AN INVESTIGATION OF TRANSIT NEW ZEALAND'S PROJECT EVALUATION PROCEDURES

Office of the
PARLIAMENTARY COMMISSIONER FOR THE ENVIRONMENT
Te Kaitiaki Taiao a Te Whare Pāremata

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1 Introduction

In 1990 the Parliamentary Commissioner for the Environment audited two State Highway environmental impact assessment reports and made recommendations on the assessment of environmental effects in the evaluation and design of road projects.[1]

In the *Audit of the "Future State Highway Number One Route" Environmental Impact Report,* March 1990 (p.78), it was recommended to the Minister of Transport:

> 21 That after consultation with the Minister for the Environment and the Minister of Finance, Transit New Zealand be provided with policy advice pursuant to section 7 of the Transit New Zealand Act 1989 regarding:
>
> (a) measures to integrate insofar as possible all the social and environmental impacts of land transport and public transport options into the benefit/cost ratio methodology; and,
>
> (b) measures to bring the full costs of road transport to bear on road users including noise, air pollution, land loss, medical costs associated with accidents and congestion, and including freight as well as passenger transport.

The present investigation has again highlighted the difficulties involved in accounting for environmental values (and other intangibles) in the benefit-cost ratio methodology. Because intangible values (such as amenity, noise, air quality and natural ecosystem values) are difficult to quantify in monetary terms, it is difficult to include and account for these values in the project evaluation process.

A complaint concerning the 'Project Evaluation Procedures' of Transit New Zealand was received by the Parliamentary Commissioner for the Environment on 29 March 1994. The complainant expressed concern that Transit New Zealand did not take full account of environmental values and the potential adverse effects of roading on the environment in benefit-cost ratio calculations and subsequent planning and allocation of funding.

This report investigates Transit New Zealand's Project Evaluation Procedures and the assessment of intangibles, with particular reference to the proposed Napier-Hastings Northern Motorway Extension.

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[1] Parliamentary Commissioner for the Environment - *Audit of the Future State Highway Number One Route Environmental Impact Report,* March 1990. - *Redevelopment of State Highway 2, Te Marua to Kaitoke - Environmental Impact Audit,* December 1990.

2 Authority for the Commissioner's Investigation

The Parliamentary Commissioner for the Environment is authorised under the Environment Act 1986, section 16 (1)(b):

- Where the Commissioner considers it necessary, to investigate the effectiveness of environmental planning and environmental management carried out by public authorities and advise them on any remedial action the Commissioner considers desirable.

The Commissioner undertook to investigate Transit New Zealand's Project Evaluation Procedures and the assessment of intangibles with particular reference to the proposed Napier-Hastings Northern Motorway Extension.

3 Investigation Procedure

The investigation involved examination of the following documents and reports:

- The Transit New Zealand *Chronology of Investigations for the proposed Napier-Hastings Northern Motorway Extension* (two volumes);
- The decisions by the Joint Hearing Committee (the Hawke's Bay Regional Council, the Minister of Conservation's representative, and the Napier City Council Independent Commissioner) with regard to the proposed Napier-Hastings Northern Motorway Extension;
- The Transit New Zealand *Project Evaluation Manual*;
- The Ministry of Transport *Transport Directions 1994-1999*;
- The Transit New Zealand *Highway Planning Under the Resource Management Act*;
- Relevant research reports and other background information.

During the course of the investigation the Commissioners staff communicated with:

- David Young (Transit New Zealand - Head Office, Wellington);
- Rick van Barneveld (Transit New Zealand - Head Office, Wellington);
- David Rendall (Transit New Zealand - Napier);
- Chris Kilby (Ministry of Transport - Wellington);
- Neil Grant (Department of Conservation - Napier); and,
- Roland Sapsford (Ministry for the Environment - Wellington).

4 Relevant public authority policy

Ministry of Transport Strategy[2]

Transport Directions 1994-1999 lists environmental sustainability as one of the main transport policy goals identified by the Ministry of Transport.

> 4: Environmental Sustainability: The New Zealand transport system will operate in a manner that recognises the need for long term environmental sustainability in every aspect of its activities.

Priority strategic initiatives have been identified by the Ministry of Transport which will assist transport policy in moving towards the stated goals. The initiatives that have been identified for environmental sustainability are: National Transport Strategies; Noise Standards; Water and Air Quality and Related Environmental Issues; Greenhouse Gas Emissions; Emissions Limitation; Resource Management Act; and Marine Pollution Rules.

