

Before the Board of Inquiry  
Waterview Connection Project

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*in the matter of:* the Resource Management Act 1991

*and*

*in the matter of:* a Board of Inquiry appointed under s 149J of the Resource Management Act 1991 to decide notices of requirement and resource consent applications by the NZ Transport Agency for the Waterview Connection Project

Statement of Evidence of Michael Copeland (Economics) on behalf of the  
**NZ Transport Agency**

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Dated: 11 November 2010

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**INDEX**

**INTRODUCTION ..... 2**

**SCOPE OF EVIDENCE ..... 3**

**EXECUTIVE SUMMARY ..... 3**

**BACKGROUND AND ROLE..... 3**

**ECONOMICS AND THE RMA ..... 4**

**COMMENTS ON PROJECT ECONOMIC ASSESSMENT ..... 5**

**COMMENTS ON SUBMISSIONS ..... 8**

ANNEXURE A: CURRICULUM VITAE OF MICHAEL CAMPBELL COPELAND ..... 13

**STATEMENT OF EVIDENCE OF MICHAEL COPELAND ON BEHALF OF  
THE NZ TRANSPORT AGENCY**

**INTRODUCTION**

- 1 My full name is Michael Campbell Copeland.
- 2 I hold a Bachelor of Science degree in mathematics and a Master of Commerce degree in economics. I have over 35 years experience in the application of economics to various areas of business including transport economics and resource management matters. A summary of my curriculum vitae is attached as **Annexure A**.
- 3 I am a consulting economist and managing director of Brown, Copeland and Company Limited, a firm of consulting economists which has undertaken a wide range of studies for public and private sector clients in New Zealand and overseas. During the period 1990 to 1994, I was also a member of the Commerce Commission and during the period 2002 to 2008 I was a lay member of the High Court under the Commerce Act. Prior to establishing Brown, Copeland and Company Limited in 1982, I spent six years at the New Zealand Institute of Economic Research and three years at the Confederation of British Industry.
- 4 I have been engaged in a number of areas of road transport economics and my curriculum vitae, in **Annexure A**, contains details of some of the assignments related to road transport I have undertaken. With respect to the Resource Management Act 1991 (*RMA*), I have prepared evidence for clients covering a number of projects and policies. A selection of these is listed at the end of my curriculum vitae in **Annexure A**.
- 5 My evidence is given in support of notices of requirement and applications for resource consents lodged with the Environmental Protection Authority (*EPA*) by the NZTA on 20 August 2010 in relation to the Waterview Connection Project (*Project*). I understand that the Project comprises works previously investigated and developed as two separate projects, being:
  - 5.1 The SH16 Causeway Project; and
  - 5.2 The SH20 Waterview Connection Project.
- 6 I have been briefed about the area that the Project covers, and the State highway and roading network in the vicinity of the Project.
- 7 I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Consolidated Practice Note (2006), and I agree to comply with it. This evidence is within my area of expertise, except where I state that I am relying on facts or

information provided by others. In preparing my evidence I have not omitted to consider any material facts known to me that might alter or detract from the opinions that I express.

### **SCOPE OF EVIDENCE**

- 8 My evidence will deal with the following:
- 8.1 Executive summary;
  - 8.2 Background and role;
  - 8.3 Economics and the RMA;
  - 8.4 Comments on the Project economic assessment; and
  - 8.5 Comments on submissions.

### **EXECUTIVE SUMMARY**

- 9 The economic wellbeing of people and communities and the efficient use of resources are relevant considerations under the RMA.
- 10 The NZTA project evaluation procedures and database have been used to assess the efficiency of the Project. These procedures and database are based on international best practice and have been refined over many years on the basis of local and international research and investigation.
- 11 Using the NZTA project evaluation procedures and database, the Project achieves a satisfactory level of economic benefits relative to the costs of the Project. It is therefore an efficient use of resources.
- 12 A BCR greater than 1 indicates that the Project's benefits (including savings in vehicle operating costs, travel time costs and road accident costs) exceed the Project's costs (including its capital costs, its operation and maintenance costs and a return on capital). The Project will lead to improvements in productivity and economic efficiency for the Auckland regional and national economies.
- 13 I have reviewed the submissions raising economic issues and none of the issues raised in submissions alters my view that the Project will enable people and communities to provide for their economic wellbeing and represents an efficient use of resources.

