greater WELLINGTON
REGIONAL COUNCIL

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Committee Passenger Transport
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Real Time Information

1. Purpose

To inform the Committee of progress with the Real Time Information (RTI) project at GWRC, to recommend steps for the further development of the project, and to seek approval to move to the consultation and design stage.

2. Significance of the decision

The matters for decision 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

One of the key goals of the GWRC Long-term Council Community Plan (LTCCP) for 2006-16 is increasing public transport patronage. The LTCCP states that this will (among other measures) require "the provision of real time service information" (p.41). The LTCCP, through the Regional Transport Programme, provides for RTI to be introduced from 2009/10.

RTI is a useful and customer friendly part of a modern public transport system. It is a valuable information tool in big cities where the traffic volume can affect the ability of buses to keep to timetables. The reactions of public transport users during the last months also show that they expect GWRC to be able to provide RTI, especially in unpredictable situations. RTI also has advantages for operators and GWRC, because it delivers very useful and reliable information for planning, operation, reporting and monitoring purposes.

3.1 What is Real Time Information

A RTI system in public transport tracks vehicles in order to predict the 'real' arrival/ departure time of that vehicle at various points along the route. The 'real' time is in fact an 'estimated' time, being derived from the vehicle's current location and historical travel time information collected over a certain period (mostly over the last few weeks).

Although systems vary, RTI systems usually consist of:

- A device identifying the position of the vehicle (usually a Global Positioning System (GPS)) and other bus/train equipment (e.g. connection from the GPS to the ticket machine and a radio or other device to transmit the information).

- A wireless connection (which can be a radio channel or a GPRS system) from the buses to a central device/computer and the hardware to supply the connection (e.g. antennas on high buildings).

- A way to enter the necessary information into the system (e.g. bus number, route, departure time etc.). Preferably this is done with an interface that uses the actual information from the operators rather than manually (for example by the bus driver) because of the higher chance of mistakes of a manual input. In Auckland tests have proven that drivers will make input errors about 5-6% of the time.

- A central computer with software that collects the real time data from the vehicles, does the analysis, predicts the arrival time at the bus stops and prepares the information for the output. The software can also deliver reports for management information.

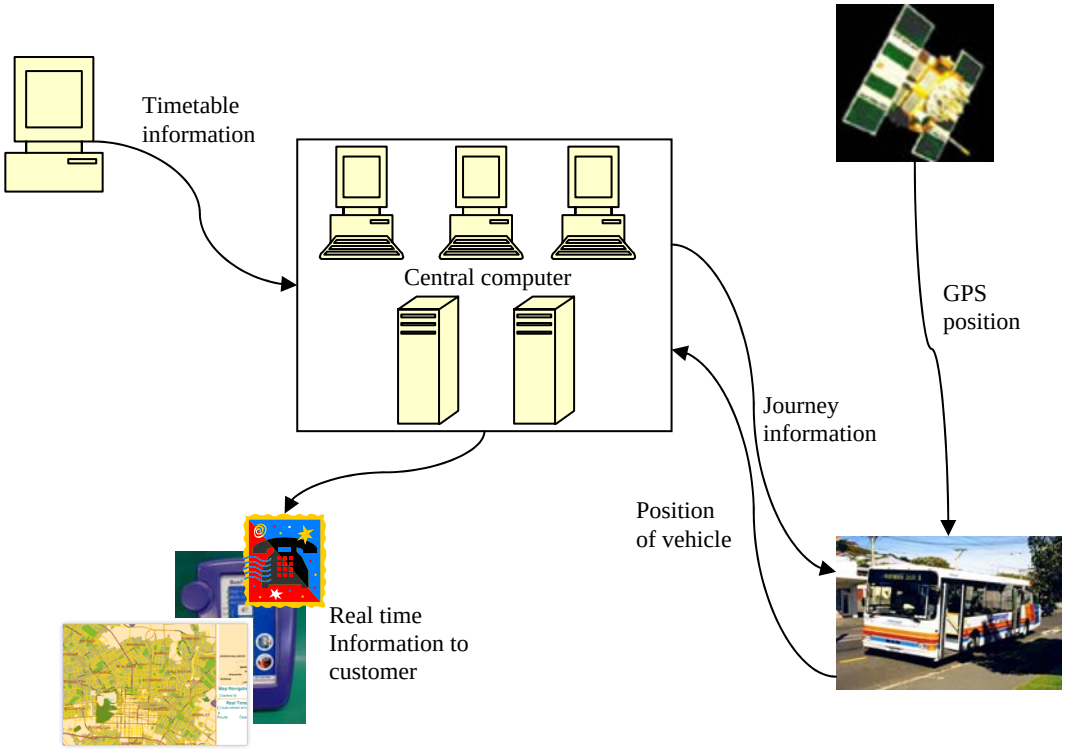
- A computer at the operator's depots, to enable them to use the RTI for their own purposes (operation, planning, monitoring, and reporting).

