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The Role of Trend Analysis in the Evaluation of a TravelSmart Program

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The Victorian Department of Infrastructure, as part of its long-term commitment to the development of sustainable transport policies and strategies, has taken a lead role in the implementation of large-scale TravelSmart programs, the objectives of which are "to maximise sustainable travel and activity choices made by individuals, households and organizations through the utilisation of voluntary behaviour change tools".

In 2004, the Department conducted a large-scale community TravelSmart project in the local government area of Darebin, in the inner north-eastern suburbs of Melbourne. Approximately 30,000 households were contacted over several months in mid-2004, using the IndiMark technique. The Victorian 2004 TravelSmart project was subjected to a full independent evaluation using a variety of techniques.

This paper describes the use of Trend Analysis of three types of data, which was used for two specific purposes. Firstly, the analysis was used to identify trends in traffic volumes and public transport usage at a broad scale to serve as control data for the evaluation. Secondly, the analysis was used to identify changes in traffic volumes and public transport usage in the area affected by the TravelSmart program. The four data sources used in the analysis were traffic volumes obtained from SCRAM traffic control sites from VicRoads, public transport ticket validations obtained from OneLink, public transport ticket sales obtained from MetLink and public transport Customer Satisfaction obtained from surveys conducted for the Department of Infrastructure.

The paper describes the opportunities and problems associated with using such secondary data sources, and outlines the trends identified over an extended period from these four data sources. The use of these results in the evaluation of the TravelSmart program is then highlighted. The overall results of on-the-ground measurements collectively indicate that reductions in VKT, increases in public transport usage and increases in public transport satisfaction have occurred in the Darebin study area following the implementation of the TravelSmart Communities program in the Darebin area. The relative size of the changes indicates that not all the reductions in VKT have been translated into increases in public transport usage. Some of the VKT may have been suppressed entirely, some may have been reduced due to increases in trip-chaining and the effectiveness of car usage, while some VKT may have been transferred to non-motorised forms of transport (e.g. walking and cycling). A fuller investigation of these changes will be possible when the analysis of the Before and After household travel surveys has been completed.

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1 Introduction

The Victorian Department of Infrastructure, as part of its long-term commitment to the development of sustainable transport policies and strategies, has taken a lead role in the implementation of large-scale TravelSmart programs, the objectives of which are "to maximise sustainable travel and activity choices made by individuals, households and organisations through the utilisation of voluntary behaviour change tools".

In 2004, the Department conducted a large-scale community TravelSmart project in the local government area of Darebin, in the inner north-eastern suburbs of Melbourne. Approximately 30,000 households were contacted over several months in mid-2004, using the IndiMark technique. The objectives of the project were as follows:

- To achieve a change in travel behaviour of approximately 10% reduction in car trips and car kilometres, across the target population, without restricting personal activity, or adverse community or political reaction.
- To raise awareness of travel behaviour change, to facilitate a greater understanding of travel behaviour change, and to encourage positive attitudes towards travel behaviour change by the community, local and state government staff, and politicians.

To facilitate evaluation of the 2004 TravelSmart community project, a two-pronged monitoring program was commissioned by the Department. The evaluation project entailed:

- The conduct of a Before-and-After household travel survey of residents of Darebin, before and after the implementation of the TravelSmart project
- The conduct of a Trends Analysis using data available from public transport operators and VicRoads, to identify background trends in travel behaviour and to identify any specific changes in the study area of Darebin.

This paper describes the methodology employed in, and some results from, the conduct of the Trends Analysis, while a companion paper (Richardson et.al., 2005) describes the conduct of the Before and After household travel surveys.

2 Reasons for the Trends Analyses

The Trends Analysis was carried out for two main reasons;

- To measure changes in travel behaviour in the Darebin study area as reflected in on-the-ground counts
- To provide background trend data to control for external changes in travel behaviour

The original intention of the Trends Analysis was to observe whether any changes that might be observed at the household level in the Before and After household travel surveys (Richardson et al., 2005) could also be observed in the field in the form of counts and other data on public transport usage. As in previous TravelSmart evaluations in Melbourne, the original intention was to focus on public transport Trends Analysis.

However, the scope of the Trends Analysis was extended to cover car traffic for two reasons. Firstly, given that a major emphasis in the evaluation was on measuring Greenhouse Gas reductions, it was considered that any opportunity to observe VKT reductions in the field should be taken, since this would provide strong evidence for the effects of TravelSmart on VKT. In previous TravelSmart projects, which have been relatively small compared to the Darebin project, such an opportunity has not been available since any changes in VKT at the household level would, cumulatively, be lost in the general level of traffic variability out on the roads (where the TravelSmart households would constitute only a small fraction of the total traffic). However, for the Darebin project, nearly every one of the 30,000 households in the southern part of the Darebin LGA would be approached in the TravelSmart project. If they each (on average) reduced their VKT by (say) 10%, then this change should also be seen out on the roads, especially on local roads in the Darebin area where the TravelSmart households would constitute a substantial proportion of the traffic. For example, if local traffic was 50% of the traffic on local roads, then a VKT reduction of 5% might be expected to be observed on the local Darebin roads after the implementation of TravelSmart.

Secondly, it has been noted in Richardson et al. (2005) that there were practical difficulties in conducting a household travel survey with a Control Group in order to measure background variations in travel patterns, against which to compare the observed changes in travel behaviour (especially VKT) in the Target Group (the TravelSmart households). The Trends Analysis data at the Metropolitan Melbourne level provides an alternative source of Control Data which will measure background changes in VKT due to external factors such as fuel prices, economic conditions etc.

3 Data Sources for the Trend Analyses

Four principal sources of data were used for the Trends Analysis, covering the road traffic and public transport aspects of the problem. These sources were:

VicRoads SCRAM Traffic Count Data: VicRoads operates a very large area traffic control scheme known as SCRAM (based on the SCATS system originally developed for Sydney). At several hundred intersections around Melbourne, these linked traffic signals are continually collecting traffic count data in order to set the next phases of the signals. Normally, this data would be discarded as soon as the phases had run. However, by making a request to VicRoads, this count data can be archived for later retrieval. As described below, advantage was taken of this option for the Trends Analysis project.

OneLink Public Transport Ticket Validations Data: The Melbourne public transport system has had an integrated time-based ticketing system for many years. As part of this system, mag-stripe tickets are used for travel on all modes of public transport (trains, trams and buses). Tickets should be validated (in validation machines at railway stations and on-board trams and buses) at the start of every trip (and at the end if the trip terminates at a City Loop railway station). All the data from ticket validations is collated by OneLink as part of the ticketing system contract, and made available to various parties including the Department of Infrastructure. The Trends Analysis project makes use of this ticket validations data for trains, trams and buses in, around and outside of the Darebin study area.

MetLink Public Transport Ticket Sales Data: Another part of the OneLink system collects information on the sale of tickets and makes this data available to MetLink, the company established by the private companies running the public transport systems. This ticket sales data covers tickets sold at railway stations, on-board trams and buses, and at retail agencies (such as newsagents and milk bars) that sell tickets. The Trends Analysis project makes use of this ticket sales data for trains, trams, buses and retail agencies in, around and outside of the Darebin study area.

Public Transport Customer Satisfaction Survey Data: The final source of data seeks not to measure the use of the public transport system, but the satisfaction with the public

transport system. On a continuous basis, Customer Satisfaction Surveys of the public transport system are conducted for the Department of Infrastructure. These surveys are conducted every quarter across all of metropolitan Melbourne. For the Jan-Mar quarters of 2004 and 2005, the sample in the Darebin area was supplemented so that statistically significant comparisons could be made between Darebin and the rest of Melbourne, before and after the implementation of TravelSmart.

Given the limitations on the length of this paper, not all the data sources described above can be analysed and reported upon. However, a sampling from each of the areas will be presented to give an indication of the types of results that can be obtained from such a Trends Analysis.

