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Committee Regional Land Transport
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Greater Wellington Regional Road Pricing Study

1. Purpose

To advise the Committee on the findings of a study on road pricing and to seek the Committee's agreement that further work be undertaken on issues requiring further investigation, but any decision to commit to a scheme be deferred until government's intentions on the mechanism are clarified.

2. Significance of the decision

The matters in this report **do not** trigger the significance policy of the Council or otherwise trigger section 76(3)(b) of the Local Government Act 2002.

3. Background

3.1 What is road pricing?

Road pricing is one of a number of Travel Demand Management measures available to improve transport network efficiency. Other measures that are currently being implemented within the region include travel planning, walking school buses and other travel behaviour change initiatives.

Road pricing involves charging users for the use of a section of road and can take several forms. In the form of tolling it is applied to users of particular roads at all times to help fund new infrastructure. In the form of cordon or area pricing it is applied to existing roads entering or exiting a defined area to restrict demand and to fund congestion-relief measures, normally including public transport alternatives. This is also referred to as congestion pricing.

With congestion pricing, the actual charge can vary by time of day. It is usually applied fully at peak and zero at off-peak. Congestion pricing is under investigation but not currently allowed for in New Zealand legislation. Road pricing as tolling is commonplace in the rest of the world and has been in place for several years (for example Singapore and Norway). Tolling is allowed for under part two of the Land Transport Management Act (2003) and requires a special approval process. While this legislation allows for the tolling of new

roads such as the proposed Transmission Gully Motorway, there is no legislation that allows for the pricing of existing routes.

3.2 Wellington regional land transport strategy

Since 1996, the Regional Land Transport Strategy (RLTS) has contained policies that refer to congestion pricing as a possible future option to address road congestion issues. The recently adopted RLTS (2007-2016) contains the following road pricing related policies:

8.2 g) Advocate for government policy to allow road pricing.

8.6 a) Support investigation of mechanisms for addressing funding gaps in the Regional Transport Programme, including but not limited to... ..(iv) Road pricing of existing roads.

In addition, the Regional Travel Demand Management Plan that was adopted in December 2005 states that “*changes in legislation at Central Government level are required to enable the introduction or road pricing mechanisms on existing roads. And that further study will be undertaken and road pricing proposals, if any, will be subject to a separate process at a later stage*”. The work undertaken and overviewed in this paper forms the first stage of further study.

4. Scope of the technical study

In accordance with the RLTS Sinclair Knight Merz Ltd (SKM) was engaged to investigate the feasibility of introducing road pricing to the greater Wellington region. It must be noted that the SKM report is a high level strategic study that is intended to identify whether a pricing scheme might work within the greater Wellington region. Therefore caution must be exercised in projecting the results of the study onto a practical (or developed) proposal for the following two key reasons.

Firstly, the SKM study was more about whether a workable scheme could be applied in Wellington, not about which scheme would apply. Hence detailed analysis of mitigations, preparations and technological choices are not covered in detail in the SKM report.

Secondly, SKM worked with the best information available, so the Wellington Transport Strategic Model (WTSM) used adjusted 2001 Census figures. We are currently updating WTSM to 2006/07 figures, and the calculations need to be rerun. It is possible that calculated VCRs will worsen on the updated figures, which will refine the functional and financial cases.

The study focussed on congestion pricing to relieve regional road congestion as agreed to by the officer’s technical working group in the first stage of the study. This group comprised officers from the region’s territorial authorities, the MoT, Transit New Zealand and GWRC. The purpose of the technical group was to ensure that the study was based on sound processes and information.

SKM examined six refined pricing schemes (discussed in detail in **Attachment One**). Analysis was undertaken using outputs from the WTSM and the central Wellington City Simulation and Assignment of Traffic to Urban Road Networks (SATURN) model to help populate planning balance sheets, with possible schemes also tested against the objectives of the RLTS. The impacts on local communities, land use, and the regional economy were also analysed along with risk and privacy issues. Reference was also made to the legislative implications of introducing a congestion pricing scheme.