- Information displays at bus stops for passenger information (wired or wireless).

- Other information sources for users such as internet, call centre, SMS-service.

More devices and software can be added to the system to enable it to be used for bus priority at traffic lights.

The diagram below gives a general idea of the most important components a RTI system consists of and how they are connected to each other:



3.2 Examples of Real Time Information

RTI systems can be found in public transport systems all over the world. In New Zealand three public transport networks have RTI systems (Auckland, Christchurch and Hamilton). Some relevant facts about the New Zealand systems are:

- The three systems work with different suppliers, which all developed their own devices and systems.
- Usually they start with a pilot on one or a few lines and only a few options for the passenger to get the information. Usually at the beginning the systems work with bus stop displays. Internet or cell phone applications often follow in a later phase of the project.
- Two of the systems are run by a regional council, the third by the supplier, under contract to the regional council.
- They all offer the operators access to the RTI of their own buses.
- The current systems in New Zealand work only with buses, not rail or ferries.
- All projects were part funded from Land Transport NZ.

3.3 Benefits and risks of Real Time Information systems

From the RTI systems running in New Zealand and elsewhere the following benefits and risks can be extracted:

3.3.1 Benefits for public transport users

The main benefit of an RTI system is that it delivers reliable information about arrival and departure time of public transport. This is especially crucial if the public transport system itself lacks punctuality. Research has shown that about 80% of the passengers prefer RTI to the printed timetables. Other benefits are:

- A RTI system with displays at stops increases the perceived reliability, because the passengers focus more on the displays than on the printed timetables. A reliable, convenient and well used RTI system could lead to a public transport system where printed timetables are almost no longer necessary.

- It can be linked to a bus priority system, which can speed up the journey times. Introducing RTI on the Link line in Auckland reduced travel times from average 56 minutes to 48 minutes per trip, almost 15%.

- A RTI system is convenient and easily accessible. The user can (usually) choose from different options (internet, cell phone, bus stop displays) to gain the information, where and when it is needed. In the GW Region RTI would be combined with the already well used Metlink information sources (journey planner on internet, call centre, txtBUS, txtTRAIN).

- An internet application enables customers to use the system for the 'just-in-time' planning of their commuter trips, which makes public transport as a transport mode more attractive. From the RTI system in Christchurch it is known that employees check the departure time of their bus via internet a couple of minutes before they have to leave their workplace, in order to leave work just in time to catch the bus.

3.3.2 Benefits for GWRC

Increasing public transport patronage is one of the major aims in GW policy. RTI can contribute to this aim, because it improves the quality of the public transport service. Another major benefit for GW is the information GW gains from a RTI system. This information can be used for planning purposes, marketing and monitoring. Beside this, customers expect Metlink, and especially the call centre, to deliver real time information and are frustrated when they hear that this information is not available, especially in situations when the public transport system has difficulty keeping to schedule. Other benefits include:

- RTI delivers information about bottlenecks in the network. For example: Where do buses always run late? GW can provide this information to other stakeholders, e.g. City Councils, who can use the information to help resolve those problems.

- It is positive for the image of the public transport in the region.