4 VicRoads SCRAM Traffic Count Data

The primary sources of traffic count data used in the Trends Analysis was, as indicated above, the SCRAM traffic count data. However, in order to establish the overall trends at the Metropolitan level, two further sources of data from VicRoads were used. The first was data from a continuous traffic counting project conducted in 2003 at six sites across Melbourne, including one site in the Darebin study area at the intersection of Bell St and Albert St, Preston. On each approach at each of these SCRAM sites, counts were recorded for each hour for every day from 1January 2003 through 30 January 2004. A summary of these counts for the 12 months of 2003 is shown in Figure 1. The seasonal variation in the flows can be seen with a rise towards the end of the year, and sharp falls over the holiday periods of late-December and January, Easter, Melbourne Cup weekend and other public holidays. The results in Figure 1 are used to create a seasonal profile against which to compare the Trends Analysis results.

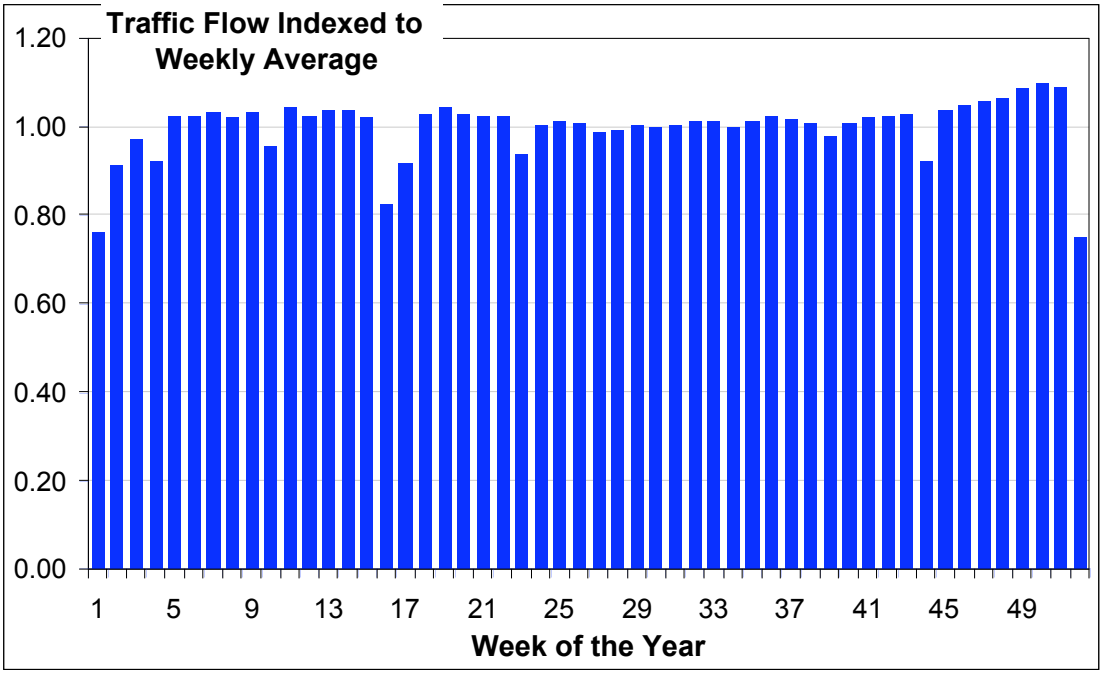

Figure 1 Traffic Flow Variations across a 12 month Period

The second source of VicRoads data was a program of counts conducted on an annual basis for Austroads. These counts, at 215 sites (SCRAM and other types of counts) across Melbourne, are used to establish annual growth rates in traffic across the years. A summary of these results for the years 2000 through 2004 are shown in Figure 2. While the growth rate is far from constant from year to year, the average growth rates over those five years has been 0.96% p.a. (i.e. about one percent per year). These results are used to extrapolate this rate of growth into the year 2005 for use in the Trends Analysis.

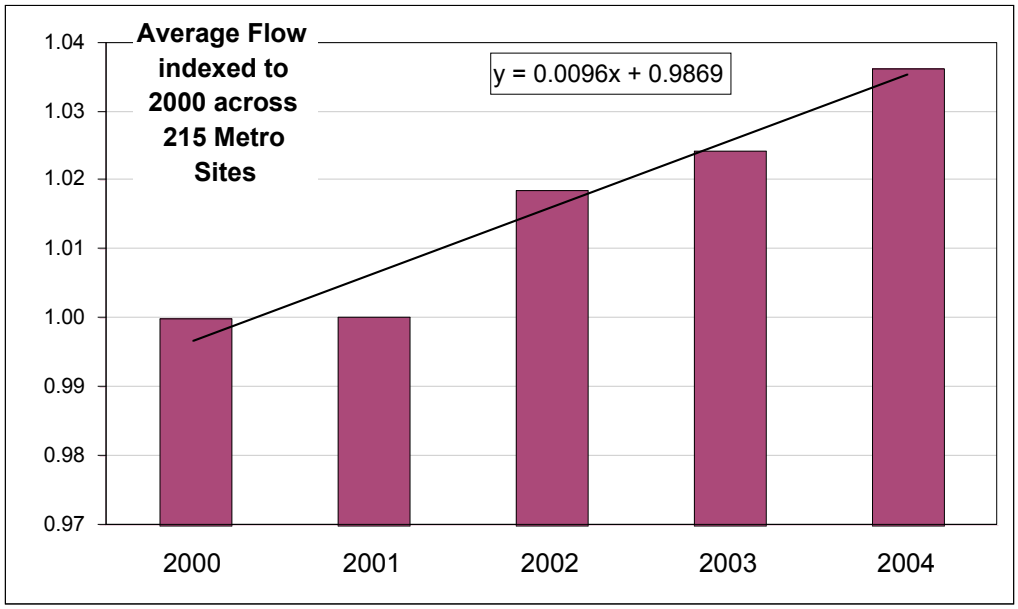

Figure 2 Traffic Growth over a 5 Year Period

The SCRAM signals are located at hundreds of intersections across Melbourne. For the Trends Analysis project, a sample of sites was selected in Darebin, near Darebin and outside Darebin, as shown in Figure 3. The sites within Darebin were divided into local streets, where most of the traffic might be expected to be local traffic, and main roads, where the proportion of through traffic might be expected to be higher.

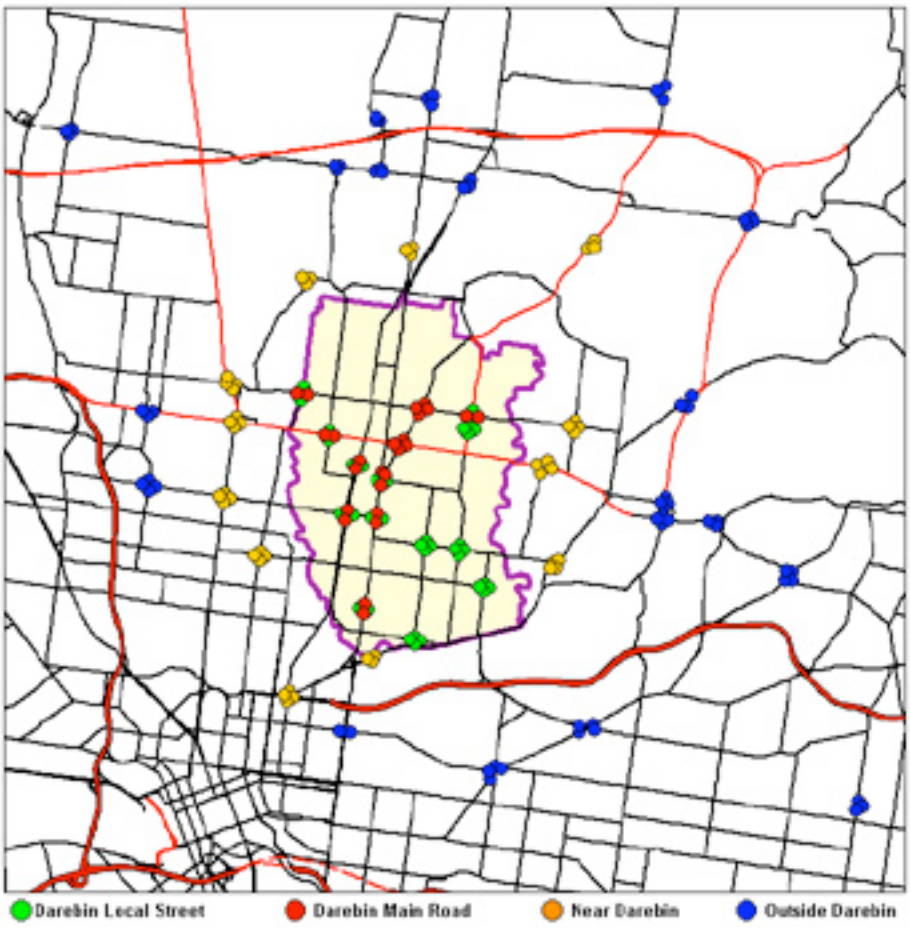

Figure 3 Trends Analysis SCRAM Sites

Data was collected at these sites in one week periods at several points in time, namely:

