COMMUNITY RESPONSES TO TRAFFIC CHANGES

A model of community-road transport systems interactions

Tom Ludvigson, Ph.D.
Transport Engineering Research New Zealand Ltd.

TERNZ Technical Report

June 2002

TERNZ Ltd
17-19 Gladding Place, Manukau City
PO Box 97846
South Auckland Mail Centre
info@ternz.co.nz

Contents

1. Introduction

This paper presents research findings, in the form of a model of community / transport system interactions. These findings are based on a review of documents produced in the context of transport related resource consent applications; augmented by interviews with traffic planners and traffic engineers. The particular focus of the review was community concerns as identified in analyses of public submissions or public consultations regarding traffic related developments. The objective of this review of documents showing communities' issues and perspectives on proposed developments was to identify significant commonalties and differences in the concerns expressed.

This research is one component in a larger research programme aimed to determine the impact of light and heavy vehicle traffic on local communities, and the expectations of those communities of the road transport system, in order to guide the sustainable development of the road transport system.

2. Approach

A two stage approach was adopted: an initial review of a small number of cases, to scope the level of complexity of the material and identify salient dimensions as input into the next stage of the research, was followed by an analysis of a further set of documents, chosen to illuminate particular dimensions identified as significant in the earlier analysis. This included reviewing transcripts of group discussions focussed on both perceived effects of contemporary increases in traffic, and projected effects of future proposed optional roading developments /treatments.

Preliminary research results were presented for feedback to traffic planners and engineers in seminars and interviews, and their responses have further informed the research.

3. Findings: diversity and complexity

Community responses to traffic and roading changes were found to be diverse, multi-vocal, and frequently contradictory.

Change was identified as a major factor in community responses to traffic. It was not volume of vehicle traffic per se that caused a response, but an increase in volume. For example, high volume /fast traffic was generally perceived as a risk to school children, while an increase in traffic volume /speed could raise parents' concern to the point where they would change their behaviour and start driving their children to school, if the walk is perceived to have become too dangerous.

Responses to traffic and roading changes were found to be largely responses to the perceived effects of those changes. Differences in perceptions and evaluations of the nature and relevance of different effects contributed to the diversity of community responses.

Individual people's responses to effects were found to be further mediated by their specific life-situation, as expressed in their daily activities, plans and interests. This contributed further to the diversity and complexity of community responses.
The importance of local context – people's concern for specific features of the local environment, and specific events in the history of the community added complexity and diversity to their responses.

The emphasis on examining different options for major developments makes for a situation where each option presented to a community is evaluated in the context of a set of specific other options. Differential location of proposed roading development options can then give rise to opposed stakeholding factions on the basis of the NIMBY (Not In My Back Yard) principle.

The discourse analysed can be further characterized in terms of a set of themes evident in concepts and contrasts that served as foci for distinctive areas of community responses:

- Types of vehicle traffic: development /construction traffic - trades people, electricians, plumbers, builders, trucks carrying materials to building sites VS residential traffic through residential area; access for residential services vehicles compromised by extended peaks – carpet cleaners, lawn mowers, house painters; through traffic, commuter traffic.
- Children and schools: parents will not let children walk on busy road sidewalk with no barrier between pedestrians and traffic, but will instead take the children to and from school in cars, which generates traffic around 9am and 3pm.
- Residential VS arterial roads: residents expectations.
- Number of lanes: this will determine the extent of issues over crossing the road and speeding cars; from two lanes (with median strip) to four lanes is perceived as going from safe to dangerous.
- Traffic effects and treatments: speed, speed limits and speed cameras; congestion deflects other traffic into residential areas; traffic lights VS roundabouts; over-bridges VS level crossing intersections; trucks causing

noise and emissions of contaminants, especially going uphill; problems turning into and out of driveways; right hand turns and median strips.

The themes analysis was an attempt to capture some typical and predictable elements among people's responses to traffic and roading changes. The analysis was focused on *general* features present in typical situations of traffic and roading changes. Community reactions to present or proposed traffic and roading changes were also predicated on *particular* features of that locality – that is the specifics of the local geographic /environmental /socio-economic /demographic /business context.

A few examples of less typical stakeholder responses to specific features of a locality affected by a proposed roading development will serve to illustrate the difficulty of building a model that will predict such "particulars":

1. *construction effects* raising community stakeholder concern over potential damage to specific local sensitive environmental features;
2. *access effects* causing business owners concern over potential effects on their customers' access to their own and their competitors' retail outlets;
3. *improved access* to a previously remote area causing land values to rise, while on the one hand being received positively by property developers, on the other hand generating concern among pensioners on fixed incomes about not being able to afford the increased rates, and so being forced to move elsewhere.

[1] above depends on what precise sensitive features are present in the local environment; [2] depends on specific features of the economic geography of the locality; [3] depends on specific features of the geography and roading network being of such a nature that a radical change in access will cause property prices to increase, etc.

To be able to predict [1] we would need to know on what precise sensitive features are present in the local environment; to predict [2] we would need to know the specific features of the economic geography of the locality; and to predict [3] we need to examine the local geography and road network for existing radical differences in access, so as to determine whether any proposed roading changes has the potential to lead to substantial increases in property values.

Such specific features of the local environment could be incorporated into a general model by developing checklists of features that, if present in the local environment, are likely to serve as "handles" for local community stakeholder expressions of concern.

4. A model of community responses

Based on the above findings a model was developed to make explicit interactions and interdependencies among:

- six model elements, and
- seven linkages among these elements.

These elements and linkages together form a framework that allows clear definition of core road transport systems interactions with communities. In particular, the model provides a framework for identifying specific traffic changes; their perceived effects; community stakeholder activities affected by the perceived effects; the stakeholder(s) whose activities are affected; community responses setting objectives for remedies to mitigate the perceived effect; and potential treatments and related measures to achieve those objectives.

The six proposed model elements are:

1. Changes (C)
2. Effects (E)
3. Activities (A)
4. Stakeholders (S)
5. Responses (R)
6. Treatments (T)

A schematic of the model is illustrated in Figure 1.