### **BACKGROUND AND ROLE**

- 14 In October 2010, I was retained by the NZTA to respond to submitters' comments regarding the national and regional economic costs and benefits of the Project, given my experience with

transport economics and road transport project evaluation procedures. I have not been involved in the traffic modelling or the calculation of the benefit cost ratio (*BCR*) for the Project.

- 15 I have met with NZTA staff, who are members of the Waterview Project team and the NZTA's planning and transport consultants for the Project. I have reviewed various documents relating to the Project, including the Western Ring Route Project Summary Statement (January 2010), Regional and Project Wide Assessment of Effects (August 2010)<sup>1</sup>, Assessment of Transport Effects Report (August 2010)<sup>2</sup> and the draft evidence of Andrew Murray.
- 16 I have also read submissions lodged on the Project which raise economic issues (and these are addressed later in my evidence).

## **ECONOMICS AND THE RMA**

### **Community Economic Wellbeing**

- 17 Economic considerations are intertwined with the concept of the sustainable management of natural and physical resources, which is embodied in the RMA. In particular, Part II section 5(2) refers to enabling "*people and communities to provide for their ... economic ... well being*" as part of the meaning of "*sustainable management*", the promotion of which is the purpose of the RMA.
- 18 As well as indicating the relevance of economic effects in considerations under the RMA, this section also refers to "*people and communities*" (emphasis added), which highlights that in assessing the impacts of a proposal it is the impacts on the community and not just the applicant or particular individuals or organisations, that must be taken into account. This is underpinned by the definition of "*environment*" which also extends to include people and communities.

### **Economic Efficiency**

- 19 Part II section 7(b) of the RMA notes that in achieving the purpose of the Act, all persons "*shall have particular regard to ... the efficient use and development of natural and physical resources*" which includes the economic concept of efficiency.<sup>3</sup> Economic efficiency can be defined as:

the effectiveness of resource allocation in the economy as a whole such that outputs of goods and services fully reflect consumer preferences for these goods and services as well as individual goods

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<sup>1</sup> Section 13, AEE, Part D.

<sup>2</sup> Technical Report G.18, Volume 1 (AEE, Part G).

<sup>3</sup> See, for example, in *Marlborough Ridge Ltd v Marlborough District Council* [1998] NZRMA 73, the Court noted that all aspects of efficiency are "*economic*" by definition because economics is about the use of resources generally.

and services being produced at minimum cost through appropriate mixes of factor inputs.<sup>4</sup>

- 20 More generally, economic efficiency can be considered in terms of:
- 20.1 Maximising the value of outputs divided by the cost of inputs;
  - 20.2 Maximising the value of outputs for a given cost of inputs;
  - 20.3 Minimising the cost of inputs for a given value of outputs; and
  - 20.4 Minimising waste.

#### **Viewpoint for economic assessment**

- 21 An essential first step in carrying out an evaluation of the positive and negative economic effects of a project is to define the appropriate viewpoint that is to be adopted. This helps to define which economic effects are relevant to the analysis. Typically a district or wider regional viewpoint is adopted and sometimes a nationwide viewpoint might be considered appropriate. For the Waterview Connection Project, the Auckland region is the relevant community of interest, but because of the Auckland region's significance within the national economy and the scale of the Project, the national economic effects of the Project are also relevant. This is underscored by the Project being included in the Government's portfolio of Roads of National Significance (*RoNS*).

#### **With and Without Analysis**

- 22 I note that in analysing the economic effects of the Project, it is necessary to compare two forward looking scenarios ("with Project" versus "without Project"), rather than a "before" and "after" comparison. This means the proper baseline for evaluating future economic (and non-economic) effects of the Project are the future volumes of traffic on the network without the Project, not current traffic volumes.

### **COMMENTS ON PROJECT ECONOMIC ASSESSMENT**

#### **Conventional Cost Benefit Analysis**

- 23 Conventional cost benefit analysis of road improvement projects involves comparison of project benefits (including vehicle operating cost savings, travel time cost savings, accident cost savings and trip travel time reliability improvements) with project costs (including capital costs and changes in operation and maintenance costs).
- 24 The methods used to estimate the benefits and the costs together with the procedures to adopt for their evaluation are set out in the

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<sup>4</sup> Pass, Christopher and Lowes, Bryan, 1993, *Collins Dictionary of Economics* (2<sup>nd</sup> edition), Harper Collins, page 148.