5. Findings

The key findings of the SKM report are set out below:

5.1 Wellington region’s congestion issue

Early in the study a review was undertaken to determine what the distribution of peak period congestion currently is and what it is expected to be in the future. Analysis showed that many key road links into the Wellington CBD are already over capacity in peak periods, as evidenced by high volume to capacity ratios (VCRs).

Once VCRs are at or close to one, the road is operating at capacity and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Traffic flow is unstable and minor disturbances within the traffic stream will cause a break-down of traffic flow resulting in congestion and unreliable travel times.

As the table below shows, WTSM forecasts that by 2016, even with planned roading improvements such as the Dowse-Petone improvements, VCRs are still anticipated to be in excess of one on all main approaches to Wellington City (as well as within the Wellington CBD itself) and in some cases total breakdown of traffic flow is forecast, with resulting queuing and delays (commonly referred to as “gridlock”).

Volume/capacity ratios for worst bottlenecks on the network (2016 AM peak)

Location	V/C Ratio
SH1 north of Mana Bridge	1.01
SH1 north of the Ngauranga merge	1.04
SH1 south of the Ngauranga merge	1.01
SH2 Western Hutt Road (by Petone)	1.00
SH2 Western Hutt Road (by SH58)	1.06
SH2 north of the Ngauranga merge	1.05
Terrace Tunnel off-ramp	1.04
Mount Victoria Tunnel	1.08

These results demonstrate the need to address the congestion issue; however it should be noted that simply enhancing capacity at bottlenecks (attempting to

build our way out of congestion) will not necessarily reduce the level of congestion experienced as it may simply transfer the congestion to the next bottleneck. Several of these bottlenecks are being investigated by the Ngauranga to Airport Corridor and Transmission Gully Motorway studies which are due to report back in early 2008.

5.2 The potential for congestion pricing

The study found that peak period congestion pricing in the greater Wellington region has the ability to reduce network congestion, and be economically and fiscally viable, while at the same time having marginal social and regional economic impacts. Moreover, reduced congestion in the greater Wellington region would improve accessibility and may well improve the regional economy by allowing greater mobility for traffic with a higher value of time (including commercial traffic).

While all of the six hypothetical congestion pricing schemes investigated performed well against the objectives of the RLTS, the best performing scheme was the “Y Medium Emphasis + Southern Screen line” (YMS) scheme. The charges imposed by this scheme are set out in Figure One.

Wellington’s geography makes it especially suitable for a congestion pricing scheme compared with other New Zealand cities. Unlike Auckland for example, Wellington City’s CBD is the primary regional employment centre and is serviced by a very limited number of arterial lanes in at AM and out at PM. This form favours a larger role for commuter rail/passenger transport, and unlike Auckland, Wellington already has a reasonable passenger transport alternative for commuter traffic. Also unlike Auckland, there is plenty of capacity in the Wellington road network outside peak hours, so there is no case for congestion pricing to apply during off-peak periods.

While the SKM report goes into extensive detail as to how the pricing system might operate, by way of summary, the technologies identified as appropriate and indicative for cordon or screenline congestion pricing in Wellington are as follows:

Vehicle mounted electronic tags. It is likely that over time the majority of users would utilise this option whereby a device within a particular vehicle transacts with a payment site on the road at each charging point such as in Singapore or on the Melbourne City Link Toll Road; and

Offline payment options. Several options could be made available for infrequent users whereby the payment is separated from the charged event. Payments could be made via the internet, call centre, on-street meters, retail shops or text message.

In addition, enforcement may be carried out using automatic number plate readers at the charging points.