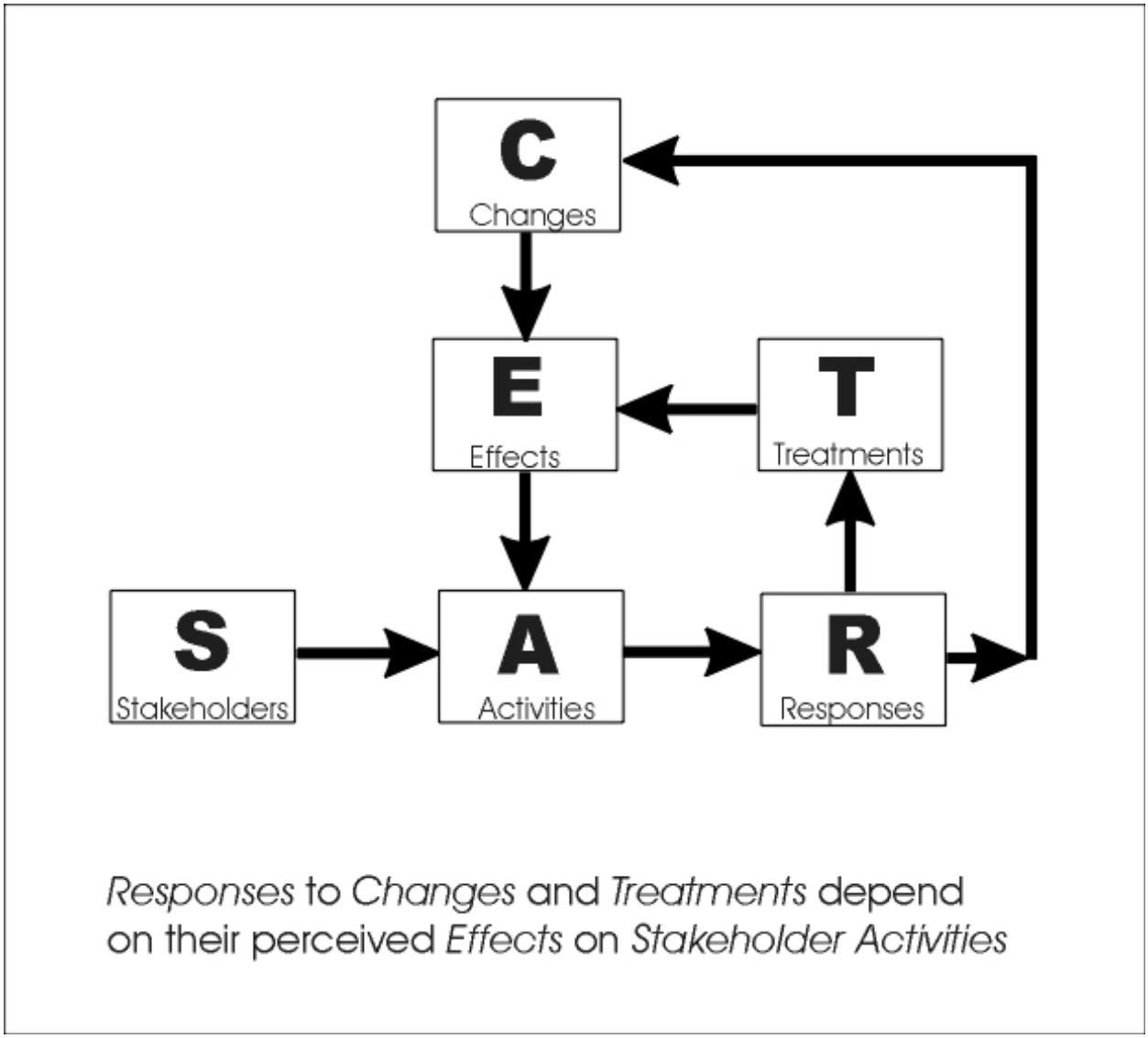

Figure 1. Model of community responses.

4.1. Changes (C)

- Existing or proposed;
- Gradual increase and threshold levels;
- Changes in traffic volume: increase /decrease in number of vehicles;
- Changes in traffic composition: increase/decrease in proportion of heavy vehicles;
- Increase /decrease in vehicle speed;

Examples: increased traffic density; increase in proportion of heavy vehicles; increase in vehicle speeds; increased traffic congestion; extended peaks; new infrastructure construction; increased exhaust fumes pollution; disrupted access; improved access -> rising land values -> increased rates; more through traffic; increase in traffic noise.

4.2. Effects (E)

The model is largely focused on effects perceived as negative /adverse by those affected.

This is an effect of the approach to the research: the community responses reported in the documents analysed were largely focused on adverse effects.

Examples of effects on people in the community as identified in the analysis are: fear of own /family traffic injury; lack of sleep; uncertainty /forced limbo; loss of access /parking /business customers /amenities /land /property values /environmental values; waste of time /delays.

Top of the list of potential adverse effects of traffic changes or increases was risk of injury from traffic accidents or incidents, due to, in particular poor visibility; busy intersections; or drivers stopping /turning /parking /pulling out into a steady uninterrupted traffic flow.

Losses of all kinds featured prominently among the perceived effects causing stakeholder concern: loss of access – including access to neighbourhood social networks; loss of time – wasted on detours and in slow traffic; loss of parking – an issue for both residents and local businesses; loss of business customers – can affect business income and viability; loss of land – any land takes required for infrastructure development; loss of traffic safety – especially for children walking to school; loss of environmental values – through e.g. pollution of clean features; loss of amenities – views, peace and quiet, dark night; and loss of property values – a drop in property values due to e.g. loss of amenity is a loss for property owners, while an increase in value will affects rates /rents, which may rise to become unaffordable for people on fixed incomes who may then be forced to move away.

Apparent improvements were found to sometimes have negative effects for some stakeholders: Improved road access to local facilities can be especially significant for elderly non-drivers and families with children, but may also constitute a threat to current lifestyles, as it may provide an infrastructure for future development of undeveloped land, with concomitant increases in property values and rates. Improved road access is likely to ultimately leads to increased pressure on:

- local environment: estuaries, water, air, green areas, wildlife /birds /fish;
- local amenities: peace/quiet, views, lifestyle;
- local services: roading, sewerage, water; and
- local finances: property values, rates.

