Cycling in New South Wales

What the data tells us

Prepared for the Premier's Council for Active Living

December 2008

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Date: 5 December 2008, rev 2 23 March 2009
Distribution: PDF and hard copy to NSW BikePlan Project Manager

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Appendices

How to use this report

The format of this report has been designed to enable the clear extraction and presentation of complex data embedded in existing reports; to provide a commentary on raw data; and to report on the analysis and interpretation of data.

While the report is self-contained two accompanying DVDs contain the detailed library of data sitting behind this overview. The NSW Cycling Geodatabase DVD contains datasets with spatial references. The DVDs should be used in conjunction with this report, to enlarge graphics and interrogate spatial datasets.

About the data:

Green text boxes provide commentary on datasets. This includes any information regarding:

- data collection
- data storage
- data handling / cleaning / manipulation
- methodology

Worth noting:

The orange text boxes highlight findings from the data collated by PB for this project.

Any data processed by PB is annotated in this way.

Relevant data sources:

The source of datasets, including relevant material received during the course of this study, are highlighted in the purple text boxes.

Reports and articles on cycling which support or complement assumptions and hypotheses advanced in this report are also noted in purple.

For further study:

The red text boxes are used to highlight gaps in the data, such as:

- no data has been collected
- insufficient detail
- infrequently collected data
- small sample size

Red boxes also indicate where further work is needed to develop appropriate technological solutions for data gathering.

About the map:

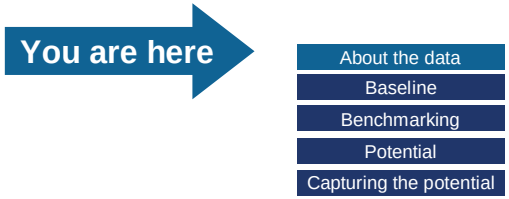
The grey text boxes identify where a map is stored on the NSW Cycling Geodatabase, and what data was used to develop the map.

This will make it easier for maps to be updated as and when datasets change.

Key Findings:

The blue text boxes contain PB's key findings, highlighting the most important issues and challenges to be addressed during work on the Premiers Council for Active Living (PCAL) NSW BikePlan. Findings are overviewed in the Executive Summary and detailed in the main body of the report.

The report is "signposted" with the five section headings and colour-coded to highlight the current section of the report, as shown below:



Executive summary

This report was prepared to inform the development of a new NSW BikePlan for the Premier's Council for Active Living. The report is structured to respond to questions posed under five key headings:

What data is available on cycling in NSW?
What gaps are evident in the existing data?

Who is cycling in NSW (and where)?

How do cycling outcomes in NSW and Sydney perform against comparable locations, including other Australian states and capital cities?

What is the broad potential for increasing cycling in NSW?

What counts, surveys, audits and focus groups would help to identify ways to grow cycling in NSW, and track outcomes achieved?
What further research would complete the picture of cycling in NSW?

Executive summary

Our objective

The purpose of this project by PB was to assemble and report on available cycling data, to inform the preparation of a new NSW BikePlan. The new NSW BikePlan is being prepared by relevant NSW Government agencies on behalf of the Premier's Council for Active Living.

Based on the assembled data this report addresses various aspects of cycling use in NSW, including current levels of cycling, and reports on the condition of the data.

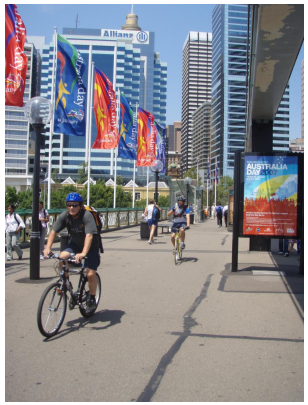
This information is intended to develop understanding of the factors influencing the use of cycling in NSW, and thereby to help establish the value for money of different types of investment in cycling that may be considered for inclusion in the new NSW BikePlan.

An array of bicycle stakeholders from across NSW and Australia hold elements of relevant bicycle usage data. Many stakeholders shared reports with PB and, where possible, datasets held by their agencies and organisations. In some instances, datasets required depersonalising or aggregation to protect privacy.

Our methodology

1. Request information from state and local stakeholders.
2. Telephone survey traffic, transport, or planning staff in all NSW local councils about local government area (LGA) bicycle usage data.
3. Map data which could be geocoded, by postcode, suburb or LGA.

   (Data was mapped at the LGA level because this level of government is frequently the most involved in delivering investments in cycling.)
4. Conduct analysis, and complete preliminary testing of hypotheses, about cycling in NSW.
5. Report on findings.
6. Recommend a future program of counts and surveys to enrich the understanding of bicycle usage across NSW and measure progress towards cycling objectives.



Executive summary

Our findings:

About the data: *What data is available on cycling in NSW?*

There is no single central source, repository or clearing-house for data about cycling in NSW.

Data is collected by a variety of NSW Government agencies, local councils and cycling organisations.

Available bicycle usage data is recorded at varying levels of detail, reliability and quality.

Datasets on cycling infrastructure are updated intermittently and standard terminology is often applied inconsistently.

Richer datasets are available on commuter cycling than recreational cycling.

Injury data may be both under-reported *and* double-counted.

Further cycling data collection and improved data management are necessary to bring NSW up to the national data standards developed by the Australian Bicycle Council and the Federal Department of Health and Aged Care.

To provide a way of managing cycling data more efficiently, PB developed the NSW Cycling Geodatabase. This already includes all the maps in this report, and many others.

The NSW Cycling Geodatabase:

As location is a unique data identifier, geographic information was selected as the organising framework for the cycling data in this report. A geodatabase is an electronic data management tool, designed to house and manage spatial information. A geodatabase is able to store, process, analyse, model, map, distribute, present and report data and information.

PB's geodatabase was designed with three objectives:

1.) to manage the volume of bicycle usage data collected

2.) to use during the analysis stage of this study

3.) to be used during planning for the NSW BikePlan and beyond.

Within the bounds of copyright and privacy laws, all raw and processed data with a spatial reference like LGA or longitude was added to the geodatabase.

Where datasets were incomplete, infrequently updated, or small in sample size, the data was added to the electronic library but not analysed in this report.

The NSW baseline: *Who is cycling in NSW?*

More people are choosing to cycle in denser, urban areas.

More commuter cyclists prefer to cycle for the whole trip, rather than with another mode.

More cycling accidents are clustered in urban areas.

Bicycles are most often stolen from residences.

More men cycle than women.

Benchmarking cycling: *How does cycling in NSW compare to other locations?*

Bicycle use across NSW and Sydney is low compared to other Australian states and capital cities.

World cities with high bicycle mode share have seen a consistent annual investment in connected bicycle infrastructure

Tested variables like topography were not found to provide a satisfactory explanation for low rates of cycling in NSW compared to Victoria.

Understanding the potential: *What is the potential to increase cycling in NSW? What further work is needed to plan and track cycling in NSW?*

Key findings:

Subject to appropriate privacy protections a Geographic Information System, that can be accessed through a single portal by all bicycle stakeholders, would be a very important tool for cycle planning and promotion.

To be most effective a NSW Cycling Geodatabase would need to be regularly updated to show new infrastructure and modified datasets.

If a growth target for NSW cycling is adopted to help in developing and tracking cycling "packages" then a commuter cycling indicator would provide the most reliable proxy for measuring all types of cycling.

High bicycle ownership rates in NSW reveal a significant opportunity for increased cycling.

Urban centres which attract a large proportion of short car trips also offer a significant market on which to focus programs to grow cycling.

Progress towards cycling objectives can be measured by gathering richer data than is currently available, through point-based counts, site audits, cyclist intercept surveys and non-cyclist focus groups.

Section 1: About the data

What data is available on cycling in NSW?
What gaps are evident in the existing data?

There is no central cycling data source, repository or clearing-house in NSW.

Data is collected by a variety of NSW Government agencies, local councils and cycling organisations.

Available bicycle usage data is recorded at varying levels of detail, reliability and quality.

Datasets showing the location and use of cycling infrastructure are intermittently updated and standard terminology is often applied inconsistently.

Richer data is available on commuter cycling than recreational cycling

Injury data may be both under-reported *and* double-counted

Further cycling data collection and improved data management is necessary to bring NSW up to the national data standards developed in the Australian Bicycle Council "Cycling Data and Indicator Guidelines".

Cycling data can be categorised according to infrastructure, cyclist and safety

The Australian Bicycle Council "Cycling Data and Indicator Guidelines" (2000) established five categories of cycling data and three levels of detail to develop the desired "breadth and depth" of cycling data.

In NSW the inter-relatedness of the categories has resulted in a degree of overlap between many datasets, studies and reports.

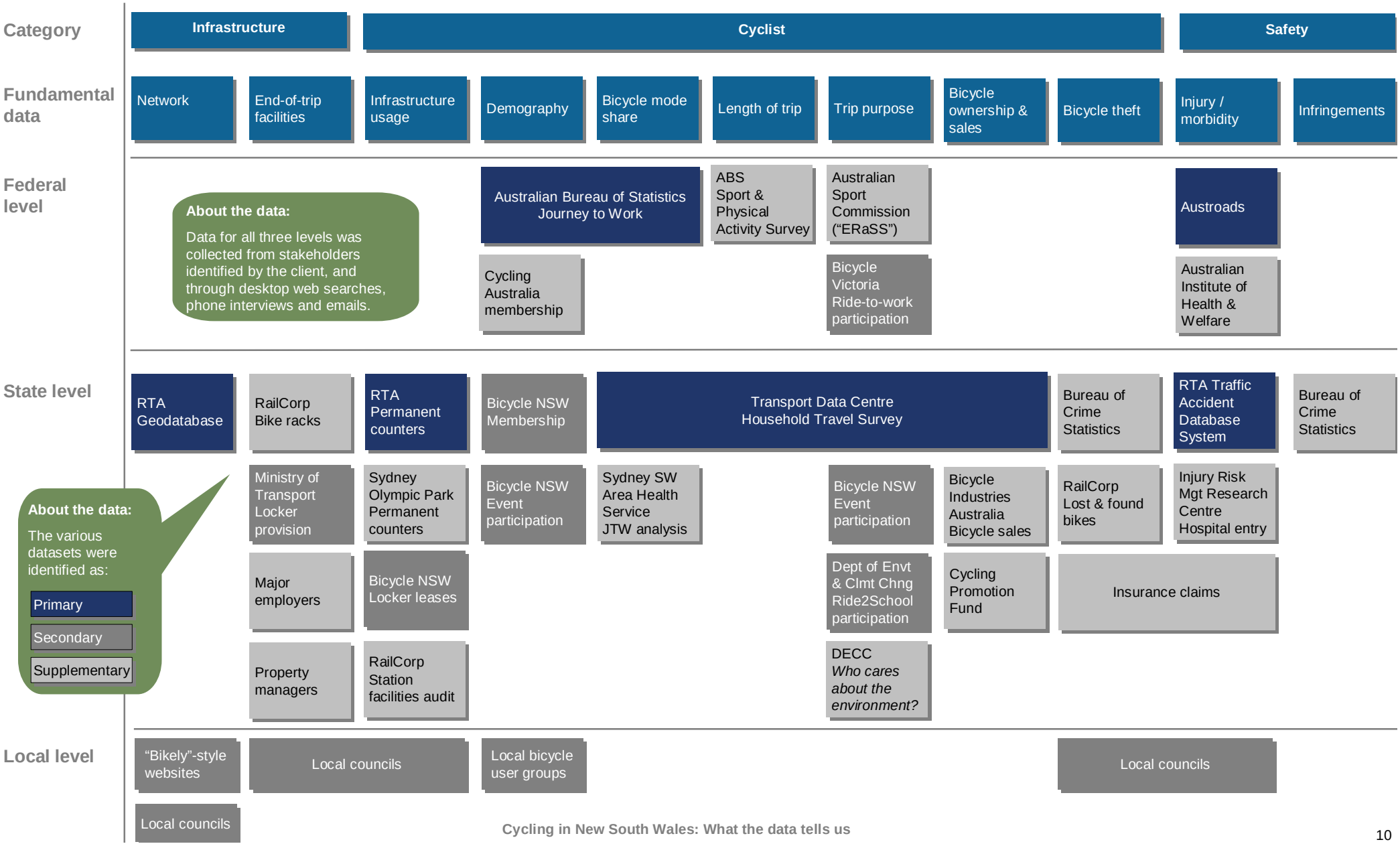
For the purposes of this report, the five categories below have been amalgamated into three – infrastructure, cyclist and safety – to improve the management of data.

Relevant data sources:

The Australian Bicycle Council and Federal Department of Health and Aged Care produced the "Cycling Data and Indicator Guidelines" report (2000) to 'provide[s] State and Territory agencies and stakeholder organisations with the framework for collecting cycling indicators. When data is collected and analysed as outlined in the guidelines, it can be aggregated to develop a national picture of cycling.'

Category for this report	Infrastructure	Cyclist			Safety
"Cycling Data and Indicator Guidelines" (2000) category	**Infrastructure**	**Usage**	**Cyclist**	**Ownership**	**Safety**
Fundamental data	Network: Cycleways, shared paths, on-road shoulder facilities	Bicycle mode share	Demographic characteristics	Bicycle ownership	Cyclist injury / morbidity
	End-of-trip facilities: Bicycle parking, change-rooms, showers	Length of trip (time and distance)		Bicycle sales	Recorded traffic infringements by cyclists
		Trip purpose		Bicycle theft	
		Infrastructure usage (network and end-of-trip facilities)			

A centralised NSW cycling data source would benefit all stakeholders



Infrastructure datasets are infrequently updated and standard terminology is inconsistently applied

With so many government agencies and stakeholders tracking bicycle usage in NSW, records are maintained at varying levels of detail, reliability and quality.

Cycling data is often collected simply because the relevant organisational role happens to be filled by someone with an interest in collecting this information. When the cycling advocate moves to another role, cycling datasets may be lost or no longer tracked regularly or thoroughly.

Detail

The RTA is currently working to geocode all constructed bicycle infrastructure and related assets.

Across NSW, there is no dataset recording end-of-trip facilities, including bicycle parking.

Cycling infrastructure data held by local councils is incomplete. Councils may use varying terminology to refer to the same type of infrastructure – or different types of infrastructure are classified using the same terminology. Of seven local councils that shared infrastructure spatial data from their Geographic Information Systems (GIS), each recorded data using a different schema.

Reliability

A preliminary audit of RailCorp station facilities included motorcycles in its review of parked two-wheelers. This is inconsistent with national definitions of bicycles as "pedal cycles".

Quality

In the case of the RTA's permanent bicycle counters, a number of files for primary counter locations were missing. Where the bicycle count files were available, counters in high use areas have on occasion not recorded data for several weeks at a time (see Appendix A).

Location

The variety of agencies and stakeholders collecting cycling data results in multiple data storage locations. For example, data is often embedded in reports and local council bicycle infrastructure maps, with the consultant who prepared these continuing to hold the background geodata.

Local councils possess varying amounts of information on bicycle infrastructure, including bicycle routes and bicycle parking. Where councils have provided bicycle infrastructure, some store this information in a GIS while others may be able to provide only a hard copy of the bicycle network and bicycle parking requirements.

Data updates

The cycling datasets collected for this study are updated at different times, at varying intervals, or not at all. With cycling data residing in more than one location, the most recently available data may be overlooked.

About the data:

Inconsistent use of bicycle facility terminology is a challenge in NSW. Facilities may be classed by width, pavement type, length, topography, other ease of use, direction of travel and/or destination.

Infrastructure is also classified as "proposed" or "existing."

Infrastructure

Network	End-of-trip facilities
RTA Geodatabase	RailCorp Bike racks
Bikely - style websites	MoT Locker provision
Local councils	

About the data:

Automatic cycle counters obtain point-based counts of bicycles passing through a specific point on a route. They provide statistics by time of day, day of week, month and year.

Relevant data sources:

The Austroads "Guide to Traffic Engineering Practice, Part 14 – Bicycles" and "Australian Standard AS1742.9 – Manual of Uniform Traffic Control Devices Part 9 Bicycle Facilities"

Relevant data sources:

The NSW Department of Planning, "Planning Guidelines for Walking and Cycling" (2004) recommended end-of-trip facilities for a range of land uses. These recommendations included minimum public and private bicycle parking provisions as well as locker, shower and change-room requirements for employee use.

Relevant data sources:

So-called "Web 2.0" sites track bicycle routes around the world.

Cyclists self-report and search bike routes using a GoogleMaps or similar interface. Details may include route difficulty level, directional information and ride profile (gradient).

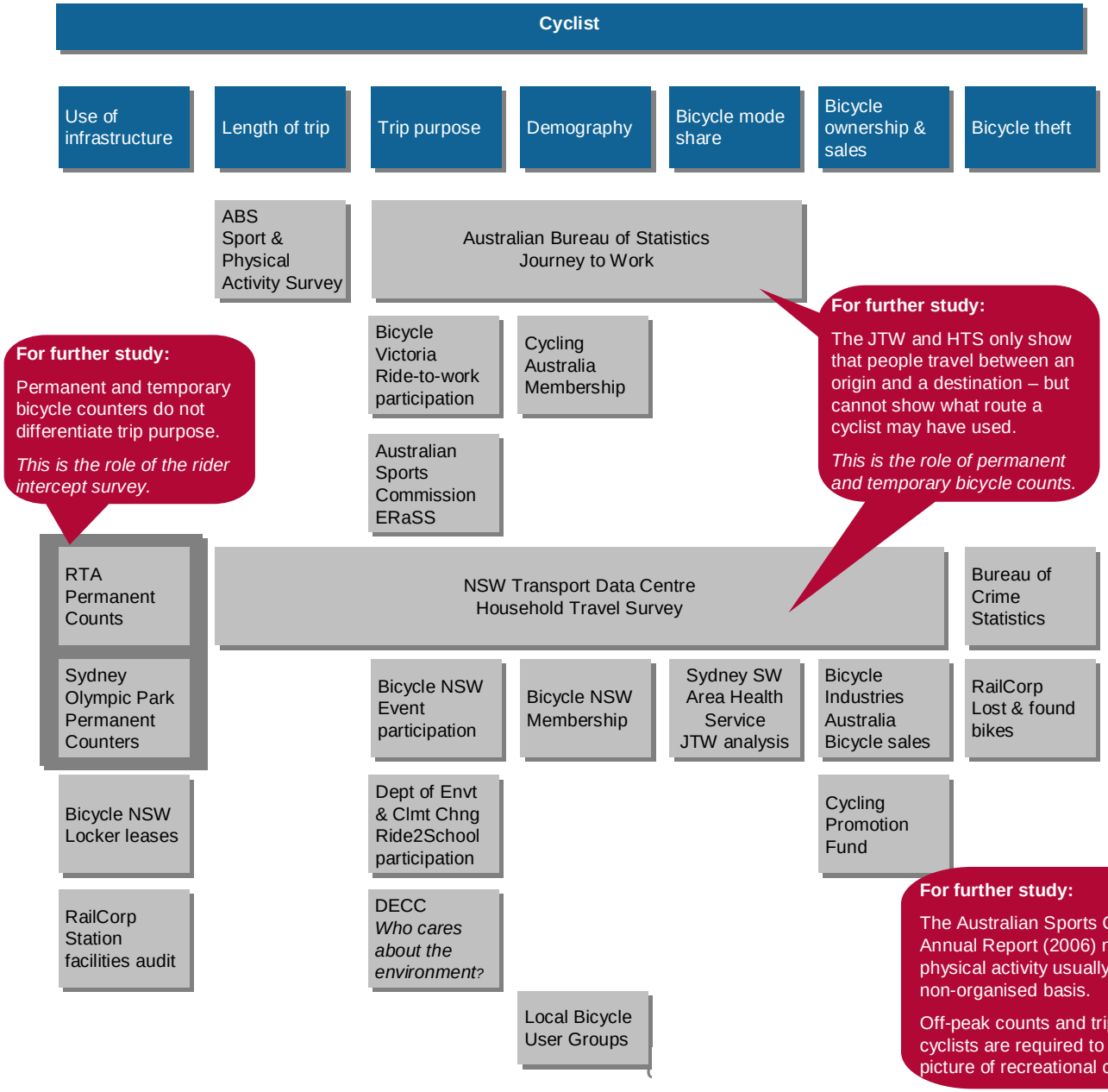
Routes may be classified by type of use, such as social, commuter or training / fitness.

Cyclists may also use a website to link up with other riders.

Relevant data sources:

The RTA "NSW Bicycle Guidelines" (2005) were developed to guide how bicycle network facilities should be delivered as part of the wider transport network. The guidelines are for use by road designers, engineers and planners and include on and off-road bicycle network facilities and recommendations for bicycle parking.

More comprehensive datasets are available on commuter cycling than recreational cycling



Detail

The nationwide benchmark figure on bicycle use is provided by the Census Journey to Work conducted every five years by the Australian Bureau of Statistics (ABS). The importance of this figure is due to the 100% sample size.

Reliability

ABS 2006 Census Journey to Work responses report very low use of cycling for NSW commuting trips (less than 1%). Between census years, there is a risk in relying on this small number of bicycle trips to describe cycling for the state.

The low rates of cycling are confirmed by the NSW Transport Data Centre Sydney Household Travel Survey which, even based on three years' worth of aggregate data, captures statistically small numbers of bike trips. To improve statistical reliability, other data sources must therefore be used to corroborate tentative statements about bicycle use based on the HTS.

Quality

Both the ABS and the Australian Sports Commission conduct national surveys of participation in sport for fitness or recreation. Both surveys return information about participation rates for cycling, although the small sample size means that the data is unable to be broken down further than the state level (i.e. to LGA level).

Ease of access

Datasets are stored in a number of different types of file formats and at varying levels of data processing sophistication.

For further study:

The Australian Sports Commission ERaSS Annual Report (2006) notes that cycling for physical activity usually occurs on an individual, non-organised basis.

Off-peak counts and trip intercept surveys of cyclists are required to further develop the picture of recreational cycling in NSW.

Worth noting:

Rates of major event participation and cycling organisation membership are sometimes used as a proxy for rates of recreational cycling.

This correlation should be drawn with care, given ERaSS findings that *most* recreational cycling occurs at an ad hoc and non-organised level.

Data quality issues for bicycle counters include reliability of data and detail

Point-based counters have been shown to provide the richest data source on bicycle infrastructure usage. Where regular counts are taken a weekly, seasonal and annual profile of cycling can be developed and analysed.

Three types of point-based counters have been used in NSW:

- Temporary point-based observations at intersections, conducted by teams of traffic counters during the peak period (example: City of Sydney)
- Permanent point-based counts on regional or other off-road bicycle infrastructure networks, recorded hourly by traffic counter machines and pneumatic tubes (example: RTA)
- Permanent point-based counts on off-road recreational bicycle facilities, recorded hourly by inductive loops and pressure counters (example: Sydney Olympic Park).

To date, technical barriers (eg separating out bicycles from a mixed traffic stream) have meant that automatic counters have not been used to gauge on-road cycling. This results in a gap in information on cycling for key routes, like the William Street or Broadway / George Street routes accessing Sydney CBD.

Crude data management, counter failures, vandalism, maintenance gaps and inconsistent file formats make comparisons across count locations difficult (see “About the data” at right).

About the data:

Persistently low values at count locations may signal a low-value location or inappropriate counter technology for the count purpose. For example, automatic counters originally designed to count motor vehicles may be sensitive to hilly locations or not differentiate bicycles from other vehicles.

Sample issues with permanent counter data from the Sydney Harbour Bridge cycleway:

The starting time of the counter was inconsistent. In some files the peaks were found to occur at unusual times (e.g. 2.37 am).

The counter classified vehicles on the bicycle-only facility as Class 5, 8 and 9 vehicles (i.e. not bicycles).

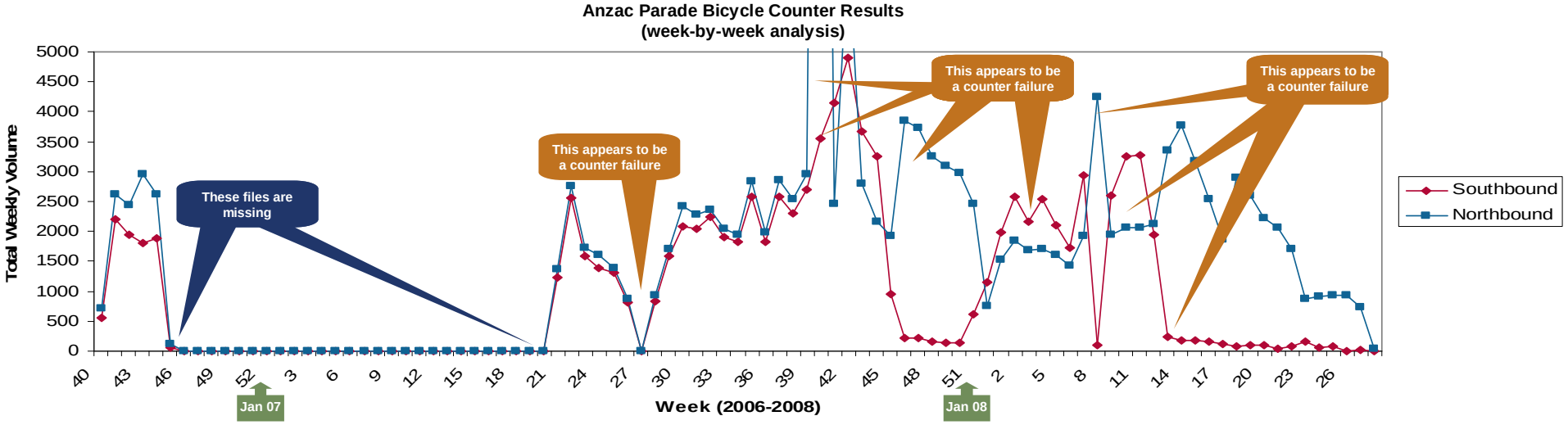
There are a number of missing files in 2004, 2005 and 2006. The counters were removed in 2007 due to fence installation.

Sample issues with permanent counter data from the Iron Cove Bridge cycleway:

The starting time of the counter was inconsistent. In some files the peaks were found to occur at unusual times (e.g. 2.31 am).

The reasons for obvious counter failure are unknown, e.g. where files show zero counts during several weeks over the summer.

There are a number of missing files in 2004, 2005, 2006 and 2007.



When more than one dataset is used injury data may be both under-reported *and* double-counted

A useful 'device' for describing data on cycling injuries and fatalities is the "injury iceberg" (see right). Several factors affect injury data, resulting in the potential for both double-counting and under-reporting.

The variety of agencies and stakeholders tracking this type of data contributes to the problem. Data "cleaning", for compliance with privacy laws, creates the potential for the same cyclist injury to be counted three times, by:

RTA Traffic Accident Database System (TADS)

This database tracks 100% of cyclist fatalities as well as "pedal cycle" crashes resulting in at least $500 worth of damage and the involvement of the NSW Police. Raw data was provided in three files the "crash record," the "casualty record" and the "traffic unit record."

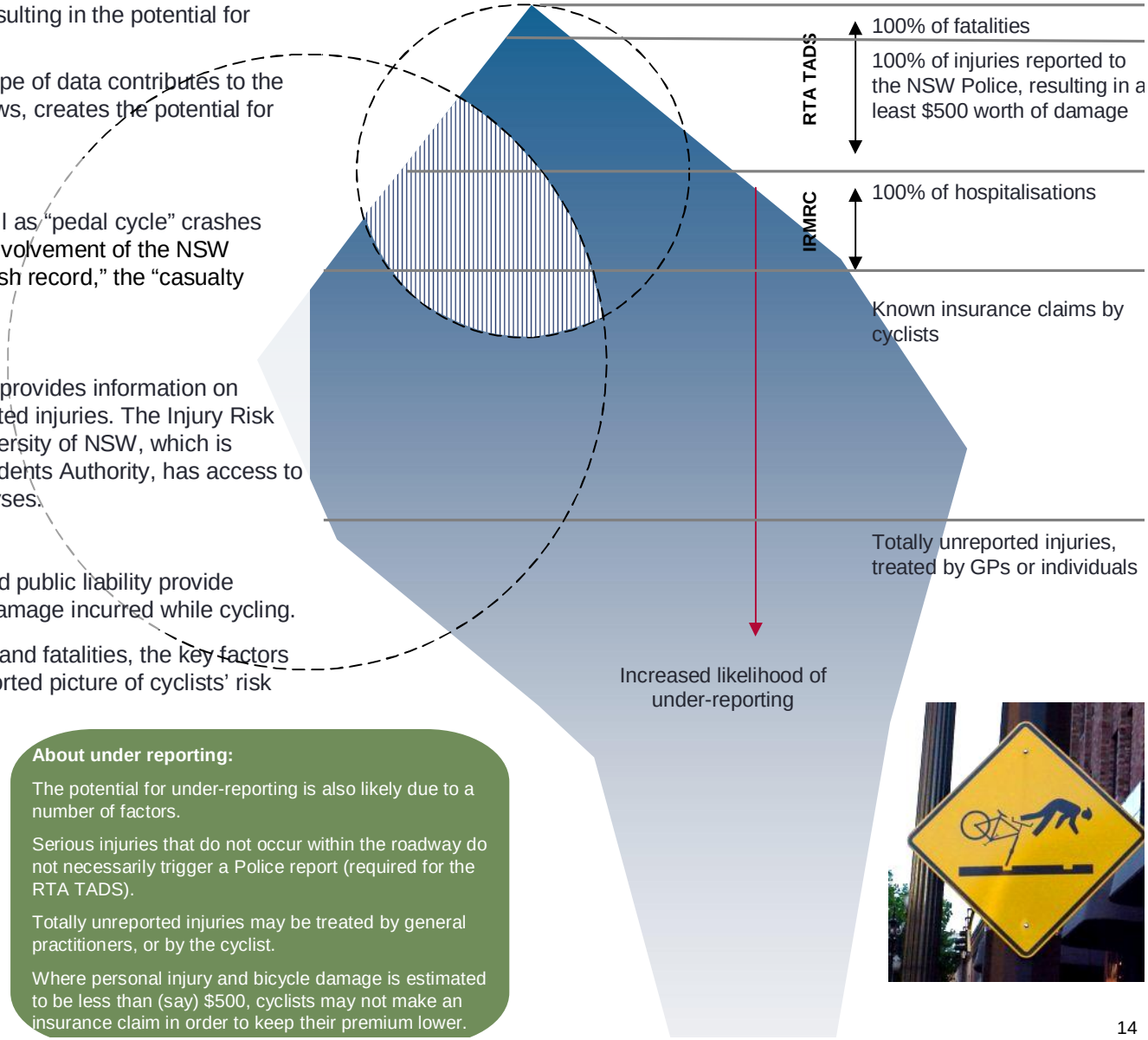
NSW Health data collection

NSW Health collects hospital separation data which provides information on hospital stays related to injury, including cycling-related injuries. The Injury Risk Management Research Centre (IRMRC) at the University of NSW, which is funded by NSW Health, the RTA and the Motor Accidents Authority, has access to this data collection in order to conduct detailed analyses.

Insurance claims

Insurance industry records about property claims and public liability provide another source of data about injuries and property damage incurred while cycling.

Double-counting and under-reporting the rate of injuries and fatalities, the key factors used to establish "cyclist exposure", may result in a distorted picture of cyclists' risk of injury or death.



About double-counting:

The potential for double-counting injuries across separate datasets is high.

The RTA provided individual crash records for this project.

The aggregation of supplied hospitalisation data (i.e. there was no unique crash identifier) means that accidents that reported in the RTA TADS may have been counted a second time.

Crashes resulting in at least $500 (a trigger for RTA TADS inclusion) may also have resulted in an insurance claim, although some insurance claims may have been for property damage or loss only.

About under reporting:

The potential for under-reporting is also likely due to a number of factors.

Serious injuries that do not occur within the roadway do not necessarily trigger a Police report (required for the RTA TADS).

Totally unreported injuries may be treated by general practitioners, or by the cyclist.

Where personal injury and bicycle damage is estimated to be less than (say) $500, cyclists may not make an insurance claim in order to keep their premium lower.

The extent and quality of cycling data collected by local councils varies across NSW

Local government plays an important role in implementing bicycle policy, frequently partnering with state government agencies to deliver bicycle infrastructure.

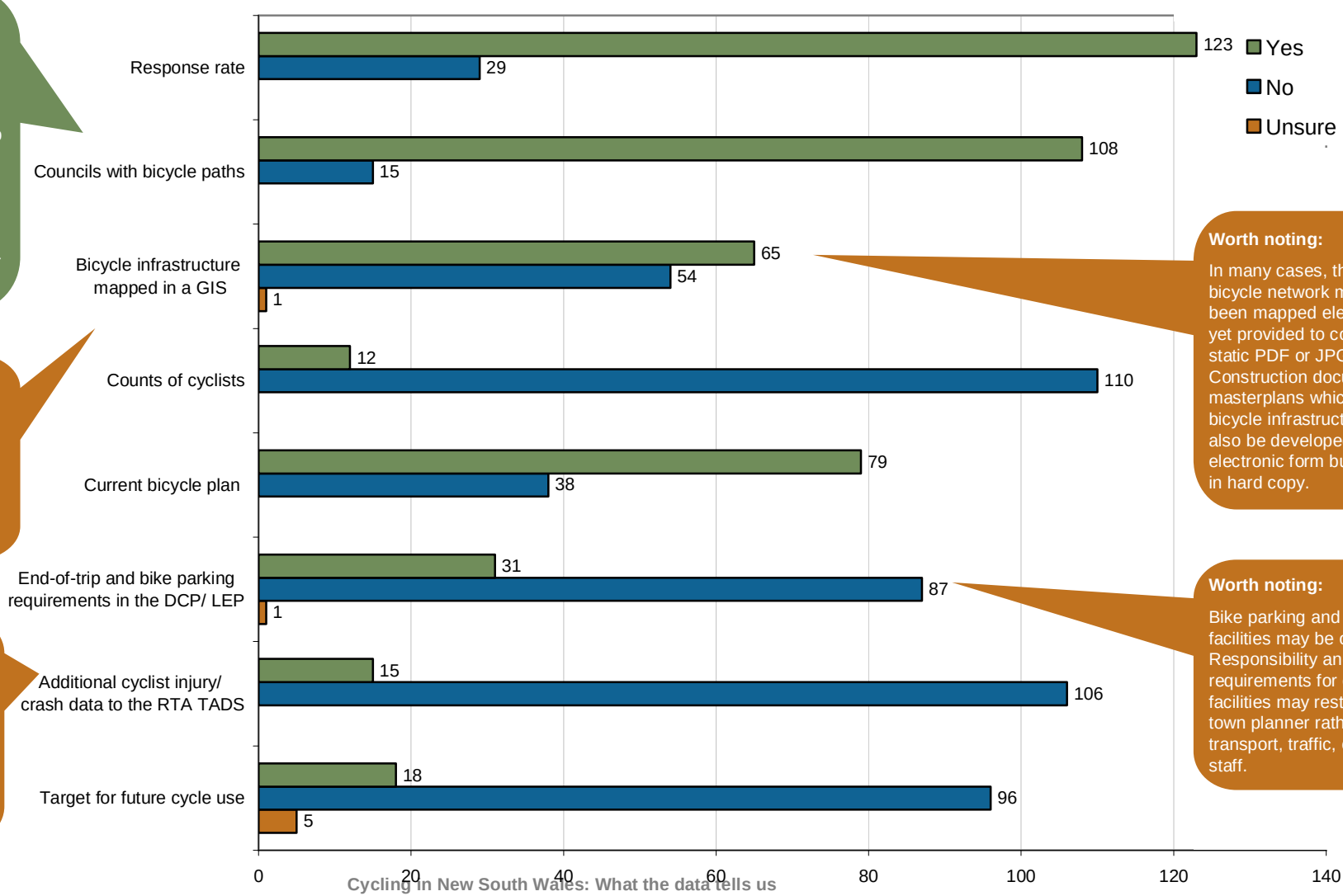
A telephone survey of all NSW local councils (152) was used to develop a picture of bicycle usage data held by councils.

About the data:

The survey transcripts, bicycle counts and local bicycle plans collected during this survey are in the attached electronic library in Appendix D.

About the data:

Each local council has a different way of delegating responsibility for the council bikeplan, cycleway construction, counts of cyclists and end-of-trip facilities. In inner Sydney councils, several staff members may look after these cycling responsibilities. At regional and rural councils all cycling matters may fall to the traffic engineer or town planner.



Worth noting:

Bicycle infrastructure plans are sometimes embedded in Pedestrian Access and Mobility Studies (PAMPs) or Transport Management and Accessibility Plans (TMAPs) as “shared paths” or “shared facilities”.

Worth noting:

In many cases, the LGA bicycle network may have been mapped electronically yet provided to council in a static PDF or JPG format. Construction documents and masterplans which include bicycle infrastructure may also be developed in electronic form but approved in hard copy.

Worth noting:

Most accident information used by councils comes out of the RTA TADS. Additional crash data may be related to non-road cycling (i.e. mountain bike injuries on fire trails or bike-pedestrian crashes on off-road shared-paths)

Worth noting:

Bike parking and end-of-trip facilities may be optional. Responsibility and requirements for end-of-trip facilities may rest with the town planner rather than transport, traffic, or parks staff.

More, and better, data collection and management are needed to bring NSW up to national standards

There are numerous sources of information available for the analysis of NSW bicycle usage undertaken for this study. However, inconsistencies between datasets and an incomplete picture of local cycling infrastructure mean that direct comparisons between datasets is hard to establish for the purposes of this report.

The following summary of datasets should be taken into account when future cycling data collection and analysis activities are commissioned in NSW.

Issues:

- A lack of non-organised recreational cycling data results in an incomplete picture of bicycle use for recreation and fitness.
- Irregular data collection can distort the picture of bicycle use and make it harder to complete an annual or seasonal analysis of datasets.
- Inconsistent formatting and file types prevent comparison of datasets.
- Only counting bicycle use of off-road facilities results in an incomplete picture of cycling, missing on-road cyclists.
- The level of detail collected by diverse bicycle stakeholders prevents comparison between datasets.
- The Journey to Work question in the ABS Census recorded a small number of bicycle-only commute trips in NSW in 2006.
- The NSW Household Travel Survey records a small number of bicycle trips for other purposes.
- The number of bicycle lockers leased at transport interchanges and of bicycles secured to racks at stations or elsewhere seems to indicate that more people are cycling in combination with one other mode than captured in the ABS Census or the NSW HTS.

Key Findings:

- Improved cycling data management practices would bring NSW up to the national standards proposed in the Australian Bicycle Council "Cycling Data and Indicator Guidelines" (2000).
- Improved practices encompass standardising, maintaining and updating cycling datasets regularly and by uploading spatially referenced data to a publicly available NSW Cycling Geodatabase.
- The most effective bicycle infrastructure funding decisions are informed by high-quality surveying and counting of cycling outcomes. This includes before and after point counts, accident trend analysis (network) and audits of usage at end-of-trip facilities.
- Standardising end-of-trip requirements and descriptive terminology assists consistent planning.

Key findings regarding RTA bicycle counters:

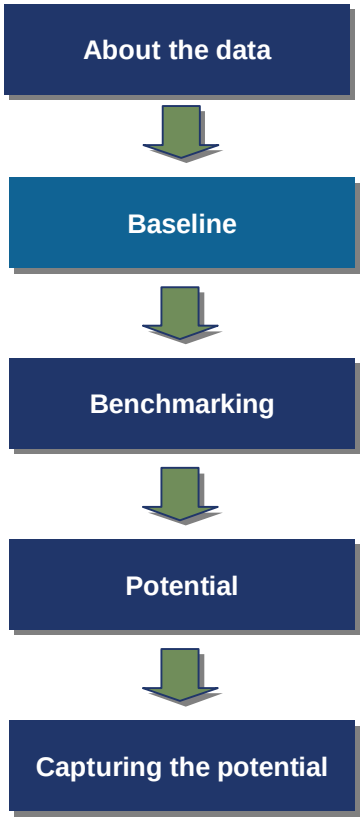
- New technological developments offer increasingly reliable bike counters for RTA consideration and possible use.
- These include counters that are able to "see" cyclists in mixed traffic (e.g. inbound traffic to Sydney CBD via Broadway / George Street, or to Bondi Junction via Bronte Road).
- Frequent checking of all counters' status, and reviewing data for errors shortly after its collection, would identify failures early, help spot data gaps, and provide guidance on relocating counters if necessary (e.g. to avoid persistent vandalism).
- Tracking extraneous factors (i.e. weather and special events) would help prevent attributing days when no cycling has been recorded to counter failure.
- Mapping exact counter locations would speed up identification and maintenance, and decisions on moving temporary point-based counters.

About the data:

In some instances, cycling data was released for the purposes of this study *only*.

Section 2: NSW cycling baseline

Who is cycling in NSW (and where)?



Bicycle ownership is higher than bicycle usage figures would suggest.

Cycling accounts for a small proportion of NSW commute trips.

Cycling decreased in suburban Sydney while the highest growth was in inner urban areas.

In the 2006 ABS Census cycling accounted for under 0.8% of all journeys to work across NSW

The local councils with the highest levels of cycling on the last ABS Census day in August 2006 showed over 750 people cycling to work from each LGA.

The Household Travel Survey provides some insight into the size and mode share of non-commuter travel by bicycle.

Rail stations with a more frequent and direct CBD service have a higher bicycle parking demand.

Women cycle less often then men.

3% of all road casualties across NSW involved cyclists in 2006, and there are defined geographic clusters of such casualties.

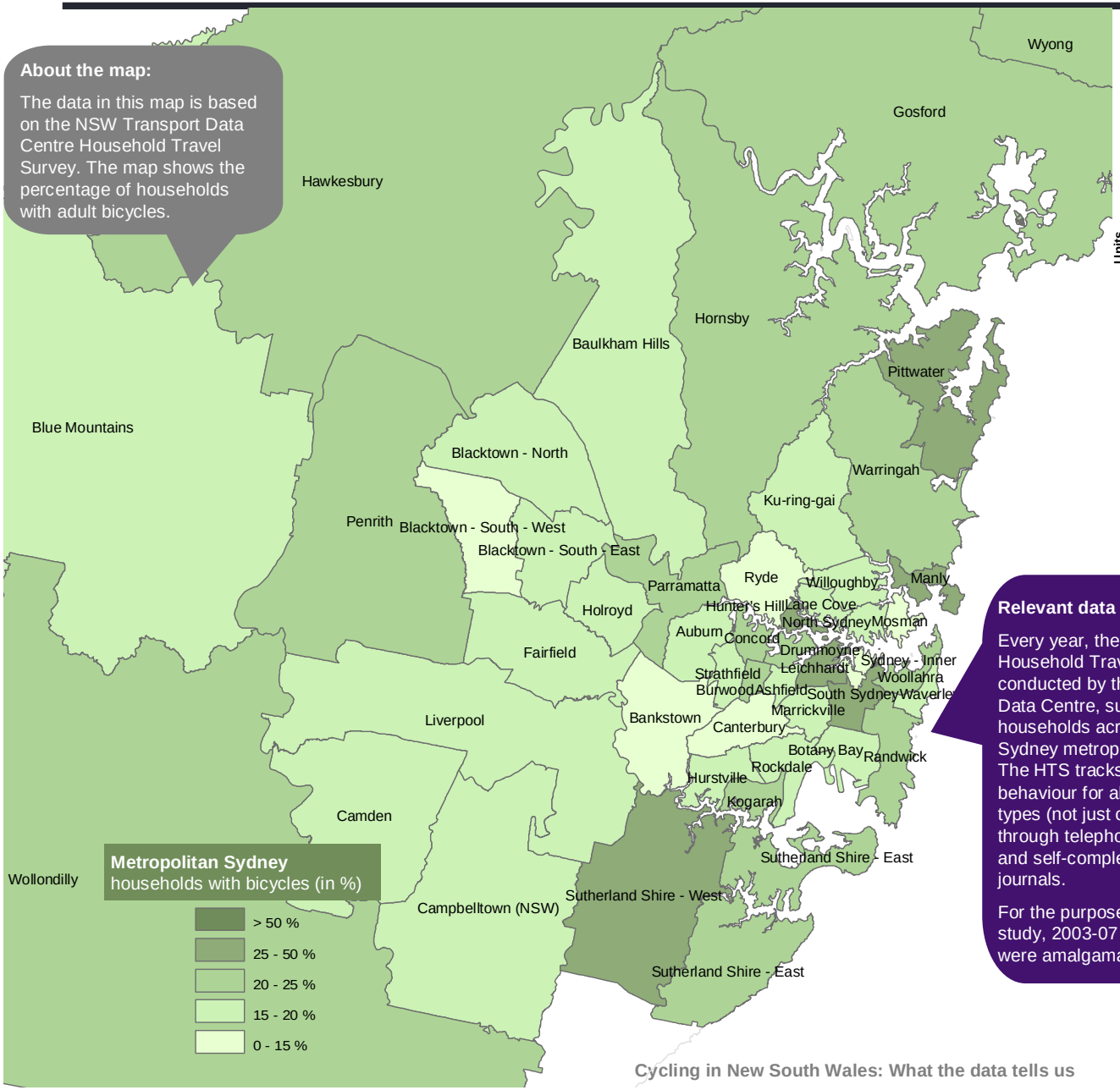
Most cycling injuries occur within the cyclist's LGA of residence.

The most common gender and age profile for a cyclist in a NSW crash is a teenage male.

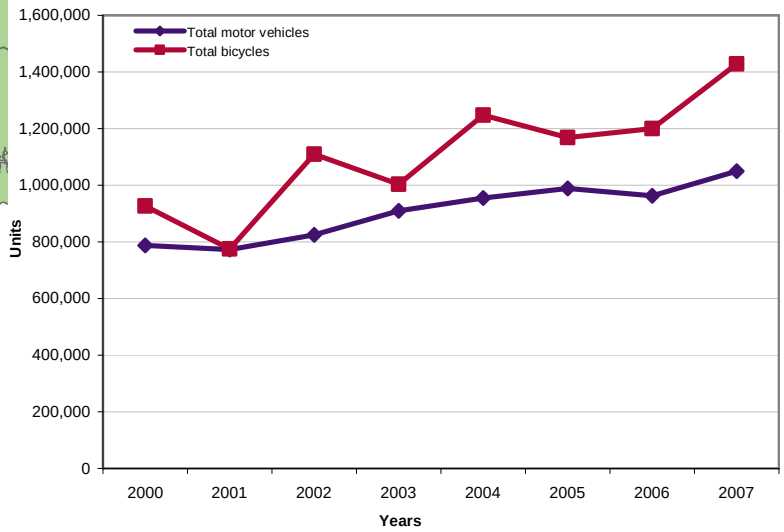
Bicycle infringements peak after school hours.

Bicycles are stolen most often from homes.

Bicycle ownership in Sydney is higher than bicycle usage figures would suggest



Australian bicycle and motor vehicle sales 2001-2007



Relevant data sources:

Every year, the Sydney Household Travel Survey, conducted by the Transport Data Centre, surveys 3,000 households across the Sydney metropolitan region. The HTS tracks travel behaviour for all journey types (not just commuting) through telephone survey and self-completed travel journals.

For the purposes of this study, 2003-07 responses were amalgamated.

Relevant data sources:

Bicycle Industries Australia data provided by the Cycling Promotion Fund, September 2008. This does includes adult and children bicycle sales but not the sales of 'high-end' bicycles.

Worth noting:

The HTS reveals very low rates of cycling across the Sydney region.

With just 648 records of cycling trips across the many thousands of trips analysed, it is impossible to establish statistically significant patterns from these few records (except that rates of cycling are low per se).

The value of the HTS is that, as well as confirming the low numbers of commuter cycling trips reported by the 2006 ABS Census, it identifies low rates of cycling for non-work trips.

The HTS further identifies that many more households own bicycles than use them, indicating a strong potential market for targeted investment in bicycle infrastructure, bike parking and cycling encouragement programs.

Cycling accounts for a small proportion of commuter trips in NSW

Bicycle-only trips accounted for less than 0.8% of NSW Journey to Work trips on Census day in August 2006. This meant 19,274 trips out of more than 2.4 million people who reported travelling to work.

Where bicycle-only *and* bicycle-plus-another mode trips were reported (22,161 trips):

- bicycle-only: 87% of bicycle trips
- bicycle plus one other mode: 11% of bicycle trips
- bicycle plus two other modes: 2% of bicycle trips

Multi-modal journeys

Of 107,486 trips where more than one mode was reported, cycling accounted for 2,887 trips. Cycling accounted for 2.7% of trips where more than one mode was reported.

Total Bicycle Usage for JTW	
Bicycle only	19,274
Bicycle + 1 other mode	2,444
Bicycle + 2 other modes	443
Total	**22,161**

Worth noting:

Where a bicycle is used for the journey to work, NSW commuters use the bicycle for the whole trip, rather than in combination with another mode.

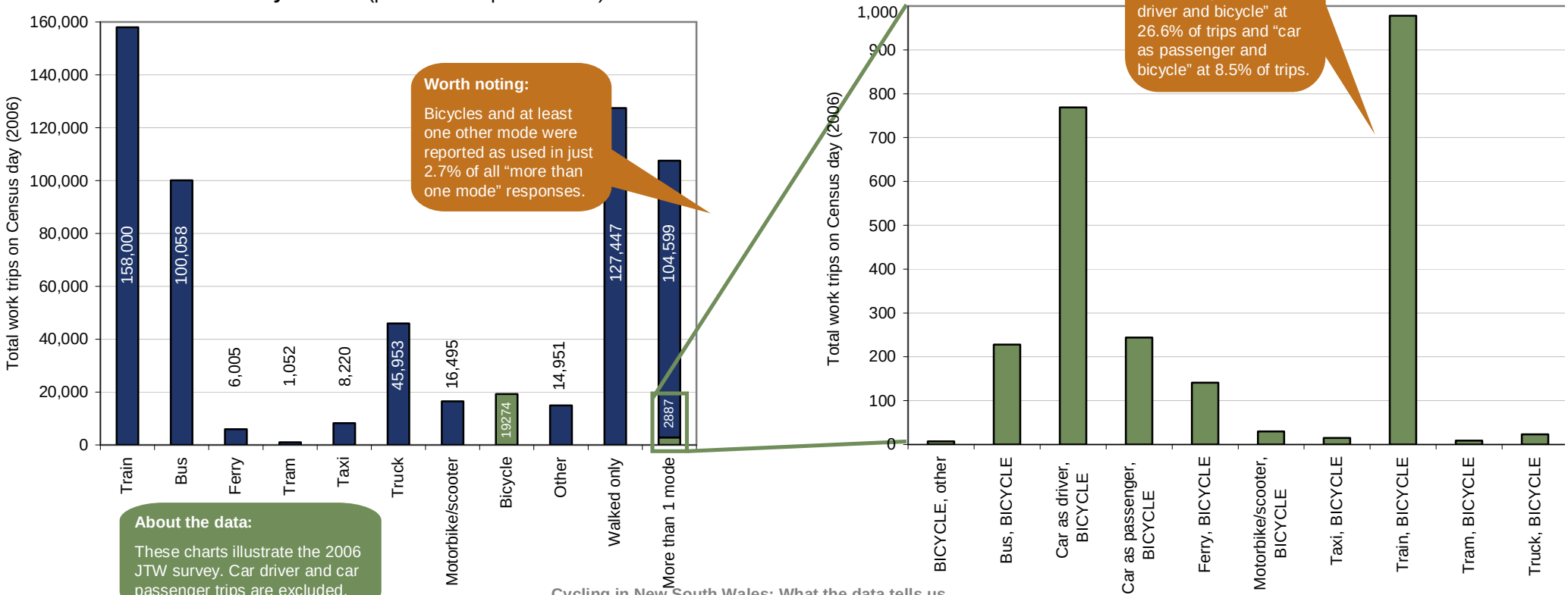
Worth noting:

33.9% of bicycle + one other mode were "train and bicycle" trips, followed by "car as driver and bicycle" at 26.6% of trips and "car as passenger and bicycle" at 8.5% of trips.

Relevant reports:

Australian Bureau of Statistics, 2006 Census Journey to Work

Journey to work (private car trips excluded)



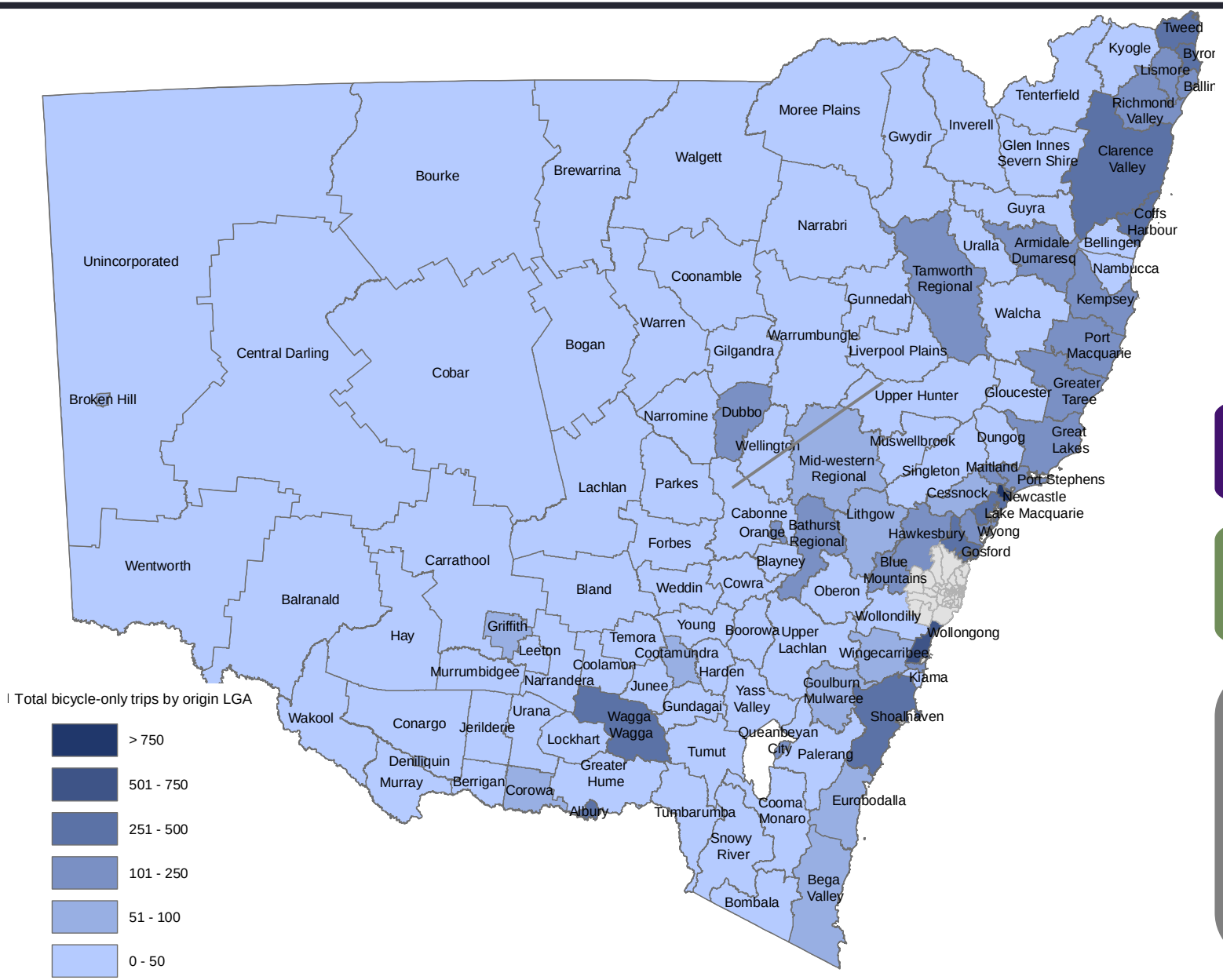
Worth noting:

Bicycles and at least one other mode were reported as used in just 2.7% of all "more than one mode" responses.

About the data:

These charts illustrate the 2006 JTW survey. Car driver and car passenger trips are excluded.

The LGAs with the highest levels of cycling to work in NSW are in inner Sydney and Newcastle



Worth noting:

More bicycle trips were reported in coastal LGAs and metropolitan Sydney.

Relevant data sources:

Australian Bureau of Statistics (ABS), 2006 Census Journey to Work, by Origin LGA.

About the data:

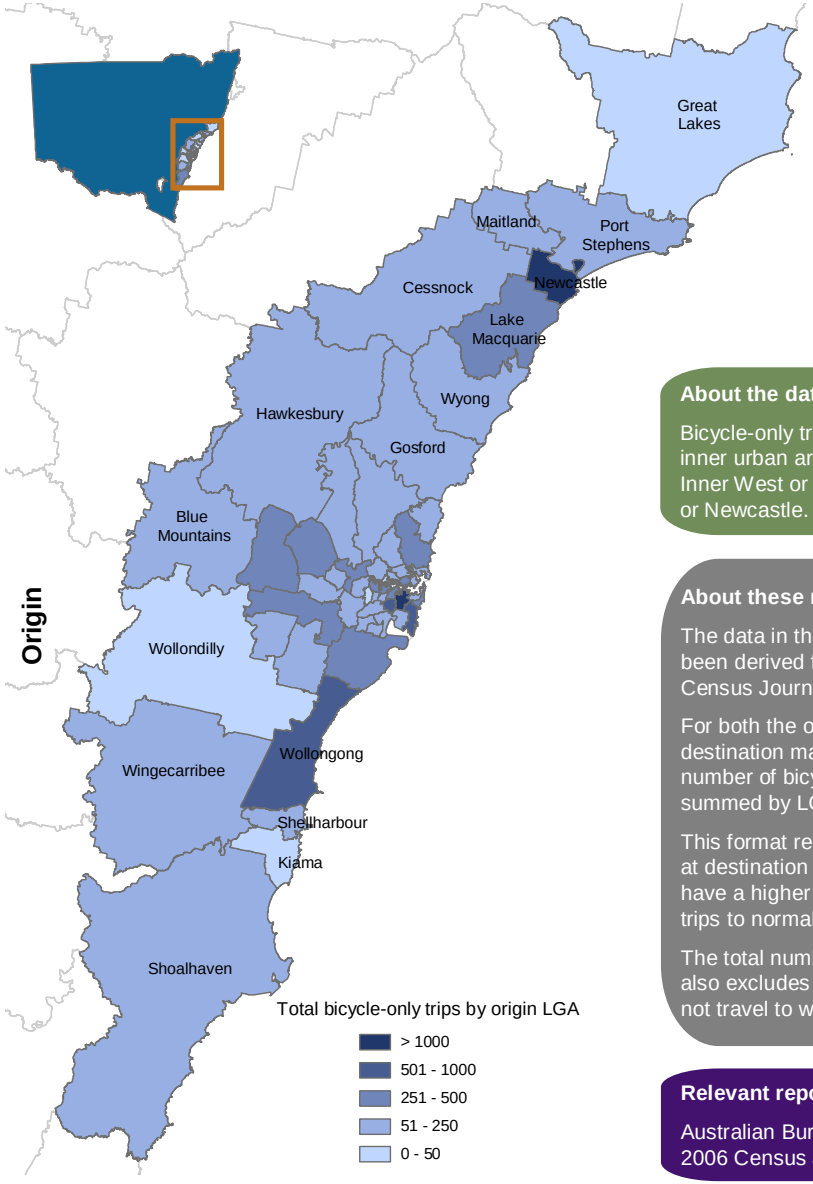
On Census day the highest-performing LGAs recorded over 750 bicycle trips commuting from homes in that LGA.

