Measure title: **Provision of real time passenger information**

City: **Norwich** *Project:* **SMILE** *Measure number:* **12.9**

A Introduction

Providing the public with high quality public transport services is vital in order to encourage bus use and modal shift. In collaboration with Norwich City Council, Norfolk County Council (NCC) is committed to identifying and implementing innovative applications towards delivering public transport services and works closely with a variety of partners to achieve this aim.

Norfolk County Council already has a database of live traffic information that includes:
- Real time information on the availability of spaces available in city centre car parks and park and ride sites
- Bus route and time table information
- Information on gritting routes during severe weather
- Road work and road closure information.

In addition work is currently being undertaken to identify further highway and traffic information that the County Council hold and which would be of benefit to road users. The methods for collecting this information together into a common database and then disseminating it to potential users are also being examined. It is therefore anticipated that further information systems will be available in the future.

The provision of Real Time Passenger Information was programmed for implementation during Months 25 to 30. The measure was intended to achieve:

- Reductions in actual PT journey times through reduced waiting times at stops and
- Improvements in perceptions, use and acceptance of PT services.

The second of these objectives can be considered alongside other measures, and there is a common approach being developed for the evaluation of measure outcomes.

The evaluation will provide inputs to the following METEOR/GUARD categories:

- SOCIETY
- TRANSPORT

A1   Objectives

The measure is identified to improve the availability of real time information for existing and potential passengers using collective transport modes, thus reducing a barrier to the increased use of public transport for local journeys into Norwich. Its implementation was designed to promote better access to real time information, by developing existing systems for accessing this information, via mobile phone texting (SMS), variable message signs (VMS) and other systems. The information was intended to be provided in a variety of locations e.g. workplaces, education institutions, medical facilities and entertainment complexes.

The desired outcome is to demonstrate the extent to which the combination of high quality passenger interchange facilities, real time information and an increase in the effective frequency of services (see Measure 8.4) can stimulate demand for collective passenger transport.

The measure objectives are:

- **Objective 1 -** Release data from BusNet for 3rd party uses
- **Objective 2** - Improved information about bus services, congestion, etc to increase bus patronage and meet Local Transport Plan targets
- **Objective 3** - Provide high quality waiting facilities and real-time passenger information at home and in other beneficial locations
- **Objective 4** - Journey time and wait time savings for public transport users
- **Objective 5** - Increase public transport modal share

A2   Description

Provision of real time passenger information has been greatly expanded in scope (from current at-stop information) through placement of real-time information displays at a potentially wide range of locations e.g. social gathering places, places of employment, health facilities, education institutions and entertainment complexes, as well as a housing development demonstration site. This system expansion has been facilitated through cooperative working with a range of employers and other organisations within the Norwich area. Mobile SMS texting technology has also been brought in, to increase the range and coverage of real-time information for bus users.

Task   *1*

- Determination of data availability and costs. A specific brief has been written for this element of the task and sets out the scheme objectives in detail for the release of data from the BusNet system for use in third party applications.
- Establishment of user needs for RTPI via SMS (to tie in with the wider service development planning) and confirmation of the functional design specification.
- Establishment of user needs for RTPI via VMS and research attractiveness to host organisations. This also tied in to wider service development

planning processes, and additionally there were consultations with host organisations.

- Establishment of user needs for RTPI via home-based systems and internet.

Task 2
- Software and systems development for RTPI via SMS.
- Factory acceptance testing
- Installation and testing of Central Management System

Task 3
- Hardware build and software development for RTPI via VMS
- Factory acceptance testing
- Installation and testing of Central Management System and VMS

Task 4
- Software development for RTPI via home-based systems
- Factory acceptance testing
- Installation and testing of Central Management System

B   Measure implementation

B1   Innovative aspects

The innovative aspects of the measure are:

- **New organisational arrangements**, regionally – Although this is an ITS measure, the innovation lies in the organisation into a single portal. Real time collective transport information is now increasingly being installed at bus and railway stations and on-street e.g. at bus stops. In many ways however the provision of information at that stage in a journey is too late as the knowledge gained at the bus stop etc does not lead to time saving. Additionally, information provided at home or in other buildings can influence modal choice, particularly if the collective transport details are linked to information about road conditions, parking availability etc.
- **New organisational arrangements**, nationally – The actual measure implemented required the introduction into the UK ITS sector of a new player in the real time information services. A single supplier offering proprietary system solutions has dominated the UK market for RTPI services. The presence of an alternative provider offering an open-standards approach to the development of RTPI is therefore a significant innovation.
- **New conceptual approach,** nationally – The actual measure deploys real time service disruption information to the public as opposed to the real time 'next departure' information that existing bus information systems have deployed.

B2   Situation before CIVITAS

Norfolk had installed a global positioning system (GPS) tracking system for buses serving Norwich and the surrounding area. This system is known as BUSNET. The entire local bus fleet, comprising vehicles belonging to eight different operators, was in the process of being equipped with tracking equipment to ensure the best availability of real-time data across the core network. The provision of real-time rail information is also being undertaken.

B3   Actual implementation of the measure

The measure was implemented in the following stages:

Stage 1: Investigation of server to server link from existing BUSNET system to existing common database *(February 2005 - current)* The original measure description was developed with a key dependency on the implementation of a server to server link between the County Council's BUSNET bus tracking system and the Common Data Management Facility (or common database) which was being developed for Norfolk by Mott MacDonald under a Partnership procurement project. A BUSNET system was supplied to NCC by ACIS and has been operational in Norfolk since the late 1990s providing a discrete Real Time Passenger Information (RTPI) system including electronic signs (called Passenger Information Points or PIPs) at bus shelters in Norwich and the west of the county. Taking a UTMC Real Time Information Group (RTIG) feed from the BUSNET server to the common database (known as Network Management System in Norfolk) would allow the distribution of RTPI to a wide range of linked systems, enabling information 'away from the stop'.   The DMP included 4 such linked systems each designed to enhance the perception and awareness of public transport services:

- SMS text message
- Hosted display screens
- Home-based displays
- Internet-based travel information

Development of these systems has been on-going throughout the period of the measure implementation, with the exception of the home-based displays. It is believed that a proprietary product has been developed by ACIS, however in Norfolk no opportunity has been identified to condition a trial as part of residential development planning conditions. This was due in part to concerns about the proprietary nature of the units. In functional terms there was considered to be a significant disadvantage with a dedicated system as compared to an open system delivered over the web, which would permit blending of a range of travel information.

An SMS text messaging service has been available in Norfolk under the East Anglia Passenger Transport Information Service (EAPTIS) consortium, although this currently provides timetable information only.