Proximity to the road was identified as a salient dimension in distinguishing between effects experienced on the road; abutting the road; and in the surrounding area (away from the road).

Construction effects on adjoining properties included, in order of severity: minor intrusion without significant effects on the property; removal of structures like a garage, water tank, or sleep-out; effects on property access (lost/steepened); loss of front yard, effectively bringing the road hard up against the dwelling and thereby

making the dwelling uninhabitable; and removal of dwelling because the proposed construction impinges on the building. The first two effects represent some loss of amenity for the residents both in terms of the loss of land (and sometimes structures) and the closer proximity of the traffic to the dwelling. The fourth and fifth options both mean that the dwelling is uninhabitable.

The research identified another salient distinction in the timing of community effects. On the one hand there were *cyclical time* dependent effects (diurnal /weekly/seasonal) featuring a mostly repetitive pattern:

- morning /evening peak traffic: Increased traffic density /congestion around 8am and 5pm, especially in urban areas, due to travel to /from work – i.e. commuter traffic;
- school rides 9am and 3pm: a perceived increase in traffic may lead to parents driving their children to and from school by car, a frequent response to increased traffic density which itself generates increased traffic density (at times to the point of congestion) in the vicinity of schools around 9am and 3pm;
- shop hours: retail hours – customers parking to shop;
- night time: sleep VS light /noise nuisance;
- weekend: sports /events /markets /churches – site-based activities with associated travel and parking;

On the other hand there were project related time dependent effects, unfolding in a common sequence :

- effects felt from times plans for changes were made public: limbo – sales on hold; property values /social effects;
- effects felt at /from time of construction: access effects; physical /construction effects; and
- effects following completion of construction: intended /unintended effects; long term effects; effects on future generations.

Time was identified as a common theme in reports where "options" studies form part of the statutory process of obtaining resource consent: "A decision needs to be made quickly so that people can get on with their lives". Early purchase of properties to "move on".
Stages of the project cycle result in an "impact cycle". Specific features of the project cycle stages generate the distinctive features of stages in the impact cycle[1]:

Stage 1: announcement of an 'options' study

Effects: limbo, plans on hold, uncertainty, property values

Population affected: hinterland of all options

Mitigation: release information, time schedule, consult affected

[1] Note that this requires a separate analysis for other types of treatme3nts apart from construction (cf. e.g. a policy /programme re residents preferential parking or school trip safety)

Stage 2: announcement of decision selecting one option

Effects: mitigation /purchase process for affected.

Population affected: hinterland of selected option (a subset of the former).

Mitigation: Fast release of compensation /property purchase policy.

Stage 3: actual construction

Effects: construction effects (mitigation in place before effects).

Population affected: hinterland of construction activities.

Mitigation: in place before construction begins.

Stage 4: operation

Effects: traffic effects.

Population affected: hinterland of completed new traffic infrastructure.

This suggests the need to distinguish between two major types of "traffic effects":

1. '[traffic] growth' effects (growth cycle dependent – continuous, 'thresholds'); and
2. '[traffic] project' effects (project cycle dependent – discrete stages).

The former drive the latter: the projects are responses to growth – they are all a form of 'mitigation' of growth effects: they are "treatments" (that in their own turn generate responses and treatments). All projects analysed were treatments of growth effects; the community discourse analysed was a mix of :

- responses to traffic growth effects; and
- responses to proposed projects – proposed construction effects and traffic (increase) effects.

Treatments are projects just as much as responses take the form of formulating objectives.

4.3. Activities (A)

The research found that each community in the analysis was best understood as a system of activities. Individual stakeholders' responses to perceived traffic effects were found to be mediated by the specific activities each person engaged in. Stakeholders responded to traffic changes when something they did was affected, hindered or prevented by those traffic changes. This system of activities also included planned activities - often "invisible" to the eye.

Examples of road-oriented activities identified as affected by traffic changes: driving to /from work; driving to /from local home; driving to /from school; driving and stopping; turning right into side road /driveway; turning left into side road /driveway;

turning out of side road /driveway; reversing out of side road /driveway; pulling out from kerbside parking; entering and exiting the stream of traffic; kerbside parking by home; walking along road; crossing the road; riding along road; and cycling along road.

Examples of off-road activities identified as affected by traffic changes: being at home; sleeping at night; retirement planning; running a shop /business; and selling a home.

4.4. Stakeholders (S)

Community responses to traffic changes were found to be complex and diverse, but not chaotic. At the level of "the community" it was rare to find a unitary response - to that extent the notion of "a" community response turned out to be misleading. It was however possible to discern structure in community responses at a lower, more detailed level of analysis, by paying attention to differences among the people that make up each community. Only when the research differentiated the community into groups with distinctive interests and responses did any order and structure in the material become apparent.

A key to unravelling the complexity of community responses was found in the 'stakeholder' concept, which differentiates members of the community according to their specific interests and concerns. Using this approach, each 'community' responding was seen as made up of stakeholder groups with different but predictable activities, interests and responses. This made it possible to gradually assemble a general model of typical community stakeholder groups with typical interests.

Examples of salient stakeholder groups identified in the research: Drivers - commuters; residential services' tradesmen; bus driver; local residents; local residents commuting; residents on abutting property /visitors; parents of school children; Cyclists - school children; commuters on bicycles; other cyclists; Horse riders - sensitive to exposure to vehicle traffic; Pedestrians - school children; mothers with children; retired people; Users of other pavement modes - issue over blocked pavements from spillover parking at weekend events, for stakeholders using tricycles, walkers, wheelchairs, skateboards, or roller-blades; Residents on properties abutting the road - proximity to the road matters, as these residents are exposed to a greater range of effects than are other area residents, especially vehicle access /driveways /parking issues, and loss of land /access /dwelling /amenities; Business owners - loss of access /parking; and Residents with environment concerns - residents on tank water concerned about increased emissions from more vehicles.

Effects on households included loss of property; reduced amenity; noise; fumes; loss of granny flats at the front of properties; the loss of development potential; stress created by the proposals; concern for the environmental impacts; the effect that it would have on lifestyles, and plans/expectations; concerns about safety (increase speed of traffic); and effects on property values.