NZTA's Economic Evaluation Manual (EEM)<sup>5</sup> and are based on considerable local and international research. The methods and data have been refined over a number of years. In the 1980s and 1990's I was personally involved in helping the predecessors to the NZTA<sup>6</sup> establish the procedures and the database to be used. I understand that in the last 10 years these procedures and the database have continued to be refined. They are consistently applied over all road improvement project evaluations seeking funding from the NZTA.

- 25 In New Zealand (and overseas) a *discount rate* is used to cover the time value of money and the opportunity cost of funds (i.e. the returns available from alternative road improvement projects, other government projects or programmes and/or private sector use of funds). The discount rate used for many years for roading projects and other public sector investment projects was 10%<sup>7</sup>, but I understand in recent years this has been reduced to 8%.
- 26 The benefits of a project are divided by the costs of the project (incorporating a cost of funds (the discount rate) of 8% in real terms – i.e. excluding the effects of inflation) to derive a benefit cost ratio (*BCR*). If the BCR is greater than 1, project benefits exceed project costs and generally this is interpreted as meaning that the use of funds for the project will be an efficient use of resources.
- 27 In economics, 'intangible' costs and benefits are defined as those that cannot be quantified in monetary terms (such as amenity/landscape values). Sometimes attempts can be made to estimate monetary values for the so called 'intangibles'. For example, road accident cost savings incorporate an estimate for reducing the risks of road fatalities occurring. On other occasions 'intangibles' will need to be considered outside the quantitative BCR calculation and decision makers will need to 'trade off' the BCR against any positive or negative 'intangible' effects.
- 28 Finally in relation to conventional cost benefit analysis, the BCR is calculated from the national perspective. It is a measure of national economic efficiency. It does not provide information about the distribution of costs and benefits. However with respect to the Waterview Connection Project, a BCR greater than 1 when calculated from a national perspective will be even larger from an Auckland regional perspective. This is because most of the benefits will accrue to Auckland businesses and residents whereas the costs of the Project will be funded from a national pool of resources.

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<sup>5</sup> Previously this document was called the Project Evaluation Manual (PEM). When the procedures were first developed they were contained in a document referred to as Technical Recommendation No. 9 (TR9).

<sup>6</sup> I.e. the National Roads Board, Transit New Zealand and Transfund New Zealand.

<sup>7</sup> Following a directive from Treasury in 1972.

### **Wider Economic Benefits**

- 29 Conventional cost benefit analysis of transport projects is now being extended to cover increases in productivity (or efficiency) at the regional and national levels that are in addition to the conventionally measured benefits (e.g. savings in vehicle operating costs and travel time). Conceptually the inclusion of a number of additional benefits can be justified. For example, there are so called 'agglomeration' benefits. These occur when the productivity and the supply of labour and other resources are enhanced when travel times between points within a district, city or region are reduced and this leads to an effective increase in the density or concentration of business activity. Another wider economic benefit may occur as a result of road improvement projects increasing the level of economic activity in an area and economies of scale leading to increased productivity and economic efficiency.
- 30 I am aware of work that has been done to extend conventional cost benefit analysis to include these wider economic benefits (although I have not carried out any such exercises myself). The NZTA's EEM now includes procedures and data for estimating agglomeration economies. I accept conceptually the possible existence of wider economic benefits but believe the quantification of such benefits in New Zealand (and probably overseas) is not as well developed as conventional cost benefit analysis. Therefore any estimates of wider economic benefits need to be treated with some caution.