- GWRC will use the information from the RTI system to monitor the fulfilment of the contracts with the operators. Key Performance Indicators regarding punctuality and reliability can be monitored precisely and the operators can use the information from the RTI system to report their performance to GW. Key data captured through the ARTA system includes patronage, running times, early/late starting of routes, buses going off-route, and time saved because of intersection priority. The way the gained information may be used has of course to be discussed with the operators in advance (for the present contracts) respectively has to be added to new contracts.

- Reliability is important to public transport users and RTI can lead to extra passengers. From other RTI systems high patronage increases are reported. The patronage in Christchurch increased by more than 22 % after introducing a package of improvement including RTI. Their supplier estimates that at least 50% of the new patronage can be directly attributed to the RTI system. The patronage of the Auckland Airbus increased by more than 30% over a 12 month period and had a 80% satisfaction rate after the introduction of RTI. Because the introduction of RTI often occurs together with other improvements of the public transport system the figures from other systems are only examples and are not directly transferable to the situation in GW.

3.3.3 Benefits for the operators

Operators will use the information for operational, monitoring and reporting purposes. Other benefits are:

- The actual operational information gained enables operators to react quicker to incidents. Deviations from the timetable can be recognized and this information enables the operator to solve the problem faster.

- The RTI system can be linked to a bus priority system, which can speed up the journey times, resulting in increased efficiency and lower costs.

- Since drivers know that they are being tracked they are less inclined to start their services early/late or deviate from the route.

- Since the accuracy of the system has increased the number of complaints in Auckland has decreased (Stagecoach in Auckland for example has 35% less complaints since the introduction of RTI, especially regarding early runnings). Passengers also react less stressed towards drivers, because they can access information about the departure time of the bus in advance.

- RTI is a useful tool to guarantee connecting services.

- It helps operators to recognize structural problems (e.g. regarding the feasibility of the timetable) earlier and solve them in a sustainable way.

- Security: RTI systems often have a distress button for drivers, which can be pressed in case of emergency.

- In Christchurch the information is also used in cases of complaints from public transport users about delays and in case of accidents, as the information is detailed enough to show the exact location of every vehicle during the whole day.

3.3.4 Risks

- The main risk of a RTI system is if the information is not accurate, meaning that the benefits cannot be delivered. This can be caused by technical reasons, especially in the start-up phase, or it can be caused by human factors (especially in systems that rely on input from the drivers). It is very important that the system is reliable right from the beginning. If public transport users lose confidence in the system in the beginning it will be very difficult to win this back later on. A reliable system should give the 'right' information in at least in 95% of all cases. A system with 80% reliability means that the information about one bus in five is not right, which means a disappointing occurrence for regularly commuters twice a week. 90% reliability still means one disappointment per week, and 95% one disappointment every 2 weeks. 'Right' information means especially that all buses are displayed and there are not 'ghost' buses or buses that never appear at the bus stop. This is worse than a prediction of a departure time that is slightly wrong.

4. GWRC Policy

GWRC has several policies which support the introduction of RTI. These are discussed below.

4.1 LTCCP

One of the key goals of the GWRC's LTCCP 2006-16 is increasing public transport patronage. The plan quotes that this will (among other things) require "the provision of real time service information" (p.41). Funding for RTI has been provided in the LTCCP.

4.2 Draft Regional Passenger Transport Plan

The Draft Regional Passenger Transport Plan (PT Plan) states that:

"GWRC will develop and implement a comprehensive real-time passenger information strategy aimed at increasing the overall reliability of the passenger transport system. This will, as one of its outputs, provide real-time information display at key points in the network. Real-time information at all departure points will be available through the text-messaging service (SMS)."

According to the PT Plan RTI should be introduced at CBD stops, the Metlink call centre and cell phones.

Those policy documents are the basis for the research GW has undertaken to date on RTI.

5. Opinions of stakeholders

5.1 The public transport users

Unreliability of public transport is one of the main frustrations of public transport users. They also are positive about RTI. This is a general conclusion based on research in different countries and it can also be concluded from feedback GWRC gets from public transport users, including the following:

5.1.1 Public Transport Customer Satisfaction Monitor 2006

In a 2006 telephone survey of public satisfaction with public transport services RTI was identified as being very important especially in cases of delay.