Three key stakeholder groups were identified in terms of life cycle stage: commuters; families with children; and retired people. These groups reflect the changing needs of

householders as they typically move from young singles/couples, into families with children, then older individuals and couples without children.

In most communities some residents work outside their home area, or have jobs which involve moving outside it at some stage during the day. A proportion of these commuters have work hours that contribute to the morning and evening traffic peaks. As a group they will gain from improved access.

Families with children have specific safety and travel concerns, which would be affected by roading developments. These principally relate to the children between 5-14 years getting safely to and from school. Specific circumstances to which influence the scale of these effects are:

- Precise location of schools in relation to main roads; and
- if families perceive that it is not a safe walk for their children to and from school a further task will be imposed on the caregiver(s) to either drive or walk them to school.

A major issue for retired people, particularly those on fixed incomes, is the affordability of any infrastructure developments to the extent that they result in rate increases. These could result from either expensive projects to be paid for by ratepayers, or a rise in property values with a corresponding increase in rates demands.

An increase in property values (and hence rates) from improved road access could also make life very difficult for retired residents. People who own real estate of sufficient land area to subdivide for more residential development are impacted in different ways. This group includes both residents with large sections that have potential for development through construction of in-fill housing; and owners of larger tracts of land bought as an investment with a view to subdivision. Improved road access hand would generally impact positively on such plans, except if the properties were directly affected by construction works. It can make a locality a more attractive area to live, with a corresponding expectation of an increase in the desirability and market value of real estate in parts of the area.

People who own businesses in the local area may experience different effects, varying with the nature of the business operated. A threat to business operators lies in changes that have effects that thwart their expectations of an expanding customer base underpinning an expanding business. Improved access to their businesses could be of benefit to business operators. Relieving road congestion would benefit mobile service vendors and other businesses that rely on swift road access to their customers' residences and other locations, to service customer needs there.

Issues identified in the reports analysed as of concern to tangata whenua included:

Need for iwi participation prior to /during construction

- Employ a tangata whenua liaison person.

Protection of spiritual values, land and sea

- Water quality, kai moana, storm water discharge, road runoff;

- Local ecology / wai /water (courses, sea); creeks /wetlands;
- Local area amenity effects – tree removal, reduced green areas;
- Areas of cultural significance, historical /archaeological sites /urupaa (burial sites), waahi tapu (sacred sites), Marae.

Effects on Maori population in the community

- Passenger transport for non-vehicle users;
- Houses affected: rental VS private?
- Employment implications of effects on businesses (closures);
- Effects on schools and recreational areas.

4.5. Responses (R)

The core response by concerned community stakeholders was found to be to formulate and pursuing remedial objectives, with the common theme to preserve or recreate the conditions or functionality seen to be lost or threatened.

Examples of remedy objectives identified in the research are: separation of pedestrians from traffic; keep horse riders and through traffic separate; slower traffic; stop traffic; reduce direct crossing of moving vehicle paths; reduce stopping in moving vehicle paths; avoid reversing into traffic; avoid main traffic stream; improve safety for bus passengers; provide for safer school trip; equity; reduce hardship; remove health hazard; eliminate situations of risk; minimise crash risk; improve visibility; reduce through traffic; minimise situations that cause (engine /traffic) noise; no road lights on homes at night; reduce vibrations felt from traffic; reduce emissions from engines; improve traffic flow; stop the proposed infrastructure construction /development; preserve /replace access and parking; and prevent loss of environment quality.

Much emphasis was placed on rationality as the core ground for any decision among options. The majority of the arguments in the discourse analysed depended on the notion of a rational method for their persuasiveness: the rational approach examines all the relevant data and comes to an inevitable and correct conclusion, while the rationality of the methods employed guarantee the validity of the results. This concern with rationality was frequently expressed through an emphasis on the need to ascertain the reliability of the data used in identifying the precise issues to be addressed; the methods used to produce such data; and the methods used in calculations and extrapolations made from such data.

The rational method often crystallized into some form of cost-benefit analysis, with a variety of explicit or implicit versions of how to add up what costs to whom, to measure against what benefits to whom. The widespread use of rationality as the persuasive ground for any decision also underpins the occasional challenges to report data, with calls for specific studies to fill a perceived lack of the data deemed necessary to make a rational assessment of a situation. The most commonly requested

studies were origin and destination of traffic; and traffic flow in different sections of road at different times of day.

Suggestions made by residents regarding what would be appropriate grounds on which to choose between proposed options included: 'people come first'; 'environmental considerations should play a major part'; 'financial considerations should be decisive'; 'a cost-benefit analysis'; and 'the maximum benefit for the minimum harm'.

Objections to proposed options were found to have a very small generic rhetorical base: "We don't want it (insert any option) because:

- it's not going to work (won't relieve the congestion; can't build a road across that land);
- it will be too expensive (if private funders pull out; buying land for road widening);
- it is not necessary (new State Highway alignment will change things; traffic is local, not to/from city);
- people won't use it; (toll cost too high; small time saving for drivers using it; New Zealanders don't use public transport); or
- it's environmental impact is too great (land reclamation; sensitive ecology).

A community may feel that inaction – the 'do nothing' option - in a particular situation has a major impact.

Many arguments revolved around environmental issues, and any perceived potential for environmental damage. Infrastructure construction was sometimes held to be environmentally destructive, damage native vegetation and /or wetlands, or otherwise harm recognised ecological and environmental values, especially:

- sensitive wetland areas,
- endangered species,
- spawning areas for fish,
- localities already under threat from e.g. silting or toxic waste, and
- landscape values and views.