Transit New Zealand Environmental Strategy

In 1993 Transit New Zealand prepared an environmental strategy, *Transit New Zealand & the Environment*.[3] The purpose of this document was to outline how Transit New Zealand takes into account environmental values in its operations. The definition of environment is adopted from the Resource Management Act 1991.

> Within the context of sustainable management, Transit New Zealand's guiding principles are to:
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> > Provide, improve and maintain roads in such a way as will, as far as practicable, avoid, remedy or reduce adverse effects on the environment[4].

Transit New Zealand recognises that the loss or damage of plant and wildlife habitats and processes may result from the construction and maintenance of roads. Appropriate design and the effective management of construction and maintenance works is required to reduce the loss of, and the damage to, natural habitat.[5]

Transit New Zealand Project Evaluation

All potential projects identified by transport studies are evaluated by considering their costs and benefits and the evaluation of each project includes an assessment of the

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2 Ministry of Transport, 1994.

3 Transit New Zealand, 1993.

4 Transit New Zealand, 1993, p15.

5 Transit New Zealand, 1993, p21.

environmental effects (in the form of an environmental impact assessment). Where a monetary value cannot be determined for an environmental effect (an intangible), a description of the effect is provided and this is taken into account in the decision making process. Intangible values are identified and reported in project balance sheets and these values are quantified where possible. TNZ is currently drafting improvements to guidelines to standardise the reporting of information and these will be ready by the end of 1994.[6] An independent review of Transit New Zealand's Project Evaluation Procedures for TNZ and Treasury is also occurring in 1994.

The benefit-cost ratio for a project is evaluated by assessing and discounting the road user benefits (accident reduction, time saved in travel, and the reduction in vehicle operating costs) and the cost of construction. Priority for national funding of State Highways is then given to those projects with the highest ratio of benefits to costs. Currently the Transit New Zealand benefit-cost ratio cut-off point for the acceptance of projects is approximately five (i.e. there are $5 of benefits for every $1 of cost).

Land Transport Pricing Study

As one of the components of the Land Transport Pricing Study, environmental externalities in the roading system will be examined. This is a very preliminary study but it will provide a basis for more informed policy making in the future which may have some bearing on the evaluation of intangibles.

5 The Proposed Napier-Hastings Northern Motorway Extension

(a) The Ahuriri Estuary[7]

The Ahuriri Estuary was formed when the 1931 Napier earthquake uplifted 1300 ha of the 3800 ha Ahuriri Lagoon. Subsequent reclamation and drainage programmes have since reduced the Estuary to a 450 ha remnant of the original lagoon. The Estuary is the only remaining sizeable estuary of its type between the East Cape and the southern tip of the North Island.

The Estuary provides habitat for a large number of birds, fish and mud dwelling fauna and it performs several ecological functions (e.g. a fish nursery area, parore habitat, mudflats, and a nesting area for resident and migratory birds). The Estuary is an internationally significant wetland area (for its abundance and diversity of bird fauna) and is regionally important for environmental, cultural, educational, and recreational values. The area has been promoted for inclusion in the Oceania Wetland Inventory because of its important ecological values. The Estuary is shown on Figure One with three associated wetlands: the Southern Marsh; the Westshore Lagoon; and North Pond.