About these maps:

The data used to generate this map was sourced from the 2006 ABS census data. It is the number of persons per LGA who reported that their method of travel to work was 'One method: Bicycle.'

Other than Sydney, maps show absolute cycle trips rather than a rate of usage in order to highlight what are small numerical differences between LGAs.

Australian commuter cycling data is available by both journey origin and destination



About the data:

Bicycle-only trips originate in inner urban areas, like Sydney's Inner West or Eastern Suburbs, or Newcastle.

About these maps:

The data in these maps has been derived from the 2006 Census Journey to Work 2006.

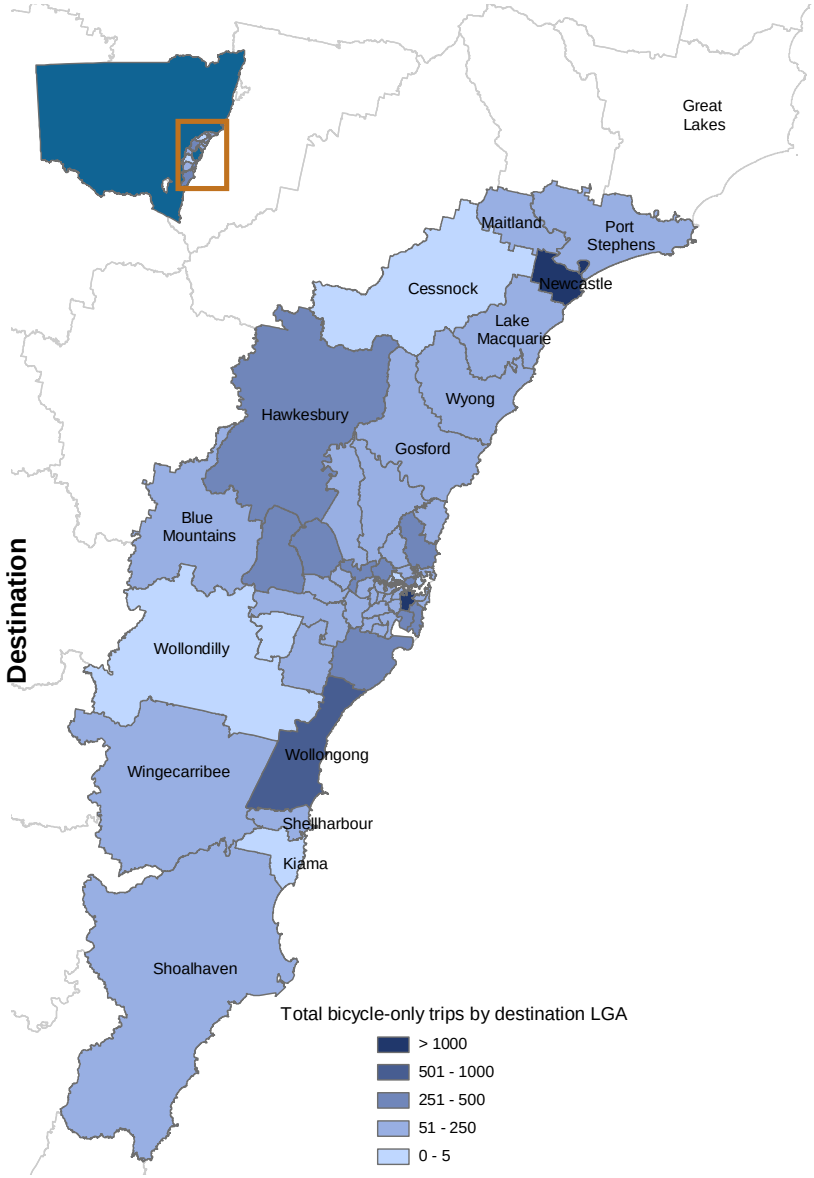
For both the origin and destination maps, the raw number of bicycle trips were summed by LGA

This format reduces distortion at destination centres which have a higher total number of trips to normalise by.

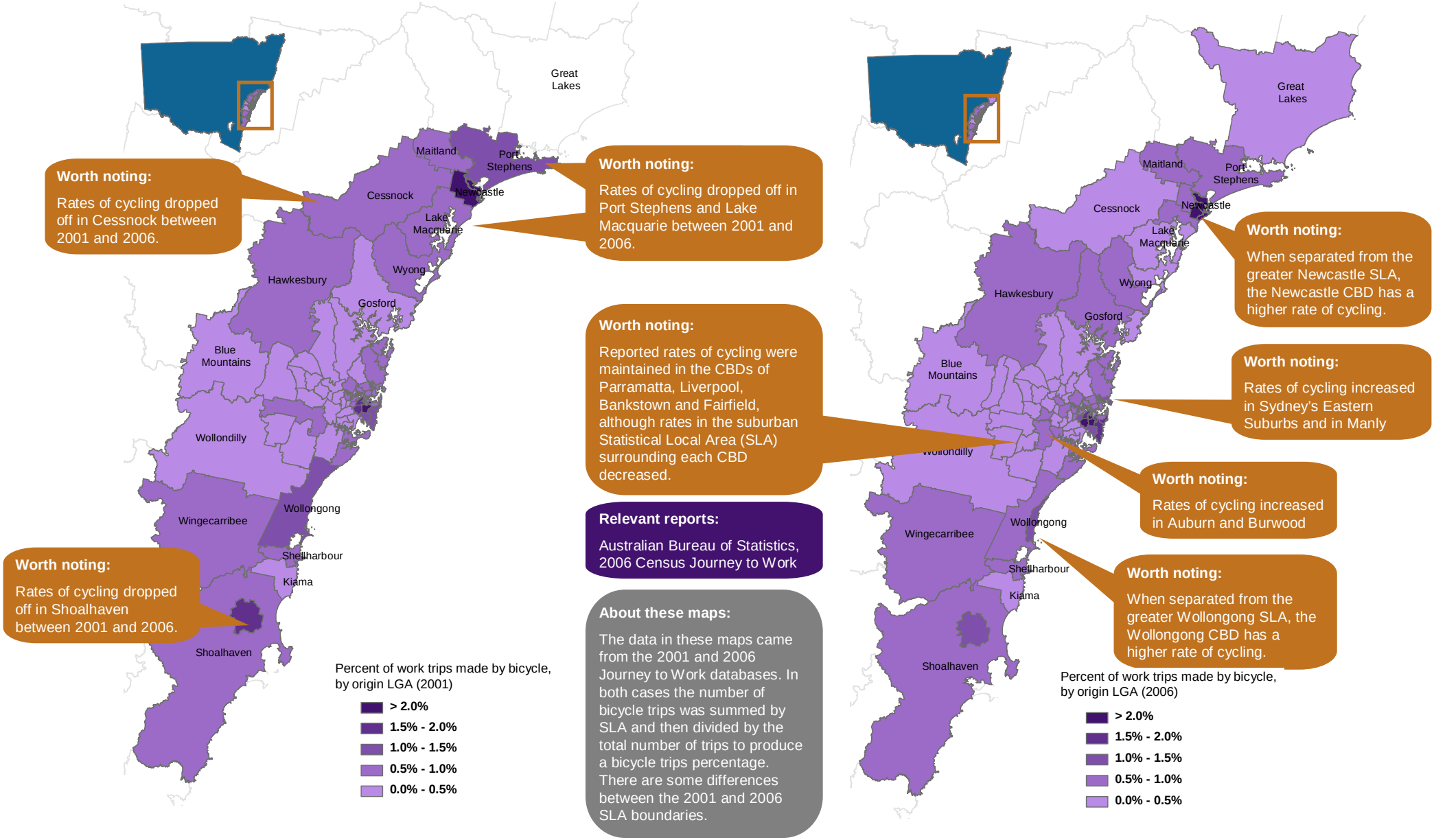
The total number of trips format also excludes people who did not travel to work that day.

Relevant reports:

Australian Bureau of Statistics, 2006 Census Journey to Work



Between 2001 and 2006, cycling to work increased in parts of Sydney: the highest growth was in inner areas



Worth noting:

Rates of cycling dropped off in Cessnock between 2001 and 2006.

Worth noting:

Rates of cycling dropped off in Port Stephens and Lake Macquarie between 2001 and 2006.

Worth noting:

Reported rates of cycling were maintained in the CBDs of Parramatta, Liverpool, Bankstown and Fairfield, although rates in the suburban Statistical Local Area (SLA) surrounding each CBD decreased.

Relevant reports:

Australian Bureau of Statistics, 2006 Census Journey to Work

About these maps:

The data in these maps came from the 2001 and 2006 Journey to Work databases. In both cases the number of bicycle trips was summed by SLA and then divided by the total number of trips to produce a bicycle trips percentage. There are some differences between the 2001 and 2006 SLA boundaries.

Worth noting:

When separated from the greater Newcastle SLA, the Newcastle CBD has a higher rate of cycling.

Worth noting:

Rates of cycling increased in Sydney's Eastern Suburbs and in Manly

Worth noting:

Rates of cycling increased in Auburn and Burwood

Worth noting:

When separated from the greater Wollongong SLA, the Wollongong CBD has a higher rate of cycling.

Worth noting:

Rates of cycling dropped off in Shoalhaven between 2001 and 2006.

The Sydney Household Travel Survey provides some insight into non-commute travel patterns

Commuting represents only a small proportion of overall trips

- The Household Travel Survey (HTS) indicates that 84% of all trips are for non-commuting purposes

Regardless of trip purpose, most trips involving cycling are less than 5 kilometres

- 50% of all trips are less than 5 kilometres
- 71% of trips involving cycling are less than 5 kilometres

Although bicycles are used for a small portion of all trips, they are used more often for work trips than non-work trips.

For trips shorter than 5 kilometres:

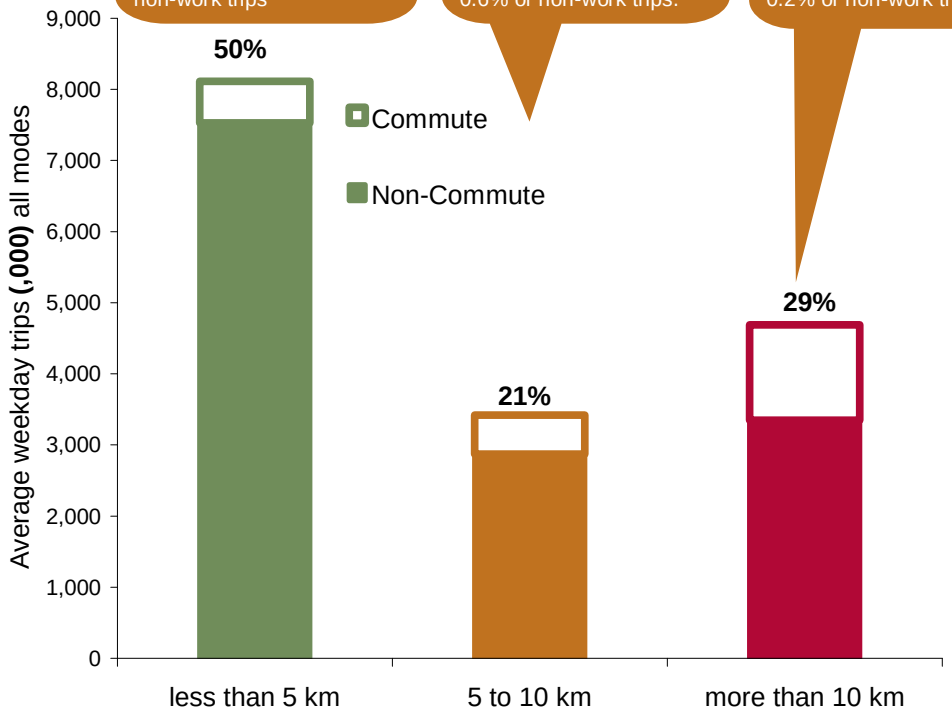
Cycling represents 1.6% of commuter trips and 0.9% of non-work trips

For trips between 5 and 10 kilometres:

Cycling represents 1.3% of commuter trips and 0.6% of non-work trips.

For trips greater than 10 kilometres:

Cycling represents 0.1% of commuter trips and 0.2% of non-work trips



Cycle mode shares are much lower for non-commuting purposes than for commuting on a weekday.

On a weekend, cycle mode share is much higher for short trips. These may be trips undertaken by those who commute by bicycle during the week.

The HTS data shows that as many as 5% of trips using bicycle also use ferry or train on part of the journey. Although sample sizes are small, indications are that the majority of these "linked" cycle trips use the train.

Worth noting:

This reported rate of cycling in conjunction with one other mode (5%) is twice the reported rate from the 2006 Census Journey to Work.

About the data:

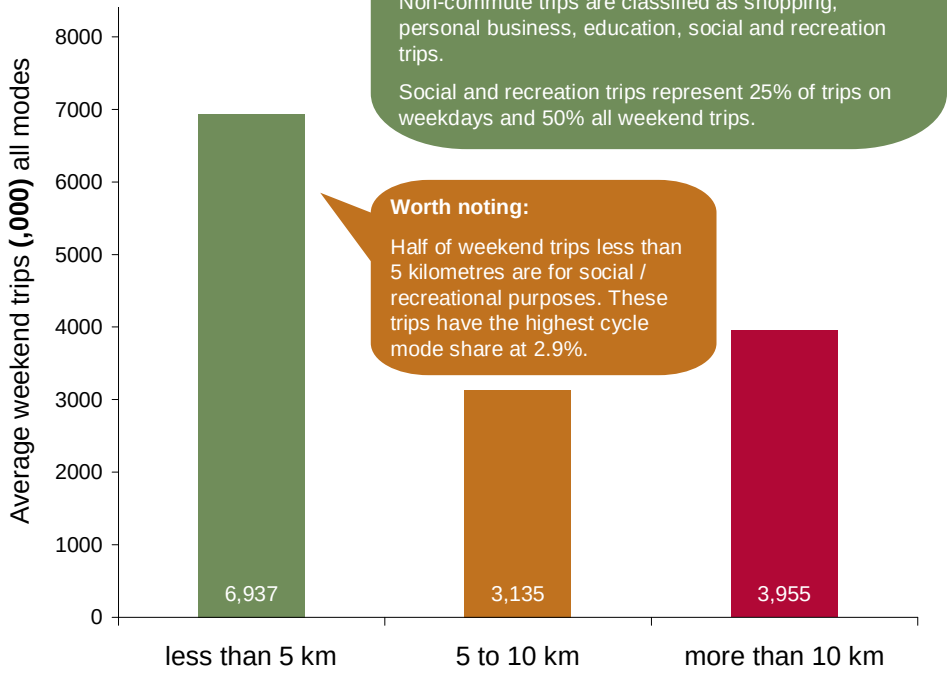
For the Household Travel Survey, the NSW Transport Data Centre (TDC) collects data on all trips – but sample sizes are too small to allow any meaningful spatial analysis.

Non-commute trips are classified as shopping, personal business, education, social and recreation trips.

Social and recreation trips represent 25% of trips on weekdays and 50% all weekend trips.

Worth noting:

Half of weekend trips less than 5 kilometres are for social / recreational purposes. These trips have the highest cycle mode share at 2.9%.



“Bike-and-ride” appears to be more popular in outer areas of Sydney

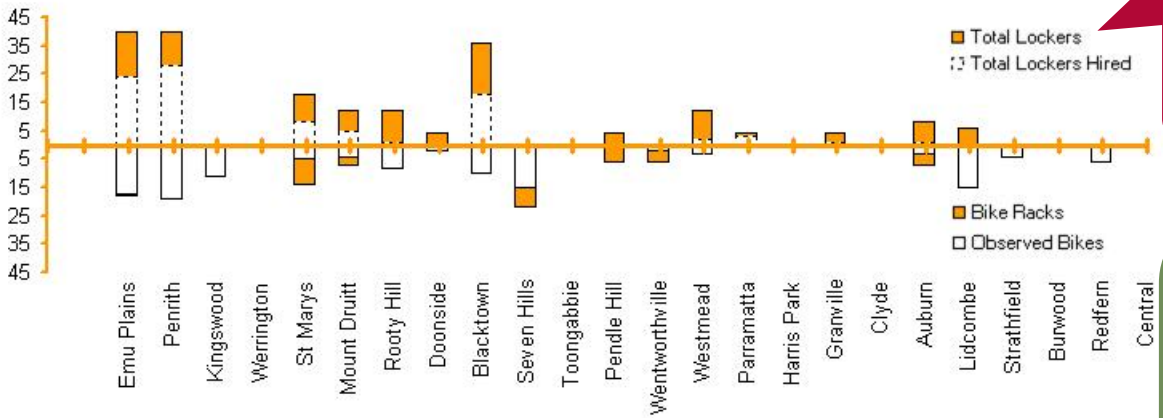
Relevant data sources:

Bicycle NSW leases lockers at transport interchanges on behalf of the Ministry of Transport. Information on leased and total lockers was received in September 2008.

Relevant data sources:

In May 2008 RailCorp conducted a preliminary audit of station area facilities, including bicycle racks and their occupancy rate.

Western Line to Emu Plains



For further study:

As a cautionary note, though a locker may be leased, it may not be in active use. All figures on this page should be used with caution.

About the data:

The line-by-line analysis of CityRail stations’ bicycle parking supply and audited demand is contained in Appendix B.

As a cautionary note, for the purposes of the RailCorp study from which this data is drawn, motorcycles and scooters were included in the audit under “bicycles”.

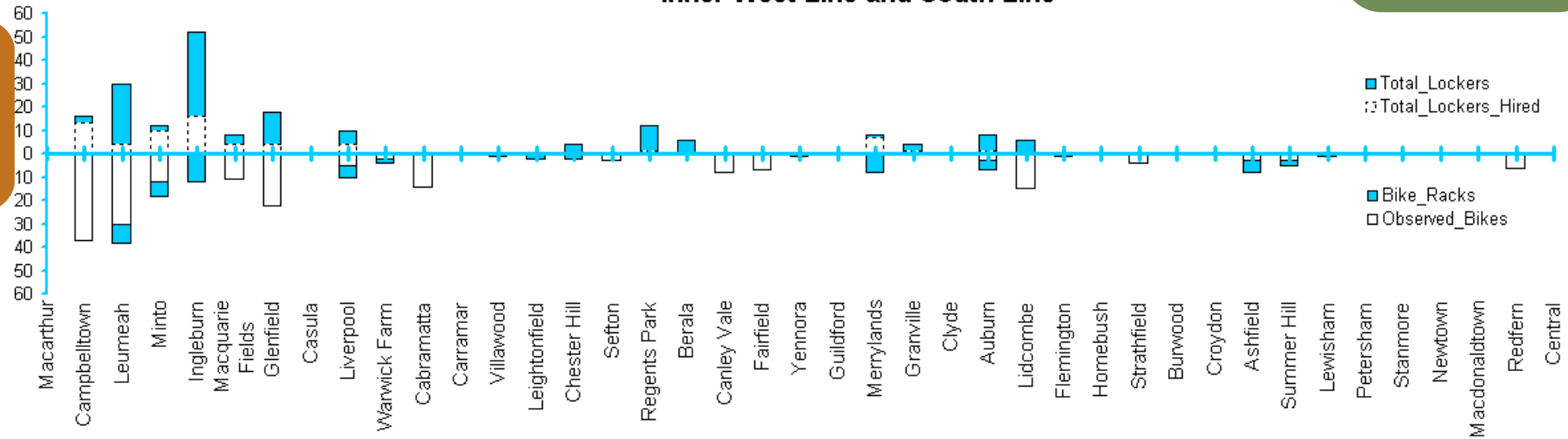
Worth noting:

The highest number of lockers leased was 16 at Ingleburn Station.

Inner West Line and South Line

Worth noting:

The highest number of observed parked bicycles was 37 bicycles at Campbelltown Station.



Women represent only 16% of commuter cyclists in NSW

About the data:

Whether it's the City of Sydney Spring Cycle or the journey to work, women cycle less often than men. The map at right shows registrations by LGA in the 2007 City of Sydney Spring Cycle. The red parts of the pie charts show female participants. In just a few LGAs did female registrations outnumber male registrations.

Worth noting:

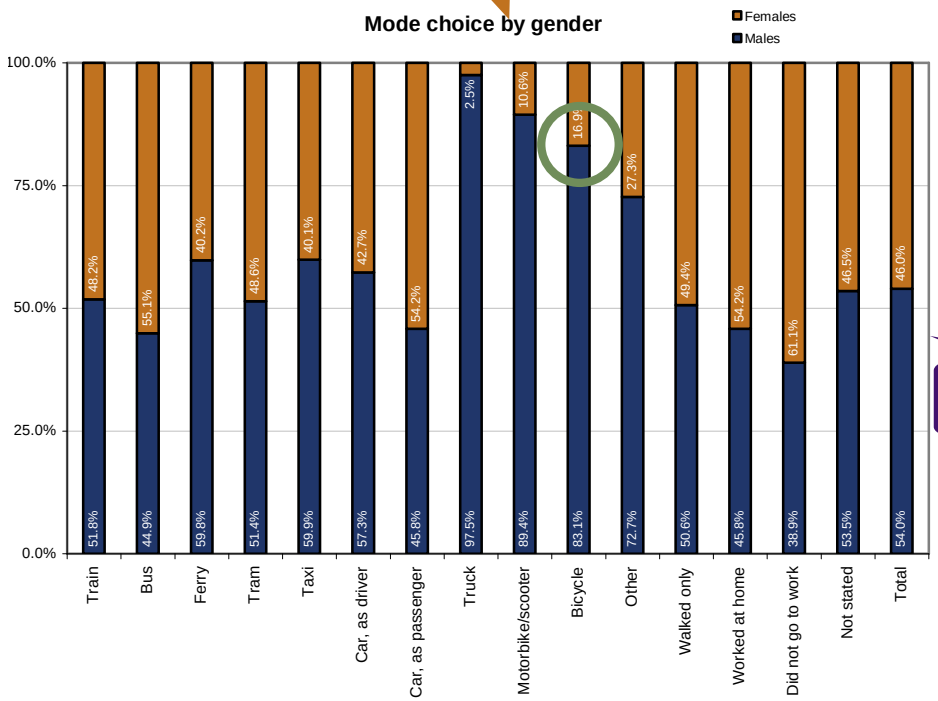
Less women cycle.

After trips by truck (97.5% of trips made by men) and trips by motorbike / scooter (89.4% of trips made by men), cycling for the journey to work was the third most differentiated mode by gender, where men accounted for most bicycle trips (83.1%) and women made just 16.9% of reported bicycle trips.

Worth noting:

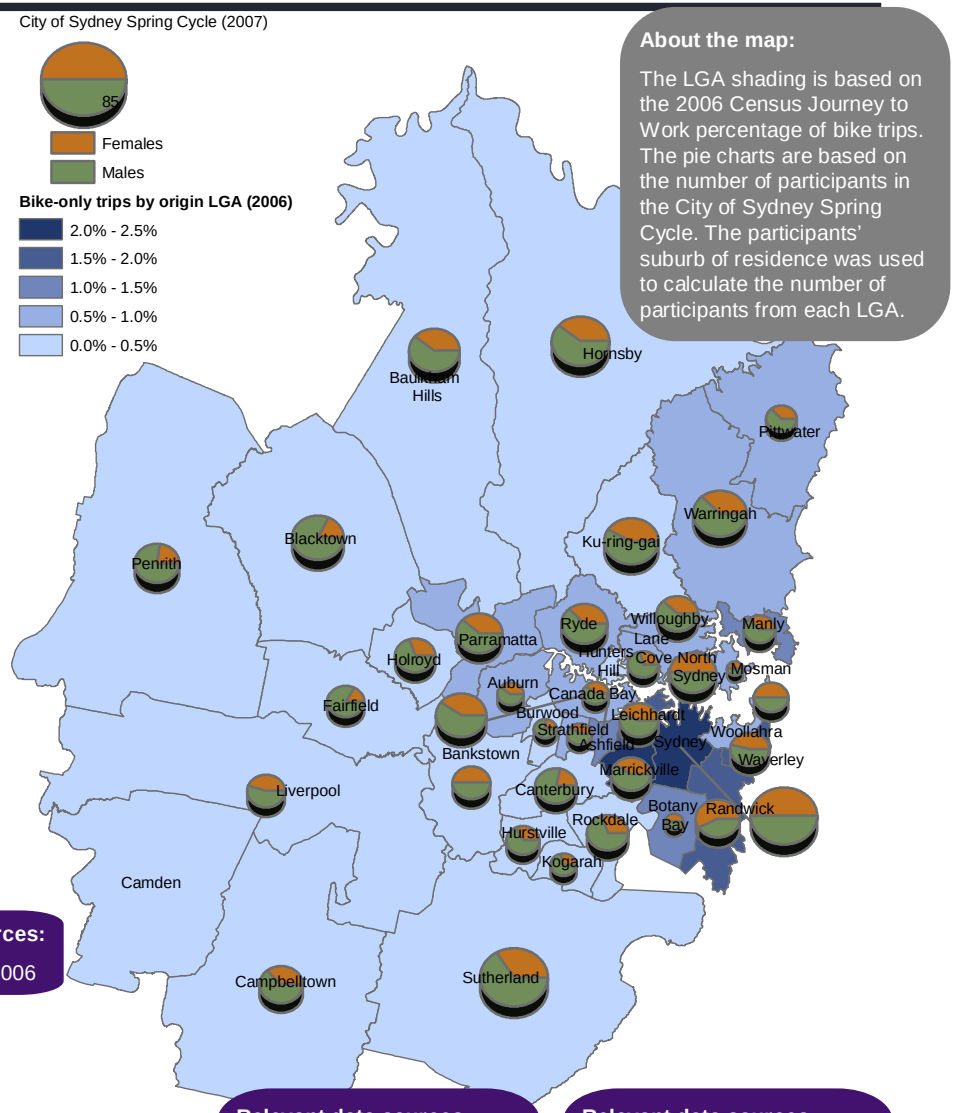
Recognising that women participate in cycling less than men, Bicycle NSW developed the two-part "Gear up Girl" series that included in 2007/08 a November Saturday seminar and a March "fun ride" from Cronulla to Sydney Olympic Park.

The workshop aimed to reduce barriers to women cycling, by teaching basic bike maintenance and safe cycling skills.



Relevant data sources:

ABS Census JTW 2006



About the map:

The LGA shading is based on the 2006 Census Journey to Work percentage of bike trips. The pie charts are based on the number of participants in the City of Sydney Spring Cycle. The participants' suburb of residence was used to calculate the number of participants from each LGA.

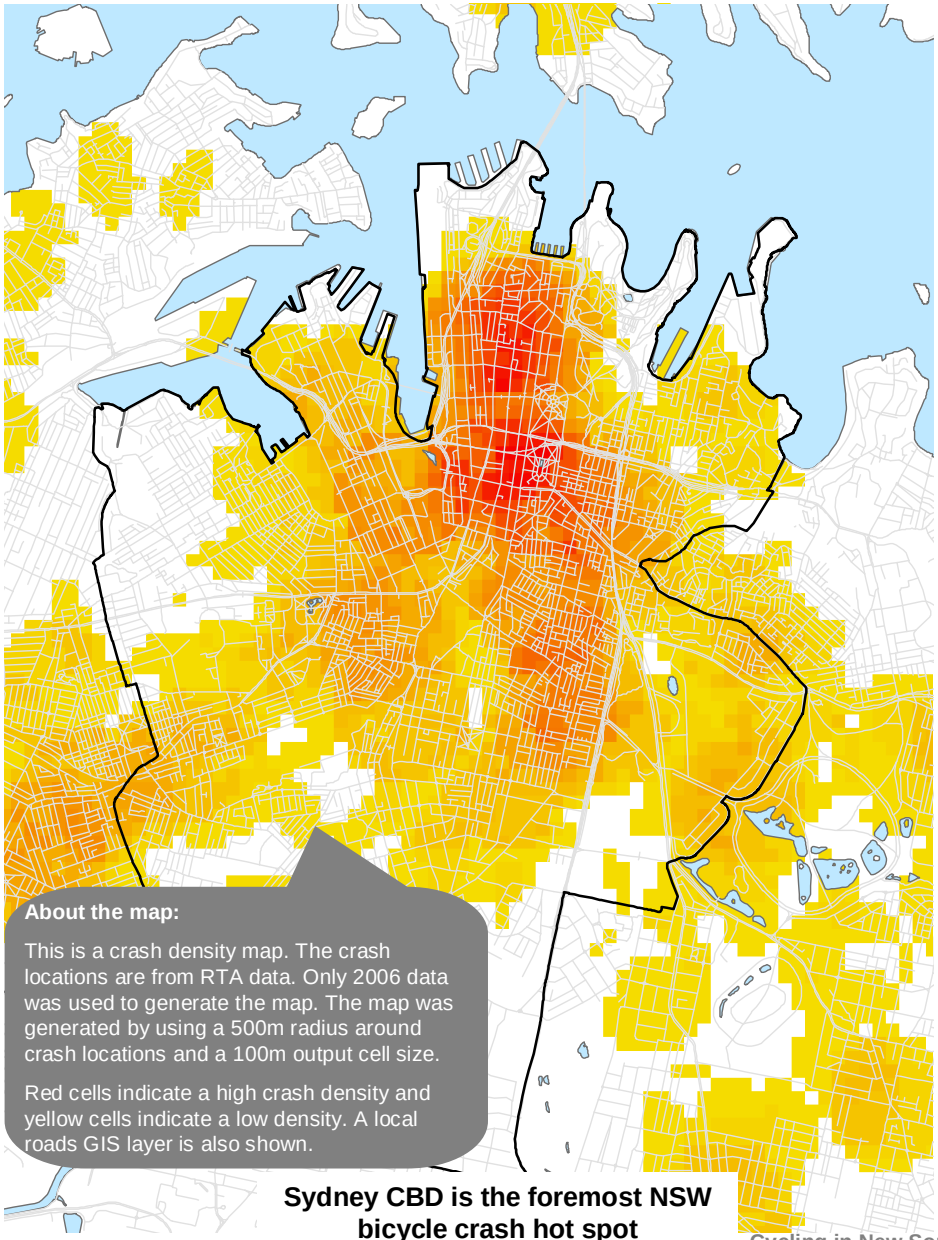
Relevant data sources:

For more information about the Bicycle NSW 2008/09 "Gear up Girl" activities, please visit http://www.gearupgirl.com.au/

Relevant data sources:

Data about participation in the 2007 City of Sydney Spring Cycle and the 2008 "Gear up Girl" ride came from Bicycle NSW.

In 2006, 3% of all road crash casualties in NSW involved cyclists



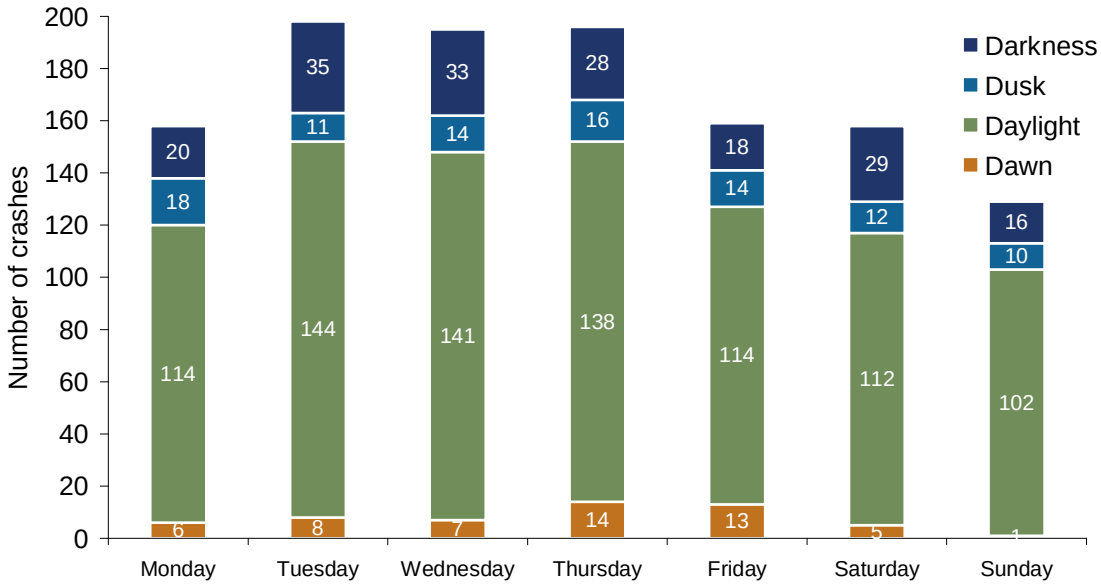
About the map:

This is a crash density map. The crash locations are from RTA data. Only 2006 data was used to generate the map. The map was generated by using a 500m radius around crash locations and a 100m output cell size.

Red cells indicate a high crash density and yellow cells indicate a low density. A local roads GIS layer is also shown.

Sydney CBD is the foremost NSW bicycle crash hot spot

Natural light conditions for reported cyclist crashes occurring across NSW in 2006



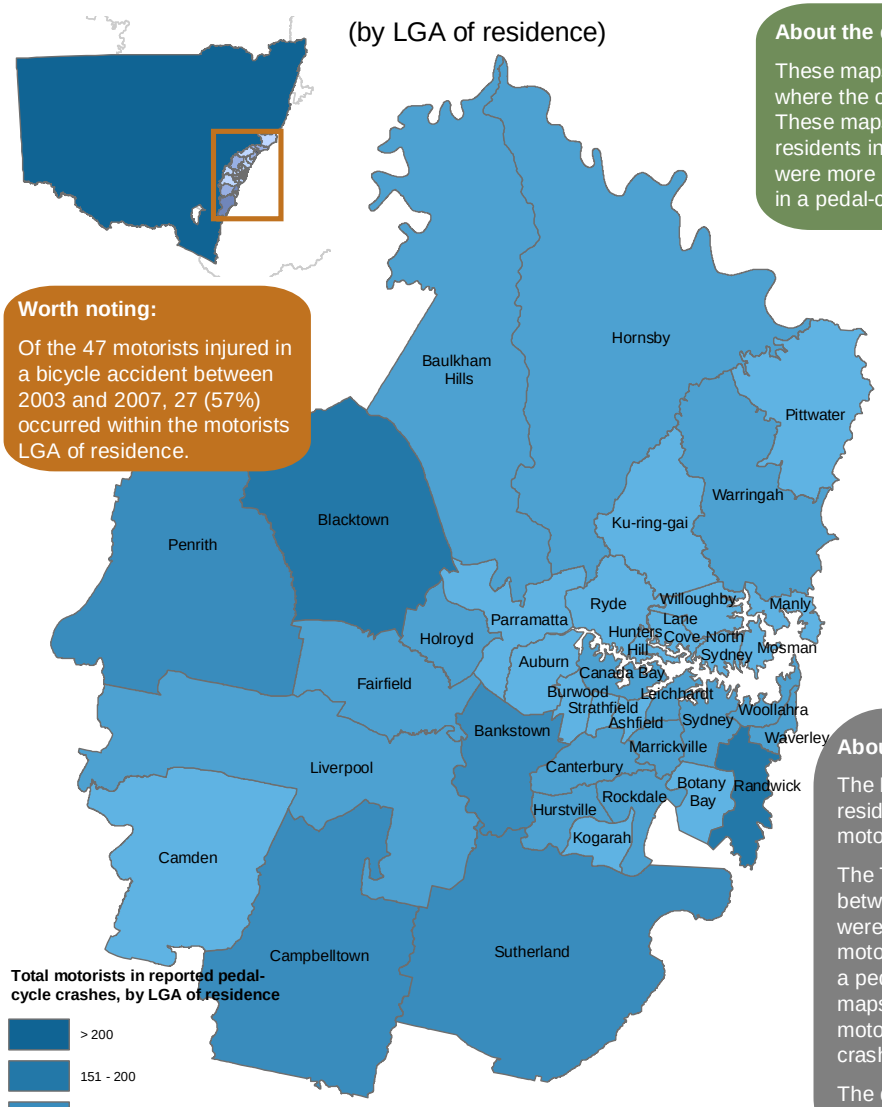
- In 2006 there were 45,528 road crashes in NSW, of which 1,193 involved pedal-cyclists.
- Crashes involving cyclists in NSW in 2006 mainly occurred during daylight hours, followed by night-time when the natural light condition was reported as dark.
- Within the Sydney metropolitan region, crashes clustered around Sydney CBD, either as on-road or off-road crashes.
- Across NSW, of the 144 crashes that were reported occurring during daylight hours on a Tuesday:
  - 59% occurred at intersections
  - 41% occurred at mid-block locations
  - 14% occurred on footpaths, cycleways in the road reserve or the nature strip
  - 13% occurred at driveways
  - 8% occurred in bus lanes.

Relevant data sources:
NSW RTA TADS 2006

Most crashes between cars and bicycles happen within the cyclists' LGA of residence

Motorists involved in pedal-cycle crashes

(by LGA of residence)



About the data:

These maps *do not* show where the crash occurred. These maps tested whether residents in a particular LGA were more likely to be involved in a pedal-cycle crash.

Worth noting:

Of the 47 motorists injured in a bicycle accident between 2003 and 2007, 27 (57%) occurred within the motorists LGA of residence.

Worth noting:

The distribution of cyclists injured in crashes reflects the stronger preference for cycling among people living in central Sydney.

About the maps:

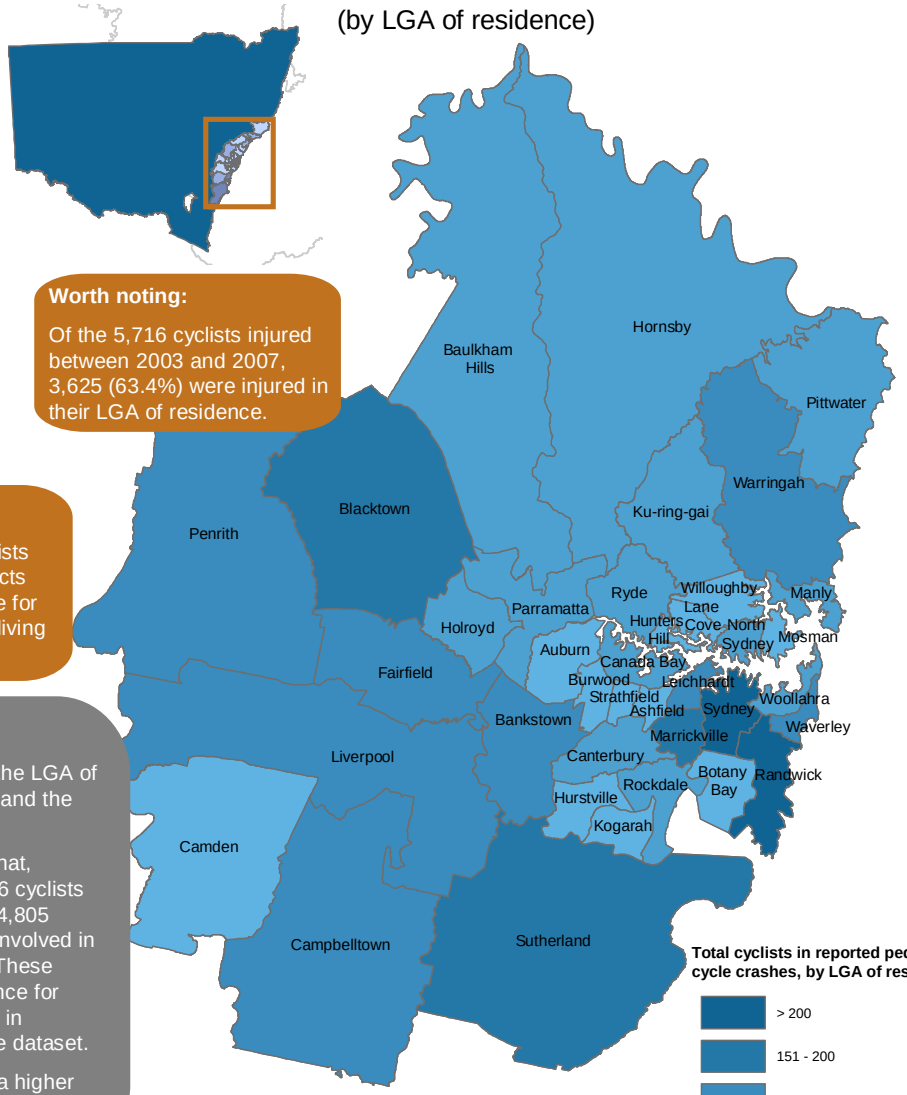
The RTA crash data includes the LGA of residence for both the cyclists and the motorists involved in a crash.

The TADS database records that, between 2003 and 2007, 5,986 cyclists were involved in a crash, and 4,805 motor vehicle operators were involved in a pedal-cycle crash, in NSW. These maps show the LGA of residence for motorists and cyclists involved in crashes captured in the bicycle dataset.

The darker values represents a higher number of residents involved in a pedal-cycle accidents.

Cyclists involved in pedal-cycle crashes

(by LGA of residence)



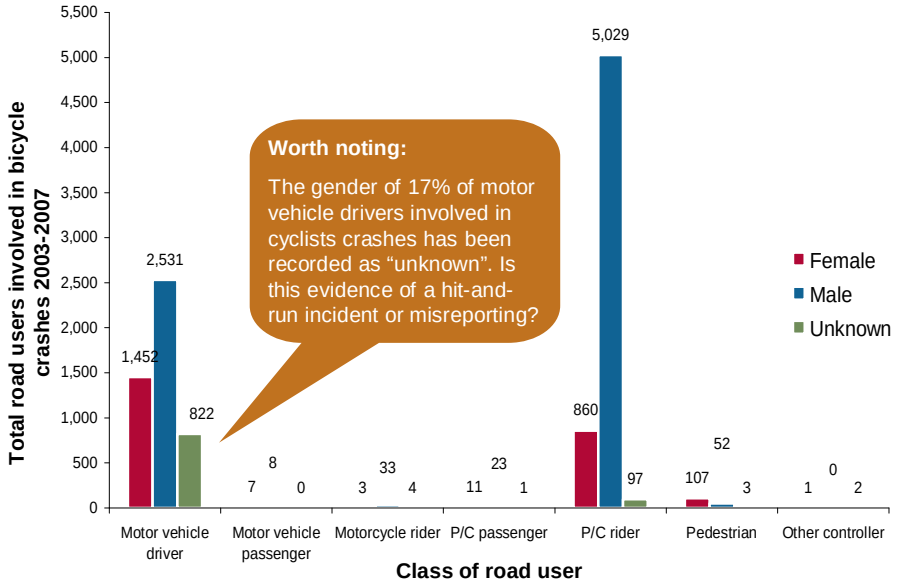
Worth noting:

Of the 5,716 cyclists injured between 2003 and 2007, 3,625 (63.4%) were injured in their LGA of residence.

Relevant data sources:

NSW RTA TADS 2003-2007

Males have the highest recorded rate of involvement in cycle crashes in NSW



Generally the number of crashes involving cyclists is higher for cyclists in their early teens. The rate of crashes for cyclists in their late teenage to early 20's is comparatively lower. This may indicate young adults cycling less often following the acquisition of a driver's license and one's own car.

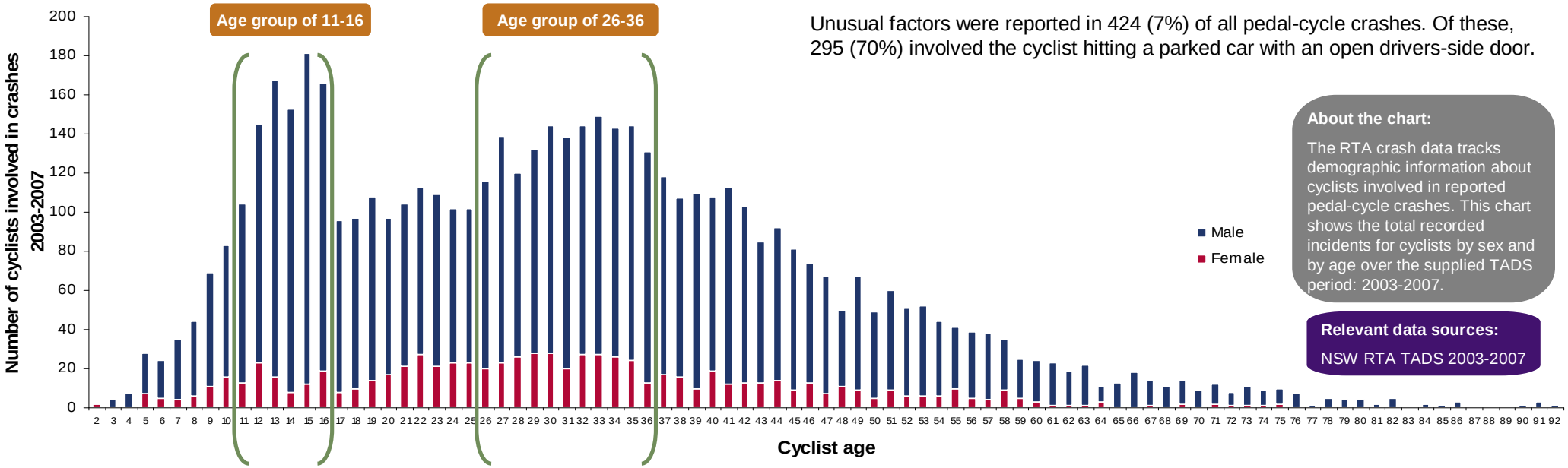
In addition, there is a higher rate of incidents amongst cyclists in their late 20's tapering off amongst cyclists in their late 30's to early 40's.

Cyclist demographics (based on 5 years of recorded data for 5,986 cyclists)

- 5,029 (84%) male cyclists were involved in crashes.
- 1,328 (22%) cyclists aged between 30 and 39 were involved.
- 1,200 (20%) cyclists aged between 5 and 16 were involved in crashes.
- 1,170 (20%) cyclists were not wearing helmets.
- 239 (4%) cyclists were disobeying traffic controls (traffic signals and signs). 41% of these were between the ages of 5 and 16.

In reported accidents, the reporting NSW Police officer may note distraction factors or other unusual factors in the accident.

Unusual factors were reported in 424 (7%) of all pedal-cycle crashes. Of these, 295 (70%) involved the cyclist hitting a parked car with an open drivers-side door.



About the chart:

The RTA crash data tracks demographic information about cyclists involved in reported pedal-cycle crashes. This chart shows the total recorded incidents for cyclists by sex and by age over the supplied TADS period: 2003-2007.

Relevant data sources:

NSW RTA TADS 2003-2007

67% of male cyclists were injured or killed in crashes during a very basic manoeuvre – heading straight

Of the 5,029 male cyclists involved in crashes in the five years of recorded data:

Cyclist manoeuvres in reported accidents

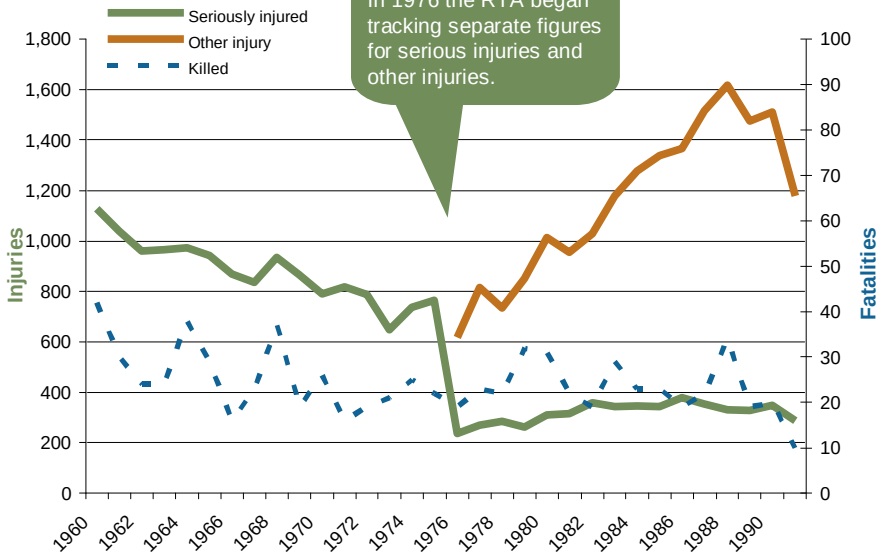
- 3,443 (68%) male cyclists involved crashes were proceeding in the lane (i.e. the cyclist was travelling straight on the road) (__%) of were injured in this type of accident
- 959 (19%) male cyclists involved in crashes were travelling along the footpath.
- 141 (3%) male cyclists involved in crashes were travelling on the incorrect side of the road (including wrong way on one-way street). 62 (44%) of these were within a age group of 5-16.

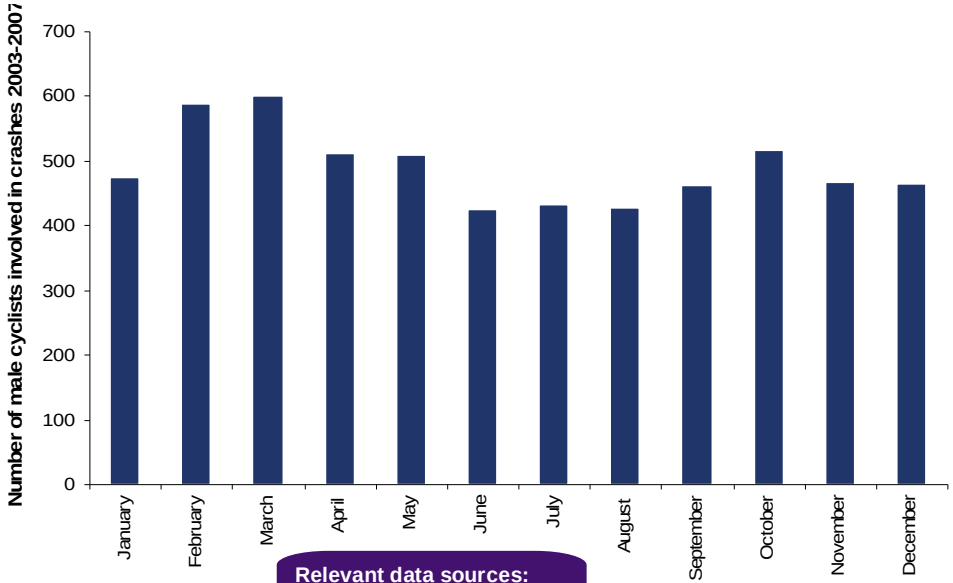
Crash locations in reported accidents

- 1,663 (33%) male cyclists were involved in crashes occurred at undivided roads.
- 1,410 (28%) male cyclists were involved in crashes occurred at T-junctions.
- 685 (14%) male cyclists were involved in crashes occurred on either footpath or cycleway.
- 524 (10%) male cyclists were involved in crashes occurred at driveway.

About the data:

In 1976 the RTA began tracking separate figures for serious injuries and other injuries.





For further study:

A number of topics stand out as warranting further research:

- Helmet use by cyclists involved in reported serious crashes
- The "safety in numbers" hypothesis (whether increase cyclist numbers correlates with better individual cyclist safety)
- Why bus lanes appear to be hot spots for **8%** of NSW pedal-cycle crashes on a Tuesday, but only **12** of the recorded crashes involved a bus
- The crash exposure rate for different cyclist groups
- A national benchmark for pedal-cycle safety against which to compare NSW outcomes.

For further study:

In 2003-2007, male cyclist crashes peaks in March and spikes in October. Further research would be needed to find out if this is due to higher rates of cycling (e.g. following the end of school holidays or corresponding with the start of spring) or higher rates of inexperienced cyclists (e.g. following the start of the academic year).

Relevant data sources:

NSW RTA TADS 2003-2007

Recorded bicycle infringements in NSW peak on Wednesdays in the mid-afternoon

In the absence of other strong datasets on cycling, the statewide data on cycling infringements collected by NSW Police is a rich dataset on bicycle behaviour – by the dataset's very nature, bad behaviour!

Like the RTA Traffic Accident Database System, this complete database could potentially provide information to supplement Household Travel Survey data on when people cycle – with the time and location of infringement issue being used as an indicator for when people are cycling and where.

Relevant data sources:

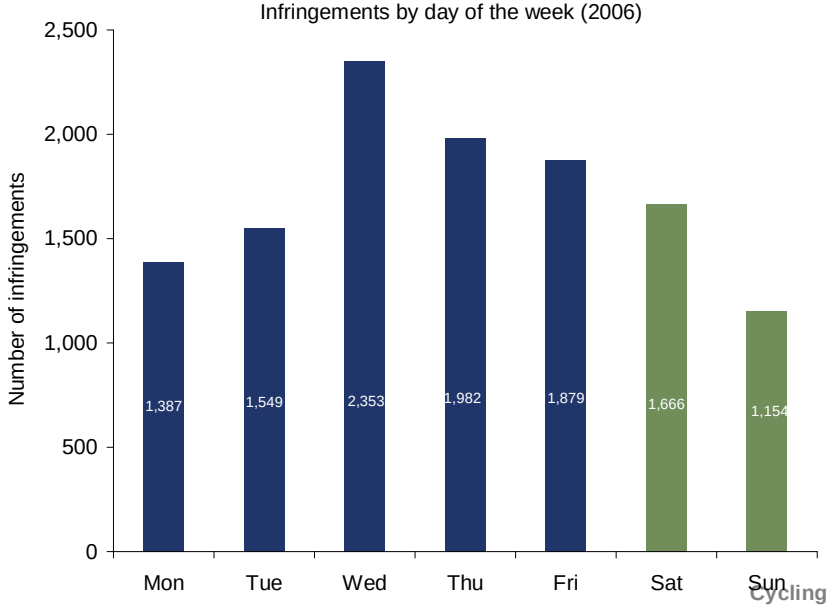
Bureau of Crime Statistics Research 2006

Worth noting:

This peak on Wednesday is reflected every year. There may be an interesting story behind this spike in infringements – possibly related to after-school activities or NSW Police officer shifts?

This can not be examined further without access to the disaggregated dataset.

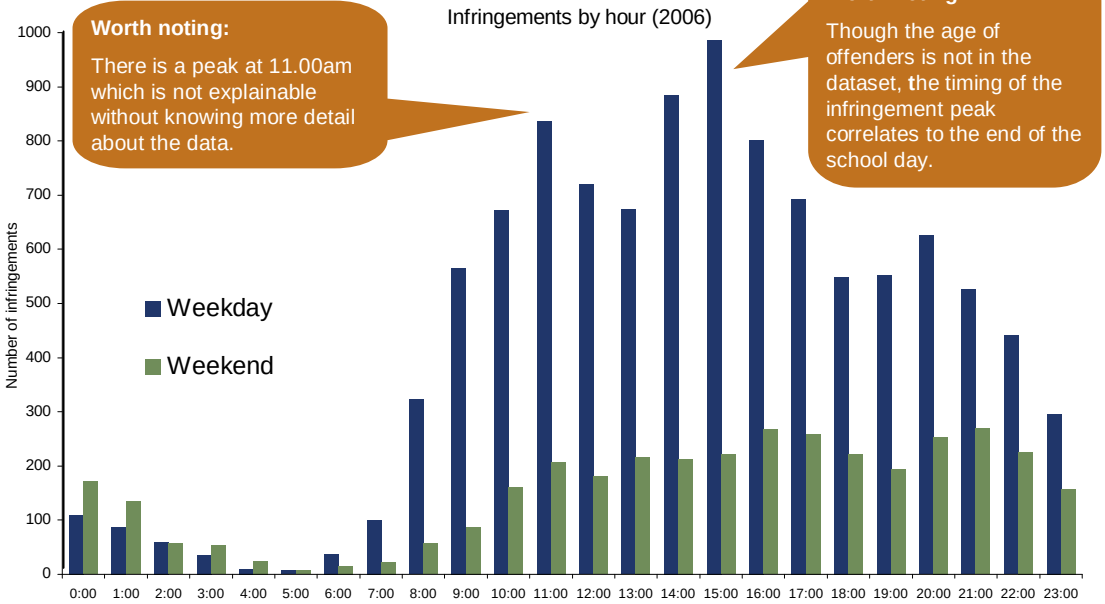
Infringements by day of the week (2006)



Worth noting:

There is a peak at 11.00am which is not explainable without knowing more detail about the data.

Infringements by hour (2006)



Worth noting:

Though the age of offenders is not in the dataset, the timing of the infringement peak correlates to the end of the school day.