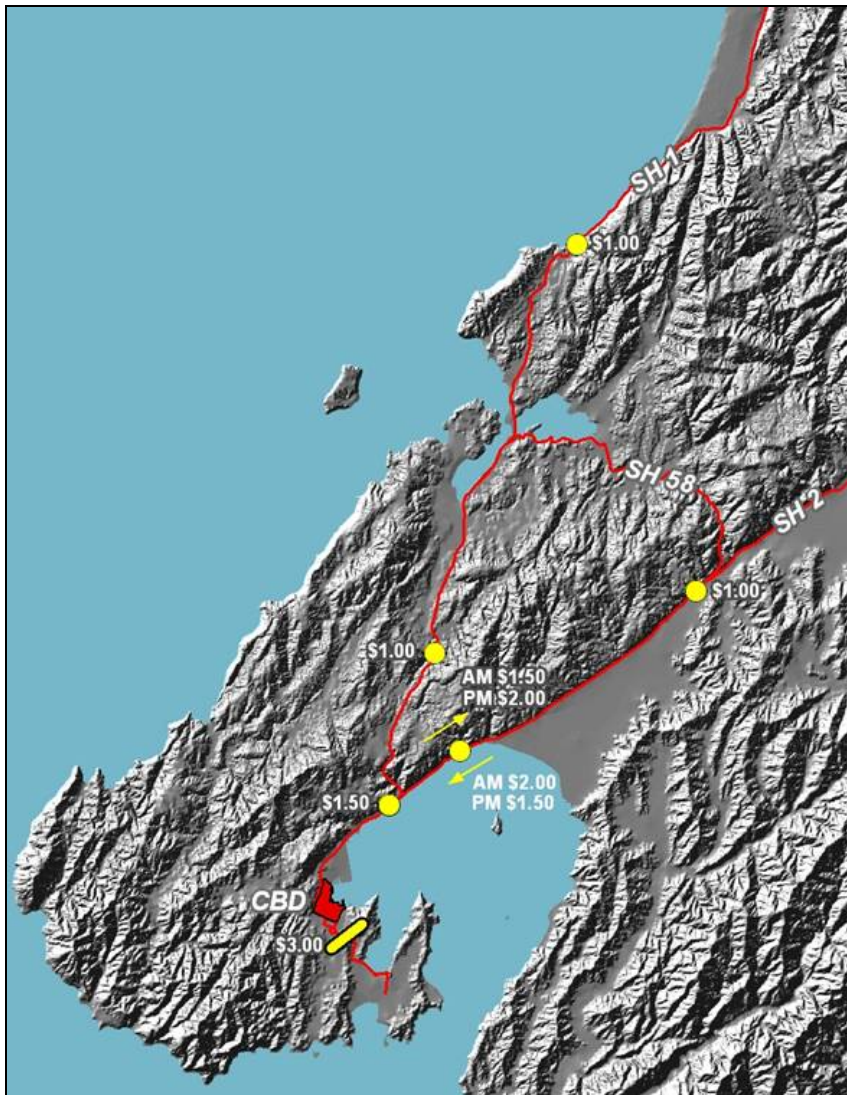


Figure One: General location of YMS charging points and charges

Under the hypothetical YMS scheme, charges range from \$1 to \$4.50, with charges higher for trips to and from the Hutt Valley on the SH2 corridor than for trips on the SH1 corridor. This is because the Hutt Valley is forecast to have higher levels of congestion by 2016. It must be noted that under the YMS scheme the majority of users (81%) would pay no charge because their trips do not pass through charging points. For example trips within the Paraparaumu, Upper Hutt, Porirua, Hutt or Wellington CBDs will not attract a charge.

The table below provides some examples of possible trips on the network, and what charges they would attract under the hypothetical YMS scheme.

Example journeys under the hypothetical YMS scheme and what charges would be paid

Trip	Charge
Otaki to Paekakariki (AM or PM peak)	No charge
Masterton to Upper Hutt (AM or PM peak)	No charge
Pukerua Bay to Porirua (AM or PM peak)	No charge
Lower Hutt to Eastbourne (AM or PM peak)	No charge
Otaki to Porirua (AM or PM peak)	\$1
Masterton to Lower Hutt (AM or PM peak)	\$1
Otaki to Wellington CBD (Am or PM peak)	\$3.50
Masterton to Wellington CBD (AM peak)	\$4.50
Masterton to Wellington CBD (PM peak)	\$3.50
Wellington CBD to Masterton (AM peak)	\$4
Wellington CBD to Masterton (PM peak)	\$4.50
Porirua to Wellington (AM or PM peak)	\$2.50
Karori to Wellington CBD (AM or PM peak)	No charge
Seatoun to Wellington CBD (AM or PM peak)	\$3
Johnsonville to Wellington CBD (AM or PM peak)	\$1.50
Porirua to Upper Hutt (via SH58, AM or PM peak)	No charge

The hypothetical YMS scheme performed best overall for congestion relief as it led to the average VCR on the eight strategic roading network “bottlenecks” falling from 1.04 to 0.96, and six of the eight individual bottlenecks operating with VCRs of less than one. This shows that while severe congestion can be reduced through the use of congestion pricing, even with the YMS pricing scheme in place, by 2016 the bottlenecks will still be close to capacity. This is acceptable as it ensures maximum use is made of the existing strategic road network up until the point where it becomes more economic to increase the capacity of the bottleneck.