Discussions were held with a number of potential host sites for away from the stop displays with RTPI feeds.

Work is on-going to develop a traffic and travel website for Norfolk, based on the Norfolk NMS. Currently there are real time feeds to websites for car parking information only, as well as roadworks information based on notices input by highway contractors and statutory undertakers.

Stage 2: Investigation of alternative measure using hosted Hogia Disruption Manager system (August 2007 – January 2008) – By the summer of 2007 (Month 30) no agreement had been reached between Norfolk County Council and ACIS over the procurement of a server to server link to provide RTIG feeds to the Norfolk NMS. Without this the implementation of the measure could not proceed. Consideration was given to an alternative approach to delivering real time public transport information 'away from the stop', and a proposal was sought from Mott MacDonald under the Norfolk Strategic Partnership. This resulted in a demonstration measure being scoped which would deliver:

- Timetable departure and service disruption messages
- Service disruption messages by SMS

The demonstration was scoped by Norfolk County Council to cover all bus services serving the Norfolk and Norwich University Hospital (NNUH) to the west of the City, and using 2 TFT display screens to be hosted by the NNUH in the main foyer areas. In addition a trial of SMS messaging would be done using a panel of users of the hospital service buses.

Stage 3: Development of bus service disruption messaging trial *(January 2008 – March 2008) The* trial measure was achieved using a hosted system provided by Hogia in Sweden. Web-based portals were made available to two bus operators First and Konect to enable service disruption information to be made available, and this is processed by the Disruption Manager module to generate the messages. The system is dependent on the bus operators inputting information about service disruptions, although there is also a facility for general information messages to be displayed by the Passenger Transport Group of NCC. This facility could be used to give advance warning of known disruption to services due to events such as planned diversions or bad weather events etc.

Training and support was provided for the operators as part of the measure implementation.

System development was completed by Mott MacDonald during April 2008, including the SMS text messaging module. As part of the measure evaluation 'before' surveys, respondents were invited to take part in a trial of the SMS information service and a total of 35 users were recruited to form a panel. The demonstration system was specified as a 'push-only' messaging service, meaning that users would automatically receive updates on routes they use (as opposed to a' pull-down' service where users request the information as and when they want to receive updates*.*

Stage 4: Implementation of bus service disruption messaging trial *(April 2008 – December 2008)* The trial of the SMS service was activated during July, with the TFT displays going live in early September 2008. The original timetable for running the trial in April-May 2008 had to be revised due to the time required for installation of the data communication link at the hospital site. The trial was run for a period of three months and then an 'after' survey was carried out to identify the results of the measure implementation. Following the surveys the trial will continue, with the intention that a fully-functional system will be implemented during 2008-09 to supersede the web-based demonstration measure.

Stage 5: Server to server link re-visited *(January 2008 – December 2008)* In parallel with the implementation of a web-based demonstration system, discussions were continued with ACIS to agree a licence for an RTIG server to server link between the BUSNET system and the CDMF. This has now been concluded and will be implemented by the end of March 2009 to enable real-time departure information to be provided alongside other travel and transport information under the strategy for ITS in Norfolk. It is intended that the Disruption Manager module will be developed into a fully functional part of the ITS Strategy under the Electronic Bus Service Registration (EBSR) project. Together these system developments will provide a range of 'away from the stop' real time passenger information for bus users which is innovative for the UK. It will also represent the entry of an important new player in the UK RTPI market which is currently dominated by ACIS BUSNET proprietary product range. The EBSR project and the PubTrans system form Hogia will provide an open-standard platform on to which RTIG standard systems from different suppliers and operators can be integrated to provide widespread RTPI for public transport users in Norfolk.

B4   Deviations from the original plan

The deviations from the original plan comprised:

- **Deviation 1 Real-time departure to bus service disruption** – The original measure was conceived to provide an expansion of the real time next departure time information available from the BUSNET system. The system currently provides this information for the public only at bus shelters along the Norwich 'western corridor' and the signs (PIPS) are now approaching obsolescence.   The information is available to bus operators, system operators and the Passenger Transport Group via the Disruption Manager viewer.

The measure which has been implemented does not provide real time next departure information to the public. Instead the measure has provided scheduled timetable departure information via electronic passenger information displays, but this is augmented by service disruption messages which appear alongside the scheduled service information in the form of 'cancelled' or 'delayed x minutes' comments. The real time service disruption messages are entirely dependent on the bus operators to input the service disruptions.

One aspect of the evaluation of the measure is to understand the response of bus operators to meeting this requirement of the system, to help inform further development of this type of realtime information.

- **Deviation 2 System development to hosted demonstration measure** – The measure was planned to be a development of Norfolk County Council's Network Management System (NMS), providing links between a number of existing systems to permit RTPI for buses to be blended with other travel information and supplied via a range of tailored views to different users. The actual measure did not provide any facility for blending the bus information with other data feeds. Neither was the implementation achieved using the Norfolk NMS as its platform.

The system used for the demonstration measure was hosted by Hogia in Sweden. This was seen as a positive approach to provide Norfolk with a means of assessing the value of real time service disruption information as part of the CIVITAS SMILE project, without the need to procure the full system.

As well as demonstrating the value of service disruption information for the travelling public, this approach gave the opportunity to present a new player in the UK RTIG market, which it was felt would be helpful in taking forward consideration of RTIG products and procurement options. It was considered that this could be of interest to other Local Authorities in the UK, as well as fleet operators who were increasingly interested in an open-standard approach to product development. Many bus operators have specified pre-fitted vehicle location equipment for their fleets, which is designed to the RTIG open standard, and this has been seen as a barrier to the uptake of proprietary product-based systems such as BUSNET, despite the proven functionality which the ACIS system delivers.

The trial uses a module of the Hogia PubTrans product (Disruption Manager) which provides the bus operator with a system portal to enable inputting of service disruption messages. The system is used in a number of Scandinavian public transport authorities, but has not been used in the UK which has a deregulated structure characterised by multiple operators in a competitive environment. The demonstration was the first opportunity to explore what issues the use of this approach might raise. In Norfolk this experience is being used to inform the development and scoping of the Electronic Bus Service Registration project.

Deviation 3 No proprietary-based 'at home' units – One of the 'away from the stop' information systems identified in the original specification of the measure was the provision of dedicated units to be pre-installed in new housing developments to give real time next departure information for residents. The measure was conceived as a means to both improve the attractiveness of bus services and to potentially reduce journey times by informing the user whilst still at home of actual service times. This could reduce the time spent waiting at the stop, and is particularly beneficial for less frequent services.