About the data:

A Traffic Infringement Notice is generated when a NSW Police officer issues an infringement for a traffic offence This notice is processed by the Infringement Processing Bureau and records of the offence are depersonalised and stored for analysis by the NSW Bureau of Crime Statistics & Research. The 2003-07 dataset was purchased on behalf of the RTA for analysis in this study only.

The infringement data is aggregated by LGA, time of day and day of week to depersonalise infringement records. All infringement types, including riding without a helmet, riding on the footpath, disobeying traffic lights, riding under the influence of drugs / alcohol and riding without bike lights, are aggregated into one record by time-of-day and day-of-week by LGA.

LGA	Bicycle-only JTW trips	Infringements in 2006
Campbelltown	152	323
Coffs Harbour	293	281
Sydney	1356	177
Newcastle	1042	643
Wollongong	661	492

For further study:

Infringement type and demographic characteristics were not supplied, to protect privacy information. This prevents further rider analysis.

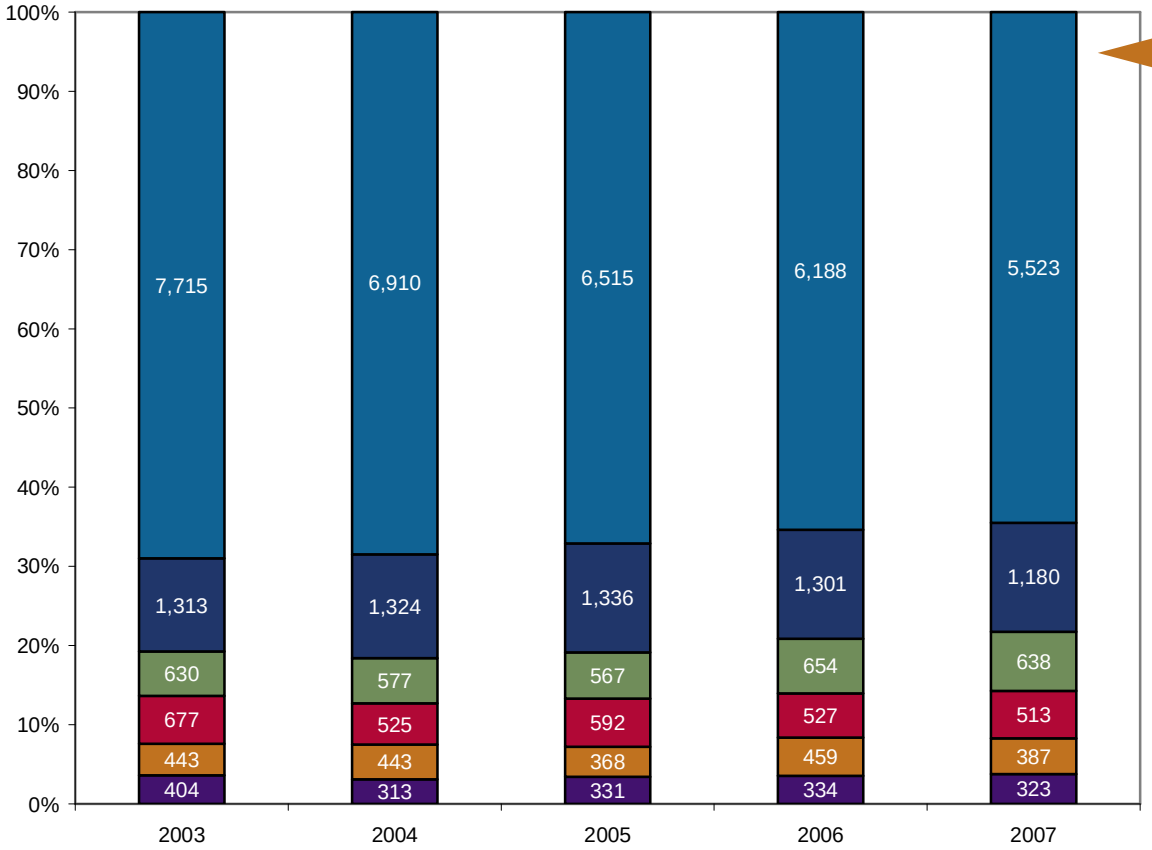
Currently only broad trends can be identified within the infringements data. Though several potential explanatory variables are identified, these cannot be determined with accuracy, until the dataset is disaggregated to reveal (at a minimum) NSW-wide or LGA-wide infringements by type.

In NSW, bicycles are stolen most often from homes

Relevant data sources:

NSW Bureau of Crime Statistics & Research. Data purchase on behalf of the RTA. Received September 2008

Bicycle theft in NSW (Bureau of Crime Statistics)



Worth noting:

Overwhelmingly most bicycles were stolen from a residence. This fits with low levels of bicycle usage and high levels of bicycle ownership: a bicycle in NSW is more likely to be at home than out on the road!

For further research:

It is possible that bicycle-owning residents believe that bicycles are safe at home and do not take appropriate precautions.

This theory would need further testing.

Worth noting:

Over a five-year period 185 bicycles were reported stolen from transport facilities across NSW. This includes public transport interchanges, airports, and freight depots / rail sidings. This represents a very small proportion of overall bicycle theft.

When bicycles were stolen from a public transport facility, most were taken from rail stations or rail station car parks. This may indicate poor surveillance at interchanges.

About the data:

'Others' includes categories such as vehicle, utilities, rural industry, religious, marine transport, transport interchange, licensed premise, recreation, law enforcement, industrial, health and unknown.

The use of this terminology varies depending on the reporting officer.

Worth noting:

RailCorp began tracking bicycles found on trains in 2005.

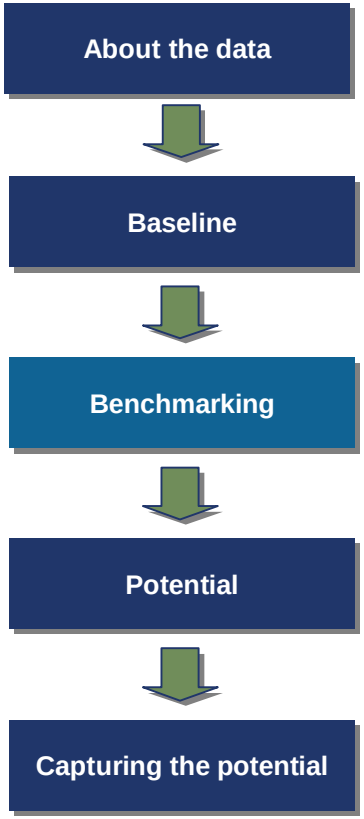
RailCorp Bicycle Data	2005	2006	2007
Removed from stations*			223
Left on trains	155	210	492

** began tracking in 2007*

RailCorp Lost Property

Section 3: Benchmarking Sydney and NSW cycling to other capital cities and states

How do cycling outcomes in NSW and Sydney perform against comparable locations, including other Australian states and capital cities?



For bicycle use Sydney rates below comparable world cities. High rates of cycling in these cities seems correlated with high rates of investment in bicycle infrastructure.

The mode share of cycling in NSW is low compared to other Australian states and territories.

The mode share of cycling in Sydney is low compared to other Australian capital cities.

As in NSW, when Australians use a bicycle for the journey to work, overwhelmingly their preference is to use *only* a bicycle rather than a bicycle in combination with other modes.

National reports on adult participation in recreational cycling are inconsistent across the different datasets.

NSW commuter cyclists are significantly more likely to be injured in a crash than commuter cyclists in other Australian states and territories.

Comparing Sydney and Melbourne:

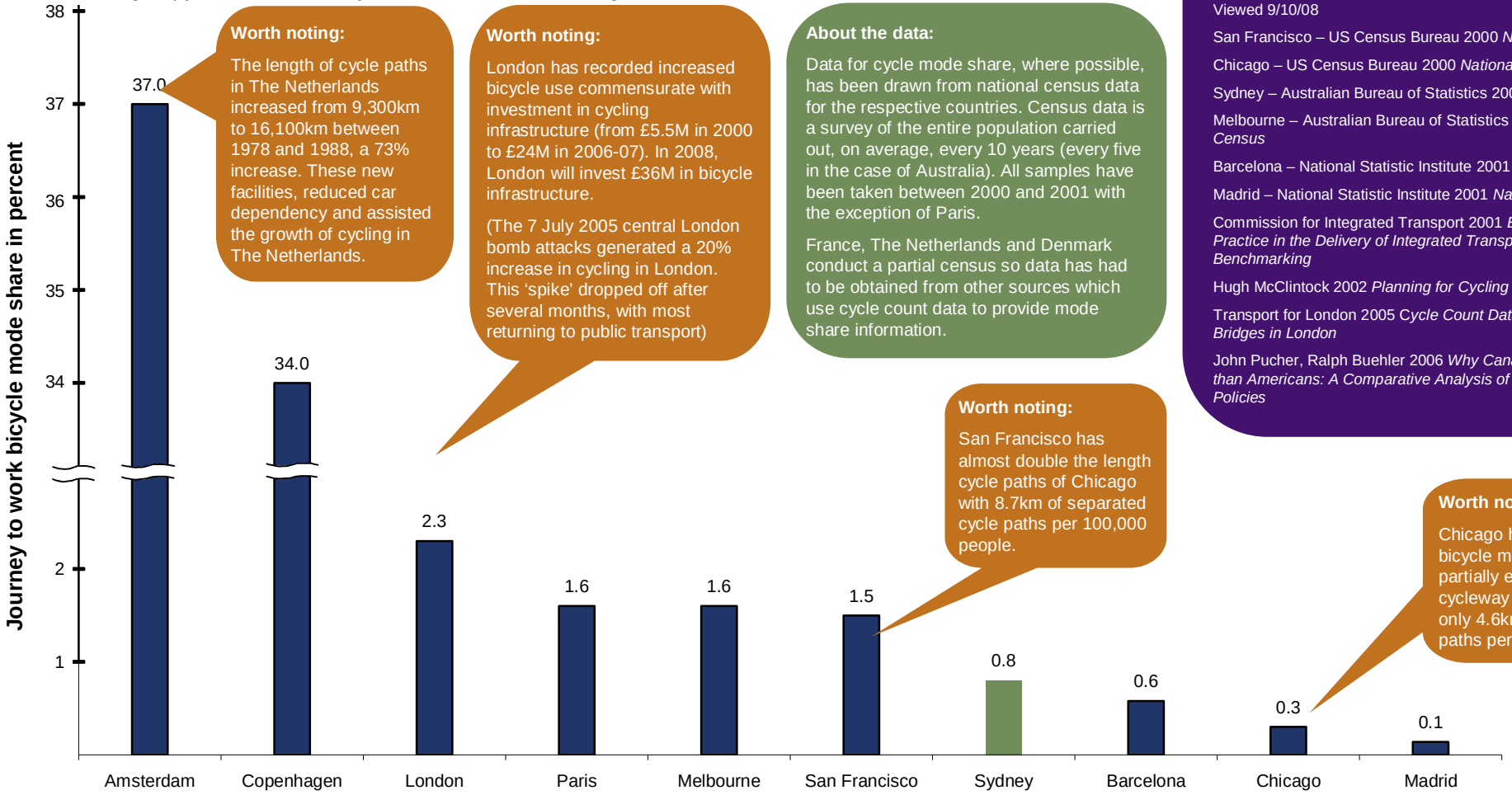
- Victorian cycling data is streamlined in its presentation, easy to use and available online at no charge
- One-way streets are a barrier to cyclists: Sydney CBD has a less permeable network for cyclists than Melbourne, with its relatively dense and legible grid road layout
- Cycleway network connectedness and legibility are factors in Melbourne's higher cycling mode share
- There is a comparable risk of cyclist injury, with hot spots in both CBDs.

Sydney's bicycle mode share rates below other world cities

Sydney falls short in comparison to other world cities with a bicycle mode share of 0.8% for the journey to work. Even cities with recent histories of car dominance such as London and Paris have a bicycle mode share twice Sydney's.

The bicycle mode share across these world cities seems to indicate that cities with a record of investment in cycle facilities reap the rewards of higher bicycle use.

In the case of the US cities, the higher length of cycleway per capita in San Francisco than in Chicago appears to be directly correlated with the stronger mode share.



Worth noting:

The length of cycle paths in The Netherlands increased from 9,300km to 16,100km between 1978 and 1988, a 73% increase. These new facilities, reduced car dependency and assisted the growth of cycling in The Netherlands.

Worth noting:

London has recorded increased bicycle use commensurate with investment in cycling infrastructure (from £5.5M in 2000 to £24M in 2006-07). In 2008, London will invest £36M in bicycle infrastructure.

(The 7 July 2005 central London bomb attacks generated a 20% increase in cycling in London. This 'spike' dropped off after several months, with most returning to public transport)

About the data:

Data for cycle mode share, where possible, has been drawn from national census data for the respective countries. Census data is a survey of the entire population carried out, on average, every 10 years (every five in the case of Australia). All samples have been taken between 2000 and 2001 with the exception of Paris.

France, The Netherlands and Denmark conduct a partial census so data has had to be obtained from other sources which use cycle count data to provide mode share information.

Worth noting:

San Francisco has almost double the length cycle paths of Chicago with 8.7km of separated cycle paths per 100,000 people.

Worth noting:

Chicago has a very low bicycle mode share. This is partially explained by low cycleway provision. There are only 4.6km of dedicated cycle paths per 100,000 people.

Relevant reports:

Amsterdam – Pex Langenberg, Head of the Strategy & Policy, Department of Infrastructure, Traffic and Transport, City of Amsterdam 2000 *Cycling in Amsterdam - Developments and Policies*

Copenhagen – City of Copenhagen 2000 *City of Cyclists Bicycle Account*

London – Office for National Statistics 2001 *National Census*

Paris – Velib a Paris 2006 *www.jcdecaux.com/UserFiles/File* Viewed 9/10/08

San Francisco – US Census Bureau 2000 *National Census*

Chicago – US Census Bureau 2000 *National Census*

Sydney – Australian Bureau of Statistics 2001 *National Census*

Melbourne – Australian Bureau of Statistics 2001 *National Census*

Barcelona – National Statistic Institute 2001 *National Census*

Madrid – National Statistic Institute 2001 *National Census*

Commission for Integrated Transport 2001 *European Best Practice in the Delivery of Integrated Transport Report Stage 1 Benchmarking*

Hugh McClintock 2002 *Planning for Cycling*

Transport for London 2005 *Cycle Count Data on Major Thames Bridges in London*

John Pucher, Ralph Buehler 2006 *Why Canadians Cycle More than Americans: A Comparative Analysis of Bicycling Trends and Policies*

NSW has the lowest cycling mode share in Australia for the Journey to Work

Compared to other Australian states and territories, the rate of cycling in NSW is low.

The Northern Territory has the highest mode share, with possible explanatory factors being the weather on Census Day (August), the size of urbanised areas, the relative concentration of the territory's employment in Darwin, and average commute distance.

The ACT also has a high mode share, which may reflect a history of investment in bicycle infrastructure and/or legislation which allows cyclists to use the footpath.

Worth noting:

In using a bicycle for the Journey to Work, Australians prefer to ride all the way to work, rather than couple cycling with another mode.

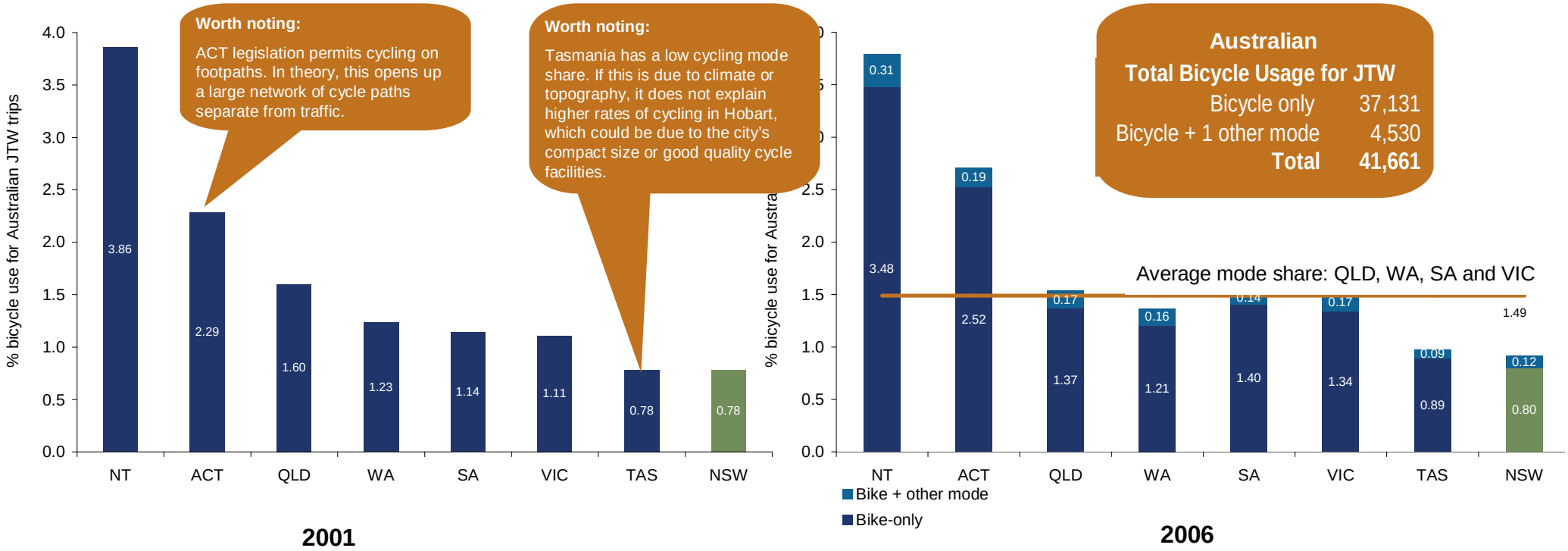
Bicycle + one other mode and bicycle + two other modes account for 0.15% of all Australian Journey to Work trips on Census Day.

Relevant data sources:

Dr Paul Ratcliffe, Department of Urban Services, ACT Government, Canberra *Cycling on Footpaths in the Australian Capital Territory*

ACT Chief Minister's Department 2004 *Population Projections for Canberra Suburbs"*

Australian Bureau of Statistics 2006 *Community Profiles*



The journey to work cycling mode share for Sydney is about half that of an interstate benchmark

Compared to other Australian state and territory capital cities, the rate of cycling in Sydney is low.

Darwin has the highest mode share, with possible explanatory factors being the compactness of the urbanised area and, therefore, shorter commute distances. The Census is taken during Darwin's relatively benign dry season climate, which may also be a factor.

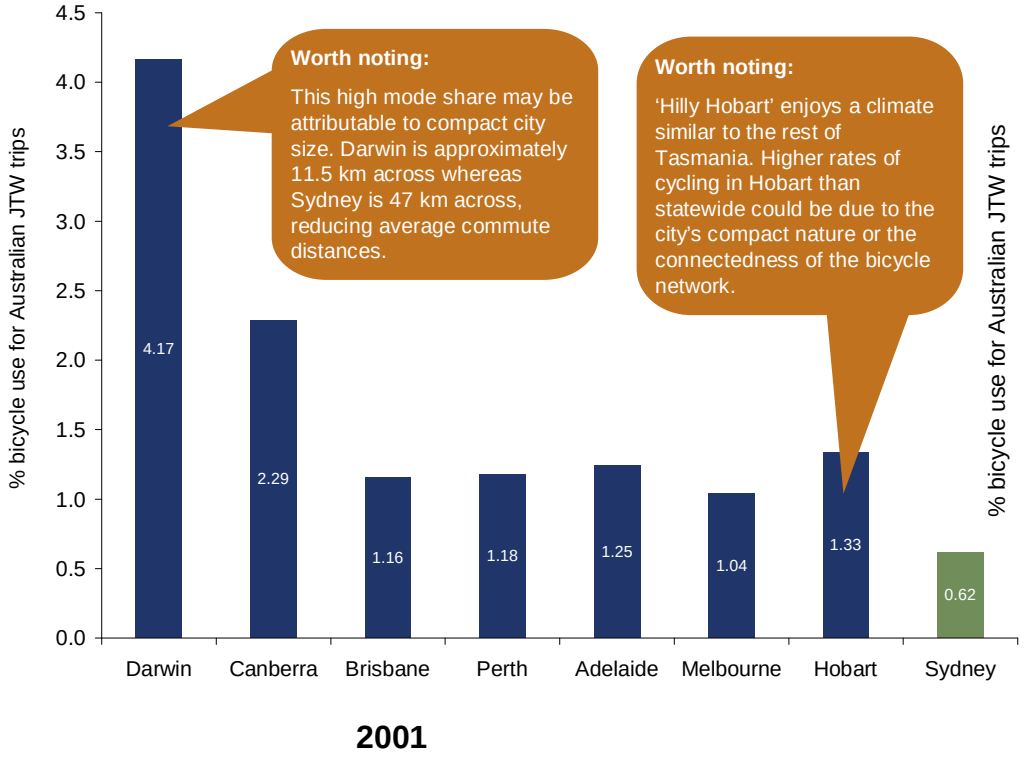
Canberra also has a high mode share, which may reflect investment in bicycle infrastructure or legislation which allows cyclists to use the footpath.

Compared to the average mode share of Melbourne, Perth and Brisbane, the three next lowest performing capital cities after Sydney, rates of cycling in Australia's largest city are still low.

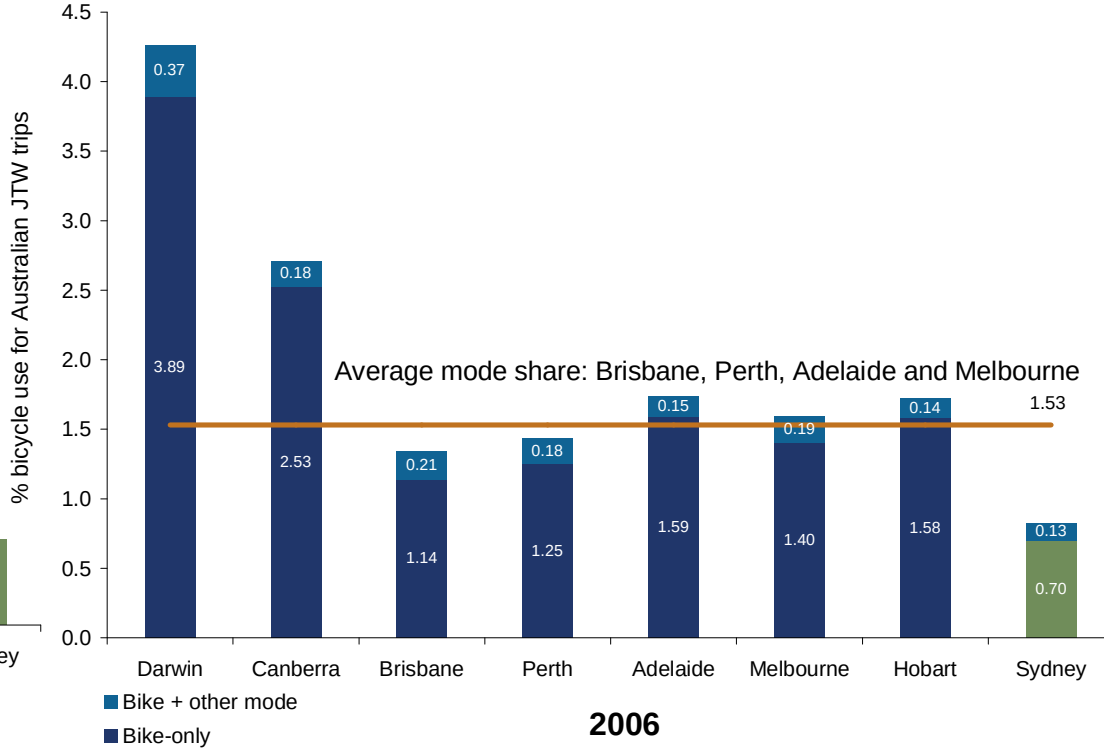
Worth noting:

Potential explanatory factors for high or low rates of cycling

	City size	Population	Yearly Rainfall
Melbourne	8,806 km²	3.8M	647 mm
Sydney	12,145 km²	4.3M	1,215 mm
Brisbane	5,905 km²	1.9M	1,146 mm
Perth	5,386 km²	1.6M	869 mm
Hobart	1,357 km²	0.2M	620 mm
Adelaide	1,827 km²	1.2M	601 mm
Darwin	112 km²	0.1M	1,715 mm
Canberra	806 km²	0.3M	633 mm



2001



2006

Between 2001 and 2006, Sydney's bicycle mode share for commute trips grew at a lower rate than other capital cities

Across Australia as a whole, cyclist numbers for the Journey to Work rose between 2001 and 2006.

Factors driving this rise could include increasing fuel prices, overcrowding on public transport, community environmental awareness, traffic congestion and growing interest in personal health and fitness.

Melbourne saw the largest rise in commuter cycling, followed by Adelaide and Hobart. All three of these capitals showed rapid compound growth of over 25%.

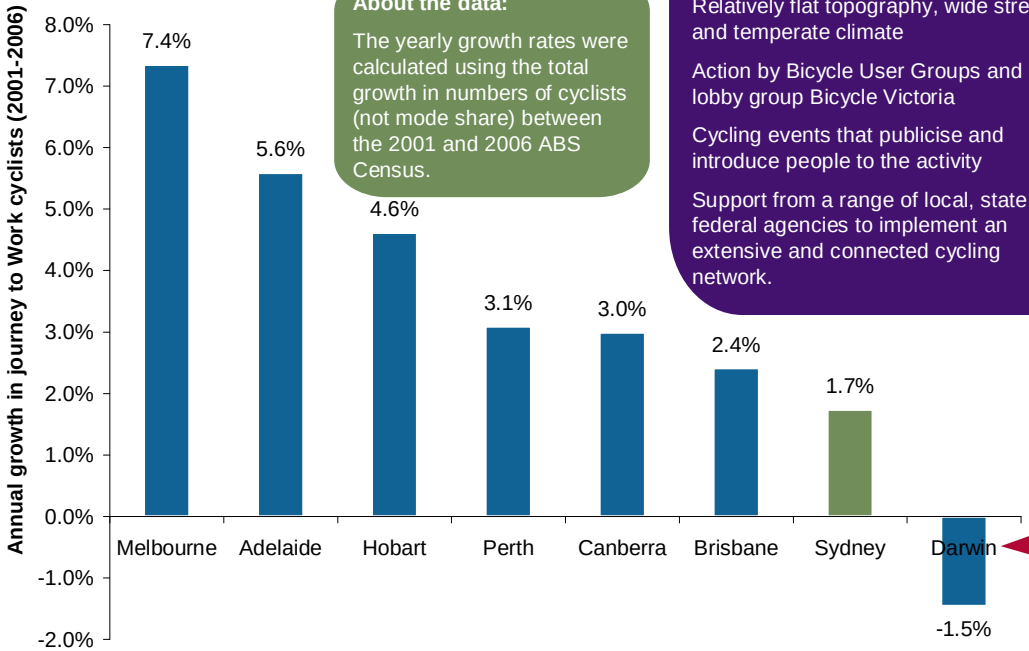
9% growth in Sydney was the slowest of all state capitals. (The number of commuter cyclists in Darwin actually declined between 2001 and 2006, indicating the possible influence of climate.)

About the data:

The 2006 ABS Census indicates that between 2001 and 2006 there was 19.58% growth in the number of people across Australia cycling to work.

About the data:

The yearly growth rates were calculated using the total growth in numbers of cyclists (not mode share) between the 2001 and 2006 ABS Census.



Relevant reports:

According to the City of Melbourne's *Melbourne Transport Strategy - Cycling Issues Paper* the growth of cycling in that CBD has been due to a number of factors:

Relatively flat topography, wide streets and temperate climate

Action by Bicycle User Groups and the lobby group Bicycle Victoria

Cycling events that publicise and introduce people to the activity

Support from a range of local, state and federal agencies to implement an extensive and connected cycling network.

For further study:

Already showing a high cycling mode share, Darwin saw a small decline in commuter cyclist numbers between 2001 and 2006. Currently cited reasons for this decline (including the weather on Census Day and growing car ownership) are speculative and may warrant further study.

Case study:

Possible correlation of Brisbane bicycle network development and Brisbane bicycle-only mode share as reported by the ABS Census 1991-2006

About the data:

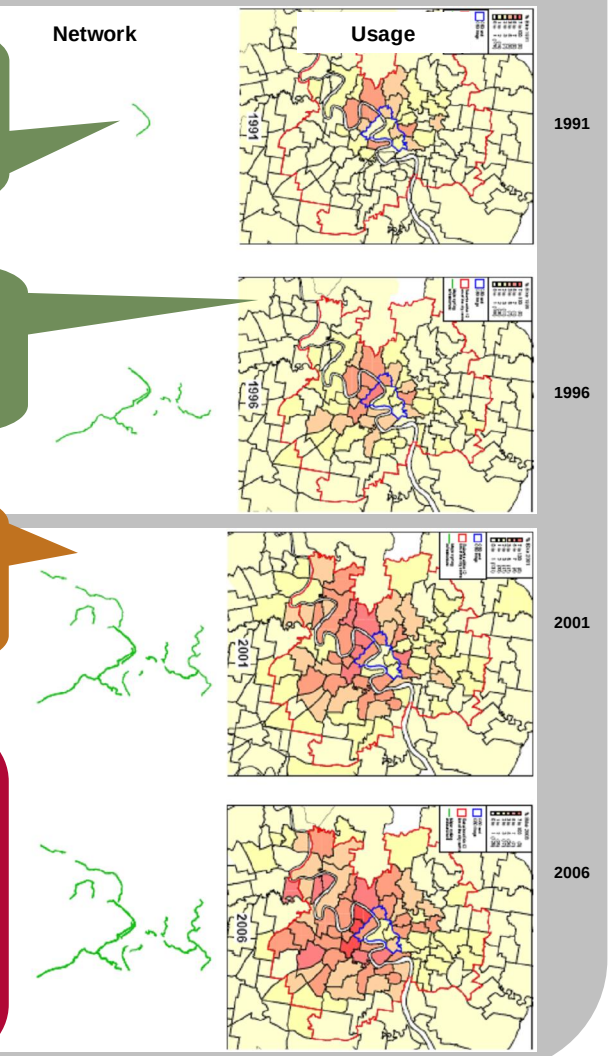
Green links showing the growth over time in Brisbane's cycleway network

About the data:

Pink / red 'heat map' of cycling mode share according to five-yearly Census results from the Australian Bureau of Statistics

Worth noting:

As the network develops, employment destination zones receive an increasing number of bicycle trips.



National data on adult participation in recreational cycling varies for similar years and sample sizes

Worth noting:

The ACT Government spent $7.5M on the Mount Stromlo mountain bike park following the devastating 2003 bushfires.

The trails at Mt Stromlo annually host Australia's biggest 24-hour MTB race (about 2,000 entrants) and the MTB Nationals. A further $1.2M is due to be invested during 08/09. (CORC)

About the data:

Why the differing results?

Both studies were undertaken in the same year.

Both had similar sample sizes

Both asked those 15 years and older if they had participated in sport (organised or non - organised) within the past 12 months.

Neither segments cycling into different types (i.e. MTB, racing, training or casual weekend rides).

Worth noting:

In the ERASS survey, the proportion of the population reporting cycling for recreation is higher than reported by the ABS.

Worth noting:

The ASC acknowledges that its report is not comparable to data from the ABS report, citing differences in methodology, scope and questionnaire design.

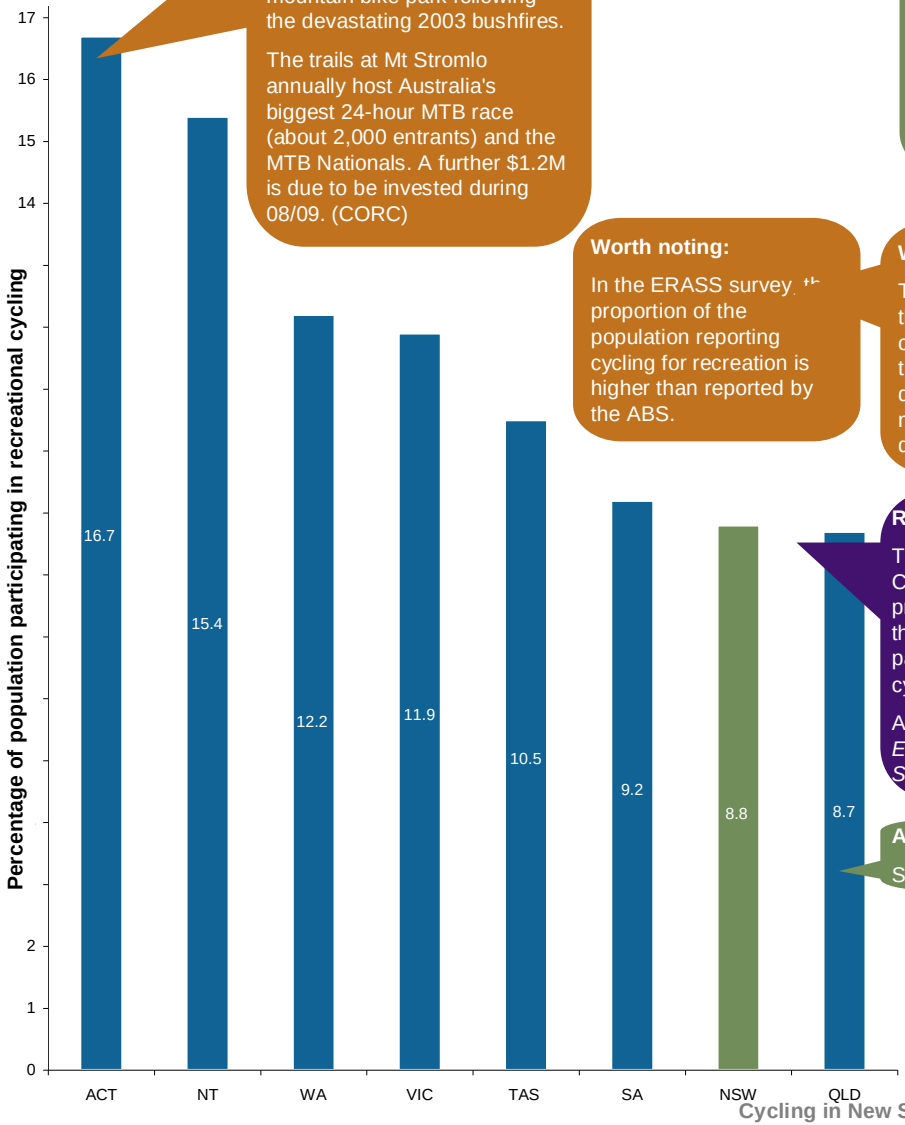
Relevant data sources (1):

The Australian Sport Commission (ASC) produces an annual report that includes data on participation in recreational cycling.

ASC 2006 *Participation in Exercise, Recreation and Sport (ERaSS)*

About the data (1):

Sample size: 13,710 people.



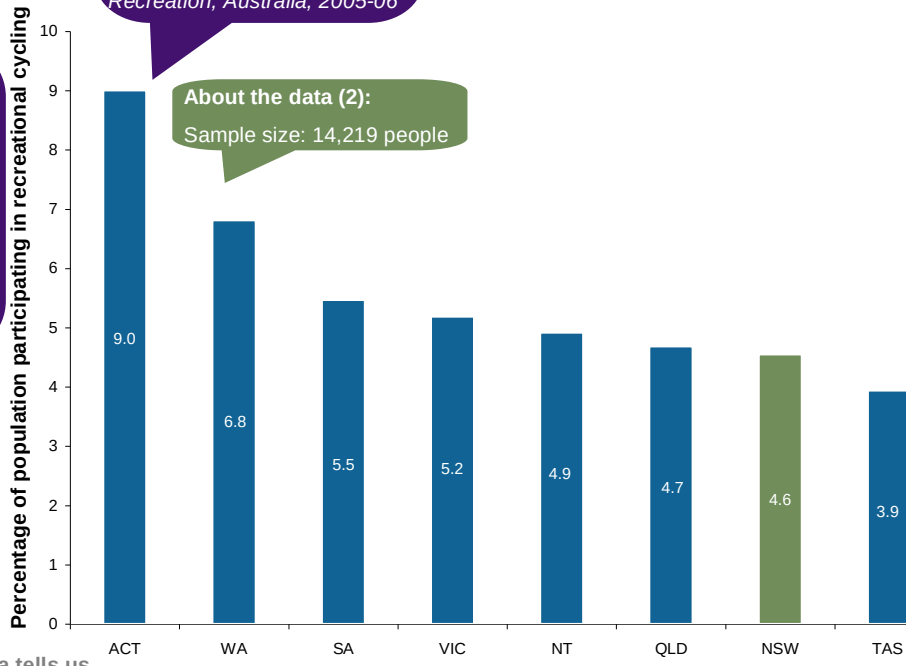
Relevant data sources (2):

The Australian Bureau of Statistics reports annually on participation in sport, including cycling.

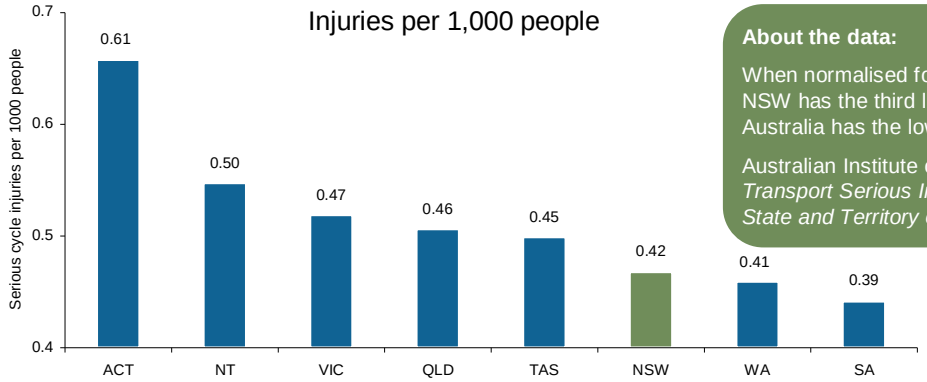
ABS 2006 *Participation in Sports and Physical Recreation, Australia, 2005-06*

About the data (2):

Sample size: 14,219 people



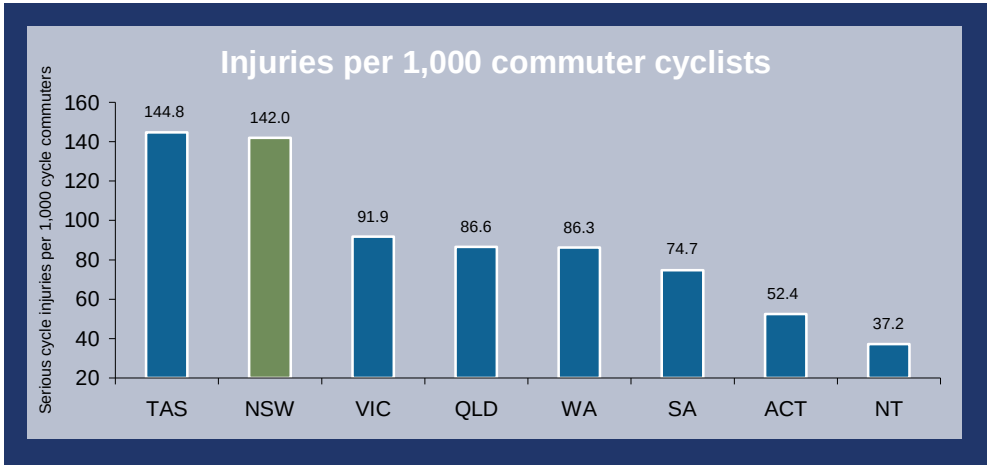
NSW commuter cyclists are more likely to be in a crash than commuter cyclists in most other states



About the data:

When normalised for the total state or territory population, NSW has the third lowest rate of cycle injuries. South Australia has the lowest.

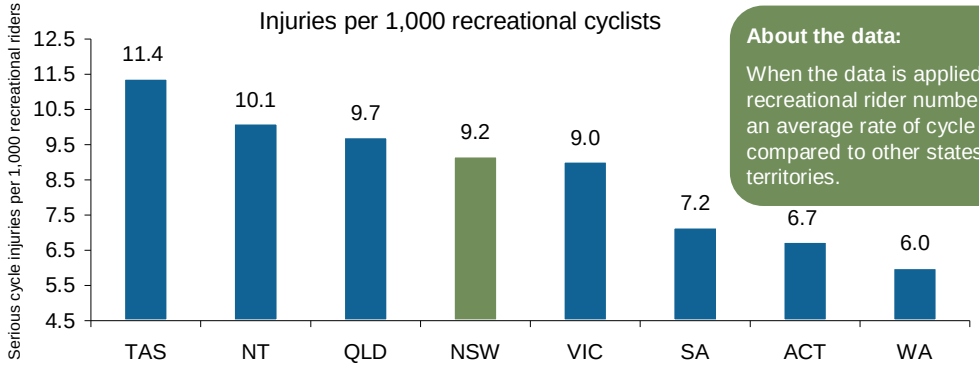
Australian Institute of Health and Welfare 2006 *Land Transport Serious Injury Cases by Road User Group and State and Territory of Usual Residence Australia*



About the data:

When normalised for total bike-only commute trips from the ABS Census Journey to Work, NSW has the second highest rate of cyclist injuries.

With regards to the reliability of the data, the number of cycle injuries per 1,000 people is the most reliable as its based on Census results for population and is therefore the preferred statistic of all those readily available.



About the data:

When the data is applied to recreational rider numbers, NSW has an average rate of cycle injuries compared to other states and territories.

Cycling fatalities are rare. The location of cycling fatalities does not enable an accurate assessment of safety in any state or territory due to the low numbers. The location of reported serious injuries provides a more accurate representation of bicycle safety.

Using the different normalising methods, NSW has an average safety record.

NSW shows it highest level of cyclist injuries when these are represented as a proportion of commuter journeys by bike. This may be attributable to low bicycle infrastructure provision or low driver awareness of cyclists. Further analysis is required to say this with certainty.

Relevant reports:

Australian Institute of Health and Welfare 2006 *Land Transport Serious Injury Cases by Road User Group and State and Territory of Usual Residence Australia*

Australian Bureau of Statistics 2006 *Participation in Sports and Physical Recreation, Australia, 2005-06*

Australian Bureau of Statistics 2006 Census

Worth noting:

Available information on injuries and fatalities is not differentiated between commuter and recreational cyclists. In the three charts at left, the Australian population, ABS commuter and ERASS recreational cycling figures are used to normalise rates of injury by jurisdiction.

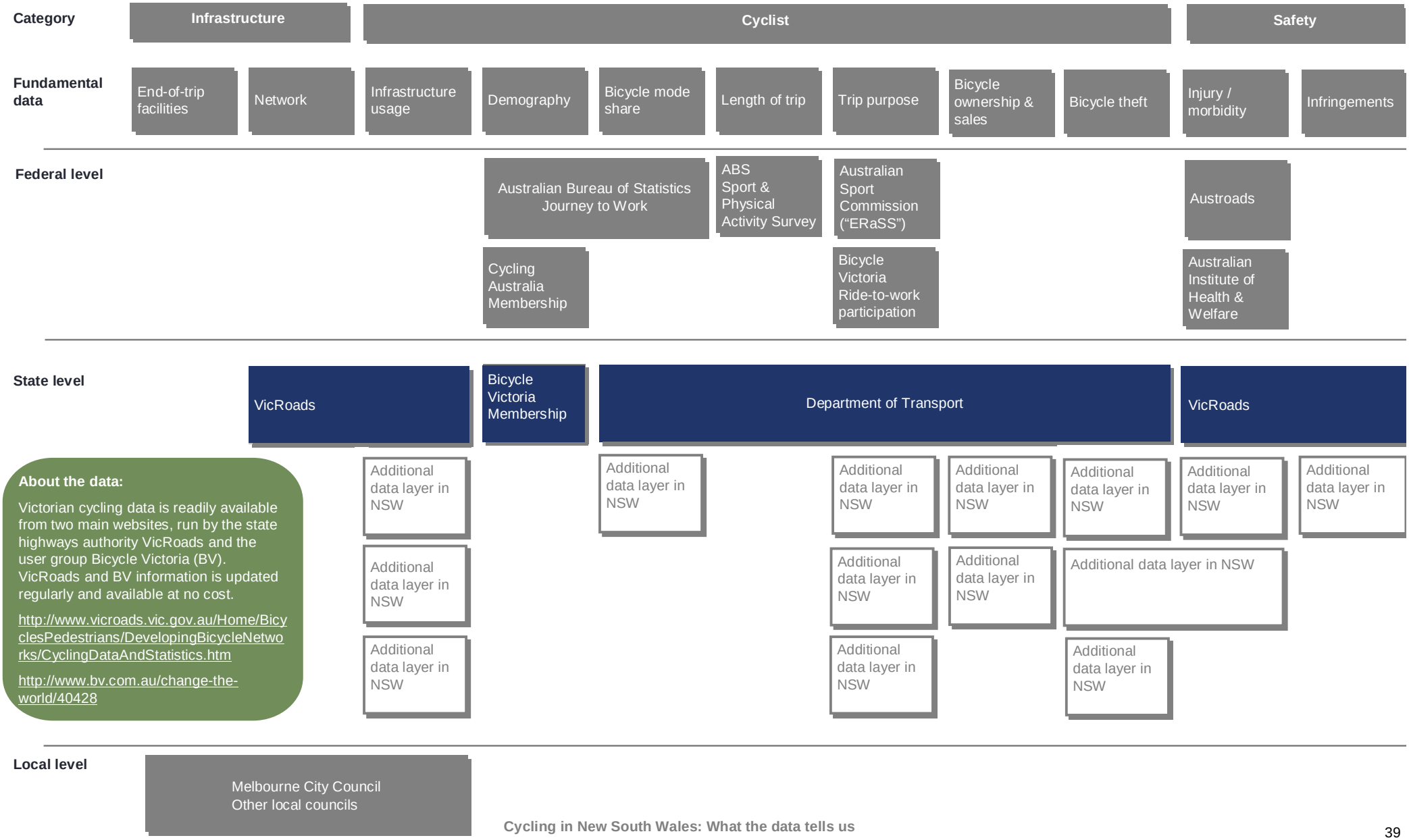
Worth noting:

As with NSW injury data, minor cycling injury data is not available for Australia. As cyclists involved in low-level crashes may be self-treated or treated by a GP, they would not be tracked by hospital separation data or road safety datasets.

For further study:

International good practice is to track injuries and fatalities against miles / kilometres travelled ('risk exposure'). However due to this information not being available for cyclists the data here is presented as injuries per 1000 riders. With improved handling of national cycling data, a figure could be developed for cyclist exposure by jurisdiction.

Victorian cycling data is streamlined in its presentation, easy to use and available free online



Commuter cycling rates are higher in Greater Melbourne than in the Sydney Metropolitan Region

Relevant reports:

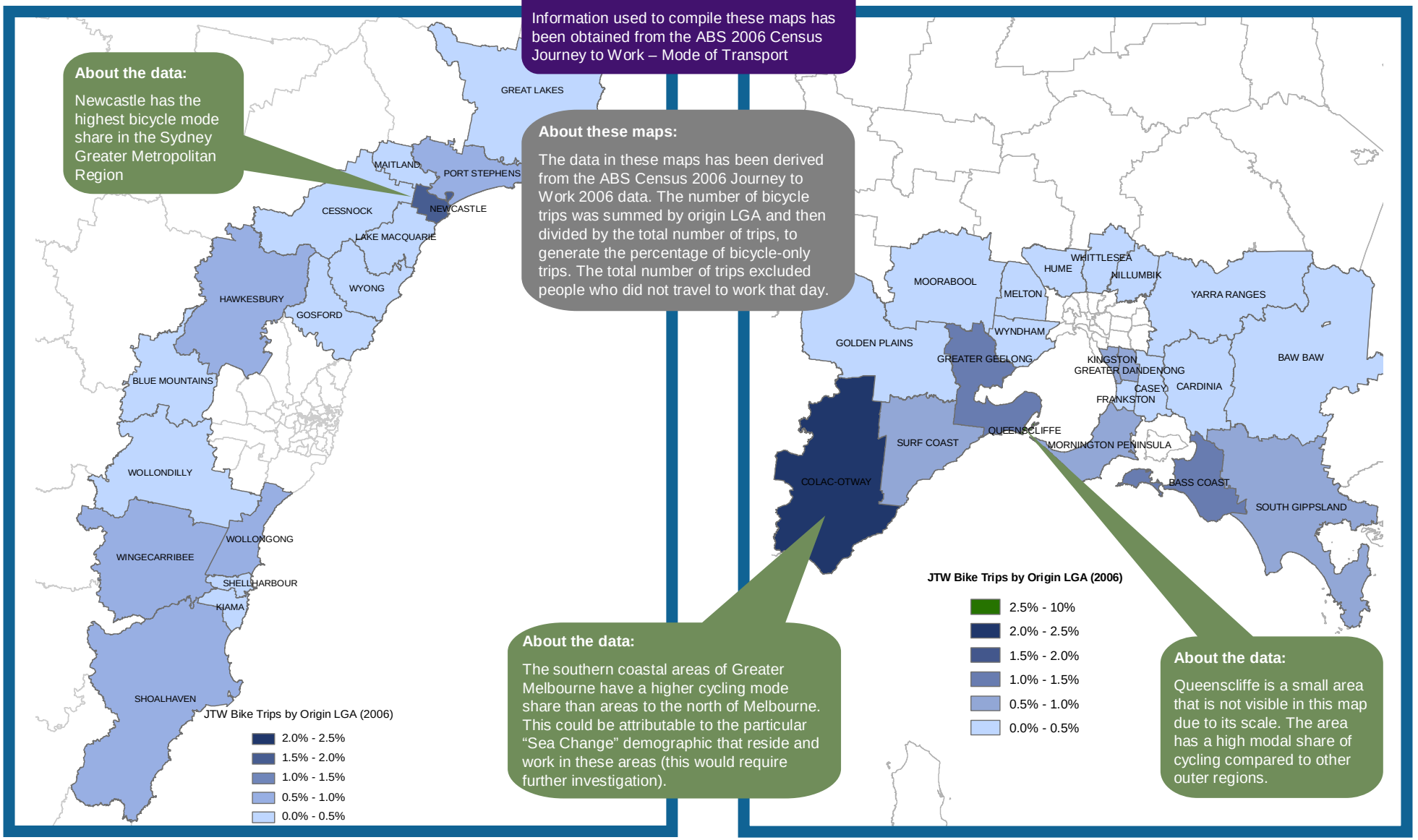
Information used to compile these maps has been obtained from the ABS 2006 Census Journey to Work – Mode of Transport

About the data:

Newcastle has the highest bicycle mode share in the Sydney Greater Metropolitan Region

About these maps:

The data in these maps has been derived from the ABS Census 2006 Journey to Work 2006 data. The number of bicycle trips was summed by origin LGA and then divided by the total number of trips, to generate the percentage of bicycle-only trips. The total number of trips excluded people who did not travel to work that day.



About the data:

The southern coastal areas of Greater Melbourne have a higher cycling mode share than areas to the north of Melbourne. This could be attributable to the particular "Sea Change" demographic that reside and work in these areas (this would require further investigation).

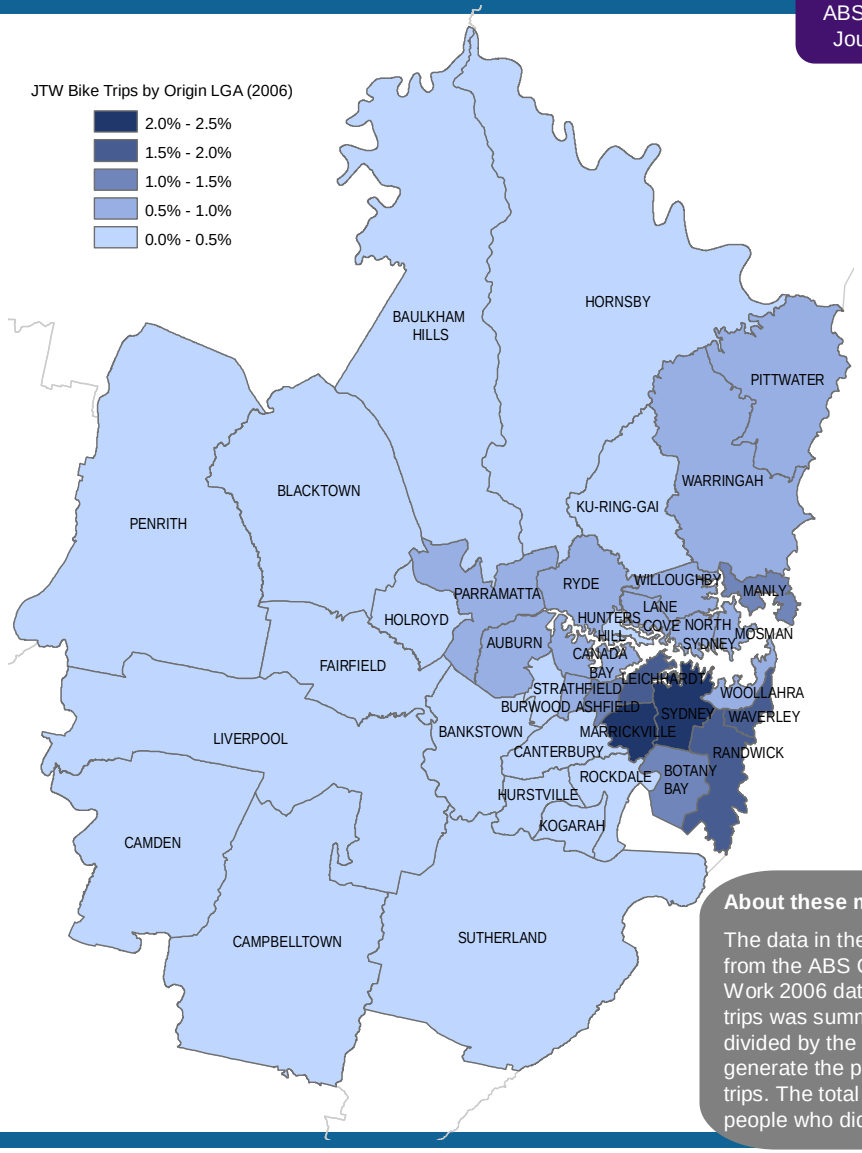
About the data:

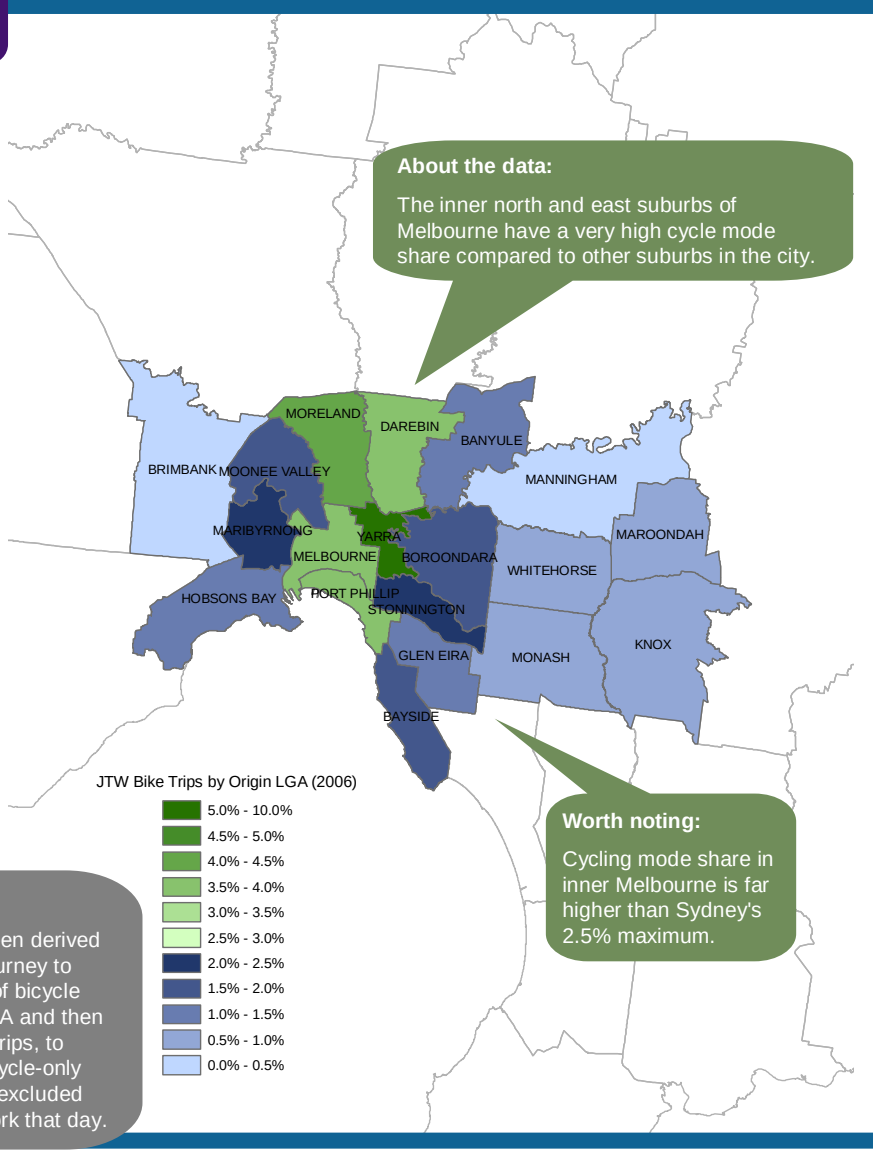
Queenscliffe is a small area that is not visible in this map due to its scale. The area has a high modal share of cycling compared to other outer regions.

Parts of inner Melbourne have significantly higher rates of commuter cycling than Sydney

Relevant reports:

ABS 2006 Census Journey to Work





About the data:

The inner north and east suburbs of Melbourne have a very high cycle mode share compared to other suburbs in the city.

