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Taxi-Vans on Rail

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Contents

1 BACKGROUND

There is a large and growing body of literature supporting the view that mobility increases based on the private car are not sustainable. The principle manifestations of this non-sustainability are congestion, inefficient energy use and polluting vehicle emissions. It is a question of which factor will reach the critical level first.

The private motor car is well entrenched as the primary provider of mobility in the developed world and developing countries are following the same trends at alarming rates. Whitelegg (1992) suggests that the world will host another 500 million cars just for India to catch up to developed world car ownership figures. Another student has suggested that the former three essentials of life: food, clothing and shelter, has now been joined by a fourth; a car (Pokasamrith, 2001).

Different authorities have different ways of coping with the problems caused by the increase in mobility and particularly private car use. Some just keep on building road capacity, others have tried to lure travelers away from motor car ownership and use by providing good public transport and others have regulated to make car use expensive or inconvenient. The most successful city in reducing car use in the 1970's was Singapore where a combination of the three types of action resulted in a reduction in per capita car kilometres (Newman & Kenworthy 1989).

Other cities have taken steps to reduce their car use only to worsen the problem. This is especially true when more roads have been built to provide the infrastructure that travelers want. Buses and various forms of rail systems have been provided that have slowed but not reduced car use. The BART system in San Francisco provides a good example. Despite carrying its first passengers in the mid 1970s average car kilometres per person still increased by a compounding 1.6% per annum during the decade, down from an annual increase of 3.5% in the previous decade (Newman & Kenworthy 1989, Bart 2003).

What is the attraction of the private car? We have all experienced the hassles of parking, congestion and the funding requirements to satisfy our car's continual appetite for fuel, tyres, oil and warrants of fitness.

1.1 FACTORS SUPPORTING THE USE OF PRIVATE CARS.

1.1.1 Cost.

One obvious answer is the subsidised cost of motoring. Numerous references are available to the degree that road users are financially assisted by the taxpayer in the form of roads, health and environmental costs. The subsidised nature of public transport is addressing some of the imbalance.

1.1.2 Image

There could be an image problem. Car manufacturers spend large sums of money to ensure that their products are seen as more than just a collection of nuts and bolts which will transport us from A to B. ACNielsen (2003) provide data regarding the estimated advertising spend of New Zealand's twenty largest advertisers in the twelve months ended October 2002. Toyota came in at number 20 with an estimated spend of $13million. This only covered the media costs of the advertising so production costs need to be added to these figures. In addition there is local spending by franchise holders. These figures are difficult to obtain. It is not unreasonable to estimate that the total advertising spend by Toyota and their franchisees will be in the region of $15million to $20million. When other car manufacturers are included, the annual advertising spend

will be in excess of $50million and may be as high as $100million. These businesses do not advertise for fun. Each $1 spent has to be effective. When Joe Commuter gets into his car in the morning, he is entering a picture created by the advertising messages he has absorbed. When he enters a bus, he enters a collection of nuts, bolts and sheetmetal that will get him to work.

1.1.3 Social

There may be a social problem. Bad occurrences are remembered far longer than good experiences. A bus passenger who has a bad social experience such as being subjected to the bad language of another patron may forget all the good social contacts on the bus. Drivers of private cars are in charge of their social environment. This extends to that socially frowned upon habit of smoking. The private car is one of the last places where the individual can smoke with impunity.

1.1.4 Convenience

There is a convenience issue, starting with access from home. The car is often stored in the garage that is attached to the house making car access as easy as bathroom access. The remote control on the garage door means it is controlled from the driver's seat. There is no waiting in cold, unpleasant environments. At work the car park may be in the same building as the office so a short walk to the elevator will see our commuter whisked to his/her office having spent no time outdoors during the entire journey. There is temporal convenience, no schedule to keep or risk of a long wait for the next service. The car runs when the driver wants it to.

