, 1991, pp3-6).

The impacts on the environment are tabulated and described in the Balance Sheet under the following sections:

Group Affected (1)

The costs (incurred by Transit) and benefits (effects on vehicle occupants, vehicle owners, owners of nearby property and those occupying or undertaking activities nearby, including pedestrians) are listed for each group directly affected by the project. The level of detail will depend on the size and nature of the project.

Nature of Effect (2)

The type of benefit or cost is described and, where relevant, the duration and time of occurrence is given.

Units of Measurement (3)

These are the units in which the effect is measured and can be in natural units or dollar values.

Positive (P) or Negative (N) (4)

This clearly identifies positive benefits such as a reduction in vehicle operating costs, as opposed to negative benefits such as an increase in traffic noise.

Magnitude of Change (5)

This expresses the size of the benefit or cost in natural units or degree of effect on a descriptive scale (such as low, medium, high) and excludes items which can be monetarised.

Magnitude of Change (6)

This expresses the present value of national resource costs or benefits of each option compared with the do-minimum option. In order to avoid double counting, Column 5 or 6 is completed, but not both (Transit New Zealand, Project Evaluation Manual, 1991, p4-10).

4.5.4 Extent of Evaluation

The Cost Benefit Analysis and Planning Balance Sheet evaluations are undertaken by the same consultant and probably by the same person. For small projects, ie, those less than \$100,000, a "quick check" of the evaluation is carried out by specialised independent consultants. This check reviews consistency and whether all environmental issues have been considered (Bailey, 1994). If the independent consultants recommend a different outcome to the original evaluation, the original evaluator is questioned as to his/her technique (Bailey, 1994).

A large number of projects have many intangibles and are frequently worth less than \$500,000. For these projects, a large matrix of intangibles would be required but, because of limited resources, the evaluation of intangibles is tailored to suit the project budget (Bailey, 1994).

4.5.5 Decision-making

In evaluating project options "the Balance Sheet should be used as a framework to decide which, if any, of the options should be adopted" (Transit New Zealand, 1991, pA7). However, whether this occurs, and to what extent, is not clear to decision-takers.

The Project Evaluation Manual reinforces this deficiency in saying that "value judgements are inevitably made between different impacts, eg, weighing up increased travel time against the cost of losing an area of regenerating native bush" (PEM, pA7). The key words in this sentence are "value judgements". When "value judgements" are the basis of a decision, accountability and auditability are lost. To gain public acceptance of a proposal, trade-offs between issues must be explicit. Any revised evaluation technique should address this issue.

4.6 Current Evaluation Practice - Conclusions and Discussions

By using CBA and the PBS for the evaluation of State Highway roading alternatives Transit has introduced the strengths and weaknesses of these techniques into its evaluation process.

The main weakness in Transit's current practice is that there is the potential for value judgements to be made in relation to intangibles. During the project feasibility stage there is no provision in Transit's PEM for quantifying or auditing these judgements. In addition, no criteria are established in Transit's PEM for auditing the effectiveness of public consultation and opinion surveys.

The PBS includes details of the duration of impacts but states that duration should be detailed "where relevant". This could allow different interpretations of the PEM to develop and decision-makers could misinterpret the significance of a minor impact of permanent duration compared with a major impact of temporary duration.

Although Transit undertakes a "quick check of the evaluation technique" for small projects, this check does not consider how environmental issues were evaluated and whether the evaluation technique used was appropriate.

In conclusion, the most significant weaknesses of Transit's current evaluation practice are the use of value judgements in the evaluation of environmental issues - more specifically, the lack of established criteria or principles for these judgements and the lack of documentation or auditing of these judgements.

5.0 Case Studies

Two case studies were undertaken to study Transit's evaluation process "through the eyes of participants" (Bryman, 1988). Two studies were undertaken because research findings may be untypical based on one study, but this can be overcome by studying more than one case (Bryman, 1988). The case studies identify and analyse the main issues raised by participants in the evaluation processes.

The case studies were chosen for the following reasons:

- i the projects were under the statutory control of the Resource Management Act 1991;
- ii they covered a wide range of impacts and issues, ie, natural; social; and physical; and
- iii employed different evaluation techniques.

The two projects chosen for study were the realignment of State Highway 1, Albany to Puhoi (Transit New Zealand, Auckland Regional Office) and the Ahuriri Estuary Motorway, State Highway 1 (Transit New Zealand, Napier Regional Office).

The Ahuriri Estuary Motorway evaluation process is considered to be atypical of current Transit practice, whereas the Albany-Puhoi process was a new initiative by Transit New Zealand (Odams et al, 1994).

5.1 Case Study Method

5.1.1 The Choice of Qualitative Research

A qualitative survey approach was chosen for this research to provide a description of the two evaluation processes from the view of participants. Qualitative research is a

"study of the social world which seeks to describe and analyse the culture and behaviour of humans and their groups from the point of view of those being studied" (Bryman, 1988, p46).

There has long been a debate over the use of qualitative or quantitative research. However, Bryman (1988) comments that since the 1960s there has been a growth of interest in methods such as participant observation and unstructured interviewing, the main reason being that compared with quantitative surveys, unstructured interviews give the subject a freer rein. The nature of the interview also allows "ramblings" which reveal areas of most interest or concern to the interviewee. The interviewer does lose some control during these "ramblings", but this can be overcome by catching up on any questions which are missed (Bryman, 1988).

Babbie (1992) discusses the advantages and disadvantages of qualitative and quantitative survey approaches. Qualitative interview surveys have the primary advantages of being personalised and therefore achieve a high response rate (compared with self-administered questionnaires). Interviews are also more effective in dealing with complicated issues as they can be explained more easily face-to-face and interviewers are able to make observations during the interview (aside from the responses to questions) eg, whether the respondent had difficulty communicating, was hostile or seemed to be lying, etc.

Despite these advantages interviews tend to be more expensive than self-administered questionnaires and therefore do not cover such a large sample area as self-administered questionnaires. There may also be difficulty in dealing with sensitive issues because interviews do not offer complete anonymity (Babbie, 1992). To overcome this difficulty interviewees have not been named in the transcripts.

In summary, the qualitative survey interview approach was used for this research for the following reasons:

- i the complicated nature of the evaluation process;

- ii the need to allow participants to “ramble” as there was a wide range of concerns and areas of interest held by each participant; and
- iii the small group of people directly involved in each process.

5.1.2 Selection of Interviewees

Interviewees were chosen who were considered to be representative (by Transit) of the public involved in the evaluation process. However they may not have been representative of the larger population.

A sample will be representative of the population from which it is selected if all members of the population have an equal chance of being selected in the sample (Babbie, 1992). Members of the population affected by the Albany-Puhoi realignment do not appear to have been given an equal chance of being in the Consultative Group³ as Transit invited only people who lived alongside the various options.

The public involved in the Ahuriri Estuary project may have been more representative of the total population because there were no restrictions to the public becoming involved in public meetings or lodging submissions.

This issue of representativeness and the vocal minority versus the silent majority is discussed in Chapter 6.0.

For each case study the method of interviewee selection is outlined below:

Ahuriri Estuary Motorway

Transit New Zealand's Consultants provided a list of people who had been involved in the Ahuriri Estuary motorway project. These people had attended public and pre-hearing meetings, or lodged submissions on the project.

³ Consultative Group: This group was formed from representatives of the affected community and interest groups. The role of the group is discussed in Section 5.3.2.

Letters were sent to fifteen people outlining the research and asking for their help. Appendix 2 contains a copy of the letter sent to participants. Eleven positive responses were received. The balance of four declined due to a conflict of interest, or did not reply.

Albany-Puhoi Realignment

Transit New Zealand Auckland established a Consultative Group comprising representatives of the community to evaluate the alternatives on behalf of the community. This group was extensively involved in the evaluation process and is discussed in Section 5.3.2.

Seventeen letters were sent to members of the Consultative Group inviting them to participate in the research. Eleven positive responses were received; the balance of six did not respond.

5.1.3 Interview Format

Two sets of questions were developed for the interviews. The same questions were asked for both case studies apart from slight variations due to the different techniques. The questions sought to explore, describe and explain each participant's role in the evaluation process and their reactions to the route selection process. Appendices 3 and 6 contain the survey interview questions for each case study.

Participants were given the opportunity to stray from the questions and add anything further to the interview. The interviewer ensured that no questions were left unanswered at the end of the interview. Some questions asked the interviewees to rate the selection process.

Each participant was interviewed at a place of their choice, usually their homes. The interviewees were asked whether they approved of the interview being taped. None objected to this. For clarification, notes were also taken during each interview.

Transit New Zealand staff involved in each evaluation process were interviewed and transcribed last to prevent bias.

Transit New Zealand's Consultants co-ordinating the consultation and evaluation processes were not interviewed because Transit had overall control of the process. Transit instructed and monitored their Consultants' progress to maintain neutrality throughout the process.

5.1.4 Analysis of Interview Data

The relationship between data from the survey interviews and theory will be formulated in this thesis in terms of "grounded theory". This approach draws on the basis of analytic induction and is a means of generating theory which is embedded in data (Bryman, 1988). Critics of qualitative research (Hammersley, 1984) comment that much qualitative research relies on the elucidation of a theoretical framework, subsequent to (rather than during) the data collection phase.

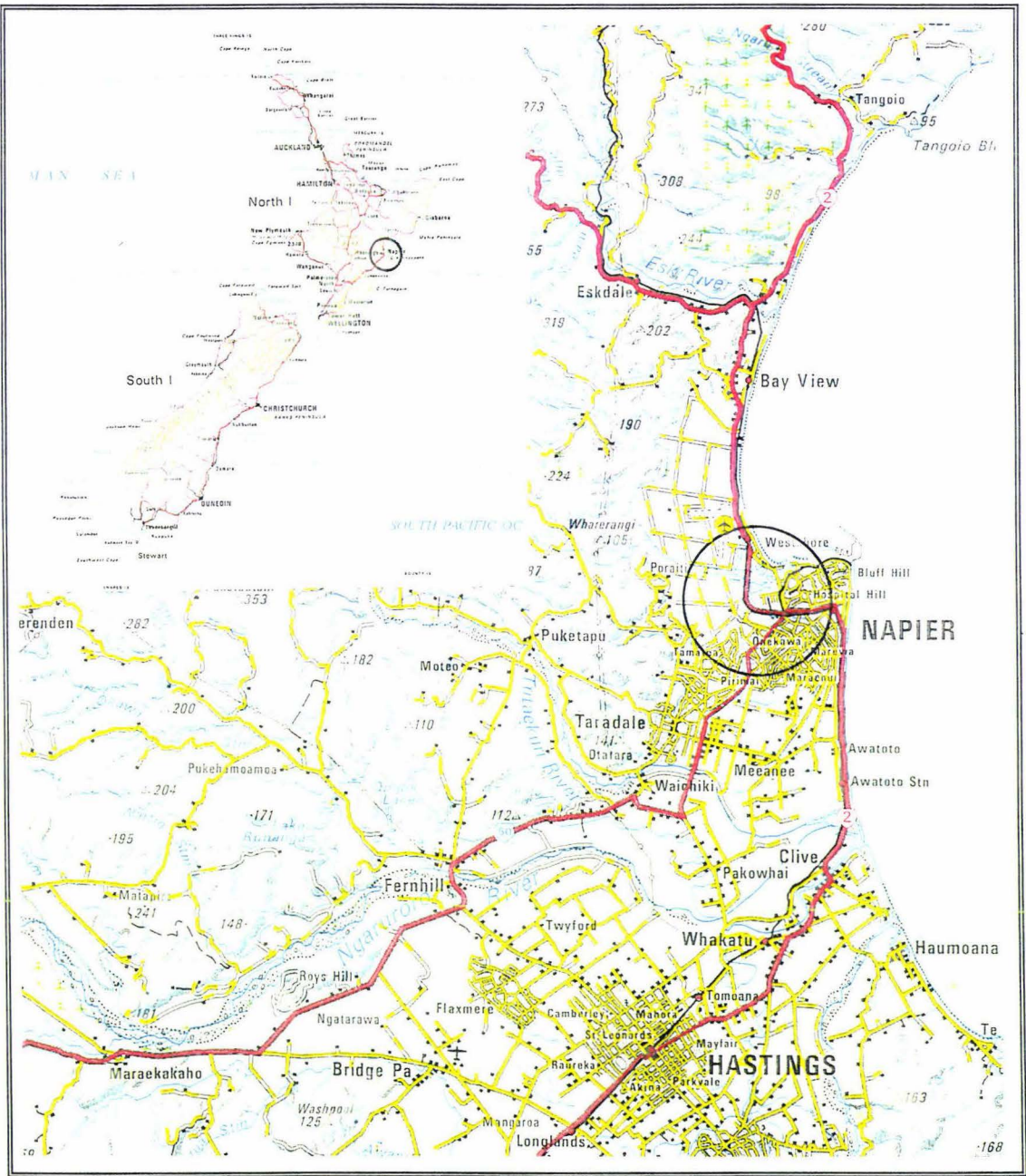
Babbie (1992) supports the use of "inductive logic" in analysing data from qualitative surveys. As a general guide, similarities and dissimilarities should be examined which are generally common or universal to the area of study (Babbie, 1992). Questions can then be asked such as: why are they universal? Using inductive logic, theories or generalised understandings will be developed over the course of the interviews. Babbie (1992) notes the potential to "observe only those things that support your theoretical conclusions, ie, selective perception". To overcome selective perception, Babbie (1992) suggests augmenting qualitative observations with quantitative ones, eg, the number of interviewees who gave this response, and being aware or sensitive to the problem.

The data from the two case study interviews has been analysed using "inductive logic" and has avoided selective perception by taking the steps suggested by Babbie (1992).

5.2 Case Study 1: Ahuriri Estuary Motorway Project

5.2.1 Project Background

This proposed section of motorway is the northern section of the Napier-Hastings motorway initially developed in the early 1960s. Map 1 illustrates the location of the Ahuriri Estuary and Map 2 the alternative routes considered by Transit.



Map 1: Location Map of Ahuriri Estuary Proposed Motorway

Source: McKenzie, 1987, p42



Map 2: Alternative Alignments of Ahuriri Estuary Proposed Motorway

Source: Transit New Zealand, December 1993.

The route was originally intended to provide a "rapid transit link between Hastings City and the newly established Hawke's Bay Airport - as partial compensation to Hastings for the selection of a Napier based airport site" (Transit New Zealand, December 1993). However, the motorway is now recognised as a regionally strategic transportation link and a cost-effective project. The motorway has been included in various transportation studies of the Heretaunga Plains (1980 and 1986).

The location of the motorway has been designated twice and was last moved in 1970 in response to plans by the Napier City Council to allow western expansion of the Onekawa industrial zone.

Since 1970 two significant changes have occurred:

- i the demand for industrial land at Onekawa has dropped off, suggesting that the existing designation may not need to avoid this area; and
- ii an increased appreciation of the significance of the Ahuriri Southern Marsh and other wetlands in the area.

Both these changes prompted the review of the designated alignment. A review was opportune because the Napier City Council was reviewing its District Plan, which included the designated alignment.

The following photographs (next page) depict the nature of the environment through which the proposed motorway will pass. Additional photographs of the area are in [Appendix 4](#).



Photograph 1: Looking South adjacent to North Pond



**Photograph 2: Looking North adjacent to North Pond,
Alignment 2 marker in foreground.**



Photograph 3: Looking North from Embankment Bridge,
Alignment 3 marker in background (adjacent to single power pole).



Photograph 4: Looking South along Embankment Bridge.

5.2.2 The Evaluation Framework

Nine different alignments west of the railway bridge were investigated. In assessing each alignment the impacts on the following issues were considered:

- noise;
- property access;
- damage to habitats;
- fauna and flora of the Ahuriri Estuary;
- landscape impacts;
- Maori interests (including a claim to the Waitangi Tribunal heard in July 1993);
- bird-strike by aircraft;
- impacts on property;
- flood damage; and
- possible future implications for New Zealand Rail.

The public consultation process began in 1990. The steps in this process (outlined in chronological order in Appendix 5) included: Environmental Impact Studies; discussions with environmental groups; public submissions; public meetings; Iwi consultation; and the production of various specialist reports.

The consultation process was frozen in 1990 because of a nation-wide 20% cut in Central Government funding, but was restarted when funds became available in 1992.

Planning consent was given to Transit to build the motorway and alter the designation in 1993 but Transit has since appealed a condition of that consent relating to bridge length. At the time of writing this thesis the decision from the Planning Tribunal was pending.

5.2.3 Valuation and Evaluation Techniques

A cost/benefit ratio was calculated for each of the nine options. Impacts on the environment of each option were then assessed by focusing on the issues listed in Section 5.2.2 above. "In doing so, it was possible to progressively eliminate those

options which presented the most significant problems. By focusing on each of these issues in turn, the final choice of alignment was eventually arrived at" (Dave Rendall, Transit New Zealand, December 1993).

Three options (1 and 1A near the end of the Airport runway; and the designated alignment) were eliminated in the early stages of the evaluation process because of safety and "unacceptable impacts on the wildlife in the southern marsh" (Dave Rendall, Transit New Zealand, December 1993).

No specific valuation technique was used for this project, apart from identifying the costs of mitigating the effects of the motorway on the environment. The values placed on issues by the community could also be implied from the content of submissions received. Options were evaluated using cost benefit analysis.

Transit New Zealand and its Consultant developed an impact matrix to evaluate the options. This matrix detailed each alternative route, the issues relevant to each alternative such as the airport, cost and benefit cost rating, flood control, effects on Westshore Lagoon, and noise affecting residents, etc.

Each issue was weighted and scaled by Transit and its Consultant, based on comments from public meetings and submissions. The weights were the same across all alternatives and ranged from 10 for the CBA, bird-strike and flood control issues to 1 and 2 for the impacts of purchasing airport property and the effects on the new ponds. The weights and scales were then multiplied to obtain a single figure for each alternative. It is interesting to note that the final alignment (Alignment 2) was ranked fourth in order of least impacts. This result should not be relied upon because the weights and scales were not provided or vetted by the community or interest groups.

Works Consultancy Napier's Principal Planner commented that "the matrix was useful for identifying impacts and comparing alignments but it was difficult to incorporate the CBA". The matrix became an internal exercise which was not presented to the public.

Evaluation of the alternatives was undertaken through public meetings. At these meetings public concerns would be raised and Transit or its Consultant would investigate the possibility of addressing these concerns, whilst maintaining the CB ratio at a level that would secure funding.