- March 15 - March 21, 2004
- May 31 - June 6, 2004
- July 19 - July 25, 2004
- Sept 6 - Sept 12, 2004
- Nov 15 - Nov 21, 2004
- Jan 31 - Feb 6, 2005
- March 7 March 13, 2005
- May 30 - June 5, 2005

Several weeks after each collection, the data was forwarded by VicRoads. Since some counters failed during some of the collection periods, an imputation system was developed to replace the missing data with imputed estimates based on the previous and future values from this site and day of week, and from other flows at the site during the week of the collection. In the end, a complete matrix of data was obtained for all sites for all days for all collection periods. The flows were then summarised for each of the four types of site for each of the collection periods, and then indexed to the March 2004 results, which was the only period before the implementation of TravelSmart in the area.

Before using the SCRAM data to represent traffic patterns in the various areas, the data for each area was examined to determine if any outliers existed which might bias the results (especially given the relatively small number of sites in each area), due to the commencement or cessation of roadworks during the period on that road or on neighbouring roads (causing traffic diversion onto the road in question). These outlier sites were removed prior to detailed analysis, leaving those sites representing general traffic behaviour in that group of sites.

A summary of the results across all days of the week is shown in Figure 4. Also shown in Figure 4 is a Metro Average curve, based on the results described in Figures 1 and 2 above.

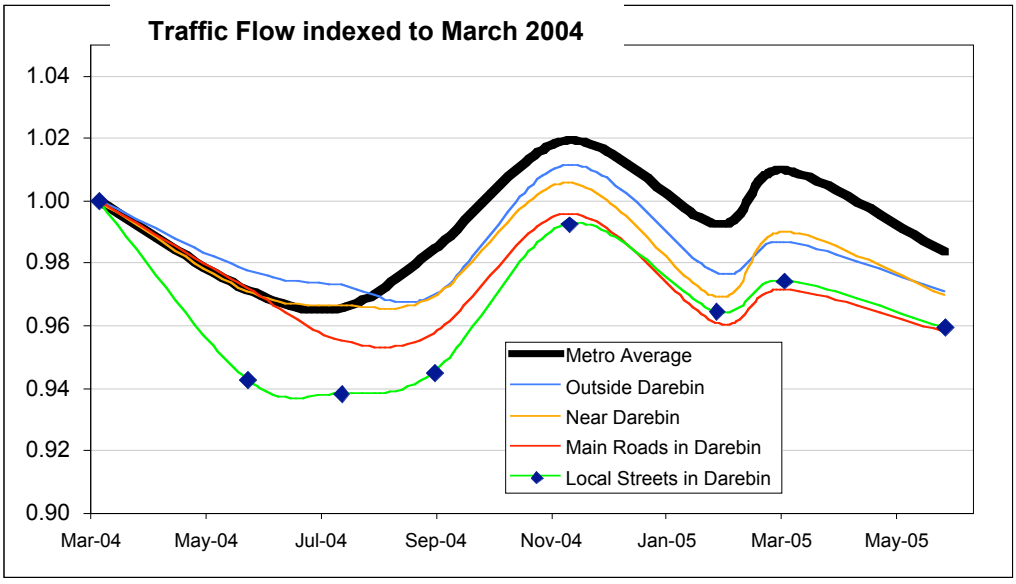

Figure 4 Average Daily Traffic Flows indexed to March 2004 Flows

It can be seen that all the curves follow the same basic seasonal pattern described by the Metro Average curve, with a dip through the winter months, a rise towards the end of the year followed by another dip through the summer holidays. However, importantly, the sites inside Darebin show an overall decrease in traffic flows from June 2004 onwards. This decrease is more clearly seen in Figure 5, where the curves for the four groups of SCRAM

sites are expressed relative to the Metro Average curve. Here it can be more clearly seen that the traffic flows at the sites inside Darebin fall (relative to the Metro Average) from March through September 2004, then stabilise at a reduction of about 3% from September 2004 onwards. In the initial stages, the reduction on the Darebin local streets was greatest, but both groups stabilise to the same reduction after September 2004. The sites near and just outside Darebin appear to stabilise at a reduction of about 1-2% from September 2004 onwards, indicating that some spillover effect may be occurring as the Darebin traffic gradually gets overtaken by the non-Darebin traffic on these roads.

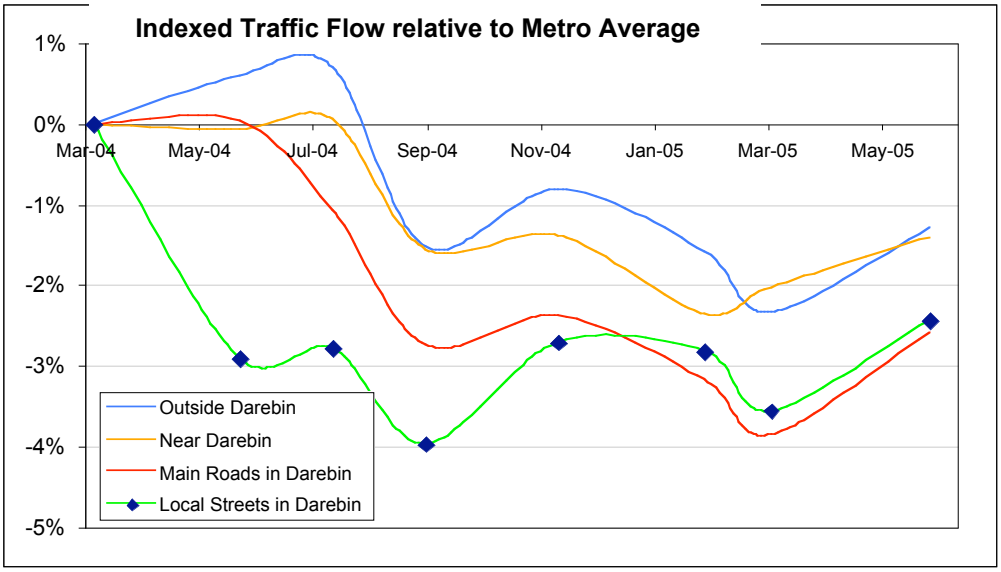

Figure 5 Average Daily Traffic Flows indexed to March 2004 Flows

The results for weekday and weekend traffic are shown in Figures 6 and 7. Because weekday traffic makes up at least five-sevenths of the weekly traffic, Figure 6 is not much different from Figure 5. On the other hand, since the weekend traffic is no more than two-sevenths of the weekly traffic, there is potential for the weekend results to be somewhat different. Indeed it would appear that the weekend reductions on the local Darebin streets may be initially greater than the weekday reduction (reaching a peak of about 6%), but thereafter returns to the same long-term reduction of 2-3%. However, because of the smaller sample size on weekends, the weekend results are also more variable than the weekday results, as typified by the March 2005 results which show an overall dip at all sites because of inclement weather on the weekend chosen for data collection.