Worth noting:

Cycling mode share in inner Melbourne is far higher than Sydney's 2.5% maximum.

About these maps:

The data in these maps has been derived from the ABS Census 2006 Journey to Work 2006 data. The number of bicycle trips was summed by origin LGA and then divided by the total number of trips, to generate the percentage of bicycle-only trips. The total number of trips excluded people who did not travel to work that day.

Cyclist injuries are more prevalent in the Central Business Districts, for both Melbourne and Sydney

About the data:

Cycle crash data for 2006 was obtained from the relevant road authority in each state and mapped. This data shows a comparison of cycle crash hot spots in both Sydney and Melbourne.

Sydney's spread of crashes correlates broadly with the suburb-by-suburb level of Journey to Work cycle mode share shown on the previous page.

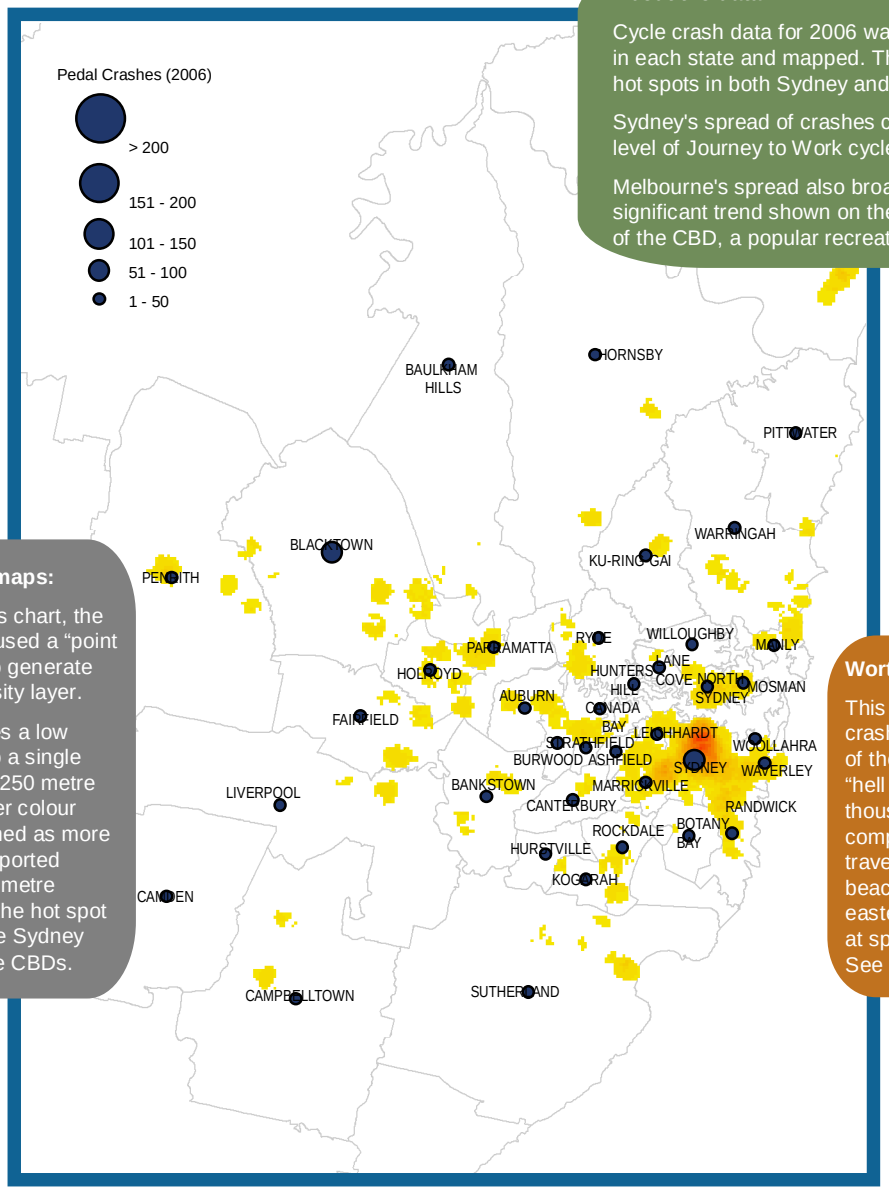
Melbourne's spread also broadly correlates with mode share. However a significant trend shown on the map is the spread of crashes to south-east of the CBD, a popular recreational cycling location.

Relevant reports:

"Safety in numbers" research conducted by Dr Jan Garrard of Deakin University indicates that the severity of cycling injuries drops as rates of cycling increase.

Victorian crash data was obtained from the VicRoads traffic accident database for 2006

NSW crash data was obtained from the RTA database for 2006



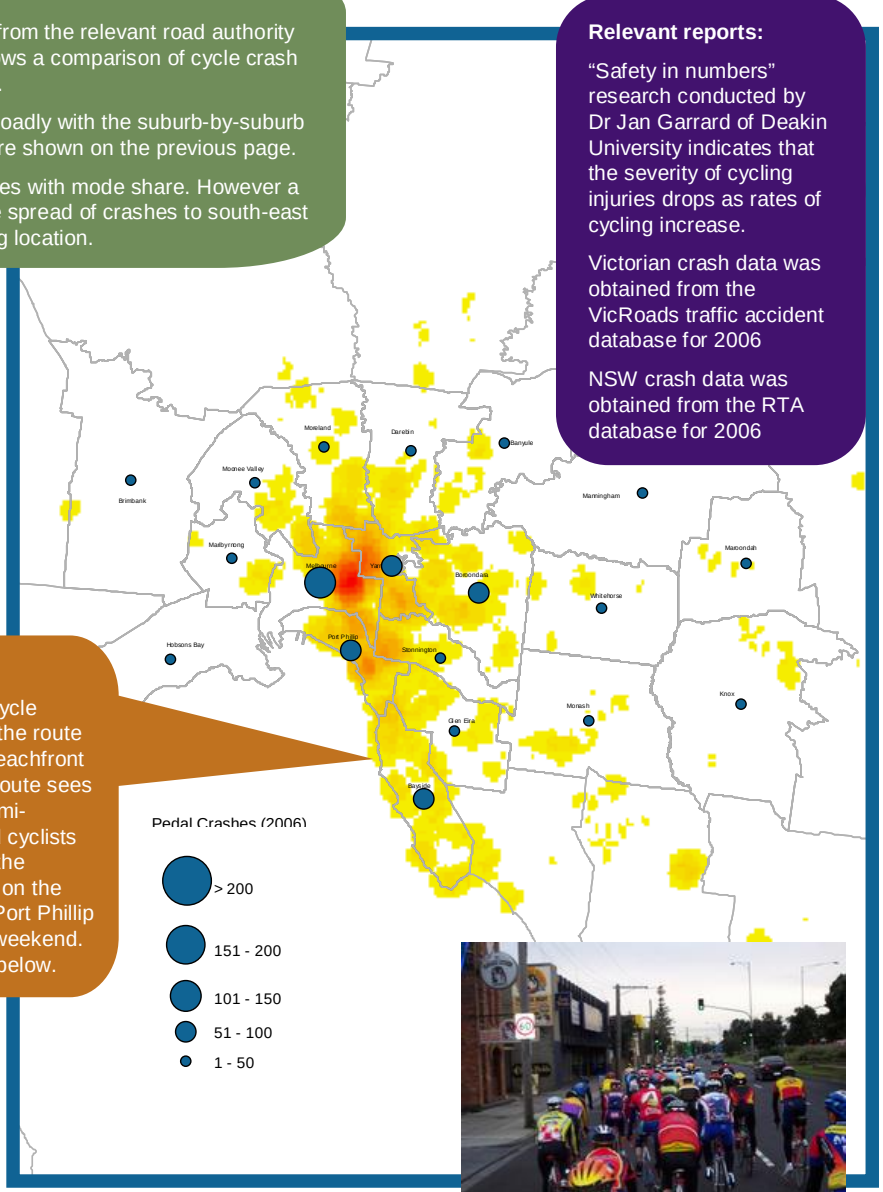
About these maps:

To develop this chart, the PB GIS team used a "point density" tool to generate the crash density layer.

This chart gives a low colour value to a single crash within a 250 metre radius. A higher colour value is assigned as more crashes are reported within the 250 metre radius, giving the hot spot densities of the Sydney and Melbourne CBDs.

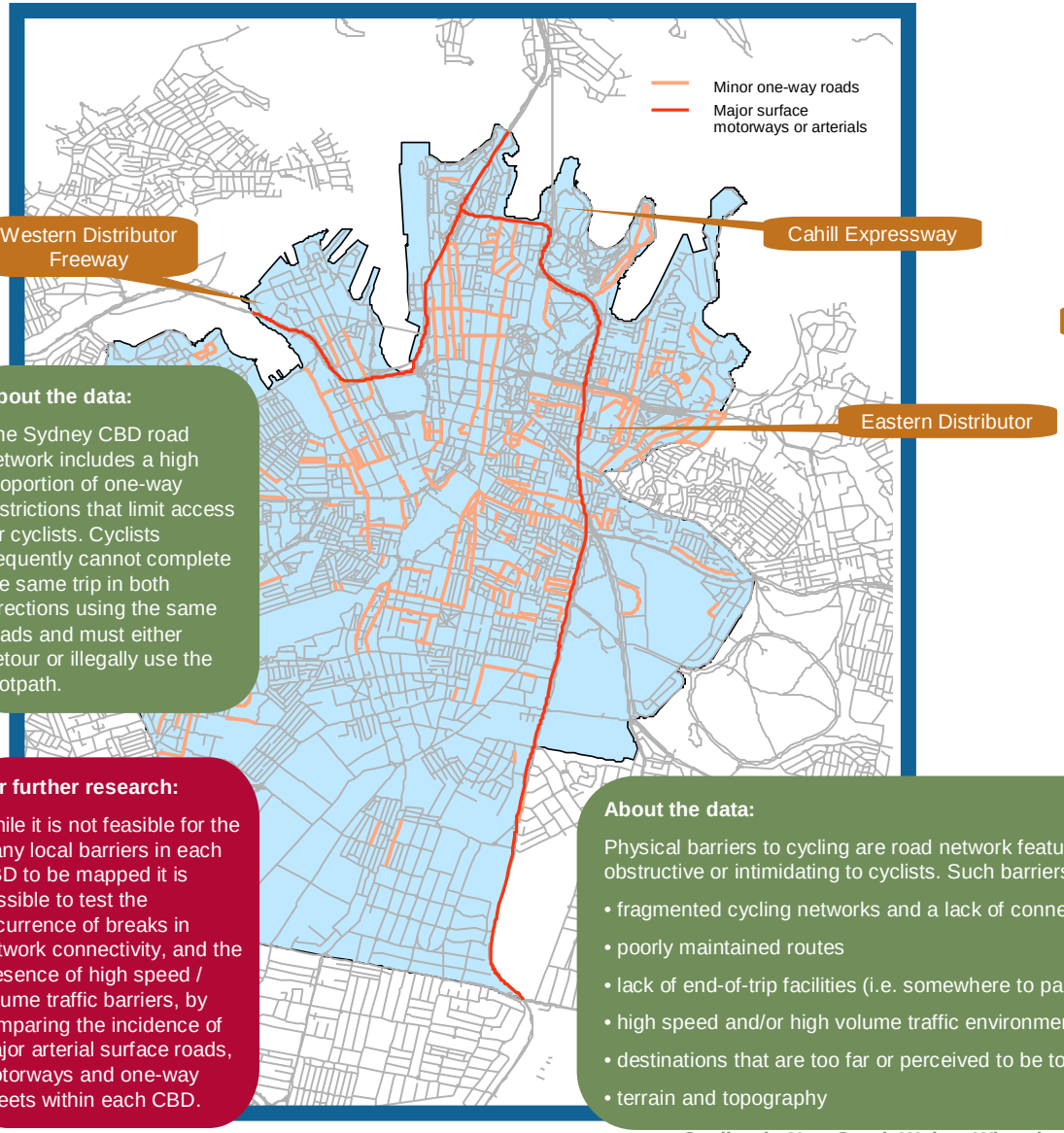
Worth noting:

This pattern of cycle crashes follows the route of the popular beachfront "hell ride". This route sees thousands of semi-competitive road cyclists travelling along the beachfront road on the eastern side of Port Phillip at speed every weekend. See the picture below.



Network permeability is potentially a barrier to cycling in Sydney compared with Melbourne

Sydney LGA



About the data:

The Sydney CBD road network includes a high proportion of one-way restrictions that limit access for cyclists. Cyclists frequently cannot complete the same trip in both directions using the same roads and must either detour or illegally use the footpath.

For further research:

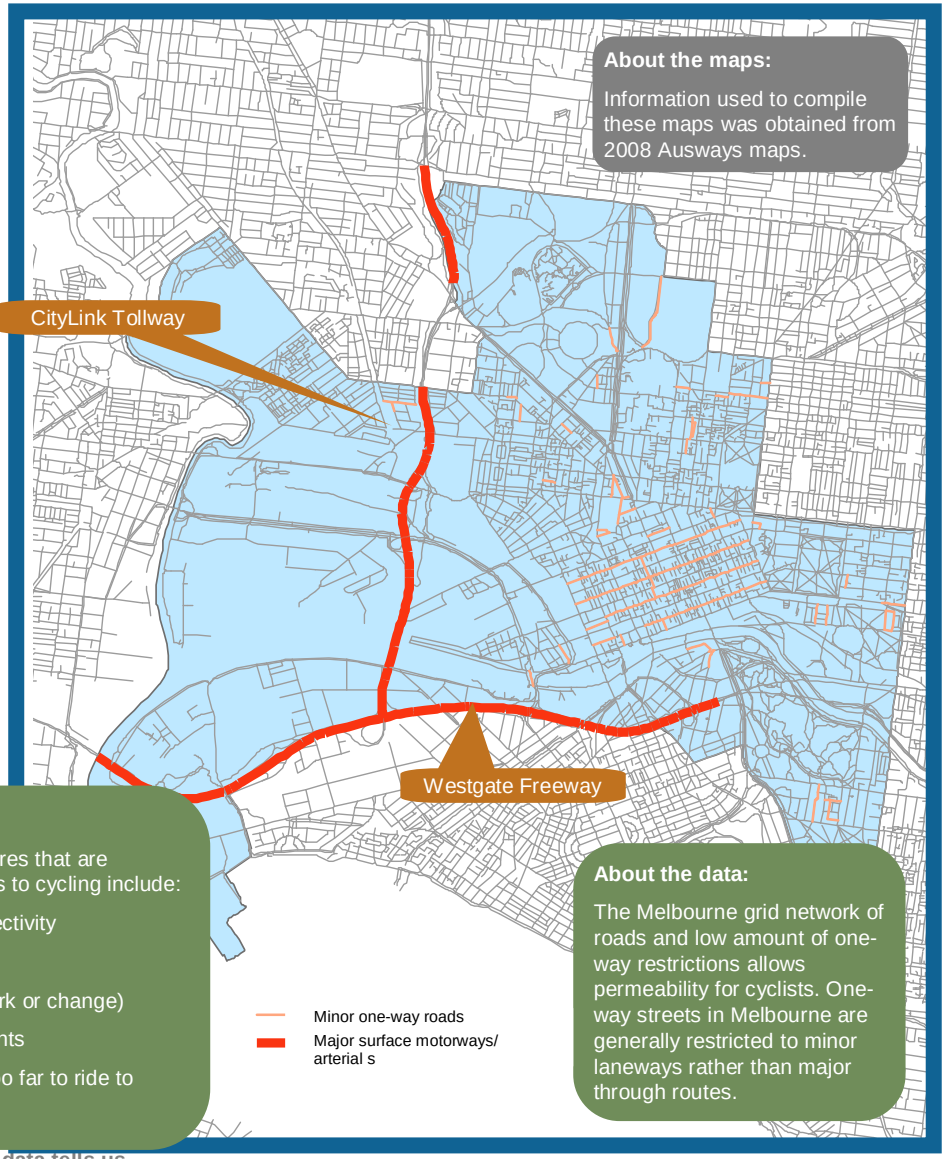
While it is not feasible for the many local barriers in each CBD to be mapped it is possible to test the occurrence of breaks in network connectivity, and the presence of high speed / volume traffic barriers, by comparing the incidence of major arterial surface roads, motorways and one-way streets within each CBD.

About the data:

Physical barriers to cycling are road network features that are obstructive or intimidating to cyclists. Such barriers to cycling include:

- fragmented cycling networks and a lack of connectivity
- poorly maintained routes
- lack of end-of-trip facilities (i.e. somewhere to park or change)
- high speed and/or high volume traffic environments
- destinations that are too far or perceived to be too far to ride to
- terrain and topography

Melbourne LGA



About the maps:

Information used to compile these maps was obtained from 2008 Ausways maps.

About the data:

The Melbourne grid network of roads and low amount of one-way restrictions allows permeability for cyclists. One-way streets in Melbourne are generally restricted to minor laneways rather than major through routes.

CBD topography is less friendly to cyclists in Sydney than in Melbourne

About the data:

Topography, real or perceived, can be a factor influencing cycling. Popular opinion sees Melbourne as flat in comparison to Sydney and this may have played a role in encouraging Melburnians to embrace cycling as a mode of transport.

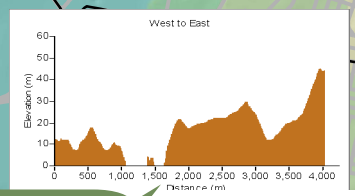
To test this theory, the CBD of each city has been topographically mapped, highlighting the most popular north-south and east-west cycling route through each CBD (as identified by cycle path counts).

A cross-section for each of the four cycle routes gives an indication of the changes in level met by cyclists.

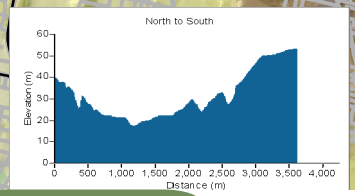
Worth noting:

To provide further information on the role of topography in propensity to cycle, it would be useful to assess the sequence and severity of gradients encountered on each cycle route. This would give further insight into the "amount of effort" needed to travel by bicycle in each city centre.

Sydney LGA



About the data:
Maximum: 50 metres



About the data:
Maximum: 40metres

Melbourne LGA

About these maps:

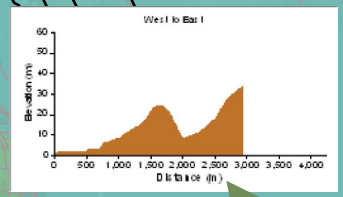
Information used to compile these maps has been obtained from:

Vicmap – 1m elevation contours

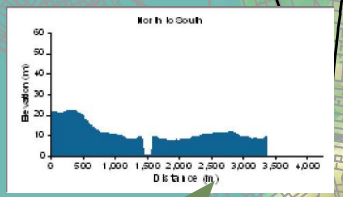
NSW Department of Lands, Digital Terrain Database (DTD) – 2m elevation contours

VicRoads cycle route maps

Sydney – existing bicycle routes and likely bicycle routes from the end of major bicycle infrastructure (i.e. from the Anzac Bridge and Sydney Harbour Bridge cycleways).



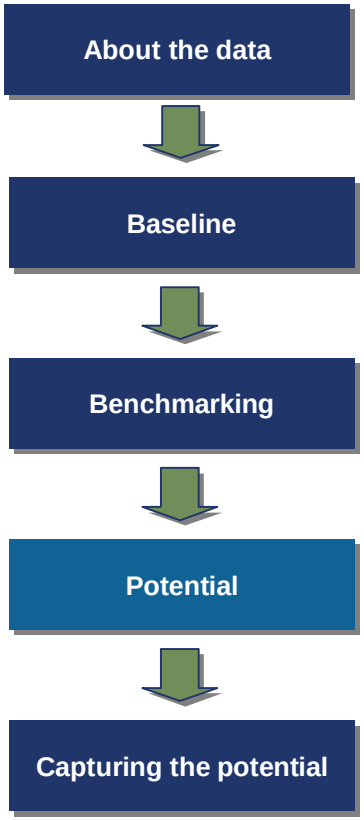
About the data:
Maximum: 35 metres



About the data:
Maximum: 10 metres

Section 4: The potential to increase cycling in NSW

What is the potential to increase cycling in NSW?



The most reliably measured data on cycling in NSW is the Journey to Work, measured during the five-yearly Census by the Australian Bureau of Statistics.

The NSW Transport Data Centre have shown that commuting only represents 15% of all person trips in Sydney.

However, we could reasonably assume that there is a link between the levels of commuter and non-commuter cycling.

PB therefore suggest that Journey to Work is used as the primary indicator for NSW to reach its potential medium-term bicycle mode share.

The average Journey to Work bicycle mode share for South Australia, Queensland, Victoria and Western Australia is an aspirational, but achievable, benchmark for the purposes of this analysis.

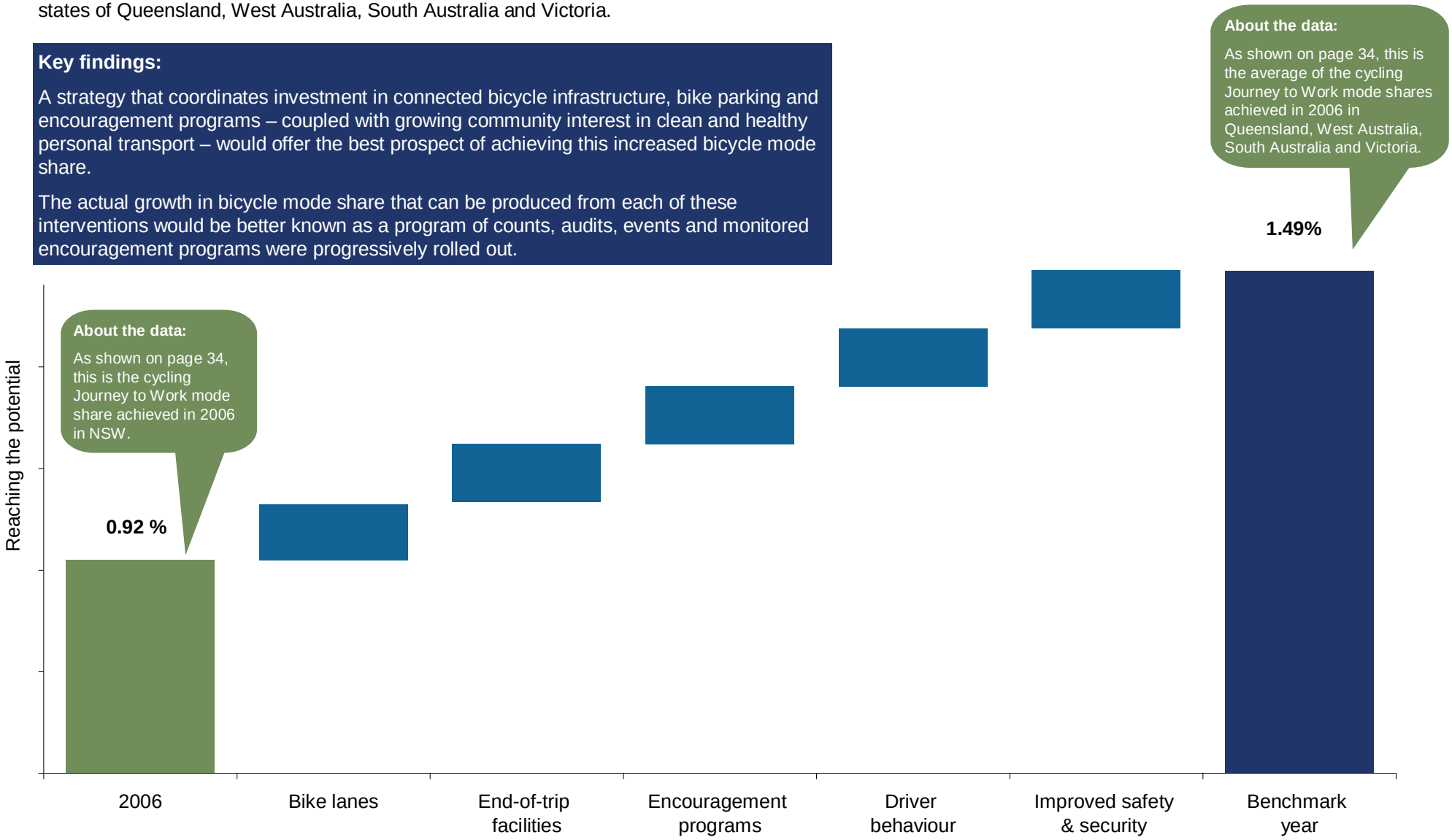
Cycling to work in NSW could match an Australian interstate benchmark

A reasonable working benchmark for NSW bicycle mode share, as measured by Census data on the Journey to Work, is the average bicycle mode share achieved by the "middle four" states of Queensland, West Australia, South Australia and Victoria.

Key findings:

A strategy that coordinates investment in connected bicycle infrastructure, bike parking and encouragement programs – coupled with growing community interest in clean and healthy personal transport – would offer the best prospect of achieving this increased bicycle mode share.

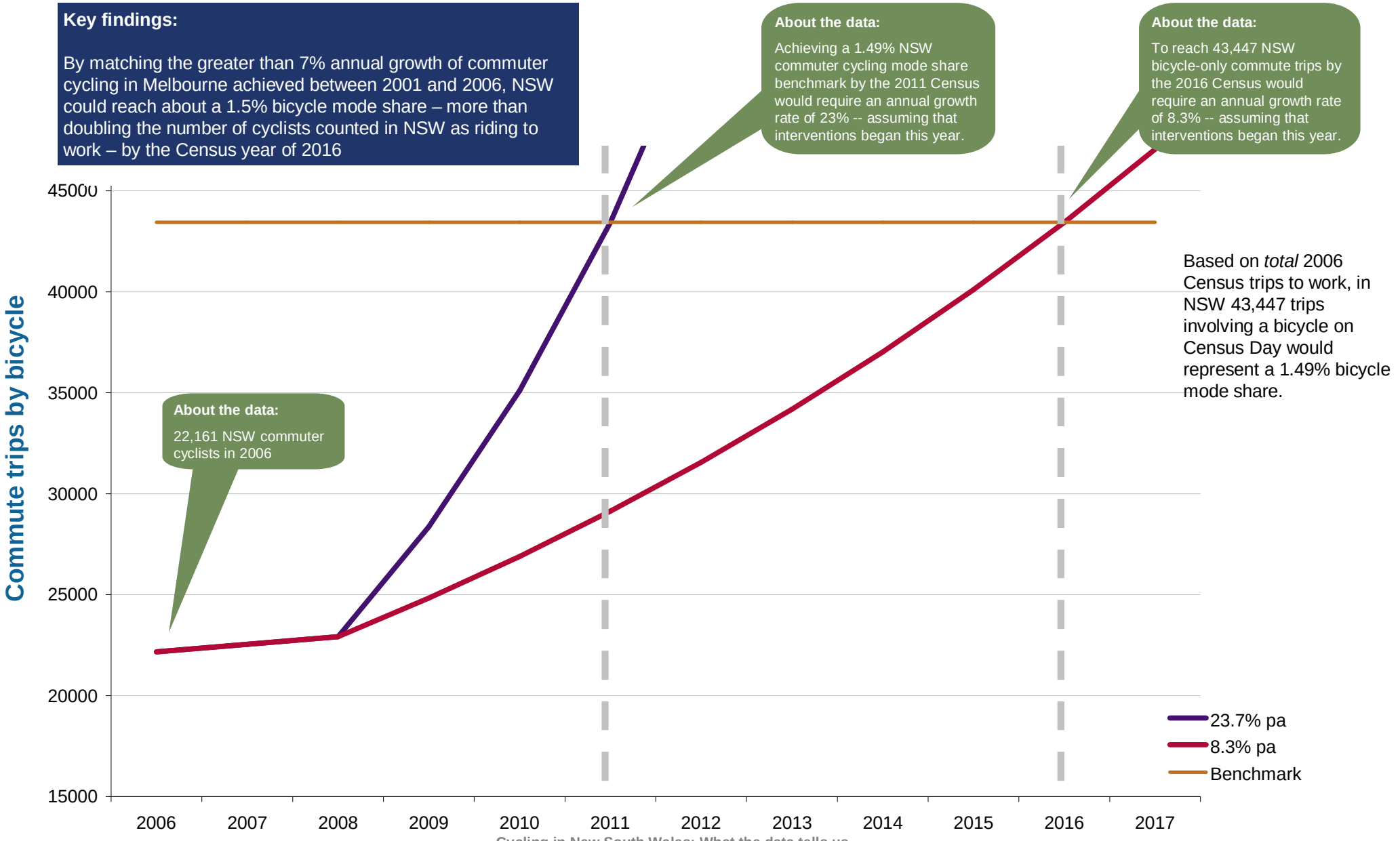
The actual growth in bicycle mode share that can be produced from each of these interventions would be better known as a program of counts, audits, events and monitored encouragement programs were progressively rolled out.



"Melbourne-style" growth would see NSW reach its cycling Journey to Work benchmark by 2016

Key findings:

By matching the greater than 7% annual growth of commuter cycling in Melbourne achieved between 2001 and 2006, NSW could reach about a 1.5% bicycle mode share – more than doubling the number of cyclists counted in NSW as riding to work – by the Census year of 2016

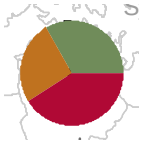


Based on *total* 2006 Census trips to work, in NSW 43,447 trips involving a bicycle on Census Day would represent a 1.49% bicycle mode share.

Current short car trips to Sydney's major centres present a market to increase cycling

A total of 43,447 bicycle trips would bring NSW up to an Australian benchmark for commuting cycling.

The map below illustrates car trips to centres reported in the 2006 Household Travel Survey of the NSW Transport Data Centre are classified by trip length. The map below shows Metropolitan Strategy centres as pie charts. The size of the pie chart corresponds to the total number of car trips arriving at that centre on a weekday:



Green represents the proportion of car trips shorter than 5 km

Yellow represents the proportion of car trips between 5 and 10 km

Red represents the proportion of car trips greater than 10 km.

The car trips shown in green or orange could well represent a market for cycling growth.

Relevant data sources:

NSW Transport Data Centre Household Travel Survey 2006 *Car Trips to Centres*

About the map:

Using Household Travel Survey data for weekday car trips to Sydney's centres, the size of each centre's pie chart is based on total weekday trips.

The "slices of the pie" illustrate the proportion of trips that are less than 5 km, trips between 5 and 10 km and trips longer than 10 km.

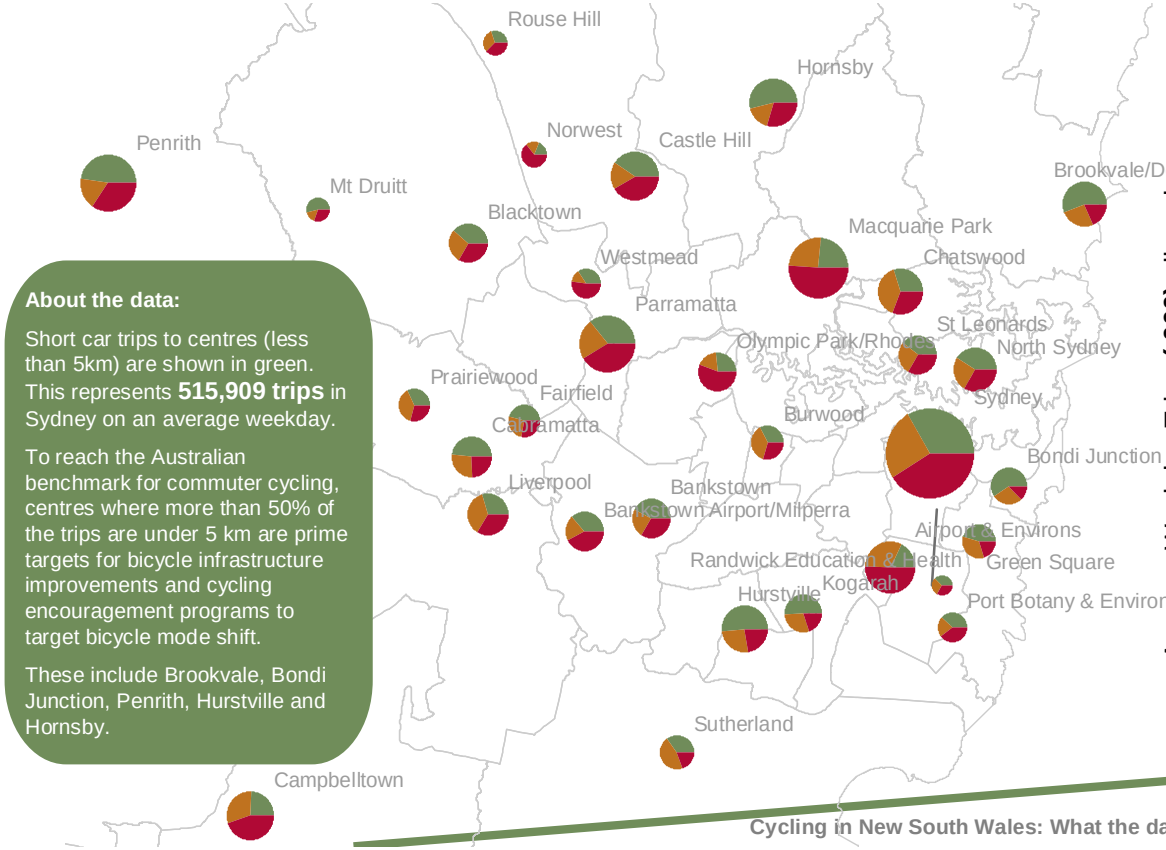
Worth noting:

To target bicycle mode shift

At Penrith, the proportion of short car trips is higher at 47% of trips (34,946 trips under 5km)

Short trips account for 56% of car trips to Brookvale/ Dee Why (25,351 trips under 5km).

Though the proportion of short trips is smaller in the Sydney CBD (33% of car trips) there are 61,955 trips under 5km

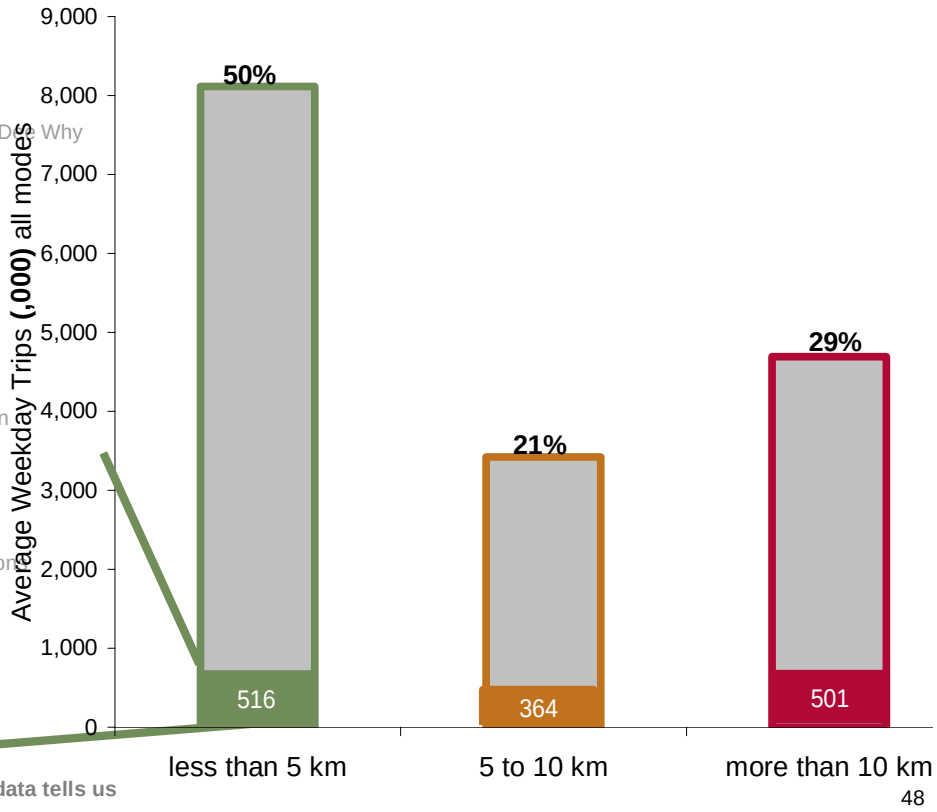


About the data:

Short car trips to centres (less than 5km) are shown in green. This represents **515,909 trips** in Sydney on an average weekday.

To reach the Australian benchmark for commuter cycling, centres where more than 50% of the trips are under 5 km are prime targets for bicycle infrastructure improvements and cycling encouragement programs to target bicycle mode shift.

These include Brookvale, Bondi Junction, Penrith, Hurstville and Hornsby.



Section 5: Proposed program of counts to monitor NSW growth in cycling

What counts, surveys, audits and focus groups would help to identify cycling achievement in NSW?

What further research would complete the picture of cycling in NSW?

Evidence indicates that an integrated program of “hard” and “soft” interventions could significantly increase cycling in NSW.

There is a need to formalise a continuous cycling monitoring framework. Journey to Work Census data provides the most reliable indicator of bicycle usage and should be used for identifying potential. However, the Journey to Work Census is only measured every five years and processing takes approximately two years. It is therefore necessary to understand what is happening between census releases.

An accurate and targeted quantitative regime should be established to gauge progress towards a bicycle usage benchmark.

An infrastructure monitoring strategy would capture use of the bicycle network, end-of-trip facilities and bicycle parking.

Surveys would illuminate the reasons why people do cycle, while focus groups will provide a better understanding of why other people choose not to cycle.

The monitoring strategy should include:

permanent point-based counters

- at main off and on-road routes into Sydney CBD

temporary point-based counters

- at main on-road routes into other centres and major recreational facilities
- at corridors containing cycle crash hotspots in the Greater Metropolitan Region

periodic audits and surveys:

- of cars arriving with bicycle carriers at major recreational facilities (Sydney Olympic Park, Centennial Park, major fire trails and recreational rides like Bobbin Head and the Royal National Park)
- of bicycle parking at public transport interchanges
- of bicycle parking utilisation at major employment centres

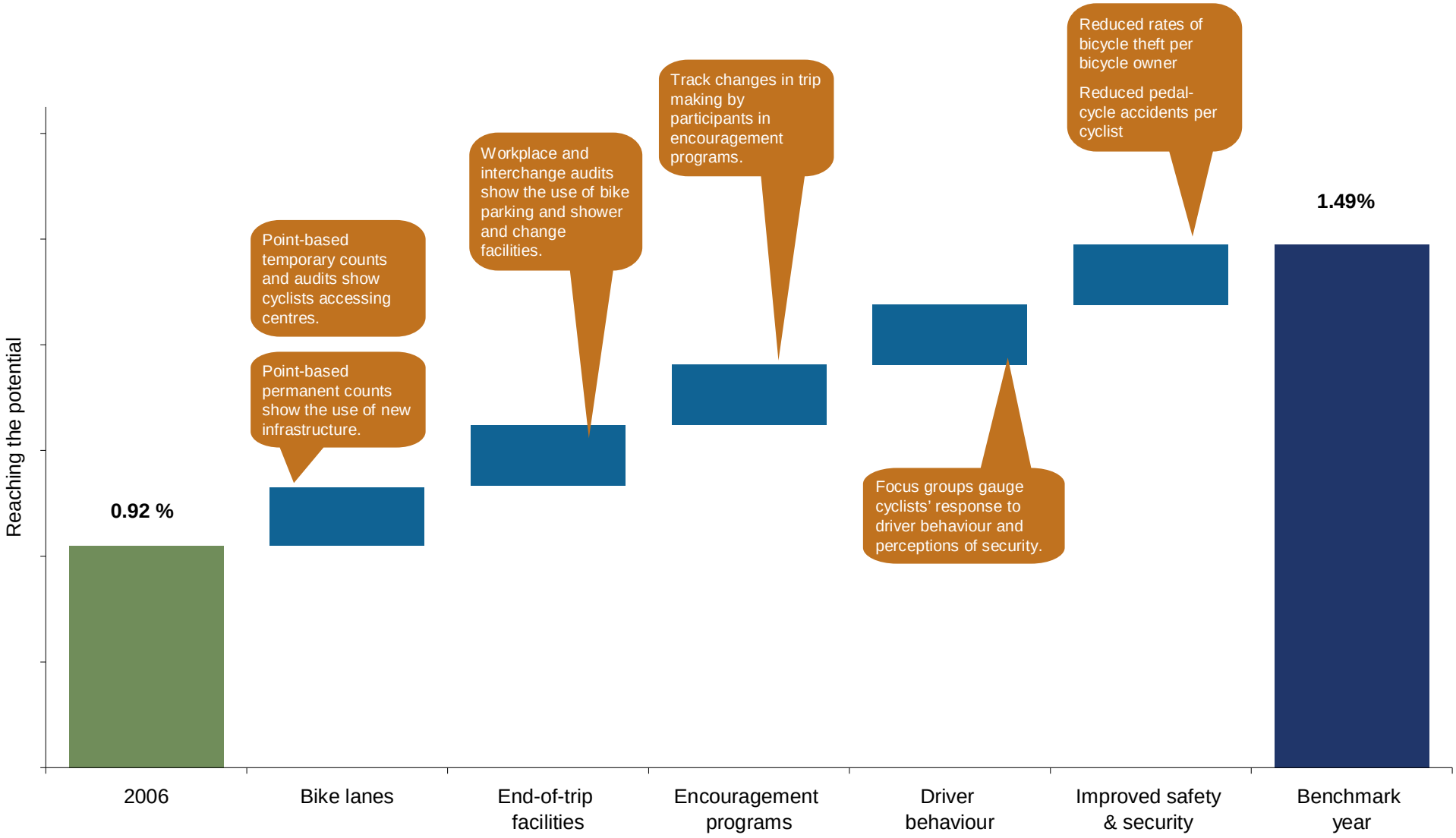
cyclist intercept surveys and *focus groups*

- to measure changes in the cycling baseline
- to measure the results of specific interventions to promote cycling.

self-reporting

- enable cyclists to provide information on safety, connectivity and maintenance blackspots. Reporting with links to photos or a maps, including via web-based tools like Google Maps.

Consistent and regular audits, counts, and surveys would monitor NSW progress towards cycling objectives



Fit-for-purpose surveys, counts and audits will fill out the picture of bicycle usage in NSW

	Fitness & exercise (NSW Health, Department of the Environment & Climate Change, Premier's Council for Active Living, Australian Sport Commission)	Infrastructure use (Roads & Traffic Authority, owners / operators of major recreational sites, local councils)	Trip purpose (Australian Bureau of Statistics, Department of the Environment & Climate Change, Department of Planning, Premier's Council for Active Living)
Permanent point-based counters	**For further study:** To target bicycle infrastructure needs and develop appropriate infrastructure solutions, easily moveable "roving" counters would count cyclists in an area under planning investigation before the start of any construction. Regular roving follow-up counts would ascertain usage after construction.	**Key findings:** Upgraded and relocated permanent point-based counters would provide a reliable annual, seasonal, weekly and hourly profile of strategic bicycle routes (on-road and off-road). Possible locations for upgraded counters are Anzac Bridge, Sydney Harbour Bridge and Anzac Parade. New counter locations could include William Street, Parramatta Road / Broadway / George Street corridor and Military Road. Permanent counters at Prospect and Cabramatta locations provide data of limited value and can be removed.	**Key findings:** Intercept surveys of cyclists at permanent cycling counter locations would add information on users' destination and trip purpose to raw counter data.
Temporary point-based counts		**Key findings:** Roving counters could be deployed across Greater Metropolitan Region centres to count cyclists at on-road and off-road routes. Users of recreational cycle routes, such as at Prospect and Cabramatta, could be tracked seasonally as part of a roving counter program.	**Key findings:** New technology allows the development of a GPS-based bicycle computer or key chain device for use by participating cyclists, to help track cycle trip-making patterns and improve decision-making. To be most useful for planning purposes GPS data would need to be supplemented with data from a travel journal, on trip purpose, trip time and journey length.
Site-based infrastructure audits	**For further study:** Local councils' expenditure on cycling assets is often not identified in annual reports separately to roads, bridges footpaths and car parking. Tracking this information through the NSW Cycling Geodatabase would develop a more complete understanding of total expenditure and identify places to count bicycle usage in the future.	**Key findings:** A uniform or mandatory reporting process would improve reporting by local councils and others on the provision of cycling infrastructure and usage outcomes. Similarly, a uniform auditing process would enable local councils and others to track the provision and use of end-of-trip facilities like bicycle parking.	**Key findings:** Questionnaires attached to bicycles parked at specific end-of-trip locations (e.g. train stations, shopping centres, major entertainment facilities) can produce data of value to promoting cycling for purposes other than commuting.
Focus groups & market research	Key findings: A telephone / web-based survey could target non-riders who are already participating in organised physical activity. New riders can be identified among participants in cycling events and surveyed subsequently regarding their ongoing cycling.	**For further study:** To better target cycling interventions, focus groups would identify why particular areas have low levels of cycling. Further market research, based on the outcomes of focus groups, would identify particular areas and demographics to target with specific programs.	**Key findings:** Intercept surveys at existing or proposed cycling destinations (shops, businesses, sport facilities) would ascertain trip purpose and help guide planning. Focus group consultation with non-cyclists would help in understanding the reasons for low rates of cycling participation and developing strategies in response.

A range of appropriate technologies are available to count bicycles in Sydney and NSW

Point based counts

Using a variety of technologies (see right) point-based counts track the number of bicycles passing a specific point on a route.

Point-based counters provide statistics based on time of day, day of week, month and, in some cases, direction. There are a number of technologies that can collect this information.

Subject to the location of a counter being carefully planned data collected at one point on a route can be representative of usage along the whole corridor.

Careful placement of counters is critical to building up a complete picture.

For further study:

It is likely that a range of different counting technologies will be needed to suit the various installation environments.

Key finding:

Upgrading the existing, and installing new, permanent point-based bicycle counters would deliver high-quality data on cyclist numbers using major routes.

Key finding:

Developing and deploying roving bicycle counters across centres and corridors would complete the picture of changes in cycling before and after route improvements.

Inductive loop

This type of device features wires embedded into the road / cycleway and connected to an adjacent unit which collects the raw information.

In general, embedded loops are highly reliable and are used widely by the RTA to monitor motor vehicles' presence as part of the SCATS system that controls traffic signals.

Loops can be used in mixed mode conditions or on off-road cycle / pedestrian routes.

Potential issues

Cyclists may unintentionally avoid passing over the loop.

When used in mixed mode environments it may be difficult to separate bicycles from other vehicles (e.g. motor vehicles which pass over or park in cycle lanes or stop in green "cycle storage areas" at traffic signals).

For further study:

Effort will be required to centralise the downloading, management and analysis of data from different counting devices according to a consistent set of procedures.

Video-image processing (CCTV)

This type of device monitors numbers by processing images captured on a continuous CCTV loop. Analysis can occur either at the count site or at a remote location using transferred data.

Image processing software is used to detect the number of cyclists and their direction, speed, and position on the roadway.

Potential issues

Cost to install and maintain

Likely to offer value for money only if used in a mixed mode environment

Pressure counters

This type of device is buried and uses piezoelectric material to detect changes in surface pressure caused by bicycles.

Potential Issues

Cannot determine the difference between modes

Buried in road / cycleway so may be difficult to maintain

Infrared (active)

This type of device uses detection of a breakage in an infrared light beam to count different types of vehicles, their direction of travel and speed.

When used in mixed mode environments this type of counter can also determine which lane the vehicle is in. Some counters are suitable for roving use.

Potential issues

Cost

May not suit some locations

Infrared (passive)

These above-ground devices can count path usage by detecting the heat radiated by people. They cannot determine speed or direction of travel.

Potential issues

Such devices would not be able to identify between pedestrians and cyclists.

Bluetooth

Innovative use of Bluetooth technology to track mobile devices being carried by cyclists by identifying unique MAC addresses. E.g. mobile phones.

Potential issues

Will need a methodology to determine which Bluetooth devices are carried by cyclists.

Pneumatic tube

Currently used by the RTA, this type of device collects count data by detecting changes in pressure on the tube.

Potential issues

Retrieval of information

Vandalism

Limited ability to distinguish between different vehicle types in mixed mode conditions

About the counters:

A combination of these devices could be deployed as roving counters to measure cycling use on (say) the Parramatta Road / Broadway / George Street corridor or routes into Macquarie Park.

About the counters:

Most contemporary bicycle counting technologies allow remote retrieval of data from units using GSM or 3G modems.

3G data management would streamline data handling and expedite data assembly.

This would come at a cost that would be determined by the amount of information transferred from each counter.

New technology could facilitate whole-of-cycle trip bicycle tracking

Worth noting:

Tracking bicycle trips is not yet common practice in Australia or internationally.

"E-tag" transponders are currently used in NSW as point-based devices to trigger tolls rather than to track the entire trip.

This technology could be used to provide real time data on traffic speeds and other variables.

Key findings**:**

Tracking a volunteer cohort of cyclists, from origin to destination of all cycling trips during a set period, would yield rich data on network performance.

Worth noting:

Information gathered in this way might for the first time make it possible to identify a "car trips saved" equivalent for bicycle kilometres travelled. Measured bicycle trips, captured via a GPS logger or downloadable bike computer as a length of route travelled, could be interpreted by transport modellers in terms of "Greenhouse Gases not emitted" or a similar desirable outcome.

GPS

A Global Positioning System logger could be fixed to the handlebars of participating bicycles to collect data on the specific routes taken by cyclists. Data would need to be uploaded to a central database for analysis. A travel journal could be used to correlate trip purpose.

Potential issues

Collecting information from GPS logger (effort increases with sample size)

Difficulty in correlating data to (e.g.) trip purposes

Cost of GPS units

Privacy issues

DSRC

Dedicated Short Range Communications radio transmission devices are used to track a wide range of functions. DSRC has been used for competitive and social running and cycling events. Cyclists would fit their bike with a DSRC chip that could then be detected using roadside detectors positioned along routes.

Potential issues

DSRC untested in tracking cyclists along routes' full length

Reliance on cyclists being detected at each point along a route

Uncertain level of accuracy

Route tracking

Tracking a cyclist's route from origin to destination would provide an even richer dataset than permanent or temporary point-based counts. Route-based information would provide information on trip distance, timing and duration. This information would be used to calibrate point-based data on infrastructure usage and anecdotal information from cyclists in focus-groups.

A wide distribution of bike computer-type GPS counters (i.e. more than 1,000 cyclists for a week or 100 cyclists over 10 weeks) would be critical to obtain a rich enough dataset to test assumptions.

There would be risk of bias arising from cyclists pre-selected for study and having a pre-existing preference for a certain type of cycling usage.

A selection process could attempt to control for bias by using Bicycle NSW members with a wide aptitude range and point-based intercepts of cyclists using existing recreational or commuter bicycle routes.

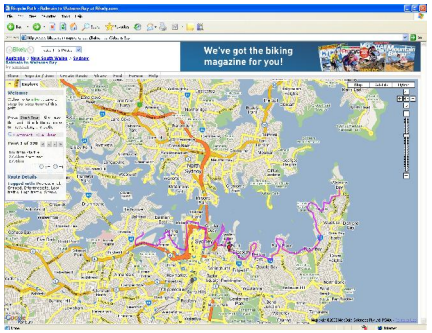
Using the power of the Internet could enable cycling information sharing and stakeholder dialogue

Key findings:

Well-designed web-based systems allow cyclists (and planners) to share route choice information.

Key findings:

Additional web-based functions allow cyclists to report network issues using a common terminology



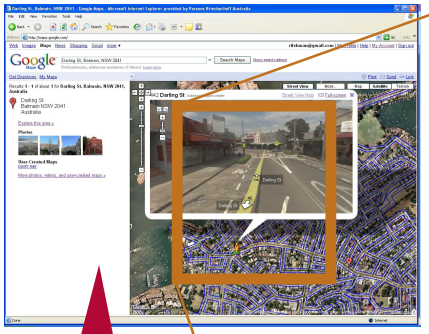
This is a cue sheet for the Balmain to Watsons Bay Bicycle Map. Yo

Cumulative	Distance	Where	Notes	Direction		Elevation
0km	0km	Balmain		SSE	155°	8m
3.55km	3.55km	Pyrmont		SSW	202°	0m
7.79km	4.24km	The Rocks		ESE	109°	28m
9.54km	1.75km	St James		SE	128°	54m
13.84km	4.3km	Potts Point		ESE	102°	48m
15.8km	1.96km	Darling Point		W	270°	19m
18.19km	2.39km	Point Piper		NE	38°	30m
21.27km	3.08km	Rose Bay		SE	131°	2m
23.2km	1.93km	Vaucluse		NE	35°	39m
27.57km	4.36km	Watsons Bay		NNW	337°	7m

For further study:

At present, websites like **http://www.bikely.com** do not have the functionality to record infrastructure type. Web 2.0 systems could include a coded patch that allows riders to cite infrastructure information (i.e. route is a shared path, dedicated cycleway or unsigned on-road route).

This would assist the RTA in capturing information on on-road routes "discovered' by cyclists – and enable the RTA to pass on tested information of this type to novice riders.



For further study:

Web-based cartographical applications like GoogleMaps offer a powerful tool for policy-makers, planners, traffic engineers and cyclists.

A street view, as shown here, provides a common point of reference for all stakeholders.

This can provide the basis for standardising the classification system for various types of bicycle infrastructure.

A web-based street view or map also offers a shared perspective that can be referenced by different stakeholders, including when they are remote from one another, when discussing infrastructure issues.

Embracing new technology would result in industry-leading data management

For further research:

Investigate using Service Oriented Architecture (SOA) to manage the next generation of the NSW Cycling Geodatabase

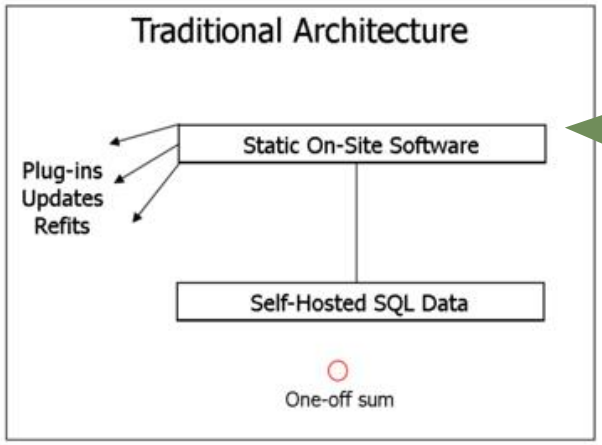
The data collated during this project was compiled to allow specific analysis tasks. The longer-term applications of this data could stretch into numerous operational and strategic bicycle policy and planning areas beyond the scope of this project.

By employing a Service-Oriented Architecture (SOA) approach it would be possible to create flexible and extensible Geographic Information Systems (GIS) for ongoing data management. This GIS would be quickly adaptable to the future requirements of bicycle data users. Under a SOA model data user requirements could be met by dynamically chaining multiple data services from different providers.

Services provide well-defined and separate functions over the Internet, and could include Web Mapping Services (WMS) and Processing Services. Many other existing GIS software applications are able to deliver services via the Internet. Simple services can be provided with little or no customisation.

For example, those responsible for building and maintaining bicycle infrastructure (the RTA or local councils) could provide a WMS that produced a graphic image of the cycleways or bike parking for a given area or locality. This service could be used for future planning projects. Additionally, stakeholders like Bicycle User Groups and local councils that wanted to provide this information to consumers could use this service to produce web-based interactive mapping applications, route profiles for bicycle computers, and/or static cycle maps.

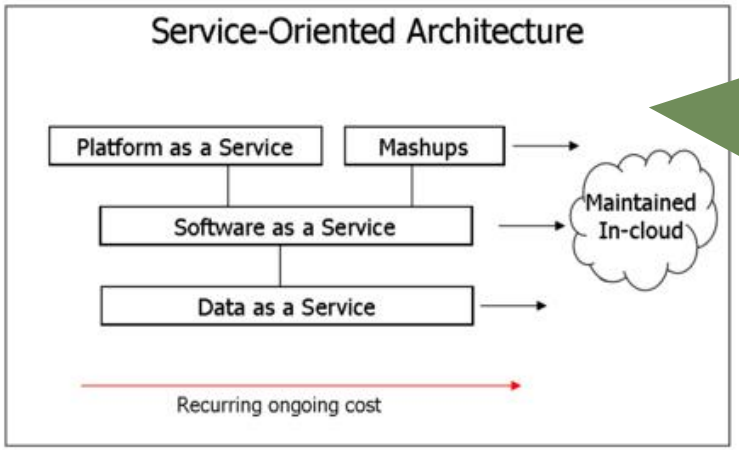
The point to note is that if a service is well-designed and self-contained it can be used in ways that may not have been envisaged at its inception. Delivering services through a SOA model results in a more readily extended GIS environment than through traditional GIS architecture where data is exchanged in real time as and when it is requested.



About the data:

This is the process used for this Bicycle Usage Study and in the development of the NSW Cycling Geodatabase. To maintain the data would require a dedicated resource to contact each NSW government stakeholder for their updated data.

This labour-intensive methodology could lead to out-of-date data being used in bicycle infrastructure and program funding decision making.



About the data:

The opportunity offered by Service Oriented Architecture (SOA) is that a “mash up” or piece of computer code would be written to retrieve the latest organisational data as required to complete individual queries.

This would ensure that all cyclists and bicycle decision-makers had access to the most recently updated data available.

Worth noting:

This approach would result in industry-leading data management.