5.2.4 Main Points Emerging from the Ahuriri Estuary Case Study Interviews

The following section discusses similar themes and ideas which were expressed by the majority of interviewees.

Public Interviews

Transit was considered to listen and be open to the public's concerns. However, a common point made was that Transit was only as open as it could be within its financial constraints. Transit's openness was seen to be demonstrated by its willingness to change options. A large number of comments were, however, that the interviewees were suspicious or unsure about Transit's openness throughout the process. Concern was expressed at the accuracy and type of information provided by Transit to the public.

The majority of interviewees were disappointed at the lack of New Zealand Rail's involvement in the process and were not convinced that a motorway was justified for a three-minute travel time saving.

Interviewees rated the selection process above 2.5 on a scale of 1-5 (1 being totally unsatisfied and 5 very happy). None of the interviewees said they were totally unsatisfied. The reasons given were that Transit tried to listen; was professional; and was efficient in its consultation.

A similar rating was given for the final route. The main reason for not giving the process a rating of 5 (very happy) was because the majority of interviewees wanted the crossing fully bridged.

Representatives of community or interest groups considered their group would give the same rating as their own regarding the process and final route.

A repeated strength of the selection process was that the public were able to be involved in the decision process. This involvement was in the form of submissions, public meetings and being kept up to date with information provided by Transit - such as the regular information sheets.

The main weakness identified by interviewees was the amount of consultation which the public is now being asked to be involved with, and the amount of information provided by local authorities and government departments through this process. Interviewees commented that there was too much repetition between local authorities and government departments which were all seeking input from the public. Interviewees commented that small voluntary groups lack resources and are "being swamped with consultation".

The majority of interviewees said that Transit did not explain the trade-offs undertaken, or they were unsure of the trade-offs. A common point raised was that "the decision comes down to dollars but there are no dollars placed on environmental issues".

The most significant improvement suggested was that agencies should be more co-ordinated and also consider the limitations of small voluntary groups. A further suggestion was that the planning hearing process should be explained thoroughly to the public and submitters. Many of the submitters were unaware of the duration of the hearing and also felt that the hearing was focused on or catered for the applicant.

Other common points made by the interviewees were that the process made small groups lobby against dominant/powerful groups.

The majority of interviewees also considered that dollar values should not be placed on natural values.

Transit New Zealand Staff Interviews

One Transit staff member was involved primarily in the selection process. The following are the main points raised by this interviewee.

Transit offered to provide assistance to the public in the form of typing or photocopying submissions. This is an interesting point because none of the public interviewed appeared to be aware of this offer. Transit confirmed that very few groups took up this offer.

Two interviewees made contradictory comments as to who was responsible for initiating the bird-life report in relation to bird-strike.

Transit considered itself to be project promoter and facilitator but also final decision-maker.

Transit developed an impact matrix to evaluate options, but commented that it became too complicated to analyse because different factors were worth different weights to different people, and prioritising groups was difficult. Although this matrix helped Transit understand the issues, in the end Transit used value judgements to weigh up the merits of each option. These value judgements were based on Transit's knowledge; advice from interested parties; and Transit's professional advisors.

Transit considers it listened to the public because it investigated or undertook measures that groups wanted. This comment is supported by the majority of public interviewees.

Contrary to the views of the public interviewees, however, Transit felt that the trade-offs were explained to the public who understood them because they undertake trade-offs in their everyday life.

Transit is pleased with the outcome of the process, mainly because there were no outright objections to the motorway. Transit gave the final route a rating of 5, but

commented that they were not happy with the resource consent conditions and have subsequently appealed.

Transit felt that the general public would give the process a rating of 4 because they were unaware of the costs of the process, but pleased with its openness. The public was considered by Transit to give a rating of 3/4 for the process because it was dominated by interest groups.

Transit considered the main strengths of the consultation process to be that it was aware of all concerns at an early stage; the public appreciated an 'up-front consultation process'; and the public could form their own opinions about the vocal minority.

Four weaknesses of the process were identified by Transit:

- i effects of existing uses are not given sufficient emphasis in the Resource Management Act 1991;
- ii well-organised vocal minorities can dominate the process;
- iii the planning arena is not designed for the general public; and
- iv it is difficult to link CBA with impacts on affected or interested parties.

Improvements to the process suggested by Transit included ensuring that funds were available for the project at the outset and improving tangata whenua consultation.

5.3 Case Study 2 : Albany-Puhi State Highway Realignment

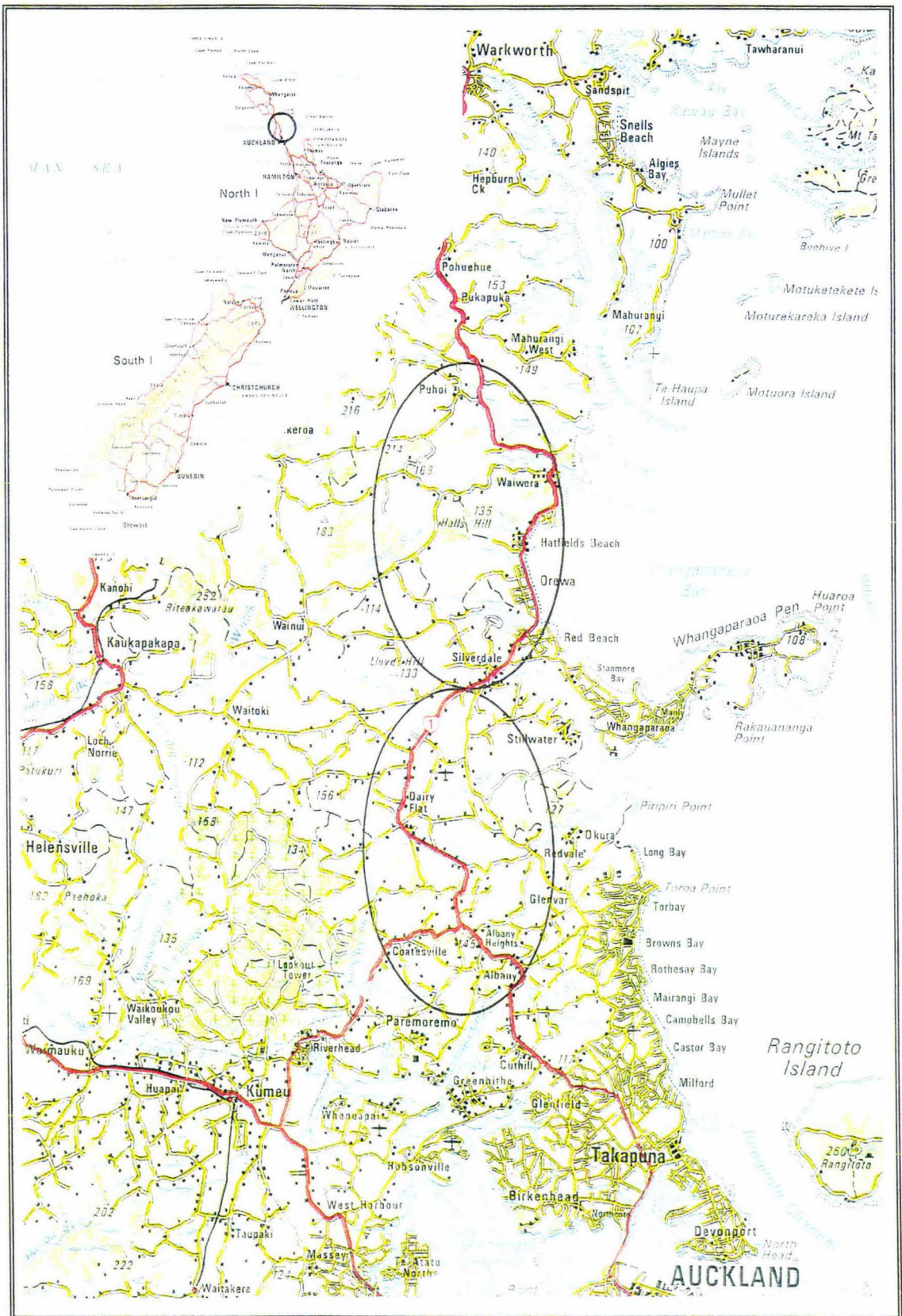
5.3.1 Project Background

The designation for the realignment of State Highway 1 south of Albany to Hatfields Beach (23 km total length) has been identified in local district schemes since 1967. In 1987 Transit New Zealand (then the National Roads Board) undertook an extensive study of the designation. The study recommended that the designation was necessary and should be confirmed when the district scheme was reviewed.

The Rodney District Council confirmed the designation, but its decision was appealed by local land developers. When the appeal was heard in October 1991, Transit was mindful that when the original route was designated, comprehensive environmental studies (sufficient to meet the requirements of the Resource Management Act 1991) had not been undertaken.

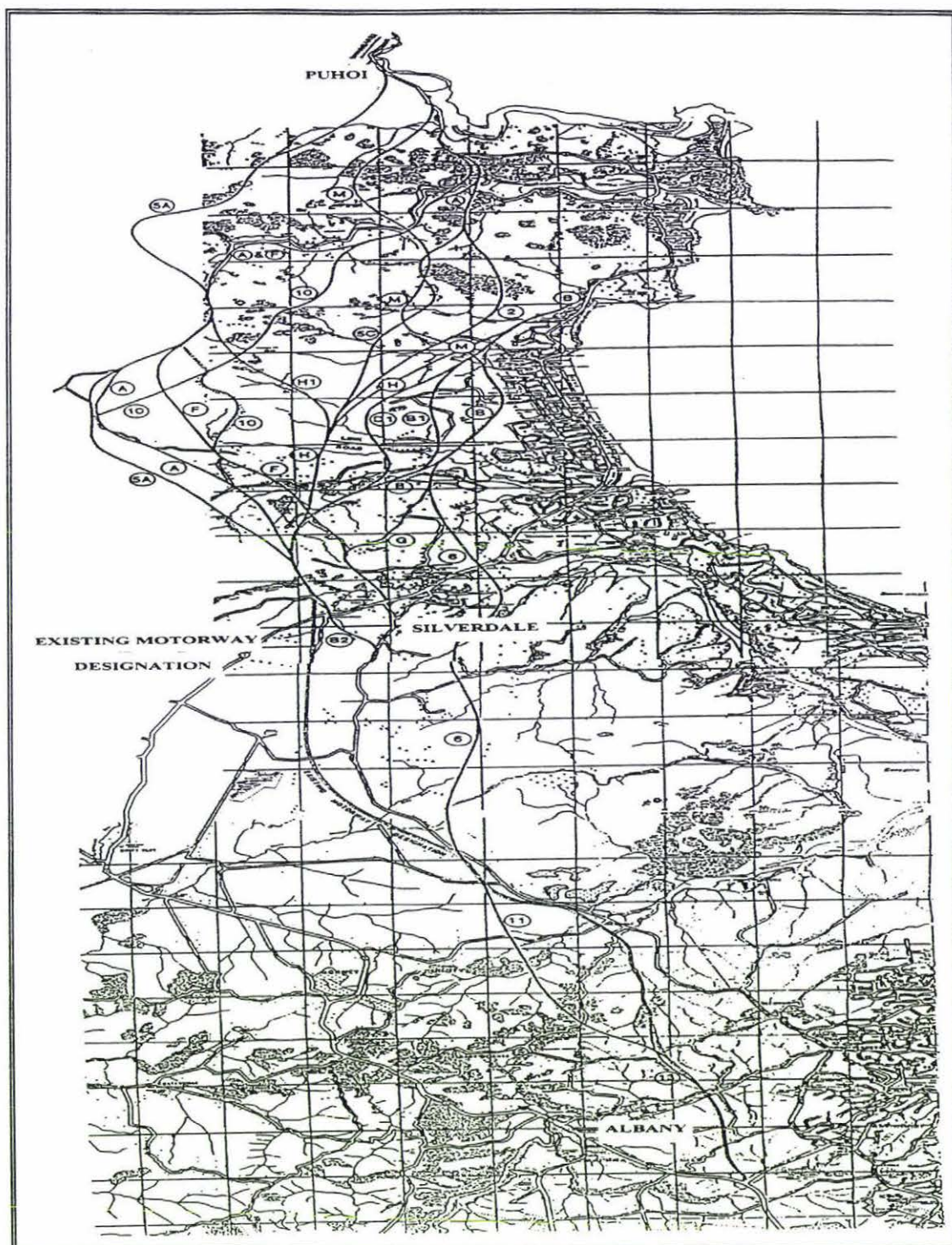
The Planning Tribunal granted a consent order allowing Transit time to carry out an environmental impact assessment of the designated route and other alternative routes. The consent gave Transit nine months for the study and four months for final public consultation and consideration (Brown, 1993).

Map 3 (next page) illustrates the location of the proposed Albany-Puhoi realignment and Map 4 (also next page) the alternative alignments considered by Transit New Zealand and the Consultative Group.



Map 3: Location Map of Albany-Puhoe Proposed Realignment of State Highway 1

Source: McKenzie, 1987, p11



Map 4: Alternative Alignments Albany-Puhoi Proposed Realignment of State Highway 1

Source: Beca Carter, 1993

The following photographs (next page) depict the nature of the environment through which the proposed realignment will pass. Additional photographs of the area are in Appendix 7.



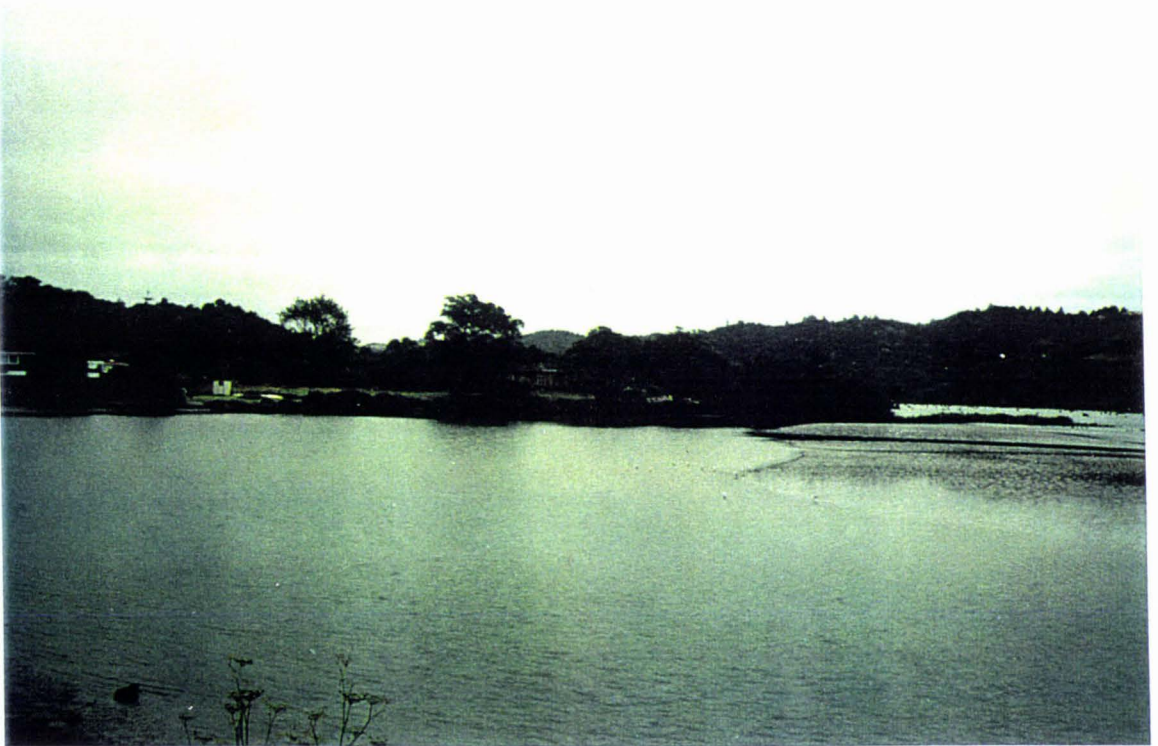
Photograph 1: Looking North along the designated alignment,
in the vicinity of Silverdale.



Photograph 2: Looking South towards Red Beach. The designated alignment is in the
vicinity of the bare land in the background.



Photograph 3: Looking West in the vicinity of the preferred Alignment (5CM9).



Photograph 4: Looking West at Hatfields Beach Estuary.

5.3.2 The Evaluation Framework

In December 1991 Transit commissioned a Principal Consultant to manage and co-ordinate a series of studies by eleven environmental consultants. The lead Consultant was also responsible for social assessment. The environmental consultants studied the environmental effects of the realignment and produced a comprehensive Environmental Impact Assessment (EIA) (Williams, 1993).

Public consultation was undertaken through the provision of information; consultation; and social impact assessment. A Consultative Group comprising affected residents along the routes under study and interested members of the community was also established (Williams, 1993).

A Technical Group was formed to work in tandem with the Consultative Group. The Technical Group included representatives from Rodney District Council, North Shore City Council, Auckland Regional Council and the Department of Conservation (Brown, 1993).

The purposes of the Consultative Group (which met at key times during the process) were:

- i to act as a channel of information between the study team and community;
- ii to provide inputs of local expertise and experience;
- iii to enable affected parties to directly monitor the progress of the study;
- iv to provide a local focus for inputs from particular segments of the routes; and
- v to provide one of a number of mechanisms for the community to influence the outcome of the study (Beca et al, 1993).

A scoping report highlighting issues to be addressed by the study, and details of alignments previously studied, received nearly 150 submissions (Brown, 1993). A “coarse screen phase” was undertaken by the Consultative and Technical Group using a scoring process (this process is discussed in Section 5.3.3). This phase reduced the original nineteen options to six. These six options were the subject of further detailed

evaluation by the two groups. As alignments were considered or altered, additional members of the public were involved in the consultation process as appropriate.

The discussions of the Technical Group were reported to the next Consultative Group meeting. Minutes of the Consultative Group meetings were recorded by the Principal Consultant.

Transit also distributed community-wide newsletters (eight to date) during the study and consulted with tangata whenua through a Maori issues advisor. The tangata whenua did not score the various route options. The consultant engaged to consult with the tangata whenua gave composite scores as their responses. A cultural impact assessment report identified the tangata whenua's special relationships with the land.

After extensive consultation, the Consultative Group and the Technical Group recommended a final alignment (B5CM9) which is identified on Map 2. The EIA supported this final alignment.

Transit applied for planning consent in 1994 to designate the proposed realignment and the decision is pending.

5.3.3 Valuation and Evaluation Techniques

Prior to the scoring process, the Technical Group determined the critical issues and concerns for each route.