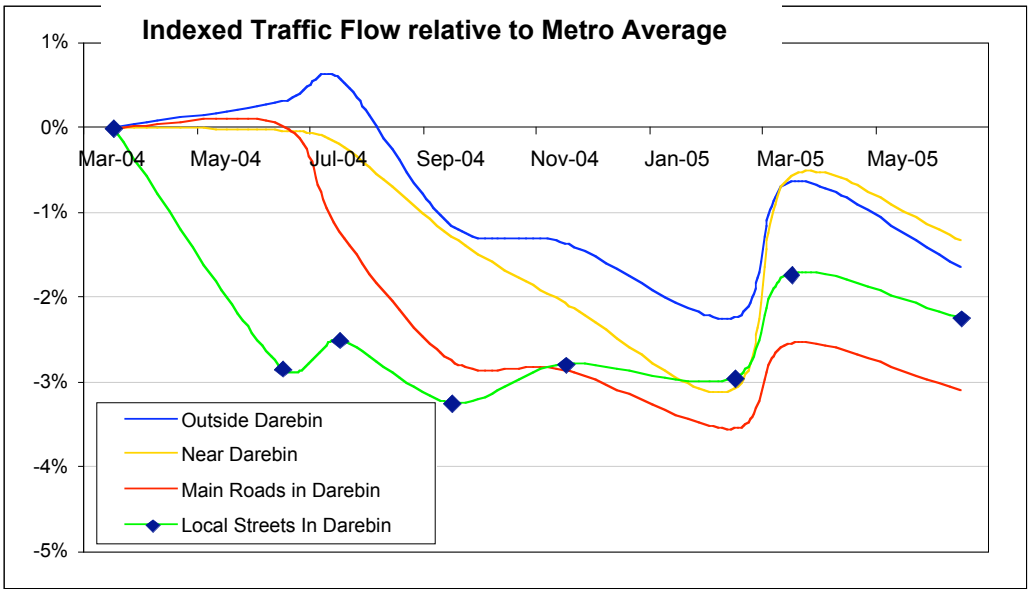

Figure 6 Average Indexed Weekday Traffic Flows relative to Metro Average

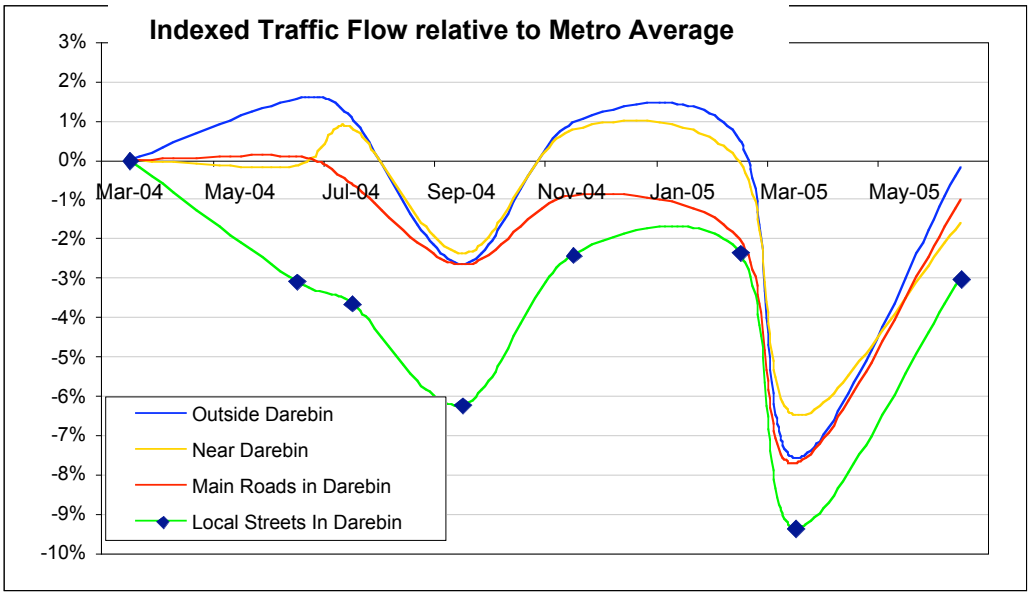

Figure 7 Average Indexed Weekend Traffic Flows relative to Metro Average

The overall findings from the SCRAM data analysis indicate that there was a gradual reduction in traffic flows within the Darebin area over the period of the TravelSmart implementation, leading to a sustained 3% reduction from September 2004 onwards. Since traffic flows are a surrogate measure of VKT (since traffic flows at sites are self-weighted by distance travelled, because longer trips have more chance of passing and being counted at randomly located traffic counting sites), then this equates to a VKT reduction within Darebin of about 3%. Since the flows at these internal sites would not be composed solely of Darebin-based traffic, then this equates to a TravelSmart-household reduction in VKT of about 5%, given that the proportion of through traffic on the Darebin local streets and main roads is about 50%.

5 OneLink Public Transport Ticket Validations Data

Public transport ticket validations are one measure of public transport usage. While being far from a perfect count of public transport trips, since not all travellers validate their tickets at the

start of every trip, they are one of the few ongoing sources of information on public transport usage. Validations data is probably a very good measure of bus usage, since the passengers must validate their tickets in full view of the driver. They are also probably a reasonable measure of train usage, especially if the trip starts or ends at a City Loop station where the ticket must be validated before gaining entry to, or leaving, the platform. However, validation of tickets on trams is an ongoing problem, with relatively low validation rates due to the validations being done at ticket machines out of sight of the driver.

However, while ticket validations may not be a perfect measure of absolute numbers of public transport trips, they could be a reasonable measure of trends in public transport usage, provided the validation rates (the percentage of trips for which a ticket validation is recorded) stay relatively constant over time. With this proviso in mind, the following paragraphs outline some results obtained from an analysis of the trends in train station validations over the period of the TravelSmart implementation (similar analyses have been conducted for tram and bus, but are not reported in this paper).

As with the SCRAM data analysis, the railway stations have been divided into a number of groups, as shown in Figure 8. Twelve stations are within the Darebin study area, another 13 have been defined as being near the Darebin study area, while the remainder of the metropolitan stations (excluding the City Loop stations) have been grouped together. The City Loop stations have been excluded from the analysis because of their different validation patterns since these are the only stations where tickets must be validated at the end of a trip.

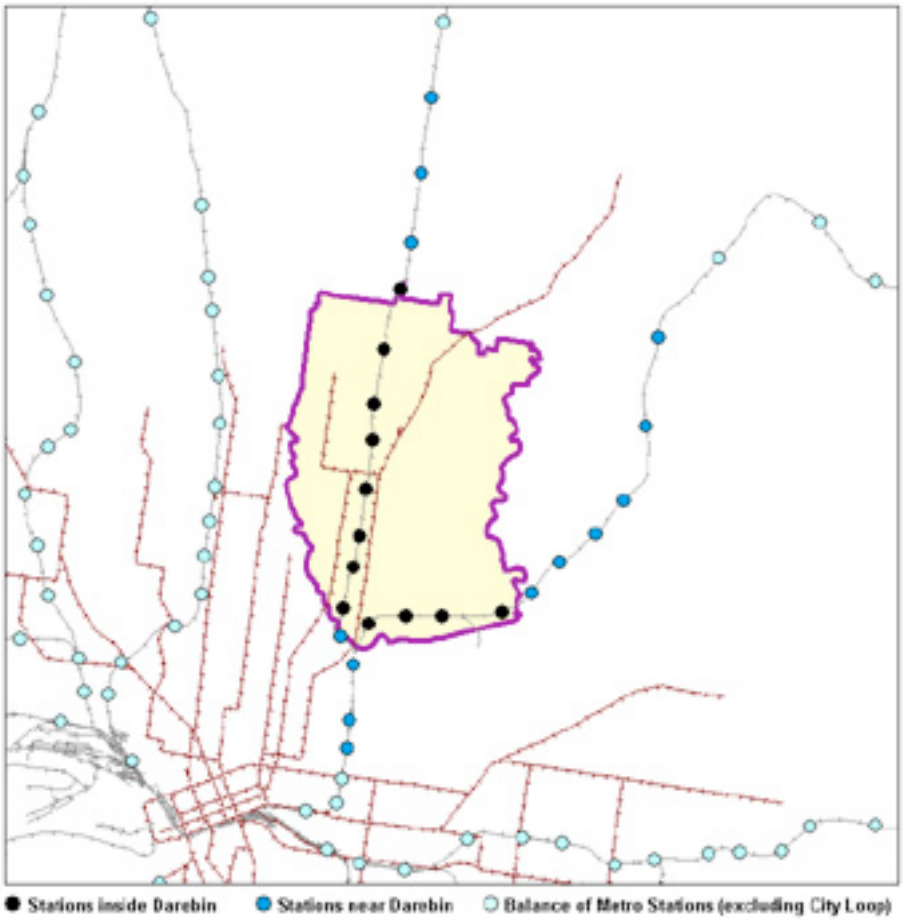

Figure 8 Trends Analysis Railway Stations

The average daily number of ticket validations in each station group for each month from March 2004 through April 2005 (indexed to the March 2004 values) are shown in Figure 9. It can be seen that since mid-2004, the validations at the stations inside Darebin appear to have

been moving ahead of the validations at the other stations At March 2005, the validations at stations inside the Darebin study area are about 3% higher than they were in March 2004