4.6. Treatments (T)

- The effects of treatments are not available apart from specific affected stakeholder activities;
- treatments are part of feedback loop;
- context-free ranked evaluation of treatments not feasible - only misleading;

The list below of proposed treatments and enhancements shows the variety of what community members suggested be done to mitigate perceived effects in the cases analysed:

- lower / raise speed limits; speed cameras; regular police patrolling;
- footpath, fences, railings; separators;
- walkway, cycleway, sidewalk, railing, school bus;
- pedestrian crossing /over-bridge /underpass;

- well lit /patrolled pedestrian facilities;
- traffic lights; roundabouts; traffic islands;
- change phasing of traffic lights
- traffic calming on local roads, speed bumps etc..
- reverse vehicle into driveway; median strip for right turn;
- turning bays; parking bays ; slow lanes; bus stop bays, bus lanes;
- provide lanes for turning /stopping /passing;
- free turn lane, free lane at T crossing lights; merge lane at T crossing;
- give way signs /road markings; road signage;
- provide / prohibit car parking; off-street parking;
- alternative parking / access provided;
- divert through traffic from horse riding areas;
- provide horse riding paths away from traffic;
- minimise stops; redirect trucks /through traffic elsewhere;
- more efficient engines; enforce emission standards;
- dedicated truck /through traffic routes;
- improve capacity of collector /arterial roads;
- widen road; multiple lanes; plus movable centre barrier;
- leave things as they are (=no change option);
- straighten bend /road; dig out hill; remove obstacles;
- relocate dwelling(s); land /property purchase; compensation;
- minimise uncertainty; fast resolution; relocation grants;
- plant /preserve green belts; plant shelter belt /hedges;
- connect to /provide reticulated water supply;
- culverts, silt traps, environmentally sensitive road alignment ;
- calculate rates on other criteria than property market values;
- reduce road /property entrances; provide / close access;
- driveways sized to turn car around; double driveways; and
- shopping centres / zoning.

5. Model linkages

It is the linkages between the elements of the model that furnish its dynamic aspect and allows it to function as a tool in analysing and predicting community responses to traffic changes. The model linkages allow an analyst to formulate precise hypotheses about the specific characters and detailed features of less known model elements, by extrapolation along the model linkages from elements about which more information is initially available. This is indeed the core application that turns the model into an analytic and predictive tool.

The six model elements interact through the following seven linkages:

1. Traffic Changes -> Effects
2. Effects -> Activities
3. Stakeholders -> Activities
4. Activities -> Responses
5. Treatments -> Effects
6. Responses -> Traffic Changes
7. Responses -> Treatments

5.1. Changes -> Effects

This model linkage makes explicit the finding that traffic changes themselves cause specific effects, or changes in specific effects, and that it is these effects that people respond to. The research consistently found community concerns and responses focused, not on the traffic per se, but on the effects of traffic changes. This model linkage also mirrors the emphasis on effects in the Resources Management Act.

5.2. Effects -> Activities

This model linkage makes explicit the finding that the traffic effects at the focus of community concern impinge on and become noticed by community stakeholders by affecting the activities in which they are engaged. To put it differently, the effects only become available for perception by people engaging in the activities. An obvious corollary is that if no community activities are affected, there will be no response.

From a broader perspective, this model linkage acknowledges the common human fact that people are always ‘on the move’ within their own lives, with each activity guided by aims that build into a more or less ordered hierarchy of means and ends, which in turn gives purpose to our everyday activities, from grocery shopping to retirement planning. It is often this larger context of aims and plans that gives perceived traffic effects their particular character, as they frequently frustrate the aims

that underpin the affected activity, by making it more difficult or impossible to achieve those aims.

5.3. Stakeholders -> Activities

This model linkage makes explicit the finding that a typology of stakeholders allows prediction of the types of activities in which different types of stakeholders engage. Some stakeholder groupings have descriptive labels derived from people's travelling activities (sometimes featuring the mode of transport employed), such as 'commuters', truck drivers', and 'cyclists'. Others have labels drawn from other activities implicated in traffic effects, such as 'shoppers', 'property developers', 'business owners', 'school children' and 'roadside residents'.

Note that this linkage allows an analyst the opportunity to generate hypotheses about what might be salient stakeholder groups within the community by deriving the groupings from known activities.

Conversely, another application of this model linkage could be to use demographic/census data to predict the predominance within a locality of specific activities (including travel behaviour) associated with specific life cycle groups such as commuters, families with children or retired people[2].

5.4. Activities -> Responses

This model linkage makes explicit the finding that the nature and significance of the stakeholder activity that is affected by the effects of traffic changes will largely determine how that stakeholder will respond to those effects.

This linkage allows an analyst the opportunity to generate hypotheses about the potential scale and significance of the community response to specific effects, based on the prevalence and significance of that activity within the community. Effects on significant activities translate into significant effects and significant responses. Effects on prevalent activities translate into prevalent responses.

5.5. Responses -> Changes

This model linkage makes explicit the finding that people frequently respond by changing their (travel) behaviour, which in itself can constitute or contributes to further traffic changes, that in their turn cause further effects, creating a feedback loop within the model.

[2] See UTC (1987) for a New Zealand study linking life cycle groups and travel behaviour.

5.6. Responses -> Treatments

This model linkage acknowledges the special character of community responses in the form of a requests for an 'official' intervention, often in the form of construction of some specific roading feature designed to generate a mitigating effect, to address the issue that gave rise to the response.

5.7. Treatments -> Effects

This model linkage makes explicit the finding that treatments also generate effects that people can respond to, creating another feedback loop within the model.

6. Model use: a guide to inquiry

The model was developed in the form of a spreadsheet, listing typical examples of associated model elements as identified in the consultation reports analysed.[3] This spreadsheet shows in detail the empirical connections identified among types of model data.

- Spreadsheet columns show typical instances (values) of model elements (variables) or their components.
- Spreadsheet rows show empirically derived connections among typical instances of model parts.

Reading along the spreadsheet rows allows for inference from known data to not known potential community responses. The model described above can be used as a guide to inquiry into a contemporary case-at-hand. It works by allowing a user to extrapolate (along spreadsheet rows) from known instances of model elements identified as present in the case environment to associated unknown elements that may be expected to be found; and so contributes to early and rapid identification of both community issues and remedy options.