The “coarse screening” process involved rating each option's performance in relation to 25 factors in the areas of: ecology; socio-economic; cultural; transport effectiveness; and financial aspects (Transit New Zealand, June 1992).

Each option was scored between 0-10 in respect of these factors ranging from 10 = unacceptable adverse impact, 5 = neutral or negligible impact and 0 = over-riding benefit.

The scores were recorded on a matrix and totalled to identify the options of least impact. Appendix 8 contains the matrix score sheet used for this process. Weights were applied to various factors to test for sensitivity. Although the total score for each option may have changed slightly with different weights, the overall ranking remained basically the same (Beca et al, 1993).

During this process the advantages and disadvantages of each route were debated and resulted in an "overall consensus as to which routes should be the subject of further investigation" (Beca et al, 1993).

Beca et al (1993) comment that this scoring process was undertaken twice, once by the Technical Group and secondly by the Consultative Group. However, there are conflicting comments in Transit's Newsletter no. 4 which states "the Consultative Group went methodically through all the scores given by the consultants" and the views of the interviewees. This issue will be discussed in the Chapter 6.0.

At the end of this phase six routes were identified for further investigation: B, State Highway 1 upgrade; B/M; B1/M; 5C/M; and D1/M.

The scoring process for phase 2 involved the same process and criteria that were used for the first screening of options.

The valuation technique used in this process was a combination of team rating, rating panels and impact matrices. The evaluation technique used ie. the scoring phase, was a form of impact matrix varied to incorporate weights and CBA.

5.3.4 Main Points Emerging from the Albany-Puhi Case Study Interviews

The following section discusses similar ideas which have been expressed by the majority of interviewees.

Consultative Group

Concern was expressed at the make-up of the Consultative Group. Interviewees stated that they were unhappy in that the Group was "heavily in favour of large landowners" and was "made up of people directly affected by the highway with vested interests".

Aside from this, the majority of interviewees felt that the Consultative Group was effective, to a limited extent. The limiting factor was that small landowners could have a say, but were influenced by large landowners. The Consultative Group was thought to be effective because members of the Group had local knowledge; information could be channelled to the community; and good discussions were held during the process.

The majority of interviewees became involved in the consultation process when they were directly affected by the highway, ie, when an option was through their land.

The two main areas of concern to members of the Consultative Group were impacts on their property and on the community. The impact on the environment was not a common concern, possibly because the Consultative Group predominantly comprised residents and affected property owners. Only one or two members of the Group had environmental interests, but they were also affected landowners.

The Consultative Group was divided as to whether Transit had listened to and considered their concerns but there was a trend towards Transit listening or trying to listen.

The majority of interviewees believed that Transit had a closed mind when it approached them for consultation. The Group was of the opinion that Transit had a "preconceived idea of where it wanted the highway" and the final route was "a foregone conclusion". These comments could be linked to the fact that Transit was not seen to be considering the Group's concerns.

The majority of interviewees gave the selection process a rating of less than 2.5 (on a scale of 1 being totally unsatisfied and 5 very happy). Some of the comments were that

the process was "window dressing to support Transit's decision"; "as I am affected I will never be happy with the process" and "Transit was gutless in the end". A similar rating was given by the interviewees for the group they represented.

Interviewees considered that the "winners" on the Consultative Group would be happy with the selection process.

Interviewees identified strengths of the process to be: an opportunity for the public to raise any issues and to have input into the decision process. Three common themes were raised as weaknesses or criticisms of the selection process:

- i The consultation process was a "farce". Some of the comments made in support of this were: "the Consultant was brought in to persuade rather than consult"; "Transit is not obliged to take account of the Consultative Group's recommendations"; "the Consultative Group was used to strengthen the argument to uplift the designation"; and "the purpose of the Consultative Group was to work towards everybody agreeing with Transit".
- ii The Consultative Group was unhappy with the Chairperson of the Group. Reasons given were: "the Chairperson was not impartial, if the Chairperson disagreed with the Consultative Group the Chairperson would question the group"; "the Chairperson could not relate to the Consultative Group"; "if the Chairperson was criticised the issue became personal"; and "the Chairperson was not prepared to consider other options".
- iii The nature of groups. Dominant people (or large numbers of people) can dominate a group. Supporting comments were: "political lobbying within the group"; "some people are stronger than others and can manipulate the group"; "the larger the number of people the more chance of success"; and "logic did not flow through the process because of the power [or dominance] of the developers".

The main comments on how to improve the selection process related to the make-up and skill of members of the Consultative Group and the need to establish (in the early stages of the process) what Transit expected from the Group.

Interviewees suggested that there be two groups: one with people who have large investments and another for people whose quality of life will be affected. Membership was suggested to be kept constant. Interviewees also commented that members of the Consultative Group should be able to analyse information, be positive in their attitude and have foresight. The employment of an independent person was also put forward by interviewees to help the Group through the process.

It was suggested that the Consultative Group be made up of a selection of people from the community, eg, business people, and not from pressure groups.

On a scale of 1-5 (1 being totally unsatisfied and 5 very happy) the final route was given a rating of more than 2.5. The Group had reservations about the link road and whether the highway would ever be built. Mixed responses were given in relation to the group which each interviewee represented. The majority of interviewees thought that the Consultative Group would be pleased with the final route "except the person directly affected".

Two main themes emerged regarding the evaluation (scoring) technique:

- i The scoring technique was too long and complicated and was not fully understood by the Group. Comments in support of this were: "highly technical, apart from two members I believe the group did not fully understand the significance of the scoring process"; "the rest of the group was totally lost during the scoring process"; "the scoring process was difficult as you needed to be familiar with the area"; and the Group was "overloaded with information a complex process".

- ii The Consultant manipulated the Group by persuading members to change their scores. Comments which supported this theme were: "the Consultant tried to talk the group out of each score which the Consultant thought more appropriate [sic]"; "if the Consultative Group's scores were different to the Technical Group's the Consultant explained the reasons why, until the Consultative Group changed its scores", and "the Consultative Group's results were manipulated to get close to the Technical Group's scores".

Several miscellaneous comments were made by interviewees. These comments covered the planning process (and Resource Management Act) in general; the status of designations; individuals' rights versus groups; and the fact that the selection of the final route had taken a very long time.

Transit New Zealand Staff

The comments of the two Transit staff interviewed were in conflict as to whether the results of the Consultative Group were accepted or changed to reflect the Technical Group's.

However, there were common points raised by the two staff interviewed, namely that the Consultative Group was felt to be representative of the community affected by the various alignments, and was effective. The Consultative Group was considered effective because it would have been difficult to deal with the many fragmented groups within the community; the community was "accepting of the outcome as it was seen as honest and thorough"; and 'many good ideas were driven by the Consultative Group'.

In relation to the scoring process the main points made by Transit staff were that the Technical Group's scores were "used as a guide or to frame up an attitude towards options", weights were tried by the Group but discarded, often the information presented to the Group was "beyond their comprehension", and the process was very time-consuming and stressful for all concerned.

A further difference of opinion between Transit staff interviewed was whether the evaluation process should result in a number or a description. One interviewee felt that "numbers do not represent an issue in its true sense" and "preferred a large discussion or justification" for an outcome. The other interviewee commented that "intangibles may always sit to one side and not be measured in dollar terms".

Unlike the Consultative Group interviewees, one Transit staff member interviewed thought that the Consultative Group understood the process of scoring as "they were a very clued-up bunch".

A rating of 3.5/4 was thought to reflect the community's view of the final route chosen and a rating of 3 for the process was considered to be the view of the Consultative Group.

One Transit interviewee commented that the strength of the selection process was also its weakness, ie, that it was very iterative and expensive but the Transit interviewee did would not wish to remove any steps in the process.

A comment was also made that the suggestion of an independent chairperson was inappropriate. Transit was happy with the Chairperson as it considered the role of Consultation leader to be a difficult one.

5.4 Comparison of Main Case Study Points

Aside from the actual variations between the two case studies, there are significant differences and similarities in the interview responses.

5.4.1 Similarities

Common to both case studies was the view that Transit had listened, or tried to listen, to the concerns of the public involved. Although some interviewees made negative

comments about Transit and the way it handled the evaluation process, the majority of interviewees still considered that Transit listened.

A significant strength of the two processes was that the public were (or could be if they wished) involved in the decision-making process by lodging submissions, attending public and pre-hearing meetings or receiving information updates such as regular newsletters. This point was made almost unanimously by both groups of interviewees.

The final route chosen in both case studies was satisfactory to the majority of interviewees. Both groups rated the final route higher than 2.5 (1 being totally unsatisfied and 5 very happy).

Both groups of interviewees expressed concern at the dominance of large or powerful groups over small powerless individuals.

In relation to the evaluation process itself, both Transit Napier and the Consultative Group commented that the matrix/scoring process was complicated. Contrary to this view, Transit Auckland believed that the Consultative Group understood the process. A detailed analysis of the scoring process is discussed in Chapter 6.0.

Transit Auckland and the Consultative Group did not support the weighting of issues because they felt that this would distort the impact. Transit Napier applied the same weights to all factors in its matrix but later discarded the matrix because it became very complex and difficult to incorporate economic issues into it.

There were several common points raised in relation to the selection process in general. Staff from both Transit offices commented that the process of selecting the best option is time-consuming and expensive and they would like to improve the process in this respect. However, a positive spin-off of this point is that staff from both Transit offices considered the community to be pleased and accepting of the final decision because the process had been seen to be open, honest and thorough.

Transit staff interviewed believed that the public directly involved in the selection process would give it a rating of 3 (1 being totally unsatisfied and 5 very happy). This assumption appears to have been correct for the Ahuriri Estuary case study but not for the Albany-Puhoi case study.

There were also common points raised about the Resource Management Act and planning process in general. Interviewees expressed concern at the fact that the planning arena, ie, hearings, did not provide for the general public. The interviewees felt that the hearing was designed to meet the needs of the applicant and they did not understand the amount of time required to present a submission. The status of designations was also an issue which interviewees wished clarified or explained.

5.4.2 Differences

There are only two differences between the two case studies. These differences are very important because they illustrate whether the evaluation process was accepted by the public directly involved.

The interviewees of the Ahuriri Case Study considered Transit to be open in its approach but, in contrast, the Consultative Group for the Albany-Puhoi case study considered Transit to be closed and were very suspicious, sceptical and generally unsatisfied with the process. The level of dissatisfaction for the process appears to be related to whether Transit was considered to have an open or closed attitude towards the final outcome. Interviewees of the Ahuriri Estuary case study gave the process a rating of more than 2.5 whereas the Albany-Puhoi case study process was given a rating of less than 2.5 (1 being totally unsatisfied and 5 very happy).

This raises an interesting point about the effectiveness and appropriateness of directly involving the community in the evaluation of alternatives. Direct involvement of the community was the most significant difference between the two case studies. One involved empowering the community (Albany-Puhoi) while the other merely gave the community an opportunity to be advised and educated (Ahuriri Estuary).

A common and important point made by Albany-Puhi interviewees (which does not emerge out of the Ahuriri case study because of the different technique used) is that the Consultative Group were not happy with the make-up of the Consultative Group and the Chairperson of the Group. Interviewees felt that group members should be more skilled to analyse information and be more representative of the community in general, rather than representative of affected landowners and small pressure groups.

There was an overall unhappiness with the Chairperson of the Consultative Group who was thought to "manipulate the group and persuade them to change" rather than consult. Several interviewees commented that an independent Chairperson could be appointed to guide and assist the Group.

The Consultative Group in general was unsure of its role in the selection process and commented that Transit should explain and establish its expectations of the Group at the beginning of the process.

5.4.3 Discussion

It is interesting to note that the Ahuriri Estuary route selection process had the support of the majority of people interviewed, but many of the trade-off decisions were made behind closed doors. Perhaps the members of the Albany-Puhi Consultative Group had high expectations of their role, felt empowered, but were disappointed when reality did not live up to these expectations.

A further issue worth considering is that too much information may be dangerous. This was identified in the Albany-Puhi case study because the Consultative Group was given a large amount of information, made much more aware of the trade-offs and opportunities which were rejected, and became more knowledgeable in technical areas. Consultation with Iwi (particularly in the Albany-Puhi case study) does not appear to have been given significant emphasis during the selection process. This has been reiterated further in the fact that Transit did not forward contacts from the Iwi group for

interviewing. Although the Ahuriri Estuary selection process included Iwi consultation, the Regional Manager of Transit admits that there is room for improvement with consultation with tangata whenua.

A final issue observed by the interviewer was that the public perception of Transit, central government, local authorities and their decision-making environment could be incorrect.

An element of the interviews not discussed previously is "are the comments made by the interviewees valid or factual?". Many factors can contribute to the way people respond to questions. People have in-built biases, are influenced by their own situation and beliefs, and are subject to political or organisational influence. This complex area of human behaviour is not discussed in this research but the next Chapter analyses the current evaluation process and whether some of the criticisms made by the case study interviewees are valid.

6.0 Critique of the Current Evaluation Process

This chapter criticises the current evaluation process based on the preceding chapters.

6.1 Current Environment

6.1.1 Legislative Framework

6.1.1.1 Resource Management Act 1991

Although the RMA was not specifically written to link with the TNZ Act it does set the environmental boundaries or limits for transport. Transit's latest policy documents on the environment ("Transit New Zealand and the Environment" and "Planning for a Safe and Efficient State Highway Network under the Resource Management Act 1991") use the RMA for this purpose. Through these documents, Transit is using the RMA as intended by the Ministry for the Environment.

6.1.1.2 Planning Consent

In applying for resource consent to designate and build State Highways Transit is required to carry out an assessment of effects on the environment. This assessment (set out in the fourth Schedule of the RMA) should include:

- "(b) Where it is likely that an activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity
- (h) An identification of those persons interested in or affected by the proposal, the consultation undertaken, and any response to the views of those consulted"

Both these requirements (but particularly (h)) do not allow for assessment of whether the steps taken to consider alternatives, or the consultation process were, effective, appropriate and fair. Submissions lodged in objection to or support of the proposals may imply the effectiveness of the evaluation process. However, submissions are

normally made by a vocal minority, or people directly affected by the proposal, rather than the population as a whole.

Applicants (in this case Transit) should be required to detail the consultation and evaluation processes undertaken to select the "best route". They should also be required to provide evidence of an independent review of the process.

Transit, as a "requiring authority" under section 166 of the RMA is required to recognise Sections 6, 7, and 8 when exercising its powers and functions under the RMA. These sections relate to:

Section 6

Matters of national importance include recognising and providing for the preservation of the natural character of the coastal environment; protecting outstanding natural features and landscapes; areas of significant indigenous vegetation and habitats of indigenous fauna; maintaining and enhancing public access to and along the coastal marine area; and recognising and providing for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.

Section 7

Other matters which include Kaitiakitanga; amenity values; intrinsic values of ecosystems; and heritage values.

Section 8

This section requires that the principles of the Treaty of Waitangi be taken into account in relation to managing the use, development, and protection of natural and physical resources.

Both case study evaluation processes attempted to address the issues in Sections 6 and 8 of the RMA, but interviewees felt that Transit had (prior to the consultation process) already decided where to build the motorway and proceeded to mitigate any adverse effects - rather than preserving or protecting natural resources.

Transit (in both case studies) recognised and endeavoured to provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga. The Iwi consulted for the Ahuriri Estuary motorway were quite happy with the final route but would have liked the bridge to be higher to allow for the passage of a waka.

Iwi contacts for the Albany-Puhoi case study were not provided for this study so it is unclear whether they were satisfied with the final outcome. It could be assumed that Iwi concerns were met because they did not formally object to the final alignment.

Some of the matters in Section 7 (RMA) were recognised and provided for in both case studies, namely Kaitiakitanga and amenity values. Intrinsic values were not specifically recognised by either process. Heritage values were not identified in the Albany-Puhoi evaluation process, but could have been considered by members of the Consultative Group under the headings of "neighbourhood values" or "attachment and expectations". It is unlikely that these factors would have incorporated heritage values to the extent intended by Section 7 of the RMA. Interviewees from the Ahuriri Estuary case study did not consider Transit recognised and provided for heritage values adequately, or at the right stage of the process.

If Transit wants to use the RMA to establish boundaries for transport then it also needs to comply with the requirements of the RMA.

6.1.2 Institutional Framework

6.1.2.1 Central Government

Transit New Zealand

Transit has recognised that its current objective "to promote policies and allocate resources to achieve a safe and efficient land transport system that maximises national economic and social benefits" (emphasis added) is inappropriate under the RMA. Consequently new environmental initiatives have been proposed by Transit in its

document "Transit New Zealand and the Environment" (1993) but only those relating to social disruption discuss improving the assessment of effects.

In fulfilling its purpose, Transit "seeks to safeguard the environment" (Transit New Zealand, Transit New Zealand and the Environment 1993). Although the purpose of the RMA is to "promote sustainable management of natural and physical resources", Transit has chosen to take a lesser stance of maintaining and preserving rather than promoting sustainable management. This is reiterated by the statement from Dunlop (Transit New Zealand, Transit New Zealand and the Environment, 1993) "Transit New Zealand is committed to managing existing resources relating to land transport in a way that is sensitive to environmental issues" [emphasis added].

In both case studies, land transport will impact on the natural environment and human well-being of the community within the transport corridor. Interviewees (particularly of the Ahuriri Estuary project) commented that they were not convinced that a motorway was necessary to save three minutes of travel time. In this case, it is obvious that Transit has considered the national viewpoint ahead of impacts on the environment. The appropriateness of this national viewpoint needs to be reviewed.

Communities affected by a State Highway proposal may not be given appropriate consideration by Transit because of this national objective. This issue was raised by several interviewees whose view was that Transit or government was "a big machine rolling forward" that couldn't be stopped. Although funding for State Highway projects is derived from taxpayers, it is the specific community which faces direct impacts such as the loss or damage to a wetland, and increased noise pollution.

Transit's new environmental initiatives need to be expanded to take a more proactive approach in promoting sustainable management.

Transit New Zealand Funding

The selection of options which meet the "cut-off" Benefit cost ratio may not sustain the natural and physical environment because, by maintaining the CBR, the level of

avoidance or mitigation of adverse effects on the environment is manipulated. This was illustrated in both case studies, where some impacts were only avoided if they did not result in the project costs lowering the BC ratio below the present cut-off level. The public (particularly those affected by or interested in the Ahuriri Estuary project) were well aware of this situation and commented that for the additional cost of lessening impacts on the Estuary (and possibly jeopardising the construction of the motorway because it might increase the CBR above the cut-off level) the crossing should be fully bridged.