Some work was done to identify suitable developments that could provide a Norfolk trial. However it was not considered that, under the planning system, a development could be easily conditioned to require the provision of a dedicated system, and furthermore it was considered that web-based applications could provide equal if not more functionality in more flexible way. Whilst it remains possible that developers may volunteer to install display units, this has not transpired up to this date.

Deviation 4 SMS messages 'pushed out' rather than 'on demand' – Norfolk County Council currently provides scheduled departure information for all stops in Norwich as part of the East Anglia Passenger Transport Information Service (EAPTIS) organisation. This allows users to draw down information on the next 3 departures by sending a text request with a code for the bus stop. It was intended that the measure would enable real time next departure information to be similarly requested by providing a link to the EAPTIS system from the Norfolk NMS. This development would be possible following the provision of the BUSNET server to server link.

An alternative is to provide a direct server to server link from BUSNET to the EAPTIS system, and this has been pursued by other authorities. This approach did not fit the strategy for ITS in Norfolk which is based on an open-standard system with less reliance on multiple system links and the associated licence agreements. Therefore the real time SMS link was not pursued as part of the measure.

The alternative measure developed with Mott MacDonald has provided a trial of real time service disruption messages, sent automatically to members of a panel of registered users. Users were able to filter the messages they would receive based on which services and days they needed to access the hospital. The intention is to provide a basis for assessing the value of this type of real time information, both in itself and as compared with real time next departures.

Participants in the panel had the option to withdraw from the trial, and during the period of the trial 1 user withdrew from a total of 35 participants.

Deviation 5 Multiple sites for hosted EPI displays – Due to the demonstration nature of the actual measure, it was decided to focus on one site and the Norfolk and Norwich University Hospital (NNUH) was selected as an ideal trial site. During earlier stages of the project discussions had been initiated with a number of potential host sites and in general the site management were positive to the aims of the measure. The hospital was considered to be the best site for an initial implementation due to the mix of staff, patients and visitors using the site at most hours of the day, and the number of bus operators and services. The hospital Trust were very keen to play an active part in the trial in support of their travel plan aspirations. Initially four bus operators were approached to take part, but two operators, NCS and Anglian had withdrawn their services by the date of the measure implementation.

The actual measure was implemented using two TFT displays in the main foyer areas of the hospital.

Deviation 6 Internet-based RTPI for the public – Development of the Norfolk Traffic and Travel website was on-going at the time of the measure implementation, but the inclusion of real time next departure times for buses remains dependent on the delivery of either the BUSNET server to server link or the development of open-standard systems with bus departure predictions. Both of these options are under development but were not in place at the time of the measure implementation.

B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **Measure 8.5 On-street Ticket Vending Machines**

An on-street TVM has been installed at the hospital site and was included in the evaluation of awareness and acceptability of public transport for this location.

C Evaluation – methodology and results

C1 Measurement methodology

C1.1 Impacts and Indicators

Table of Indicators.

	METEOR/GUARD Inputs			
No.	Evaluation Category	Indicator	Description	Data/Units
	SOCIETY			
13		Awareness level	Degree to which the awareness of the measure has changed	index, qualitative, collected, survey
14		Acceptance level	Attitude survey of current acceptance with the measure	index, qualitative, collected, survey
15		Perception of PT accessibility	Attitude survey of perception of physical accessibility of PT network (distance to nearest PT stops)	index, qualitative, collected, survey
17		Perception of PT security	Perception of security when using PT options	index, qualitative, collected, survey
	TRANSPORT			
19		Quality of PT service	Perception of quality of PT services	index, qualitative, collected, survey
26		Average modal split-PAX	Percentage of pkm for each mode	%, quantitative, derived
27		Average modal split-vehicles	Percentage of vkm for each mode	%, quantitative, derived
28		Average occupancy	Mean no. persons per vehicle/day	%, quantitative, derived

Detailed description of the indicator methodologies:

- **Indicator 13** (Awareness level) – Data on changes in the awareness of bus service information was collected through interview surveys conducted outside the Norfolk and Norwich Hospital main entrances close to the bus stops. A total of 471 responses were recorded in the pre-implementation baseline survey (18 &19 March 2008), and 416 responses were recorded in the post-implementation survey (16 & 17 December 2008). Respondents were asked:

  Question 14: Do you think there is enough public transport information available inside the hospital?

  If YES, what is available and where is it located?

  If NO, what needs to be improved?

In the after survey, respondents were also asked:

Question 14B: Are you aware of the electronic bus information displays which have been installed in the foyer areas at the hospital?

If YES, Have you found the information on the displays useful for any of these reasons:

To show which bus services are available for a journey?

Finding out about delays or cancellations?

Planning future trips to the Hospital?

- **Indicator 14** (Acceptance level) – Data on changes in the acceptance of the measure were collected from the interview surveys at the NNUH and from e-mail surveys of the respondents who were included in a trial of the SMS text messaging service.

  Acceptance was measured in terms of the reported actual usage of information available – from the TVM and display screens, taken from responses to Questions 13 and 14B. In addition, the following question asked for stated preferences on the acceptance of the measure.

  Question 15: *This question asked respondents to score (1-5) what other travel information they would most like to see at the hospital.*

- **Indicator 15** (Perception of PT accessibility) – Perception of the frequency of bus services was used as a proxy for the general perception of PT accessibility. Respondents were asked to state:

  Question 11: How many buses per hour do you think serve the hospital during the day?

  In addition the survey asked those who would not consider using the bus for their next journey to give reasons for this (Question 17), so that the impact of the measure could be detected in relation to these reasons where accessibility is a factor.

  Question 17: Would you consider using the bus for your next journey?

- **Indicator 17** (Perception of PT security) – Data on perceptions of security while using public transport was collected using the interview survey and the telephone/e-mail survey.

  Question 9: Do you feel secure while travelling on a bus?

- **Indicator 19** (Quality of PT service) –Data on perceptions of the quality of the PT service were collected using the interview survey. Question 17 asked those who would not consider using the bus for their next journey to give reasons for this, so that the impact of the measure could be detected in relation to these reasons where quality of service is a factor.

- **Indicator 26** (Average modal split PAX) – No data was collected to allow a quantitative analysis to be conducted.
- **Indicator 27** (Average modal split - vehicles) – No data was collected to allow a quantitative analysis to be conducted.
- **Indicator 28** (Average occupancy) – No data was collected to allow a quantitative analysis to be conducted.

C1.2 Establishing a baseline

Awareness of public transport information inside the hospital

Do you think there is enough public transport information inside the hospital?