Relevant Reports:

A number of resources are available online with information about SOA design guidelines.
http://commons.wikimedia.org/wiki/Image:SOA_Diagram.png

PR_2124

Cycling in New South Wales

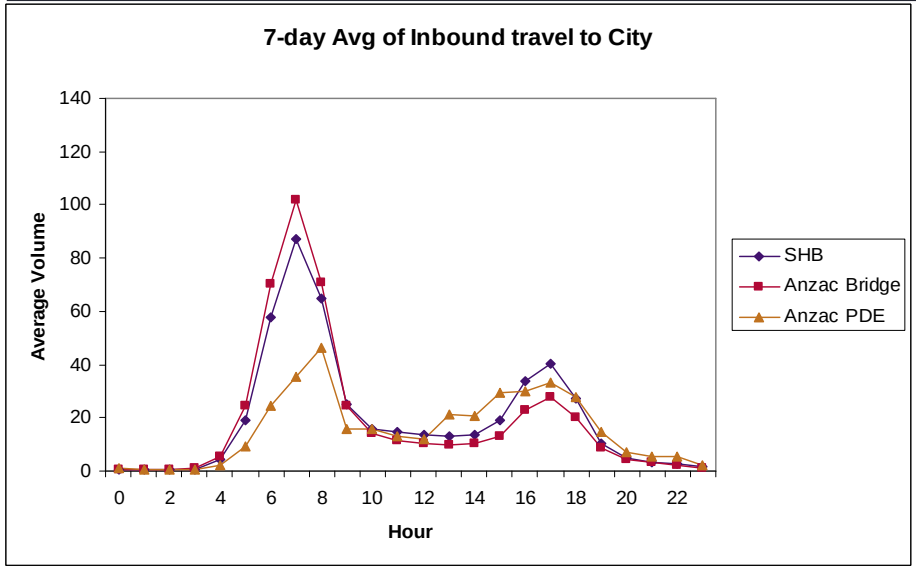
What the data tells us

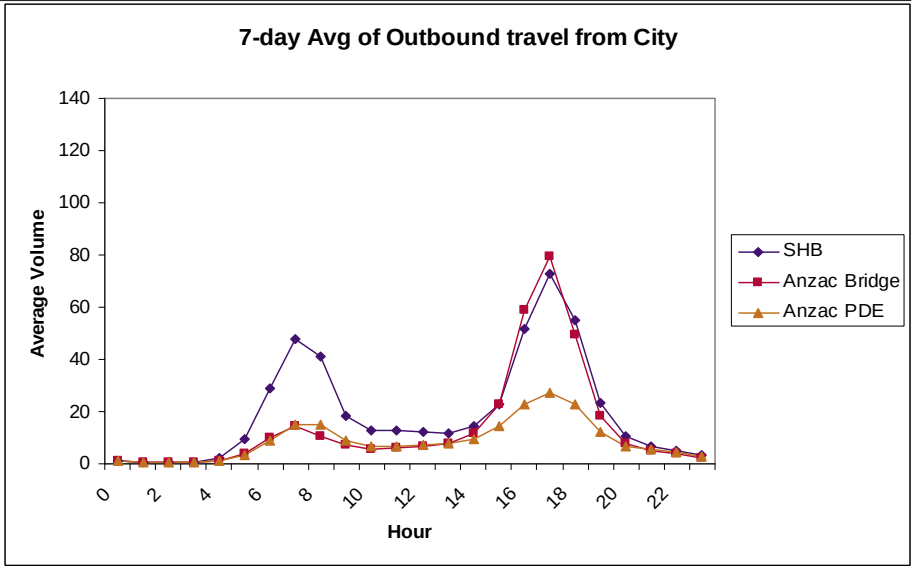
Appendix A: Bicycle counter data

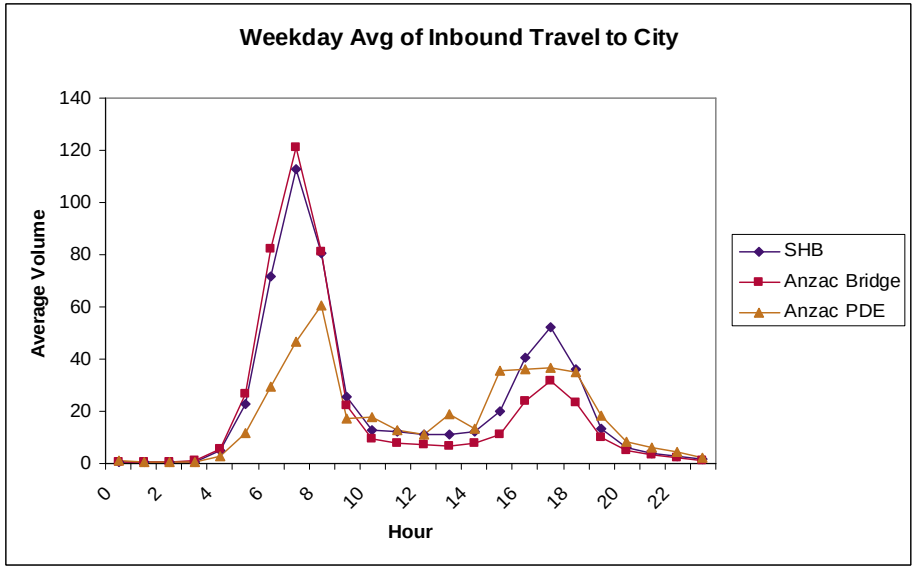
Prepared for the Premier's Council for Active Living

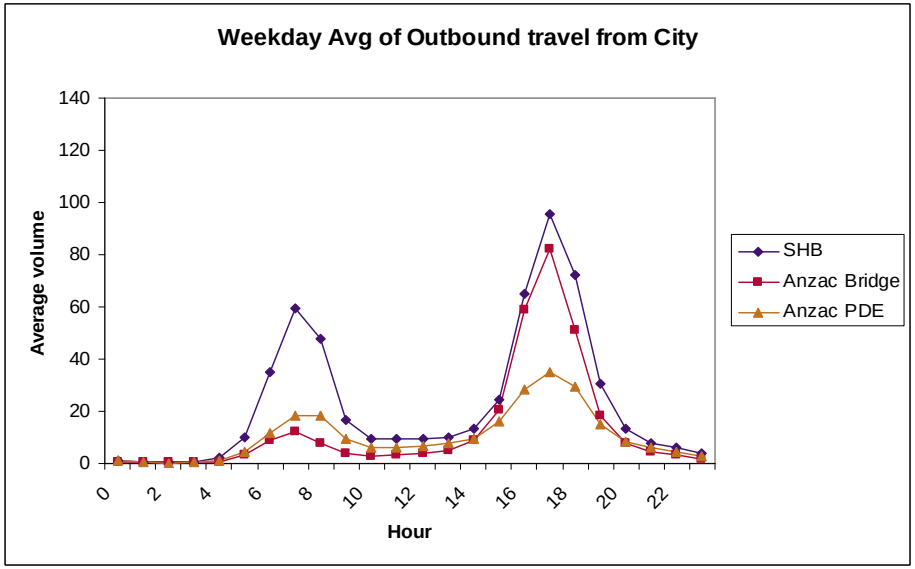
December 2008

Inbound and Outbound travel of Sydney CBD (2006-2008) – Hour by hour profile

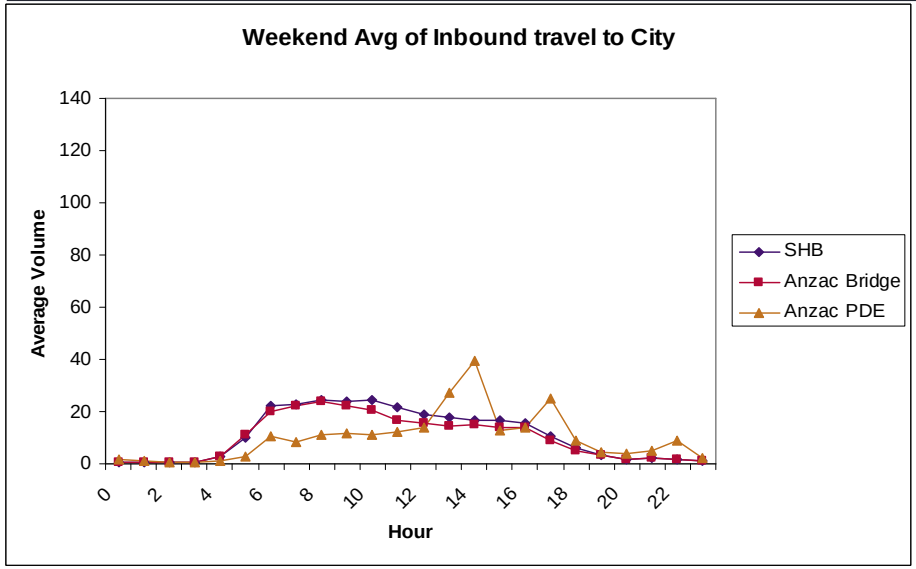


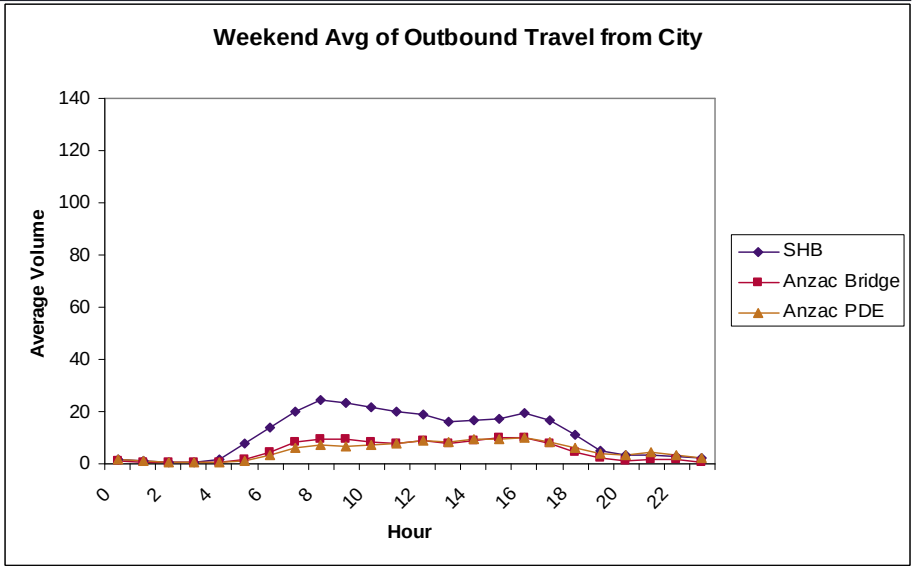




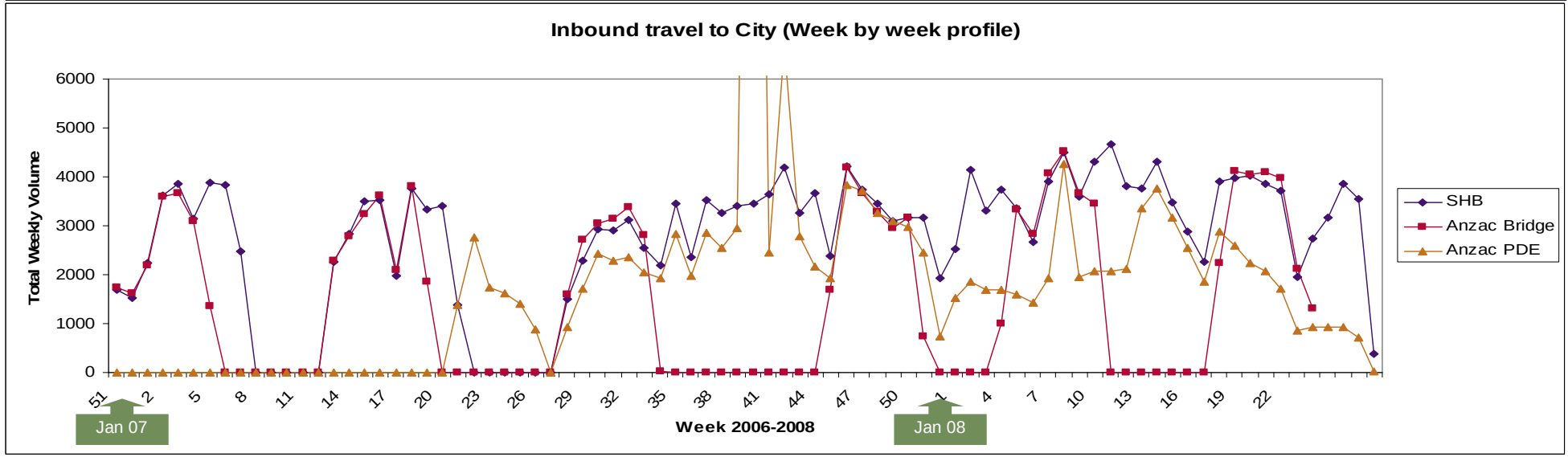


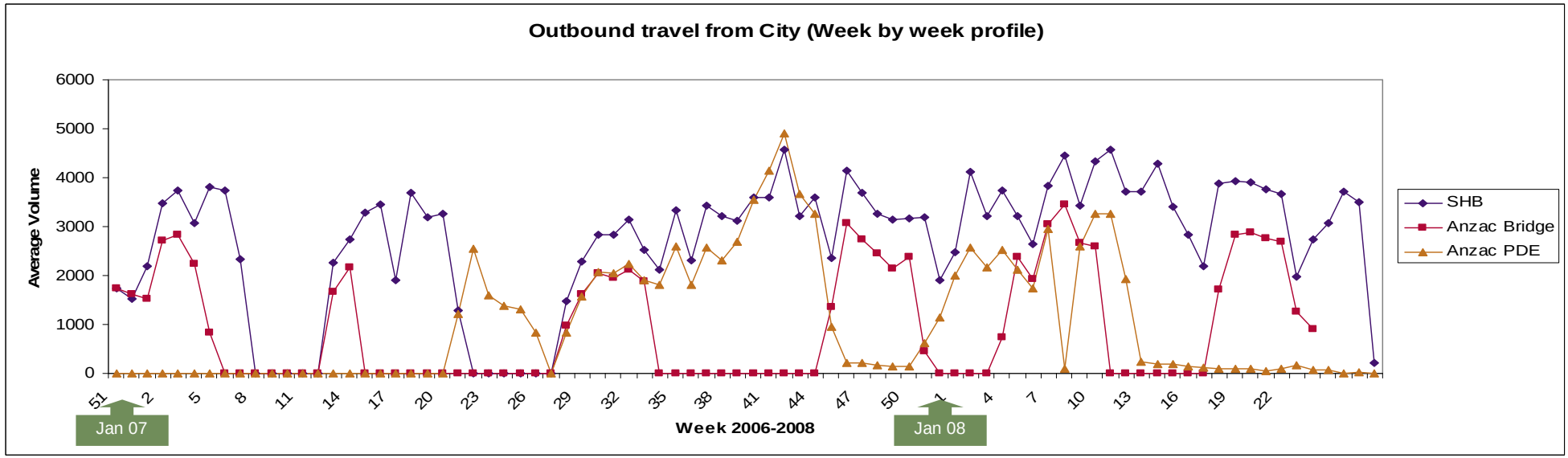
Inbound and Outbound travel of Sydney CBD (2006-2008) – Hour by hour profile continued



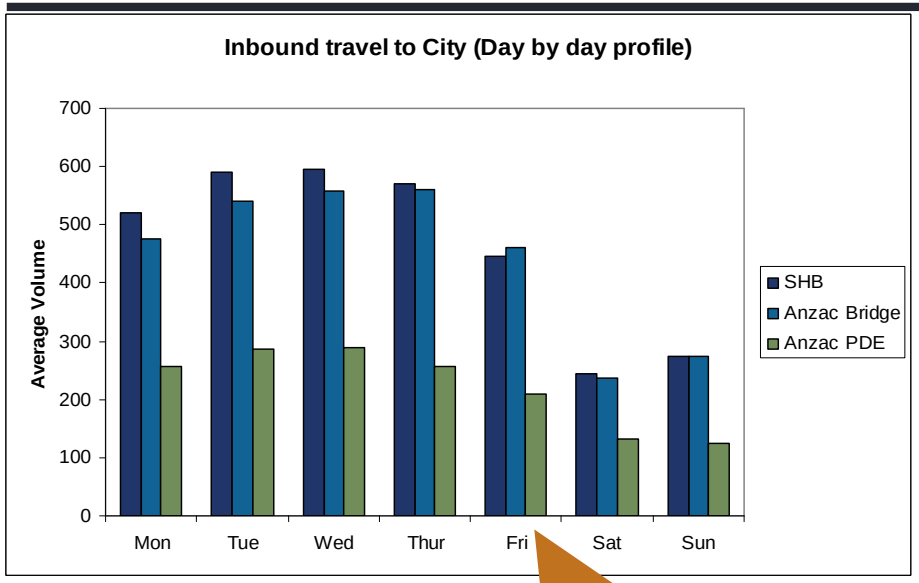


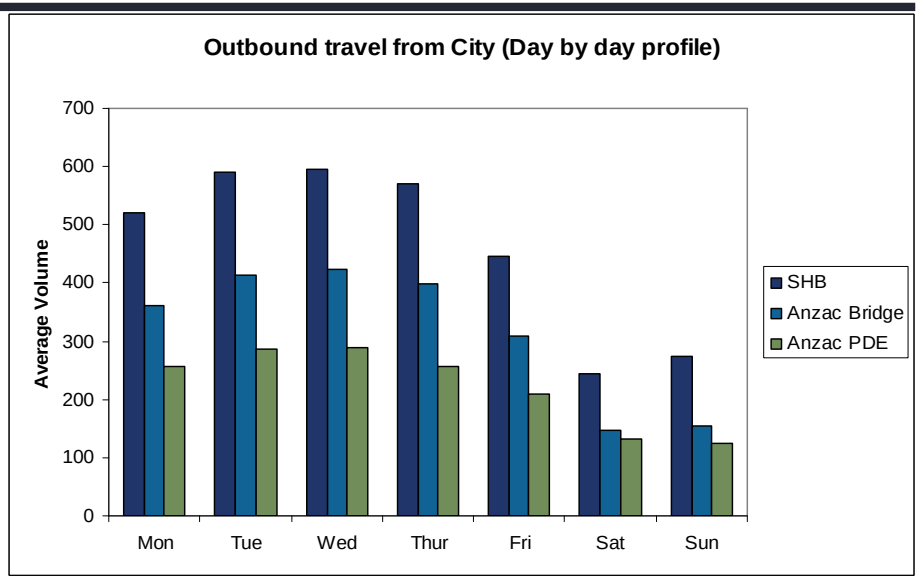
Inbound and Outbound travel of Sydney CBD (2006-2008) – Week by week profile





Inbound and Outbound travel of Sydney CBD (2006-2008) – Day by day profile



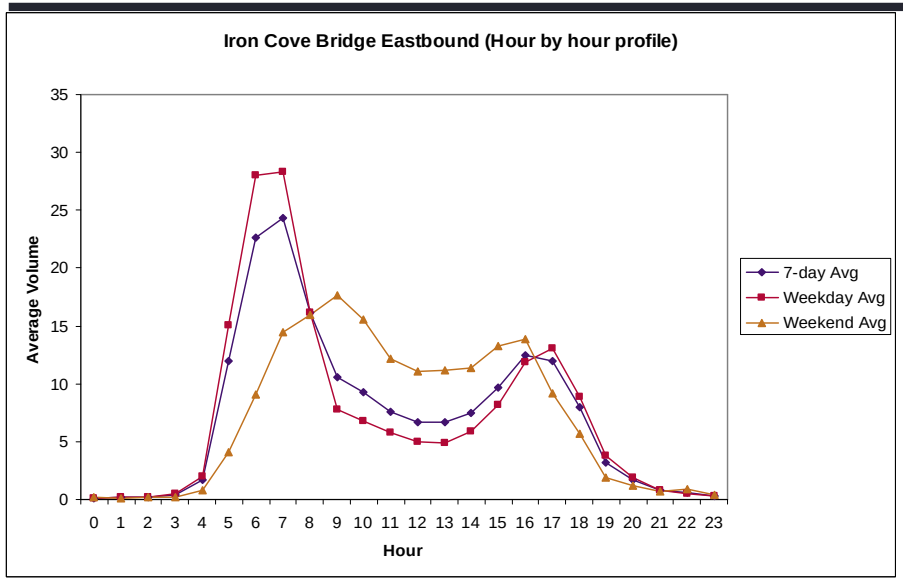


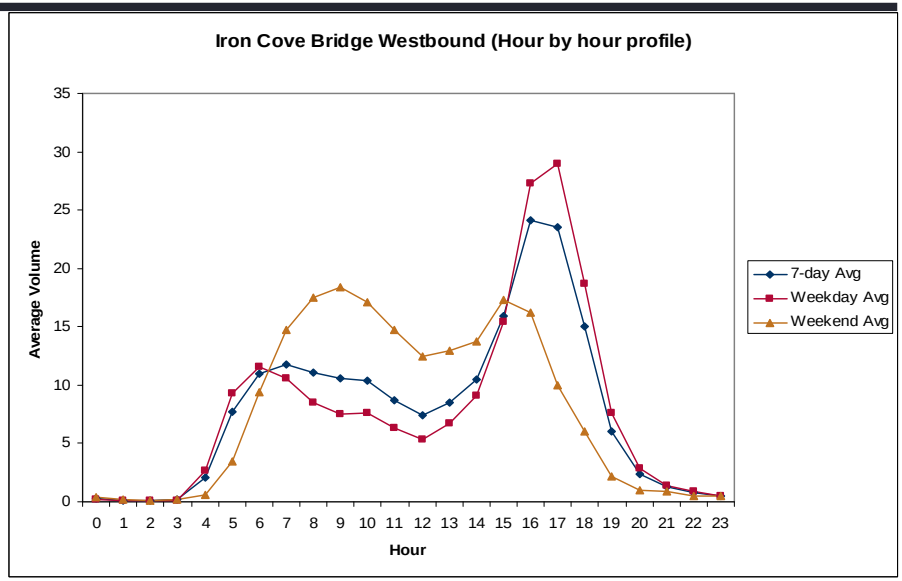
Worth noting:

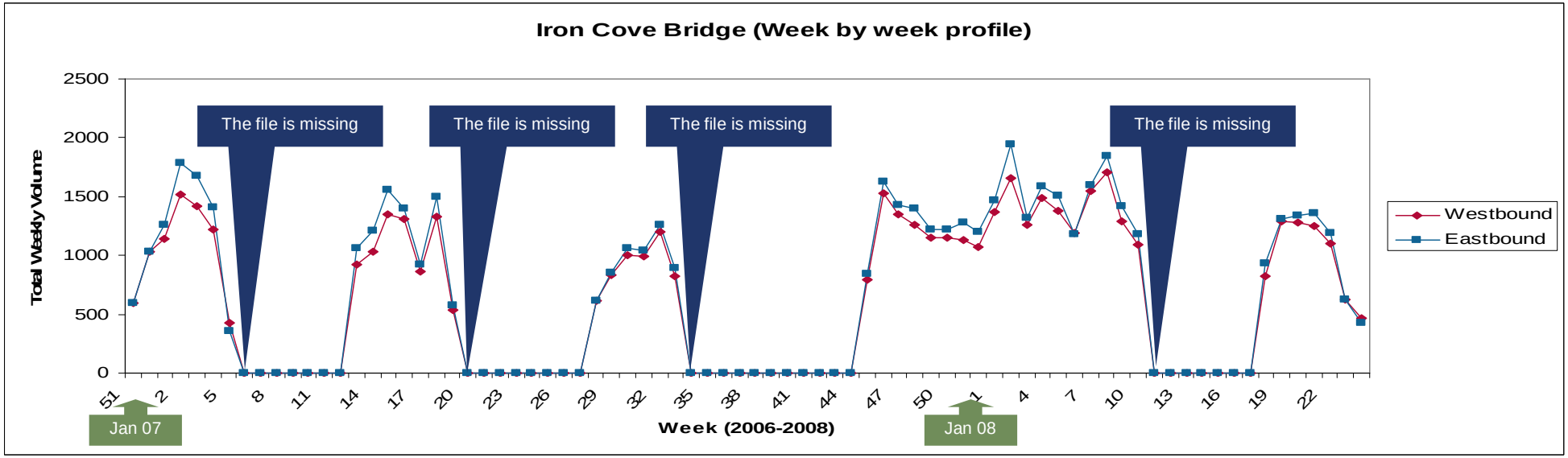
The low values returned by the Anzac Parade bicycle counter may be due to:

1. Riders entering Centennial Park, a popular bicycle route, just before the counter.
2. Sydney-bound commuters from Maroubra Junction or Botany Bay may prefer to continue cycling on road on Anzac Parade

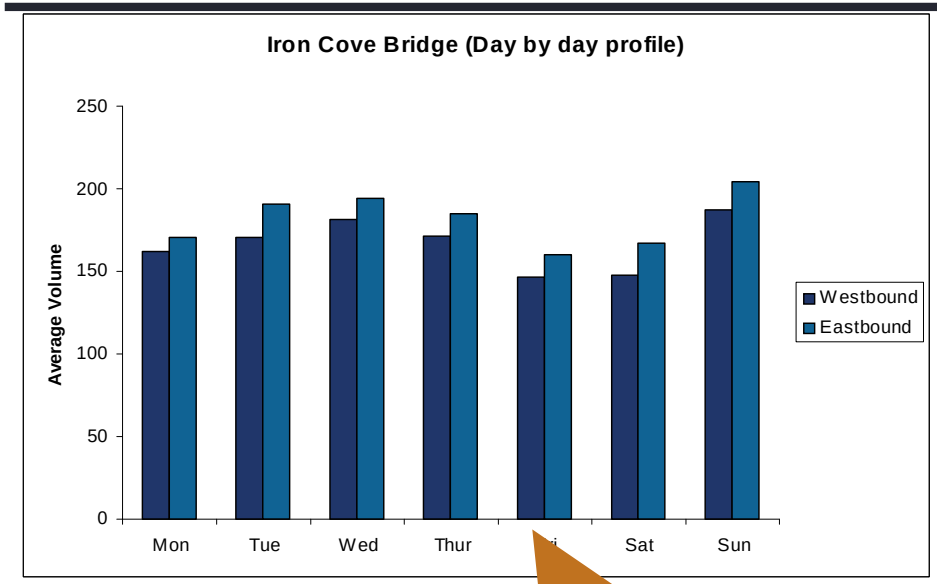
Iron cove Bridge Cycleway (2006-2008)







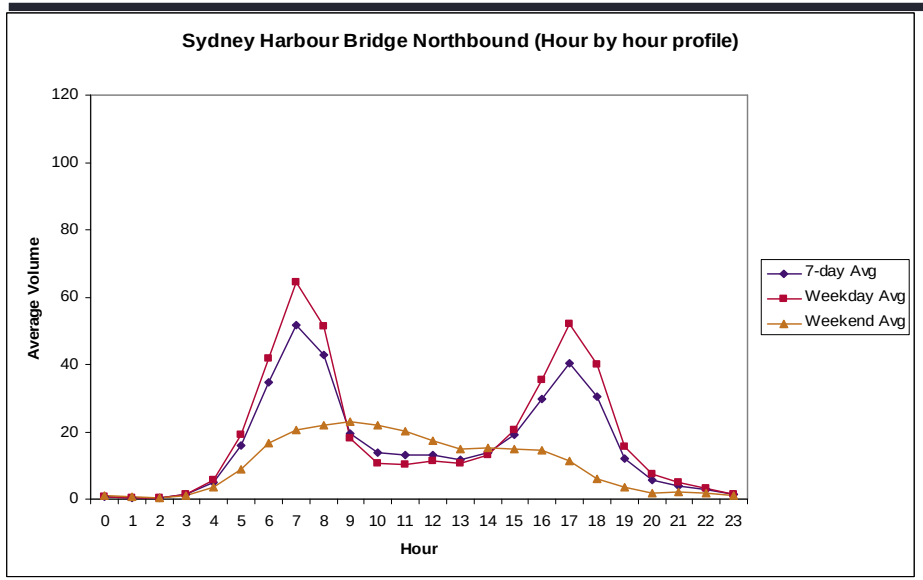
Iron Cove Bridge Cycleway (2006-2008) continued

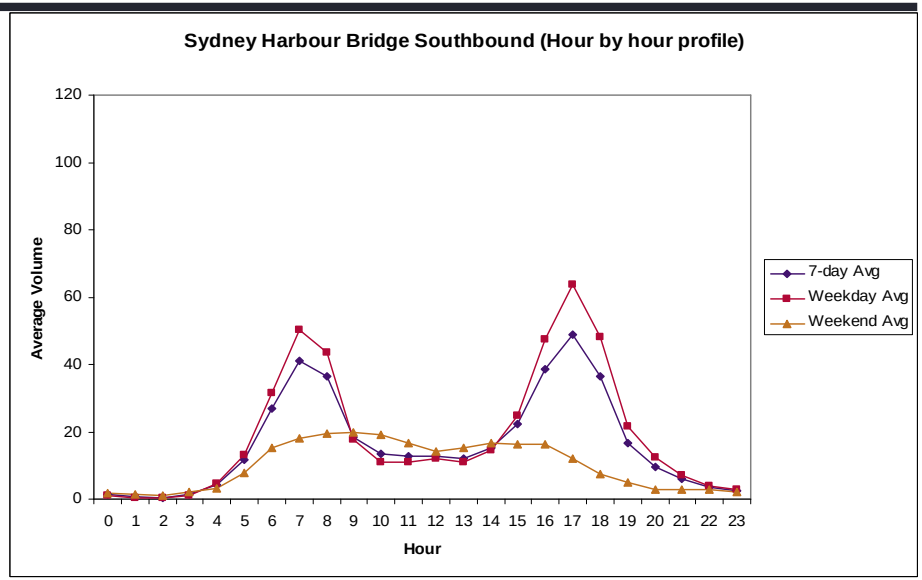


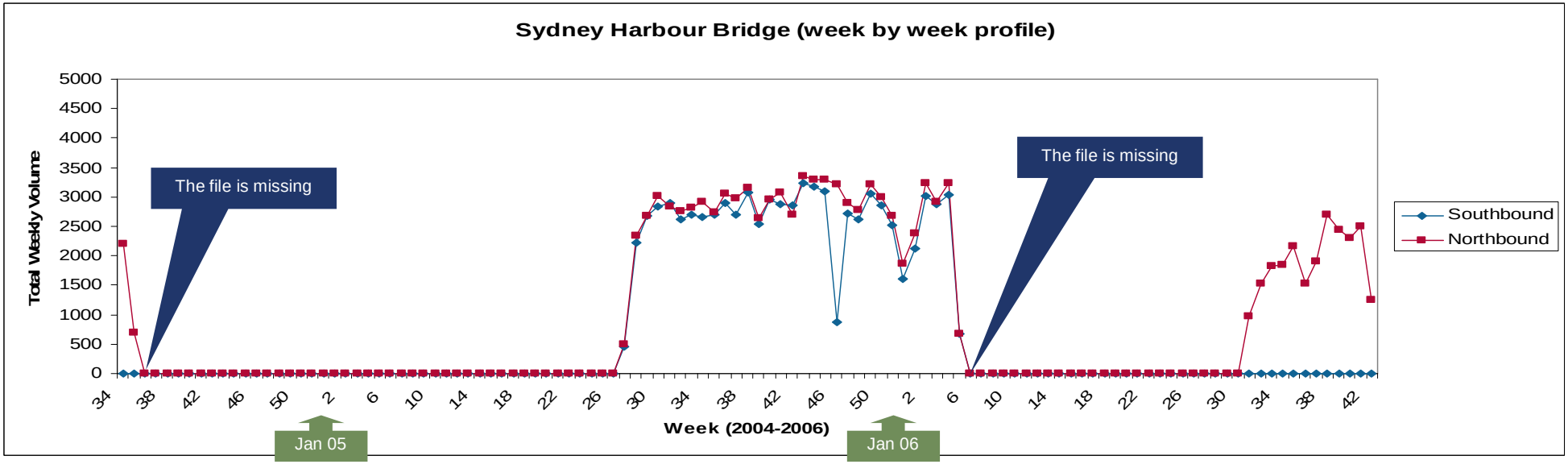
Worth noting:

The higher weekend values seem to indicate that ICB is as popular for recreational cycling than commuting.

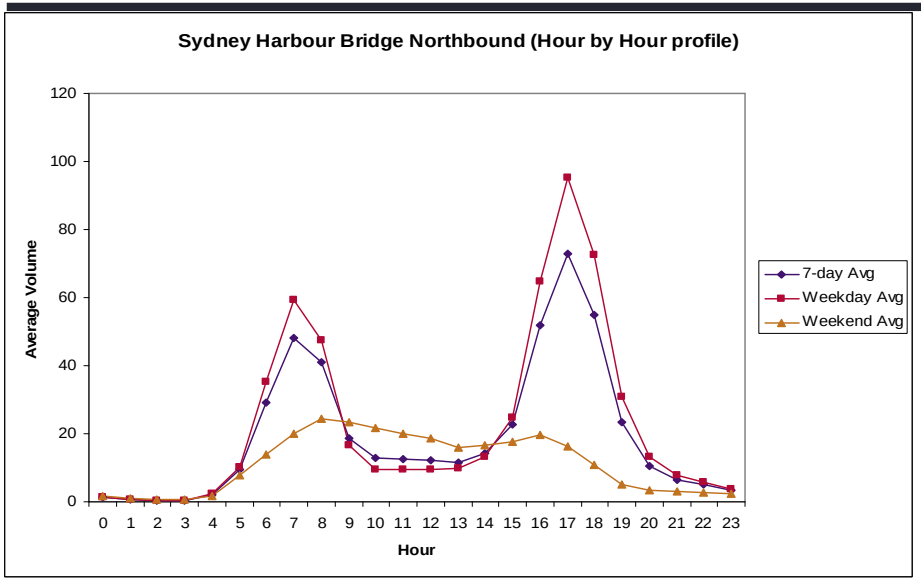
Sydney Harbour Bridge Cycleway (2004-2006)

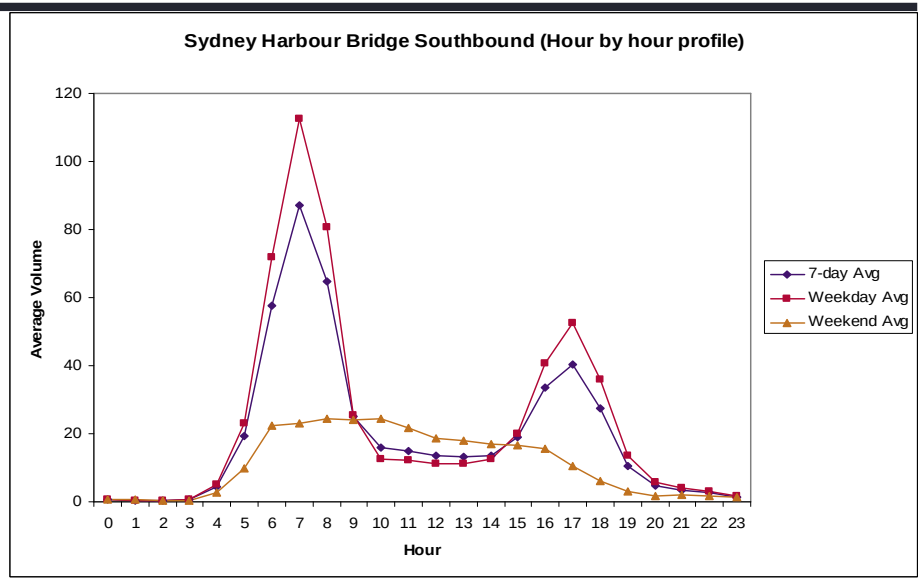


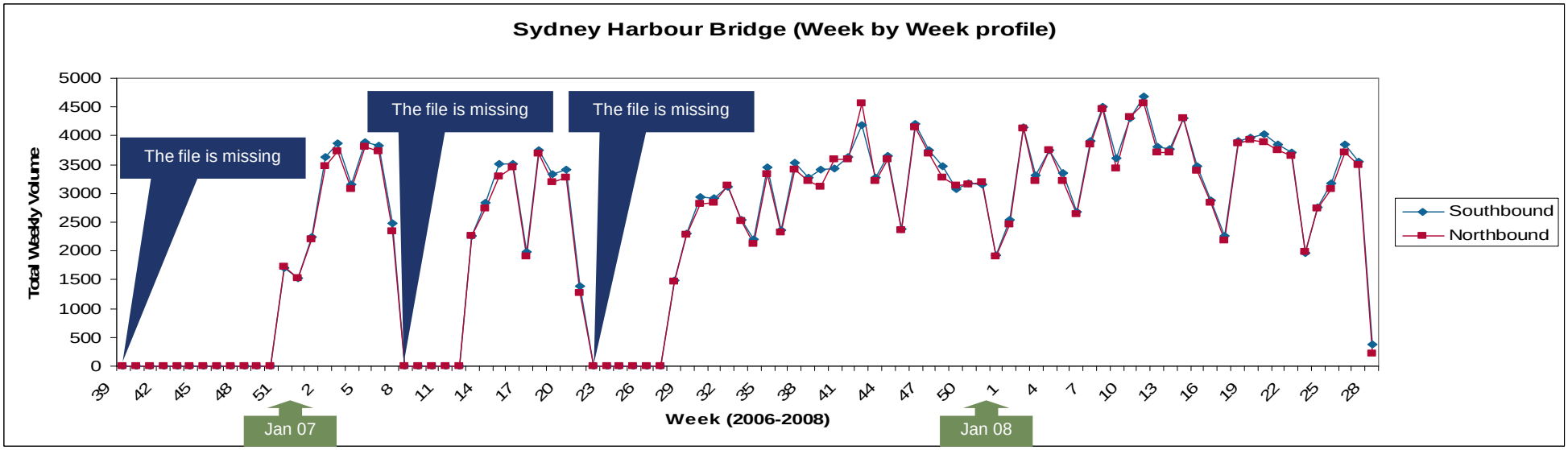




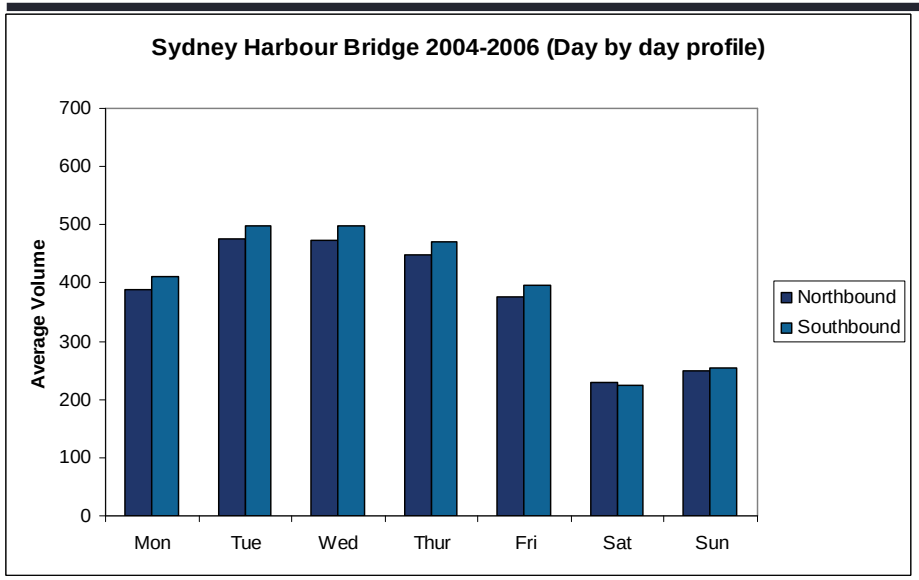
Sydney Harbour Bridge Cycleway (2006-2008)

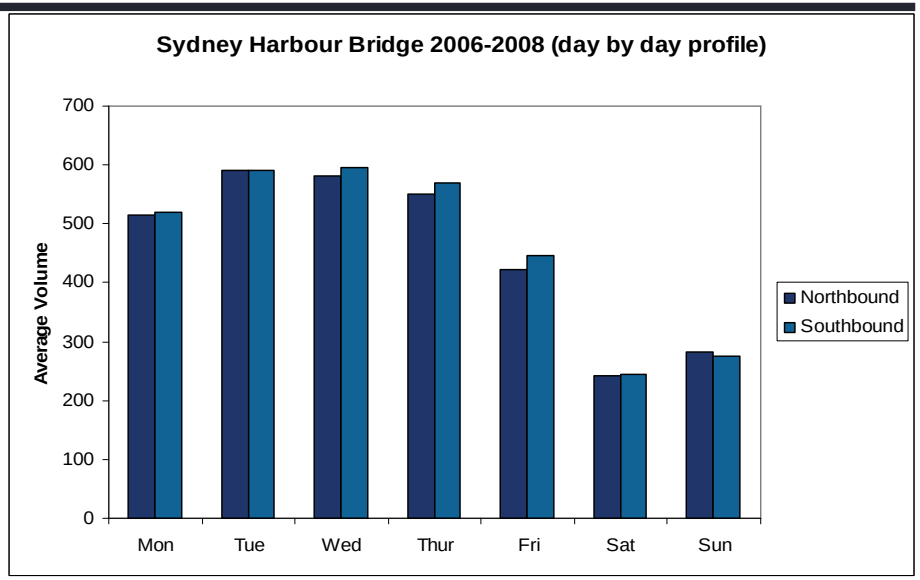




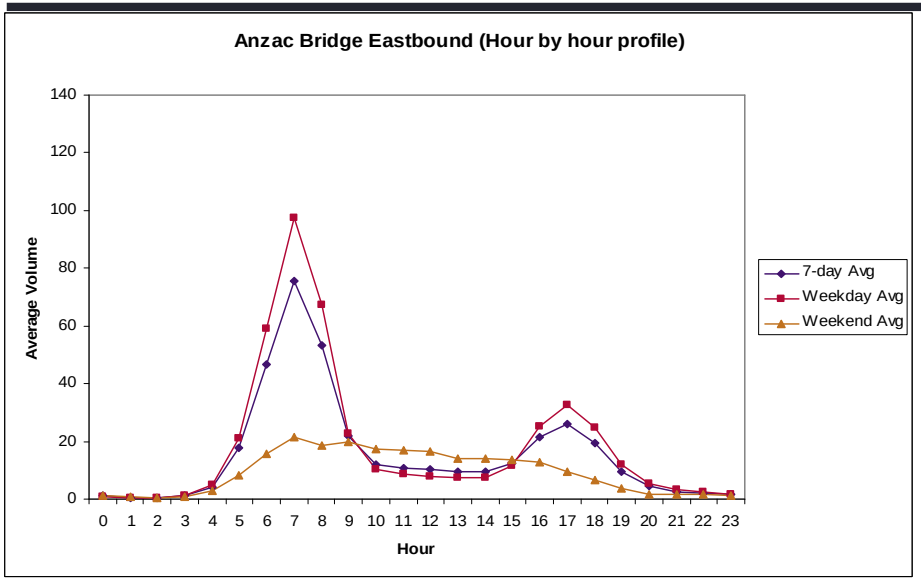


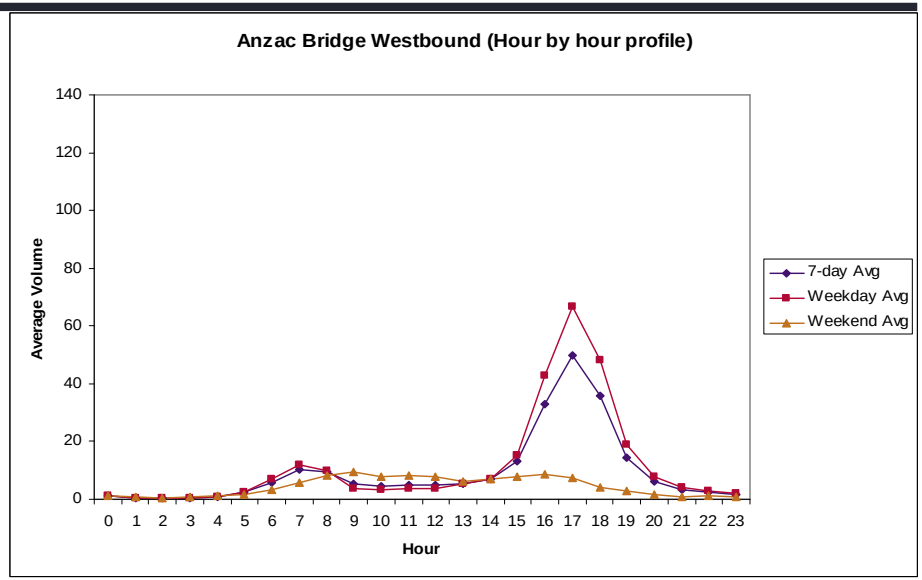
Sydney Harbour Bridge Cycleway (2004-2008) continued

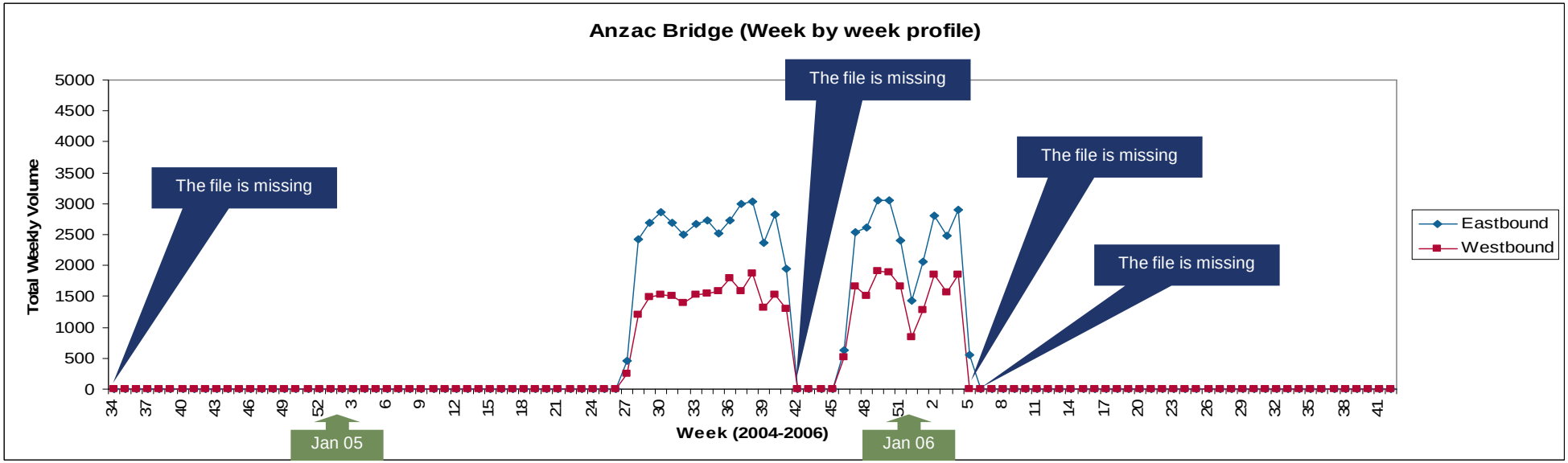




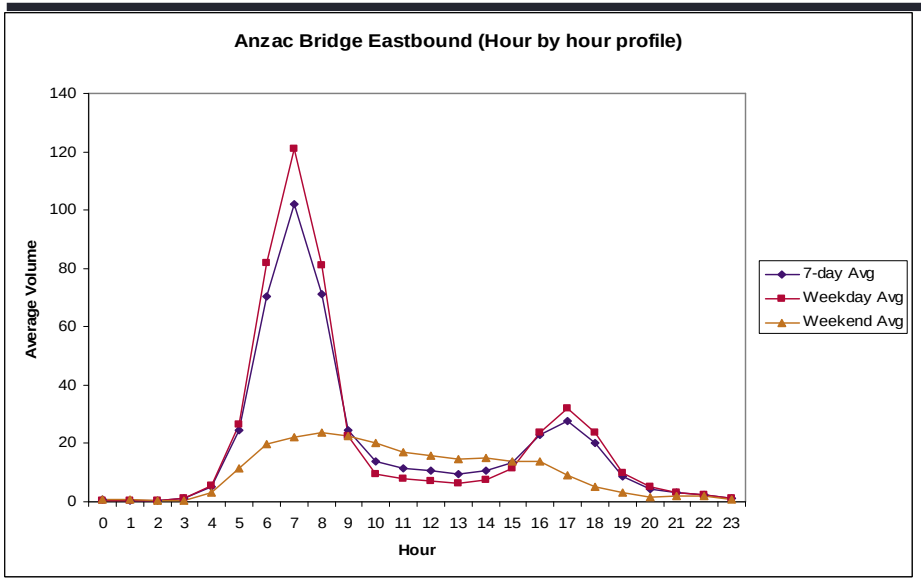
Anzac Bridge Cycleway (2004-2006)

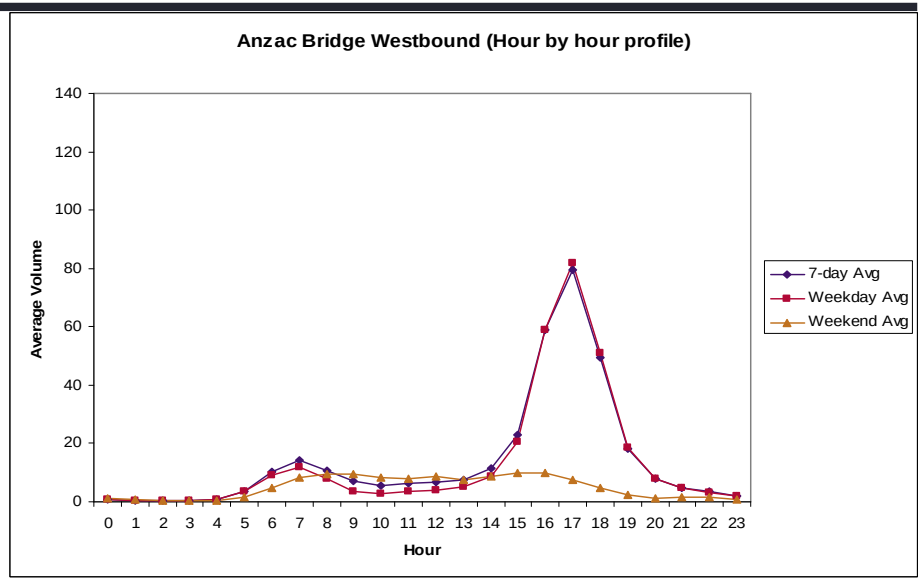


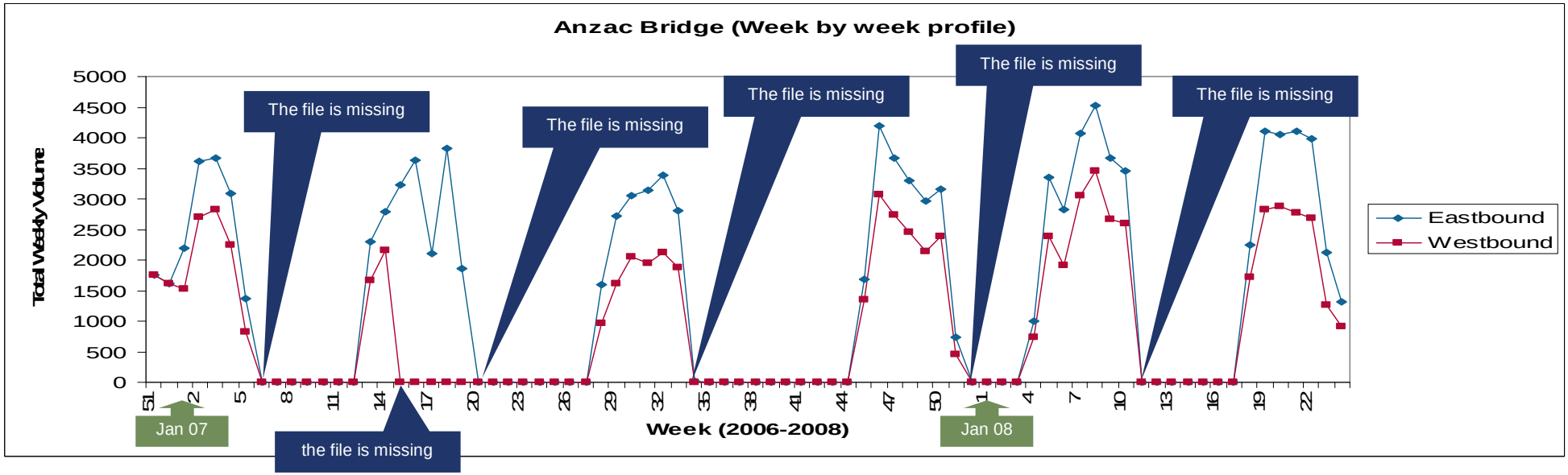




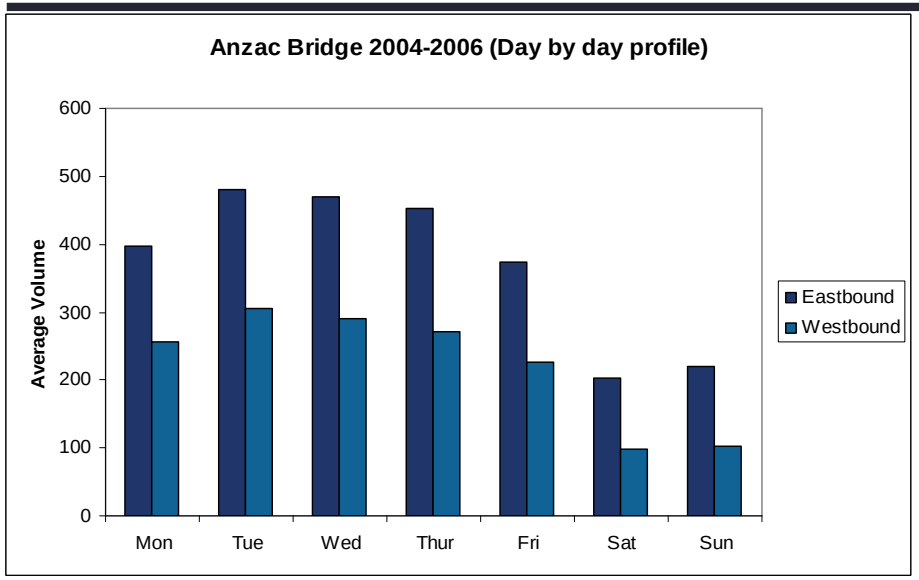
Anzac Bridge Cycleway (2006-2008)

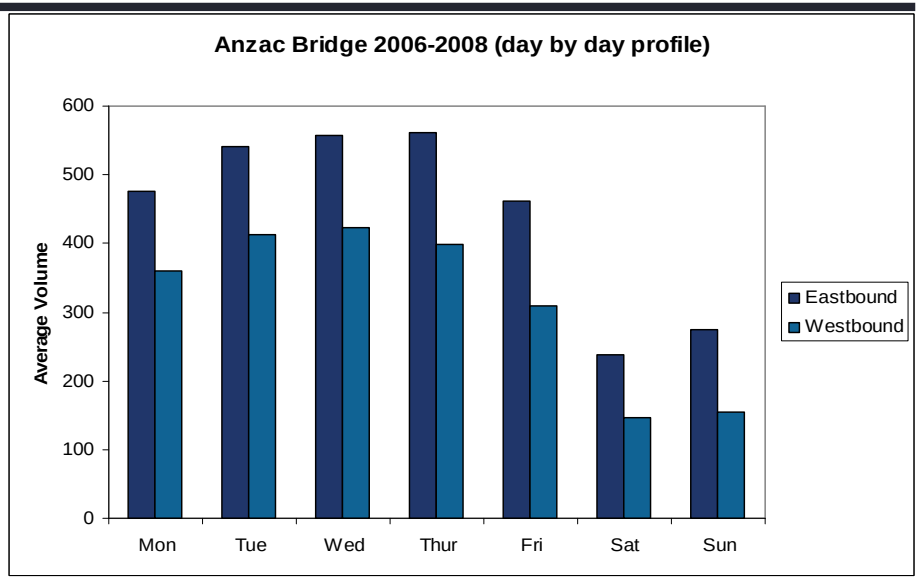




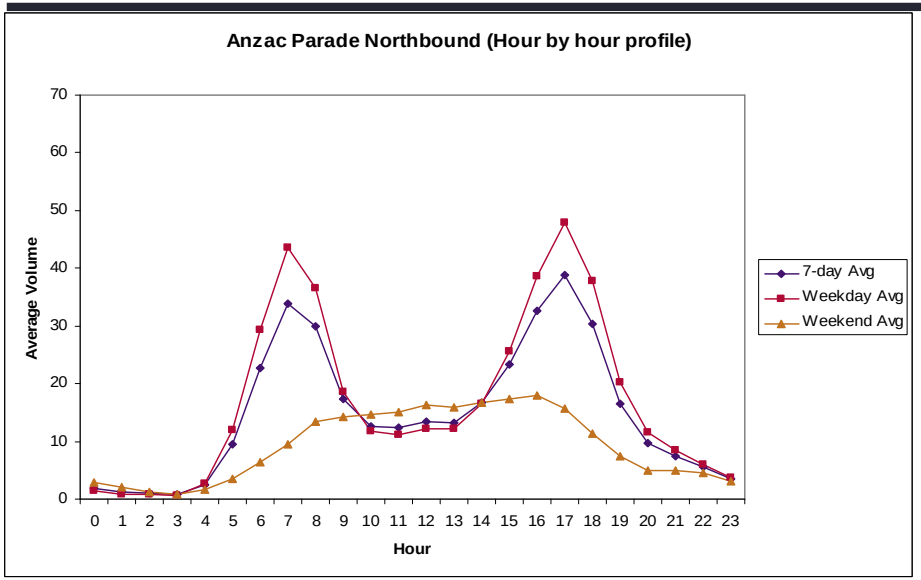


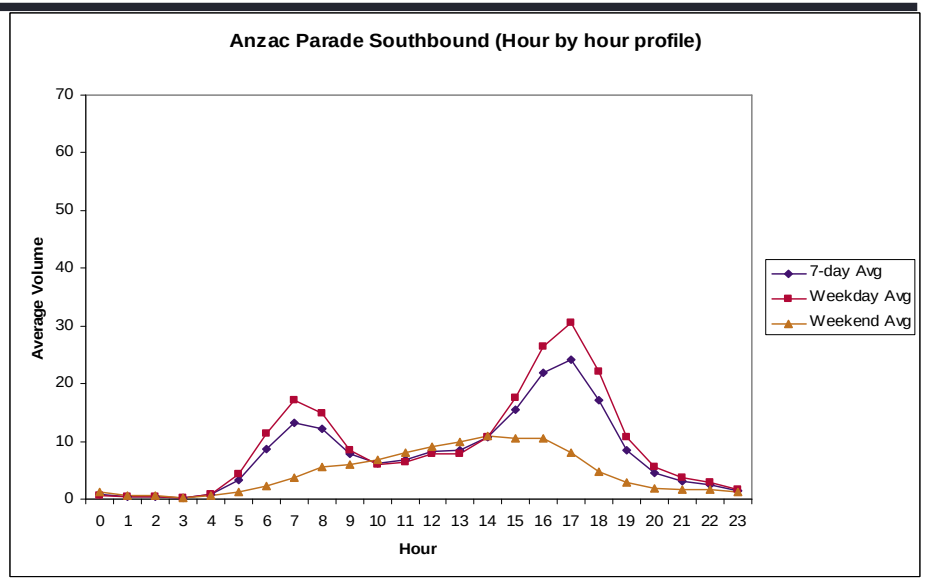
Anzac Bridge Cycleway (2004-2008)