2 PRELIMANARY FINDINGS

These conclusions have been tested by a small survey of the public regarding their attitudes to public transport. The survey was conducted using a web-based questionnaire. This approach was meant to make responses much easier for the public with 24/7 availability and no telephone calls at mealtime. The response was disappointing. The initial invitations to respond were placed under the windscreen wipers of cars parked in the commuter belt around central Christchurch, that area just outside the metered parking area where commuters can leave their vehicle for the day without parking costs. On the first day about 400 invitations were given out for 17 responses. This level of response was typical of the method.

The second approach was to advertise the web site in primary school newsletters in the target areas of Rolleston and Rangiora. This resulted in one phone call (supportive) but no discernible responses.

Shortly afterwards, invitations were handed out to businesses in Rangiora and Kaiapoi with another disappointing response.

Armed with the final 52 invitations, Don ventured to town on a Friday morning and gave the invitations to people walking towards the city centre. Whilst this approach was less selective because it included walkers from houses in the direction of the point where the invitations were dispersed, it was felt that the survey was mostly concerning people's attitudes to public transport so there would be some commonality between people regardless of where they live. Eleven responses were received from this exercise, over 20% response rate.

This exercise has been repeated on a different sector of the CBD with similar results.

It is suggested that there were three reasons for the increase in response rate:

1. The personal approach, Don asked people to please look at the questionnaire and complete it,
2. The timing on a Friday morning, maybe people's work commitment was not as high on a Friday so they could take 10-15 minutes out of their work day to complete the survey, and
3. The physical nature of the invitation meant people arrived at work with a surplus piece of paper in their hand so responded.

A copy of the questionnaire used is attached in Appendix 2. It can be seen that it dealt with people's attitudes to public transport first, made an attempt to determine which was the most important aspect of public transport that needed to be addressed to make it better meet the requirements of the respondent, collected some demographical data then finally did some trip analysis ultimately providing the respondent with a trip cost calculator based on the published AA table.

At the time this paper was written, 48 responses have been received of which 16 were invalid because they were surfers that did not answer the questions. We used IP addresses and time of entry to attempt to identify hackers that may enter erroneous data on more than one occasion. This showed that there were people that looked at the survey right through first then went back and completed their responses. Each entry to the site was logged as a response.

1.2 ATTITUDES TO PUBLIC TRANSPORT

The survey tried to measure people's attitude to public transport at a generic level rather that the specifics associated with their home and place of work. Specific concerns are being met by the operators of public transport systems that have benchmarks of service and cost that are provided to different community sectors. By way of example, we

wanted to hear peoples' comments that the bus was too far to walk to even if that were not true because that is a barrier to use for that person.
The responses to this section were:

Factor	**"Bad"**	**Responses**					**"Good"**
Frequency of Service	Very Infrequent	14	8	4	5	1	Very Frequent
Comfort	Very Uncomfortable	2	7	15	6	1	Very Comfortable
Trip Time	Very Long	8	8	11	4	0	Very Short
Safety	Very Unsafe	0	6	6	14	5	Very Safe
Cost	Very Expensive	3	9	11	4	4	Very Reasonable
Accessibility (Home)	Very Inaccessible	5	5	7	5	9	Very Accessible
Accessibility (Christchurch)	Very Inaccessible	1	6	7	12	6	Very Accessible
Transfers	No Transfers	15	7	4	2	3	Often Transfer

There are no surprises here, frequency of services is still perceived to be low, safety is recognised as being high, the bus exchange in the city has made accessibility there good and few people will use public transport if it requires a transfer.

1.3 IDEAL PUBLIC TRANSPORT

The next section of the questionnaire asked about the level of these service aspects that they would like to make public transport more likely to be used by their household. The responses largely chose the best service offered so have not been analysed seriously.
At the end of the section where the ideal public transport was chosen, respondents were asked to rank the three most important factors for them.

Factor	**Most Important**	**Secondary Importance**	**Third Important**
Frequency of Service	14	6	3
Comfort	0	0	5
Trip Time	3	9	4
Safety	1	1	1
Cost	3	4	9
Accessibility (Home)	2	5	3
Accessibility (Christchurch)	2	0	1
Transfers	1	1	0

Frequency of service continues to provide the main barrier to use of public transport with trip time and cost the other relevant factors.