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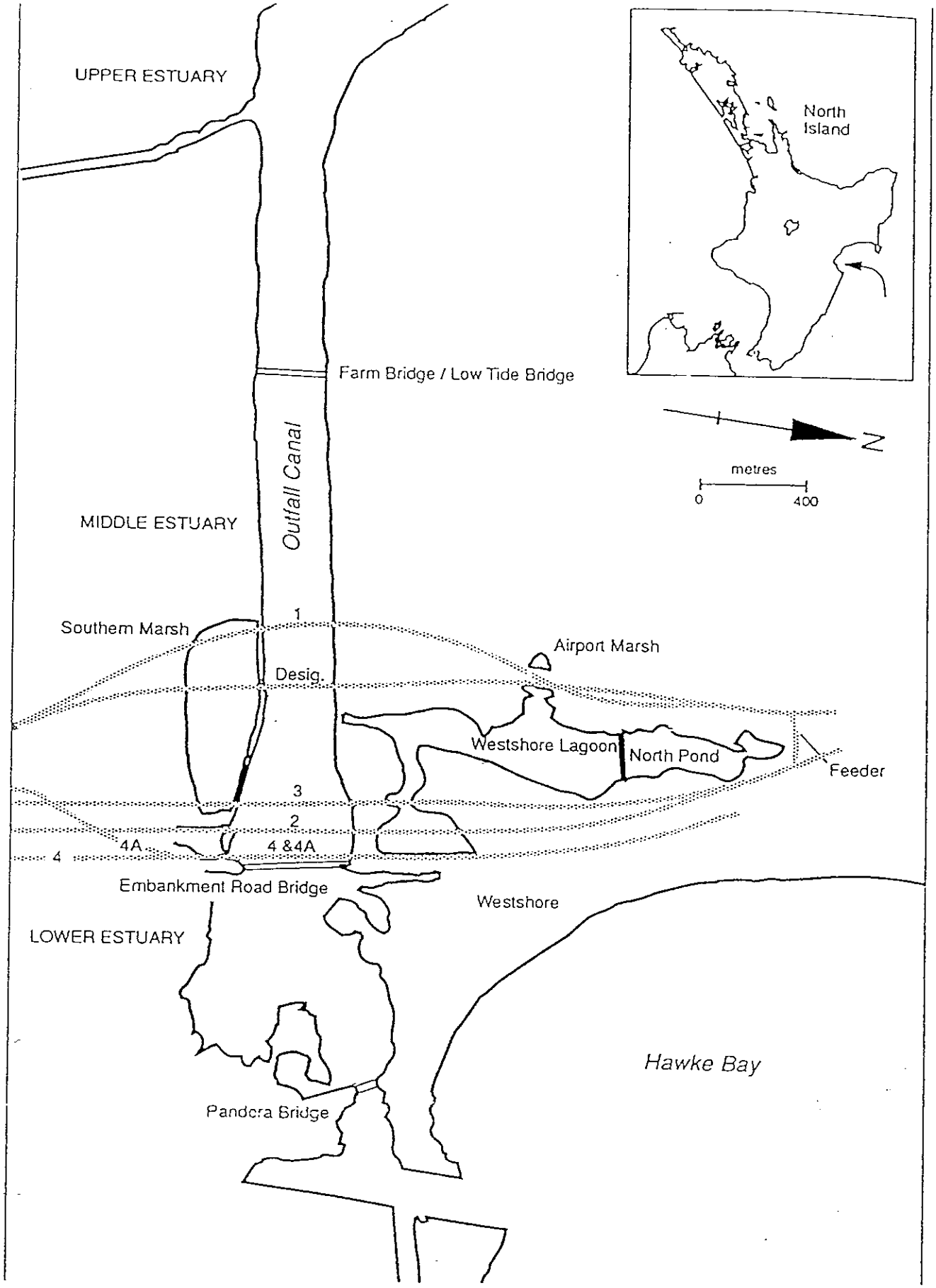
[6] David Young, Transit New Zealand, 1994, pers. comm.

[7] Hume *et al* 1990, pp 3-6; Department of Conservation, 1994, p70.

Figure One Ahuriri Estuary and surrounds, showing the motorway alignment options. *Source:* Hume *et al*, 1990.



Ahuriri Estuary Management Plan[8]

In 1989 in an attempt to resolve some of the conflict over the future of the estuary, various local and central government agencies together with local tangata whenua and environmental groups formed a joint committee to prepare a management plan for the Estuary. The *Ahuriri Estuary Management Plan* was released in September 1992, however it is not a statutory document as it was only intended to provide direction and guidance to agencies involved with the Estuary. The purpose of the Management Plan is:

> To prepare and implement a plan for the integrated and sustainable management of the natural, physical and historical resources of the Ahuriri Estuary and its catchment.

For transport activities the objective of the plan was:

> To recognise and make provision for transport services and infrastructure that are compatible with the environmental constraints, natural features and values of the estuary.

Management policies to achieve the objective included the need to:

> Ensure that structures e.g. bridges, are designed to minimise the effects of runoff and effects on the tidal and natural systems of the estuary and adjacent wetlands. All works and structures in on or over the estuary should be the subject of an Environmental Impact Assessment; and,
>
> Protect the open space of the Estuary by ensuring that the scale, bulk and landscape treatment of transport related structures is considered in the design process.

(b) The Napier-Hastings Northern Motorway Extension[9]

The first proposal to construct the Napier-Hastings motorway was the result of a 1960 Cabinet compromise agreement on the siting of the Hawke's Bay Airport. The construction of the motorway was to begin within four years (by 1964). However by 1964 only the basic location and form was approved, and it took several years for the motorway to be designated on all local district schemes (the last designation occurring in 1970). Construction of different stages of the motorway proceeded slowly during the late 1960s. Because of concern over the lack of coordinated planning in the Hawke's Bay (particularly for roading) a committee was formed in 1969 to complete a comprehensive transportation study for the region. An interim report was presented in 1974 and the full Heretaunga Plains Transportation Network Plan (HERTS) was

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[8] Department of Conservation *et al*, 1992, pp 16,40-41.