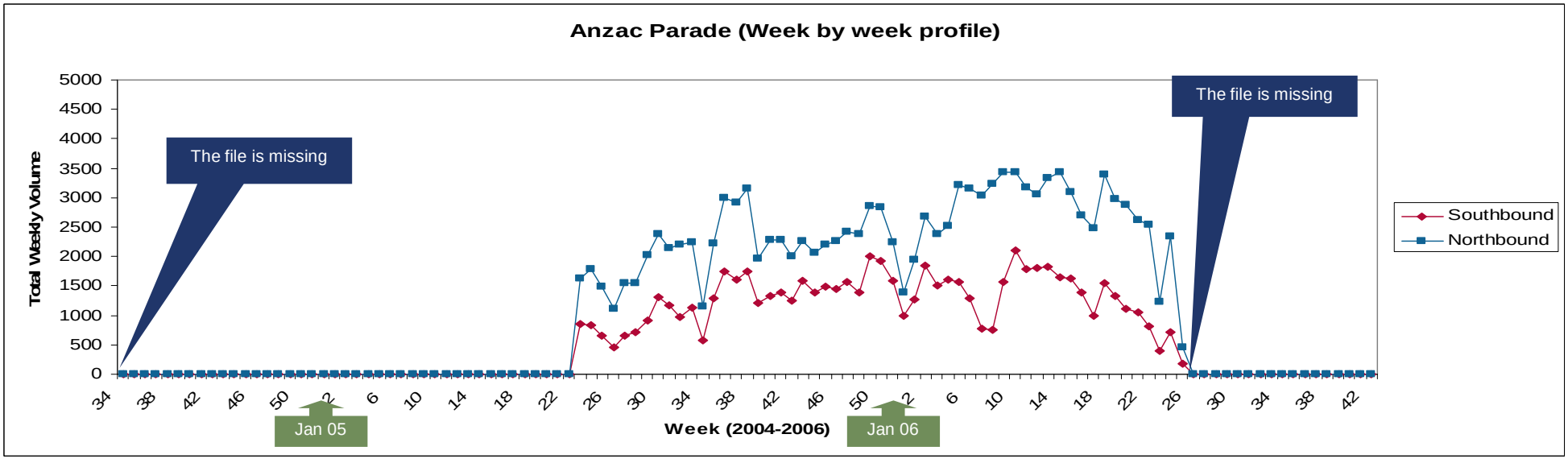




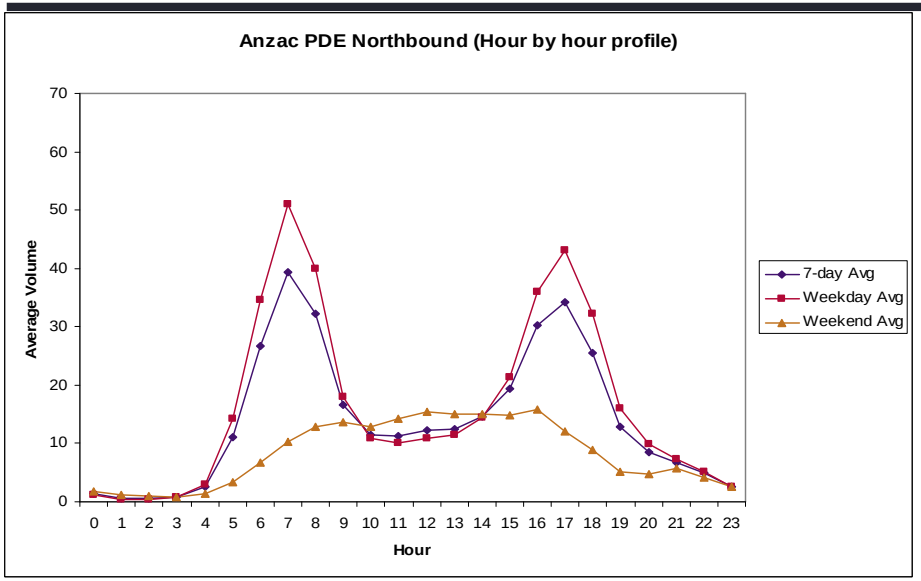
Anzac Parade Cycleway (2004-2006)

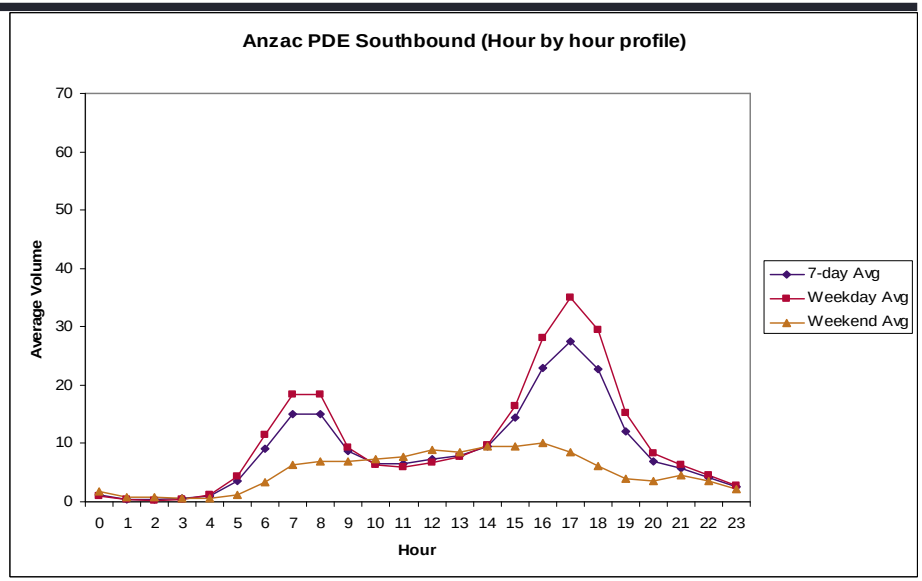


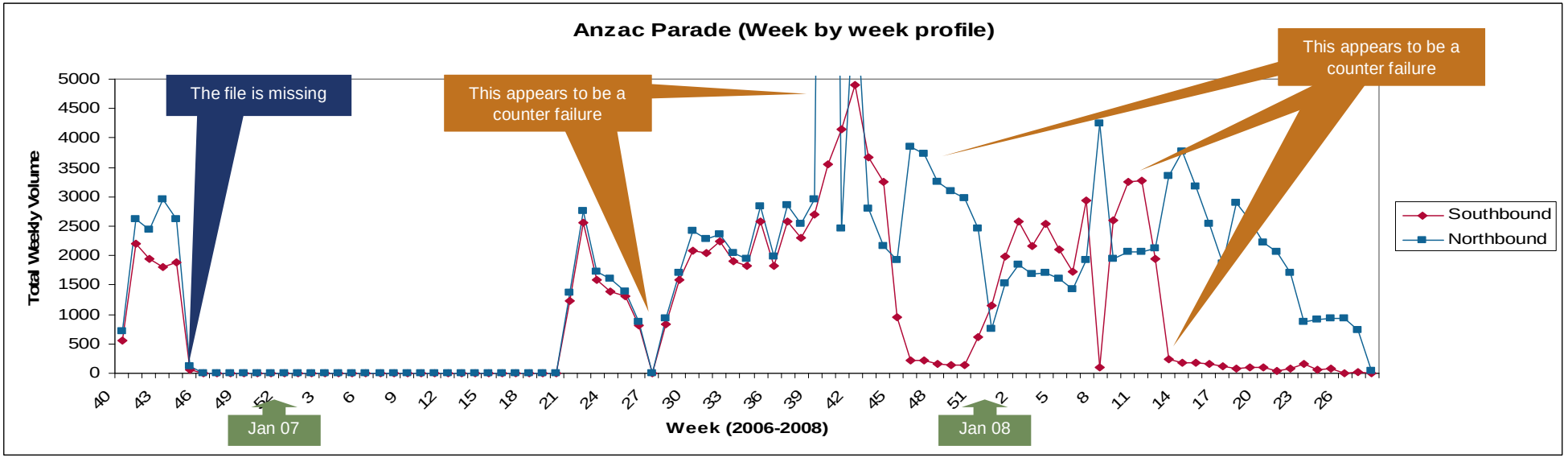




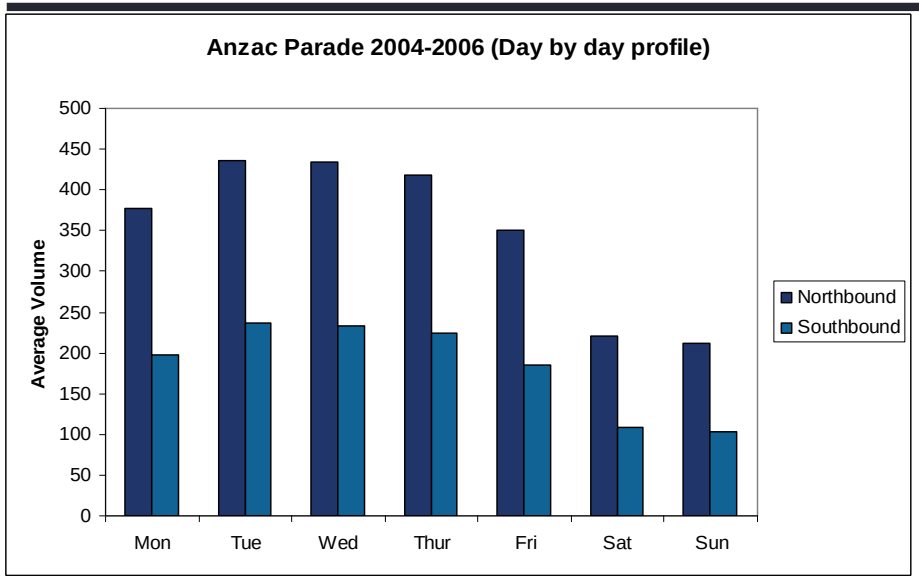
Anzac Parade Cycleway (2006-2008)

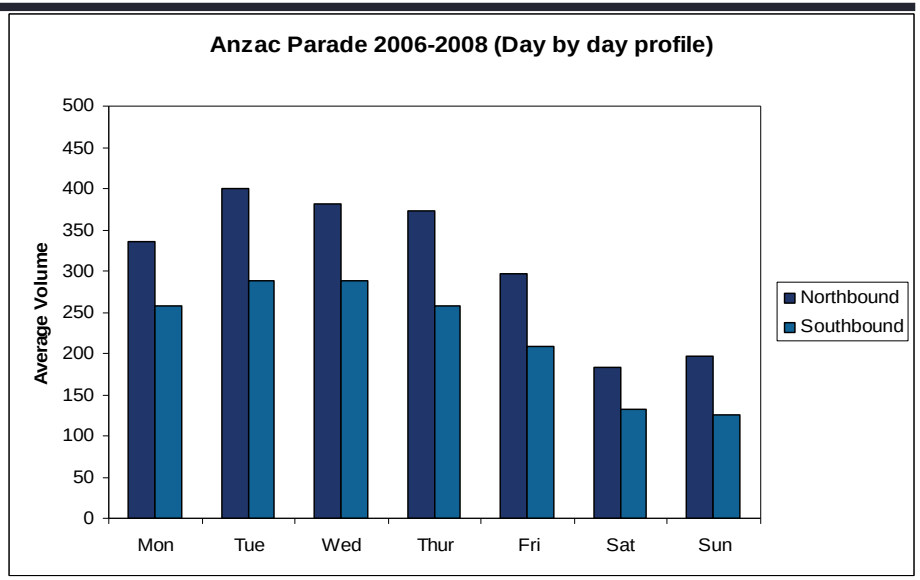




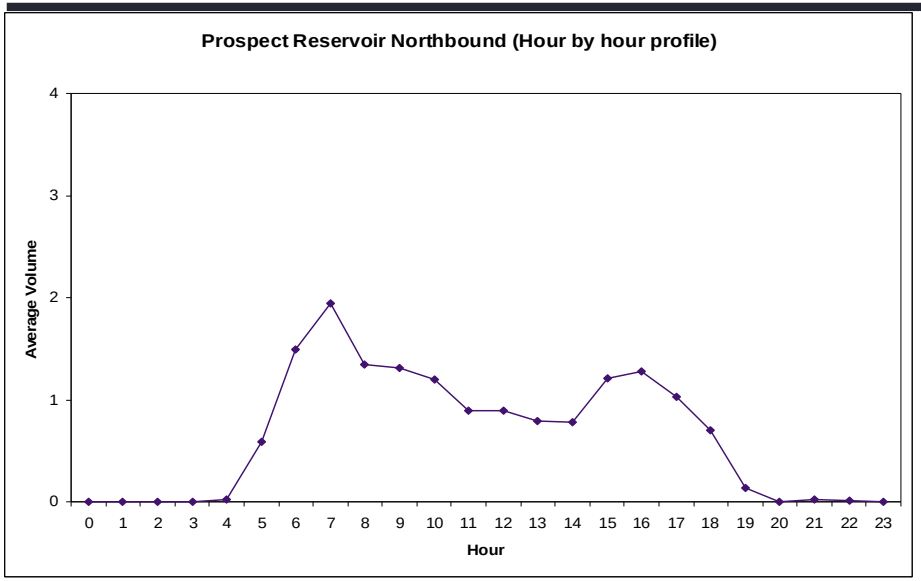


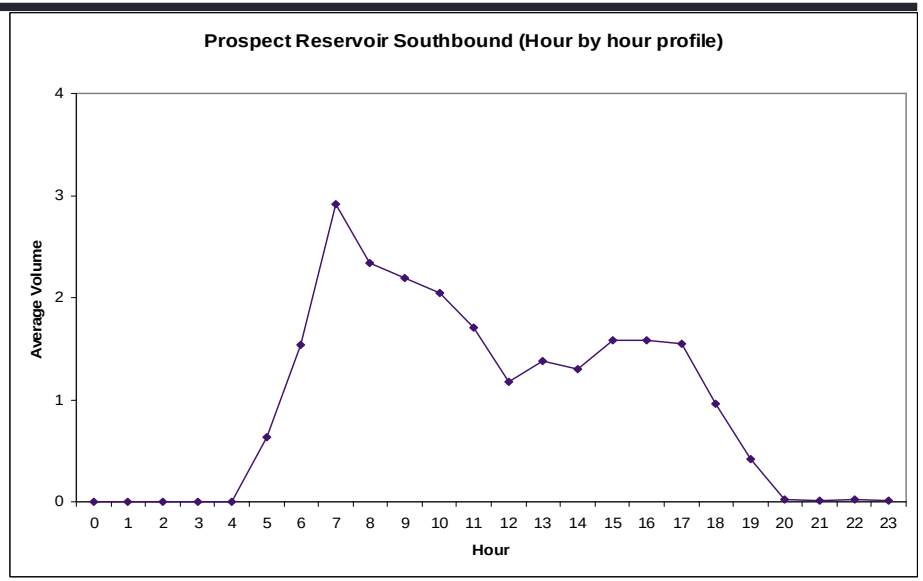
Anzac Parade Cycleway (2004-2008)

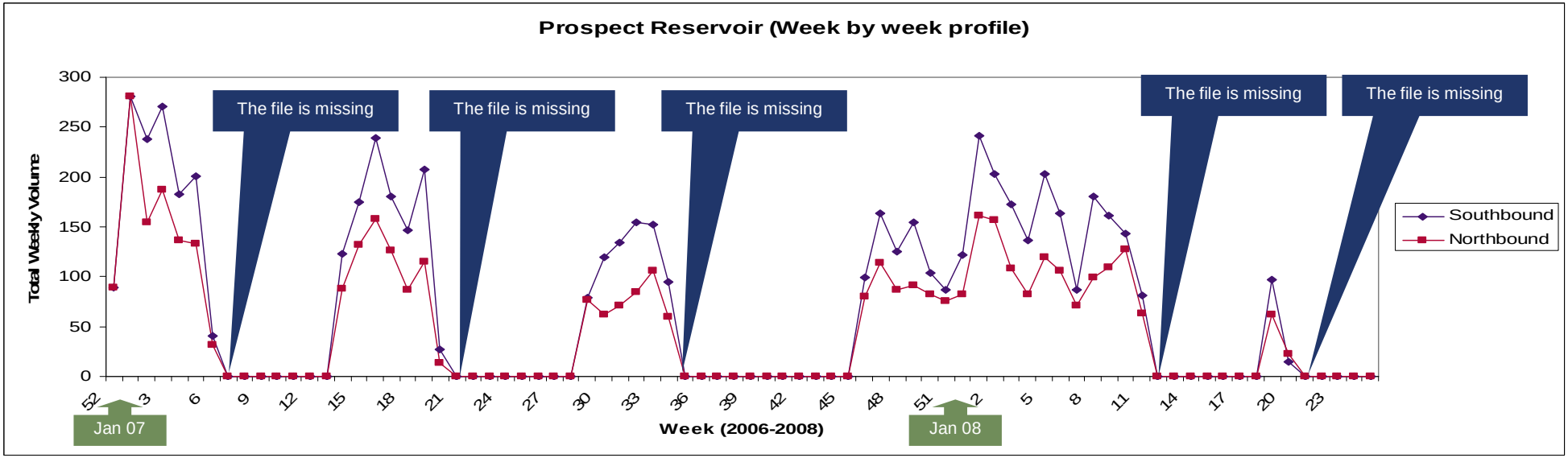




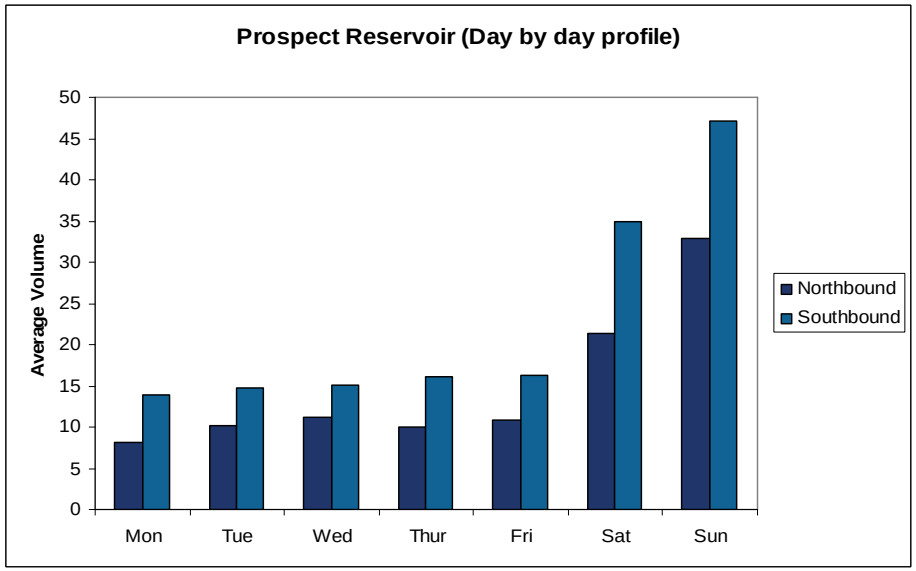
Prospect Reservoir Cycleway (2006-2008)



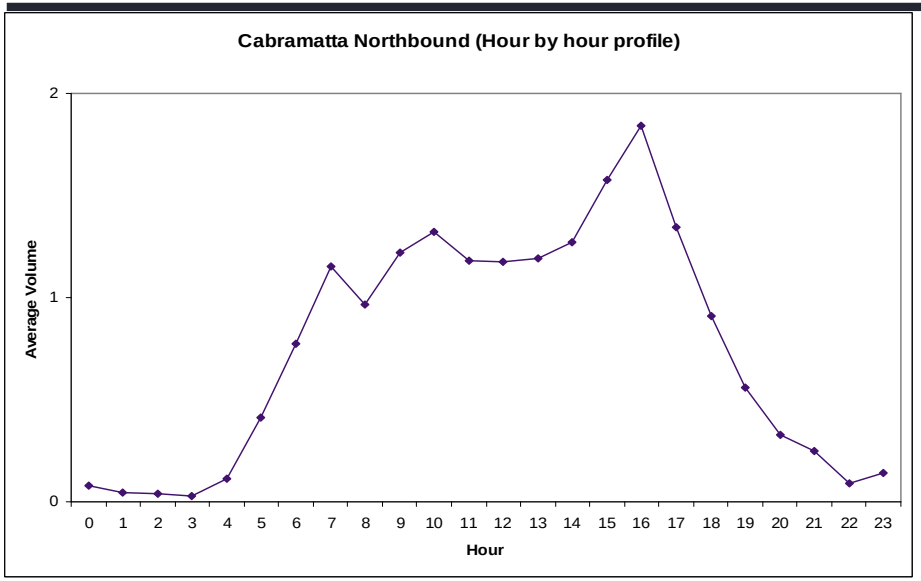


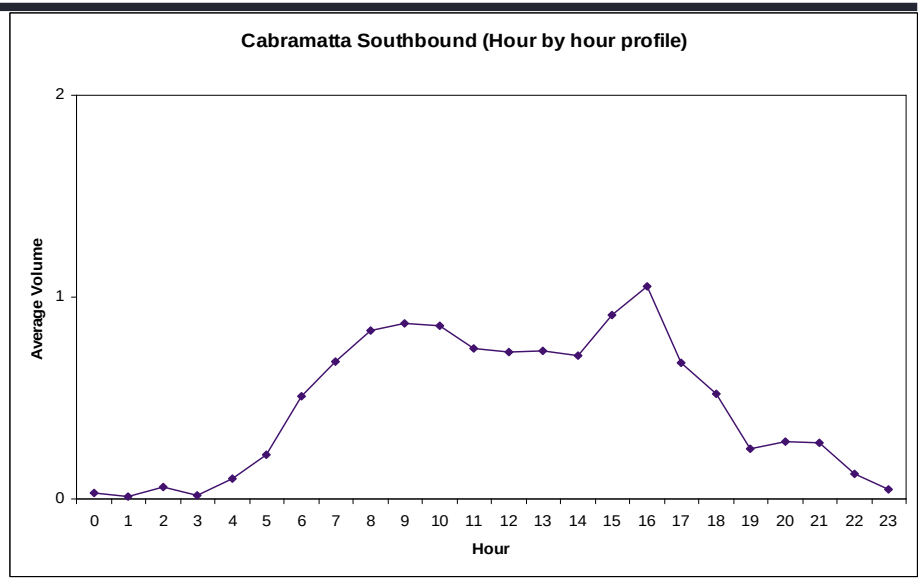


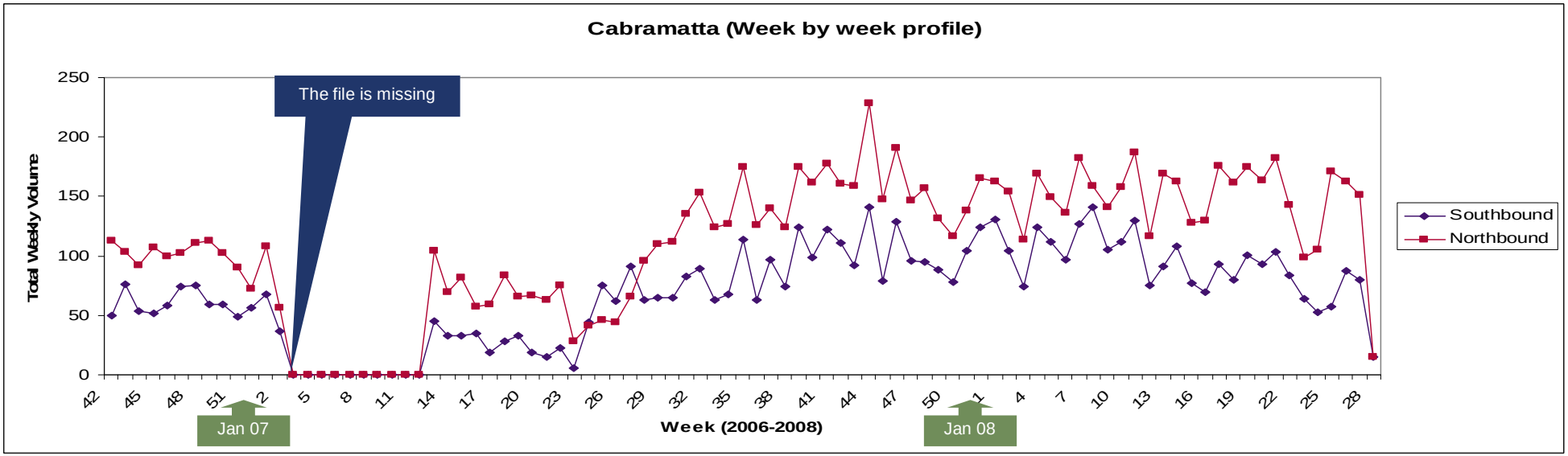
Prospect Reservoir Cycleway (2006-2008) continued



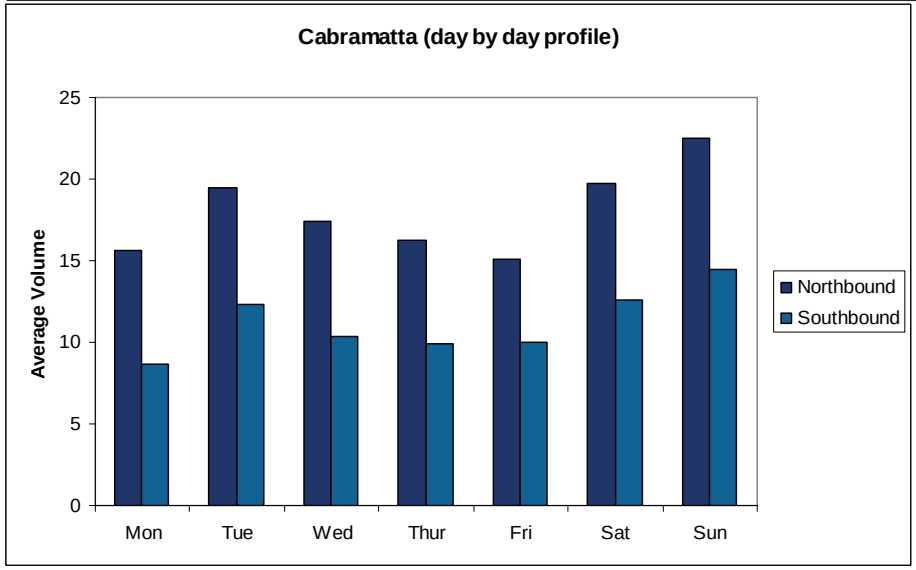
Cabramatta Cycleway (2006-2008)



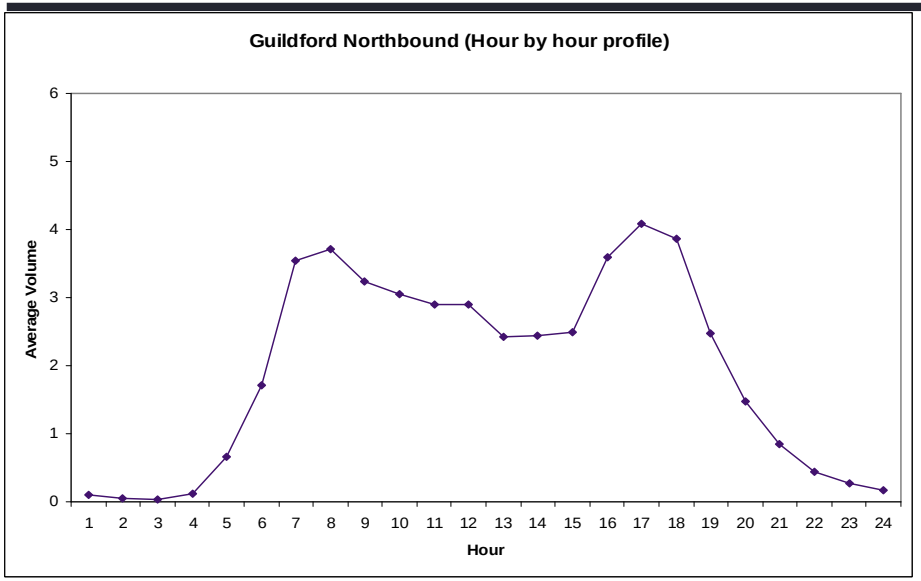


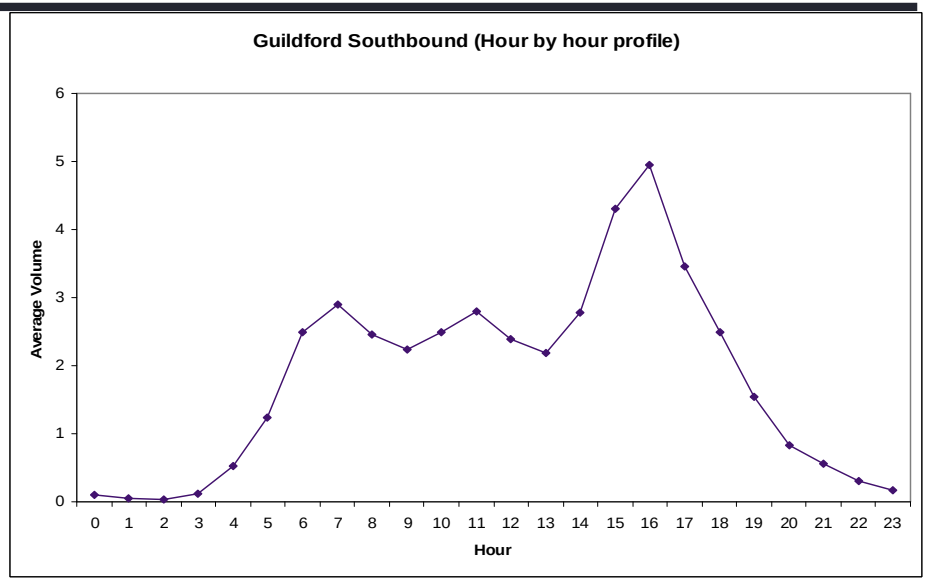


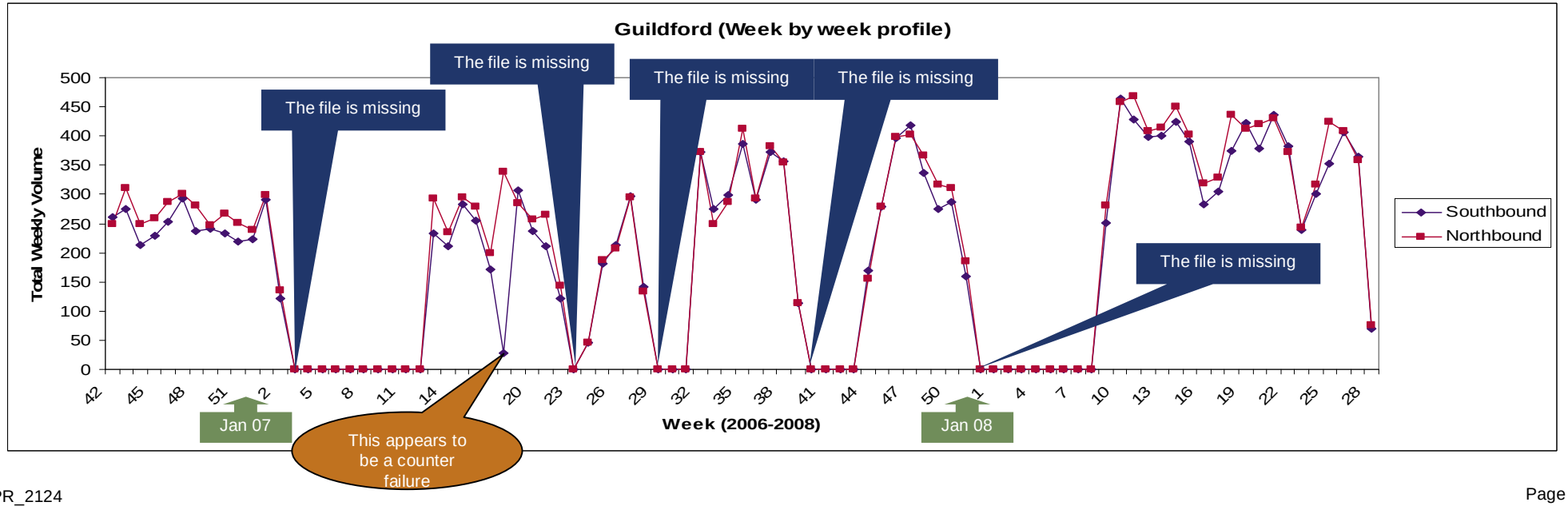
Cabramatta Cycleway (2006-2008) continued



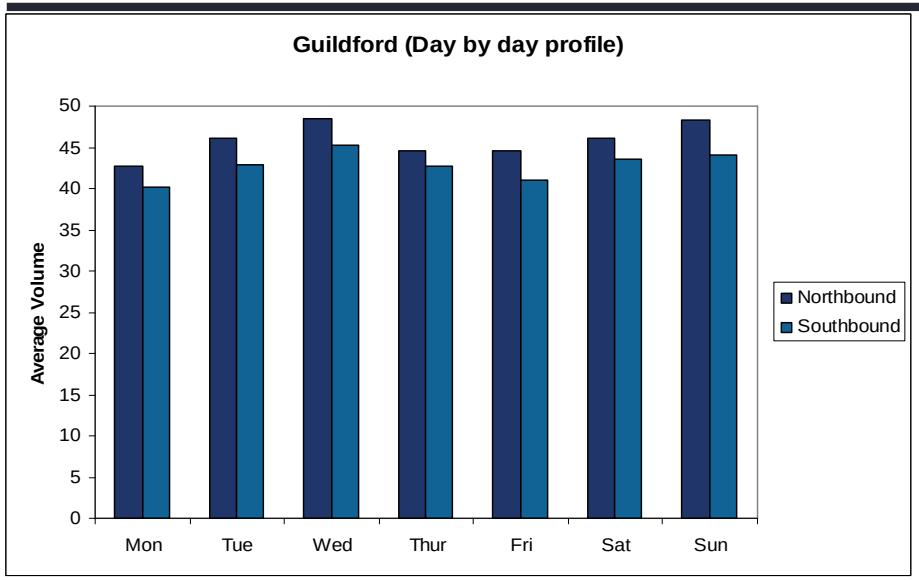
Guildford Cycleway (2006-2008)



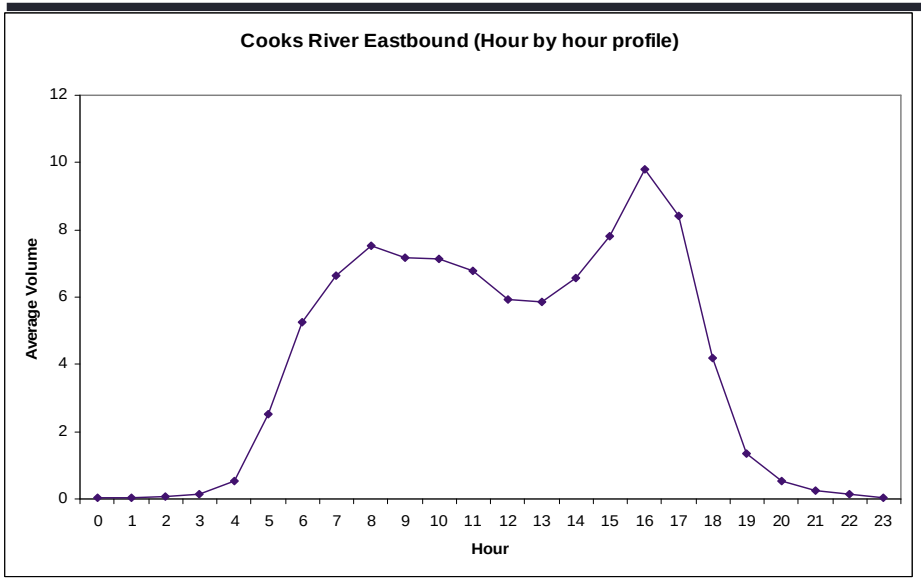


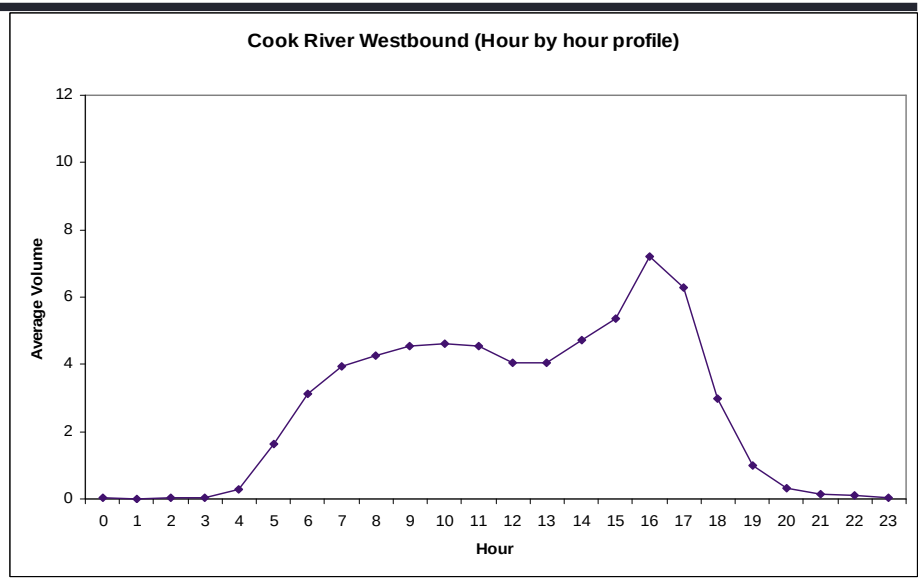


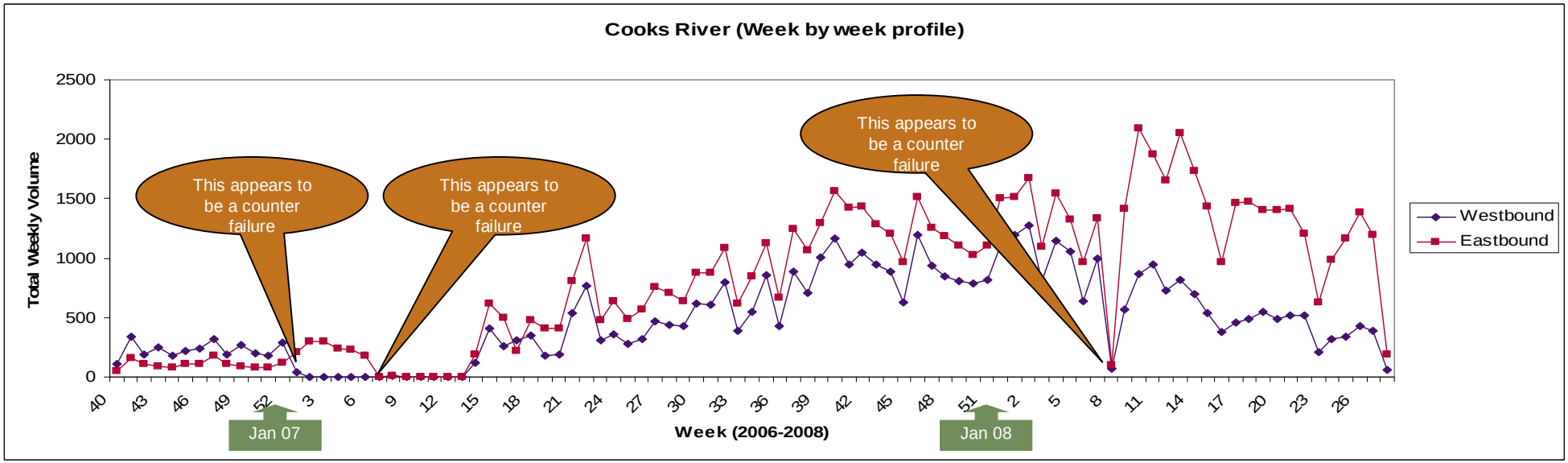
Guildford Cycleway (2006-2008) continued



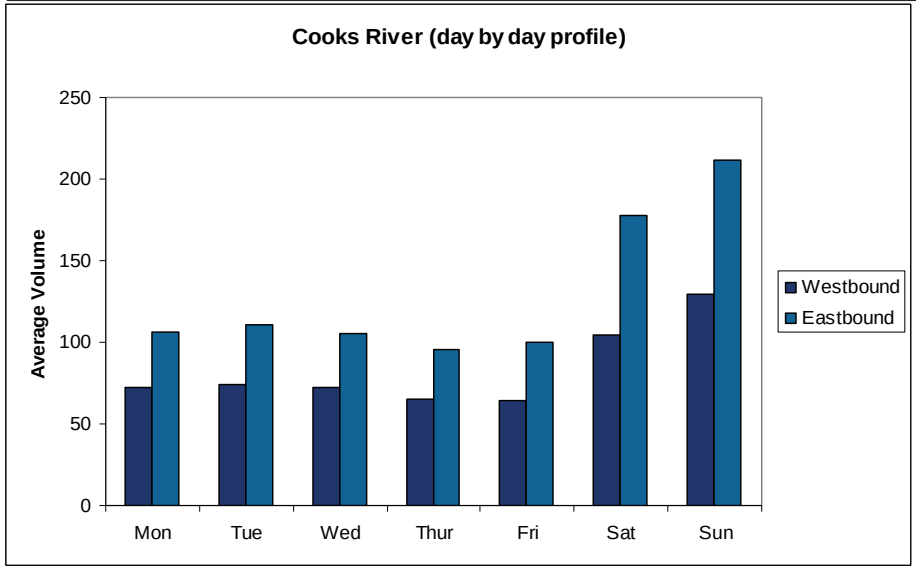
Cooks River Cycleway (2006-2008)



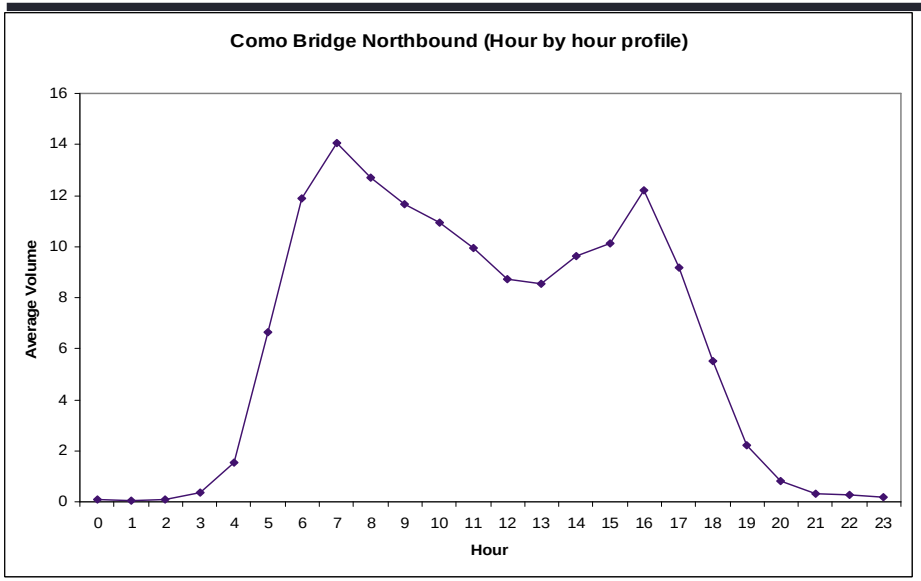


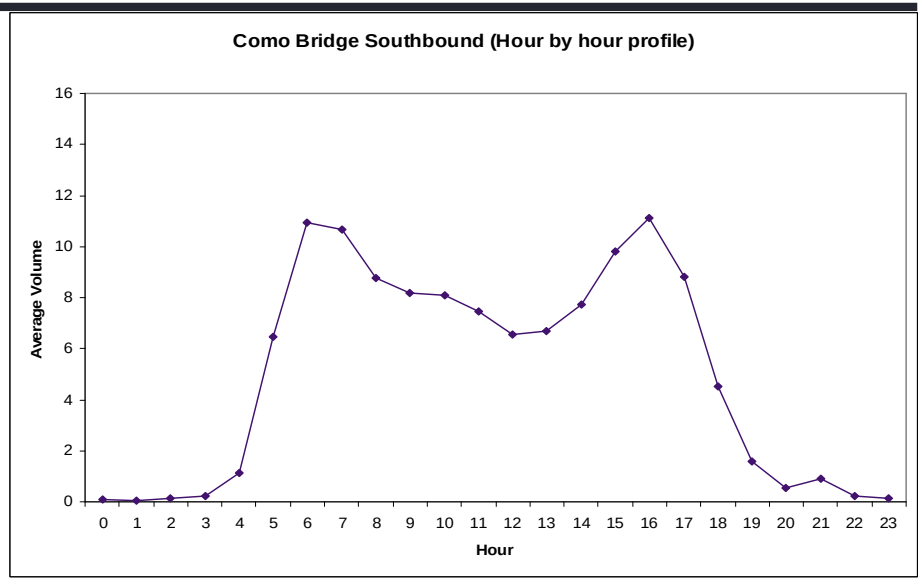


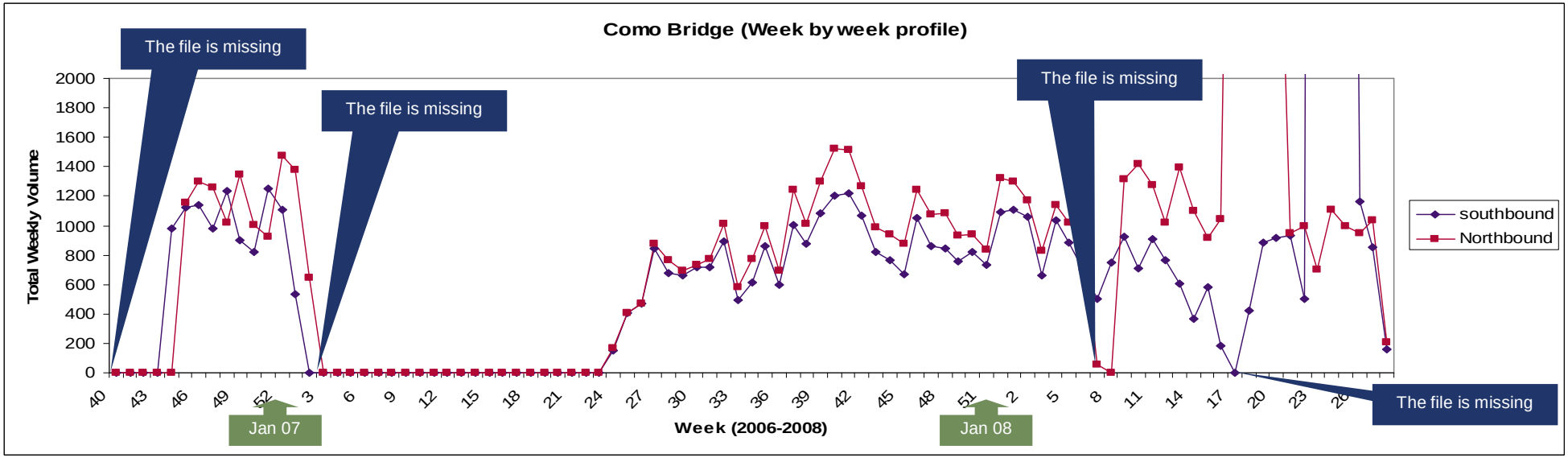
Cooks River Cycleway (2006-2008) continued



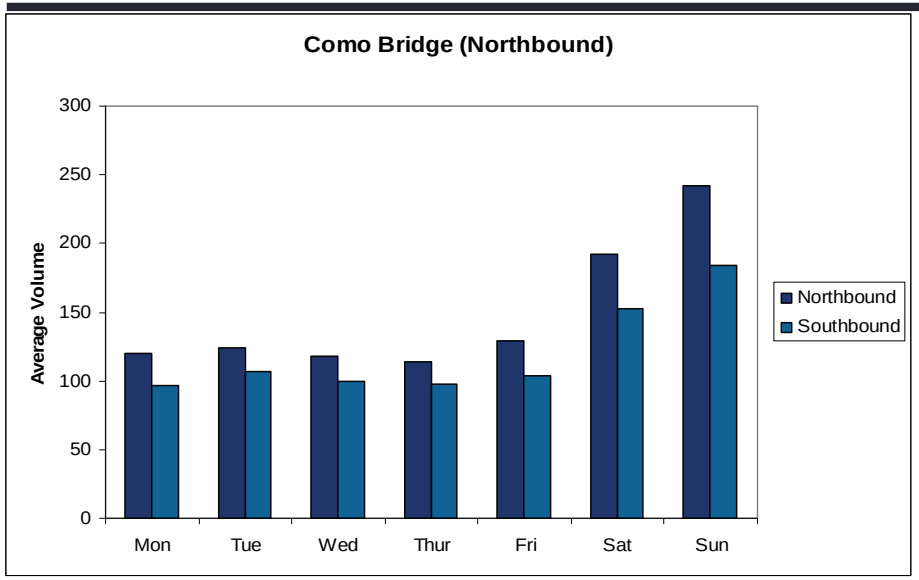
Como Bridge Cycleway (2006-2008)



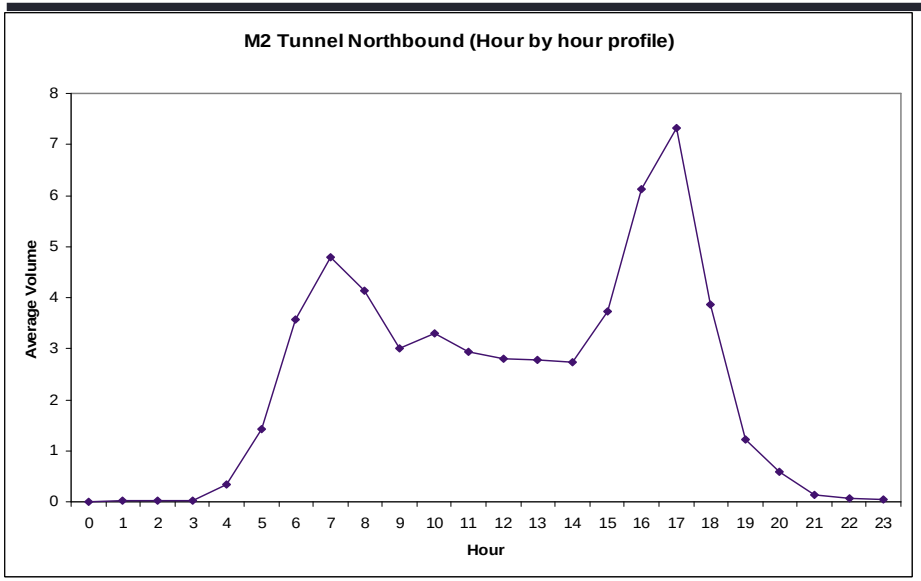


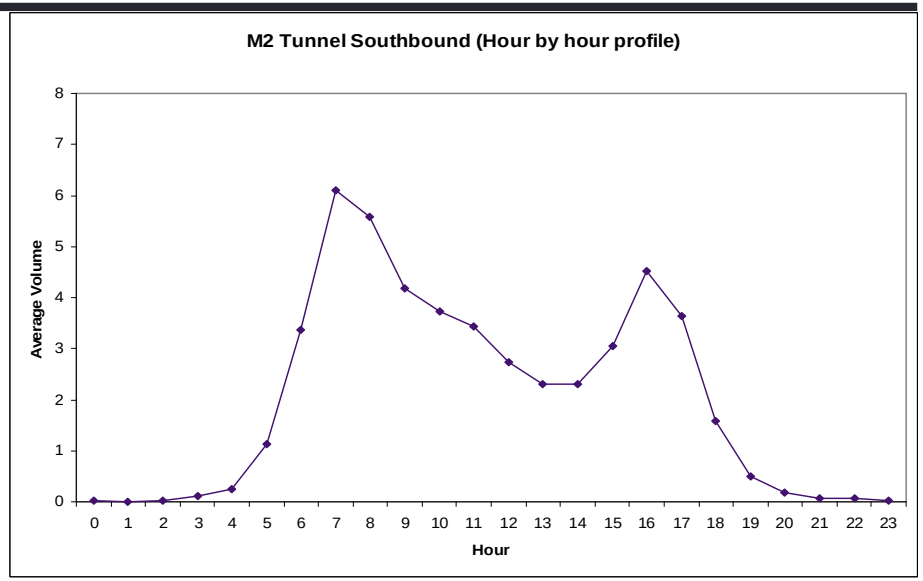


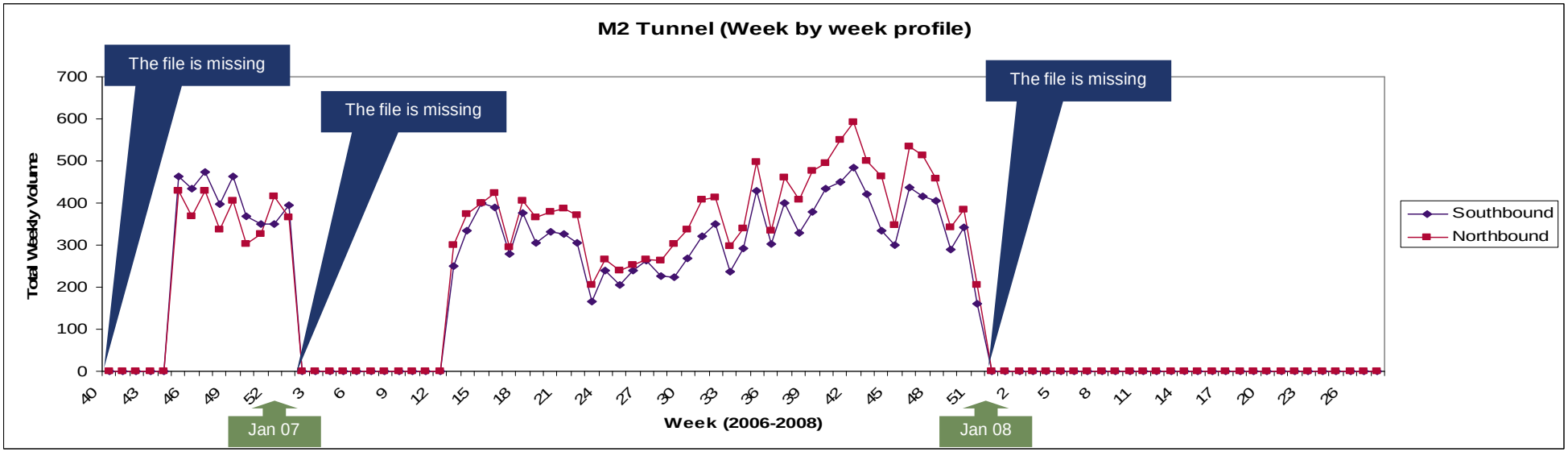
Como Bridge Cycleway (2006-2008) continued



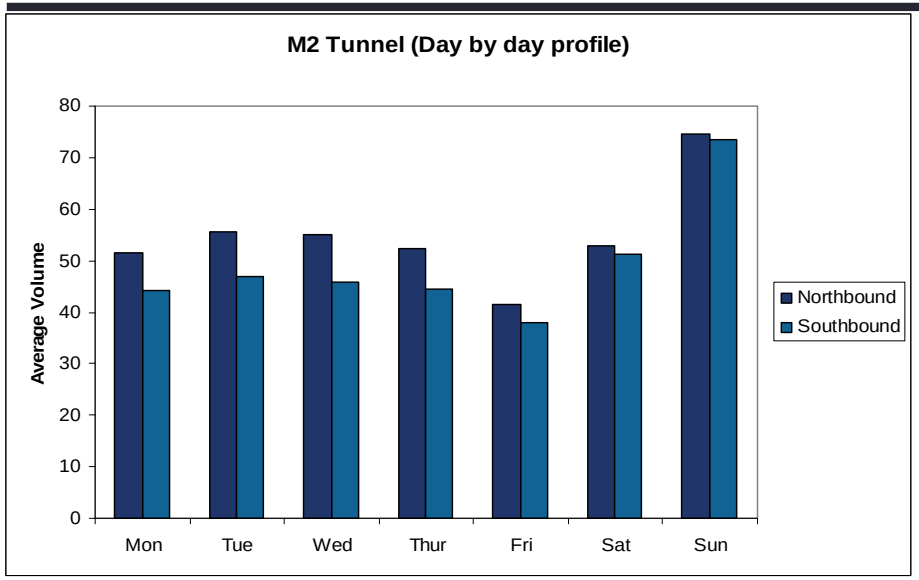
M2 Tunnel Cycleway (2006-2008)