The summary table below shows that a suitably designed congestion pricing scheme would make overall positive contributions toward the achievement of RLTS objectives. The SKM report concludes that congestion pricing could be a viable scheme for the greater Wellington region with the maximum estimated capital cost to implement a scheme (\$42M for the CY scheme) being less than 0.24% of regional GDP, while the maximum operating cost (\$18M for the CY scheme) is less than 0.1% per annum. In addition, the total annual user charge (\$47M for the CC scheme) is less than 0.27% of GDP generating excess

revenues of \$28-38M per annum¹. Detailed project financing issues were not undertaken in the study as they are more appropriately dealt with at a detailed scheme assessment stage.

Results of the best performing hypothetical (YMS) congestion pricing scheme

RLTS Objective	Performance Indicator(s)	Effect compared to no congestion pricing
Assist economic and regional development	Average charge paid per trip for the 19% of commuters required to pay a charge (AM peak private vehicle)	\$2.84
	Average cost of travel per kilometre (AM peak private vehicle)	+2%
Assist safety and personal security	Annual injury accidents	-6%
Improve access, mobility and reliability	Congested vehicle kilometres travelled (VKT) ²	-39%
	Average vehicle speed on the network (AM peak)	+10%
	Average travel time on key routes inbound to Wellington CBD (AM peak)	-10%
	Person kilometres of travel (AM peak)	-4%
Protect and promote public health	Vehicle emissions, noise impact and number of trips by active modes	Marginally better over all indicators
Ensure environmental sustainability	Effects on sensitive water receiving environments, greenhouse gas emissions and fossil fuel use	Marginally better over all indicators
Ensure that the regional land transport programme is affordable for the regional community	Capital Cost	\$40M
	User benefits (25 year NPV)	\$119M
	Scheme costs (25 year NPV)	\$57 - 105M
	User charges (25 year NPV)	\$221M
	Excess surplus revenues (Annual)	\$28 - 38M

5.3 Passenger transport and active mode requirements

It is well documented that the better the alternatives (such as passenger transport, car pooling, cycling facilities, etc), the more congestion pricing will lead to modal shift from single occupied vehicles. Further, by using the revenues generated from pricing to improve the alternatives, the incremental costs to motorists of shifting out of single occupied vehicles can be reduced, or in some cases eliminated, making the majority of people better off as a result of

¹ The study's GDP figures were based on data in the NZIER report, *New Zealand's Regional Economic Performance Report to MED*, September 2004.

² VKT with VCR >0.8 in the AM peak

the introduction of congestion pricing. The study found that with the YMS scheme, the most significant increases in passenger transport demand occurred on the bus trips into the Wellington CBD from the southern suburbs, where over 1000 additional trips would be generated in the morning two hour peak period. In addition, 425 extra bus trips would be generated from Petone into the Wellington CBD.

On the Petone to Wellington CBD route, increases are attributed to improved road travel times and reduced congestion making the bus services slightly more attractive than rail, leading to a small shift (approximately 300 less trips by rail) from rail to bus in addition to a shift from car to bus.

The study concluded that the rail capacity improvements already being catered for would be sufficient to meet any modal shift to passenger transport. GWRC officers find this conclusion questionable, particularly for potential modal shift to bus and will carry out further investigation using the updated WTSM (due for completion in late 2007).