The fact that Transit's funding is derived nationally means that any shortfall of national funds can affect the viability of local projects. This problem was demonstrated during the Ahuriri Estuary project when a nation-wide 20% cut in Transit funding was announced. This cut stopped the consultation and selection process in mid-stream and lost valuable ground in educating the community. The Regional Manager of Transit Napier commented that this would be one measure which should be improved in the future, ie, ensuring that funds were available for the project at the outset. This reinforces the need for a local/regional body to have control over roading funds.

Ministry for the Environment (MfE)

More specific and detailed involvement by MfE in the evaluation of roading projects may be inappropriate because mainly local and regional issues are involved. It is interesting to note that although the Ahuriri Estuary was considered to have national (if not international) significance, the Ministry was not called in under s140 of the RMA. Perhaps the Ministry should have called in the project because the most significant and contentious impact was on the Estuary.

6.1.2.2 Local Government

Regional Councils and Territorial Authorities have very little (if any) control over the process of selecting the "best route". Their only recourse is during the planning application phase.

Regional Land Transport Committees (RLTCs)

Regional Councils can rank projects within the Regional Land Transport Programme. However, this appears (on questioning the four main regions) to have been taken over by Transit which chairs the meetings and obtains comments, rather than a recommendation from the Regional Land Transport Committee.

In many cases it is not the full Regional Land Transport Committee that meets with Transit to discuss priorities, but representatives from the Committee and staff. At this meeting, the cost benefit rankings have already been set by Transit and are discussed for confirmation. This is contrary to the current legislation which gives Regional Land Transport Committees the power to recommend to the Transit Authority a Regional Land Transport Programme for the following financial year.

Regional Policy Statements (RPS)

The Regional Policy Statements produced by the two case study regions illustrate two different approaches to the issue of land transport. Hawke's Bay Regional Council (HBRC) includes land transport as a "land use development and protection issue" made up of two parts:

- (a) "efficient and effective development of land transport; and
- (b) adverse effects of land transport activities on the environment" (HBRC, 1994).

The Statement discusses the need for roading hierarchies and comments that the Council's Regional Land Transport Strategy will deal with issues relating to land transport. No mention is made of policies to address the evaluation of environmental issues, but the Statement does mention that "policies and plans will ensure the maintenance and enhancement of the State Highway roading infrastructure in a planned and integrated manner" (HBRC, 1994).

In contrast, the "Proposed Auckland Regional Policy Statement" has a separate chapter on transport. Transport issues and policies discussed relate to "minimising the adverse

effects of transport on the environment and enabling the accessibility needs of all groups in the community to be met" (Auckland Regional Council, 1994).

To achieve these policies, the Council proposes to prepare a Regional Plan "to show the transport network required to support the preferred form and pattern of urban development the Regional Plan and RLTS will establish criteria for the evaluation of projects" (ARC, 1994, emphasis added). This proposal is encouraging, but is contrary to the intentions of the RMA because it is attempting to plan transport through the RMA.

Regional Land Transport Strategy (RLTS)

The HBRC's RLTS is fairly general but includes the objective: [to achieve] "a sustainable land transport system which minimises adverse effects on the environment" (HBRC, 1994). The Strategy does not discuss the process of evaluating environmental issues but is consistent with its RPS.

Auckland's RLTS is naturally of a larger scale than Hawke's Bay's and contains various policies relating to the evaluation of roading projects. Specifically its policies include:

"Policy 4.4: Develop criteria for evaluating and prioritising proposed network improvements.

Implementation Policy 1: Support the establishment of a firm national basis for the management of the land transport system. This policy includes an implementation method of 'requesting Transit New Zealand to remove the bias in the choice of transport investment through developing better procedures to value the environmental and social benefits of projects, and investigating the use of lower discount rates for projects of long term strategic significance'" (ARC, 1993, emphasis added).

Although these policies are stronger than those contained in the HBRC RLTS, and are consistent with the ARC's RPS, they are not specific in detailing the Council's criteria

and principals for valuing environmental issues. Transit has had numerous requests to remove this bias (referred to in Implementation Policy 1) but has taken some time to respond proactively.

6.1.3 The Agency Responsible for the Evaluation Process

This is a difficult question because State Highway roading projects contain elements of local, regional and national issues. All three are important, but the present evaluation process places a disproportionate amount of emphasis on the national viewpoint. After all, although State Highway roading projects are funded nationally from the public purse, the local community are generally the losers (as a result of property loss, increased traffic noise, etc) and the regional and national community the winners.

Therefore the agency in control of the evaluation process should have a local or at least regional focus. Input would still be required from a national perspective because roading projects do include national and global impacts such as carbon dioxide emissions. An appropriate mix of local, regional and national representatives is required which could be obtained through the already established Regional Land Transport Committees.

6.2 Current Evaluation Practice

6.2.1 Project Evaluation Manual (PEM)

During the pre-evaluation phase, value judgements are made by the evaluators. These judgements determine the possible value of intangible factors for a project, and how they may affect the viability of a project. These early value judgements are open to interpretation and there are no established criteria for auditing them or the effectiveness of the public consultation process. Inconsistencies and incorrect judgements may result if they are not documented and open to independent review.

Significant effects on the environment could be identified at an earlier stage and appropriate investigations undertaken which could result in a project not progressing

any further. The PEM appears to take intangibles for granted during the initial pre-evaluation phase by giving them a very cursory investigation.

The Project Assessment phase appears to suffer from the same limitation in that only "general impacts" (PEM, 1991) are evaluated. It was observed from the case studies that interviewees believe that intangibles have been taken for granted in the past and, although the process has improved, there is still a long way to go.

The PEM gives no guidance on addressing impacts of a temporary or permanent nature apart from providing for duration issues to be identified in the Planning Balance Sheet "where relevant". The PEM does not explain this statement nor who decides what is relevant.

Although the PEM identifies measurable intangible factors, there is no mention of factors such as the loss of wetlands or native bush nor impacts on intrinsic or cultural issues. In a recent update of the PEM, processes for valuing carbon dioxide emissions and dust on agricultural land have been included, but more work is required on the aforementioned issues.

Transit is undertaking a major review of its PEM with a view to implementing the final version in 1996. This would be an appropriate time to address the issues discussed in this study.

6.2.2 Compliance of Case Studies with the PEM

As required by the PEM, both case studies employed specialists to assess significant intangible effects. For projects of major impact the PEM requires opinion surveys to be undertaken but the PEM does not specify what it considers "major impacts".

The case studies did not specifically undertake opinion surveys, but a scoping report was circulated (for comment) to residents within the vicinity of the various options for the Albany-Puhoi case study. This report would have provided Transit with public

opinion, but not a statistical analysis of these opinions. Because the report was circulated to a selected group of people, its findings would not be representative of the population. Selective surveys (or requests for comment) tend to capture only the views of the vocal minority, whereas well-designed opinion surveys can be very effective in obtaining the community's values.

The Ahuriri Estuary case study attempted to obtain the opinions of the public by circulating the Environmental Impact Assessment Report and Scheme Assessment. However, like the Albany-Puhoi case study, they were circulated only to selected groups for comment.

Both case studies were selective in obtaining public opinion. The PEM is not specific about the extent of any survey boundaries. This needs to be clarified.

6.3 Valuation and Evaluation Techniques used in the Case Studies

6.3.1 Valuation Techniques

Neither of the two case studies used direct valuation techniques to value intangible factors. The Auckland and Napier Transit Regional Managers were not asked to explain, but this could have been due to resource constraints (time and financial), and the view that the public would see the process as more honest and transparent if their values were not monetarised.

Both projects used a combination of indirect monetary and non-monetary techniques to determine community values.

6.3.1.1 Indirect (Monetary) Valuation Techniques

Ahuriri Estuary

Mitigation and shadow project costs were used to a limited extent to ascertain community values in the Ahuriri Estuary case study. These were not specifically

provided to the public. Instead, when issues were raised during public meetings, pre-hearing meetings and submissions, Transit would outline the mitigation measures available within the financial limits of the CBR cut-off level.

One environmental group from the Ahuriri Estuary project commented that Transit had offered to establish a replacement bird-life habitat, but the group did not consider this to be a realistic option. Once again, the costs of establishing shadow projects were not specifically presented to the community with the intention of determining community values.

Albany-Puhoi

It was not clear during the Albany-Puhoi interviews whether mitigation costs were presented to the community. Mitigation measures were discussed with the Consultative Group when assessing how impacts could be lessened. It does not appear that the community was given the opportunity to comment on the costs of various mitigation measures. The costs of shadow projects were not discussed by Transit during the case study interviews.

In both case studies it may have been useful to give the community details of the costs of mitigating any adverse effects on environmental factors so that they could assess the values that they placed on these factors.

6.3.1.2 Indirect (Non-Monetary) Valuation Techniques

Both case studies used a form of impact matrix. Scores were aggregated for each option and the matrix was used essentially as an evaluation technique because it included the impact, size of impact and importance or weight of the impact.

An indirect valuation technique such as Focus Groups or Attitude Surveys would have provided a basis for discussion and a grounding for the Consultative Group to base its matrix scores on. Neither of these techniques were used, apart from in public meetings, which were a type of informal Focus Group.

6.3.1.3 Environmental Values

Environmental values were measured during both case studies, but this measurement was not explicit and not necessarily consistent across all groups or individuals involved in the selection process. The values were only considered for select groups: interest and environmental groups; the Consultative Group; and the community within the vicinity of the transport corridor.

6.3.2 Evaluation Techniques

6.3.2.1 Non-monetary Evaluation Techniques

Ahuriri Estuary

A matrix was developed for the Ahuriri Estuary project but weights were not provided by the community. Transit Napier agreed with Mitchell (1989) that impact matrices can be used as a checklist to identify impacts that need to be evaluated. Because of the disadvantages of these matrices (as discussed in Section 2.6.3.2) Transit Napier used the matrix merely as a presentational tool for themselves and their Consultant.

There may not have been any benefit in presenting the results of the matrix to the community because the majority of interviewees were happy with the process and outcome. However, it would have been interesting to compare the values placed on factors by Transit with those of the community, either through public meetings or attitude surveys.

Albany-Puhoi

In contrast, the matrix developed for the Albany-Puhoi case study sought to determine community values with a Consultative Group scoring each issue, and evaluate options at the same time. The disadvantages of impact matrices previously discussed are applicable to the Albany-Puhoi case study, but because the scoring process was undertaken in a public and open manner, the disadvantages are much more apparent.

The Consultative Group felt that weights would distort the issues, although some members requested weights when the outcome was not what they wanted.

The Consultative Group was given a large amount of information on which to base their scores. The majority of interviewees thought the scoring process was too complicated, involved too much information and that many people in the group did not understand the process or its implications.

The main reasons why interviewees thought the evaluation process was complicated was that they were asked to assess the effects on factors they were not knowledgeable about. For example, one interviewee commented that he was not familiar with an area which he was being asked to score so he travelled specially to the site to gain some knowledge about what he was scoring. This was not a common action. A further comment compounding the perceived complexity of the scoring task was that because the Group members were not technically proficient, they were unable to distinguish between correct or biased advice.

Neither case study's evaluation technique accounted for impact duration. This is an important issue because it can affect the significance of impacts ie. a major impact of short duration may be less significant than a medium impact of long duration.

6.3.2.2 Monetary Evaluation Technique

Cost Benefit Analysis was used in both case studies but in neither study was the calculation of a Planning Balance Sheet documented.

6.4 Analysis of Evaluation Techniques used in the Case Studies

6.4.1 Ahuriri Estuary Case Study

No specific evaluation technique was used for the Ahuriri Estuary motorway project (although a matrix was developed but then discarded), so it is difficult to analyse the process under the four evaluation objectives discussed in Section 3.1. However, overall

the process did: recommend a preferred project option; allow different options to be compared; and was understood by interested parties. The strengths of this process (and how they were attained) should be maintained in any "ideal" evaluation framework.

The Ahuriri Estuary evaluation process did not meet the evaluation objectives by not maximising the amount of directly-comparable information. Critical trade-offs were discussed at public meetings in the form of, eg, if bird-life is to be protected then it is not possible to have a full length bridge because it would shift the BC ratio below the present funding cut-off level. Some trade-offs might not have been discussed with the public if they had not been raised at public meetings or in submissions, and therefore were made by Transit and its Consultant.

The Ahuriri Estuary evaluation process did promote better understanding and enabled decision-making by producing results which assisted the decision-makers. However, it is questionable whether the Ahuriri Estuary evaluation process consulted in accordance with the true meaning of consultation as discussed in Section 6.4.5.

6.4.2 Albany-Puhoi Case Study

The following detailed analysis of the Albany-Puhoi evaluation process is possible because an overt evaluation process was undertaken.

Objective 1: The identification of a preferred project option

This objective was met because the lowest scoring option was recommended to the decision-makers (Transit and the Consultative Group) as the preferred alternative.

Objective 2: The establishment of a common comparative framework

This objective was met (for the most part) because different options were able to be compared using the scoring matrix. Each matrix scored options in respect of set criteria, using a common scale, thereby identifying the trade-offs between issues. However, the matrix itself did not easily allow examination of the trade-offs. Discussions would need

to be held with the Consultative Group, Transit's Consultant, and the Technical Group to ascertain the background and justification for each score.

Objective 3: Transparency

The scoring process was not easily understood by the Consultative Group because of the complex nature of the issues being scored, and the fact that many of the Group had no prior specialist knowledge of particular issues, eg, sites of cultural value. Although the process of determining scores was complex, the result is reasonably transparent to readers. Using this process the "best" option could stand up to rational debate (if the whole matrix was presented) because the trade-offs would be explicit for each factor. An explanation to justify each score would still be required, because this is not evident from the matrix sheet.

Objective 4: Maximise directly-comparable information

The scoring process met this objective.

Overall, the evaluation technique used for the Albany-Puhoi case study was more successful in meeting the objectives of evaluation, the most significant difference being that all options were able to be directly compared. However, it is interesting to note that the overall response from interviewees was that participants in the Ahuriri Estuary selection process were more satisfied than those involved in the Albany-Puhoi process.

The positive features of the Ahuriri Estuary process were the amount of information provided to the community and the level and timing of the public consultation. The negative features were the lack of public ownership, a less transparent process and the use of undocumented value judgements. The Albany-Puhoi process went some way in avoiding these negative features but failed to achieve the positive features of the Ahuriri Estuary process.

6.4.3 Decision-making Process

The final route chosen for the Ahuriri Estuary was not based on the results of the matrix because it gave a vastly different result from what Transit (and from Transit's point of view, the public) decided was the preferred route. The preferred route from the matrix (the route having the least impact) was a route close to the current designation. This route would have had less impact on the Estuary but more impact on the Airport. The final decision for the Ahuriri Estuary alignment was undertaken "behind closed doors" by Transit and its Consultant, taking into consideration the submissions made by the community and interest groups.

There are conflicting statements on how the final route was chosen for the Albany-Puhoi case study. The majority of Consultative Group interviewees commented that their scores were manipulated and they were persuaded to change their scores to reflect those of the Technical Group. However, some Transit interviewees (and the Principal Consultant) considered that the recommendations of the Consultative Group were accepted.

6.4.4 Decision-makers

Transit made the final route decision for the Ahuriri Estuary project based on comments and submissions from the public; whereas the final decision (from Transit's point of view) for the Albany-Puhoi case study was made by the Consultative Group (representing the community), the Technical Group and Transit. Consultative Group members have a different view from this and believe that Transit made the decision by "persuading" the Consultative Group to agree with the Technical Group's recommendations. This difference of opinion is discussed further in Section 6.4.5.

The question of who should make the final decision relates back to the agency controlling the evaluation process. If the consultation and evaluation processes are effective, then, to some extent, it is irrelevant who makes the final decision because this decision would be supported by the stake-holders. However, because external pressures can influence the consultation and evaluation process, eg, politics, in reality it is very

difficult to achieve a truly effective consultation and evaluation process. Therefore the agency making the final decision must be in a position to take on board all concerns and issues and come to a fair and equitable decision.

The agency to make the final decision, to have any effect, must also be in control of the funding for the project. Therefore the present funding regime is inappropriate if the final decision-maker is to be at the regional or local level.

6.4.5 Public Consultation Process

Maori interests are required to be considered (under Section 27 of the TNZ Act) when including projects in district or Regional Land Transport Programmes. Local authorities responsible for the project are required to consult every Iwi or hapu "that in the opinion of the local authority will or may be affected by the project, and the local authority is satisfied after such consultation that the project should proceed". Consultation with tangata whenua and the investigation of areas of historic value are "taken account of in the design of the project" (TNZ, Transit New Zealand and the Environment, 1993).

Transit proposes to "consult more effectively with Iwi authorities and give more recognition to the significance to communities of heritage conservation" (TNZ, 1993).

When applying for planning consent, Transit (as an applicant) is required (under the fourth schedule of the RMA) to undertake consultation. Neither the RMA nor TNZ Act define the term "consultation". However, under the first schedule of the RMA a recent decision outlines:

“what amounts to consultation:

..... For consultation to be meaningful, there must be made available to the other party sufficient information to enable it to be adequately informed so as to be able to make intelligent and useful responses. If the party having the power to make a decision after consultation holds meetings with the parties it is required to consult provides these parties with relevant information and with

such further information as they request, enters the meetings with an open mind, takes due notice of what is said and waits until they have had their say before making a decision, the decision is properly described as having been made after consultation" (Resource Management Act, 1991, A16-8 (23/5/94) emphasis added).

From the findings of the case studies, in particular the Albany-Puhoi project, Transit did not undertake proper consultation as described above because the Consultative Group was not provided with relevant (or accurate) information; Transit did not provide the Group with further information they requested, ie, analysis of alignments which were identified as worthy of further consideration; and (in the Consultative Group's view) Transit did not have an open mind. Transit were felt to have listened to the concerns of the Group, but the majority of the Group considered that a decision had already been made prior to the start of the consultation process, and the "consultation" was merely to persuade or manipulate the Group to agree to this decision.

This is an interesting outcome because Transit Auckland made a significant attempt to empower the community and have them "seen to be making the decision on the final route". In contrast, the community affected by the Ahuriri Estuary motorway did not have high expectations of consultation and were more satisfied with the selection process than the Albany-Puhoi interviewees.

The aforementioned definition of consultation appears to leave the final decision with the decision-maker, which is not what the Albany-Puhoi case study attempted to do. This raises the issue of what is appropriate consultation, ie, should the community be involved in the decision to the level of the Albany-Puhoi case study, or would it be more effective to carry out consultation as defined in the 1st Schedule of the RMA?