Responses by gender	Yes enough PT information		No not enough information	
Male	69	45%	84	55%
Female	81	30%	190	70%
Total	150	35%	274	65%

Responses by mode	Yes enough PT information		No not enough information	
Bus	69	45%	85	55%
Car – driver	61	26%	170	74%
Car - passenger	13	36%	23	64%
Other	10	37%	17	63%
Total	153	34%	295	66%

What public transport information is available and where is it located?

What is available and where?	**Number of responses**	**% of Total**
Do not know	31	21%
Leaflets in hospital	4	3%
Not interested	4	3%
Bus arrived – end of survey	3	2%
Bus shelters	3	2%
Bus not convenient	1	<1%
Intranet	1	<1%
Never noticed any	1	<1%
Noticed bus signs inside hospital today	1	<1%
Very good	1	<1%
Website	1	<1%
When employed I was given information	1	<1%
No response given	98	65%
Total	**150**	**100%**

How aware are people at the hospital of the ticket vending machine for buses?

Responses by gender	Aware of TVM		Not aware of TVM	
Male	86	39%	83	33%
Female	135	61%	167	67%
Total	221	47%	250	53%

Responses by mode	Aware of TVM		Not aware of TVM	
Bus	100	43%	66	25%
Car - driver	98	42%	161	61%
Car - passenger	22	10%	18	6%
Other	11	5%	20	8%
Total	231	47%	265	53%

Acceptance of public transport information inside the hospital

Have you used the ticket vending machine?

Responses Mode	Has used TVM		Has not used TVM	
Bus Users	8	5%	158	95%
Total	17	4%	454	96%

Top 10 reasons for not using the ticket machine

Reasons	Number of responses	% Total
Bus pass	81	35%
Do not use buses	27	12%
Car User	23	10%
Purchase ticket on bus	22	10%
Annual ticket	14	6%
Do not need to use ticket machine	7	3%
Bus not practical	6	3%
Day ticket	5	2%
Park and ride user	5	2%
Weekly ticket	5	2%
Other	35	15%
Total	**230**	**100%**

Perception of public transport accessibility and quality (Indicators 15 and 19)

How many buses per hour do you think serve the hospital during the day?

Responses by gender	Less than 5		5-10		11-20		Over 20	
Male	6	5%	35	31%	47	41%	26	23%
Female	14	7%	68	32%	86	41%	43	20%
Total	20	6%	103	32%	133	41%	69	21%

Responses by mode	Less than 5		5-10		11-20		Over 20	
Bus	15	12%	43	34%	40	32%	28	22%
Car - driver	1	1%	53	31%	81	47%	38	22%
Car – passenger	4	17%	5	21%	11	46%	4	17%
Other	1	4%	6	25%	10	42%	7	29%
Total	21	6%	107	31%	142	41%	77	22%

Would you consider using the bus for your next journey?

Responses by gender	Yes would use bus		No would not use bus	
Male	79	47%	90	53%
Female	145	48%	157	52%
Total	224	48%	247	52%

Responses by mode	Yes would use bus		No would not use bus	
Bus	157	95%	9	5%
Car - driver	47	18%	212	82%
Car - passenger	20	50%	20	50%
Other	26	84%	5	16%
Total	250	50%	246	50%

Perception of public transport security (Indicator 17)

Do you feel secure while travelling on a bus?

Responses by gender	Yes feel secure		No do not feel secure	
Male	149	37%	20	30%
Female	256	63%	46	70%
Total	405	86%	66	14%

Responses by mode	Yes feel secure		No do not feel secure	
Bus	157	36%	9	14%
Car - driver	214	50%	45	69%
Car - passenger	31	7%	9	14%
Other	29	7%	2	3%
Total	431	87%	65	13%

C1.3 Building the business-as-usual scenario

Included in the interview surveys were questions about the age, gender, reason for visiting the hospital and mode of travel of the respondent. This data was used to assess any changes in the background behaviour of hospital visitors, such as the split between mode and the reasons for visiting to ensure a match between the before and after survey results.

Sample attributes	Before survey		After survey	
Gender	Frequency	Percentage	Frequency	Percentage
Male	169	36%	137	33%
Female	302	64%	279	67%
Total	471	100%	416	100%
Age Range				
16-19	9	2%	16	4%
20-29	44	9%	37	9%
30-39	81	17%	56	13%
40-49	90	19%	81	20%
50-59	110	23%	77	18%
60+	137	29%	149	36%
Total	471	100%	416	100%
Reason				
Visitor	80	17%	61	15%
Patient	129	27%	138	33%
Hospital Employee	216	46%	185	44%
Volunteer	17	4%	15	4%
Contractor	1	-	0	0%
Other	28	6%	17	4%
Total	471	100%	416	100%
Trip frequency				
More than once a day	8	2%	5	1%
Once a day	227	48%	166	40%
1 or 2 times per week	52	11%	77	18%
Once or twice per month	34	7%	36	9%
Once every 3 months	50	11%	53	13%
1 or 2 times per year or less	100	21%	79	19%
Total	471	100%	416	100%
Mode used on day				
Walk	4	1%	0	-
Cycle	3	-	6	1%
Motorcycle	0	-	2	-
Bus	166	33%	136	33%
Car – as driver	259	52%	200	48%
Car – as passenger	40	8%	63	15%
Taxi	6	1%	7	2%
Other	18	4%	2	-
Total	496*	100%	416	100%

*Some respondents gave 2 modes for arrival/return trips.

Both surveys achieved a satisfactory sample size, and the 2 samples have very similar attributes. As a proportion, there were more patients and more people over 60 years of age in the after survey, and there was also an increase in people travelling as a car passenger. There was a small reduction in the proportion of respondents driving to the hospital.

The reporting of additional modes by some respondents, present in the before surveys, was eliminated in the after survey design.

Further analysis was carried out of the trip purposes reported in the samples.

Sample attributes	Before survey				After survey			
Trip purpose	Origin		Destination		Origin		Destination	
Home	450	96%	400	85%	387	93%	343	82%
Temporary residence	1	-	1	-	3	1%	3	1%
Usual place of work	5	1%	10	2%	7	2%	9	2%
Employer's business	1	-	5	1%	2	-	3	1%
Personal business	1	-	1	-	1	-	7	2%
Shopping	5	1%	18	4%	5	1%	31	7%
Education attendance	1	-	2	-	7	2%	8	2%
Visit friends or family	6	1%	16	3%	2	-	8	2%
Recreation/leisure	0	-	8	2%	0	-	2	-
Other	1	-	10	2%	2	-	2	-
Total	471	100%	471	100%	416	100%	416	100%

Most trips to and from the hospital were home-based. The increase in shopping as a destination purpose when leaving the hospital may be a seasonal effect.