[9] Works Consultancy Services, 1992, Appendix A.

presented in 1980. The HERTS Report was reviewed in 1986 and was subsequently adopted by all contributing authorities.

The original designation of the Northern Motorway Extension was Alignment 2 and not the designated alignment as shown on Figure One. The designation had been changed to that shown in 1985 following the 1980 HERTS report. However with renewed interest in the construction of the motorway and further investigations in 1990 and 1992, Alignment 2 has again been selected as the desired motorway designation.

Transit New Zealand is the sole agency in charge of the planning, development and construction of the proposed Napier-Hastings Northern Motorway Extension. It is proposed that the road will initially be declared a state highway before being fully upgraded to motorway status.

(c) Assessment of Effects:[10]

Several environmental impact statement reports were commissioned and prepared and there was further assessment of specific environmental values at risk in the estuary. The information in the environmental impact assessment reports was considered by TNZ in the selection of the most appropriate alignment.

The maintenance or upgrading of existing routes was not an option as traffic problems would intensify in the area. In assessing alternative options a number of key issues emerged from the effects assessment. There was a need to:

- Avoid if possible the Southern Marsh because of important ecological values;
- Minimise the adverse effects on the safety of aircraft;
- Protect the structural integrity of the railway Embankment Bridge;
- Minimise land severance, disturbance of the Southern Marsh and interference of city drainage.

The original designation was discarded as it went through the Southern Marsh and it was too close to the airport with a potentially high risk of birdstrike. Alternative Alignment 1 was declined for similar reasons. Alignments 4 and 4A were too close to the existing embankment rail bridge with potential for land subsidence and differential settling of the road and the railway. Alignment 3 also went through the Southern Marsh which had important ecological values that needed to be protected which left Alignment 2 as the best option.

The method of crossing the estuary and variations on bridge clearance were then examined with a number of considerations taken into account including:

- The impact on the biota and habitat of the estuary;

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[10] Transit New Zealand, 1992, *Scheme Assessment Report*, June 1992, Napier; 1993 *Application for Resource Consents.* August, 1993, Napier.

- The effects on the water flow in the middle estuary;
- The navigability of the estuary for various craft;
- The visual impact of alternative types of crossing; and,
- Cost.

At Alignment 2 the full embankment option was discarded because of the impacts on the bed of the estuary and culverting was not suitable because of the increased rate of flow and the effects on the passage of fish. The full bridging option while having a negligible effect on the biota and habitat of the estuary and a better visual appearance would cost an additional $2.3 million which would put the project out of contention for funding priority.

The selected crossing is a part-bridge (140 m) and part-embankment (80 m southern embankment and 240 m northern embankment). The bridge section is restricted to the main channel to reduce the impact on the bed of the estuary and to reduce the visual impact of the full embankment.

(d) Consultation:

The consultation process was very thorough and involved all major parties. The Joint Hearing Committee considering the resource consents acknowledged and appreciated the extensive consultation by Transit New Zealand.

(e) Resource Management Act 1991 Processes

A notice of requirement for an alteration to the designation of the proposed Napier-Hastings Northern Motorway Extension was given to the Napier City Council on the 20 August 1993.

Transit New Zealand applied for the following resource consents from the Hawke's Bay Regional Council on the 20 August 1993:

- A coastal permit for construction of a motorway bridge and culverted embankment structure across the Middle Ahuriri Estuary;
- A water permit for diversion of water in the Purimu and County drains and the old bed of the Tutaekuri River;
- A land use permit for the construction of a culvert or bridge across the old bed of the Tutaekuri River;
- A discharge permit for the discharge of fine sediment into the Ahuriri Estuary during construction of the motorway crossing;
- Any other consents that may be required.

A Joint Hearing Committee (consisting of the Hawke's Bay Regional Council, the Minister of Conservation Appointee, and the Napier City Council Independent Commissioner) heard the consent application and the notice of requirement. Separate decisions were made by the Napier City Council, and the Joint Committee of the

Hawke's Bay Regional Council and the Minister of Conservation appointee under the Resource Management Act section 102 (3)(b).