Members of the Albany-Puhoi Consultative Group were empowered because they were given the opportunity to be involved, their knowledge was extended considerably, and they were given the impression of having influence (and therefore an important role) over the final decision. However, the problem with this process was that the power was

not redistributed to members of the Consultative Group. The final decision-maker was still Transit.

Arnstein (1969, p216) comments that "..... participation without redistribution of power is an empty and frustrating process for the powerless. It allows the power-holders [in this case Transit] to claim that all sides were considered, but makes it possible for only some of those sides to benefit".

Arnstein (1969, p40) has developed a ladder of citizen participation which is based on the level of redistribution of power from "the haves to the have nots". The ladder (shown below as Figure 4) has eight rungs and ranges from citizen control down to manipulation.

8. **Citizen control:** Citizens govern a program or an institution, take full charge of policy and managerial aspects, and are able to negotiate the conditions under which "outsiders" may change them.
7. **Delegated power:** Citizens achieve dominant decision-making authority over a particular plan or program.
6. **Partnership:** Citizens negotiate and engage in trade-offs with the power-holders.
5. **Placation:** Citizens advise but the power-holders continue to make the decisions.
4. **Consultation:** Inviting citizens' opinions with no assurance that these will be taken into account.
3. **Informing:** Citizens are informed of their rights, responsibilities and options without providing any channel for feedback.
2. **Therapy:** Citizens engage in extensive activity, but the focus is on changing their perceptions of the planning authority, such that they would eventually support the authority.
1. **Manipulation:** Citizens are invited to participate in order to "educate" them or engineer their support.

Figure 4 : Eight Rungs on a Ladder of Citizen Participation

Source: Arnstein, 1969, p40.

When comparing the two case studies it could be assumed that the interviewees of the Ahuriri Estuary project would have placed the selection process somewhere between rungs 4 and 6. The Ahuriri Estuary selection process contained elements of all these three rungs. It is expected that Transit Napier would give the same range.

The Albany-Puhoi case study differs in that it could be assumed that interviewees would have placed the selection process between rungs 1 and 2, but there were a large number of comments (up to half the interviewees) who felt that they were manipulated. From Transit Auckland staff's comments it could be construed that they would place the process between rungs 4 and 6.

The outcome of these anomalies is twofold:

- i is the right or appropriate meaning of "consultation" being implemented by Transit? and
- ii does the public have the appropriate expectation of "consultation"?

The comments from the case studies tend to move towards the view that the Albany-Puhoi consultation process is not true consultation, and it is giving the public false or high expectations of their power over the decision-making process.

Consequently, either of the following steps need to be taken:

- i the definition of "consultation" expanded so that power is redistributed; or
- ii the public advised that they have misunderstood the meaning and purpose of "consultation".

It is important that the definition of "consultation" is clarified because with the introduction of the RMA the public have a "perception" that they have greater control over the decision-making process. However, this perception appears to be incorrect within the current definition.

A further issue which relates to the consultation process is the aspect of small groups versus large powerful groups. This was a common theme throughout the case studies. Transit will need to consider this problem and endeavour to empower small groups in order to ensure that decisions are based on comments or submissions from a fully informed public.

6.4.6 General

A general criticism of the current environment and planning process surfacing from the case studies was that there is a general lack of knowledge about the planning process. Interviewees were unsure of the hearing process (particularly their role during the hearing), the implications of their submissions and the hearing, and the status and implications of designations.

Several interviewees (from the Ahuriri Estuary case study) commented that they felt the planning hearings were focused on the applicant rather than the submitters in that they were at the back of the room with poor audible facilities and the applicant's back to them. Submitters also commented that because many were unfamiliar with presenting submissions at planning hearings, they had no idea of the time required and were not advised of the amount of time they would need to commit to present their submissions. Consequently some of the submitters were unable to present their submissions because of time constraints.

Overall, the public (specifically submitters) should be educated further as to their rights during the planning process and given equal treatment compared to the applicants.

A final general criticism is that there appears to be the need for Transit and other government agencies to educate the public to counter possible misconceptions about central government and the "big machine".

6.5 Improvements to the Current Evaluation Process

From Chapters 2.0, 3.0, 4.0 and 5.0 strengths and weaknesses of current evaluation processes emerge which are the basis for the following criteria. These criteria are in addition to the four evaluation objectives outlined in Section 3.1.

1. Environmental, social and engineering issues should be considered together at an early stage in the process.
2. Institutional, legislative, engineering, environmental and social limitations should be assessed early in the process.
3. Public consultation should be effective, ie, the values of the non-vocal minority should be obtained.
4. The process should be integrated with constant feedback of information.
5. One body should make the final decision based on the recommendations from the community and technical experts.
6. An independent review should be undertaken during and after the process is complete.
7. An independent expert should be employed to guide and advise the community group.
8. All issues should be assessed on the same basis.
9. The process must lead to recommending the "best" option to decision-makers.
10. The decision and evaluation process must gain community acceptance and ownership.

6.5.1 Specific Evaluation Process Improvements

By combining the positive aspects of the Ahuriri Estuary process with those of the Albany-Puhoi process the following changes could be made to produce an "ideal" evaluation framework:

Consultation

- i Consult the community (including Iwi) at an early stage in the process, ie, before it is perceived that a decision has been made to build a new State Highway.

Community Group

- i Form a group representative of the community by assembling focus groups (during public meetings) to be involved in the evaluation of alternatives.
- ii Ensure that this group is aware of its role and what is expected of it.
- iii Ensure that the community group is capable of understanding the process and information by employing an independent advisor(s) (funded by a separate body). The advisor(s) would ensure that the group was given unbiased information and also ensure that small groups were not dominated by large groups - a principal advisor may be required for this purpose.
- iv Remunerate the community group members for their time and expenses.

Technical Group

- i Form a technical group made up of experts.
- ii Ensure that this group is aware of its role and what is expected of it.

Decision-maker

- i Ensure that the community and community group understand that the body controlling the evaluation process, ie, Regional Council, will consult them but it will make the final decision based on the views expressed by the community and technical groups.

Valuation and Evaluation Techniques

- i Use an evaluation technique which does not require the community group to be technically proficient, ie, Goals Achievement Matrix.
- ii Undertake attitude surveys of the community so that the community group is aware of community values in respect of environmental issues.

Community Ownership of Process and Final Decision

- i Promote community ownership of the process by having the community group present and justify its recommendations to the community, eg, through public meetings.
- ii Document all value judgements so that they are open to rational debate.

Educate and Assist the Community

- i Explain the planning process to the community and community group.
- ii Ensure that submitters are given equal rights to the applicant.

An evaluation framework which incorporates these elements would have the potential to be effective and to be accepted by the community, decision-makers and the public nationally.

7.0 An "Ideal" Evaluation Framework

The following chapter discusses an "ideal" evaluation framework for evaluating State Highway roading projects. This framework has been developed on the basis of preceding chapters, with particular emphasis on Chapter 6.0, Sections 6.5.1 and 6.5.2.

7.1 Institutional and Legislative Framework

Chapter 6.0 highlighted the weaknesses in existing legislative and institutional frameworks. This section synthesises these weaknesses and recommends two "ideal" Legislative and Institutional Frameworks for evaluating State Highway roading projects. The legislative and institutional frameworks are inter-linked, as shown in Figure 5.

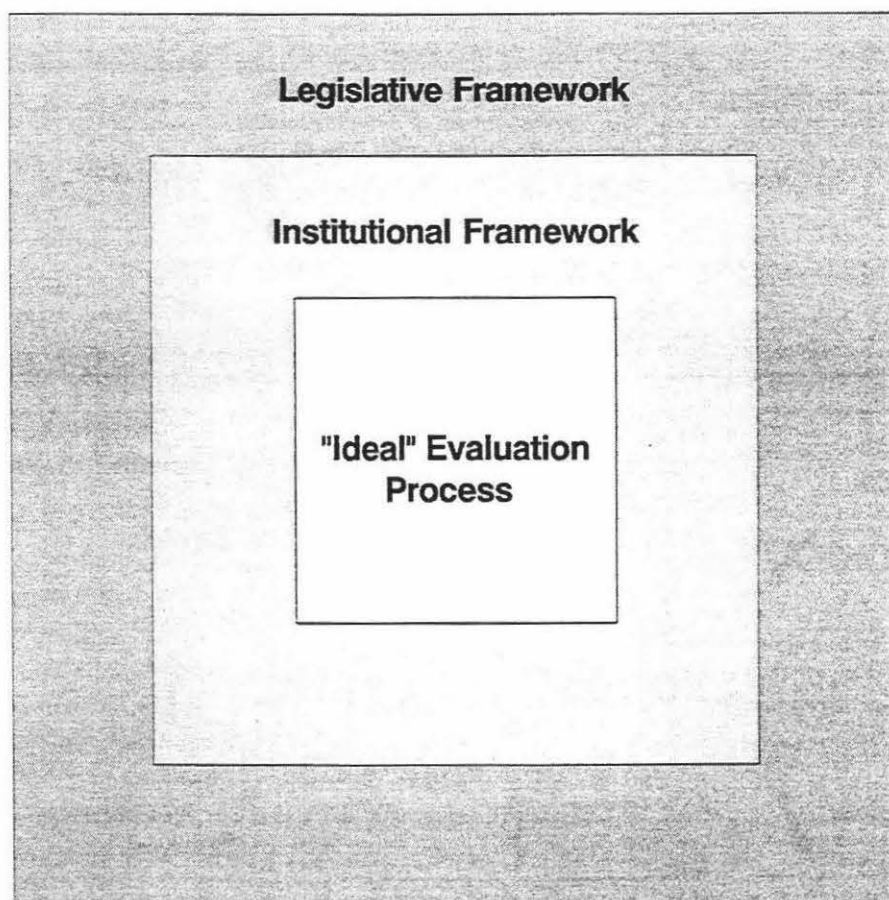


Figure 5: Inter-linking of Legislative and Institutional Frameworks

Figures 6 and 7 detail the two "ideal" legislative and institutional frameworks.

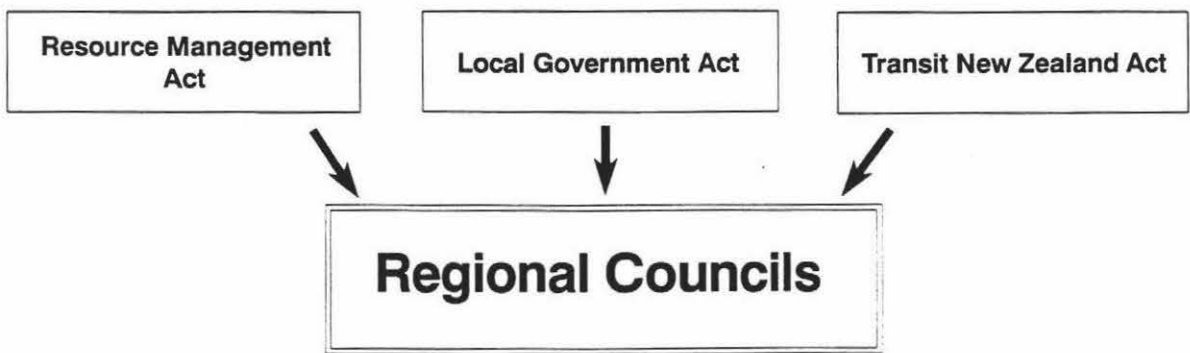


Figure 6: "Ideal" Legislative Framework

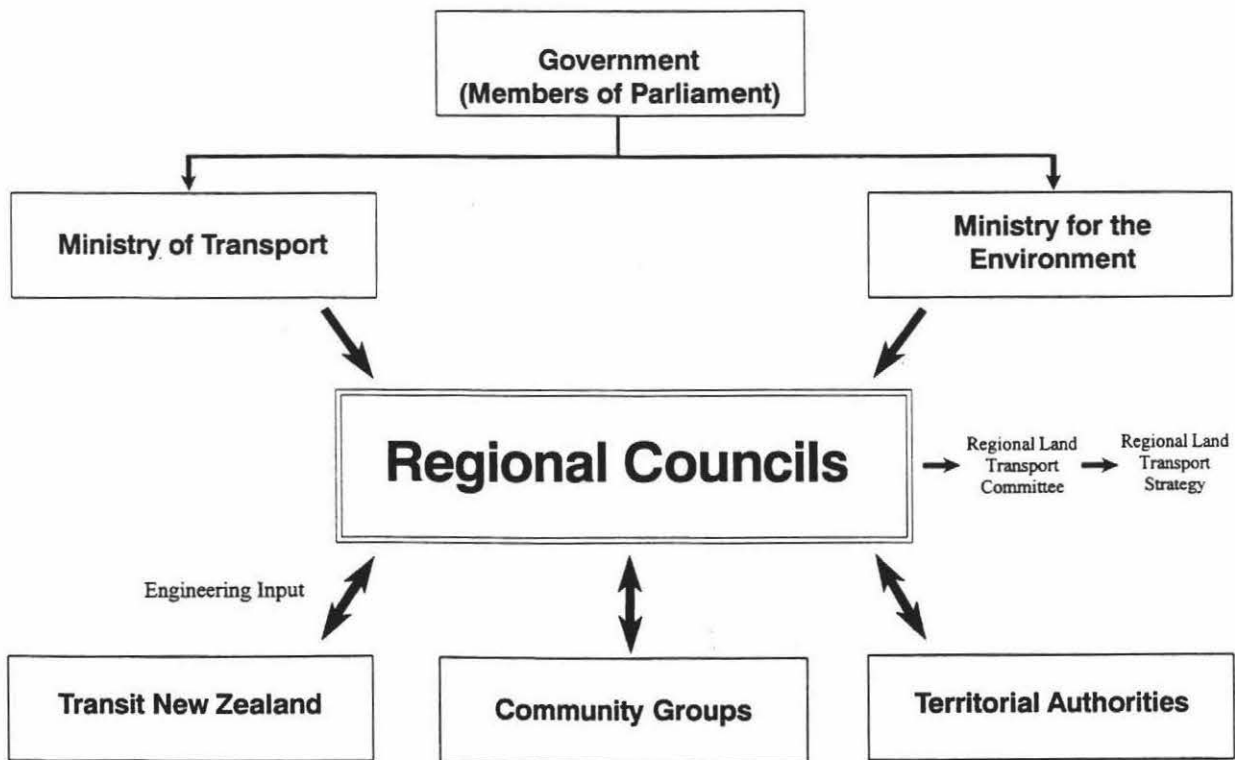


Figure 7: "Ideal" Institutional Framework

As discussed in Chapter 6.0, the current legislative framework within which State Highway roading projects are evaluated is disjointed. There are weak links between the TNZ Act and the RMA which need to be strengthened if the "ideal" evaluation framework is to perform effectively.

The "ideal" institutional framework would have the Regional Council as the central body. Regional Land Transport Committees would then be responsible for the evaluation of State Highway roading projects.

Regional Land Transport Committees are the relevant Committees to decide the final option because they contain representatives of the region's transport groups and representatives of the community, and are accountable to the affected local and regional community. Section 23 of the TNZ Act requires that RLTCs comprise the following members:

- "(a) three members of the regional council, appointed by the regional council, one of whom shall be appointed as chairperson:
- (b) four persons appointed by territorial authorities whose districts are within the region:
- (c) one person, not being a member or employee of any local authority, appointed by the regional council after consultation with any organisation it considers represents private road users in the region:
- (d) one person, not being a member or employee of any local authority, appointed by the regional council after consultation with any organisation it considers represents commercial road users in the region:
- (e) one person appointed by the Secretary (Ministry of Transport):
- (f) one person appointed by the Authority (Transit New Zealand)" (RMA).

State Highway roading project decision-making should be made at the regional level (specifically by RLTCs) rather than at the national or local level. A national decision-

making body furnishes an unbalanced emphasis on national issues compared with local issues. However, because roading projects include national issues, such as carbon dioxide emissions, the decision-making body should include representatives of Central Government. Territorial Authorities would not provide an overview or broad perspective of State Highway issues. Therefore to maintain a strategic focus, Regional Councils should be the decision-makers for State Highway projects.

A further criticism of a national decision-maker is that projects competing for funds nationally are compared with projects from different areas; having different purposes, different issues and different environments. A Regional decision-maker would partially address this anomaly, by decreasing the number of projects competing for funds and comparing projects of a similar regional environment.

Section 84 of the RMA specifies that "local authorities shall observe their own policy statements and plans". Regional Councils could undertake evaluation of State Highway roading projects, lodge an application and give planning approval. To avoid any conflict of interest three steps should be undertaken:

- i the RLTC (or its nominated representative) should undertake the evaluation of alternatives;
- ii the Resource Consents Committee should consider the applications; and
- iii an independent audit should be undertaken of the evaluation process.

Transit would be responsible for the construction and maintenance of the State Highway and would provide technical information to the RLTC.

Funding for the evaluation and construction of new State Highways would be proportionately allocated to Regional Councils from the Government. As the Cost Benefit ratio would not be a deciding factor (under the "ideal" evaluation framework) in what was the "best option", there would no longer be a cut-off benefit cost and funding level. The priority for each regional project would be decided by each region through its RLTC and RLTS.

7.1.1 Resource Management Act 1991

There should be a stronger link to transport by re-defining "physical resource". The present definition of natural and physical resources is:

" ... includes land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced), and all structures".

Structures are further defined as:

" ... any building equipment, device, or other facility made by people which is fixed to land and includes any raft" (Section 2 RMA).

This current definition implies (rather than declares) that roads are structures and hence physical resources.

The definition of "consultation" should be introduced and clarified, the reason being that the community and local government appear to have different concepts of what "consultation" is and who the decision-maker is.

In applying for resource consent, the applicant (the RC) should be required to detail (along with the Environmental Impact Assessment) the planning process undertaken and techniques used to find the final option.

7.1.2 Transit New Zealand Act 1989

With RLTCs as decision-makers and funders, the role of the TNZ Act and TNZ would be greatly diminished. The purpose of the TNZ Act (in this framework) would be to provide TNZ with the ability to make policy decisions about State Highway standards and let contracts for construction.

The practice of discounting within the Cost Benefit Analysis technique is at odds with the RMA which focuses on "future generations". The TNZ Act should be amended to

stress the importance of considering the needs of future generations. Internally, TNZ may need to re-think the appropriateness of discounting.

7.1.3 Local Government Act 1974

The LGA would give Regional Councils the power to undertake the evaluation of State Highway roading projects and make the final decision.