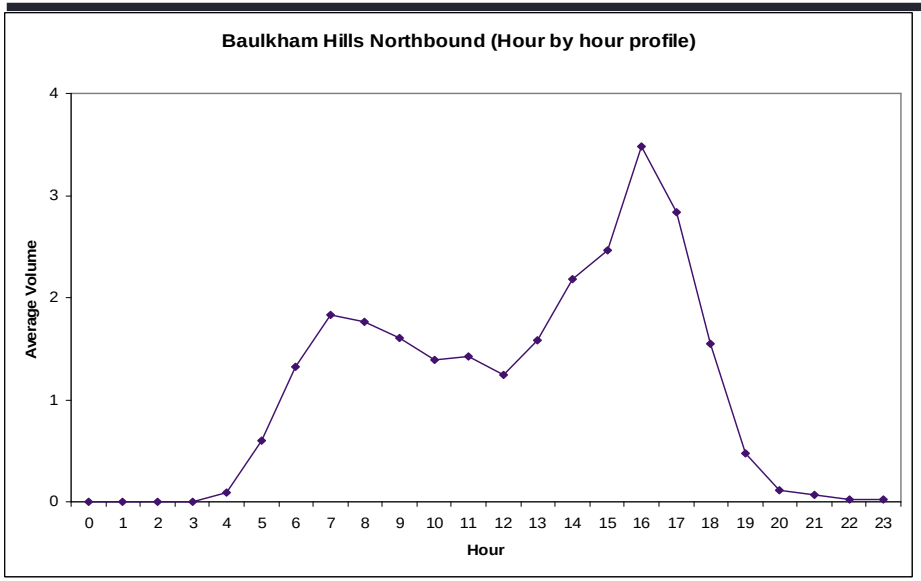


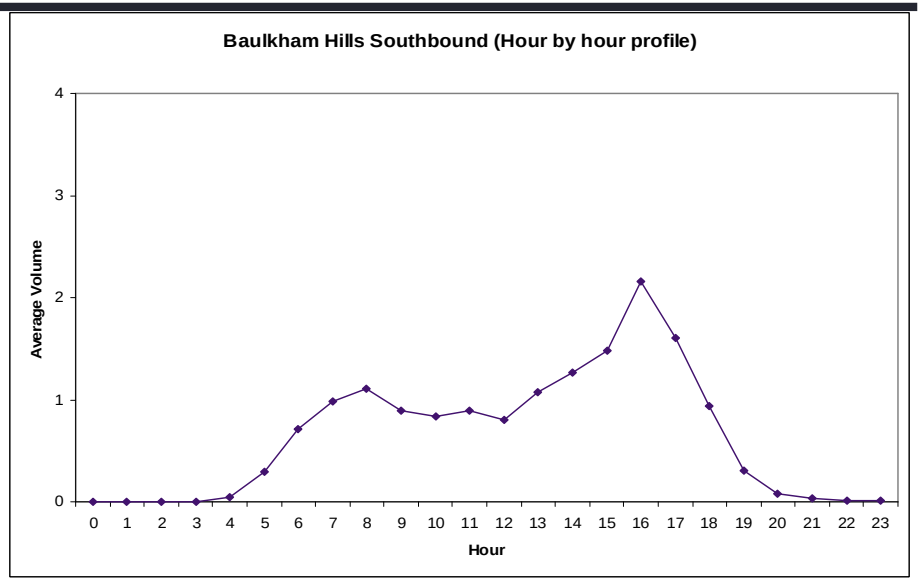


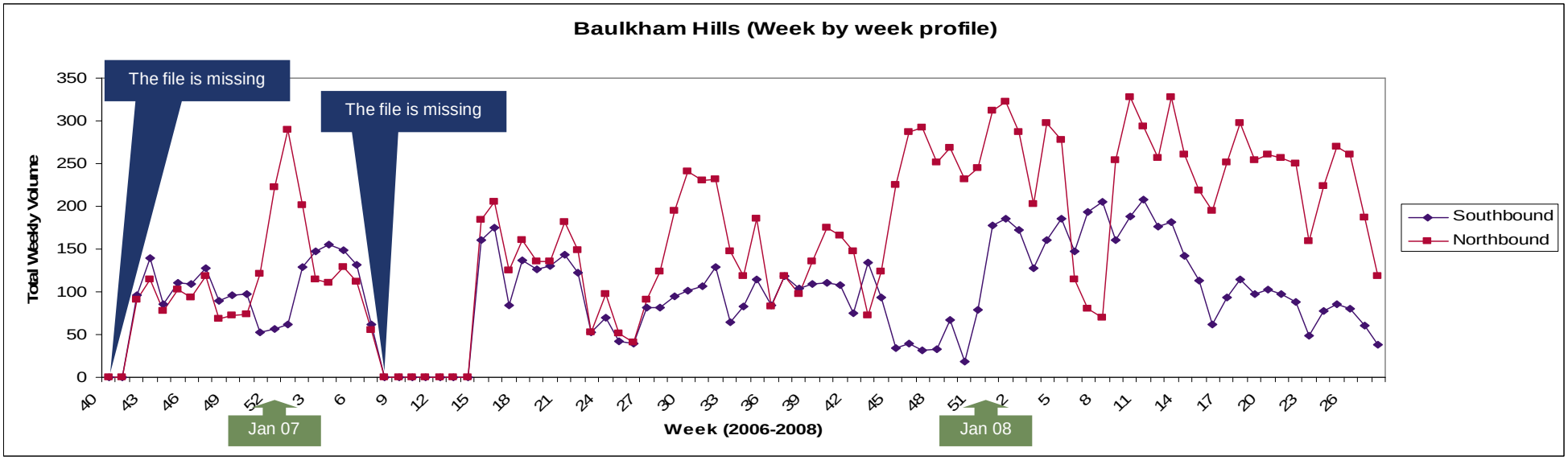
M2 Tunnel Cycleway (2006-2008) continued



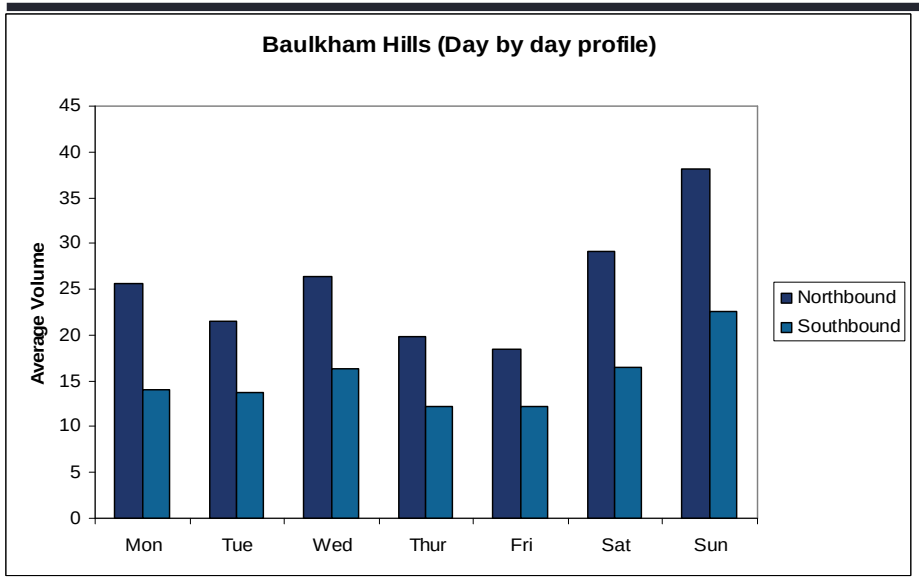
Baulkham hills Cycleway (2006-2008)



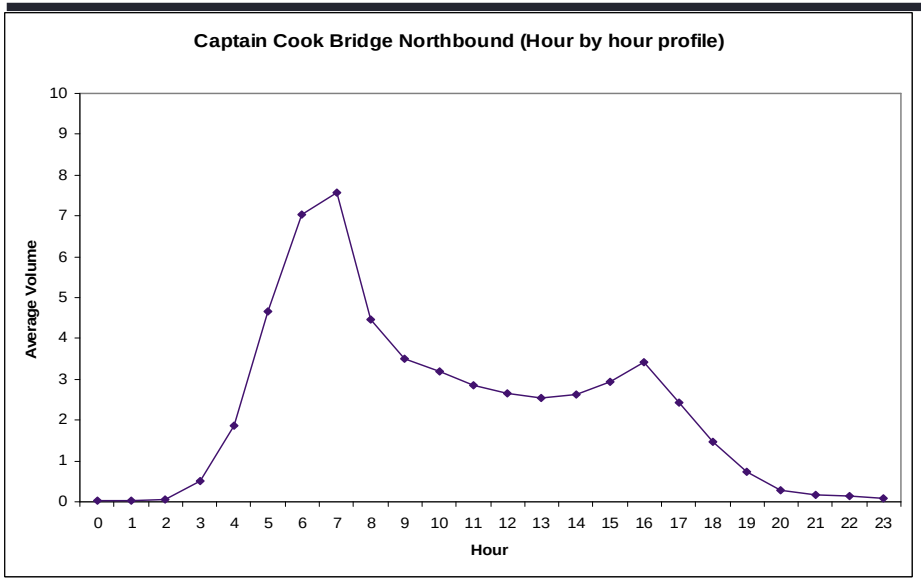


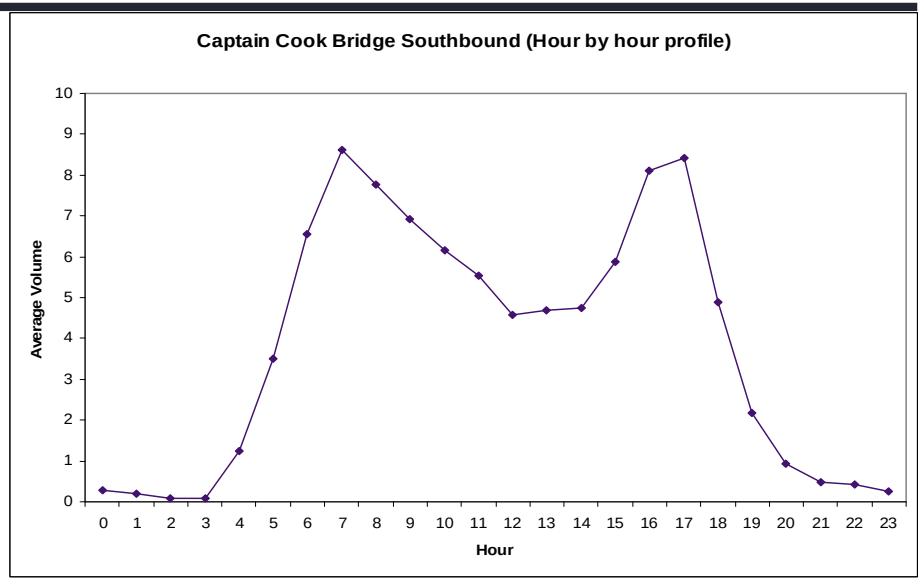


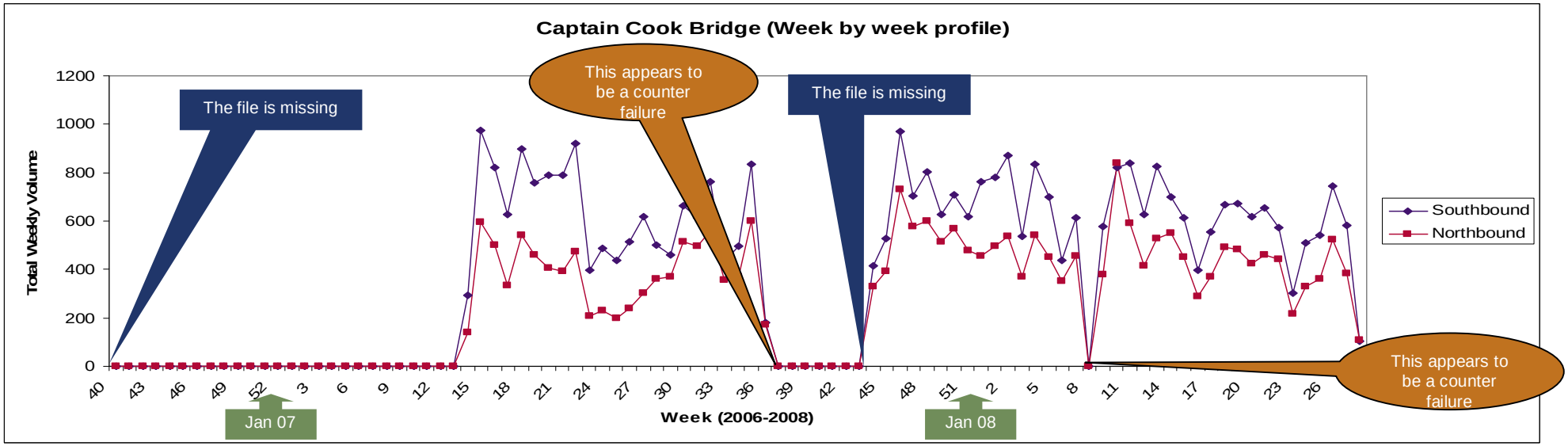
Baulkham hills Cycleway (2006-2008) continued



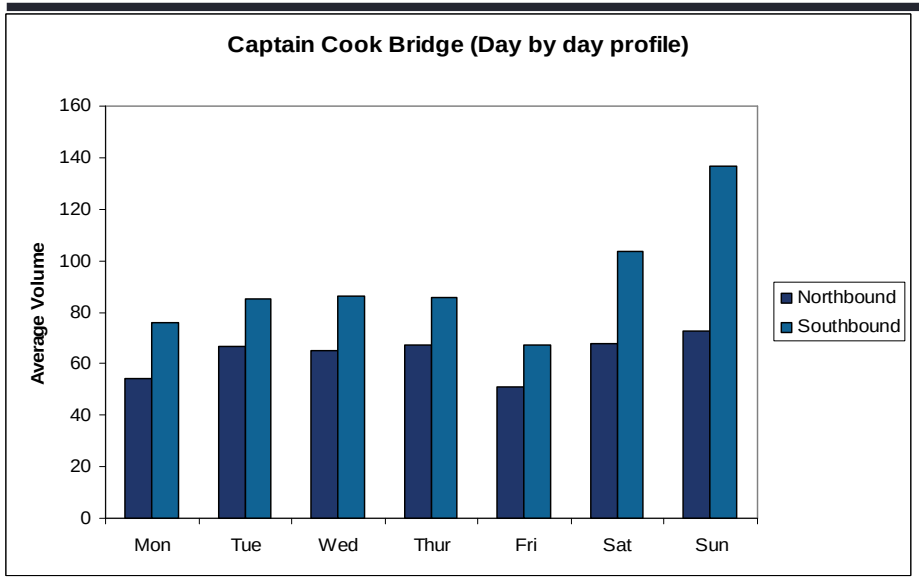
Captain Cook Bridge Cycleway (2006-2008)



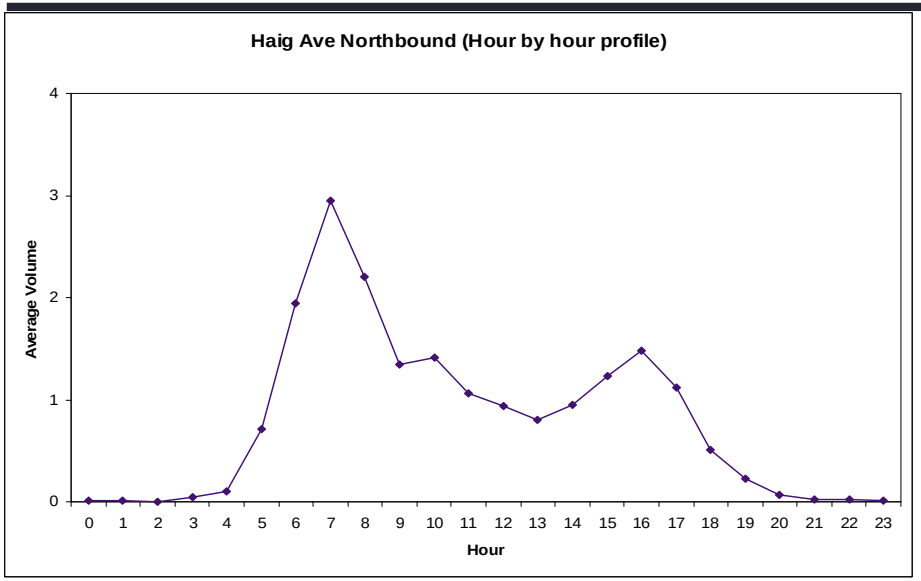


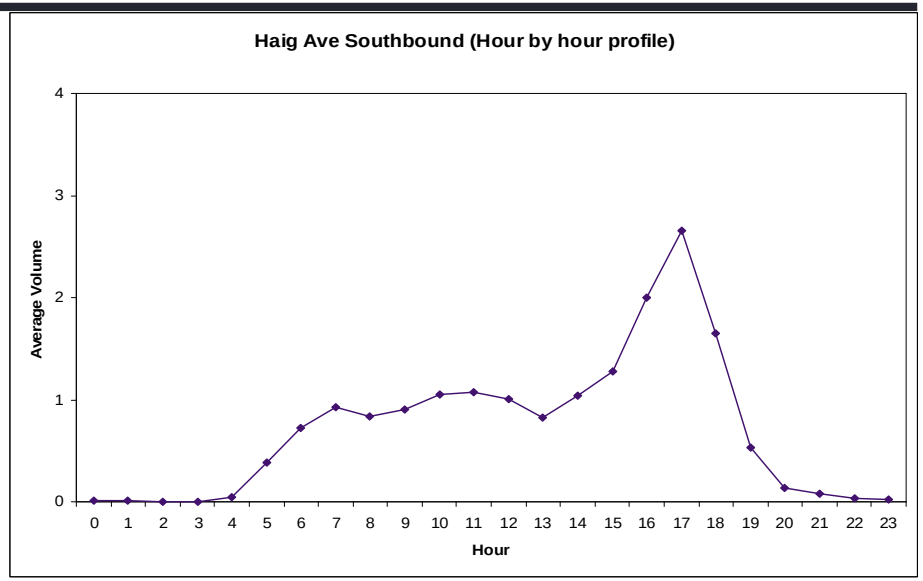


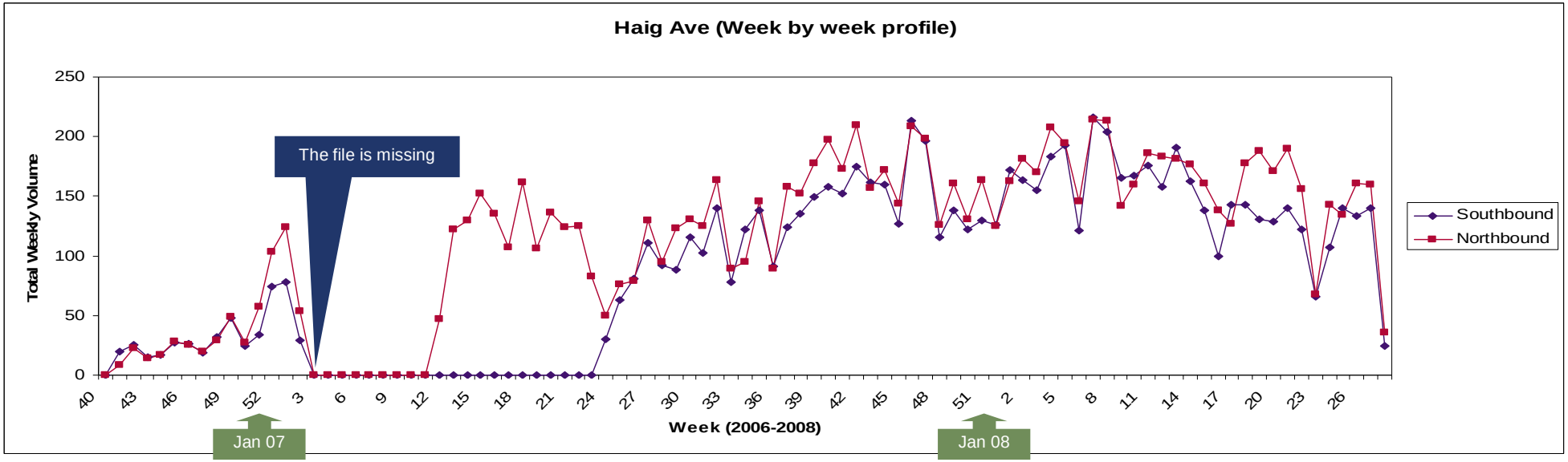
Captain Cook Bridge Cycleway (2006-2008) continued



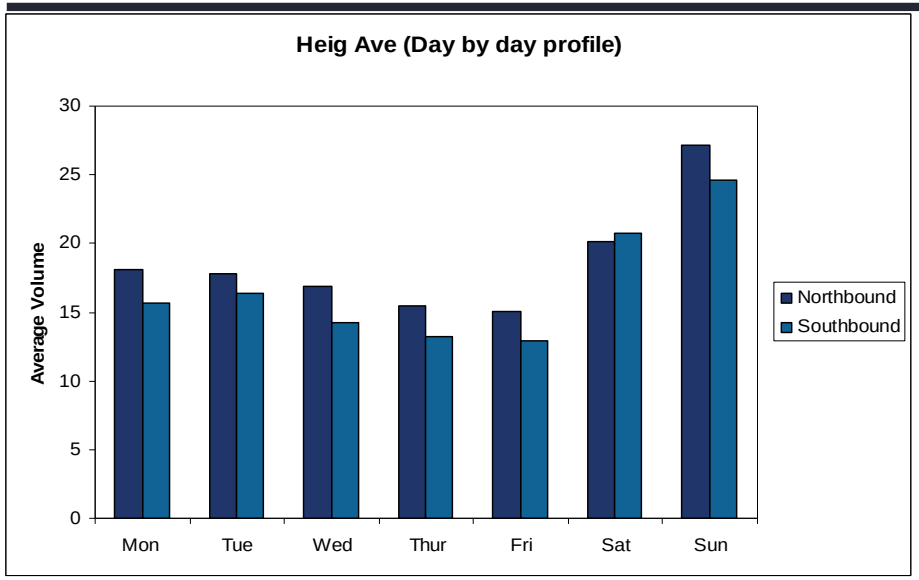
Haig Ave Cycleway (2006-2008)



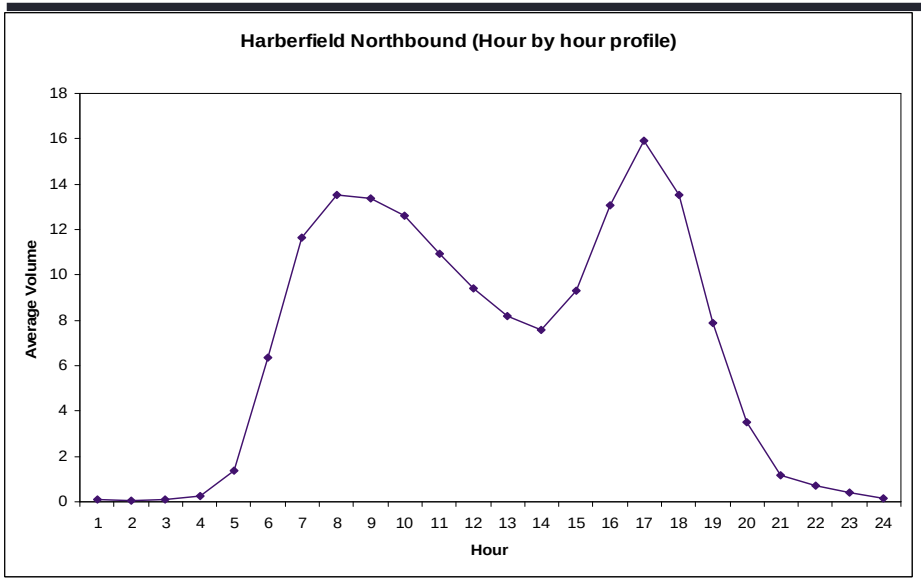


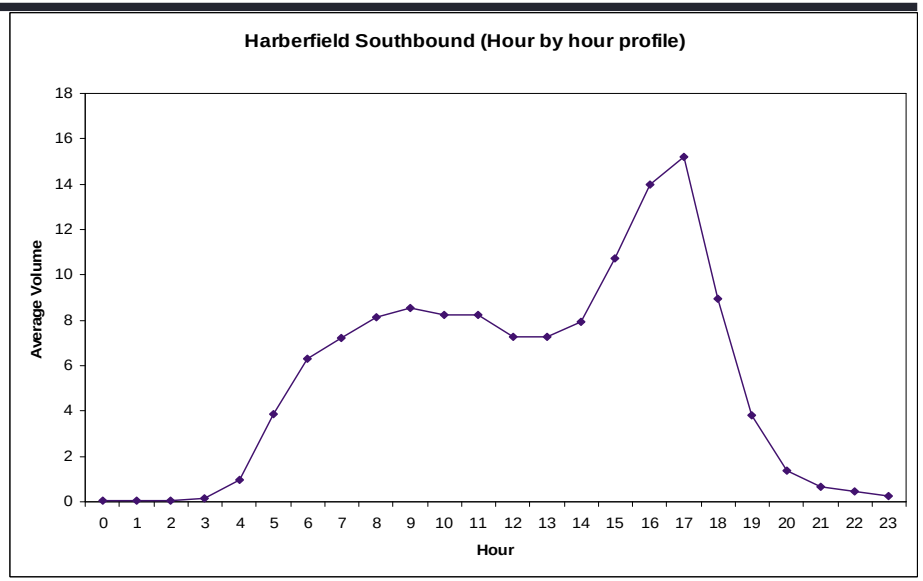


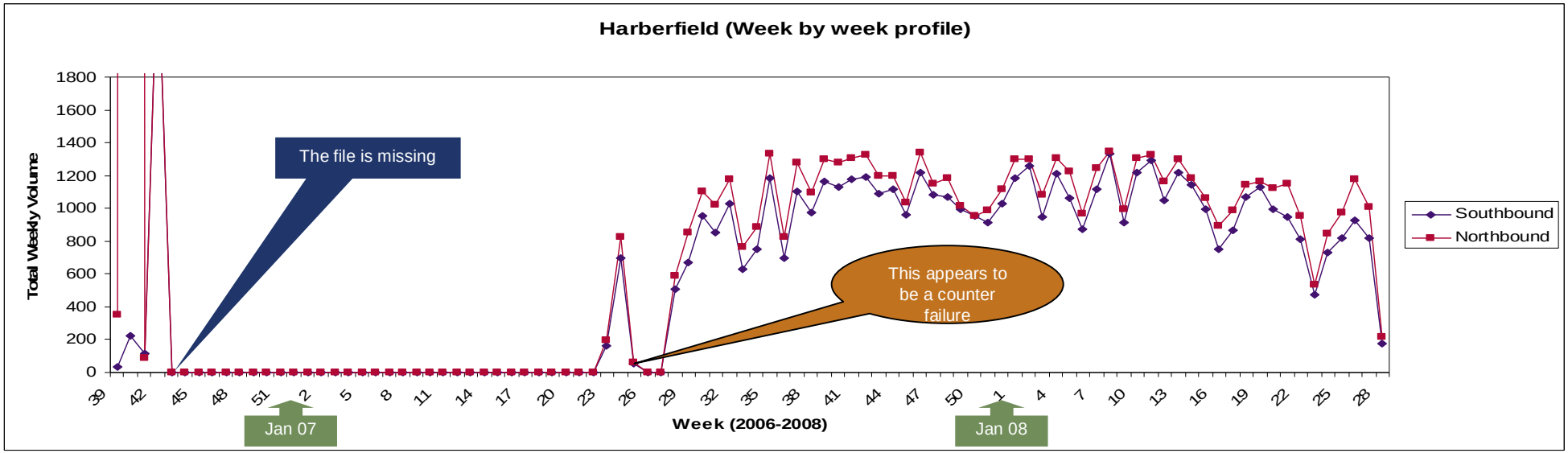
Haig Ave Cycleway (2006-2008) continued



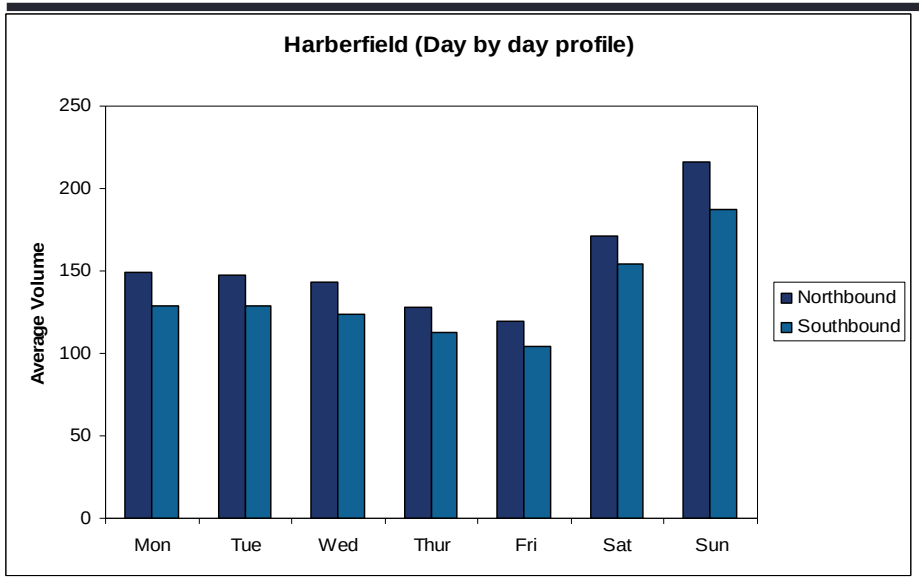
Haberfield Cycleway (2006-2008)



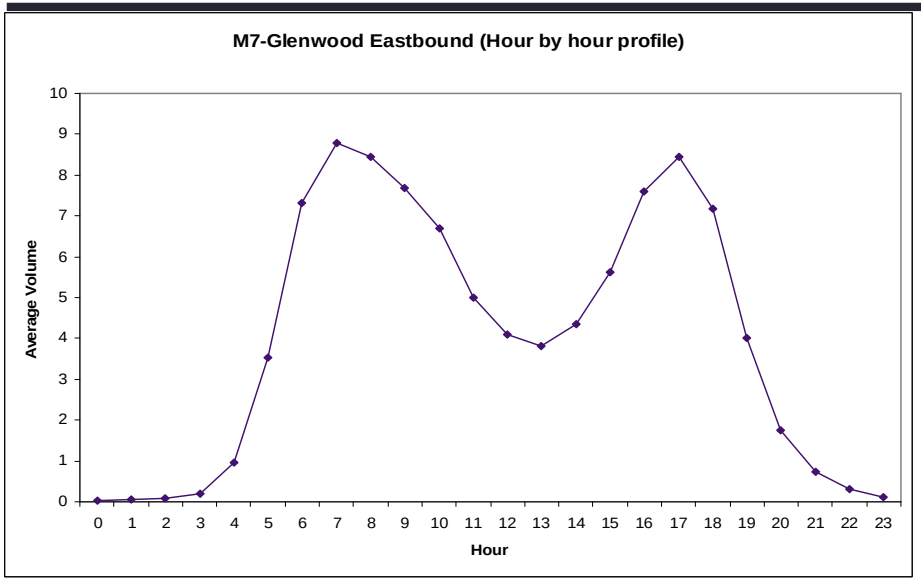


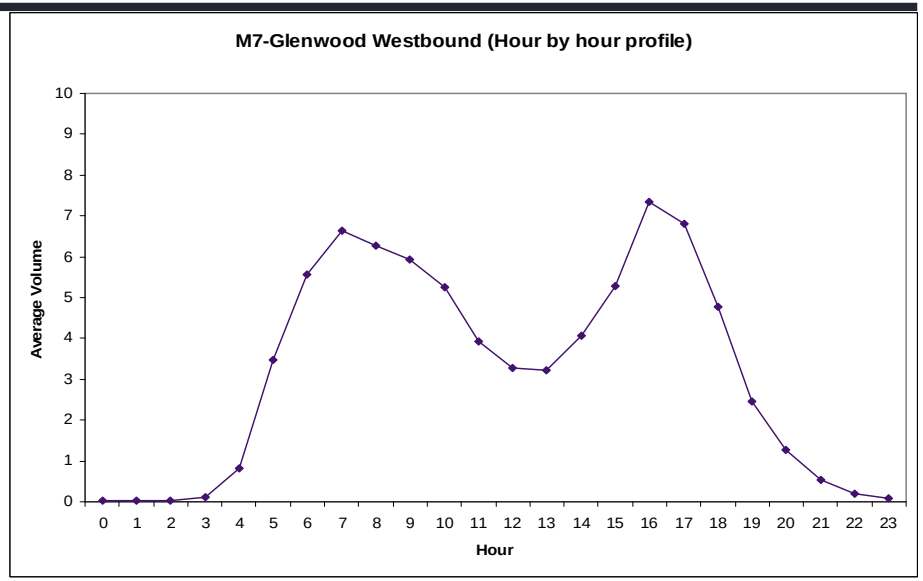


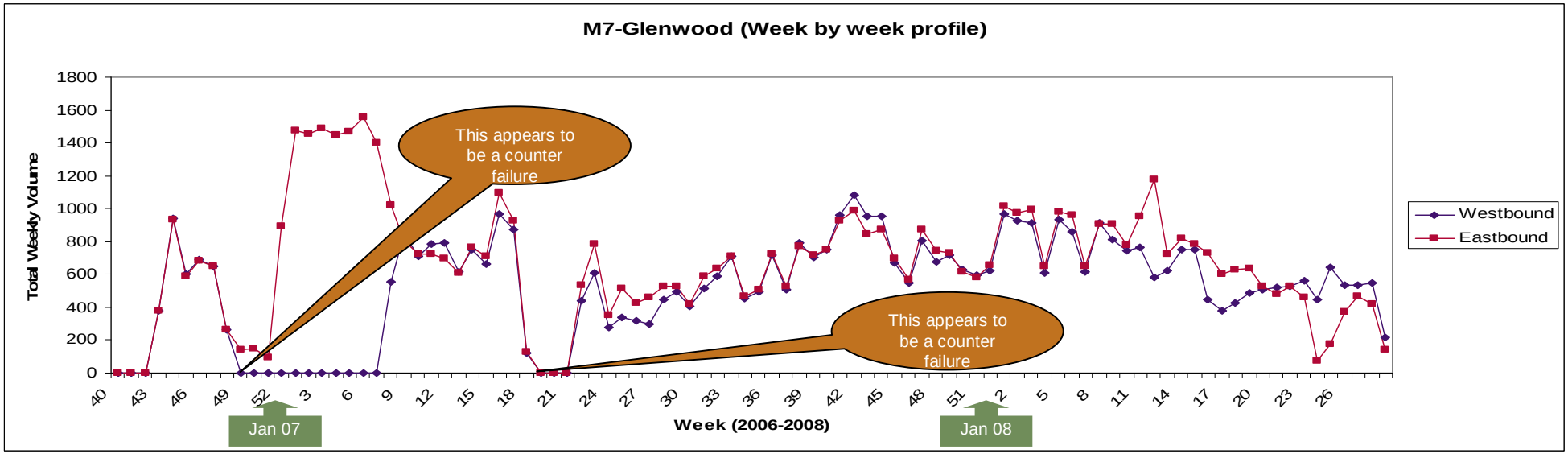
Haberfield Cycleway (2006-2008) continued



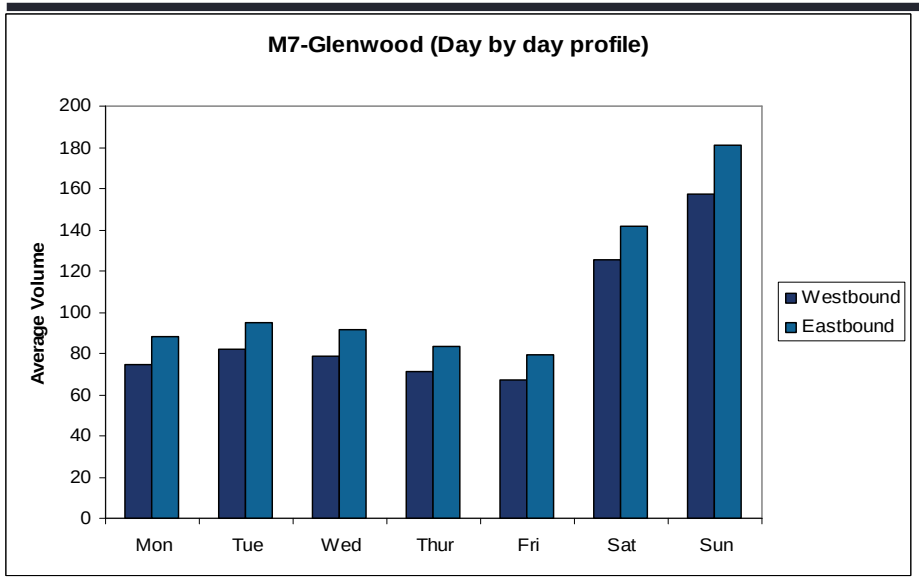
M7 Cycleway - Glenwood (2006-2008)



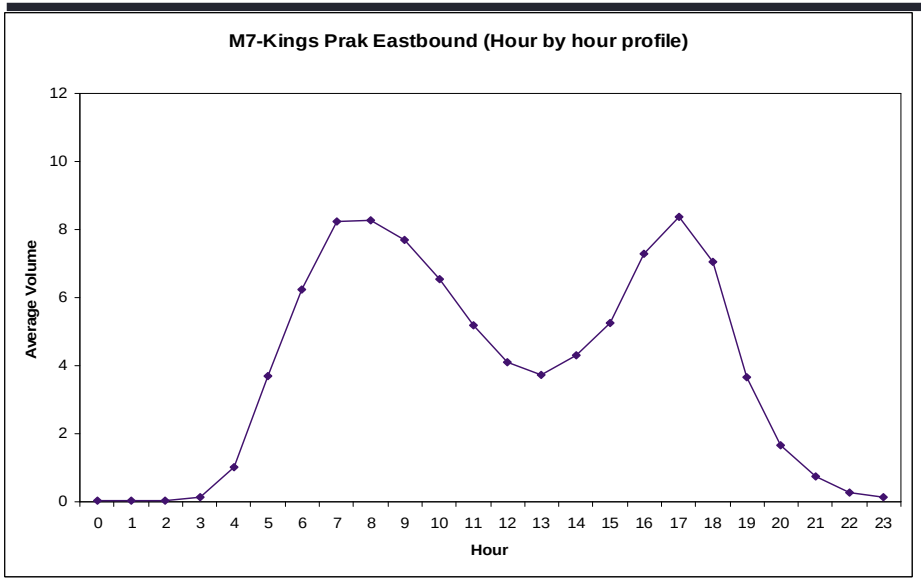


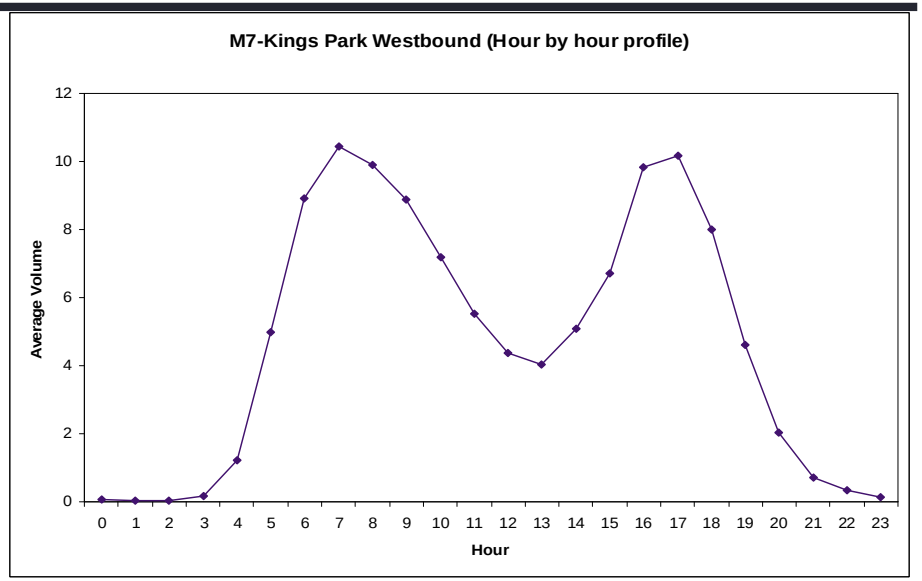


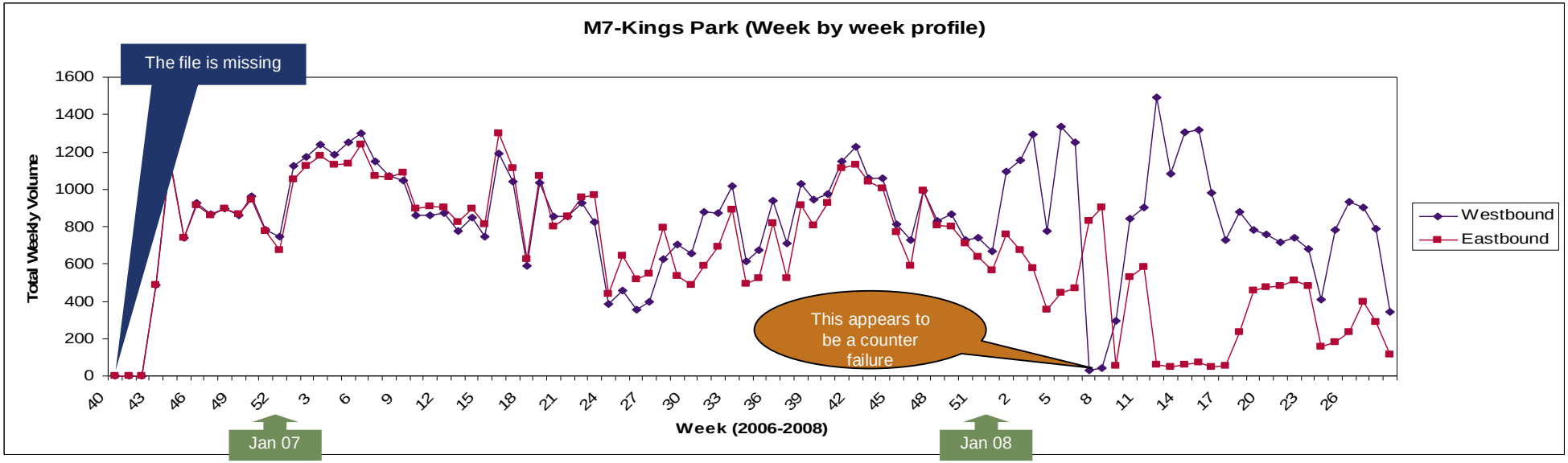
M7 Cycleway – Glenwood (2006-2008) continued



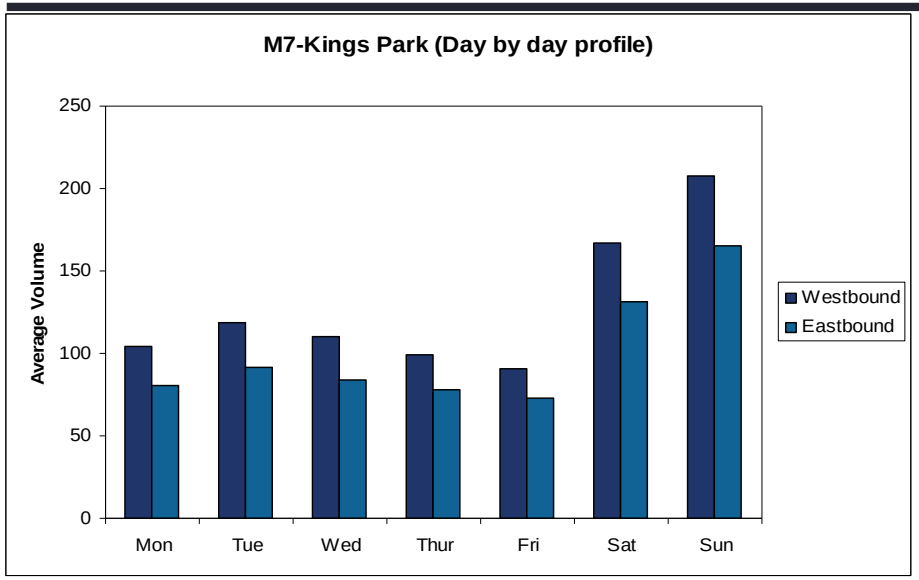
M7 Cycleway – Kings Park (2006-2008)



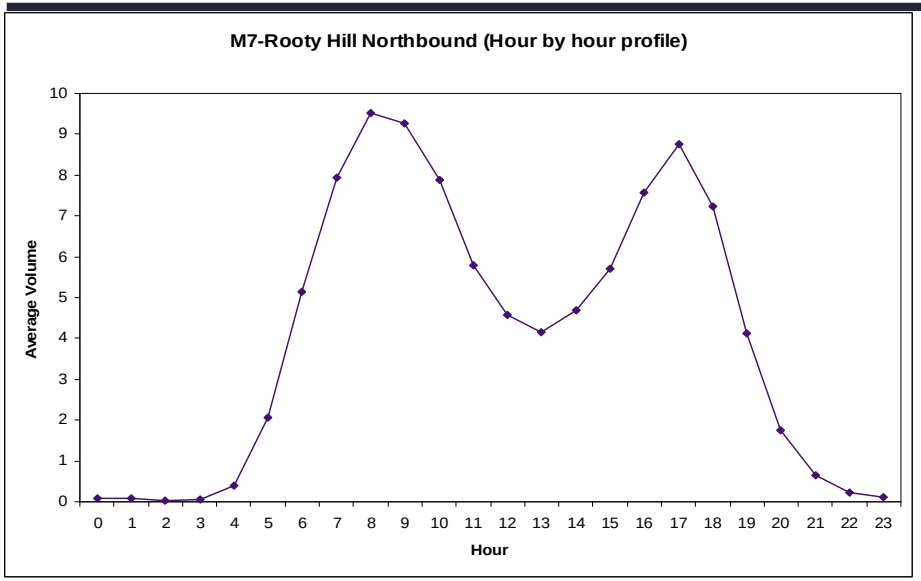


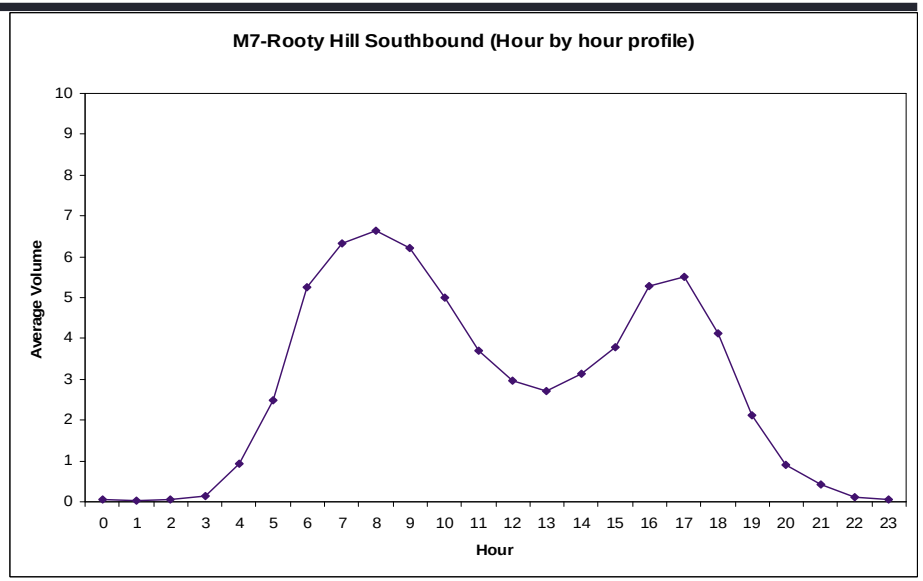


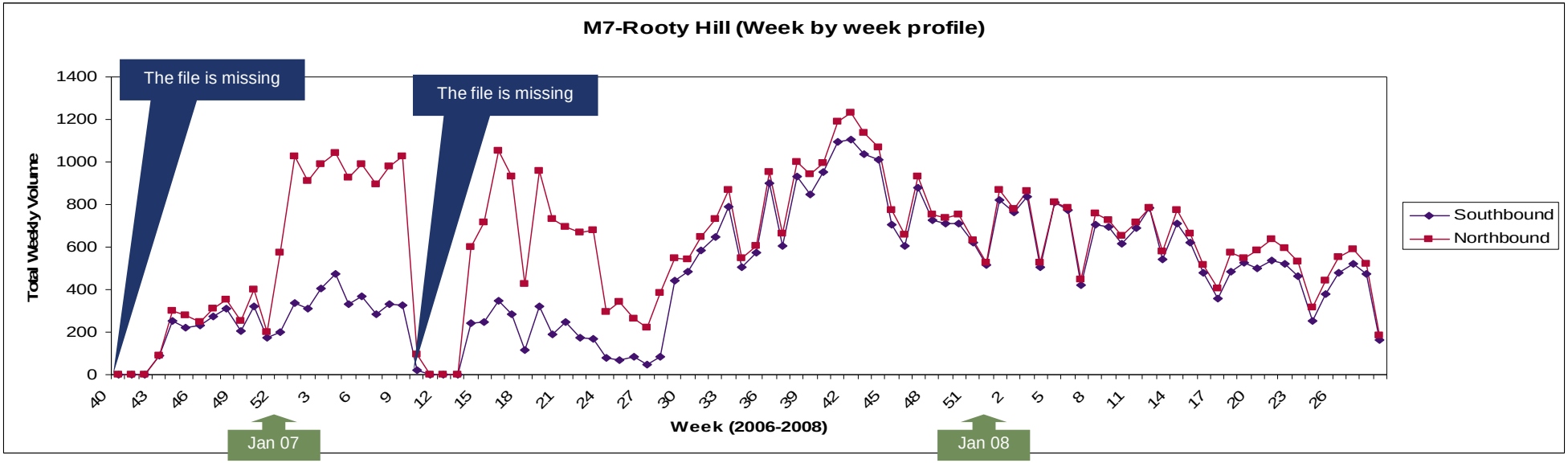
M7 Cycleway – Kings Park (2006-2008) continued



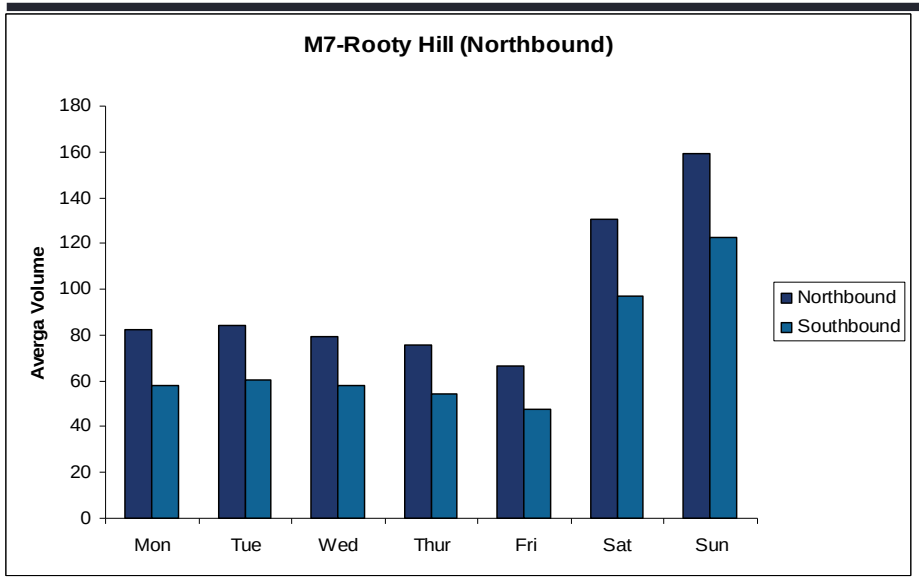
M7 Cycleway – Rooty Hill (2006-2008)



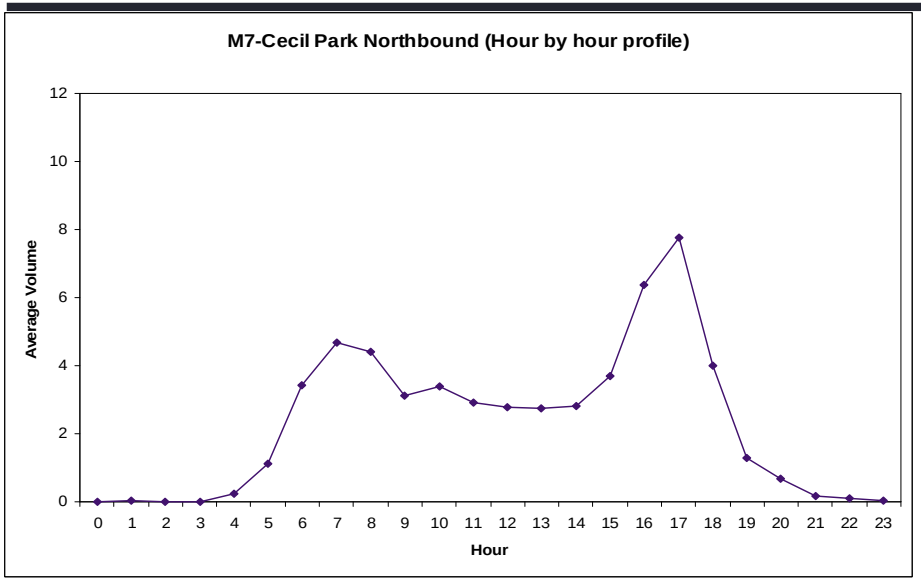


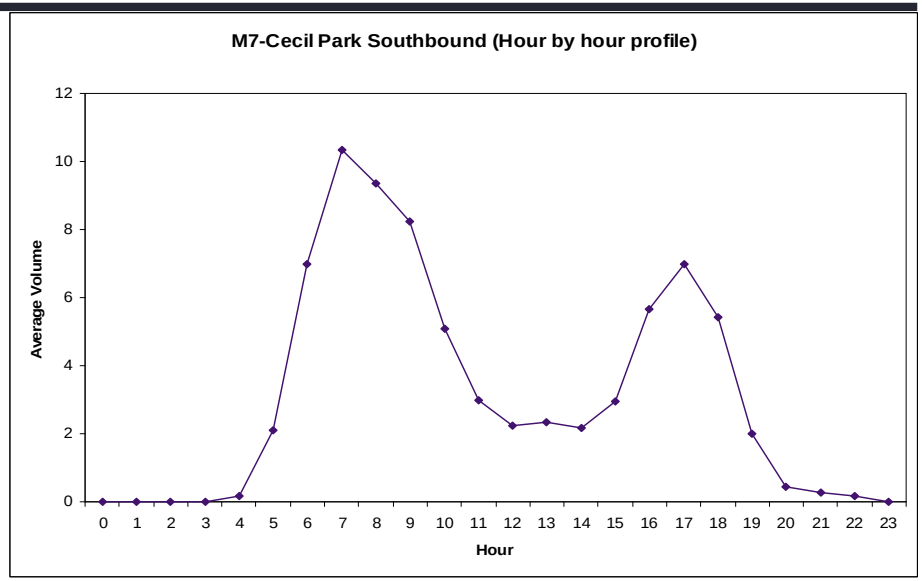


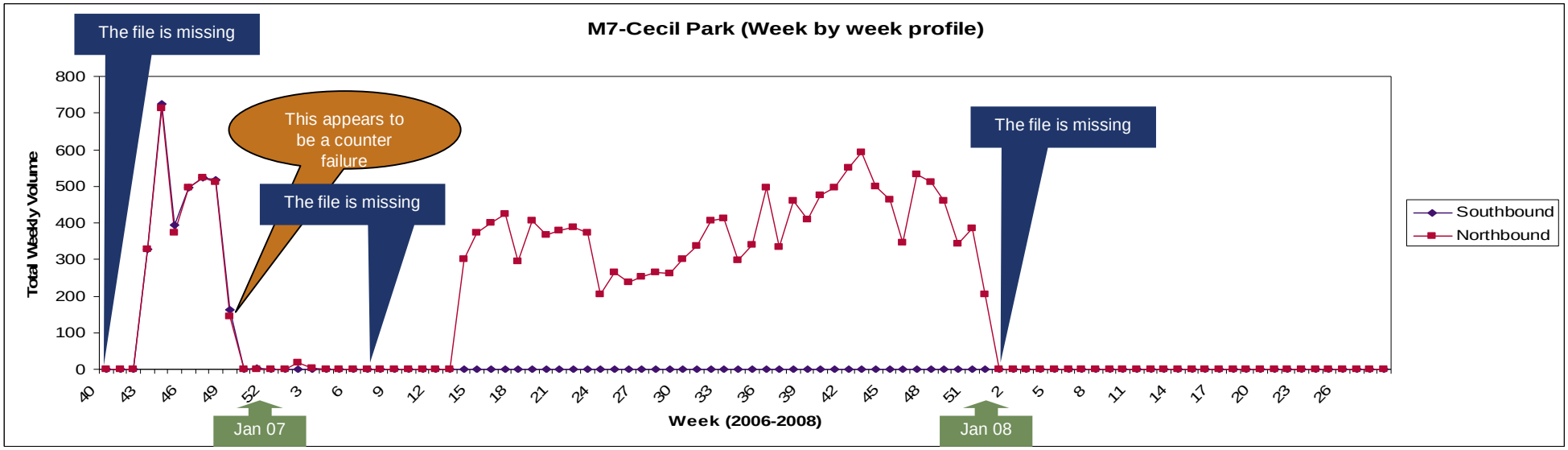
M7 Cycleway – Rooty Hill (2006-2008) continued