The model is not intended to offer a substitute for community consultation. Instead it offers a means to scope what kinds of issues are likely to come up during a community consultation, and to inform subsequent consultation. It can be used as a practical guide to what kinds of questions to pursue when consulting with a community about traffic changes. Specifically, the model should serve a useful function in at least two different contexts:

1. Before community consultation takes place in relation to present or planned traffic changes. Here the model could be used to scope (and cost) likely responses to a set of alternative design options before they are developed to the point where they can be presented to a community for feedback as part of a community consultation process. At this stage of the project the model is used as a proxy for consultation as there are not yet materials available /produced that would enable consultation to take place. The value to the user of using the model here lies in being able to anticipate community effects and likely responses, which allows for designing and costing appropriate mitigating treatments at an early stage, and reducing the uncertainty associated with (the cost of mitigating) unpredictable community effects.
2. During a community consultation. Here the CRM could be used to inform a consultation facilitator (who may have community consultation expertise, but not necessarily traffic expertise), and aid in the design of a project-appropriate communication plan. The CRM would enable a facilitator to go into a community consultation better informed about potential responses.

[3] See Appendix B

6.1. Interpreting a local situation into model input terms: the checklists

The elements and linkages depicted in the model are ideal types, and as such have no specific content until interpreted into a particular locality. This interpretation into a local context-at-hand is done by working out the answers to a set of questions about local conditions. More precisely, it is a matter of establishing the presence (or not) of types of items indicated by the specific terms in the spreadsheet, or in a set of corresponding checklists (see below). Interpreting a local context into model terms yields a set of model inputs.

6.2. Interpreting model output terms into a local situation

For each model (=checklist) item identified as present in the local context, the associated spreadsheet row now offers suggestions for other potentially associated types of phenomena, to look for and determine the presence of (or not) in the locality – much like a set of hypotheses to test.

7. Practitioner feedback

This section summarises the responses of practitioners - traffic planners and traffic engineers - to a presentation of preliminary findings in the form of the Community Responses Model.

Engineers said they usually do not use a model when identifying potential community effects and responses, but instead "do it without thinking". Experienced people are able to identify potential issues arising from a planned project, but always miss some. Matters that initially seem as trivial may become bigger. Here the CRM can be used to scope what the issues may be; to help focus consultation; it is awareness-raising.

The CRM consolidates things now often done in a piecemeal fashion. It describes what planners and engineers do, and what they need to do, and it provides a rational view of the process. Without a systematic approach it is not easy to learn from one case to another in order to improve ones practice. The CRM allows for doing something that is already being done, but doing it systematically. It works as a checklist for things to think about - a formalisation of the thinking that needs to be gone through to deal with effects. From this perspective, the checklists for defining stakeholders and activities are an appropriate basis to work from.

The CRM makes evaluation possible, as it allows for the definition of steps in the process of model use. It is then possible to ask: ' was A done?', 'Was B done?', 'Was C done?', and so on about each step in either the process of consultation or the process of assessment of environmental effects.

7.1. Potential risks of CRM use

It was suggested that there may be a risk that the model could be used to replace consultation ("we can do it for $1000 VS for $5000 in the community"). The model is not meant to be used as a substitute for consultation. It is not intended for it to be used to deprive community members of input into the development process. Use of the model instead of consultation to scope community responses is appropriate very early in a project, to 'cost' potential responses without consultation (cf prior to lines drawn on maps that enable consultation to take place).

Danger of users misinterpreting the model - users of the model not understanding it in depth, but just treating it as a 'black box', and misinterpreting its use. Or users may give unwarranted credence to model predictions - users who give more credence to the model than its developers, treating it as something that is more reliable than it is.

7.2. Case-focused checklists from expandable spreadsheet

Providing the CRM as an MS EXCEL .xls spreadsheet file would make it possible for a user to print checklists for only the issues relevant in each case of use of the model to interpret a specific locality. This 'locally relevant' checklist could be given to the consultation facilitation staff. Another potential bonus from providing the CRM as an

.xls would be for the user to keep adding data, so that the model 'evolves' through input from each occasion of its use.

7.3. Project cycle

The CRM could be used to both scope and evaluate community responses to projects with traffic effects, at different stages of the project cycle:

1. In initial investigations, before community consultation: use the CRM to scope cost of potential responses to design options being scoped, so as to build in cost of appropriate treatments at scoping stage. Here the model is used as a proxy for consultation at a stage of the process when there are not yet materials available /produced that would enable consultation to take place. The model could be of particular value here, due to the qualitative focus, as it can assist in early identification of potential issues. The value to the user of the model lies in being able to anticipate community effects and likely responses, which allows designing and costing appropriate mitigating treatments at an early stage, and so reducing the uncertainty associated with the potential cost of mitigating unpredictable community effects. This reduces the risk that a project is found to be economically nonviable due to unanticipated expenses in alleviating community effects, only after the process of implementation has begun.
2. During community consultation: use the CRM to guide and inform consultation, and to design a project-appropriate communication plan. Consultation facilitators employed to implement consultation are not always knowledgeable about traffic issues - the model makes it possible for them to go into a community better informed about potential responses to traffic changes. The CRM could also be used to focus a consultation, as it helps a user discriminate among multiple voices expressing diverse concerns, in order to rapidly identify priority issues.
3. Monitoring /evaluation of a community consultation: use the CRM checklists as a standard to measure progress and completeness of consultation.
4. 'Small projects', development options where an assessment of effects without community consultation is the common process: a shop here, a child care centre there, Council doing up a road, Mobil wanting to put in a service station, etc.. There always has to be an assessment of effects, but not always is there a community consultation. Not much data available on which to base a decision among options. Much debate about what are appropriate treatments.

7.4. Relationship /context of potential use

This section discusses practitioners' feedback, in terms of the relationships or contexts identified within which the CRM could be useful. The common theme is use of the CRM as a device for communication among team members regarding a project. The value of the CRM lies in that it brings clarity and definition to processes that now are less graspable.

The CRM can help solve some problems for consultants at the start of a project: how to go about costing potential responses to design options. At the start of the cycle

there is ‘nothing tangible’ from a Local Authority perspective. The LA wants dollar data from a concept. The Council wants an estimate of the cost of options, well before they have been developed to the extent that they can be consulted on. In this situation it would be possible to run the range of options through the model to compare potential effects /responses, and the cost implications of those responses.
This process would allow for integrating the treatments into the initial design. All this could be done prior to consultation, allowing for both cost savings, and subsequently going into the community better informed (‘more intelligent’).