### **BCR Calculation for the Project**

- 31 Whereas in the past the BCR and a qualitative<sup>8</sup> assessment of any 'intangibles' were the only criteria on which New Zealand road improvement projects were assessed and ranked, I am informed that this assessment of a project's efficiency is now only one of the relevant assessment and ranking criteria, with other criteria relating to 'strategic fit' and 'effectiveness'.<sup>9</sup>
- 32 I have been informed that the Project has a BCR of at least 1.2 based on conventional cost benefit analysis (with an even higher BCR if wider economic benefits such as agglomeration are taken into account).<sup>10</sup>
- 33 Even ignoring agglomeration benefits, it is my opinion that a BCR above 1 indicates an efficient use of resources. This is because the benefits of the Project exceed the costs of the Project, where the costs of the Project incorporate an 8% real rate of return on the investment funds required. Another way of expressing this is that

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<sup>8</sup> Or at least not quantified in money terms.

<sup>9</sup> I am not personally familiar with the background to the development of these two additional criteria, how they are measured or how they have been determined in relation to the Waterview Connection Project.

<sup>10</sup> See the evidence of Mr Tommy Parker.



the Project's economic internal rate of return (*EIRR*) is in excess of the Government's hurdle rate of 8%.

### **COMMENTS ON SUBMISSIONS**

34 I have read submissions lodged on the Project raising economic issues relevant to my area of expertise. In this section of my evidence I address these submissions under the following headings:

34.1 Adequacy of Regional and National Economic Benefits;

34.2 Cost Benefit Analysis Methodology;

34.3 Impacts on Land Use;

34.4 Economic Benefits Associated with Travel Time Savings;

34.5 Exclusion of Certain Economic Costs from BCR Calculation;

34.6 Public Transport Implications of the Project; and

34.7 Impacts of the Project on New Zealand Trade and Tourism.

#### **Adequacy of Regional and National Economic Benefits**

35 A number of submitters opposed to the Project have raised general concerns that the Project is not economically justified and will not enable the efficient use and development of resources.<sup>11</sup> Similarly, other submitters have commented that the Project will provide insufficient regional and national economic benefits or will not lead to higher productivity or higher economic growth.<sup>12</sup> In contrast, I note that other submitters refer to regional and national economic benefits in their reasons for supporting the Project.<sup>13</sup>

36 Given the BCR for the Project is greater than 1 (even without wider economic benefits included in the analysis and with a real cost of capital of 8% included in the BCR's calculation), it is my view that the Project will lead to efficiency gains, higher productivity and greater economic growth. The benefits of the Project in the form of savings in vehicle operating costs, travel time costs and road accidents costs have been measured to be greater than the capital costs and additional operation and maintenance costs for the motorway and local road networks. As I have stated earlier in my

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<sup>11</sup> Including for example, the Campaign for Better Transport (Submitter No. 146), Alison Town (Submitter No. 121) and Belinda Chase (Submitter No. 126).

<sup>12</sup> Including, for example, Julie Genter (Submitter No. 198), Eden Albert Community Association (Submitter No. 129), Marianne Riley (Submitter No. 221), North Western Community Association (Submitter No. 185), and Springleigh Residents Association (Submitter No. 43).

<sup>13</sup> Including the Auckland Business Forum (Submitter No. 58) and Onehunga Enhancement Society (Submitter No. 187).

evidence, at the regional level I would expect the benefits in terms of improved efficiency, productivity and economic growth to be even higher since businesses and residents of Auckland will receive most of the benefits but only pay a proportion of the total cost.

### **Cost Benefit Analysis Methodology**

- 37 Some submitters have suggested that the cost benefit analysis methodology to assess the economic efficiency of the Project was flawed.<sup>14</sup>
- 38 I do not agree. As explained in the evidence of Mr Andrew Murray and Mr Tommy Parker, the methodology used to calculate the BCR is that recommended by the NZTA and even excluding agglomeration benefits, the analysis yields a BCR in excess of 1. As I have explained earlier in my evidence, the NZTA's conventional cost benefit methodology of roading projects has been developed over many years and is consistent with international best practice and the best available data.
- 39 The inclusion of some wider economic benefits, whilst conceptually correct in my view, is still relatively new to road project cost benefit procedures and some uncertainty about the accuracy of quantifying such additional benefits remains. However it is reassuring that the BCR is still greater than 1, even without the inclusion of wider economic benefits.