C2 Measure results

The results are presented under sub-headings corresponding to the areas used for indicators – economy, energy, environment, society and transport. In the tables used in this section, the results of the after surveys are in **bold**, and figures in normal typeface are the baseline results for comparison.

C2.1 Economy

There are no evaluation indicators for the measure in this category.

C2.2 Energy

There are no evaluation indicators for the measure in this category.

C2.3 Environment

There are no evaluation indicators for the measure in this category.

C2.4 Transport

Perception of quality of public transport services at the hospital (Indicator 19)

How aware are people at the hospital about the frequency of bus services?

Responses by gender	Less than 5		5-10		11-20		Over 20	
Male	6	5%	35	31%	47	41%	26	23%
	3	**3%**	**21**	**21%**	**45**	**45%**	**32**	**32%**
Female	14	7%	68	32%	86	41%	43	20%
	9	**4%**	**45**	**20%**	**109**	**48%**	**66**	**29%**
Total	20	6%	103	32%	133	41%	69	21%
	12	**4%**	**66**	**20%**	**154**	**47%**	**98**	**30%**

Responses by mode	Less than 5		5-10		11-20		Over 20	
Bus	15	12%	43	34%	40	32%	28	22%
	4	**3%**	**25**	**20%**	**66**	**52%**	**32**	**25%**
Car - driver	1	1%	53	31%	81	47%	38	22%
	6	**4%**	**32**	**21%**	**61**	**41%**	**50**	**34%**
Car – passenger	4	17%	5	21%	11	46%	4	17%
	1	**3%**	**7**	**18%**	**19**	**48%**	**13**	**33%**
Other	1	4%	6	25%	10	42%	7	29%
	1	**7%**	**2**	**14%**	**8**	**61%**	**3**	**21%**
Total	21	6%	107	31%	142	41%	77	22%
	12	**4%**	**66**	**20%**	**154**	**47%**	**98**	**30%**

Following the measure, there was an increased reporting of the higher frequency categories (typically, frequencies during the day are at the higher end of the scales given). Whilst gender was not a factor, mode appears to have affected the responsiveness to the measure.

C2.5 Society

Awareness of public transport information inside the hospital (Indicator 13)

How aware are people at the hospital of the ticket vending machine for buses?

Responses by gender	Aware of TVM		Not aware of TVM	
Male	86	51%	83	49%
	52	**38%**	**85**	**62%**
Female	135	45%	167	55%
	107	**38%**	**172**	**62%**
Total	221	47%	250	53%
	159	**38%**	**257**	**62%**

Responses by mode	Aware of TVM		Not aware of TVM	
Bus	100	60%	66	40%
	54	**40%**	**82**	**60%**
Car - driver	98	38%	161	62%
	70	**35%**	**130**	**65%**
Car - passenger	22	55%	18	45%
	27	**43%**	**20**	**57%**
Other	11	35%	20	65%
	8	**47%**	**9**	**53%**
Total	231	47%	265	53%
	159	**38%**	**257**	**62%**

The rate of awareness of the ticket vending machines has fallen in the sample generally. This is not thought to be as a result of the measure directly, and could reflect the high levels of bus pass holders and other ticket types used by respondents in the survey. There may be an opportunity to promote the awareness level using the display screen messages.

These results are also helpful to confirm that the impact of the electronic display screens has not been obscured by other factors affecting awareness and acceptance.

How aware are people at the hospital of the display screens for bus services?

Responses by gender	Aware of display screens		Not aware of displays	
Male	**38**	**28%**	**99**	**72%**
Female	**75**	**27%**	**204**	**73%**
Total	**113**	**27%**	**303**	**73%**

Responses by mode	Aware of display screens		Not aware of displays	
Bus	**46**	**34%**	**90**	**66%**
Car - driver	**51**	**25%**	**149**	**75%**
Car - passenger	**11**	**17%**	**52**	**83%**
Other	**5**	**29%**	**12**	**71%**
Total	**113**	**27%**	**303**	**73%**

Only about one in four respondents were aware of the electronic display screens provided under the measure, although the proportion was higher for bus users (one in three). There was some publicity for the trial of the EPI displays but there were also some significant technical problems during the trial which could have affected the impact of the screens. There is therefore scope to improve the awareness levels. Again there is some variability of awareness levels by mode of travel, with car passengers particularly unaware, and this pattern of variation would appear to support the validity of the results.

Acceptance of public transport information inside the hospital (Indicator 14)

Do you think there is enough public transport information inside the hospital?

Responses by gender	Yes enough PT information		No not enough information	
Male	69	45%	84	55%
	47	**46%**	**56**	**54%**
Female	81	30%	190	70%
	119	**50%**	**117**	**50%**
Total	150	35%	274	65%
	166	**49%**	**173**	**51%**

Responses by mode	Yes enough PT information		No not enough information	
Bus	69	45%	85	55%
	65	**50%**	**64**	**50%**
Car – driver	61	26%	170	74%
	70	**47%**	**78**	**53%**
Car - passenger	13	36%	23	64%
	21	**46%**	**25**	**54%**
Other	10	37%	17	63%
	10	**63%**	**6**	**37%**
Total	153	34%	295	66%
	166	**49%**	**173**	**51%**

The measure does appear to have raised the acceptance level, particularly for female respondents. Users of all travel modes have reported an increased acceptance of the measure. This accords with feedback from other stakeholders that the displays provide a high quality presentation of service information.

What information is available and where?

Type of information	No of responses	Percentage
Timetable at reception	**8**	**28%**
Timetable at bus stop	**2**	**7%**
Information in foyer	**9**	**31%**
Don't know or not certain	**4**	**14%**
Timetable at information centre	**2**	**7%**
TV/display screens in foyer	**4**	**14%**
Total	**29**	**100%**

Respondents stating 'information in foyer may be referring to the EPI displays but it is not possible to verify this.

What needs to be improved?

Type of information	No of responses	Percentage
General information and advertising of services	**39**	**34%**
Better timetables	**18**	**16%**
Better website	**1**	**1%**
Don't know what is available	**18**	**16%**
Don't use buses	**1**	**1%**
Better services required including to rural areas	**4**	**3%**
Maps and visual information	**18**	**16%**
More electronic displays	**3**	**3%**
More information in or near the wards	**5**	**4%**
Not interested in bus information	**2**	**2%**
Signs to the buses	**6**	**5%**
Total	**115**	**100%**

The improvements to visual information and the desire for information closer to the wards are interesting results to come out of this survey.

Respondents were asked to score (1 Low to 5 High) how useful some other types of information would be. The table below shows the average scoring in the two surveys.