Responses to communities may vary in costs. When applying for a Transfund subsidy, the cost associated with community responses may make a project economically non-viable. It is essential to know this as early as possible – to be able to consider potential issues before drawing lines on a page. A nil response is always possible, if the cost of the remedy is too large.

Councils insist on project consultants providing a ‘communications plan’ or ‘consultation plan’ for all projects. Use the model to evaluate /aid in design of consultation /communications plan. ‘Have you considered these in your design?’
Consultants or Council may employ a ‘consultation facilitator’ to ‘tell us how to do that’. But they (consultation facilitators) don’t have a model, and are not always knowledgeable about traffic issues, so the Model could be used to instruct the facilitator about how to go about it – they could be instructed to use the model.

The checklists then feed back to the spreadsheet – makes it possible to print a spreadsheet for only the relevant issues in each case. This ‘relevant’ spreadsheet could be given to the consultation staff; asking “Have you considered these in your design?”

Where someone else is leading a project, it can be used to be able show them the effects on the local community, to be able to make the effects clear to them.

7.5. Piloting the model

It was suggested that the model could be piloted in three different kinds of traffic related contexts:

1. a *project* like road widening;
2. a *programme*, like ‘Safe Access to Schools’, which aims to reduce car use for school rides (20% of the morning peak is rides) by arranging for alternative safe walking /cycling access to schools away from main roads and hazardous traffic [AK City has sth similar]; and
3. a *policy* area; e.g. increasing the price of parking in the commercial centre, or a residential preferential parking scheme.

The first step in using the checklists is to *add more items* to the checklists. Then, after going down the lists and checking each item, at the end, to add any others to the lists that have come to light in the process.

An outline of the process of CRM use:

1. get a map showing the location within the local community of the existing /proposed changes;
2. using the map, go through the checklists and locate /indicate on the map the locations of each item discussed; and
3. using the spreadsheet rows, extrapolate to aims and treatments.

The process could be rendered as answering a series of questions:

1. Identify /map Cs: what, where, when, how;
2. Identify /map As: who, what, where, when, how;
3. Identify /map Es: what, where, when, how;
4. Identify /map Ss: who, where, when;
5. Identify /map Rs: who, what, where, when, how;
6. Identify /map Ts: what, where, when, how.

8. Appendix A: Documents analysed

1. Anon, n.d., ‘Whangaparaoa Road: State Highway One to Vipond Road, Survey of Local Opinion regarding Possible Improvements, including the option of “three-laning”’, unpublished community survey documents
2. Auckland City Council, 1998, ‘Cycle and Walking Strategy’, Auckland.
3. Auckland City Council, 1999, ‘Life in Avondale: A summary of focus group sessions held in Avondale’, Avondale Livable Community Plan, Auckland, 100 pp.
4. Auckland City Council, 2000, ‘SkateAuckland, Auckland City 2001 Skate Strategy’, Community Planning Group, Auckland, 23pp.
5. Auckland Regional Council Transport Planning Department, 1990, 'North Shore Busway: Social Impact Assessment', Auckland, 55 pp.
6. Protac Investments Ltd., 1998, ‘Eastcliffe on Orakei Retirement Village: Results of the Public Consultation’, 55p.
7. Rodney District Council, 1997, ‘Consultation‘, in ‘Whangaparaoa Peninsula Access Options Study, Draft Assessment of Environmental Effects’, pp. 70-76.
8. BCHF 1997, ‘Whangaparaoa Peninsula Access Options Study – Report on Public Consultation and Assessment of Social Effects’, Auckland, 287 pp.
9. Rodney District Council, 2000, ‘Report on Traffic Capacity Issues West of Vipond Road’, 33pp.
10. Tauranga City Council, 1988, 'Public Participation', in ‘Proposed Expressway Route P Environmental Impact Assessment’, pp. 108-131.
11. Transit New Zealand, 1993, 'Social Effects', in 'SH1 Realingment: Albany to Puhoi. Route KM, Assessment of Environmental Effects', pp. 19-25.
12. Transit New Zealand, 1997, ‘Auckland Harbour Bridge Approaches Capacity Improvement Options (Draft) Assessment of Environmental Effects’, BCHF, Auckland, 110 pp.
13. Transit New Zealand, Auckland Regional Council and North Shore City Council, 1997, ‘Northern Corridor Priority Lane: Constellation Drive to Onewa Road (Draft) Assessment of Environmental Effects’, BCHF, Auckland, 133 pp.

14. Transit New Zealand, 1998, ‘Upper Harbour Corridor SH16 & SH18 (Hobsonville Road) realignment study, Draft scheme assessment’, BCHF, Auckland, 78 pp.
15. Transit New Zealand, 1998, ‘Upper Harbour Corridor SH16 & SH18 (Hobsonville Road) realignment study, Draft Route Options Selection & Assessment on Environmental Effects’, BCHF, Auckland.
16. Transit New Zealand, 2000, ‘State Highway 20 Hillsborough to Richardson Road, Assessment of Effects on the Environment’, Traffic Design Group & URS NZ, Auckland.
17. Urban Transport Council, 1987, ‘Market Targeting in Public Transport’, Wellington.
18. Wastecare Ltd, 1990, 'Proposed Manukau Landfill: Public Participation and Social Impact Assessment', 23 pp.