### **Impacts on Land Use**

- 40 Submitters have also suggested that the economic evaluation of the Project has taken insufficient account of its impacts on land use.<sup>15</sup> I understand a number of other witnesses are covering various broader aspects of impacts on land use and I confine my comments here to land use effects related to economics.
- 41 The economic evaluation methodology requires the expected cost of the land which is required for the Project to be included in Project costs. This will reflect the value of the land in alternative uses and in my opinion is the appropriate way to treat the forgone benefits from alternative uses of the land.
- 42 The Project's impacts on adjacent land uses may be either positive or negative. It is generally not appropriate to incorporate such effects in the quantitative analysis of the BCR by attempting to estimate changes in land values with and without a project. This is because firstly such estimation is difficult to do accurately; and secondly it will in many instances lead to double counting of benefits or costs. This is because positive and adverse effects on land values

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<sup>14</sup> See for example Julie Genter (Submitter No. 198), Alison Town (Submitter No. 121) and Belinda Chase (Submitter No. 126).

<sup>15</sup> See Julie Genter (Submitter No. 198).

(such as improved accessibility or increased noise) are likely to have already been measured in the analysis or decision making process – e.g. in measures of vehicle operating and travel time savings, or in the balancing of the BCR and intangible effects.

### **Economic Benefits Associated with Travel Time Savings**

- 43 Another issue raised in submissions relates to the inclusion of time savings benefits in the Project’s economic evaluation, as in the submitter’s view there are no economic benefits associated with travel time savings.<sup>16</sup>
- 44 I disagree, and consider that travel time savings do have economic benefits. Travel time savings from road improvement projects are made up of work and non-work time savings for vehicle drivers and passengers, vehicle time savings, freight time savings and improvements in travel time reliability. Each of these components are economic benefits and the NZTA procedures incorporate the procedures used in overseas jurisdictions such as Australia, the United Kingdom and the USA, and available research from New Zealand and overseas on the value of travel time savings.
- 45 Work time savings for vehicle drivers and passengers free up resources to do other tasks or enable fewer people to be employed to achieve the same level of output. Similarly, shortening journey times for work vehicles enables fewer vehicles to do the same amount of work within a given time period. There is an obvious link here to improvements in productivity and economic efficiency. The time taken for freight once ordered to arrive at a destination impacts on the requirements to hold inventory stock, whilst perishable freight (e.g. foodstuffs in transit) is another dimension of freight time values.
- 46 Non-work time savings benefit the individuals concerned who need to spend less time commuting to or from work or undertaking other trips in their non-work time. Creating a greater amount of time to undertake other tasks or pursue leisure activities is of benefit to individuals and therefore part of community economic (and social) wellbeing.<sup>17</sup>
- 47 Travel time reliability is important since it affects how much time must be set aside for journeys which must be made in accordance with deadlines. If it is known that congestion or accidents on a

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<sup>16</sup> Julie Genter (Submitter No. 198).

<sup>17</sup> The only instance where there is no benefit to an individual from non work travel time savings is where the journey is deemed to be an end in itself – e.g. a sightseeing trip. However in the case of the Waterview Connection Project, these are likely to make up only a very small proportion of total trips. Even tourists and other visitors to Auckland will usually deem it desirable to get between their origin and destination as quickly as possible to enjoy activities and attractions at their destination.

route can considerably add to journey time, each time a trip is made allowances for delays on such trips is needed resulting in “dead time” at the trips’ destinations. Therefore road improvement projects which increase trip time reliability contribute to increased productivity and economic efficiency.

**Exclusion of Certain Economic Costs from BCR Calculation**

- 48 Submitters have also commented that the costs associated with property values, road safety, public health, vehicle storage, vehicle ownership, water and air pollution, and climate change have been omitted from the Project’s economic evaluation.<sup>18</sup>
- 49 In my opinion, appropriate factors have been included in the Project’s BCR calculation. I have discussed the effects of the Project on land use and property values earlier in my evidence. It is my assessment that any such effects have been appropriately dealt with in the BCR calculation. Costs associated with road safety and climate change (greenhouse gas emissions) have been also incorporated within the Project’s economic evaluation as required by the EEM methodology.
- 50 Positive effects on vehicle storage and ownership costs (i.e. reductions in these costs from the Project) will have been incorporated within the economic evaluation via reductions in vehicle travel time costs. Negative effects on vehicle storage and vehicle ownership (i.e. increases in these costs from the Project) will have been incorporated via increases in vehicle travel time costs of generated or induced traffic.
- 51 Any costs related to water and air pollution need to be treated as ‘intangibles’ and dealt with outside the quantitative BCR analysis. Any such negative ‘intangibles’ would need to be considered in the context of any positive ‘intangibles’ such as social and amenity benefits from reductions in traffic volumes on local streets.