5.1.2 Feedback from the Metlink Service Centre

It is clear from the recent reliability problems that the public transport users are expecting GWRC/Metlink to be able to give RTI. The Metlink team experienced that customers were frustrated when they found out that the Metlink Service Centre was not able to provide 'real time' information about when their bus is due to arrive. Having RTI available on screen for the Metlink Service Centre staff, the Metlink website and via txtBUS would reduce frustration when services are disrupted and provide a much better level of service for customers.

5.1.3 Submissions on Draft PT Plan

The Draft PT Plan received many submissions supporting RTI for the Wellington region. They all emphasized the need to improve passenger information and RTI.

5.2 The operators

Expressions of support for RTI have been received from the major transport operators in the region.

5.3 LTNZ

LTNZ has indicated their support in principle for the project. Before funding approval can be given however GW needs to prepare a business case.

5.4 City and District Councils

Submissions on the Draft PT Plan were made by several councils regarding RTI. Porirua City Council and Upper Hutt City Council supported the introduction of RTI. Masterton District Council suggests a RTI pilot on the Wairarapa rail network. Kapiti Coast District Council supports investment for improved delay information. Informal support has also been received from Wellington City Council.

6. Options for the implementation of Real Time Information in the GW region

If GW is to proceed with RTI, the Committee will eventually need to choose between several options for its introduction. These are briefly discussed below. Note that the final decision on which option to choose is not required now; the description is provided for information only.

All options generally involve the phased introduction of RTI. If the council decides to proceed with RTI, the options, their advantages and disadvantages, and their costs will need further examination at a later stage to be able to make a decision regarding the preferred option.

6.1 Option 1: Introduce RTI throughout the whole region all at once

One option is to introduce RTI in the whole region, for all bus and train services, at once.

Advantages

- The price per piece of the needed devices would probably be lower because of the larger scale.
- A lot of devices such as a central computer and the software have to be bought anyhow; the savings of a smaller system lie in the lower number of devices needed for the vehicles and at the stops/stations.

Disadvantage

- The much higher total costs (see section 7 for an indication of the costs).
- The much bigger scale of the system, which makes the project more vulnerable for delays and introduction problems.

6.2 Option 2: Start with the train system

Option 2 involves introducing RTI on the train system first.

Advantages

- Starting the RTI system on the trains means giving information to customers that currently face delay and unreliability.
- It could help to improve the quality of the train-bus interchange. At this moment an often heard complaint of train users is that the buses don’t wait if the train is delayed.
- There are fewer vehicles which have to be equipped (in comparison with the whole bus system), which makes the system less expensive in the beginning.

Disadvantages

- The train system might be technically more challenging, because of its tunnels.

- Delays often occur through breakdowns. In these cases RTI would not help a lot, because the system would not be able to predict how long the breakdowns last (at the same time the users would expect the correct information, because of the existence of RTI. Management of the expectations would be very important if this option was chosen).

6.3 Option 3: Start with the buses in Wellington City

Introducing RTI on parts of the bus system would mean that a decision has to be made on which part to start. In this option the assumption is to start with Wellington City. This is because most of the bus users have their trip origin and/or destination in Wellington, which means that a large number of public transport users could benefit from RTI. Another reason is that a lot of the traffic problems occur within Wellington, which affects the reliability of the timetables. Even in this option it will be useful to start with only one or a few lines, to test the hard- and software before introducing it in the whole city.

Advantages

- Starting with a part of the region offers the chance to try the reliability of the system before introducing it in the whole region. As mentioned earlier, the acceptance of RTI from a customer perspective is very vulnerable regarding the reliability, and lost confidence is hard to be built up again.

- Introducing RTI in a part of the region first gives the opportunity to monitor the effects of the system before deciding to enlarge it.

- The costs of starting with a part of the system are naturally lower than of the ‘all at once’ option.

- If the system would start for example on a couple of lines along the Golden Mile, it would immediately reach a high percentage of public transport users with a relatively low number of bus stop displays needed. At the same time, this is the area where delays often occur, because of the high traffic volume.

Disadvantages

- Because a lot of buses call at the stops in the Golden Mile, multi-line RTI signs (which are more expensive) are needed to be able to display all the information.