(f) The Decision

In its decision the Joint Hearing Committee took into account the environmental values of the estuary. However:

- The Joint Committee regretted that the Transit NZ benefit/cost ratio process failed to adequately account for the ecological and social values of the impacted environment.

- The Napier City Council also commented that cost/benefit ratios take no account of conservation or amenity values. It then stated that there should be some effort by Transit NZ to value important environmental assets and include these values in the benefit-cost ratio.

The Joint Committee agreed with submissions that the estuary should ideally be fully bridged but recognised that this would increase the cost and could preclude the bridge being built, so it framed its conditions to account for this.

The conditions included:

Condition 3: The motorway crossing of the Outfall Canal should be fully bridged unless the benefit/cost ratio of such a crossing causes the project to fall from funding priority, in which case the bridge span should be the maximum length achievable under the funding criteria current at the time and not less than 140 m.

Condition 5: That the southern causeway should be no longer than 80 m' and if it involved infill then there would be a need to reinstate the channel.

Condition 19: 'No activity' was allowed outside the 34 metre imprint of the motorway without consent. This condition in effect required TNZ to apply for an additional consent in order to dredge a new channel to reinstate the main southern channel around the embankment.

TNZ then lodged a notice of inquiry with the Planning Tribunal regarding conditions 3 and 19 pertaining to the bridge length and the need for a dredging permit. The appeal was based on the grounds that condition 3 would be 'invalid, unenforceable and lacking in certainty for the applicant' and that for condition 19 'it is unreasonable to expect construction activities to be limited to the 34 metre imprint of the proposed bridge and causeways.' The inquiry is scheduled to be held in August 1994.[11]

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[11] Transit New Zealand Notice of Inquiry, 1994

TNZ in response to condition 19 requiring an additional consent for dredging in the estuary, applied for and obtained (with conditions) a consent from the Hawke's Bay Regional Council to reinstate the main channel around the southern embankment.

The owners and operators of the camping ground near the Westshore Lagoon have also appealed the granting of the consents because of the adverse effects of the motorway on the camping ground.

6 Evaluation

Cost-benefit analysis (CBA) can assist decision makers to select the most appropriate project from different alternatives by providing a technique which allows the comparison of projects with different time periods, locations, designs, costs, and benefits. The CBA process relies on the identification and allocation of quantifiable monetary values of various costs and benefits for the value of any project to be determined. If the economic value of different projects can be evaluated and then ranked, the selection of projects that provide the most value (return on investment) can be chosen.

The evaluation and inclusion of intangible costs and benefits in the CBA process has been an ongoing problem. Attempts have been made to incorporate intangible values into the mainstream CBA process but techniques such as hedonic pricing and contingent valuation can be time consuming, expensive, and still not provide accurate monetary measurements for intangible values.

A detailed environmental impact assessment and consultation with the local community can identify the main environmental and social effects of any project. In association with the formal benefit-cost ratio process, the identification and listing of intangible values can indicate the values that are affected by any project. These steps in the evaluation process are the minimum requirements to enable informed decisions to be made about the true cost (tangible and intangible) of any project.

The Transit New Zealand *Project Evaluation Manual* 1991 (see section 4) explains how benefit-cost ratios for TNZ projects are calculated. As part of its project evaluation process TNZ takes into account the various effects on intangible values from different options within a project (i.e. relative weightings are given to different intangible values). For example, for the proposed Napier-Hastings Northern Motorway the chosen Alignment 2 reflected the need to avoid the Southern Marsh to protect important environmental values. The benefit from the protection of the Southern Marsh was not included in the benefit-cost ratio analysis.

However consideration of intangible values does not occur in the national ranking and weighting of projects. A formal procedure where intangible values are considered on a nationwide basis would enable the projects with significant intangible values to be recognised and provided for, with appropriate project design to protect or mitigate adverse effects on significant intangible values. The 'matters of national importance' as

set out in the Resource Management Act 1991, s6, could be used as a set of criteria for significant intangible environmental values.

For the proposed Napier-Hastings Northern Motorway, TNZ have stated that current funding will only permit a bridge length of 140 m. Full bridging would cost an additional $2.3 million and remove the project from the priority list for TNZ funding (the benefit-cost ratio would be reduced to approximately 3.7).

It is recognised that for TNZ to be able to rank projects and allocate funding on a national basis there must be sound criteria for the inclusion or exclusion of costs and benefits. The demands on national funding pools can increase *ad infinitum* without strict criteria for project selection. If exceptions are made to funding criteria for any one project this can distort the national ranking formula and result in inequitable and inefficient funding decisions. Additional benefits such as extra bridging, the extension of motorways, the construction of crash barriers, the widening of roads, and landscaping could all be claimed for various national projects but they also incur additional costs.