1.4 EXPECTED USE

Finally, respondents were asked to state how often their household would use public transport for the return trip to central Christchurch if the service met their expectations on the three most important factors that they identified. The shortcoming with this question is recognised, the respondent may be saying that everyone else in the household would

use it whilst they got exclusive use of the car. The responses ranged between 10-15 times per week and never with an average between 1 and 5 return trips per week.
These preliminary results are limited by the small sample of respondents at the time of reporting but do provide some insight into the areas that need to be addressed if more people are to be encouraged out of their cars.

3 SUGGESTED SOLUTION

This paper offers an answer to the convenience problems related to trip time and accessibility. The suggestion will not work without social and image problems being addressed also. So like all solutions to transport problems, a multi-faceted answer will likely provide for the greatest success.

Public transport cannot perform better than a car in terms of convenience. Who wants a train stored in their garage? However, we think we can perform better than we are at the moment.

We need to collect people from their home gates at a time that is convenient to them and deliver them to their destinations. Can a system be designed that meets these criteria?

We believe it can. The system we are proposing uses taxi vans to collect people from their house then delivers them to a railway station where the van drives onto a rail wagon for the journey. At the end of the rail journey, the van drives off and delivers the traveler to their destination.

This system is seen as most appropriate at sparsely populated nodes along existing rail corridors.

Telecommunication technology is used to enable the traveler to call for a van at a time that is convenient for them. We are not experts in this area but can see that people could register once with the service. At registration, the user's GPS coordinates and their phone number are recorded and stored. Next time the client phones, the service recognises the number, accesses the stored GPS coordinates and provides information to the nearest van that a collection is required. The caller can be provided with real-time information about the likely collection time by the van and likely departure time of the next train.

When the commuter is in the van it is important that she/he is provided with the same level of comfort as in his/her own car. Heaters and air-conditioners are requirements. Earphones should be provided so the traveler's choice of radio or recorded audio is available. Extras could be provided in the form of television. The opportunity to undertake tasks that are not legal or possible when driving should also be encouraged. This includes cellphone use and the opportunity to travel after social drinking.

The driver of the van does not need to accompany the van during its railway journey. However, having to wait for a driver at the destination introduces some of the uncertainty the system is trying to reduce. Drivers at the destination will meet the van for the delivery of the people to their destinations. If appropriate, passengers for the return journey could be collected at the same time as with many dial-a-bus systems (Kissling, 1972).

It would make sense for the passengers to rearrange themselves during the rail journey so the destinations of the vans at the journey's end are clustered. This is represented in the diagram below.