7.2 An "Ideal" Evaluation Process

The "ideal" evaluation process detailed in Figure 8 (next page) is based on the Rational Comprehensive Planning Process (RCPP). This traditional process involves (1) goal-setting, (2) identification of alternatives, (3) evaluation of means against ends, and (4) implementation of decisions (Hudson, 1979).

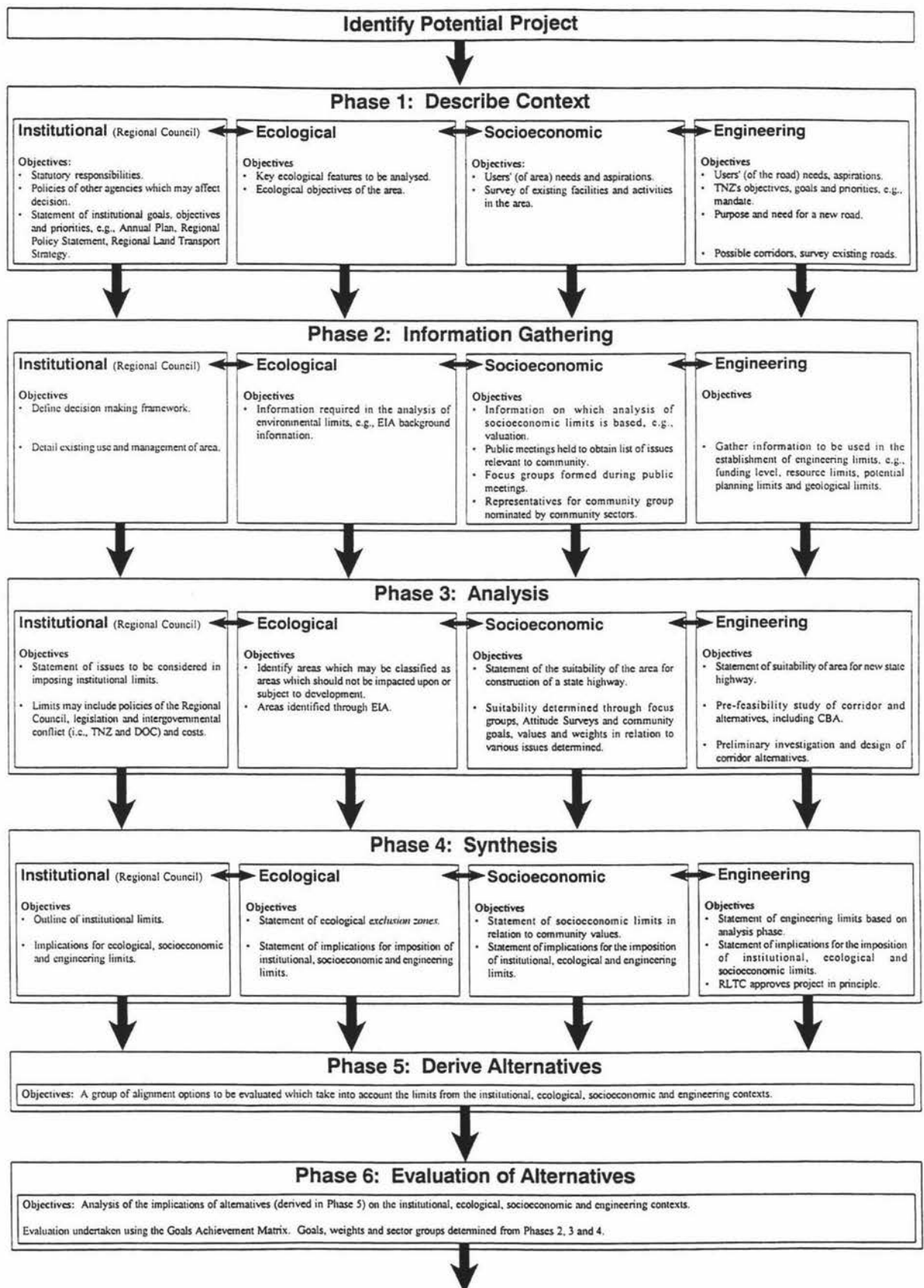


Figure 8: "Ideal" Evaluation Process

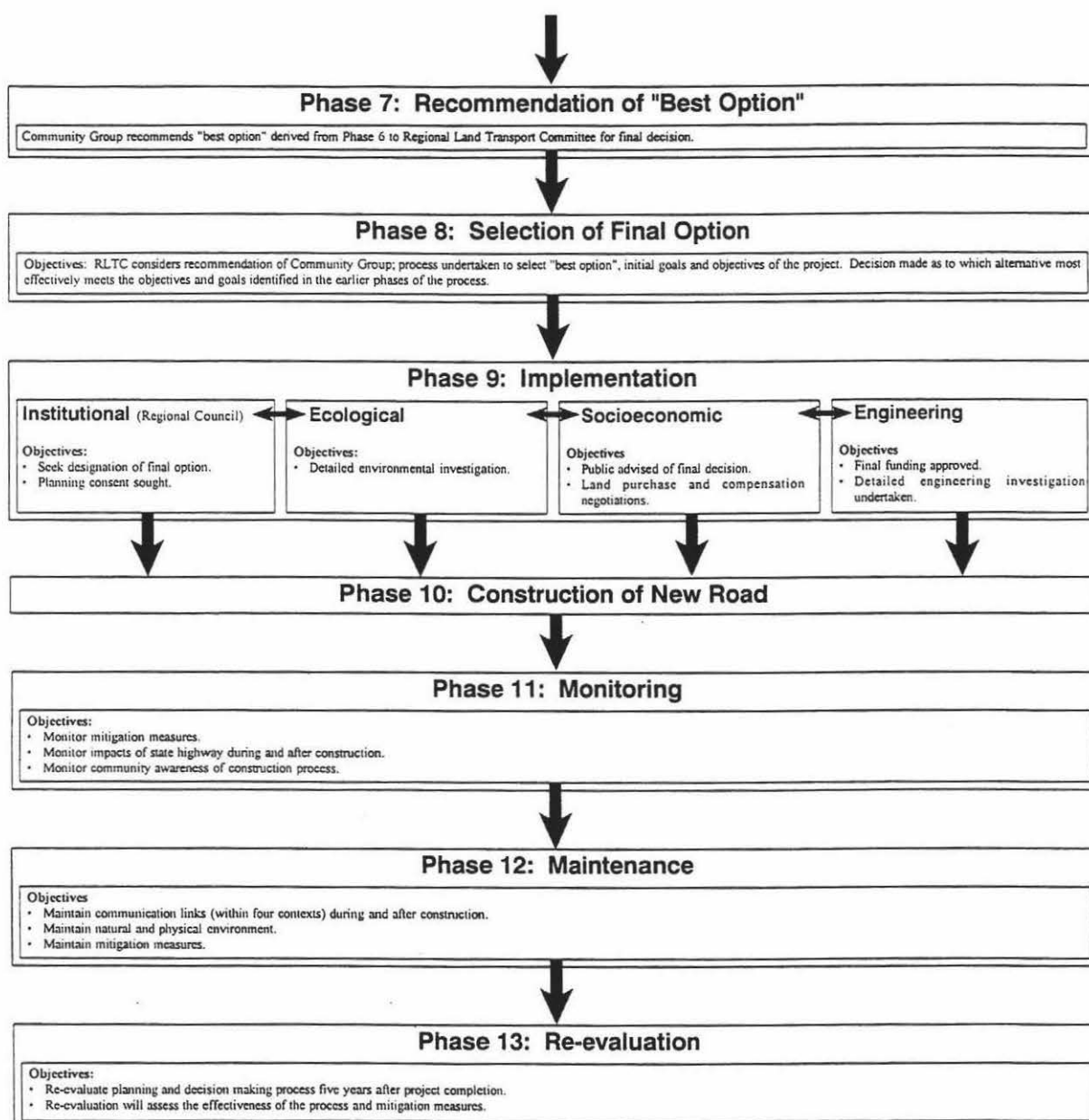


Figure 8: "Ideal" Evaluation Process (continued)

The RCPP is suitable for analysing environmental features (Rosier, 1993) because of its simplicity and the fundamental issues which it addresses, ie, ends, means, trade-offs and actions required for implementation (Hudson, 1979). The RCPP's flexibility allows different processes and techniques to be accommodated within each of the stages of the evaluation. This is particularly useful for the evaluation of State Highway roading projects which can involve impacts from a wide range of contexts, requiring the application of different evaluation techniques.

The RCPP has been modified to incorporate Lang's (1986) ESA (Environmentally Sensitive Area)-Plan process. Engineering aspects and further stages have been incorporated from Moore's Revised Planning Process (Moore, 1988), Transit New Zealand's current process for project assessment and an integrated model of project planning stages developed by Al-Madany et al (1991). The main emphasis on the "ideal" evaluation process is on the RPP and ESA-Plan. The reasons why the RCPP has been modified to incorporate parts of the above-mentioned processes are now discussed.

To achieve the purpose of the RMA (sustainable management) requires an integrated planning process. Such a process must consider all relevant issues concurrently. Al-Madany et al (1991) support an integrated planning process, emphasising that it is important to consider the environmental impacts [together with other impacts] of a proposed State Highway at the initial or conceptual stages of project planning (Al-Madany et al, 1991).

The "ideal" evaluation process achieves this integration by evaluating alternatives simultaneously within four contexts: institutional, ecological, socio-economic and engineering. During each phase of the evaluation, the relationship between the four contexts is considered - hence the horizontal arrows linking each context.

Considering alternatives within the four contexts ensures that all issues are specifically dealt with in the appropriate context, and trade-offs between values and options (between and within each context) are explicit (Rosier, 1993). The "ideal" evaluation process also acknowledges that the processes required to derive institutional, ecological,

socio-economic and engineering limits differ, and therefore need to be considered separately, but simultaneously.

Integration between phases is also achieved through the provision of feedback loops. These loops occur throughout the process, particularly during the first six phases. The benefit of feedback loops is that they provide an opportunity to reassess issues which may not have been considered, or incorporate new information which comes to hand. Figure 9 (next page) identifies possible feedback loops in the “ideal” planning process.

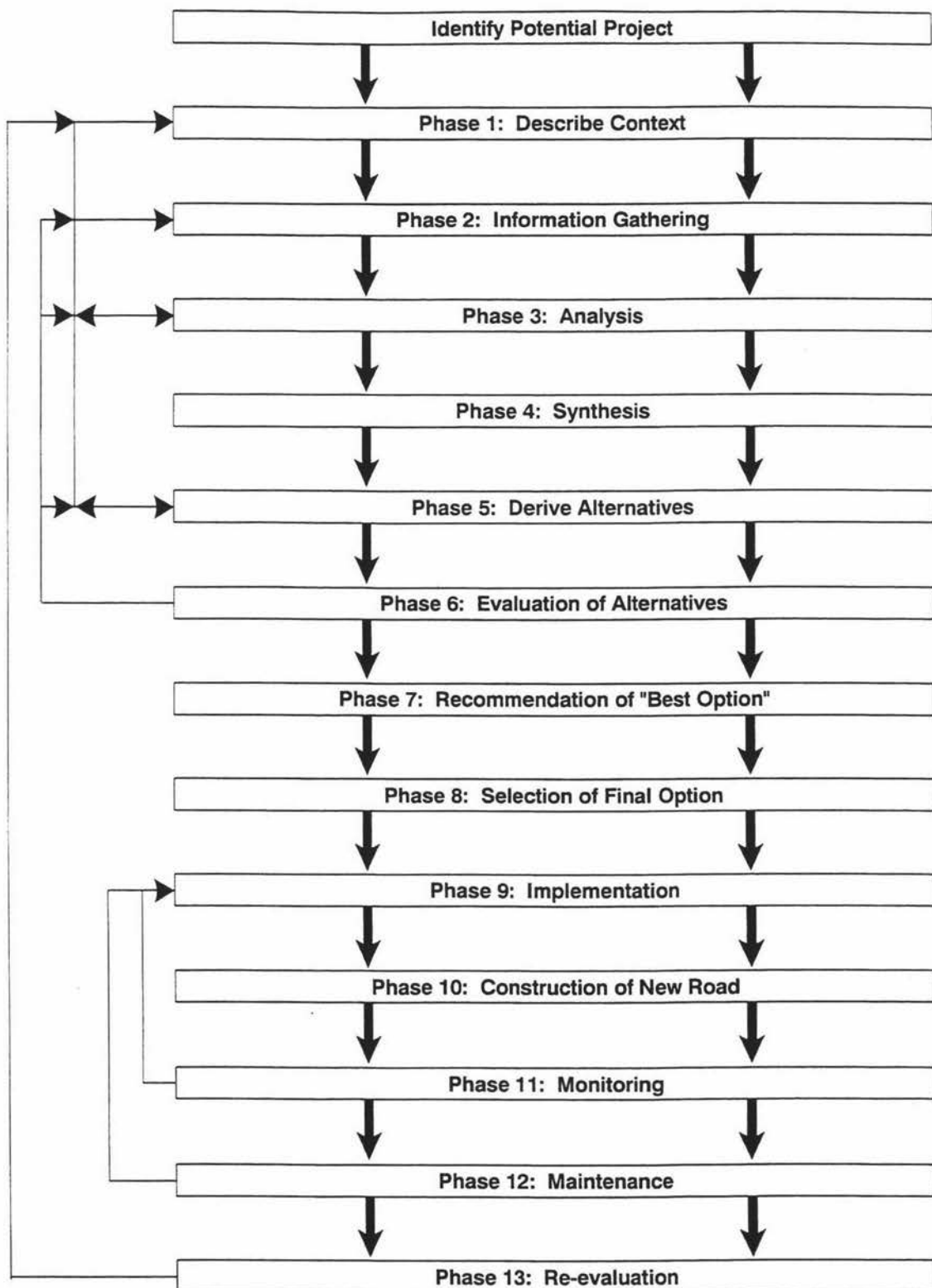


Figure 9: Schematic "Ideal" Evaluation Process

This process achieves the criteria set out in Section 6.5, namely 1, 2 and 4 and also meets some of the suggested improvements in Section 6.5.1.

7.2.1 Process Contexts

Analysis within the Institutional Context (refer to Figure 8) reflects the "political, institutional and managerial constraints which, of necessity, are imposed on all development" (Rosier, 1993, p170). These must be acknowledged if the outcome is to be realistic and achievable.

The limits derived in the Ecological Context relate to the ecological significance of places and how they would be affected by the construction of a new State Highway.

The Socio-economic Context reflects the limits to human use in relation to social and economic well-being. Human use can be affected by a new State Highway during construction, eg, noise, vibration and traffic delays, and after construction, eg, loss or reduction of access to facilities, increased traffic noise, loss of view and fear of the State Highway. The economic consequences of a new State Highway can be significant on the well-being of the affected community. Examples of such consequences are land acquisition and compensation, and the loss or gain of income from businesses within the vicinity of the State Highway.

The Engineering Context identifies the technical limits to constructing a new State Highway which are a vital consideration in the analysis of alternatives.

Linkages between the four contexts result in the sharing of information, particularly when the action in one context may be dependent on the outcomes of another, eg, the actions in the Socio-economic Analysis Phase may be constrained by legislation outlined in the Institutional Context.

7.2.2 Process Phases

Phases 1 to 4 of the "ideal" evaluation process provide the background and justification for the contextual limits identified in Phase 5. These first four phases are essential to the process and must be comprehensive and accurate in their methodology. If aspects of these first four phases are incorrect or insufficiently researched, then the contextual limits from which the feasible alternatives are derived will be erroneous.

Hudson (1979) considers that the Rational Comprehensive Planning Process is not always undertaken in the sequence of (1) goal-setting, (2) identification of alternatives, (3) evaluation of means against ends, and (4) implementation of decisions. However, it is vital in the "ideal" evaluation process that the contextual limits are determined prior to the derivation and evaluation of alternatives.

Transit New Zealand's current process for State Highway projects does not determine limits on the social, economic and institutional contexts prior to evaluating the various alternatives. As a result, significant impacts on the aforementioned contexts may be overlooked during the evaluation phase, or only "mitigated" (as compared to "avoided") after the final route has been decided upon.

Phase 7 involves the Community Group recommending its "best option" to the RLTC. The RLTC then considers the Community Group's recommendation and selects the "final option".

These phases address the criteria set out in Section 6.5, namely 5 and 9.

Phases 9, 10 and 11 then involve the physical construction of the new State Highway. The monitoring and maintenance phases ensure that limits established in Phase 4 are not exceeded, and any conditions placed on the planning approval are adhered to. The maintenance phase also relates to the ongoing maintenance of the State Highway such as re-sealing, the clearing of water tables and weed spraying. Mitigation measures should also be monitored and maintained.

The final phase, Phase 13 involves the re-evaluation of the evaluation process after a five-year period. This important phase is not currently undertaken by Transit - apart from an evaluation of the effectiveness of improvements in relation to the reduction of injury accidents.

These phases address criteria number six set out in Section 6.5.

7.2.3 Phase Format

Five components are considered within each context. The main components are:

- i Objectives of the phase resulting from planning actions;
- ii General Considerations - reminders of the issues and important changes of attitude needed to be considered by the planner in each phase;
- iii Planning Actions - these will vary with each situation;
- iv Type of Information required to carry out the planning action; and
- v Sources of Information (Rosier, 1993).

This research focuses on the evaluation phase of the planning process, therefore components (ii) - (v) have not been discussed in detail but suggested Objectives for each phase have been identified in Figure 7.

Section 7.3 discusses Phases 6, 7 and 8 in detail, on the basis of a case study example.

7.3 An "Ideal" Evaluation Technique

This section details Phase 6 of the "ideal" evaluation framework within the context of the Albany-Puhoi case study. The Albany-Puhoi context has been chosen because it met the majority of the evaluation objectives; was comprehensive; and attempted to gain public ownership of the process and outcome.

The Goals Achievement Matrix (GAM) is recommended as an "ideal" evaluation technique which incorporates environmental effects into the decision-making process. Despite the limitations outlined in Chapter 3.0, the GAM is considered to be "the most rational way to approach a problem" (McAllister in Valdez, 1993) because it establishes a formal procedure for assessing equity issues; includes all impacts (quantified and non-quantified); and emphasises community goals. The Albany-Puhoi case study did not achieve all these outcomes using the impact matrix. The GAM is more effective and less technical because the Community Group assesses goal achievement. GAM also meets the majority of criteria set out in Section 6.5.