Type of information	Average score in Before survey	Average score in After survey
Real Time bus departure information	4.70	**4.30**
Current disruptions to bus services	4.38	**4.25**
Future disruptions to bus services	4.14	**3.67**
Traffic congestion hotspots in the Eastern Region	3.78	**3.13**
Not interested in bus information	1.99	**1.53**
Other	2.33	**1.00**

The respondents scored bus information relatively highly compared with traffic congestion information. There is a relatively low score for 'not interested in bus information'.

Have you used the ticket vending machine?

Responses Mode	Has used TVM		Has not used TVM	
Bus Users	8	5%	158	95%
	3	**2%**	**133**	**98%**
Total	17	4%	454	96%
	14	**3%**	**402**	**97%**

Reasons for not using the ticket machine.

Reasons given by bus users only	Number of responses	% Total
Bus pass	62	46%
No need to purchase ticket	24	18%
Did not know about ticket machine	8	6%
Difficulty with using machine or prefer to purchase ticket on bus	4	3%
Weekly ticket	2	1%
Ticket not available from machine	1	0.5%
Not interested	1	0.5%
Other	34	25%
Total	**136**	**100%**

Reported use of the TVM has reduced, but the reasons given for not using the machine are generally positive ones. The indication is that there is quite limited scope to raise the rate of usage with current bus users, although non-bus users could be a target for increasing use of the TVM.

Have you found the information on the EPI displays useful?

To show which bus services are available for a journey	Yes – has used displays		No – has not used displays	
Male	7	50%	7	50%
Female	33	70%	14	30%
Total	40	66%	21	34%

Finding out about delays or cancellations	Yes – has used displays		No – has not used displays	
Male	15	65%	8	35%
Female	31	66%	16	34%
Total	46	66%	24	34%

Planning future trips to the hospital	Yes – has used displays		No – has not used displays	
Male	**15**	**65%**	**8**	**35%**
Female	**31**	**65%**	**17**	**35%**
Total	**46**	**65%**	**25**	**35%**

There is a marked difference in acceptance levels for male and female respondents. This will require further investigation to determine what the underlying factors might be.

To show which bus services are available for a journey	Yes – has used displays		No – has not used displays	
Bus users	**22**	**79%**	**6**	**21%**
Total	**50**	**70%**	**21**	**30%**

Acceptance of the measure was higher for bus users than for the sample overall, with 4 out of 5 passengers using the signs to inform themselves of services available. This is a high level of acceptance of the electronic passenger information even without the added real time information benefits.

Finding out about delays or cancellations	Yes – has used displays		No – has not used displays	
Bus users	**18**	**67%**	**9**	**33%**
Total	**46**	**66%**	**24**	**34%**

Planning future trips to the hospital	Yes – has used displays		No – has not used displays	
Bus users	**17**	**63%**	**10**	**37%**
Total	**46**	**65%**	**25**	**35%**

These results would have been affected by the limited use of the disruption manager system by the bus operators. Only one operator posted disruption messages during the trial, and these were all 'cancellation' messages with no 'delayed' messages being posted.

Perception of public transport accessibility (Indicator 15)

Would you consider using the bus for your next journey?

Responses by gender	Yes would use bus		No would not use bus	
Male	79	47%	90	53%
	54	**39%**	**83**	**61%**
Female	145	48%	157	52%
	143	**51%**	**136**	**49%**
Total	224	48%	247	52%
	197	**47%**	**219**	**53%**

Overall there is no real change in the responses to this question. However in gender terms the perceptions of females and males have moved in opposite ways. Perceived accessibility has increased slightly among females and noticeably reduced among males. There could be a seasonal effect related to the accessibility of other modes such as car.

Responses by mode	Yes would use bus		No would not use bus	
Bus	157	95%	9	5%
	126	**93%**	**10**	**7%**
Car - driver	47	18%	212	82%
	31	**16%**	**169**	**85%**
Car - passenger	20	50%	20	50%
	34	**54%**	**29**	**46%**
Other	26	84%	5	16%
	6	**35%**	**11**	**65%**
Total	250	50%	246	50%
	197	**47%**	**219**	**53%**

Only car passengers reported an improved perception of the accessibility of public transport following the measure. This is at odds with the fact that fewer car passengers (only 17%) reported an awareness of the electronic display screens, and the improvement is not therefore attributable to the measure itself. Again, seasonal effects could be masking other factors in these results.

Perception of public transport security (Indicator 17)

Do you feel secure while travelling on a bus?

Responses by gender	Yes feel secure		No do not feel secure	
Male	149	88%	20	12%
	130	**95%**	**7**	**5%**
Female	256	85%	46	15%
	253	**91%**	**26**	**9%**
Total	405	86%	66	14%
	383	**92%**	**33**	**8%**

Responses by mode	Yes feel secure		No do not feel secure	
Bus	157	95%	9	5%
	133	**98%**	**3**	**2%**
Car - driver	214	83%	45	17%
	177	**89%**	**23**	**11%**
Car - passenger	31	78%	9	22%
	58	**92%**	**5**	**8%**
Other	29	94%	2	6%
	15	**88%**	**2**	**12%**
Total	431	87%	65	13%
	383	**92%**	**33**	**8%**

Generally there has been an improvement in the perceived security of public transport following the measure, although further analysis is required to determine why this has occurred. It may be that the display screens have contributed to an improved perception of the quality of the services as a whole. This is an interesting and not expected result which requires more consideration.

C3   Achievement of quantifiable targets

No.	Target	Rating
1	Recruit and maintain a panel of 20 to 50 participants in the SMS text messaging trial.	0
2	Increase the percentage of respondents answering 'yes' to 'Would you consider using the bus for your next journey?'	0
3	Increase the percentage of respondents reporting 'over 20 buses per hour' serving the hospital.	★★
4	Increase in the percentage of respondents answering 'yes' to 'Is there enough public transport information inside the hospital?'	★★
5	Increase in percentage of respondents answering 'yes to 'Do you feel secure travelling on a bus?'	★★★
NA = Not Assessed **0 = Not achieved** **★ = Substantially achieved** **★★= Achieved in full** **★★★= Exceeded**		

Target 1 was not achieved in full although a panel was maintained throughout the trial period. A number of panel members did not receive disruption messages due to technical and organisational issues with the system used for the trial. Some of the feedback received from the panel is included in Section C4.

The measure did not achieve a measurable improvement in perceived accessibility of public transport, and this may reflect the limited success in delivering quality real time information to new and existing users of bus services. There may also have been seasonal effects on the attractiveness of public transport generally.