- Favouring one area means others will have a delay in getting the system implemented.

- Other parts of the region might be simpler to try.

Of course it is also an option to start in another part of the GW region. Some of the advantages named above would be valid as well, as e.g. the chance to try the reliability in a part of the region first. It might be even simpler to try in a smaller area and (depending on the area chosen). Because there are many possibilities the indicative costs given in section 7 are only provided for the option starting on some major lines in Wellington city.

For all options there are further "sub-options" regarding how RTI can be displayed and used, for example at bus stop displays, via the Metlink Service Centre, internet or cell phone. The information can also be used to give buses traffic priority at traffic lights. Both the chosen option to introduce RTI, and how the information is provided, influence the costs of the RTI system.

7. Indicative costs

The table below gives an indication of the possible costs of each option. They are based on indicative costs of the existing RTI systems in New Zealand, which are designed, built and maintained by different suppliers. The costs are indicative only; no official request to potential suppliers has been made.

		OPTION 1		**OPTION 2**		**OPTION 3**	
	costs per piece $ 000	quantity	costs $ 000	quantity	costs $ 000	quantity	costs $ 000
CAPEX							
Bus equipment incl. GPS	5	500	2,500		0	250	1,250
Train equipment	5	100	500	100	500	0	0
Extra server for central computer (excl. central computer itself)	10	1	10	1	10	1	10
Computer for operator's depots	10	10	100	1	10	3	30
System development incl. software	2,000	1	2,000	1	2,000	1	2,000
Bus signs ('important' stops)	15	30	450	0	0	20	300
Bus signs ('suburbian' stops)	10	70	700	0	0	30	300
Signs at stations	15	50	750	50	750		0
SUM CAPEX			**7,010**		**3,270**		**3,890**
OPEX per year							
Maintenance	200	1	200	1	200	1	200
Communication costs	0.3	600	180	100	30	250	75
Software licences, upgrades etc.		1	0	1	0	1	0
SUM OPEX per year			**380**		**230**		**275**

The table only gives an indication of the capital and operational costs for the RTI system itself. It does **not include** costs for the preparation of the system (business plan, tender procedure, project management). It also does not include possible extra costs for cabling (at bus signs) and for extra information options as an internet tool or a cell phone tool. The costs for these devices depend on

how complicated it is to link up the RTI software with the existing Metlink tools.

On the other hand, the costs do not take into account possible savings, for example, from buses already equipped with GPS. In Hamilton one GPS device delivers the information for RTI and electronic ticketing. Further research is necessary to find out if the GPS infrastructure the operators in the Wellington region have already put in their buses or are going to put in for electronic ticketing can be used for RTI as well.

The table below gives the indicative rates effect of the three options, assuming that Land Transport NZ funds 75% (assuming the project is eligible for additional C1 funding).

	Option 1 ($ 000)	**Option 2 ($ 000)**	**Option 3 ($ 000)**
Rates on capital expenditure (debt funded over 10 years)	264	122	145
Operational costs	190	115	138
Indicative transport rate effect (per year)	**454**	**237**	**283**

8. Funding

The RTI systems in New Zealand are funded from different sources, depending on the region and the 'history' of the project. Usually LTNZ pays 50% of the costs. In Auckland, the city council played an active role in the development of the system and also paid a part of it. Auckland also has found the operators willing to pay a part of the ongoing costs (they pay 25% of the communication costs for the buses).

The Auckland example shows that co-funding from other stakeholders is possible. The further opportunities for GW have to be investigated.

GWRC has included projected expenditure for RTI in its LTCCP 2006/16. The total projected over the 10 years was $7.9m for capital expenditure, and $13.9m for ongoing operational costs. (Note that this projected expenditure was based on estimates available at the time the programme was put together, and are likely to be out-of-date now. More precise costings will be available only once further investigation is undertaken).

The major funding included in the LTCCP is in 2008/09, 2009/10, and 2010/11. This assumes the major capital posts will occur in those years. In this years Annual Plan process, the project was deferred by one year, meaning that funding will not be available until 2009/10.