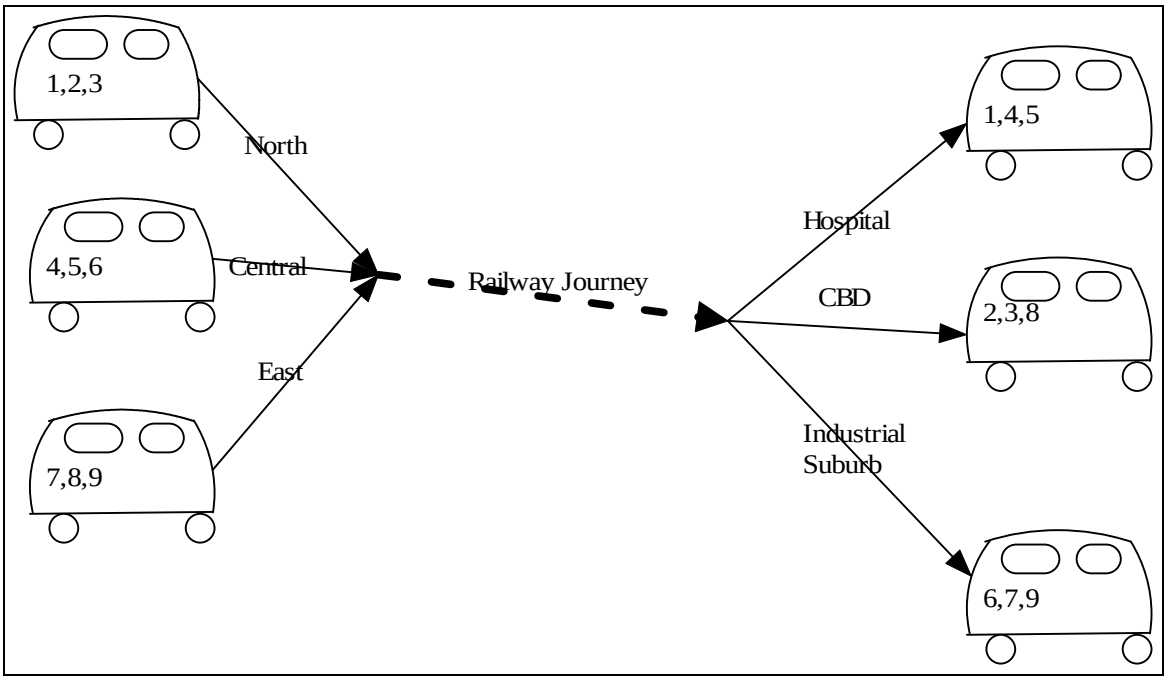

Figure 1. Redistributing passengers between vans whilst in transit.

There is precedence for the use of predominantly freight lines for passenger transport. A panel of top executives from USA rail operators had a panel discussion on July 8 2003 where one of the topics addressed was using the rail system to provide inter city transport between cities 100 to 400 miles apart (Anon. 2003). There are reports that Recife in Brazil has gone down the path of using the existing rail infrastructure to provide a commuter service but references have been hard to find. The city is reported by the IEA/OECD as having a well performing bus system (IEA/OECD, 2002).

3.1 THE PRACTICALITIES

3.1.1 Application to Greater Christchurch

The success of the proposed system in reducing the big three problems of mobility; congestion, energy use and emissions, needs to be assessed. For simplicity, I have applied the system to Christchurch and its surrounding towns of Rangiora, Kaiapoi and Rolleston. The first two are on the northern railway link out of Christchurch, 28.5 and 19.5 kilometres away from the central city respectively. Rolleston is at the junction of the western and southern lines 23 kilometres south west of central Christchurch. There are other similar towns between these points and the centre of Christchurch. The journey to work results of census 2001 have revealed the following:

Travel to	Central City	Western Inner City	Southern Inner City	Northern Inner City	Eastern Inner City	TOTAL
Travel from						
Rangiora	378	129	141	126	126	900
Kaiapoi	537	195	198	168	210	1,308
Papanui	417		81		63	561
Rolleston	63	51	36	15	12	177
Templeton	102	90	75	21	27	315
Hornby	441	387	216	87	129	1,260
Lyttelton	315	102	147	18	123	705
Other Bays	183	72	63	27	51	396
Total	**2,436**	**1,026**	**957**	**462**	**741**	**5,622**

Source :Statistics New Zealand

Table 1. Target market size and distribution.

Within the city, the northern line passes to the west of the city centre before joining the southern line at Addington. The southern line passes south of the city centre on its way to the region's port at Lyttelton. The junction of the northern and southern lines is an incomplete triangle requiring trains from the north to enter the southern line heading away from the city before reversing for access to the traditional south of the city rail terminal. Whilst this rail terminal is now a movie complex, it is still the nearest point on the rail system to the centre of Christchurch and is on the edge of the free shuttle bus service that operates through the area.

Population density has been shown to be one of the strongest positive influences on public transport use. Rangiora, Kaiapoi and Rolleston are not particularly dense areas. Some parts have more than 20 people per hectare but overall densities range from 11.5 in Rolleston up to almost 18 in Kaiapoi. These figures are below those often recognised as being able to support a good public transport initiative. Population growths in these areas are high, Rangiora and Kaiapoi grew by about 2% per annum between the 1996 and 2001 census dates whilst Rolleston has grown at 14% per annum compounding. This is one of the reasons for the low density in Rolleston, there are developed sections to be sold, houses partially built and land awaiting development. Residential developments in the area generally have about 10 sections per hectare giving densities in the mid- to high-20s per hectare at current occupancy levels.