There was some success at improving awareness and acceptance of the level of public transport information, and this accords with the feedback from stakeholders that the high quality signs give a very good impression and enhance the general perception of the services. This may also explain an unexpected improvement in reported levels of perceived security of public transport.

C4   Up-scaling of results

The results of the measure evaluation will be used to inform the further development of linked information systems in Norfolk. In addition to the measure results obtained from the surveys, there are two other sources of evaluation information to draw upon:

Feedback from the SMS text messaging trial panel

A panel of 35 people was recruited to receive SMS text messages generated by the Disruption Manager system. Under the demonstration system, all messages were generated automatically (rather than on request) so the panel were asked to give details of which services, days and time periods to be included for their individual journeys. There was a concern that if all panel members received all messages this could cause a nuisance and some people might withdraw as a result.

Unfortunately this approach has led to some people in the panel not receiving any disruption messages, due to the combination of their preferences and the operating regimes of the bus operators not coinciding. Development of a fully automated message generating system would overcome these factors, and this is one of the developments being considered in Norfolk.

Nevertheless the trial was a useful exercise and succeeded in generating some positive feedback from the panel, including the following comments:

'Yes, I would like [the service] to be continued, provided it is more reliable and gives information at all times, not just during the daytime.'

'it would be very helpful to know if buses are being held up as, for instance, on a number of times I have had to wait ¾ hour or more for a bus when they are supposed to run every 10 minutes.'

'Overall I wish to say that the theory of this trial is good but in practice it has not worked.'

'I received mails and found it useful.'

'I would very much like the service to continue but obviously it would be better if I received messages when buses were delayed.'

'Yes, I would like it to continue. MAKE IT WORK!'

'We would all like to try the system as in theory it would be helpful for us.'

Feedback from First on the success of the disruption management trial.

'The Disruption Manager module was provided to First and has been accessible over the duration of the trial period. This has been used throughout the trial period to post 'cancelled' messages only – time constraints have meant that inputting 'delayed' messages has not been practicable.

First are always interested in ways to get information out to customers, and the public really appreciate the information. Definitely fits into the Group's thinking about future developments, and in the longer term there may be additional resource to provide more focus on real time information provision. However, it would definitely be an advantage if service/journey-specific messages were generated automatically – based on information from the AVL system (BUSNET) to which First contributes financially. Difficult to see there ever being sufficient time available to post these messages manually.

The current priority is to ensure that services run reliably and that is where effort and resources have to be concentrated. It would be an advantage to be able to post general disruption messages directly. At present this can only be achieved via Norfolk County Council staff and is therefore not always possible or immediate. Example given was recent road accident with air ambulance call-out on the A47, which caused general disruption to services, and it would have been useful to convey that all services were running albeit with longer journey times and some delays.

The electronic displays contribute well to the aim of giving customers high quality information about services but the main thing is the reliability of the information. This was another factor in First using the system for cancellations which are clear-cut but not delays which are difficult to accurately forecast and update. Again some automation of this information would be an ideal feature in the system.

The measure would definitely need to be widened to cover all services and more locations for hosted signs. Castle Mall near Castle Meadow would be obvious next step, and railway station. Could even extend to market towns but this would be mainly for the X1 & X2 longer distance routes.'

Feedback from Konectbus on the success of the disruption management trial.

'The Disruption Manager web portal was provided to Konectbus and has been accessible over the duration of the trial period.

Konectbus are always interested in ways to get information out to customers, and view the disruption information messages positively in this context. However the current priority is to ensure that services run reliably and that is where effort and resources have to be concentrated. In the longer term it would be an advantage to be able to post general disruption messages directly, as an alternative to service/journey-specific messages which is more labour-intensive, often at just the time when resources need to be concentrated on managing reliability. At present this can only be achieved via Norfolk County Council staff and is therefore not always possible or

immediate. Example given was recent snowing on Saturday afternoon, which caused general disruption to services, and it would have been useful to convey that all services were running albeit with longer journey times and some delays. It wasn't practical to give service-specific information in this instance.

The electronic displays at the hospital contribute very well to the aim of giving customers high quality information about services. They look impressive and professional. However the destinations shown need to signpost the key destinations for a particular route, which sometimes doesn't come out when the final destination only is displayed, eg, 'via Watton' should be included for service 3 to Shipdham, and 'via Dereham' for service 4 to Swanton Morley Robertson Barracks.

The measure would definitely need to be widened to cover all services and more locations for hosted signs. The TFT screens are strongly supported as an improvement over the older matrix displays in the shelters. The provision of service disruption messages is probably more valuable when used at the general than the service-specific level

Is there an issue of competitor suppliers reducing the success of system linking and developments?'

Feedback from Norfolk and Norwich University Hospital (NNUH) on the success of the disruption management trial.

'There are close links between NNUH and NCC for transport and travel planning activities, and we have been aware that the real time information work was on the cards for some time. NNUH represents a huge public site and is keen to be involved in new measures which can assist staff and visitors. The Trust's role was to act as the 'driving force for the hosted TFT signs in dealings with the facilities management contractor (SERCO) who have the 'landlord' function.

The TFT displays contribute well to the aim of giving customers high quality information about services. Previously there wasn't any information available other than timetable leaflets in stands, and anything we can provide to improve on this is a benefit. The screens make the information much more available. The service needs to be continually developed, and the NNUH would want to be at the forefront of any new technology.

Getting 'signup' from the landlord had been an issue – it was important that the signs were prominent and not 'hidden in the corner'. However, now that this has been done there should not be any issues for the longer term. The benefits in future should overcome the matters of cost and maintenance, provided there is a genuine will to move to real time information being fed to the systems.

Staff using the displays have given feedback that the information should also be available direct to their workstations via the Trust's intranet, so this should be explored as well.

Consideration should also be given to groups with visual or other impairments who won't see the information on the signs.

Reiteration of the positive view the Trust has on the measure. Need to ensure that success is backed up with further efforts so the service the public gets can move from strength to strength.'

C5   Appraisal of evaluation approach

This measure has been a small technical trial in terms of the ultimate application, which has lent itself to a largely qualitative evaluation. However, to get this far has required a significant amount of technical and liaison / consultation effort in order to overcome some very significant commercial and institutional barriers as explained in
Section D.

C6   Summary of evaluation results

The key results are as follows:

- **Key result 1** – There is strong evidence from this evaluation that the public and other stakeholders desire the measure to be taken forward and expanded further in Norwich and more widely in Norfolk.

- **Key result 2** – In technical terms there remains an imperative of developing robust and linked systems to enable high quality real time passenger information to be provided to customers.