**Public Transport Implications of the Project**

- 52 Submissions have also raised concerns that the Project does not support public transport.<sup>19</sup>
- 53 I do not agree. It is my understanding the Project preserves a corridor for possible future rail passenger services and will provide significant additional capacity for bus lanes to facilitate an increased level of service for bus public passenger services.<sup>20</sup> Bus transport services are affected by route congestion in the same way as for private motorists. By reducing congestion the Project will lead to improvements in the levels of service provided by bus public

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<sup>18</sup> Julie Genter (Submitter No. 198).

<sup>19</sup> Julie Genter (Submitter No. 198).

<sup>20</sup> See the evidence of Mr Andrew Murray.

passenger services as well as reducing their capital and operating costs. Reduced congestion and trip travel times mean fewer buses are required to provide the same level of service thus making them more financially sustainable. Alternatively with the same resources increased frequency and higher levels of service can be provided.

**Impacts of the Project on New Zealand Trade and Tourism**

54 Another matter raised in submissions is that the Project will have a negative impact on New Zealand's image and therefore detrimentally affect our export trade and international tourism.<sup>21</sup> It is my opinion that this is unlikely since:

54.1 New Zealand's major trading partners and the origins of our international tourists (Australia, People's Republic of China, Other Asia, the United Kingdom, other Northern Europe and the USA) all have much more extensive motorway and arterial road networks than New Zealand will have even after implementation of the Project; and

54.2 Heavily congested motorways and local road networks (i.e. the future 'without Project' scenario) are likely to be more damaging to New Zealand's image as a tourist destination than an improved and less congested motorway and local road network system.



**Michael Copeland**  
**November 2010**

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<sup>21</sup> Kath Dewar (Submitter No. 18).

**ANNEXURE A:  
CURRICULUM VITAE OF MICHAEL CAMPBELL COPELAND**

<b>DATE OF BIRTH</b>	3 October 1950
<b>NATIONALITY</b>	New Zealand
<b>EDUCATIONAL QUALIFICATIONS</b>	Bachelor of Science (Mathematics) 1971 Master of Commerce (Economics) 1972
<b>PRESENT POSITIONS</b>	
(Since 1982)	Economic Consultant, Brown, Copeland & Co Ltd
(Since 2003)	Director, Wellington Rugby Union
(Since 2010)	Director, Southern Pastures
(Since 2010)	Director, Healthcare New Zealand
<b>PREVIOUS EXPERIENCE</b>	
1978-82	NZ Institute of Economic Research Contracts Manager/Senior Economist
1975-78	Confederation of British Industry Industrial Economist
1972-75	NZ Institute of Economic Research Research Economist
1990-94	Member, Commerce Commission
2001-06	West Coast Regional Council Trustee, West Coast Development Trust
2002-08	Lay Member of the High Court under the Commerce Act 1986

## **GEOGRAPHICAL EXPERIENCE**

- New Zealand
- Australia
- Asia (India, Indonesia, Kazakhstan, Malaysia, Nepal, Pakistan, People's Republic of China, Philippines, Tajikistan, Sri Lanka, Uzbekistan, Viet Nam)
- South Pacific (Cook Islands, Fiji, Tokelau, Tonga, Vanuatu, Western Samoa)
- United Kingdom

## **AREAS OF PRIMARY EXPERTISE**

- Agriculture and Resource Use Economics (including Resource Management Act)
- Commercial Law and Economics (including Commerce Act)
- Development Programme Management
- Energy Economics
- Industry Economics
- Transport Economics