7.3.1 Phase 6 - Evaluation of Alternatives

The GAM attempts to determine the extent to which alternatives will achieve a predetermined set of "goals" or "objectives". The progress towards and retrogression from the specified goals or objectives represent the advantages and disadvantages associated with the alternatives (Lichfield, 1975). The following table is a simplified GAM:

		Goal A	Goal B	Goal C
		Weight A	Weight B	Weight C
Stake-holder 1	Weight 1	n=pts (i)xAx1	r=pts(iv)xBx1	u=pts(vii)xCx1
Stake-holder 2	Weight 2	p=pts(ii)xAx2	s=pts(v)xBx2	v=pts(viii)xCx2
Stake-holder 3	Weight 3	q=pts(iii)xAx3	t=pts(vi)xBx3	w=pts(ix)xCx3
	Totals	n+p+q=X	r+s+t=Y	u+v+w=Z
GRAND TOTAL = X+Y+Z				

Table 4: Simplified GAM
Source: Massey University, 1993

Before evaluating the alternatives, several aspects of the goals need to be considered. The following sections discuss these aspects.

7.3.1.1 Determining the Stake-holders

Hill in Lichfield (1975) considers that it is the responsibility of the analyst to identify all the people whose well-being will be affected in some way by a proposal. In this process, elected representatives, eg the RLTC, would decide who the Stake-holders should be from the list identified by the analyst - in this case the Regional Council Planner would be the analyst.

Information gathered in Phase 2 will identify the Stake-holders and how they will be affected by a new State Highway. This information may need to be supplemented by surveys to obtain the views of the "silent majority". The format of the survey is discussed in Section 7.3.1.4.

During Phase 2, Focus Groups would be formed at public meetings. The groups would consist of people from similar backgrounds and interests, eg, ratepayers or environmental groups, who would discuss the State Highway proposal. The aim of these discussions would be to reveal issues of importance to the community, select values, and determine how to describe the issues for the remainder of the community who have not attended public meetings.

As well as an invitation to attend public meetings, the public would be invited to forward written or verbal comments to the Regional Council. This would also assist in identifying Stake-holders and issues.

A Community Group should be formed. This Group would represent the community; assist in all stages of the "ideal" planning process; and make recommendations to the RLTC. The Community Group would be formed during Phase 2 from nominations made by each Stake-holder Group.

Depending on the size of the project, two groups may need to be formed. The first group (Directly Affected Landowners) would comprise directly affected landowners who would be appointed to the group as of right. Membership to the second group (Community Group) would be through nomination as outlined above. Both groups would carry out the functions of the Community Group as described in the following text.

A Technical Group comprising experts in the social, economic, environmental and engineering areas should be formed. This Group would advise the Community Group on their areas of expertise.

Expectations of the Consultative Group differed from those of Transit and its Consultant in the actual Albany-Puhoi case study. Therefore, the role, responsibility and expected outcomes of the two groups should be clearly outlined prior to the Community Group being established. In this study, the role of the Community Group is:

- i to represent and present the views of the community;
- ii to relay information back to the community;
- iii to assist in the evaluation process; and
- iv to recommend the best option to the RLTC.

It must be made clear to the Community Group that the final decision rests with the RLTC.

The case studies found that voluntary groups do not have the resources to be extensively involved in the evaluation process. To overcome this, members of the Community Group should be remunerated for their contribution. This could be a monetary remuneration, contributed by a separate governmental agency, eg, the Territorial Local Authority from which they originate. Alternatively, the contribution of each member could be acknowledged in the final report. To avoid an influx of nominations to the Community Group, the remuneration should cover only the cost of each member's time and any disbursements.

Voluntary groups lacking in resources could also lobby Community Group members. The case studies also found that because of the technical nature of the process and information, an independent expert was considered necessary to assist the Community Group. The appointment of an independent expert is considered appropriate because, overall, the Community Group would consist of "lay people" who would need assistance with technical information. Because of the variety of issues canvassed during the evaluation of State Highway alternatives, several independent experts may need to be employed at different stages of the process.

Funding for the independent expert(s) should ideally be derived from an independent governmental agency. The decision to appoint the independent experts (and who should provide their remuneration) would be made on a case by case basis by the RLTC (in consultation with the Community Group).

The Chairperson of each Community Group should be a Regional Council Planner who would be able to understand the technical issues but at the same time be an advocate for the community.

The views or recommendations of each Community Group would be presented to the RLTC by the Planner (or a representative of the Community Group) for the RLTC to make a specific decision or to resolve conflicts between the Community Groups.

7.3.1.2 Goals

The goals should be based on the information and knowledge obtained from the first four phases of the ideal process. The goals would be categorised under the Institutional, Ecological, Socio-economic and Engineering contexts.

Table 5 suggests goals for the Albany-Puhoi case study. These goals are based on the case study interviews, documentation supplied by Transit, Transit goals, and Regional Council goals.

CONTEXT	SUGGESTED COMMUNITY GOALS FOR ALBANY-PUHOI CASE STUDY
Institutional	Goals/objectives expressed in the ARC RLTS.
Ecological	Protect and preserve the natural character of the area.
Socio-economic	Maintain access, no increase in traffic noise, no adverse effect on visual attributes of the area, maintain lifestyles, and maintain economic businesses. Goals for Directly Affected Group: maintain quality of life, compensate for loss of lifestyle.
Engineering	To achieve a safe and efficient land transport system that maximises national economic and social benefits.

Table 5: Suggested Community Goals for Albany-Puhoi Case Study

Under each goal, objectives would be defined in operational terms in order to measure the extent of their achievement. For example, within the Ecological context a goal for the Albany-Puhoi case study might be to maintain the Orewa Estuary in its current state. The objectives for this goal may be: minimise the loss of fish habitats and ensure that mangrove growth is not affected.

7.3.1.3 Formulation of the Goals

Goals will initially be formulated during the first four phases of the "ideal" planning process. They will emerge from public meetings, Focus Groups, public submissions and Community Group discussions but will only provide a small indication of community goals. Weiner (1972, p130) states that "the most obvious method of determining community goals is by asking the residents to state their preferences through some form of voting procedure".

Attitude or Opinion Surveys should be conducted which ask residents to respond to a series of questions; rank in order of importance a number of factors; or write down what they feel are the most important community goals, by describing the nature of the goals, and the order and magnitude of their importance.

The Community Group should recommend the format of the survey to the RLTC. The reason for having the Community Group recommend the survey format is that the Group will have an understanding of the community's ability to respond to surveys. For the Albany-Puhoi case study, a combination of the aforementioned formats might have been appropriate.

As discussed in Chapter 2.0 Attitude Surveys have drawbacks, but these can be overcome by wording questions very clearly, ie, in a language that the community can understand. This is where information obtained during public meetings, Focus Group and Community Group discussions will be very useful because issues and values will have been expressed by the community.

Weiner (1972) considers that the faults of Attitude Surveys can be partially corrected by random sampling, using trained impartial interviewers. Using both Attitude Surveys and random interviews maybe very time-consuming and expensive - therefore three options should be considered by the Community Group with the preferred option being recommended to the RLTC:

- i Attitude Surveys plus random interviews, or
- ii Random interviews of the community plus the Community Group, or
- iii Attitude Surveys plus interviews of the Community Group.

Of these three options, the most effective (but most expensive) would be (i) with the Community Group being presented with the results of the surveys and interviews, and making a recommendation to the RLTC.

7.3.1.4 Determination of Weights

The next step (prior to the assessment of goal achievement) is the determination of value weights for each goal in terms of its relative importance, and the importance of each goal to each of the Stake-holder groups.

Hill (in Winfrey et al, 1971) comments that the weighting of factors is the key that controls the ultimate conclusion to be drawn from the analysis. Weiner (1972) suggests that a professional planner be designated (from the proper authority) as the "weighting agent" for the community.

In the "ideal" planning process the planner would be designated from the Regional Council and would guide the Community Group in the determination of goal and Stake-holder weights. The starting point for determining these weights would be from the Attitude Surveys and the results from the random interviews.

For each alternative, different weights would need to be determined for the Stakeholders depending on the level of impacts, ie, for option 5C (Albany-Puhoi) landowners might need to be given a higher weighting than businesses because they will be directly affected. Goal weights would also differ for each alternative.

For the first evaluation, the weights should all be set equal, ie, 1, so that the relationships between each goal and Stake-holder can be identified. Then, by altering the weights, the sensitivity of the matrix is tested and trade-offs for different alternatives revealed.

7.3.1.5 Assignment of Goal Achievement

The impacts of alternatives on each goal should be measured in the same units. This will permit an objective comparison between positive and negative impact, and facilitate the comparison of alternatives (Valdez, 1993).

Provided that the aforementioned process is undertaken, along with continual public consultation, and confirmation by the Community Group, consistency in the evaluation of each alternative should be maintained.

The main advantage of the GAM is that it can incorporate tangible and intangible costs and benefits into the evaluation.

For each goal, a benefit-cost account is produced. Depending on the goal and its associated objective, costs and benefits are expressed as:

- i tangible costs and benefits expressed in monetary terms, eg, economic goals - construction costs and land acquisition costs;
- ii tangible costs and benefits which cannot be expressed in monetary terms but can be expressed quantitatively eg. a noise reduction goal - decibels; and
- iii intangible costs and benefits which are noted down, eg, environmental goals - loss of wetland, impacts on sites of cultural significance or visual impacts (Moss, 1979).

In the "ideal" evaluation framework an ordinal scale should be used to measure the achievement of goals in relation to each alternative. The higher the score, the higher the goal achievement. A possible scale would be 0-10 which provides a sufficient range to indicate extremes of goal achievement.

The Community Group, assisted by the Planner and Independent Expert(s) would undertake the assignment of these indicators.

The weighted achievement levels of the goals are summed to give an overall index of goal achievement for each alternative. These indexes are then tabulated against the Stake-holders and goals for all the alternatives.

The Community Group would then present its recommendation (of the "best option") to the RLTC based on this evaluation - Phase 7. The Community Group's

recommendation would outline the trade-offs between the alternatives and why it recommended the particular option.

After the RLTC vote on the final option, Phase 9 would commence.

This "ideal" evaluation framework incorporates the objectives of an evaluation technique; the criteria for an effective process; and suggested improvements discussed in Chapter 6.0.

8.0 Conclusions and Recommendations

8.1 Key Findings

8.1.1 Review of Valuation and Evaluation Techniques

This study has established that indirect non-monetary valuation techniques and non-monetary evaluation techniques are the most appropriate and effective methods of incorporating environmental issues into the evaluation of State Highway roading projects.

The community are more likely to accept values obtained from non-monetary valuation techniques such as Focus Groups and Attitude Surveys. Non-monetary evaluation techniques address the weaknesses of monetary and semi-monetary techniques because: comparison of options is explicit; all issues are considered in an integrated manner; and issues are assessed on the same basis. Both these techniques also involve significant input from the community.

The Goals Achievement Matrix (GAM) has advantages over other evaluation techniques and is recommended as an appropriate technique to incorporate environmental issues into the evaluation of alternatives.

8.1.2 Evaluation of State Highway Roding Projects in New Zealand

At present a Central Governmental body, Transit New Zealand, controls the evaluation of State Highway roading projects. This body is not representative of the affected community and has a national (rather than local or regional) focus. Regional Councils are promoted as the most appropriate bodies to control the evaluation process, using the already established Regional Land Transport Committees to make the final decision. These Committees are accountable to the ratepayers of the region and comprise representatives of local, regional and national organisations.

This study also suggests that the link between the Transit New Zealand Act 1989 and the Resource Management Act 1991 should be strengthened, particularly if Transit is to use the RMA to set boundaries for transport.

The main weakness in the current evaluation process is that undocumented value judgements are made in relation to the evaluation of environmental issues. The study also found that there are no criteria in Transit's Project Evaluation Manual to audit value judgements or the public consultation process undertaken. The issue of impact duration was also found to be inadequately addressed in the PEM.

8.1.3 Case Studies

In both the Ahuriri Estuary and Albany-Puhoi case studies Transit was considered to have listened, or tried to listen, to the community's concerns. The main strength of both processes was that the public could be involved in the decision-making process by attending public meetings, lodging submissions, or receiving regular newsletters.

The majority of interviewees were satisfied with the two final routes chosen, but were concerned at the dominance of large groups over small ones during the process.

One Transit Regional Office and the Consultative Group thought that the impact matrices drawn up to evaluate options were complicated. Both Transit Office's felt that the evaluation process was time-consuming and expensive and would like to improve it, but felt that this was also a strength because the public considered the process to be thorough.

The most significant finding from the case studies was that the Consultative Group was very dissatisfied with the process's lack of openness and felt that its views were manipulated to agree with the Technical Group's recommendations. In contrast, the Ahuriri Estuary interviewees (who were less involved in the process) were happy with the process and considered Transit to have an open mind. This demonstrates that the Consultative Group was unsure of its role and level of decision-making. There is also

the possibility that manipulation did occur. However, this was difficult to assess without being involved throughout the duration of the evaluation process.

A further common theme which emerged from this study was that the community does not understand the planning process and the meaning or implications of "designations". The Ahuriri Estuary interviewees (excluding Transit) also believed that the planning hearings catered for the needs of the applicant rather than those of the submitters.

8.1.4 Critique of Current Process and an "Ideal" Evaluation Framework

The critique of the current evaluation process reinforces previous criticisms of the current institutional and legislative frameworks.

The study identifies that the requirements for resource consent applications need to be expanded to include: the type of evaluation technique used to obtain the final option; evidence of an independent review of the evaluation process; and the findings of the review.

The research highlights a further area in which the RMA needs to be reviewed and that is the meaning of "consultation". This is evident in that the Consultative Group in the Albany-Puhoi case study appears to have misinterpreted the meaning of consultation, or its level of decision-making was not made clear to the members. As discussed in 8.1.3, this conclusion is not definitive because, although manipulation may have occurred, without the researcher being involved throughout the evaluation process, this perception is unable to be confirmed as factual. The Consultative Group believed that it was going to make the final decision but was manipulated to produce the same outcome as the Technical Group.

The Regional Land Transport Strategies produced by the two case study regions were also found to insufficiently address the method of valuing environmental issues and how they would be incorporated into the decision-making process.

In analysing the two case study evaluation techniques it was found that both met many of the evaluation objectives, with the Albany-Puhoi technique being the most successful. However, the majority of the Consultative Group were dissatisfied with the process's lack of openness compared to the participants of the Ahuriri Estuary process, who were satisfied with the openness of the process.

Several criteria which would improve the current evaluation process were recommended. An "ideal" evaluation framework is developed out of these criteria which includes Regional Councils, or more specifically RLTCs, controlling the evaluation process.

The "ideal" planning process is based upon a modified Rational Comprehensive model which consists of four strands: institutional, ecological, socio-economic, and engineering. The process begins with identifying the values of the community through Focus Groups and Attitude Surveys. From this phase, the limits of each of the four strands are established and the alternatives evaluated using the Goals Achievement Matrix.

In the second phase of the process, a Community Group is formed which recommends a preferred option to the RLTC. The RLTC makes the final decision based on this recommendation. The process continues through several other phases including the construction and maintenance of the new State Highway and a re-evaluation of the process five years after completion of the project.

8.2 Achievement of Thesis Aim and Objectives

The aim and objectives of this research have been met.

8.3 Improvements on the Research Methodology

Several aspects of this research could be improved on to more accurately reflect current practice and lead to a more concise "ideal" evaluation framework. These are:

- i The scope of the literature reviewed could be increased to include more recent articles. Because the majority of the literature was sourced from outside New Zealand there were significant time delays between requesting and receiving literature.
- ii A review of a third case study would present a wider picture of current evaluation practice.
- iii The people interviewed for the case studies were directly involved to some degree with the evaluation process, but the "silent majority" were not canvassed for their views. The accuracy of this research would have been improved if the "silent majority" had been surveyed or interviewed.
- iv To assess whether the comments made by the Consultative Group (and other interviewees) were factual it would have been very useful if the researcher (or an independent person) had observed the entire evaluation process.
- v To gauge the effectiveness of the "ideal" evaluation framework it would have been very beneficial to this research if the "ideal" framework had been trialled on a project.

The main reason why these aspects were not incorporated into this research was because of time constraints.

8.4 Further Research

Research in the form of a “pilot” run of the “ideal” evaluation framework would reveal the effectiveness of the framework. It may also highlight aspects of the framework which need further study.

A “pilot” run of the framework would best be undertaken on a relatively small project and its success reviewed during and after completion of the project. The review would include interviewing principal participants in the process.

As highlighted in 8.3 (iv) the researcher (or an independent person) should be involved as an observer throughout the evaluation process to assess whether the perceptions of participants were based on facts.

A final area of research would be to ascertain the aspects of the “ideal” framework which can be given less emphasis, depending on the scale of the roading project. Aspects which could be excluded, depending on the scale and nature of the project, could include Attitude Surveys. The number of goals to be achieved would also vary according to the scale and size of the project.

APPENDIX 1

Excerpt from Wellington Regional Land Transport Strategy

5. Prioritising

Because this strategy is not prescriptive and does not attempt to give a precise programme of projects, priorities are not automatic. Nevertheless, there has to be a means of deciding between competing investments, given limited funds.

The following guiding principles are put forward:

PRIORITIES

1. Basic public passenger transport support - to ensure the continuation of the system.
Basic road maintenance - to protect the asset.
Basic road safety services provided by the Traffic Safety Division of the Police.
2. Road safety improvements.
Enhancement and modernisation of the public passenger transport system, as it has been demonstrated by public opinion to be a high priority.
3. Bridge renewals.
4. All other investments ranked according to their environmental, social, safety and economic returns.

Because some of the important aspects of transport projects within the Region are non-economic, a simple benefit cost ratio priority ranking of group (4) projects is difficult. Prioritisation should be undertaken on a regional basis by the Regional Land Transport Committee.

APPENDIX 2

Megan Stevenson
C/- Works Consultancy
Private Bag 6019
NAPIER

Phone: (06) 844-8796 (H)
(06) 835-8196 (W)

13 December 1993

To participant

Dear

Research Topic: State Highway 1 Albany-Puhi Realignment

I am currently undertaking research in environmental planning at Massey University. The research involves examination of the Albany-Puhi realignment as it applies to the Resource Management Act 1991.

The research will investigate the process in which State Highway realignments are selected in relation to natural and physical resources. From this investigation, alternative methods for selecting realignment routes will be developed.

The purpose of this letter is to seek your assistance to carry out this research. Your name was given to me by Transit New Zealand, Auckland.