5.4 Congestion pricing and the Regional Transport Programme

The normal expectation under congestion pricing is that the revenue raised is applied to relieving congestion in the area that raises the revenue, not elsewhere, i.e. congestion pricing revenues from a Wellington scheme would be applied to congestion-relief measures through the Wellington Regional Transport Programme (RTP). In this respect congestion pricing offers the hope of assisting with future funding gaps, especially in congestion relief measures. However, without clarifying legislation, there is no certainty on this point and no clarity on ownership, governance or use of the revenue. Until there is such clarity, it cannot be assumed that congestion revenues could be taken into account in the RTP, even if a workable scheme might be theoretically possible.

The RTP is due for review in early 2008 following reports back on the Transmission Gully Motorway, East-West and Ngauranga to Airport studies. Preconditions for including projected congestion pricing revenues cannot be in place at that time and therefore it is recommended that they are not taken into account in the next review of RTP.

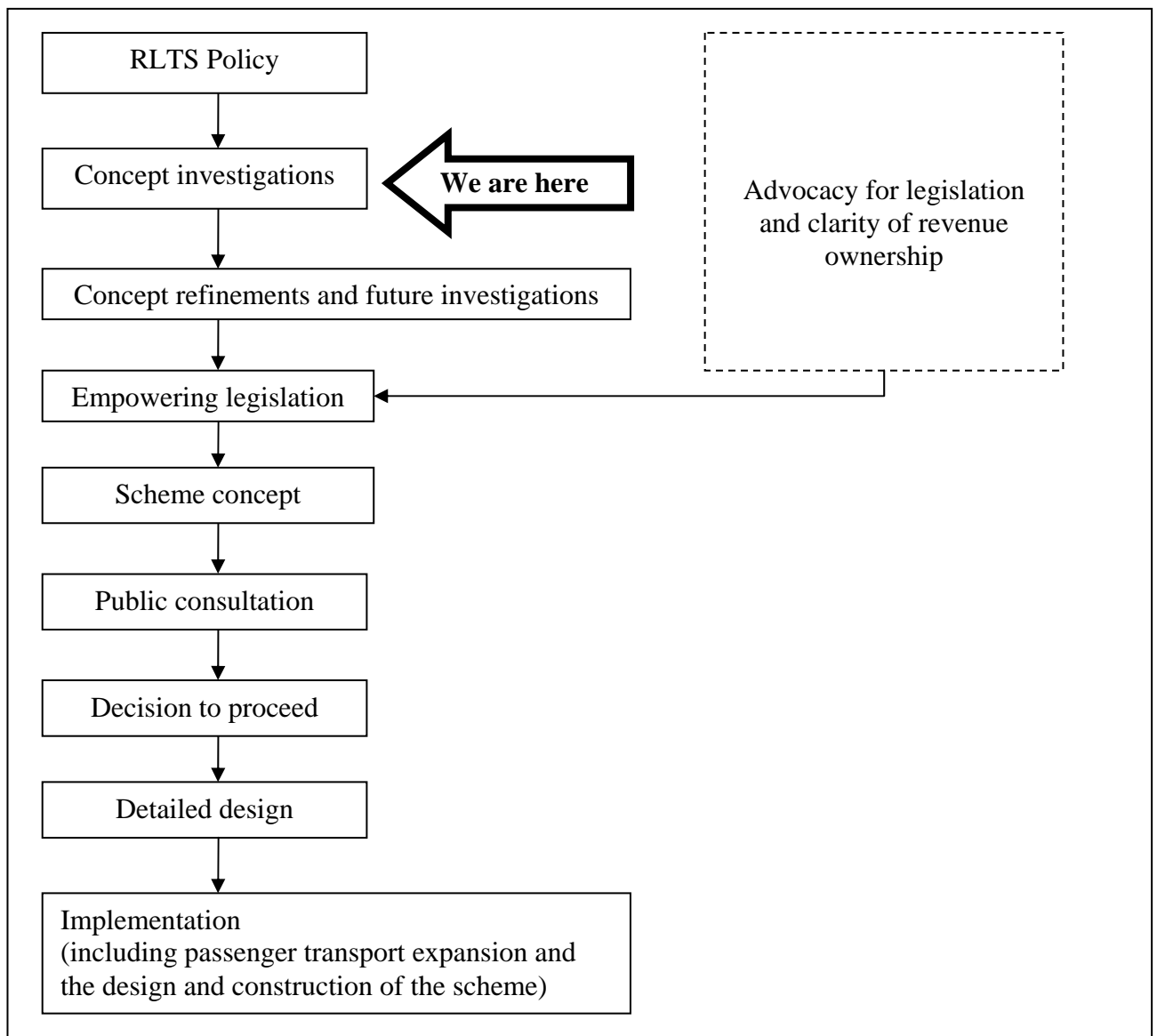
Currently the RTP is supplemented by R funding of \$225M (which is fully allocated in the present RTP) and possibly by a future regional fuel tax. R funding is a temporary measure expiring at the end of March 2015, and it is uncertain what, if any, replacement is contemplated to R funding beyond 2015. The potential regional fuel tax will have various conditions attached to it, and is also currently uncertain as to its amount, sustainability, governance, and application. Congestion pricing offers a more sustainable funding stream particularly suitable for this region that might replace at least a regional fuel tax. However, a congestion pricing scheme would take three to five years to get into place and perhaps longer.