However since that decision to defer was made, several reasons have arisen which suggest that the original timetable i.e. a start date of 2008/09, should be retained:

- Strong current demand for RTI as expressed by public transport users, operators and other stakeholders.

- The benefits of RTI when services have difficulty keeping to schedules (as is the case in Wellington at present).

- The likelihood that the integrated ticketing project will not be sufficiently advanced to uplift the funding provided for it in the funding programme (integrated ticketing is currently programmed to be funded one year prior to RTI). Thus it is possible to "swap" the funding for the RTI project with the integrated ticketing project, with little effect on overall Council funding levels and little effect on the implementation of integrated ticketing.

Given the above, it is suggested that that RTI be implemented as soon as possible. This means advancing the project by about a year, with funding to be available from 2008/09.

9. Next steps

It should be noted that the Committee is not asked to make a decision regarding the introduction of a RTI system in the GW region right now. All that is sought at this time is approval to further investigate and design the system. A final decision of the Committee to proceed with the introduction of RTI has then to be taken in November 2007, once that investigation and design have been undertaken (according to the indicative timetable given below in 9.5).

9.1 Stakeholder consultation

Stakeholders in this project are the operators, the City or District Council(s), the public transport users (including specific groups such as disabled people), LTNZ and Transit New Zealand (for bus priority measures). It is important to consult the stakeholders for several reasons:

- To gain information about their needs

- To look for win-win situations (e.g.: is it possible to use the GPS devices for electronic ticketing on buses for RTI as well?)

- To get input for the functional specification

- To get their commitment for the project

The first contact with the stakeholders will be organized on a one-to-one basis. Meetings later on in the process might also take place with a group of stakeholders. It is suggested consultations begin immediately.

9.2 Preparation of the business case

A business case will need to be prepared for different purposes. On the one hand a business case will be used as a discussion paper for GW and will help to make a decision regarding the preferred option. It will establish a time line for the project and costs, based on the GW requirements. The business case will also assess technical issues that are specific to the Wellington region. It will deliver the information the Committee needs to be able do make a go/no go decision.

On the other hand Land Transport NZ requires a business case to support a funding application. To gain funding a standard procedure has to be followed, and also the business case has to be delivered in a Land Transport NZ approved format. This could mean that the business case for internal use and external use are likely to be different documents.

It is suggested to start working on this immediately should the Committee agree with the recommendations of this report.

9.3 Decision regarding preferred option

If the Committee decides to proceed they will eventually have to make a decision regarding the preferred option. This will be based on the business case, which also will give recommendations on the options, and is likely to occur in November 2007.

9.4 Steps after the go/no go decision

If the Committee in November 2007 decides to implement RTI in Wellington and if they choose a preferred option, the RTI system will be tendered. The business case and the stakeholder consultation will deliver a lot of information needed for the tender (e.g. for the technical specification). Once the final decision is made and the preferred supplier is chosen the implementation of the RTI system will start. Independent from the chosen option, a pilot on one or a couple of lines is likely. As mentioned earlier, RTI depends upon its reliability right from the beginning. During a pilot period problems can be recognized and solutions can be tested, before the complete system is put into practice.

9.5 Indicative timetable for the next steps

The steps described above lead to the following estimated steps and duration of a RTI project:

Step	**Estimated duration**	**Time frame**
Stakeholder consultation	6 months	June – November 2007
Preparation of business case and funding arranged	6 months	June – November 2007

Policy decisions regarding go/no go of the project, the preferred option etc.		Report to PT Committee 20 November 2007
Tender procedure	6 months	January – June 2008
Contract awarded		July 2008
Implementation System development Pilot Rollout	 4 month 5 months	 August – November 2008 December 2008 – April 2009 From May 2009 onwards

10. Recommendations

That the Committee:

1. ***Receives** the report.*

2. ***Notes** the content of the report.*

3. ***Agrees** to proceed with stakeholder consultation and the preparation of a business case.*

4. ***Notes** that the Committee will be asked to make a decision on the introduction and scope of a real time information system once the stakeholder consultation and business case are completed.*

Report prepared by:	Report approved by:	Report approved by:
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Attachment 1: Background information of RTI systems in New Zealand