Studying the Albany-Puhi realignment will involve interviewing Transit New Zealand staff and the main interest groups and individuals involved in the route selection process. The community affected by the realignment will also be surveyed.

If you do wish to contribute further to research into the Albany-Puhi realignment, I would visit you in Auckland to gain your opinion on the route selection process, and whether you believe your views were appropriately considered. I will also be interested to know whether the route selection process can be improved. I expect the initial interview to take approximately 1-2 hours. As I live in Napier the follow-up interview (to confirm and clarify issues) would be undertaken by mail or telephone.

Your participation will not require any expense on your part and I will arrange an interview time to fit in with your timetable. My timeframe for interviewing is early-mid March 1994 and I intend spending approximately one week in Auckland to carry out these interviews.

The intention of this research is to greatly improve the consultation and route selection method for State Highway projects within environmentally sensitive areas.

Please complete the attached form and return it in the stamped, addressed envelope by **20th January 1994**. If you do decide to contribute, I will contact you in late February 1994 to arrange a suitable interview time.

If you have any questions regarding my research or this letter please do not hesitate to contact me at the above address and phone numbers.

I look forward to hearing from you.

Yours faithfully

Megan Stevenson

Albany-Puhoi Realignment Research

Reply Form

Name:

Address:
.....
.....

Phone No:(W)
.....(H)

Group or organisation represented:

Please cross out the incorrect box.

YES I will help with your research.

I will/will not be available in early/mid March 1994 to be interviewed.

NO unfortunately I will not be able to help with your research because:

.....

16 March 1994

Dear

Research Topic: Ahuriri Estuary Motorway Extension

I refer to previous discussions relating to my research and would like to confirm that the following time has been arranged for me to inquire about the Ahuriri Estuary Motorway project:

Date:	Tuesday 22nd March
Time:	1.00pm
Place:	Selected by interviewee

To refresh your memory, my research will investigate the process by which the final Ahuriri Estuary motorway route was selected in relation to environmental factors. From this investigation, alternative methods (if required) for selecting final routes will be developed.

In order to accurately record and interpret your views regarding the Ahuriri motorway project I would like to tape our meeting. The interview will be confidential and I will not quote you (unless you specifically agree) in my thesis. The tapes will only be used to analyse the results of my case studies and after I have carried out this analysis they will be discarded. If you strongly object to my taping the interview, I would be pleased if you could advise me by telephone or in writing to the address below before the interview.

Finally I would like to emphasise my appreciation of you setting aside time to assist with my research - your help is invaluable.

If for any reason you would like to change the above time, date or place please contact me at the following: *Address: C/- Works Consultancy, Private Bag, Napier, Telephone: (06) 835-8196 (work), (06) 844-8796 (home).*

I look forward to meeting you.

Yours sincerely

Megan Stevenson
Postgraduate Student

APPENDIX 3

Ahuriri Estuary Case Study Interview Questions

Public Interview Questions

1. I would like to know about the group you represent, when, why and how was it formed?
2. What part did you play in the route selection process?
3. At what stage did this occur?
4. What were the main concerns of your group in relation to the Estuary motorway?
5. Which of your group's concerns were listened to and considered by TNZ?
6. Do you feel that Transit New Zealand had an 'open or closed mind' when it approached your group for consultation?
7. How was this demonstrated?
8. Did it continue throughout the route selection process?
9. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) are you satisfied with the process undertaken by Transit to select the final route?
10. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is your group satisfied with the process undertaken to select the final route?
11. What were the strengths of the route selection process?
12. What were the weaknesses of the route selection process?
13. Can you suggest any ways to overcome these problems or weaknesses?
14. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) are you satisfied with the final route chosen?
15. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is your group satisfied with the final route chosen?
16. Sometimes different environmental factors are 'traded-off' between each other. How has TNZ explained this?

How did TNZ carry out this 'trade off' or how do you perceive TNZ traded environmental factors?

They may ask at this stage, what do you mean by 'environmental factors'? The technical answer to this is: any factors which are not included in the formal cost benefit analysis, ie, visual, noise, severance, cultural, spiritual, heritage, ecological and intrinsic.

- Check covered all the above issues.
- Then say that basically covers the areas that you wanted to discuss.
- 17. Are there any points you wish to clarify or emphasise?
- 18. Can you think of any questions which I should have asked?
- Then thank the interviewee for their time.
- Reiterate the issue of confidentiality and mention about a second brief telephone interview/survey to clarify issues or trial a proposed route selection method.

After the Interview

- Note on the tape the date and interviewee.
- Read brief notes taken during interview and expand sentences to ensure they make sense.
- If running short on time for next appointment drive to appointment first, then write notes and collect thoughts.

Ahuriri Estuary Case Study Interview Questions

Transit New Zealand Interview Questions

1. Briefly what were the stages of the route selection process?
2. What was your role in this process?
3. When were the environmental factors considered in the route selection process?
How were they considered?

They may ask at this stage, what do you mean by 'environmental factors'? The technical answer to this is: any factors which are not included in the formal cost benefit analysis, ie, visual, noise, severance, cultural, spiritual, heritage, ecological and intrinsic.

4. What methods were used to evaluate the environmental factors? ie, were values placed on them?
 5. When and how was the public involved in the route selection process?
 6. How were the different environmental factors 'traded-off' between each other, ie, who decided, and how, that one factor was more important than another?
 7. Was the 'trade-off' process explained to the public? How?
 8. Do you consider that the public understand how different environmental factors were 'traded-off'?
 9. On a scale of 1 to 5 (1 being totally unsatisfied and 5 being very happy) does TNZ consider the public is satisfied with the route selection process?
 10. On a scale of 1 to 5 (1 being totally unsatisfied and 5 being very happy) does TNZ consider the public is satisfied with the final route chosen? ie, public = the public involved in the route selection process.
 11. What were the strengths of the route selection process?
 12. What were the weaknesses of the route selection process?
 13. Would you undertake this process differently in the future, and if so how?
 14. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is Transit New Zealand satisfied with the final route chosen?
- Check covered all the above issues.

- Then say that basically covers the areas that you wanted to discuss.
15. Are there any points you wish to clarify or emphasise?
 16. Can you think of any questions which I should have asked?
- Then thank the interviewee for their time.
 - Reiterate the issue of confidentiality and mention about a second brief telephone interview/survey to clarify issues or trial a proposed route selection method.

After the Interview

- Note on the tape the date and interviewee.
- Read brief notes taken during interview and expand sentences to ensure they make sense.
- If running short on time for next appointment drive to appointment first, then write notes and collect thoughts.

APPENDIX 4



Photograph 5: Looking North along designated alignment.



Photograph 6: Looking North at Westshore Lagoon



Photograph 7: Looking West at North Pond and Napier Airport.



Photograph 8: Looking North. Marker in foreground lies on Alignment 2.

Note the proximity of the house on the right of the picture.

APPENDIX 5

Steps in the Ahuriri Estuary Motorway Consultation Process

1. Environmental Impact Statement (July 1990)
2. Ahuriri Estuary Environmental Impact Statement (1990)
3. Discussions with Environmental Groups (September 1990)
4. Invitation for Public Submissions
5. Environmental Impact Statement - Further Studies of Alignment Options (June 1992)
6. Scheme Assessment Report (June 1992)
7. Invitation for Public Submissions (September to October 1992)
8. Public Meeting (14 October 1992)
9. Public Meeting (21 October 1992)
10. Consultations with Wai 55 at the Waiohiki Marae (December 1992)
11. Visual Impact Assessment; Bridging versus Culverting (December 1992)
12. Report on Bird Hazard to Aircraft (December 1992)
13. Report on the effects of bridged motorway crossings on shellfish beds of the Ahuriri Estuary (January 1993)
14. Report on Shellfish Densities and Distribution in the Middle Ahuriri Estuary (February 1993)

(Source: Transit New Zealand, 1993).

APPENDIX 6

Albany-Puhoi Case Study Interview Questions

Public Interview Questions

1. I would like to know about the group you represent, when, why and how was it formed?
2. What part did you play in the route selection process?
3. How was the Consultative Group formed?
4. At what stage did you become involved?
5. What were the main concerns of your group in relation to the realignment?
6. Which of your group's concerns were listened to and considered by TNZ?
7. Do you feel that Transit New Zealand had an 'open or closed mind' when it approached your group for consultation?
8. How was this demonstrated?
9. Did it continue throughout the route selection process?
10. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) are you satisfied with the process undertaken by Transit to select the final route?
11. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is your group satisfied with the process undertaken to select the final route?
12. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is the Consultative Group satisfied with the process undertaken to select the final route?
13. What were the strengths of the route selection process?
14. What were the weaknesses of the route selection process?
15. Can you suggest any ways to overcome these problems or weaknesses?
16. Do you think the Consultative Group role was effective?
17. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) are you satisfied with the final route chosen?
18. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is your group satisfied with the final route chosen?

19. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is the Consultative Group satisfied with the final route chosen?

20. Sometimes different environmental factors are 'traded-off' between each other. How has TNZ explained this?

How did TNZ carry out this 'trade off' or how do you perceive TNZ traded environmental factors?

They may ask at this stage, what do you mean by 'environmental factors'? The technical answer to this is: any factors which are not included in the formal cost benefit analysis, ie, visual, noise, severance, cultural, spiritual, heritage, ecological and intrinsic.

- Check covered all the above issues.
 - Then say that basically covers the areas that you wanted to discuss.
21. Are there any points you wish to clarify or emphasise?
22. Can you think of any questions which I should have asked?
- Then thank the interviewee for their time.
 - Reiterate the issue of confidentiality and mention about a second brief telephone interview/survey to clarify issues or trial a proposed route selection method.

After the Interview

- Note on the tape the date and interviewee.
- Read brief notes taken during interview and expand sentences to ensure they make sense.
- If running short on time for next appointment drive to appointment first, then write notes and collect thoughts.

Albany-Puhoi Case Study Interview Questions

Transit New Zealand Interview Questions

1. Briefly what were the stages of the route selection process?
2. What was your role in this process?
3. When were the environmental factors considered in the route selection process?
How were they considered?

They may ask at this stage, what do you mean by 'environmental factors'? The technical answer to this is: any factors which are not included in the formal cost benefit analysis, ie, visual, noise, severance, cultural, spiritual, heritage, ecological and intrinsic.

4. What methods were used to evaluate the environmental factors? ie, were values placed on them?
5. When and how was the public involved in the route selection process?
6. Was the Consultative Group role effective?
7. How were the different environmental factors 'traded-off' between each other, ie, who decided, and how, that one factor was more important than another?
8. Was the 'trade-off' process explained to the public? How?
9. Do you consider that the public understand how different environmental factors were 'traded-off'?
10. On a scale of 1 to 5 (1 being totally unsatisfied and 5 being very happy) does TNZ consider the public is satisfied with the route selection process?
11. On a scale of 1 to 5 (1 being totally unsatisfied and 5 being very happy) does TNZ consider the public is satisfied with the final route chosen? ie, public = the public involved in the route selection process.
12. On a scale of 1 to 5 (1 being totally unsatisfied and 5 being very happy) does TNZ consider the Consultative Group is satisfied with the route selection process?
13. What were the strengths of the route selection process?
14. What were the weaknesses of the route selection process?
15. Would you undertake this process differently in the future, and if so how?

16. On a scale of 1-5 (1 being totally unsatisfied and 5 being very happy) is Transit New Zealand satisfied with the final route chosen?
- Check covered all the above issues.
 - Then say that basically covers the areas that you wanted to discuss.
17. Are there any points you wish to clarify or emphasise?
18. Can you think of any questions which I should have asked?
- Then thank the interviewee for their time.
 - Reiterate the issue of confidentiality and mention about a second brief telephone interview/survey to clarify issues or trial a proposed route selection method.

After the Interview

- Note on the tape the date and interviewee.
- Read brief notes taken during interview and expand sentences to ensure they make sense.
- If running short on time for next appointment drive to appointment first, then write notes and collect thoughts.

APPENDIX 7



Photograph 5: Looking West across hills behind Orewa.



Photograph 6: Looking South towards Red Beach.



**Photograph 7: Looking North from Orewa township.
Designated Alignment in foreground.**



Photograph 8: Looking North at Hatfields Estuary.

APPENDIX 8

SILVERDALE TO PUHOI OPTIONS																					
6-Jun-92																					
	Link	B	B	B	B	L		L	L	L				L	L or B	L			B	L	
Route Options		A	5A	F	10/A	H1/A		H/B/SH1	D1/B/SH1	B1/B/SH1	B/SH1	G/B/SH1		2	H/5C/M	B1/M	B/M	6/B/M	G/B	5A/A/M	6/B1/M
Environment	Water Quality	9.0	8.0	9.0	9.0	8.0		8.0	8.0	8.0	8.0	8.0		9.0	8.0	8.0	8.0	8.0	8.0	7.0	8.0
	Estuarine/coastal	9.0	9.0	9.0	9.0	7.0		9.0	8.0	9.0	9.0	9.0		9.0	8.0	9.0	9.0	9.0	9.0	8.0	9.0
	Terrestrial Habitat	8.0	7.0	8.0	8.0	8.0		8.5	8.5	8.5	8.5	8.5		8.5	8.0	8.0	8.0	8.0	8.5	6.5	8.0
	Freshwater Habitat	6.5	6.5	6.5	6.5	7.0		6.5	7.5	6.5	6.5	7.0		8.0	7.5	7.5	7.5	6.5	6.0	6.0	7.5
Socio	Land Use	8.0	7.0	7.5	7.0	7.0		7.0	7.0	5.0	8.0	8.0		6.0	7.0	7.0	8.0	8.0	8.0	7.0	7.5
Economic	Water use	5.0	6.0	5.0	5.0	6.0		5.0	5.0	5.0	5.0	5.0		5.0	6.0	5.0	5.0	5.0	5.0	6.0	5.0
	Community Networks	9.0	8.0	8.0	7.0	8.0		8.0	8.0	8.5	9.0	9.0		7.5	6.5	6.5	8.0	8.0	8.5	8.5	7.5
	Amenities	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	9.0	9.0		5.0	5.0	6.5	9.0	9.0	9.0	5.0	5.0
	Equity	9.0	9.0	9.0	7.5	8.0		8.5	8.5	8.5	6.0	9.0		8.0	8.0	8.0	6.0	6.5	6.5	8.5	8.0
	Lifestyle	9.0	9.0	9.0	8.5	9.0		9.5	9.5	9.5	9.5	9.5		7.0	6.0	8.0	9.0	9.0	9.0	9.0	9.0
	Attachment/Expectations	9.0	9.0	9.0	8.0	9.0		9.5	9.5	9.0	7.0	8.0		8.0	7.5	7.5	6.5	7.0	7.0	9.0	7.5
	Health (Noise/Emissions)	8.0	7.5	8.0	7.0	7.0		6.0	6.0	6.0	7.0	7.5		6.0	6.0	6.0	7.0	6.0	7.0	8.0	5.0
	Visual	7.5	7.0	8.5	10.0	8.5		8.5	7.5	8.5	7.0	8.0		7.5	7.5	8.0	8.0	8.5	9.0	6.5	9.0
Cultural	Sites of Cultural Impt	7.0	7.0	8.0	7.0	8.0		7.0	7.0	8.0	8.5	8.5		6.0	7.0	7.5	8.5	7.5	8.5	7.5	8.0
	Neighbourhood Values	8.0	8.0	8.0	6.5	8.0		9.0	9.0	8.0	8.5	9.0		6.5	6.5	7.0	8.0	8.0	8.0	7.0	7.5
	Spiritual Associations	8.0	8.0	8.0	7.0	8.0		7.0	7.0	8.0	8.0	8.0		7.0	7.0	7.0	8.0	8.0	8.0	7.5	7.0
	Treaty of Waitangi Issues	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Transport	Traffic Safety	2.0	2.0	2.0	2.0	2.0		4.0	4.0	4.0	4.0	4.5		3.0	2.0	2.0	2.0	2.0	4.0	2.0	2.0
Effectiveness	Access function	5.0	5.0	5.0	5.0	4.5		4.5	4.0	3.0	2.0	3.0		4.5	4.5	3.0	2.0	3.0	4.0	5.0	3.0
	Trunk function	1.0	2.0	3.0	2.0	3.0		3.5	3.5	4.0	3.0	4.5		3.0	1.5	2.0	2.0	2.0	3.0	1.0	2.5
	Technical Feasibility	5.0	5.0	5.0	8.0	6.0		8.0	7.0	7.0	7.0	7.0		7.0	7.0	6.0	5.0	7.0	7.0	6.0	7.0
	Staging Opportunities	8.0	8.0	8.0	8.0	6.0		4.0	4.0	4.0	4.0	4.0		6.0	6.0	4.0	4.0	4.0	4.0	8.0	6.0
Financial	Construction and Maint.	5.0	7.0	5.0	7.0	8.0		9.0	8.0	7.0	7.0	7.0		9.0	9.0	8.0	6.5	8.0	7.0	8.0	8.0
	Property Values	8.0	7.0	8.0	7.0	8.0		9.0	9.0	8.5	7.0	9.5		7.0	7.0	7.0	6.5	7.0	8.0	7.0	8.0
	Travel Time and Costs	2.5	3.0	3.0	3.0	2.5		4.5	4.0	3.5	3.0	3.0		4.5	4.0	3.0	2.0	3.0	2.0	4.0	3.0
SUB-TOTALS																					
Environment		32.5	30.5	32.5	32.5	30.0		32.0	32.0	32.0	32.0	32.5		34.5	31.5	32.5	32.5	31.5	31.5	27.5	32.5
Socio-economic		69.5	67.5	69.0	65.0	67.5		67.0	66.0	65.0	67.5	73.0		60.0	59.5	62.5	66.5	67.0	69.0	67.5	63.5
Cultural		30.0	30.0	31.0	27.5	31.0		30.0	30.0	31.0	32.0	32.5		26.5	27.5	28.5	31.5	30.5	31.5	29.0	29.5
Transport		21.0	22.0	23.0	25.0	21.5		24.0	22.5	22.0	20.0	23.0		23.5	21.0	17.0	15.0	18.0	22.0	22.0	20.5
Financial		15.5	17.0	16.0	17.0	18.5		22.5	21.0	19.0	17.0	19.5		20.5	20.0	18.0	15.0	18.0	17.0	19.0	19.0
RAW SCORE TOTAL		168.5	167.0	171.5	167.0	168.5		175.5	171.5	169.0	168.5	180.5		165.0	159.5	158.5	160.5	165.0	171.0	165.0	165.0

APPENDIX 9

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