Better public transport provision above that which is justified on current demographics will provide the opportunity for this fast growing area to develop around a good public transport infrastructure.

3.1.2 Keeping the Vans on Track

There are problems in ensuring the vans stay attached to the rail wagons during the trip. Mooring Systems Ltd. have developed a new concept in attaching ships to wharves

using suction pads. These are claimed to reduce considerably the labour involved in docking. Mooring Systems Ltd are investigating the challenge of using their system to attach the vans to a railway wagon. One of the criteria is the system must be quick and able to be performed by a single person either from their seat or as they leave the parked vehicle. Safety procedures will need to be in place to ensure that every van is secured before the train starts moving.
However, transporting people in vehicles on rail wagons is not new. The channel tunnel does it and rail tunnels in Europe have taken cars through the Alps for many years. In both cases only the vehicle's own means of immobilisation are used, the handbrake and gear box. The friction between the vehicle tyres and the deck is much higher than that between the wagon wheels and the track so the vehicles will not move during normal transit conditions. If there is an accident, it may be just as well if the van and the wagon part company. The channel tunnel use covered wagons but many of the European tunnels use open wagons often with a roof just to stop rocks that dislodge from the tunnel roof hitting the vehicles (pers. comm., R Weber, Director, Mooring Systems Ltd)

3.1.3 Passenger Comfort

Another concern is about passenger comfort. For energy and emission reasons, it is essential that the vans' motors are not left running during the rail journey. This will take away the ability to heat or cool the air in the vans during rail transit. There are several ways to overcome this obstacle and one possibility will also impact on the safety of the attachment system. The use of covered wagons with the doors closed will enable heat or cooling to be brought to the closed wagon. This would reduce the impact of the sun's rays during hot periods but heating of the space would be quite inefficient as most of the heat would escape when the doors were opened for entry and egress. The really exciting possibility is to use electric trains to provide the service and use electricity to run heaters or air conditioners in the vans whilst in transit. While the vans are hooked to the electrical supply, they could be recharging their batteries making the use of modern, electrically powered vans on the network a possibility.

4 TRIPLE BOTTOM LINE PERFORMANCE

4.1 ECONOMIC PERFORMANCE

There are existing bus services connecting each of these points to the centre of Christchurch. It is anticipated that the train service runs in place of the bus services at some times during the day. Given a normal bus capacity of forty passengers and a service level of three buses between 7:00am and 8:00am, it is calculated that there could be between 50 and 100 passengers at journey end using the bus service into Christchurch from Rolleston. Rangiora has a similar level of service with the buses commencing earlier to cover the increased distance. Kaiapoi is serviced by Rangiora buses. It is reasonable to assume that the new service will not carry fewer passengers than the existing bus services. This is a base, the service would be introduced to remove people's perceived barriers to the use of public transport. Patronage should grow to a higher level.

At the level of 5 passengers per van (they will have a higher capacity of 7 or eight), ten vans will be required to carry the passengers from each of these areas to the city. Three departure times will mean only three or four vans need to be used on each journey, such that two flat deck or covered wagons will achieve this. The earliest service will be able to return to carry out the later journey requiring two units each for Rolleston and Kaiapoi/Rangiora.

With the central city shuttle bus able to deliver people from the old railway station to the central city, it makes sense to provide for park-n-ride or kiss-n-ride facilities at the linehaul railway stations. This would see the train being configured as a rail car unit pulling flat deck railway wagons.

How will this system compare economically? Appendix 1 contains a spreadsheet that calculates the level of subsidy required for the service under three scenarios:
The new service only gets the passengers off the existing bus service. Ridership figures have been checked for reasonableness with the Regional Council. Rangiora support for buses is currently very low because of the length of the journey time. It is likely that a faster, more direct, train based service will achieve better support.
There is moderate support for the park-n-ride option from the journey ends and intermediate stops. Using passenger units to provide the traction for the trains, instead of the traditional freight haulage unit, will enable this service to be added at almost no expense.
The service attracts a modest number of new patrons necessitating one additional service to each destination in the mornings and evenings.