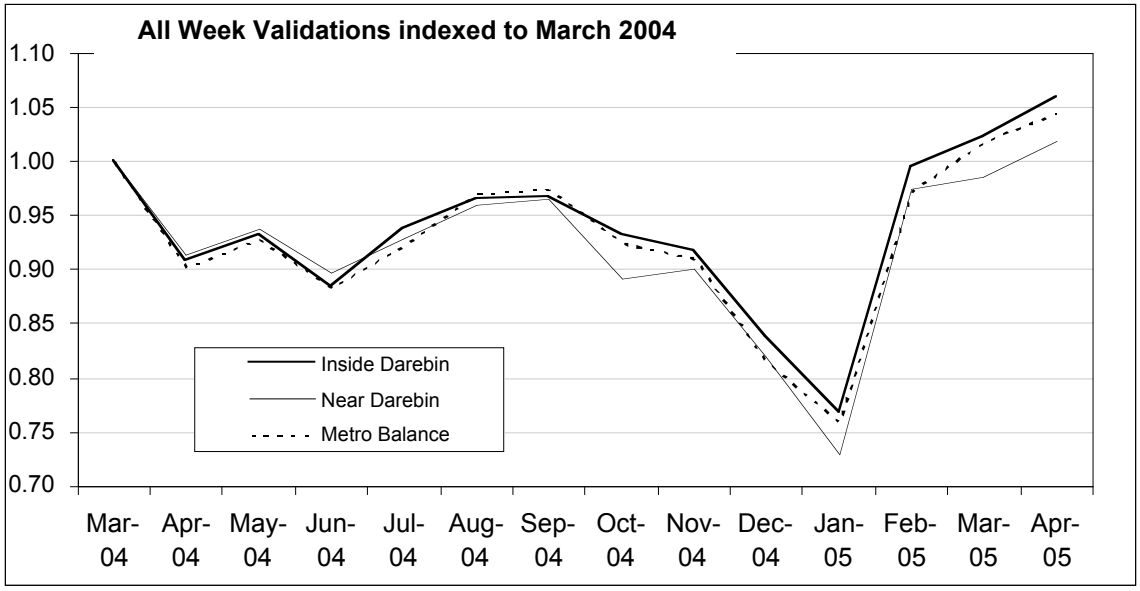

Figure 9 Average Daily Validations across All Days of the Week

However, as noted earlier, the analyses based on ticket validations are only valid if it can be assumed that the validation rates have not varied systematically across the study period. It is known, however, that a significant change did occur in 2004, with the introduction of 31 Host Stations in mid-2004. There are now three types of railway stations in the Melbourne network. Premium Stations are staffed continuously and have a range of other facilities such as kiosks, toilets and other conveniences. Host Stations (which were previously unstaffed) have staff present at the station every weekday morning to assist passengers with enquiries and ticketing issues. Unstaffed, as the name implies, are not regularly staffed, although they occasionally have ticket inspectors checking that customers hold valid tickets. It might be expected that the introduction of the Host Stations might have introduced changes to ticket purchasing and validation behaviour at those stations, and this indeed appears to be the case, as shown in Figure 10, where the indexed validation rates at Host Stations increased after their introduction in mid-2004. On the other hand, validations at unstaffed stations appear to have decreased.

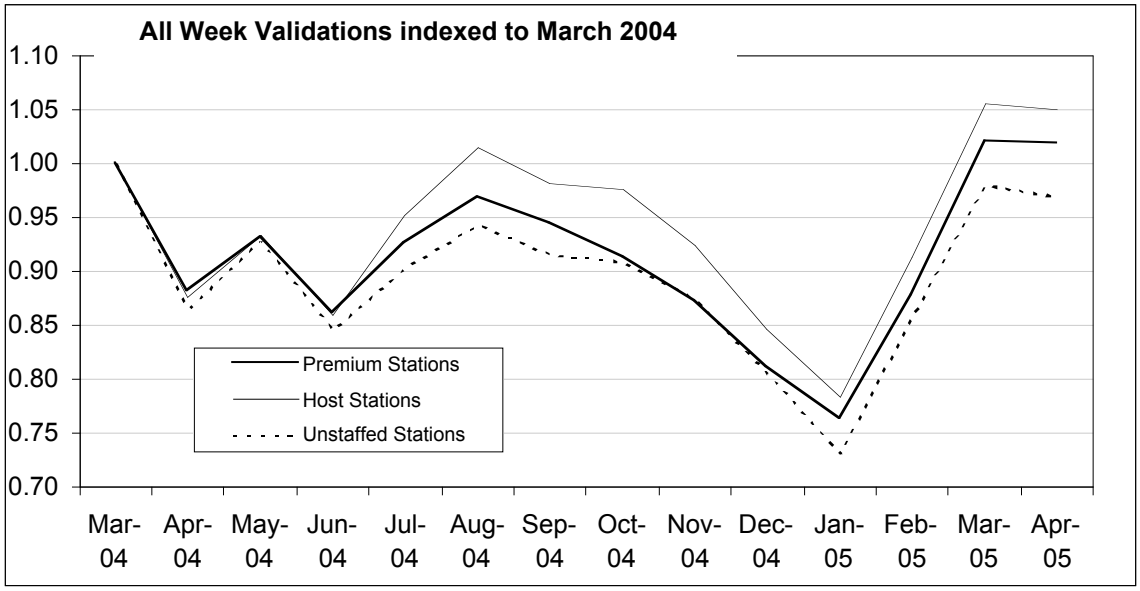

Figure 10 Indexed Daily Validations for Different Types of Station

Importantly, for the current Trends Analysis, the distribution of the different types of station is not uniform geographically. As shown in Table 1, almost all the Host Stations (30 out of 31) are in the Balance of the Metro stations, while most stations inside Darebin are unstaffed.

Table 1 Distribution of Station Types across the three Station Groups

	Type of Station		
Location of Station	Premium	Host	Unstaffed
Inside Darebin	8%	17%	75%
Near Darebin	0%	38%	62%
Metro Balance	18%	32%	50%

Given the changes in validation rates at the different types of stations identified above in Figure 10, this effect therefore needs to be accounted for before trying to assess the possible changes due to TravelSmart. Figure 11, therefore, shows the changes in indexed validations that might have been expected in the three areas given only the changes in validations at each of the different types of stations (computed by taking an average of the values in Figure 10, weighted by the proportions of station types in each area in Table 1).

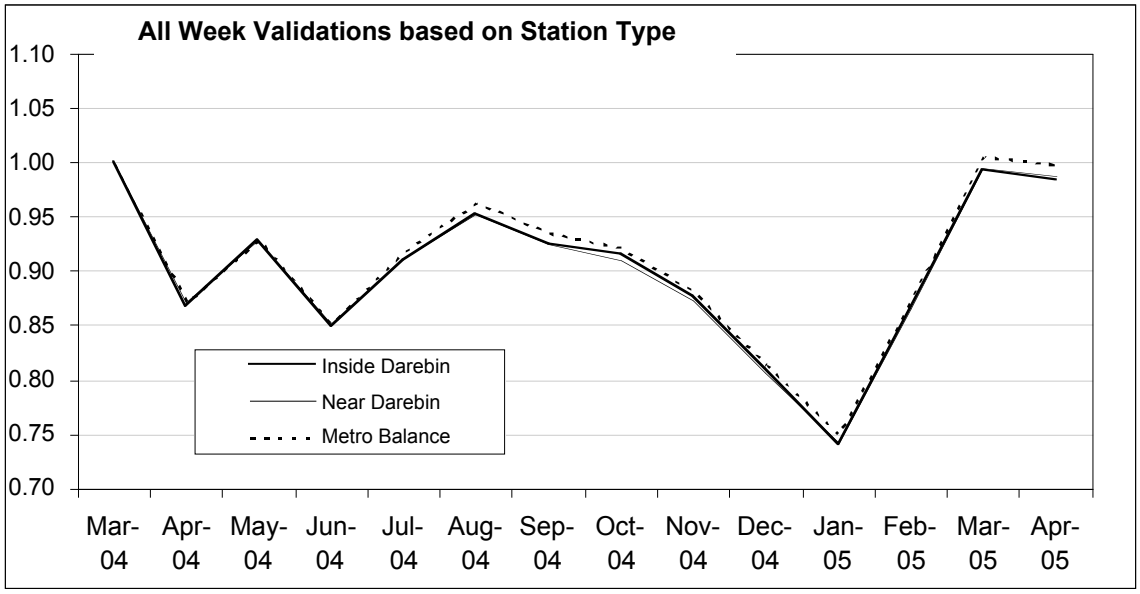

Figure 11 Expected Indexed Validations based on Different Types of Station

It can be seen that because the Host Stations are more likely to be in the Metro Balance area, the indexed validations in the Metro Balance area would have risen purely due to the introduction of the Host Stations in mid-2004, whereas the stations in and near Darebin would not have experienced such a rise.