## **ROAD TRANSPORT ASSIGNMENTS**

- The economist in a team evaluating alternative arterial route upgrades between Nelson City and Richmond;
- The application of NZTA SP9 evaluation procedures for a funding application for public transport improvements in and around Queenstown;
- Engaged by Transit New Zealand to provide advice on procedures and data for evaluating additional economic benefits from safety improvements to the access roads to the Homer Tunnel;
- Three studies for the Ministry of Economic Development investigating the economic benefits associated with road improvement works to maximise further processing opportunities from forestry resources on the East Coast and in Northland. The third study considered the potential role of the existing and planned rail links in Northland and the implications of different locations for future processing options;
- Engaged by Transfund New Zealand to assist with work on Land Transport Pricing Study, review of road user charges and Transfund's project evaluation procedures;
- Examination of the economics from both national and operator viewpoints of replacing the existing Johnsonville-Wellington suburban rail service with an all bus service;
- Commentary for Transit New Zealand on the appropriateness of using property valuation data as a basis for estimating the environmental and severance benefits from the construction of the Stoke by-pass;
- A national and international review of procedures to adopt in transportation project appraisal. Conceptual issues relevant to all

- national viewpoint project evaluations were addressed as well as the data requirements for transportation project assessment;
- Providing assistance with the preparation of a manual for roading engineers to follow when preparing requests for roading improvement works funding from the National Roads Board for New Zealand (now New Zealand Transport Agency). The manual set out the economic principles to be followed, the worksheets to be completed and the available data on vehicle operating costs, travel time values, accident costs, traffic flow characteristics and cost indices;
  - The examination of the economic issues underlying roading cost allocation procedures and provided guidance as to which costs ought to be recovered by means of road user charges and how roading costs should be spread over different road users. (Two studies in 1986 and 1993);
  - The construction of a comprehensive and consistent road accident costs data base for New Zealand, suitable for the economic analysis of accident reduction projects.
  - Retained (1982-92) as the economic consultant to the Road Research Unit of the National Roads Board/Transit New Zealand. Specific assignments related to:
    - The compilation of an updated road user travel cost database including vehicle operating costs, travel time values and accident costs.
    - A review of alternative procedures for valuing life and recommendations for the approach to be adopted in road accident cost analyses.
    - An analysis of the results of surveys conducted to identify the economic characteristics of traffic flow.
    - A case study (State Highway 73) of the use or risk analysis in the economic evaluation of roading improvements.
    - The preparation of background notes on a number of topics including risk analysis, cost benefit and project selection.
    - A review of the appropriate discount rate to use in Transit New Zealand project evaluations.

### **RESOURCE MANAGEMENT ACT SPECIFIC PROJECTS**

- The proposed Clifford Bay ferry terminal;
- The proposed pipeline and related facilities to utilise water from the Waikato River for metropolitan Auckland;
- A container terminal expansion by the Ports of Auckland;
- The designation of the Transmission Gully motorway route;
- The proposed Variation No. 8 to the Wellington City District Plan covering height and other controls on development of the airspace above the Wellington railway yards;
- A proposed Town Centre Zone within the Kapiti Coast District;
- Wellington City Council's heritage preservation policy;
- Solid Energy's proposed West Coast Coal Terminal at Granity;
- The designation of land for a proposed motorway extension in the Hawke's Bay;
- New regional correctional facilities in Northland, South Auckland, Waikato and Otago;
- Proposed controls on wake generation by vessels travelling within the waterways of the Marlborough Sounds;



- Southern Capital's proposed new township at Pegasus Bay, north of Christchurch;
- The imposition of land use restrictions within noise contours surrounding Christchurch International Airport;
- The expansion of the Whangaripo Quarry in Rodney District;
- Holcim's proposed new cement plant near Weston in the Waitaki District;
- McCallum Bros and Sea Tow Limited's appeal before the Environment Court regarding extraction of sand from the Mangawhai-Pakiri embayment north of Auckland;
- The development of the Symonds Hill pit at Winstones' Hunua Quarry;
- A new residential and commercial development by Apple Fields at Belfast on the outskirts of Christchurch;
- The proposed Central Plains irrigation scheme in Canterbury;
- The staging of residential and business development at Silverdale North in the Rodney District;
- The redevelopment of the Johnsonville Shopping Centre;
- A Plan Change enabling the relocation of existing development rights for a residential and commercial development on Mount Cardrona Station in the Queenstown Lakes District;
- A new Pak'nSave supermarket at Rangiora;
- A new milk powder plant for Fonterra at Darfield.