The spreadsheet makes a number of assumptions about the costs of providing the service that result in the per trip subsidy figure being only a vague indication. However, it can be seen that the subsidy required for scenario 1, in excess of $20 per trip, is very high. Ridership is low and the total cost is around $700,000. This would be a substantial portion of the regional transport subsidy that was $17million in 2002. It is very low compared to the $65million that is proposed will be spent on the southern motorway access in 2010. Just the interest on this figure would be at least double the annual subsidy required for the southern and northern routes using the rail network.

Track access charges have a major impact on the viability of the proposal. The model provides data to suggest that track access could be in the region of $16,500 per kilometre of track per annum based on the purchase price of the Auckland rail network. There is precedence of track access charges from the UK but the political influence on the structure has resulted in a very confusing pricing regime. It is more appropriate to compare rail access charges to road user charges in New Zealand. A ten percent increase is applied to the road user charges to reflect the extra operational costs incurred in providing the signaling system. The model has calculations of the level of track access likely under this regime. At the end of the day it is a government policy decision to set the track access charges at a figure that reflects the best return for society. The model uses the marginal cost of operation only based upon the required return given an asset base calculated in accordance with the value of the Auckland corridor and applying the UK variable cost portion at 9%. This is hypothetical but justifiable.

Track availability has been checked, TranzRail have scheduled freight services operating northbound from Christchurch in the early morning (2:30), two during the middle of the day and the next one is at 19:30. Trains go south at 3:00, 6:00, 10:00 and 23:00. There are tourist trains leaving Christchurch northbound at 7:30 and westbound at 8:15 returning at 18:35 and 18:05 respectively. In addition there will be unscheduled coal trains competing for the Rolleston track.

The low cost associated with adding the park-n-ride option to the service sees this option creating income that reduces the subsidy required. Rolleston and Rangiora stations have car-parking space available.

The third scenario is the most likely outcome. Ridership will increase over that currently using the buses as the trip time should be comparable to the car trip time without the parking and walking problems in the city. The subsidy level is still too high. It would need to be addressed by investigating the fare level and local rates options. The model uses the existing bus fares but provides superior service including collection and delivery to the door, no parking costs and a fast trip time. With good promotion of the benefits, a fare at twice that of the buses would not be unreasonable. This may necessitate the retention of some conventional bus services to provide a cheap alternative.

4.2 ENVIRONMENTAL PERFORMANCE.

The major environmental return of the proposed scheme would be the cancellation or postponement of the southern motorway extension in Christchurch. The proposed extension will cross the former Wigram air base, converting open spaces into motorway fringe land. There are similar proposals for the north of Christchurch involving making current two-laned streets into four-laned highways. Local residents are already protesting these plans. Taxpayers should also be protesting, as the programmes will cost in the region of $100million and will be completed in the next ten years.

There are many other returns to the environment including the reduction in the number of cars, reduced energy consumption and less damage to air quality. In line with the approach adopted by Hubbards Foods Ltd (2002), CO_2 emission levels will be used as a measure of overall air quality damage. The Royal Commission (1997) reported on progress to eliminate or reduce most of the other toxic substances emitted from cars but concluded that CO_2 emissions are likely to keep rising even if transport demand is constrained. Whilst governments have been slow to implement the steps proposed by

the Royal Commission, at least the steps are available and it only needs the will of the people to make it happen.
Any environmental assessment needs to have boundaries according to the recommendations of the New Zealand Business Council for Sustainable Development (2002). In this case the environmental impact will be restricted to the use of the system, excluding the manufacture and transport of the components. If the manufacture was included it would add to the benefits of the proposal as one train unit with 6 vans on it can replace in excess of 50 motor cars for each return journey.
The assumption in the cost section is that the trains will require 20 litres of diesel per 100 kilometres based on the local bus figures of 30 l/100kms. The train will use less because it stops less often and has less contact friction. Use will be increased by providing power to the vans for personal comfort whilst in transit. The vans are projected to drive 9 kilometres per passenger and use 8.6 litres of diesel per 100 kilometres.
Calculations included in Appendix 2 show that the existing system with buses and private cars uses 193 litres of diesel on the buses and 1,142 litres of petrol in private cars. The proposed system will use 357 litres of diesel split between the trains using 171 litres and vans using 186 litres. The saving is a little under 1,000 litres per day. There is potential to save more by electrifying the train lines and supplying electricity to the vans so hybrid engine systems could be used. Even generating the electricity on the train may provide economies of scale to make the exercise justifiable.