One can now correct for the effect of the introduction of the Host Stations by dividing the actual changes in indexed validations (shown in Figure 10) by the expected indexed validations due to the introduction of the Host Stations (Figure 11) to obtain a relative measure of changes in indexed validations which has had the effect of the Host Stations removed. This measure is shown in Figure 12, where it is shown that the Metro Balance line has fallen relative to the Inside Darebin line.

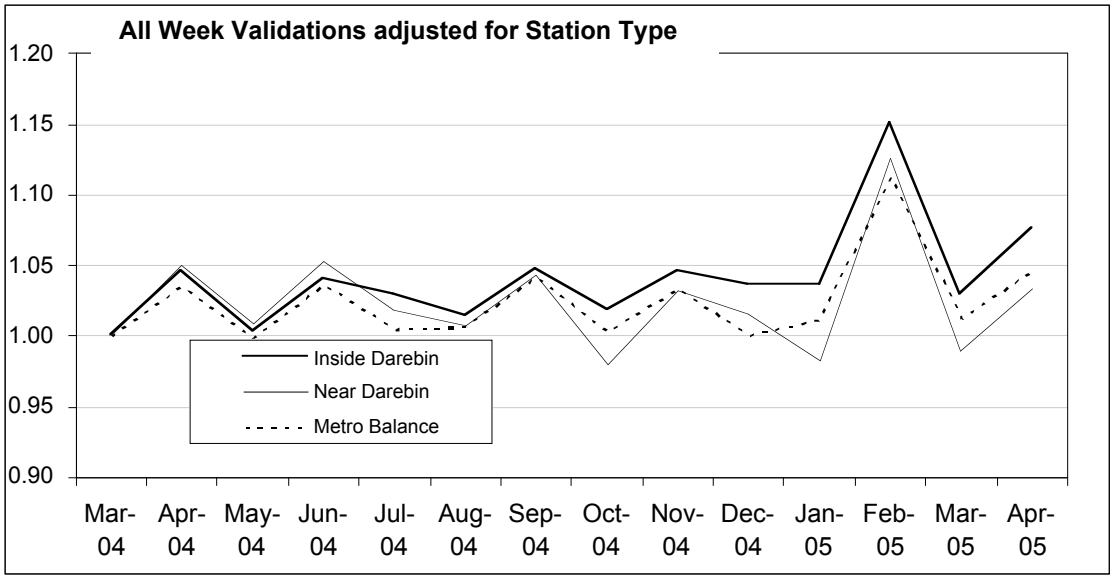

Figure 12 Adjusted Indexed Validations (after removal of Host Station effect)

The difference between the station groups can be shown more clearly by plotting the results for the Inside Darebin and Near Darebin groups, relative to the Metro Balance group, as shown in Figure 13. Here it can be clearly seen that the Inside Darebin stations have experienced a relative rise in validations while the Near Darebin stations have experienced a relative decline in validations. The extent of this rise and fall has been summarised by calculating a line-of-best-fit for each of the results. The x-coefficient of the resultant equation indicates the slope of the rise or fall in validations

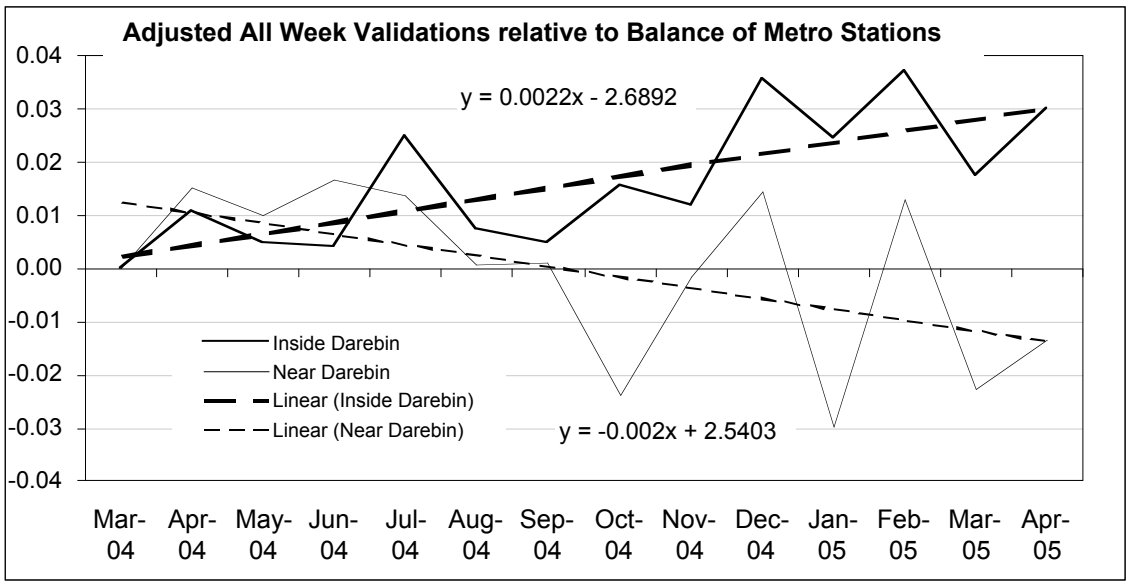

Figure 13 Adjusted Indexed Validations relative to the Metro Balance Results

Similar analyses have been performed for train validations on weekdays and on weekends, and the results are shown in Figures 14 and 15. By comparing the slopes of the lines-of-best-fit, it can be seen that the increase in validations at the Inside Darebin stations has been greater on weekends that on weekdays, while the fall in validations at the Near Darebin stations has also been greater on weekends that on weekdays. If one attributes the changes Inside Darebin to the implementation of the TravelSmart program, then it appears that TravelSmart is having a greater effect on weekend travel than on weekday travel. This appears a reasonable assumption since no major changes in service levels or fares occurred in the Darebin area during the study period.