However a problem occurs with project evaluation if the costs to prevent or mitigate adverse effects to significant intangible values are included in the benefit-cost ratio without the corresponding benefits. The evaluation procedure is distorted with an unfair comparison of benefits and costs. To solve this problem it is proposed that either:

- The costs to prevent or mitigate adverse effects **and** the benefits obtained from the action should be included in project evaluation; or,

- The additional costs to protect or mitigate adverse effects on significant intangible values should not be included because of the difficulties in valuing intangibles and incorporating the benefits into the benefit-cost ratio.

It is recognised that this approach would reduce the number of road transport projects nationwide, but it would also bring an improved environment, the mitigation of adverse environmental effects and the protection of significant intangible values. The inclusion of road transport projects on the priority list for national funding needs to include criteria other than just direct costs and benefits. If the public determine that an ecosystem should be protected, this is a limit that should be reflected in an appropriate road design.

Alternative funding strategies should be investigated if there is insufficient funding at the national level to provide for the mitigation of adverse environmental effects and the protection of significant intangible values (such as the Ahuriri Estuary). A local or regional contribution to funding of road transport projects in recognition of the regional and non-road user benefits from the protection of significant intangible values may be required.

7 Conclusions

The present investigation has again highlighted the difficulties involved in accounting for intangible values in the benefit-cost ratio methodology. This report promotes the explicit recognition of significant intangible values in project evaluation procedures so that sustainable management of the roading network can be achieved. The proposed Napier-Hastings Northern Motorway provides a classic example where all costs and benefits have not been included in the benefit-cost ratio.

Findings:

1) Further recognition, development and standardisation of methods and procedures for considering intangible values is required.

2) Where monetary values cannot be obtained for intangible values the recognition and listing of them in the assessment of projects is the minimum requirement.

3) If all costs and benefits are not included in a benefit-cost ratio analysis there is the potential for incorrect decisions to be made, with resulting adverse effects on the environment. The costs to protect or mitigate the adverse effects on significant intangible values should not be included in the evaluation of projects unless the resulting benefits are also included.

4) A formal procedure needs to be developed by Transit New Zealand where it can consider the relative adverse effects of road transport projects on significant intangible values on a nationwide basis. The matters of national importance as set out in the Resource Management Act 1991, s6, could be used as a set of criteria for significant intangible environmental values.

5) It is recognised that this approach would reduce the number of road transport projects nationwide, but it would also bring an improved environment, the mitigation of adverse environmental effects and the protection of significant intangible values.

6) Additional funding will be required for some projects to protect or mitigate the adverse effects on significant intangible values and this may also reduce the total number of national road transport projects.

7) A local or regional contribution to funding of road transport projects in recognition of the regional and non-road user benefits from the protection of significant intangible values may be required.

8 Recommendations

Following my investigation of the proposed Napier-Hastings Northern Motorway Extension and the procedure used by Transit New Zealand to determine the benefit-cost ratio, I make the following recommendations.

Recommendations to Transit New Zealand:

1) Develop a procedure to consider the relative importance of significant intangible values on a nationwide basis in the evaluation and funding of road transport projects. Where there are significant intangible values, additional funding may be required to protect or mitigate adverse environmental effects that result from road transport projects.

2) Note that:

   (a) Distortions will occur with project evaluation if the costs to prevent or mitigate adverse effects to significant intangible values are included in the benefit-cost ratio without the corresponding benefits. To solve this problem it is proposed that either:

   - The costs to prevent or mitigate adverse effects **and** the benefits obtained from the action should be included in project evaluation; or,

   - The additional costs to protect or mitigate adverse effects on significant intangible values should not be included because of the difficulties in valuing intangibles and incorporating the benefits into the benefit-cost ratio.

   (b) If a project is going to affect significant intangible values, additional funding will be required to protect or mitigate the adverse effects on those values. It is recognised that this approach may reduce the number of national road transport projects but it would also bring an improved environment, the mitigation of adverse effects and the protection of significant intangible values.

   (c) Alternative funding strategies for road transport projects may need to be investigated to account for regional and non-road user benefits that result from the mitigation of adverse environmental effects and the protection of significant intangible values.

Further Comment

I note that the independent review of Transit New Zealand's Project Evaluation Procedures will be completed this year. I would welcome the opportunity to see the review and make further comment if appropriate.

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