9. Appendix B: The model spreadsheet

Change	Effect		Activity	Stakeholder	Response	Treatment	
Traffic change /increase	Perceived effect	Effect detail	Activity affected	Stakeholder(s) affected	Objective for remedy	Treatments advocated	Enhancements advocated
			ROAD USE	**ROAD USERS**			
cars driving fast	hazard	risk of injury from traffic	walking along road	pedestrians	slower traffic	lower speed limit	speed camera, police
proximity to traffic	hazard	risk of injury from traffic	walking along road	pedestrians	separation from traffic	footpath, fences, railings	separator
traffic not stopping	hazard	risk of injury from traffic	crossing road	pedestrians	stop traffic	pedestrian crossing	traffic lights
traffic not stopping	hazard	risk of injury from traffic	crossing road	pedestrians	avoid traffic	pedestrian overbridge	
traffic not stopping	hazard	risk of injury from traffic	crossing road	pedestrians	avoid traffic	pedestrian underpass	well lit /patrolled
fast through traffic spooking horse	hazard	risk of injury from traffic	riding along road	horse riders	keep riders and through traffic separate	divert through traffic from horse riding areas	provide riding paths away from traffic
cars driving fast	hazard	risk of injury from traffic	cycling along road	cyclists	slower traffic	lower speed limit; traffic calming	speed camera, police; regular patrolling
proximity to traffic	hazard	risk of injury from traffic	cycling along road	cyclists	separation from traffic	cycle lanes	provide separator
hill crest, dip, corner that obscures view of	hazard	risk of crash due to poor visibility	driving	drivers	improved visibility	straighten bend /road; dig out hill;	

road						remove obstacles	
streams of vehicles cross each other's paths	hazard	risk of crash at busy intersection	driving	drivers	reduce direct crossing of moving vehicle paths	give way signs /road markings; traffic lights; roundabouts	
narrow /single lane road	hazard	risk of crash from other cars stopping /turning /parking /pulling out	driving	drivers	reduce stopping in moving vehicle paths	provide lanes for turning /stopping /passing; median strip for right turn	reduce road /property entrances; prohibit parking
traffic congestion	nuisance	delays; wasted time	driving through	outside commuters	improve traffic flow	widen road; multiple lanes	raise speed limit
local cars starting /stopping /parking /turning in traffic	hazard	car crash risk	driving through	outside commuters	minimise crash risk	median strip; parking lanes; slow lanes; turning bays; traffic lights /roundabouts	
traffic congestion; extended peak	hazard	hard access arriving /departing; delays	driving to /from work	local residents commuting	minimise crash risk	median strip; parking lanes; slow lanes; turning bays; traffic lights /roundabouts	
traffic congestion; extended peak	nuisance	hard access; delays; wasted time	driving to /from local residence	residential services' tradesmen	improve traffic flow	widen road; multiple lanes	raise speed limit
increased concern re safety of kids	nuisance	response to hazard; takes time	driving to /from school	parents of school children	safer school trip	walkway, cycleway, sidewalk, railing, school bus	traffic patrols at crossings

risk of car hitting people getting on /off /running for bus	hazard	injury to passengers from traffic	driving and stopping	bus driver	safety for bus and passengers	bus stop bays, bus lanes	pedestrian crossing; traffic lights by bus stop
steady traffic flow from behind; traffic not stopping	hazard	risk of injury from traffic	turning right into side road /driveway	local residents; residents on abutting property /visitors	avoid main traffic stream	median strip	close access, use alternative access
steady traffic flow from behind; traffic not stopping	hazard	risk of injury from traffic	turning left into side road /driveway	local residents; residents on abutting property /visitors	avoid main traffic stream	slow lanes; turning lanes	close access, use alternative access
steady traffic flow from behind; traffic not stopping	hazard	risk of injury from traffic	turning out of side road /driveway	local residents; residents on abutting property /visitors	avoid main traffic stream	slow lanes; passing lanes	
steady traffic flow from behind; traffic not stopping	hazard	risk of injury from traffic	reversing out of driveway	local residents; residents on abutting property /visitors	avoid reversing into traffic	slow lane + reverse into driveway	driveways sized to turn car around; double driveways
steady traffic flow from behind; traffic not stopping	hazard	dangerous pulling into peak traffic; injury from traffic /car crash	pulling out from kerbside parking	local residents; residents on abutting property /visitors	eliminate situation of risk	parking bays; off-street parking	access lanes
steady traffic flow from behind; traffic not stopping	hazard	dangerous stopping in peak traffic; injury from traffic /car crash	kerbside parking by home	local residents; residents on abutting property /visitors	eliminate situation of risk	parking bays; off-street parking	

Change	Effect		Activity	Stakeholder	Response	Treatment	
			ROADSIDE USE	**ROADSIDE USERS**			
loss of land /dwelling to roading development	social	loss of property value /amenities	at home	on abutting property	equity	relocate dwelling; land /property purchase; compensation	minimise uncertainty; fast resolution; relocation grants
automotive traffic	nuisance	exhaust emissions	at home	on abutting property	less emissions	plant /preserve green belts	more efficient engines
car fumes from peak traffic	health	exhaust emissions in drinking water	at home	on abutting property, on tank water	remove health hazard	connect to /provide reticulated water supply	enforce emission standards
traffic /roading changes	social	loss of access /parking for customers > loss of business	trading, selling goods /services	roadside businesses	preserve /replace access and parking	parking bays; alternative parking / access provided	shopping centres /zoning
engines racing; esp. trucks /motor cycles; uphill; stopping /starting at traffic lights /intersections	nuisance	noise nuisance, esp. at night	at home	area residents	minimise situations that cause engine noise	lower speed limit; minimise stops; redirect trucks /through traffic	dedicated truck /through traffic routes; plant trees for screening
spillover through traffic	nuisance	traffic congestion	at home	area residents	less through traffic	improve capacity of collector /arterial roads	traffic calming on local roads, speed bumps etc.
cars, street lights	nuisance	light nuisance	at home	area residents	no light on home	plant shelter belt /hedge	
large trucks driving past	nuisance /hazard	vibration, house /land shaking	at home	area residents	less vibrations felt	redirect trucks elsewhere	dedicated truck routes

(anticipated) traffic effects, road development effects	social	decrease in property values	at home	area residents	equity	property purchase /compensation	minimise uncertainty; fast resolution; relocation grant
better access > rising land values; new roading costs	social	rates increases, people on fixed incomes rated out of their homes	at home	area residents	reduce hardship; equity	calculate rates on other criteria than property market values	
access to neighbourhood disrupted by traffic /roading changes	social	social networks bisected by traffic /roading changes	visiting neighbours	area residents	preserve /re-instate access	over /underpass; pedestrian crossing /plus traffic lights	
construction effects; runoff from road; heavy metals	environment	erosion; silting /pollution of waterways; loss of wildlife	nature walks, swimming	environment concerned	no loss of environment quality	culverts; silt traps; environmentally sensitive road alignment	