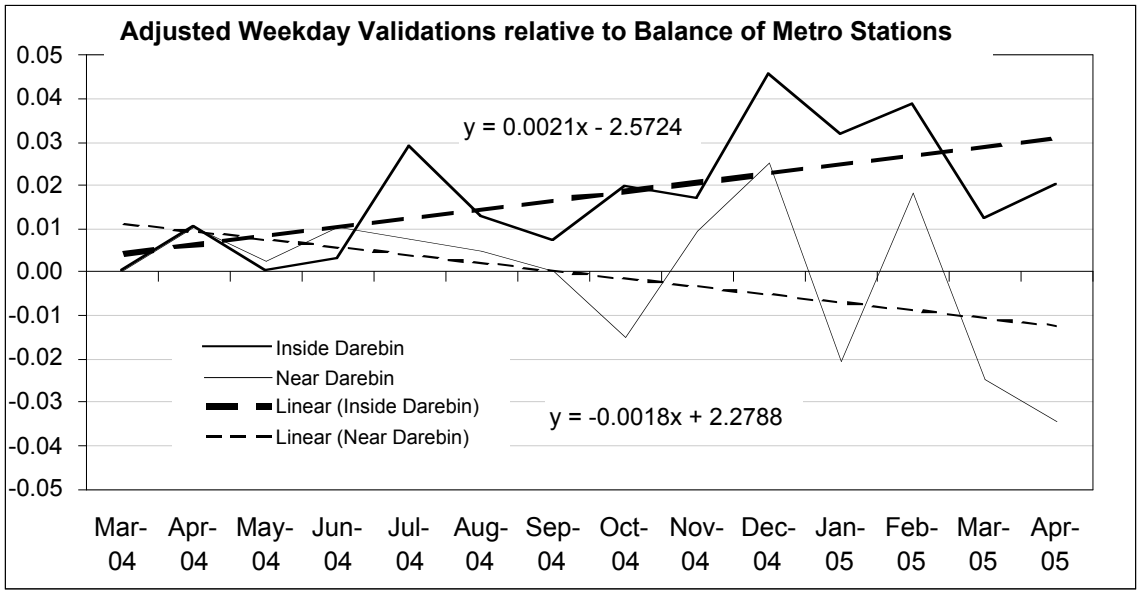

Figure 14 Adjusted Weekday Validations relative to the Metro Balance Results

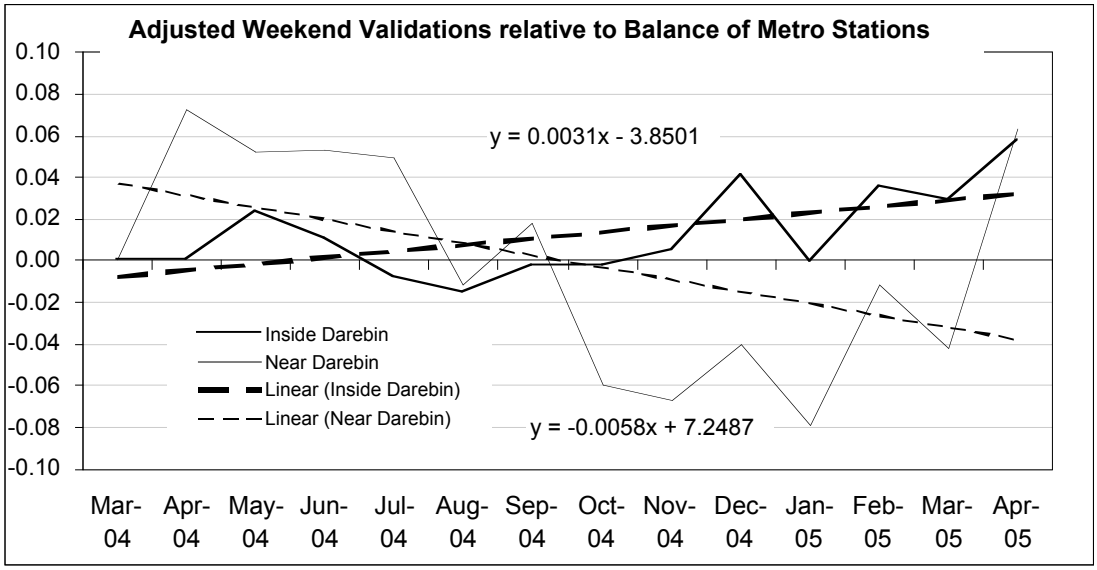

Figure 15 Adjusted Weekend Validations relative to the Metro Balance Results

6 MetLink Public Transport Ticket Sales Data

The previous section has examined changes in train usage as reflected in changes in ticket validations. Given the uncertainties about the reliability of the ticket validations data as a true measure of public transport usage (even in a relative sense), a parallel analysis was performed on ticket sales data. This was assumed to be a somewhat more robust measure of usage since it does not rely on customers having to validate their tickets on every trip. However, it does rely on customers buying tickets in the first place, and it is known that fare evasion is a significant problem in Melbourne. Nonetheless, this analysis does provide another perspective on the relative increases or decreases in train travel in the various areas following the implementation of TravelSmart (note that this analysis was also performed for tram, bus and retail agency ticket sales, with generally similar results, but only the train results are presented in this paper).

Using the same methods of analysis as described above for ticket validations, the relative changes in the value of ticket sales Inside Darebin and Near Darebin are shown in Figure 16

(Figure 16 is the equivalent of Figure 13 for ticket validations). The corresponding results for weekdays and weekends are shown in Figures 17 and 18.