4.3 SOCIAL PERFORMANCE

There have been numerous attempts to determine the social cost of motor car use with ranges of figures provided at the macroeconomic level. These are often based on the costs of accidents. They ignore the social trends that have developed with the private motor car. The car causes some and others have occurred concurrently to increase the effect of the changes. Joe Bennett commented upon the trends in his weekly comment in The Christchurch Press on 16 July 2003. His comments were in relation to children but apply equally to adults. He refers to the mantra being “isolate, then immobilise, then indoctrinate”.
Single occupancy vehicles certainly play a part in the isolation. Commuters can spend upwards of two hours per day isolated from all except radio broadcasts and their choice of other audio stimulants. Television has added to this isolation. It is not unusual for families to have more television sets than people. The result is that we have children who believe that the outrageous behaviour put on television to attract audiences is the norm. The campaign against drink driving has withdrawn the option to have a social drink after work.
Cars increase mobility so how can they contribute to immobility? Cars increase mobility for the empowered citizens that have access to a car. Unfortunately, cars often reduce the mobility of those that do not have cars. Think of your suburb and imagine how much more mobile the children would be if there were no cars in the area. We may even see children playing tennis over the street again. How much peace of mind would be restored if we knew our teenagers could rely upon good public transport to move them around when they are socialising?
Indoctrination, the children are isolated and immobile so they can be indoctrinated. One of the messages they receive repeatedly is that successful people have big cars. Other messages are portrayed through the phenomenon mentioned above, that outrageous behaviour is the norm.

These social costs can not be measured with any degree of acceptability as they are very complex. They will result in everything from increased suicide, increased crime and reduced social participation to almost indiscernible outcomes.
Reduction in car use is not going to cure all of these ills but more social contact whilst moving around will play a part. Mixing with other people while we travel will produce some experiences that we would rather forget but also provide the opportunity for numerous good interactions. Many of these may not even be noted, like a child seeing how adults behave in public places and how we use good facilities. Some transport research has shown the effect of cars on the social responsibility of the citizens. Appleyard & Lintell (1969) are referred to in Tolley & Turton (1995). They show how the "patch" size of residents reduced as car traffic increased. The residents feel a sense of pride and belonging in their patch and take care that it is working well. Whether this extends to helping others' children shape their social habits is not stated.
Social services are finding that the intervention of a "significant other" can help at-risk children decide their paths for the future. Opportunities to meet these significant others need to be provided. It will not come from the X-Box or off the television. We need to mobilise and de-isolate our children.
The social performance of businesses is usually measured by the feelings of the stakeholders' towards the business. This is important but not sufficient particularly in terms of a transport business that is partly funded by central, regional and district councils. In addition to providing a service in such a way that it is viewed positively by the stakeholders, public transport systems should also provide services that contribute to the social health of its residents. Aims in this area could be:

- Provide residential areas with reduced traffic enabling more interactions between residents, in particular, children.
- Ensure there is a good cross section of society on public transport systems.
- Provide services that meet the social needs of residents that may include later services on a Friday night.