The calculation of three to five years to put congestion pricing into place assumes the following can happen within that time:

- specific legislative provision to allow congestion pricing (at least in Wellington);
- sufficient investment in passenger transport infrastructure and services is made in order to enable required capacity at day of introduction;
- stakeholder agreement and public consultation and endorsement of a specific developed proposal;
- Government agreement to a scheme proceeding; and
- suitable technological solutions are identified, contracted, and implemented.

These steps and where the region is currently at are graphically demonstrated in the following diagram:

The road to congestion pricing



6. Central Government work on road pricing

In February of this year the Ministry of Transport released the results of stage one of the Auckland Road Pricing Evaluation Study. The Minister of Transport announced that further work will be undertaken on the issues raised in stage one of the study (see **Attachment Two**), with the second stage due to report back in early 2008. The work involved would include the technological, legislative and governance aspects of a developed proposal.

7. Issues for further investigation

The SKM report addresses feasibility and outlines risks and impacts needing further work before a developed proposal is even possible. As part of the next stage of work, officers believe we also need to engage affected stakeholders to ascertain and address their concerns and aspirations (see **Attachment Three** which outlines the results of a public acceptability and perception survey carried out in the region in 2003). In addition to work with government, further investigation is required on the following areas:

- Updated and refined estimates of congestion and passenger transport effects; revised financial, economic and benefit/cost ratio analyses;
- Land use planning and regional growth effects, including reverse agglomeration (the degree to which the measures may provoke relocations, or boundary effects);
- Sector and social impact assessments: evidence on the effects that a congestion pricing scheme in Wellington would have on particular sectors and geographic areas; on employers and on people with no alternative time or mode of travel; and
- Scheme parameters: SKM's best performing option (YMS) is quite complex, with multiple charging points and some results that need further investigation (e.g. long SH2 journeys more costly than long SH1 journeys.) Simpler and more equitable schemes are possible, and need to be examined in the lead-up to a developed proposal. Examination of the possibilities of a phased introduction would also be required.

It is therefore appropriate that discussion continues with central government on these issues, and that investigations continue as outlined above. Officers will report back to the Committee as the project progresses.

8. Communication

A press release from the Chair of the RLTC giving the report context has been released and the full SKM technical report (stages one and two) will be posted on the GWRC website.

9. Recommendations

That the Committee:

1. ***Receives*** the report;
2. ***Notes*** the contents of the report;
3. ***Notes*** that road pricing will not be available to address any funding gap that may be identified in the Regional Transport Programme when it is next reviewed in early 2008;
4. ***Agrees*** that officers continue discussions with central government on congestion pricing;
5. ***Agrees*** that officers and the RLTC Technical Working Group continue their work on issues outlined in this report, and report back to the Committee by September 2008 on progress made; and
6. ***Agrees*** to defer any decisions to proceed with the development of any congestion pricing scheme in the greater Wellington region until there is more certainty about central government's intentions.

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Attachment One: Wellington Regional Congestion Pricing Study Stage Two Executive Summary

Attachment Two: National Context: The Auckland Road Pricing Evaluation Study

Attachment Three: Public Acceptability and Perception Research