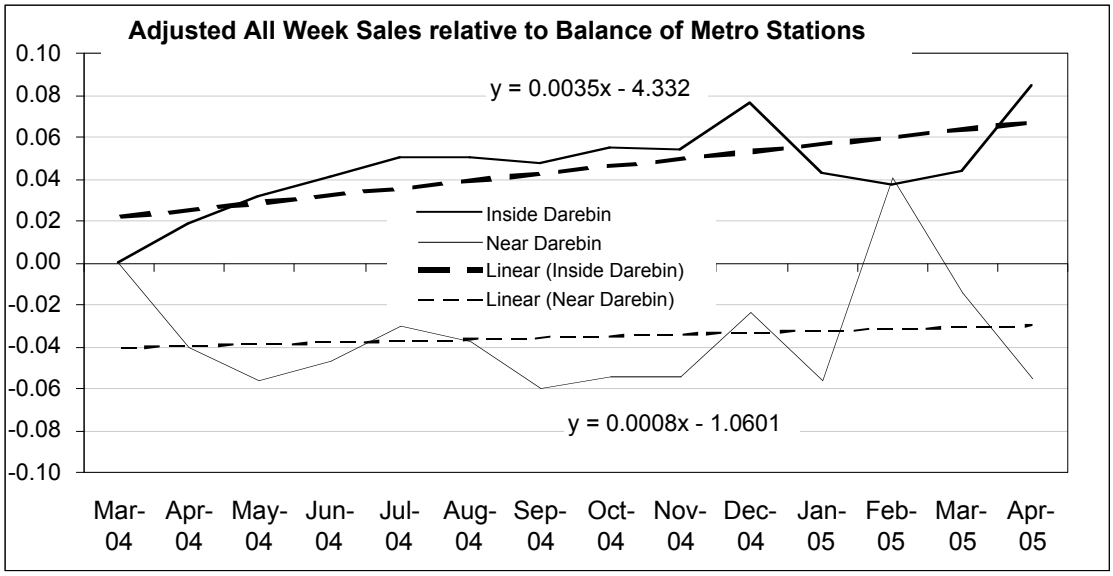

Figure 16 Adjusted Indexed Ticket Sales relative to the Metro Balance Results

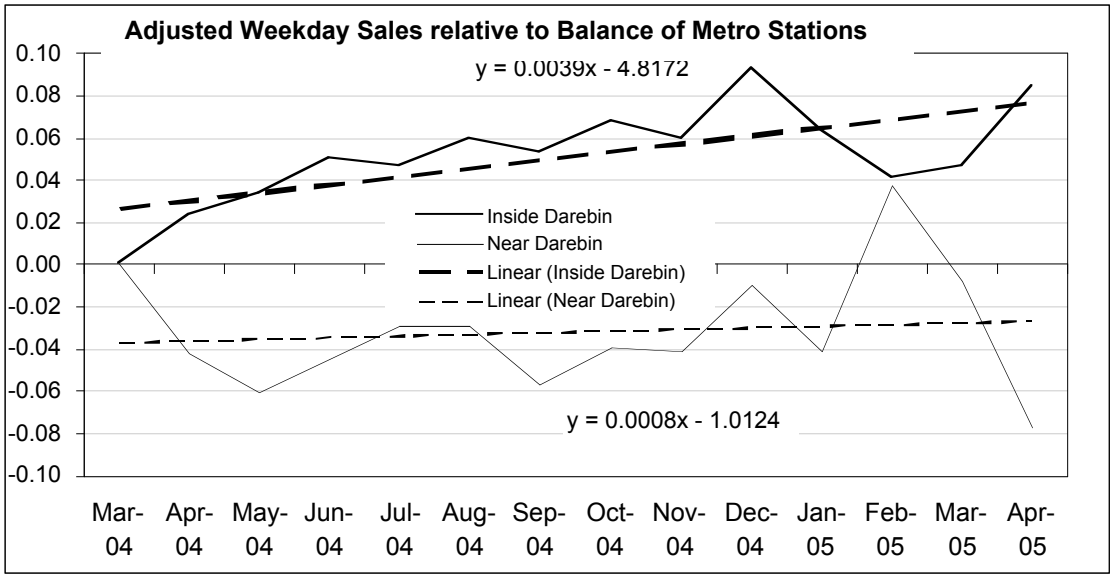

Figure 17 Adjusted Weekday Ticket Sales relative to the Metro Balance Results

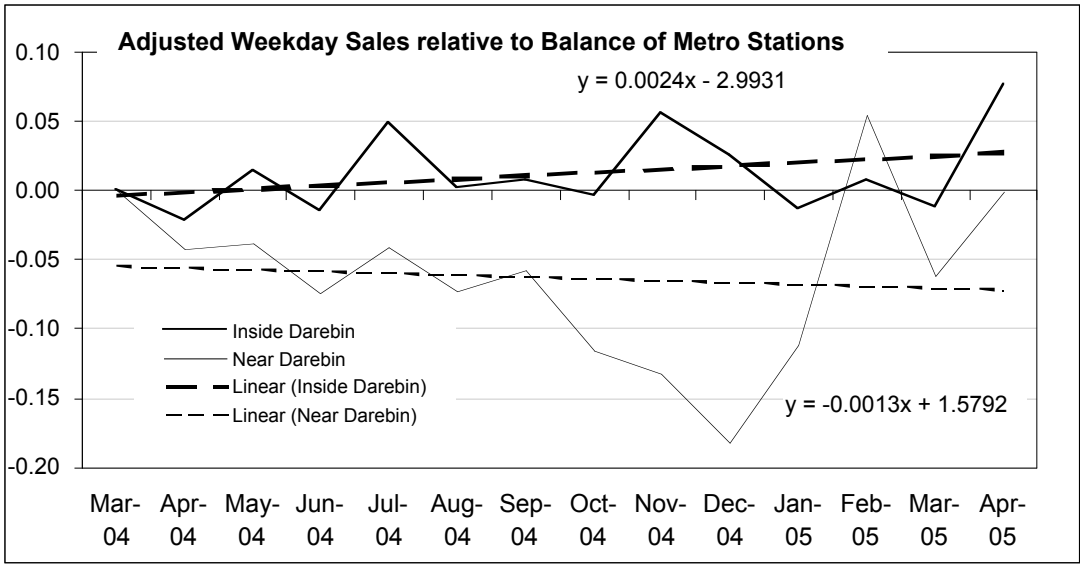

Figure 18 Adjusted Weekend Ticket Sales relative to the Metro Balance Results

As for the ticket validations, Figures 16 through 18 show that the value of Ticket Sales has increased at stations Inside Darebin while remaining relatively constant at stations Near Darebin. Examination of the slopes of the lines-of-best-fit, however, has shown that the value of ticket sales at stations Inside Darebin has increased relatively more on weekdays than on weekends. This appears reasonable since while the number of trips (reflected in the number of validations) may have increased more on weekends, many of the tickets used for these trips (such as weekly tickets) may have been purchased on a weekday. Thus TravelSmart may have had better results for the environment than for the operator's financial bottom-line.

7 Public Transport Customer Satisfaction Survey Data

The final section of this paper looks at changes in customer satisfaction with public transport services for residents of various areas, before and after the implementation of TravelSmart. These surveys are conducted on a regular basis by Market Solutions Pty Ltd for the Department of Infrastructure. The Customer Satisfaction Monitor (CSM) collects data from a series of telephone interviews conducted at monthly intervals. Sample for the Darebin study area was boosted in the January to March quarters of 2004 and 2005 to obtain a more robust sample for analysis. More precisely, at the completion of normal monthly interviewing during these quarters, additional interviews were conducted within the Darebin study area to ensure a minimum of 90 interviews per month for each mode. While the CSM runs for the entire year, only the results for the January to March quarters in 2004 and 2005 are used in this analysis, because of the relatively small sample sizes within the Darebin study area for the remainder of the year.

While the CSM collects data on a wide range of detailed characteristics of public transport services, only some overall summary results are presented in this paper to indicate the types of changes that have been observed. Table 2 shows the changes in satisfaction rating for a number of factors (which are measured on a 100-point scale) Before and After TravelSmart in various areas of Melbourne. Overall it can be seen that while there has been a small increase in average satisfaction rating of 0.8 in both the areas Near Darebin and in the Remaining Metro areas (based on postcode of residence), there has been a much larger average increase of 3.0 points in the Darebin Study Area. This increase in satisfaction within Darebin has been across the board, with the exception of satisfaction with availability of information from other places (buses only) and overall satisfaction with staff. The individual factors that experienced statistically significant increases in satisfaction were overall satisfaction with information, availability of timetable information, clarity of announcements, overall satisfaction with service delivery and overall satisfaction with ticketing.

Table 2 Summary of Selected CSM Results Before and After TravelSmart

	Change in Satisfaction Rating		
FACTOR	Darebin Study Area	Near Darebin	Remaining Metro
Overall satisfaction with service	2.4	-1.3	-1.0
Overall satisfaction with value for money	3.3	1.3	1.5
Overall satisfaction with information	3.7*	-1.7	0.3
The availability of timetable information	4.3*	1.2	2.8*
Connecting services information	2.6	1.1	0.7
The number of announcements (Train/tram only)	1.5	0.5	0.5
Cancellation information (Train/tram only)	5.5	0.0	0.4
The clarity of announcements (Train/tram only)	8.3*	1.0	0.4
The availability of information from other places (buses only)	-0.2	4.2	2.2
The ease of understanding timetable information (buses only)	3.2	4.3	-0.1
Overall satisfaction with service delivery	4.0*	-2.0	-0.8
Overall satisfaction with comfort	0.9	0.3	0.8
Overall satisfaction with station/stop	0.4	-0.9	0.1
Overall satisfaction with ticketing	6.2*	1.0	2.0*
Overall satisfaction with staff	-0.1	1.6	1.8*
Overall satisfaction with safety	2.3	2.4	0.7
Overall Average Change in Ratings	**3.0**	**0.8**	**0.8**
2004 Sample Size	249	272	1833
2005 Sample Size	273	306	1794

Note: Asterisked values are statistically significant at the 5% level

It therefore appears that in addition to increases in ticket validations and ticket sales in the Darebin study area following the implementation of TravelSmart, there has also been a general increase in satisfaction with public transport services for residents within the Darebin TravelSmart study area.

8 Conclusions

This paper has reported on changes in travel behaviour following the implementation of a TravelSmart Communities project in Darebin in the inner north-eastern suburbs of Melbourne, using a Trends Analysis of a range of secondary data sources. The principal results obtained from each analysis are:

VicRoads SCRAM Traffic Count Data: a decrease in VKT within the Darebin study area was observed across the period of TravelSmart implementation, culminating in a sustained decrease of about 3% from September 2004 onwards.

OneLink Public Transport Ticket Validations Data: an increase of 4-5% in public transport ticket validations at rail stations within the Darebin study area was observed between March 2004 and March 2005 (relative to changes in validations at stations in the balance of the Metro area), with greater increases in validations on weekends.

MetLink Public Transport Ticket Sales Data: an increase of 4-5% in the value of public transport ticket sales at rail stations within the Darebin study area was observed between March 2004 and March 2005 (relative to changes in the value of ticket sales at stations in the balance of the Metro area), with greater increases in ticket sales on weekdays.

Public Transport Customer Satisfaction Survey Data: an increase of 3 percentage points in public transport customer satisfaction for residents within the Darebin study area, compared to an increase of 0.8 percentage points in the balance of the Metro area.

These overall results of on-the-ground measurements collectively indicate that reductions in VKT, increases in public transport usage and increases in public transport satisfaction have occurred in the Darebin study area following the implementation of the TravelSmart Communities program in the Darebin area. The relative size of the changes indicates that not all the reductions in VKT have been translated into increases in public transport usage. Some

of the VKT may have been suppressed entirely, some may have been reduced due to increases in trip-chaining and the effectiveness of car usage, while some VKT may have been transferred to non-motorised forms of transport (e.g. walking and cycling). A fuller investigation of these changes will be possible when the analysis of the Before and After household travel surveys has been completed.

9 References

Richardson A.J., Davis, M.B. and Harbutt, P.L. (2005) The Evaluation of a TravelSmart Program using Before and After Household Travel Surveys, *Papers of the 28th Australasian Transport Research Forum,* Sydney: ATRF