- **Key result 3** – Information systems need to flexible so that different users can access the information in the way that most suits their needs. The inclusion of disruption messages alongside real time departure information adds to the acceptance of public transport services. More visual presentations of information would benefit some users, while others will require information to be accessible in other ways such as speech.

- **Key result 4** – Even without real time capability, enhanced electronic information systems have the potential to improve the acceptance of public transport services as an option for many trips in Norwich and Norfolk.

- **Key result 5** – As well as technical challenges, there are commercial, organisational, and behavioural barriers to the successful development of working real time systems that must be addressed as part of future projects.

D   Lessons learned

D1   Barriers and drivers

D1.1 Barriers

- **Barrier 1** – During the development of this measure there has been a commercial barrier to the development of a fully functional system based on RTIG server to server link. As the project approaches its end it is envisaged that this barrier could be removed in the near future enabling the development of much better systems.

- **Barrier 2** – The dependence of the Disruption Manager on manual inputting of service disruptions has been a significant barrier to the success of the trial. The additional time/cost for operators' staff to input real time info to the system would also apply to any further development based on the Disruption Manager tool, particularly for the smaller operators but also a matter of concern to the larger operators such as First Group.

- **Barrier 3** – the development of multiple sites for hosting TFT displays away from the stop was constrained by the nature of the technical implementation. Further coverage could have been gained by linking to the hospital site intranet but this was constrained by the financial resources for developments to a system that did not offer long term legacy potential.

- **Barrier 4** – Many technical developments are still required to provide the support which the bus operators need – eg real time automatic delay forecasts, more flexible messaging options, inclusion of positive messages as well as deviations form schedule etc. Developing these system add-ons will require an on-going financial commitment from the partners.

- **Barrier 5** – Any manual system will be restricted by the limited operating hours for the Deviation Manager. This restriction needs to be considered under any future development of the systems.

- **Barrier 6** – Securing good locations for electronic displays under hosting arrangements is a potential barrier to the successful widening of the system. There are also competing demands for information dissemination such as commercial or entertainment content, as well as other real time information relating to security etc. The permanent systems will need to interface with these parallel processes.

- **Barrier 7** – Awareness of the information systems, and existing patterns of travel behaviour will continue to provide barriers to the success of this measure. The trial has revealed that many bus users are not aware of the hospital information displays, or don't use them or go straight to the bus stops.

D1.2 Drivers

- **Driver 1** – There is a powerful driver in the commitment of all stakeholders to better and more reliable information about services. There are increasing expectations among all the players for continuous development and integration of systems and coverage.

- **Driver 2** – The County Council has a strategy for development of Intelligent Transport Systems which is based on an open-standards approach and the linking of multiple 3rd party systems to provide a fully integrated travel information infrastructure.

- **Driver 3** – There is a very strong desire to build on the commitment to the BUSNET system the bus operators. Development of automated deviation messages would be key to overcoming barriers present in the current commercial and organisational context.

- **Driver 4** – The EBSR project will be a key driver for the future development of Passenger Transport services and RTPI in Norfolk, and there are also strong links to the Local Transport Plan.

- **Driver 5** – The public have responded positively to the measure and expressed a demand for greater access to a wide range of information, provided it is accurate, reliable and accessible.

D2 Participation of stakeholders

- **First (bus operator) –** Strong support for measure and participated in trial of Disruption Manager.

- **Konect (bus operator)** – Strong support for measure and participated in trial of Disruption Manager.

- **Anglian (bus operator)** – very supportive of measure, but did not participate in the trial bus disruption information service following the withdrawal of services to the hospital site.

- **Norfolk County Services (bus operator)** – very supportive of measure, but did not participate in the trial bus disruption information service following the withdrawal of services to the hospital site.

- **Norfolk & Norwich Hospital (hosted EPI Display screens for RTPI)** – Very supportive of the measure in its original from and also provided the site for the web-based trial displays. Could have been more responsive over the detail of installing TFT display screens that took several months to achieve and delayed the progress of the measure. Also participated in the promotion of the SMS trial and hosted the evaluation surveys.

- **UEA (hosted EPI Display screens for RTPI)** – positive towards measure and would have been a key site for deployment of RTPI if a NMS-based measure had been developed. Likely to be involved at an early phase of the development of RTPI when the server to server link is procured, with information feeds to the existing network of displays on the site.

- **Chapelfield (hosted EPI Display screens for RTPI)** – positive towards measure during early consultation stages, but did not represent the best site

for a small-scale demonstration measure. NCC would want to re-engage with Chapelfield at an early stage after provision of the RTIG link to the NMS.

- **EAPTIS (PT information service partnership)** – positive support for development of RTIG data feeds from Norfolk's NMS. This approach was different to that of other member Local Authorities that were based on direct server to server links with the ACIS systems.

D3 Recommendations

Recommendation 1 – The results of this evaluation should be used to scope the further development of electronic passenger information systems in Norfolk, including :

- Development of an automated process for posting journey-specific disruption messages, based on the predictions within the BUSNET system.

- Provide all Norfolk-based bus operators with access to the Disruption Manager module so the service cancellations can be posted and disseminated in real time.

- Consider providing individual operators with a capability to post general disruption messages.

- Expand the number of sites where EPI displays are hosted. Castle Mall, Chapelfield and the UEA are obvious locations to explore for the first phase of expansion, alongside other large employers. Potentially include coverage of market towns for the longer distance routes such as the X1 and X2 services.

- Consider the needs of groups with visual or other impairments who may have difficulty accessing real time updates via displays or SMS messages.

- Develop the SMS message service to provide public transport users with real time service disruption messages as well as next departure information.

- Provide links with employers' intranet sites to give tailored travel information including real time passenger information.

- Re-configure route destination descriptions to ensure that key destinations are flagged for users who are unfamiliar with local geography.

- Recognise and understand the potential for better information to improve the travelling public perception of security while using public transport.

Recommendation 2 – Consider how new sources of revenue funding can be made available to support public transport information services. This trial has revealed that employers and other organisations are very strong stakeholders in the movement to provide their staff and customers with the best possible information about travel to and from their site.

Recommendation 3 – Consider how public transport information can be blended with other travel information to support the choice of public transport as a convenient, safe and clean option for journeys in Norwich and Norfolk, as well as to promote awareness with the wider public.

D4   **Future activities relating to the measure**

The trial demonstration system will be removed at the end of the CIVITAS SMILE project, and work is in hand to plan how the emerging components of the Norfolk Network Management System can replace the information feed to the electronic displays at the hospital, as part of the wider strategy for Passenger Transport and Intelligent Transport Systems in Norfolk.