In addition to providing a transport system that contributes to a better social environment, there is social barrier to enticing people out of their cars. Unfortunately researchers often ignore these barriers. For example, the Pinnacle Research Group have investigated the barriers such as parking costs, parking restrictions, vehicle use charges and a congestion tax to get people out of their cars. If people are more comfortable in their cars they may justify the extra cost as essential. (Pinnacle 2003).
At a personal level, when we leave our cars for public transport we leave an environment over which we have considerable control and enter a more unpredictable one. The control of the environment means that the motorist can do things that they cannot or will not do in other environments. Smoking has already been mentioned. The car is their castle and they can do what they like without frowns from others that share their space. Legislation has gradually reduced the places where people can smoke and parents are encouraged not to smoke in the family home.
The empowerment of smokers in their cars may extend to others. Non-smokers may get as much empowerment in their own car as the smoker does. There are other activities that they may carry out which are as socially unacceptable as smoking. Listening to music with plenty of base seems popular. Driving aggressively is another. What about the opportunity to have a really good think with no disruptions? Some drivers report periods of "auto-pilot" driving when driving has been safe but there is no recollection of the driving process. Some of our best goal setting sessions have been whilst driving.

Whilst the proposed system needs to address some of the social dilemmas outlined earlier, it will not succeed unless it recognises the social costs of the users. Users need the ability to have some control over their environment.

Christchurch has the distinction of being the city with the most car parks per 1,000 jobs in the CBD in the 1991 international data set reported by Bachels (1999). Every time there is a mention of changing the level of access or parking to the CBD by motor vehicles the business owners in the CBD lament that further business will be lost to the suburban malls. It is worth considering when the central city is at its liveliest, usually in the wee small hours of Sunday morning just after the Crusaders have beaten some other rugby team at the local stadium. A good proportion of the customers in town at that time has single occupancy motor vehicle use denied to them. The revelers are happy to walk from bar to bar and may even feel more comfortable because the number of cars is reduced. Maybe the town centre needs to re-examine its role in the city. We do not want 24/7 partying but there are those in the population that are past the hard out drinking on Saturday nights but want to enjoy the atmosphere in a more sophisticated way at other times. This is a further social issue that needs to be considered by the planners and businesses.

5 CONCLUSION

This paper presents an alternative that may address the convenience barrier for people using public transport at low-density nodes along existing railway lines. Economically the proposal is costly in comparison to existing public transport but could be considered cheap if it was able to eliminate the need for new road capacity.

Environmentally the proposal makes sense with the reasonable likelihood that it will save 1,000 litres of fossil fuels per day and the associated polluting emissions that arise from the combustion. There are further benefits to be had if the tracks can be electrified and the current used to recharge van batteries for central city motoring.

The proposal has the potential to reverse some of the trends towards isolation that the existing transport system is exacerbating. It will be met with opposition from central city business owners but they need to look at the type of central city that the population will use, it may not revolve around retailing.

The proposal needs further research in the relevance of the concept in terms of addressing the social barriers to people leaving their cars at home, some better costings and the attitude of the LTSA to having people in vans on trains.

Like many problems, increasing traffic levels is not going to be solved by a silver bullet solution. However, the combination of a number of good measures has been shown to reduce the use of cars in areas where use is excessive. It is hoped that this proposal may provide transport planners with another option that may help the problem in their area by extracting greater use from existing resources.

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APPENDIX 1

Fuel Use Comparison

		Existing Bus	Private Cars	Trains & Vans
Road kms/passenger				
Rangiora/Kaiapoi		22	22	9
Rolleston		23.5	23.5	9
Intermediate Stops			12	
Train Journey Length				
Rangiora/Kaiapoi				30
Rolleston				23.5
Intermediate Stops				11
Fuel Use l/100kms*		30	11	8.6
Trains				20
*Private cars usually includes cold start				
Average Car Occupancy			1.2	

Fuel Use

		Current Fuel Use		**Proposal**		
				Total	**Components**	
	Ridership	Existing	Private	Trains		
Bus Passengers		Bus	Cars	& Vans	Train	Van
Rangiora/Kaiapoi	80	108		134	72	62
Rolleston	60	85		102	56	46
Park-n-Ride						
Rangiora/Kaiapoi	50		202			
Rolleston	50		215			
Intermediate Stops	100		220			
Additional Riders						
Rangiora/Kaiapoi	50		202	63	24	39
Rolleston	50		215	58	19	39
Intermediate Stops	40		88			
Total Fuel Use		193	1,142	357	171	186

APPENDIX 2

Following is the hyperlink to the Transport Survey

http://learn.lincoln.ac.nz/tranquest/