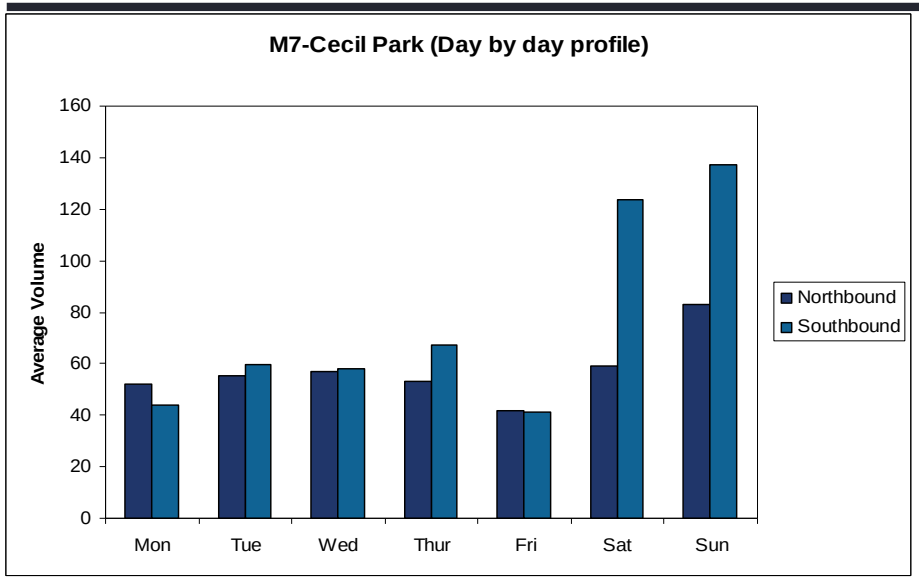
M7 Cycleway – Cecil Park (2006-2008)



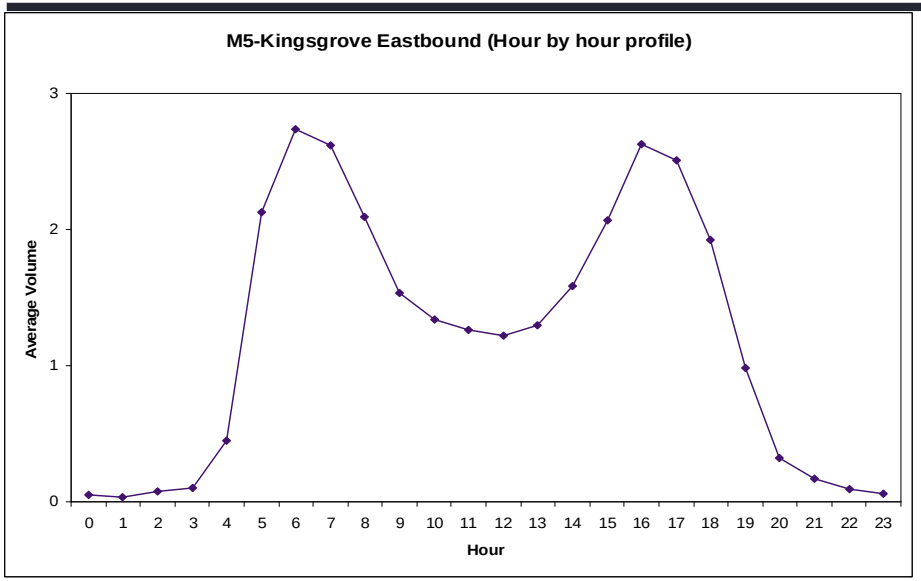


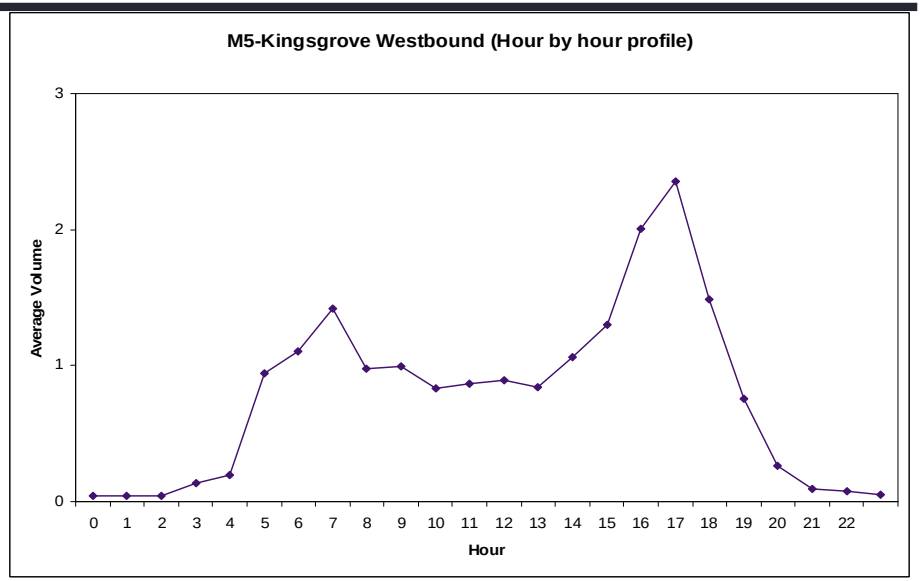


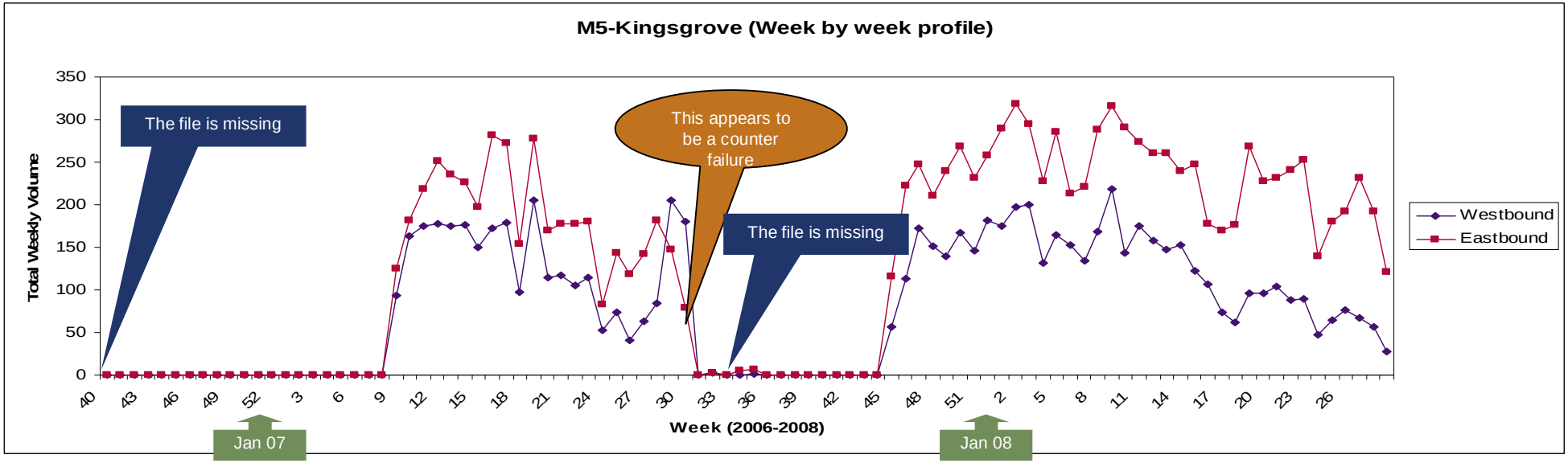
M7 Cycleway – Cecil Park (2006-2008) continued



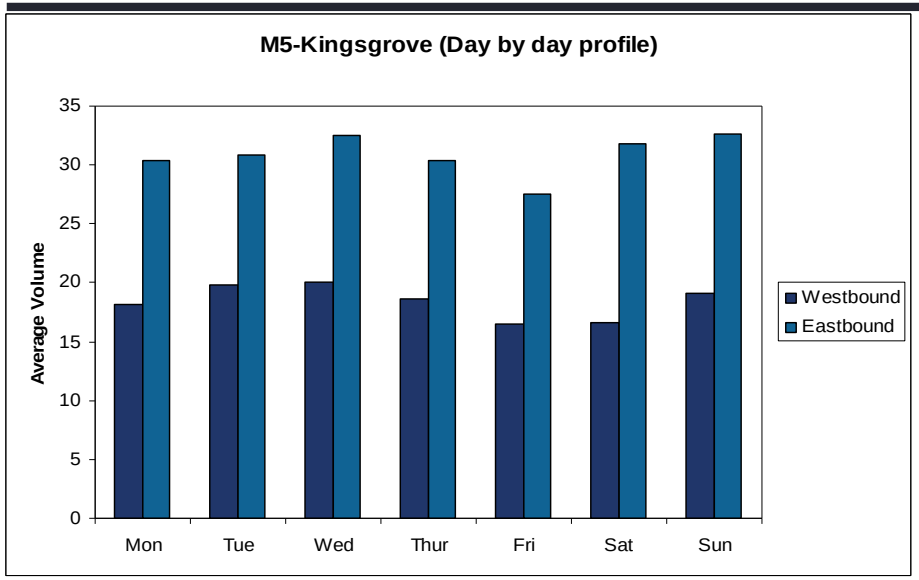
M5 Cycleway - Kingsgrove (2006-2008)



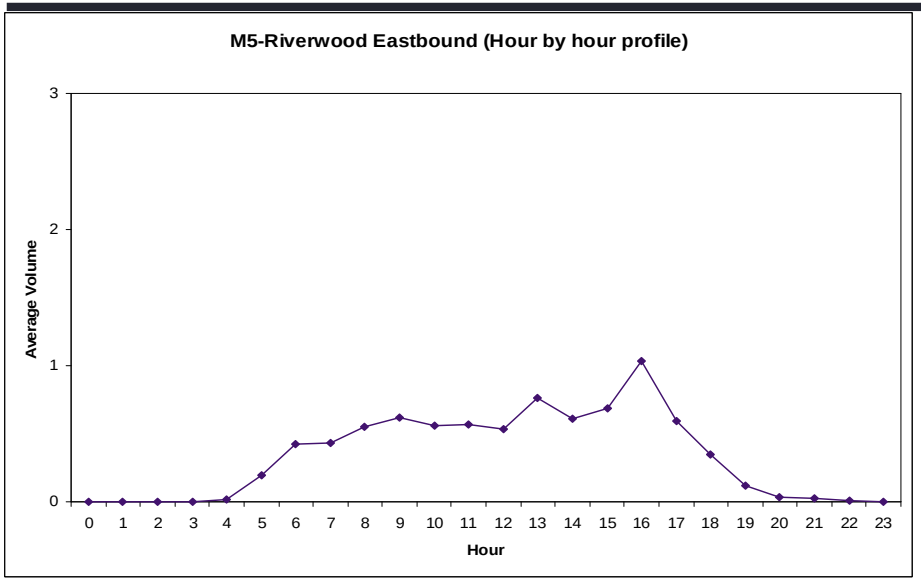


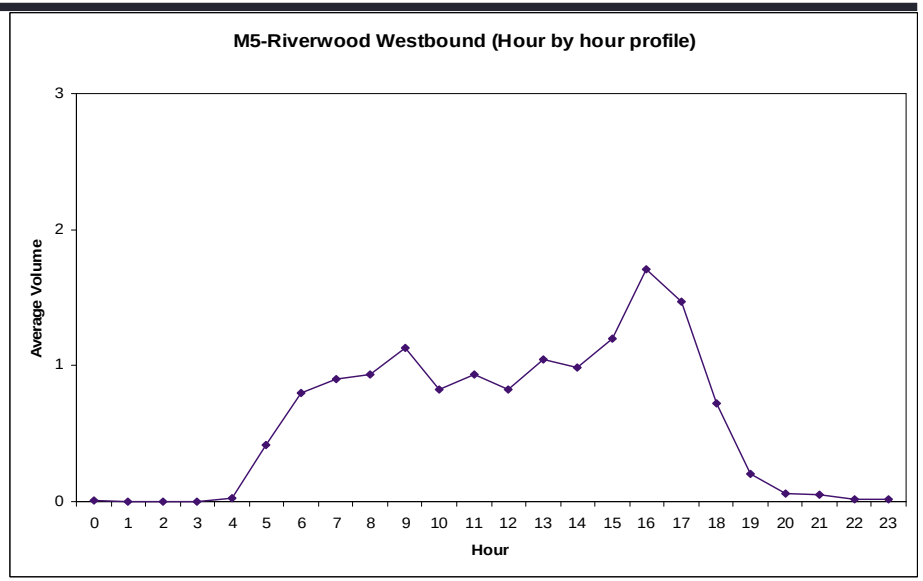


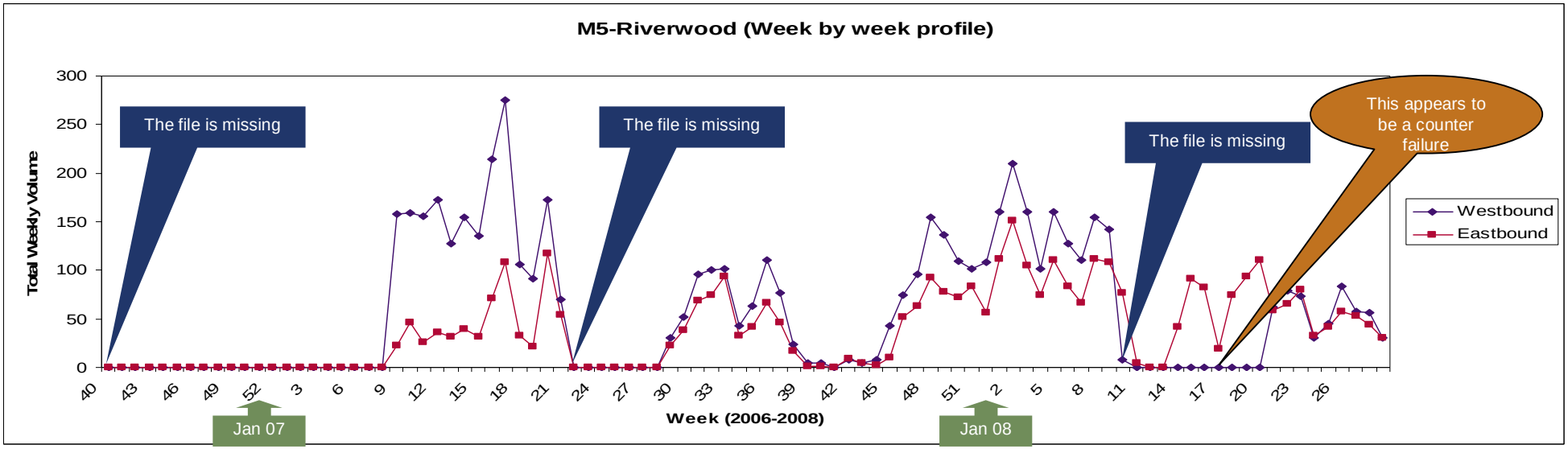
M5 Cycleway – Kingsgrove (2006-2008) continued



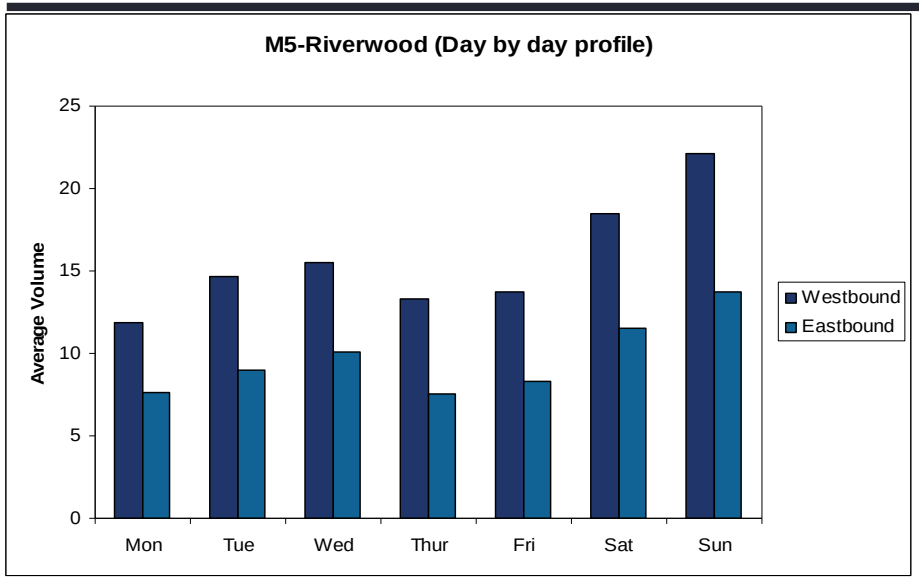
M5 Cycleway - Riverwood (2006-2008)



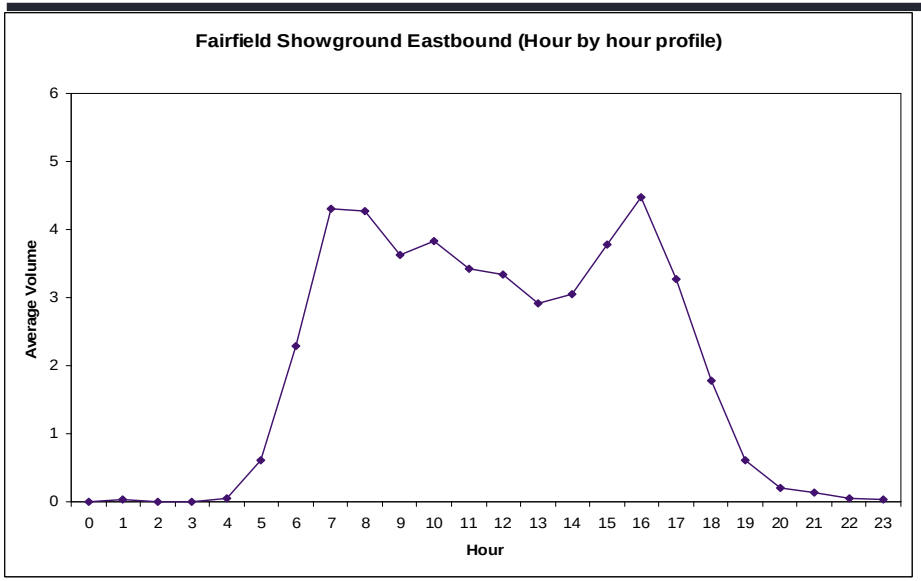


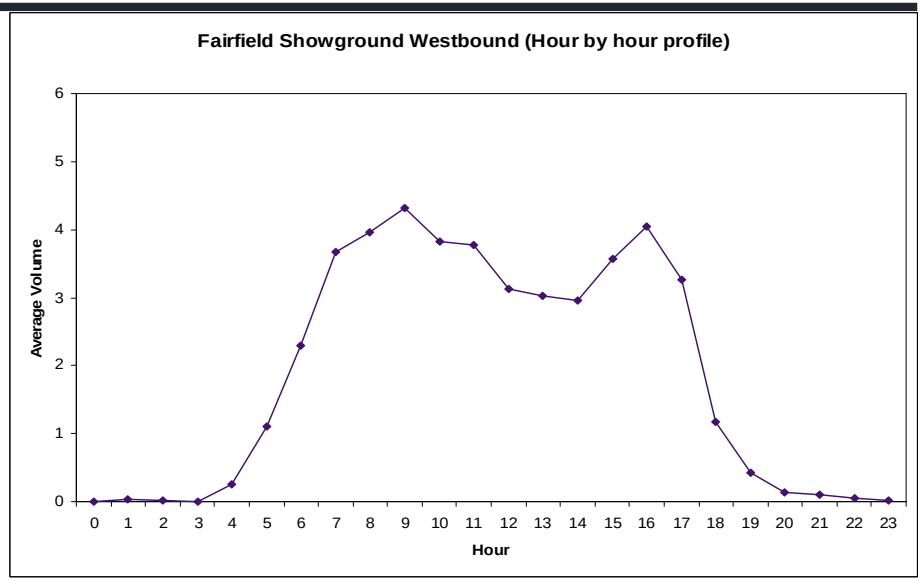


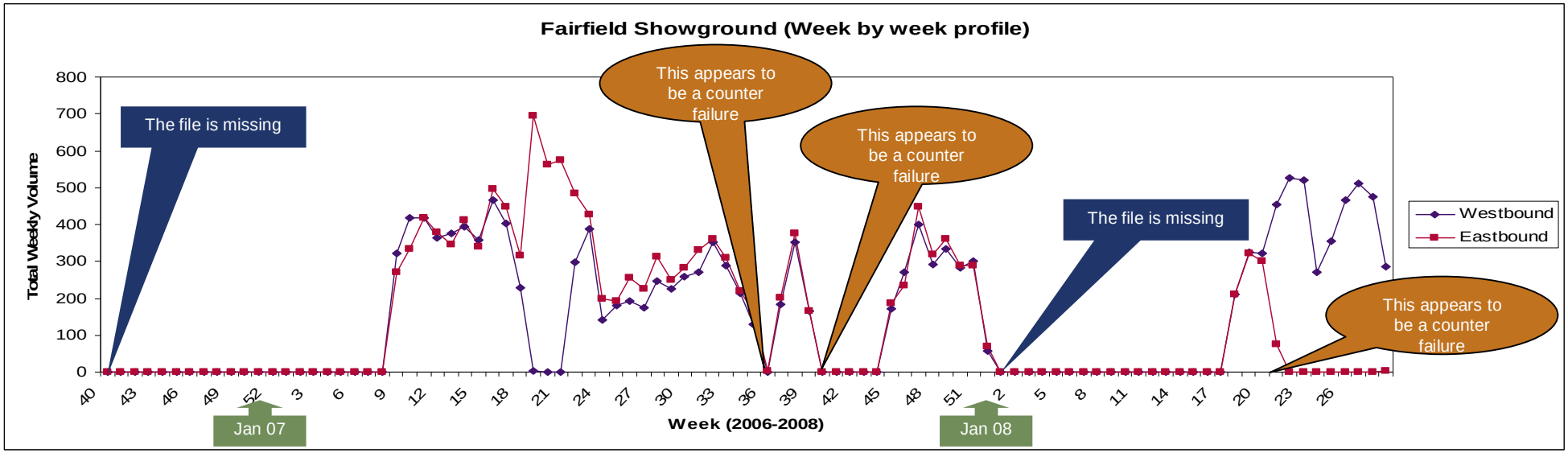
M5 Cycleway – Riverwood (2006-2008) continued



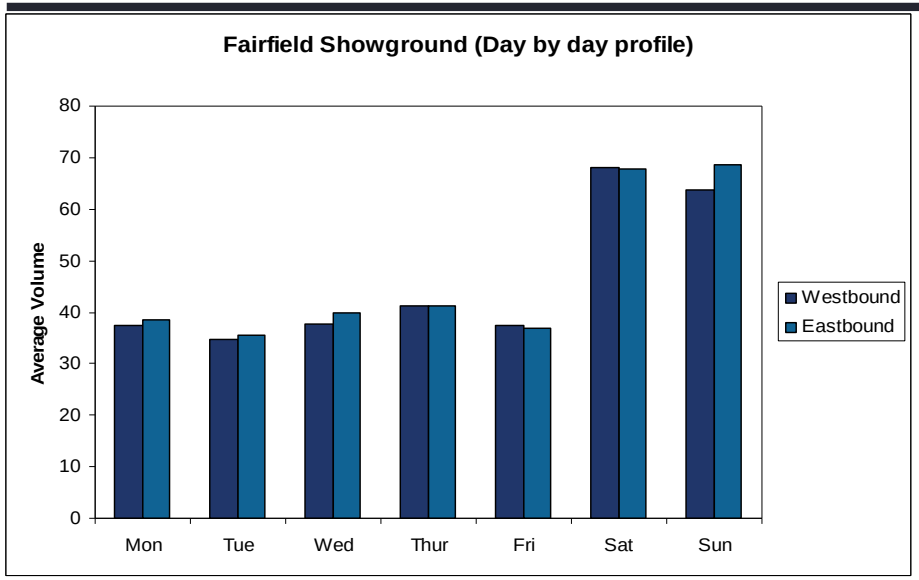
Fairfield Showground Cycleway (2006-2008)



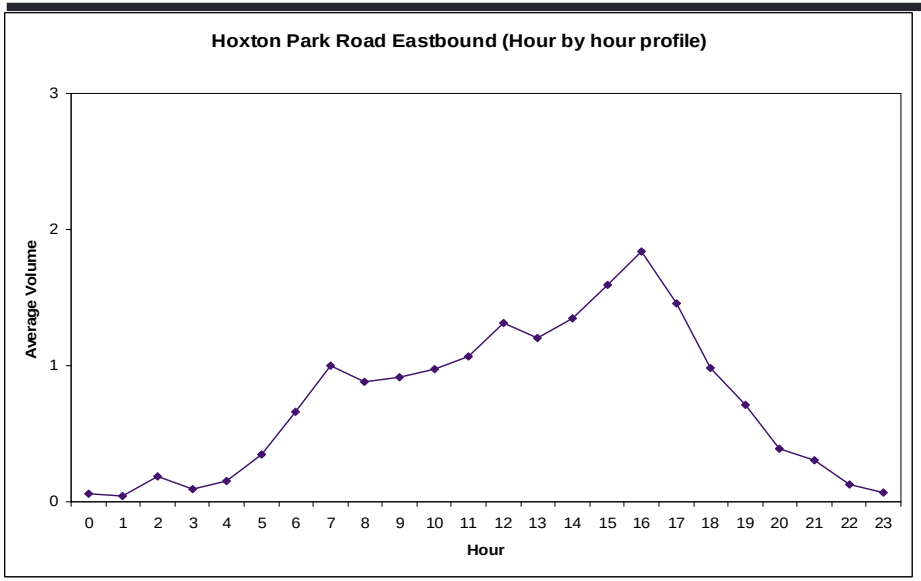


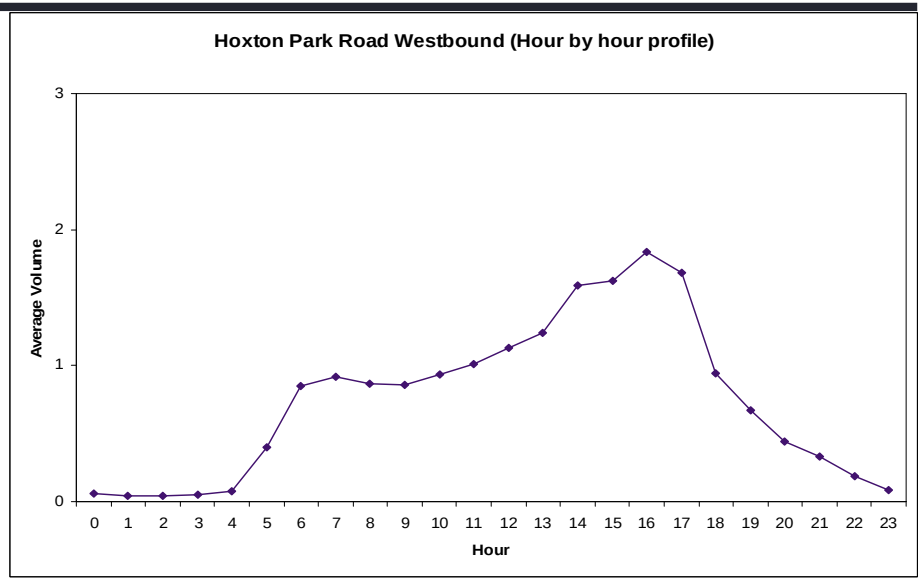


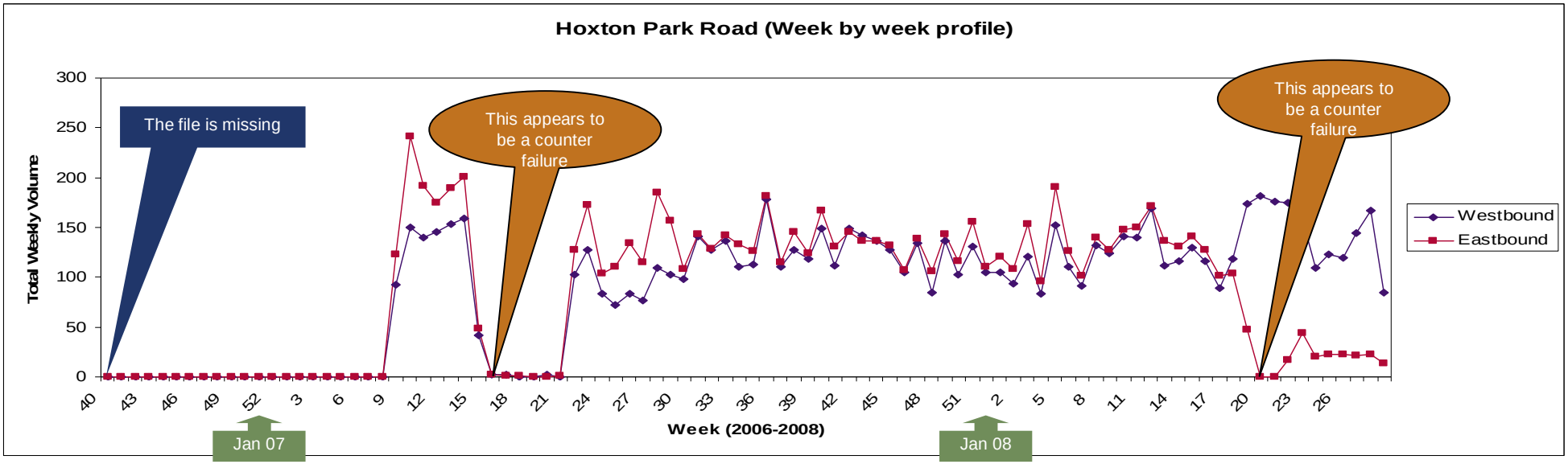
Fairfield Showground Cycleway (2006-2008) continued



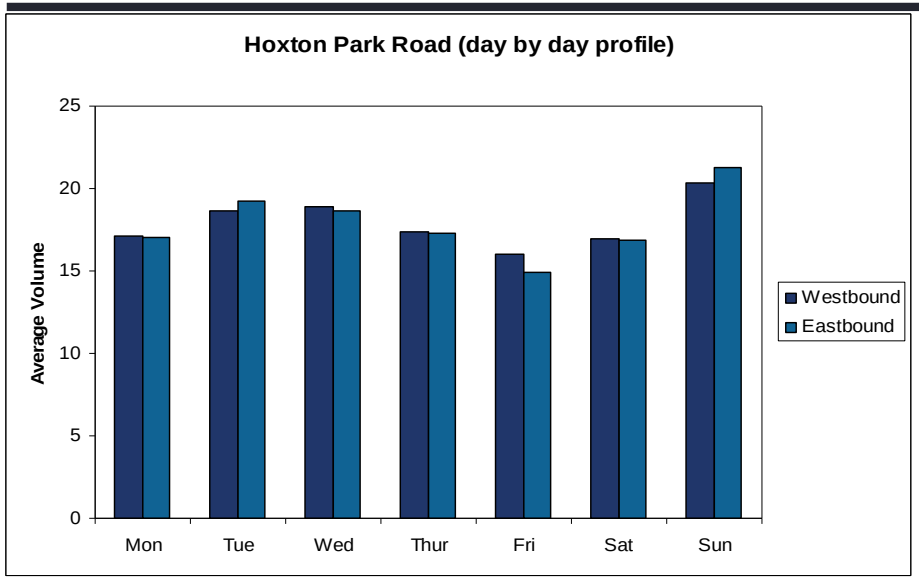
Hoxton Park Road Cycleway (2006-2008)







Hoxton Park Road Cycleway (2006-2008) continued



Site location summary

Station No.	ROAD	DESCRIPTION	Missing period	Note
30011ew	IRON COVE BRIDGE CYCLEWAY	IRON COVE BRIDGE	~06/11/07	
			07/03/08~19/12/06	
			10/01/07~28/03/07	
			09/05/07~11/07/07	
			20/08/07~30/04/08	
			11/06/08~	
90902ns	SHB CYCLEWAY	SOUTHERN TOLL OFFICE	~19/12/06	
			16/02/07~26/03/07	
			23/05/07~11/07/07	
			30/04/08~	
90903ns	ANZAC BRIDGE CYCLEWAY	GLEBE ISLAND BRIDGE	~19/12/06	
			30/01/07~28/03/07	
			09/05/07~11/07/07	
			20/08/07~06/11/07	
			18/12/07~21/01/08	
			07/03/08~30/04/08	
			11/06/08~	
90914ns	PROSPECT RESERVOIR CYCLEWAY	FAIRFIELD CITY FARM - ABBOTSBURY	~19/12/06	
			30/01/07~28/03/07	
			09/05/07~11/07/07	
			20/08/07~06/11/07	
			07/03/08~02/05/08	
			13/06/08~	
90904Ns	CABRAMATTA CYCLEWAY	BROOMFIELD STREET	~16/10/06	
			11/01/07~26/03/07	
			18/07/08~	
90905Ns	GUILDFORD CYCLEWAY	RAILWAY TERRACE	~16/10/06	
			10/01/07~26/03/07	
			01/06/07~15/06/07	
			13/07/07~06/08/07	
			25/09/07~01/11/07	
			20/12/07~26/02/08	
			08/07/08~	
90907Ns	ANZAC PDE CYCLEWAY	MOORE PARK – S OF LANG ROAD	~06/10/06	
			06/11/06~24/05/07	
			07/07/08~	
90908Ns	JOHN WHITTON BRIDGE CWY	MEADOWBANK	~17/10/06	
			10/01/07~27/03/07	
			06/06/07~13/06/07	
			08/07/08~	
90909Ew	COOKS RIVER CYCLEWAY	MARRICKVILLE SOUTH	~06/10/06	
			8/07/2008~	
90910Ns	COMO BRIDGE CYCLEWAY	COMO	~30/10/06	
			03/01/07~14/06/07	
			16/04/08~30/04/08	
			08/07/08~	

Site location summary continued

Station No.	ROAD	DESCRIPTION	Missing period	Note
90911Ns	M2 TUNNEL CYCLEWAY	NTH EPPING – BROWNS WATER HOLE	~06/11/06 07/01/07~28/03/07 20/12/07~	
90912Ns	BAULKHAM HILLS CYCLEWAY	BAULKHAM HILLS – CREASTWOOD RESERVE	~17/10/06 16/02/07~10/04/07 11/07/08~	
90913Ns	CAPTAIN COOK BRIDGE CWY	TAREN POINT – SOUTHERN APPROACH TO BRIDGE	~05/04/07 29/10/07~31/10/07 08/07/08~	
90930Ns	HAIG AVE CYCLEWAY	HAWTHORNE CANAL - WEST SIDE PATHWAY	~10/10/06 10/01/07~13/06/07 08/07/08~	
90931ns	HABERFIELD CYCLEWAY	RICHARD MURDEN RESERVE	~26/09/08 18/10/06~07/06/07 08/07/08~	
90915ew	M7 CYCLEWAY	GLENWOOD – (FAIRMOUNT CIRCUIT)	~20/10/06 10/07/08~	
90916ew	M7 CYCLEWAY	KINGS PARK – (SUNNYHOLT ROAD)	~20/10/06 10/07/08~	
90917ns	M7 CYCLEWAY	ROOTY HILL – (STATION STREET)	~20/10/06 27/02/07~28/03/07 10/07/08~	
90918ns	M7 CYCLEWAY	CECIL PARK – (ELIZABETH DRIVE)	~16/10/06 27/11/06~	
90919ns	M7 CYCLEWAY	PRESTONS – (KURRAJONG ROAD)		No data available
90906		main road - not dedicated cycleway		No data available
90920ew	M5 CYCLEWAY	KINGSGROVE - W OF KORELLA STREET	~21/02/07 23/08/07~01/11/07 11/07/08~	
90921ew	M5 CYCLEWAY	RIVERWOOD - E OF BONDS ROAD	~21/02/07 19/05/07~13/07/07 25/02/08~22/04/08 11/07/08~	
90922ew	FAIRFIELD SHOWGROUND CYCLEWAY	PRAIRIEWOOD - W OF SMITHFIELD ROAD	~21/02/07 18/12/07~23/04/08 11/07/08~	
90923ew	HOXTON PARK ROAD CYCLEWAY	CARTWRIGHT - E OF JOADJA ROAD	~21/02/07 10/07/08~	

John Whitton Bridge and Sydney Olympic Park

Worth noting:

On the next slides, four sample days and four sample months have been chosen for the comparison of Cycling counts between John Whitton Bridge and Sydney Olympic Park (SOP).

•Sample days (Mon, Wed, Sat and Sun)

•Sample Months (April (School holidays), May, Oct and Feb)

•They are the representatives of 'Typical Use' (ie. Weekday use and Weekend use)

Purpose of comparison

•Test pattern of cycling (ie. Does people use other forms of transport rather than bicycle to reach to SOP for cycling)

About the data

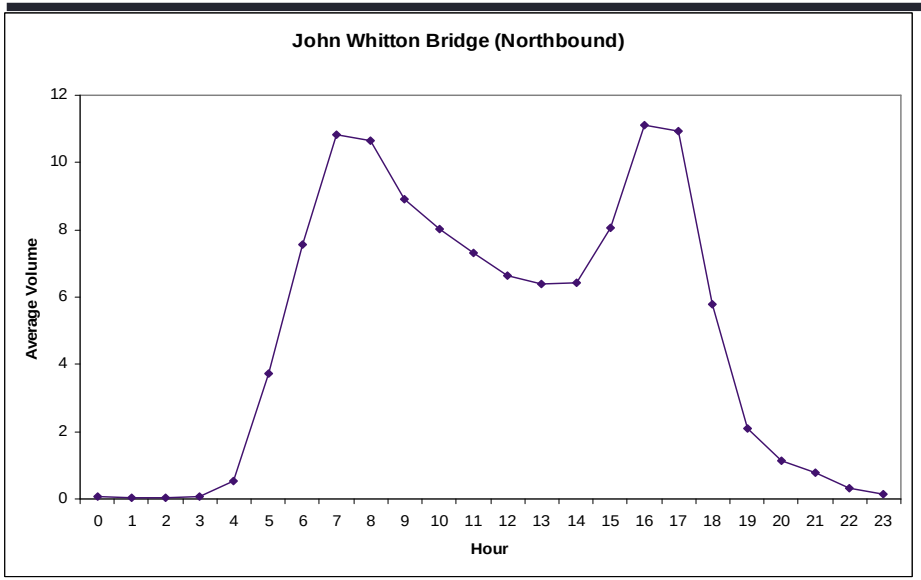
•Three locations – Corner of Hill and Bennelong Road, Ferry entrance and Nelson Park

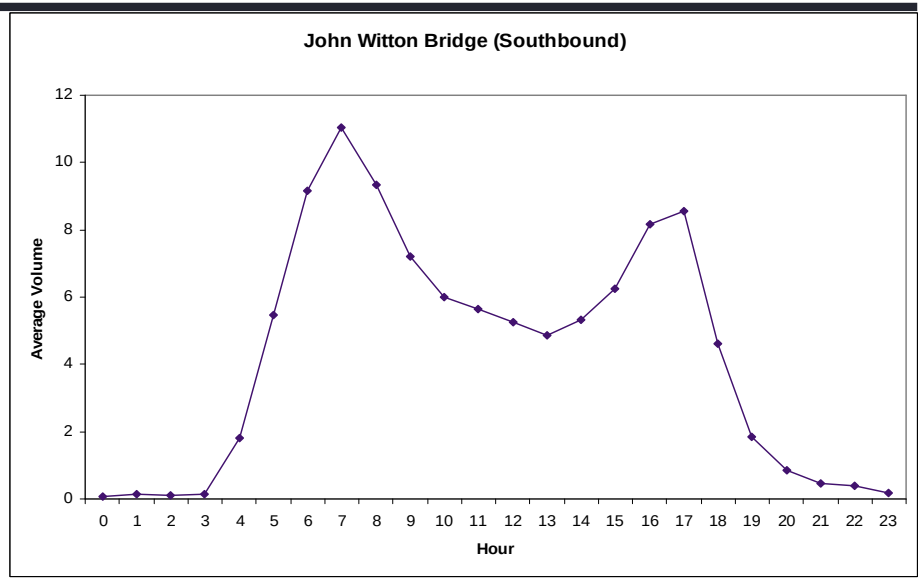
•Sydney Olympic Park Authority (SOPA) tracks daily weather (ie. maximum temperature and rainfall amount) and possible counter errors (ie. Indications being used for all possible counter errors).

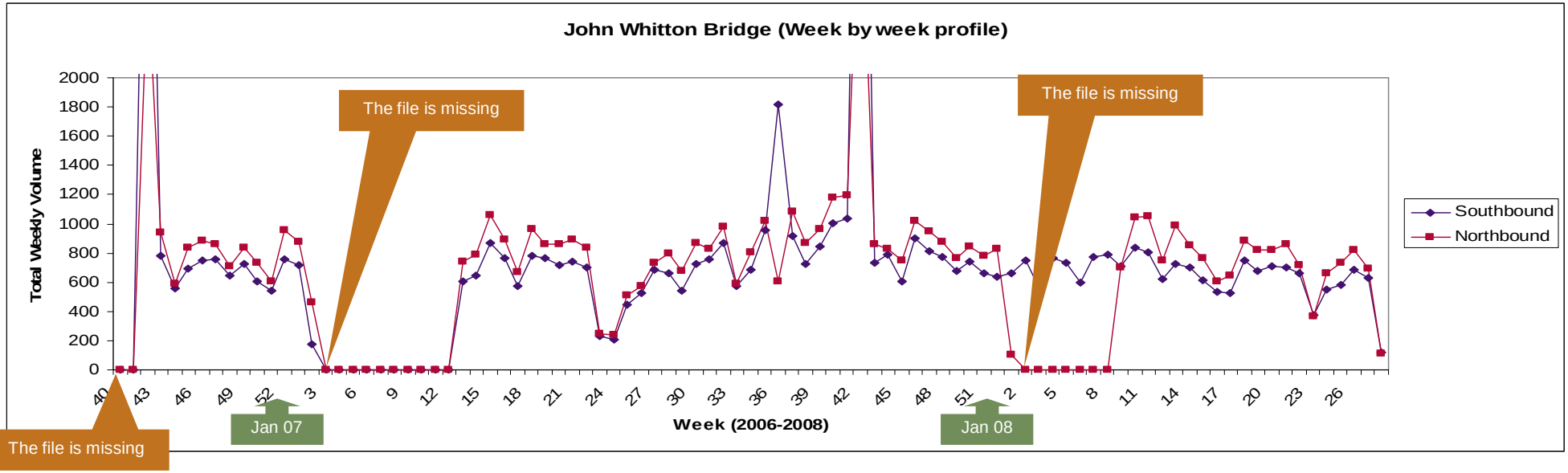
•Weather is a factor of non-riding or low cycling volume.

•Weekday cycling volume increases during school holidays.

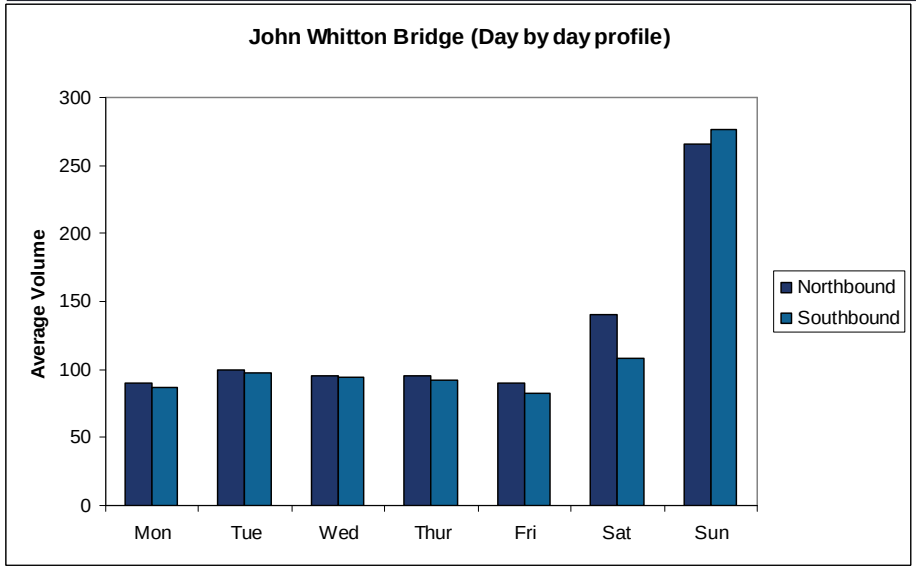
John Whitton Bridge (2006-2008) Cycleway



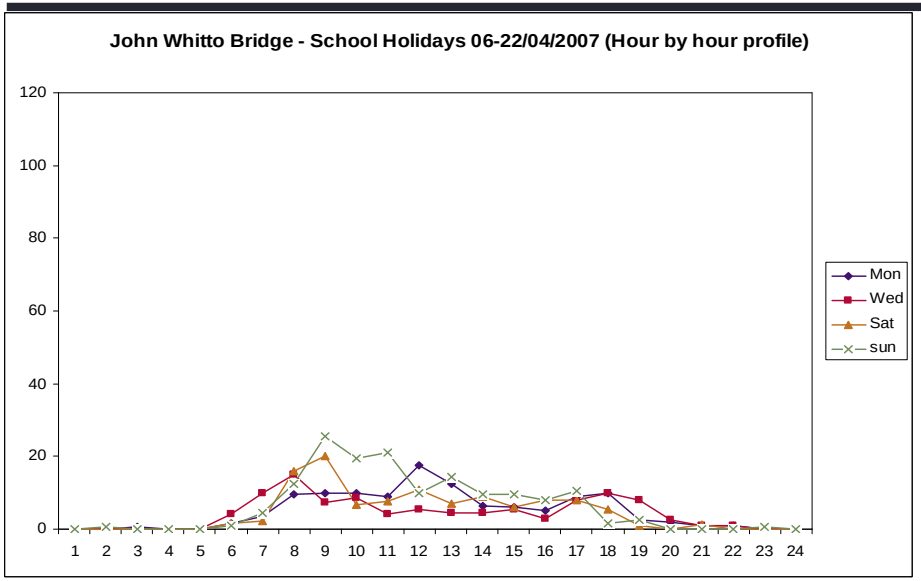


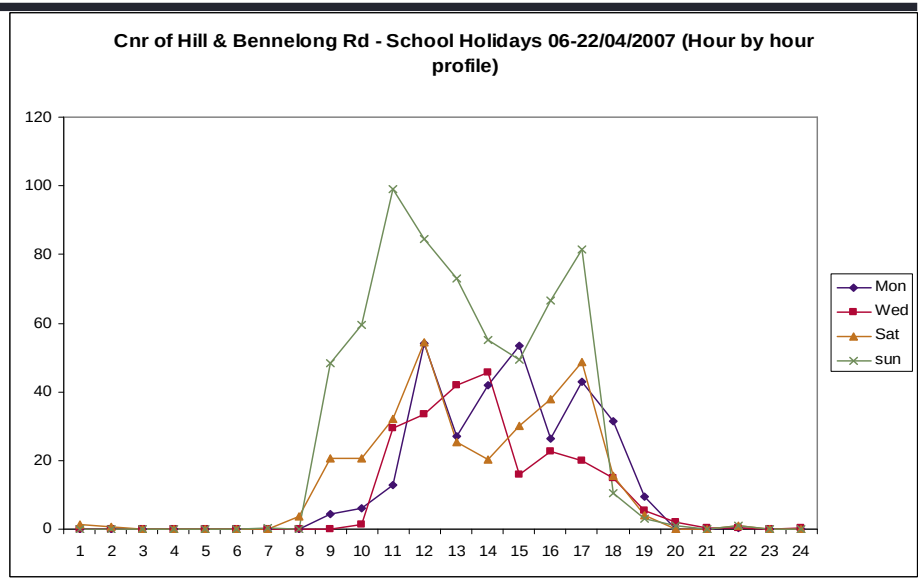


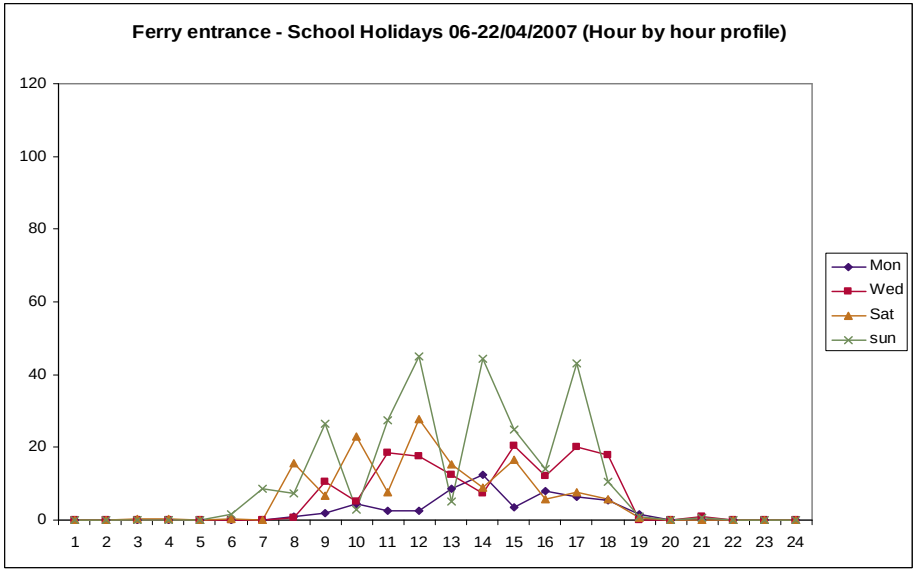
John Whitton Bridge Cycleway (2006-2008) continued

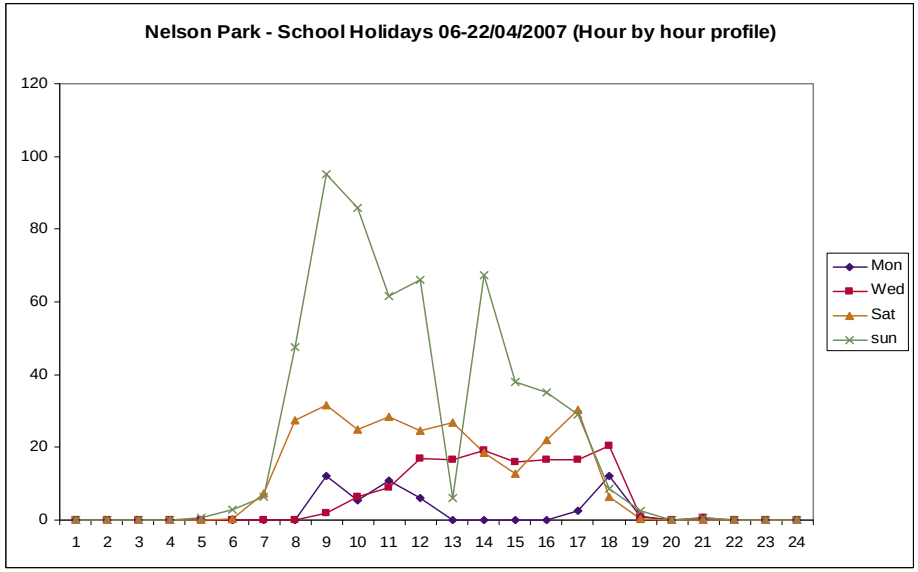


School Holidays 06/04/07 – 22/04/07 (Hour by hour profile)

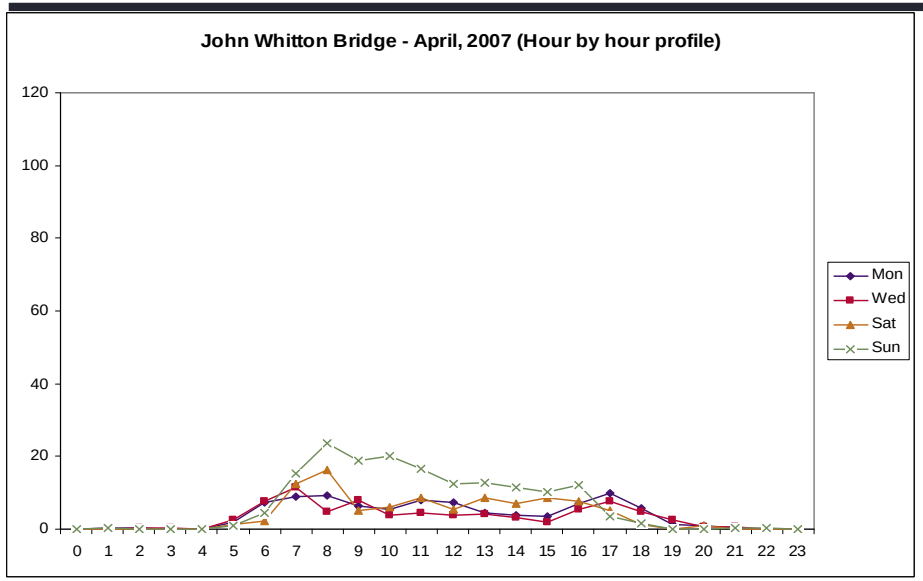


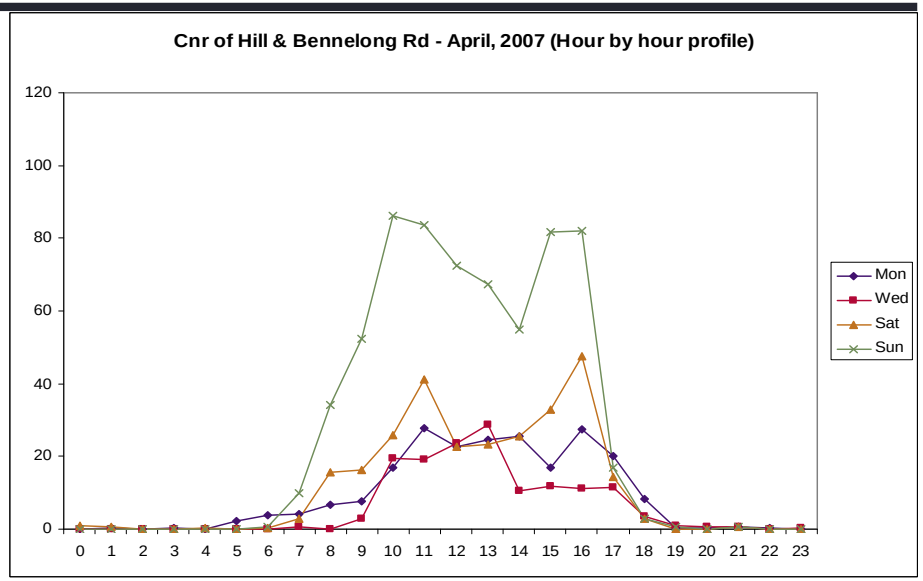


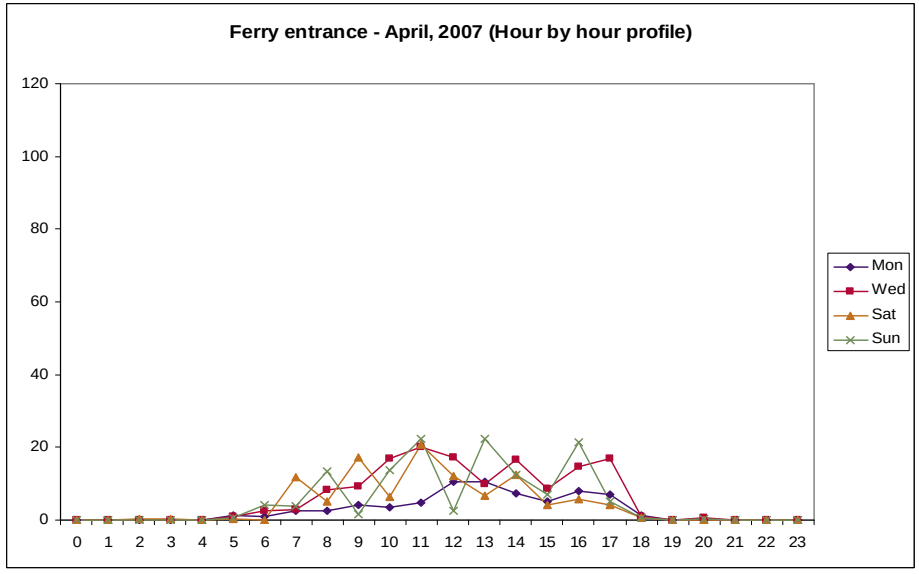


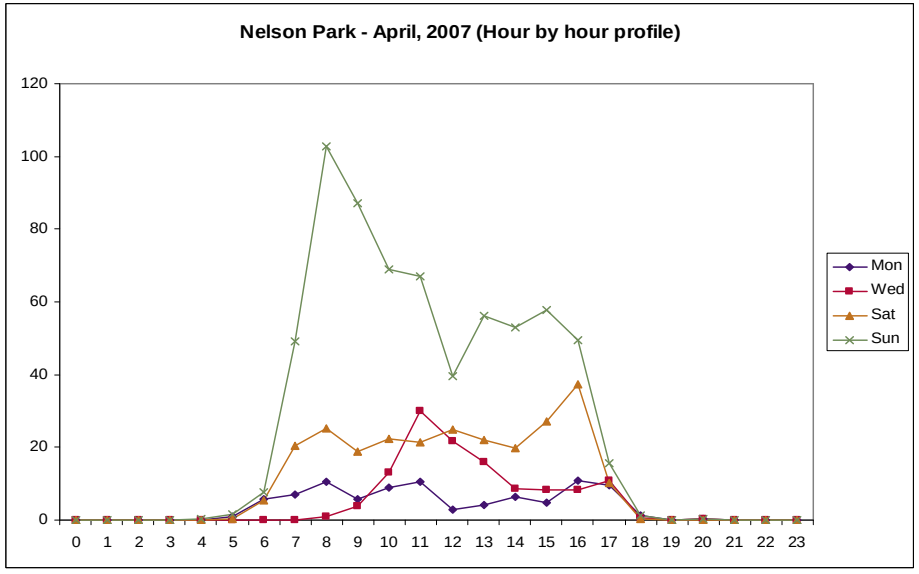


April, 2007 includes School holidays (hour by hour profile)

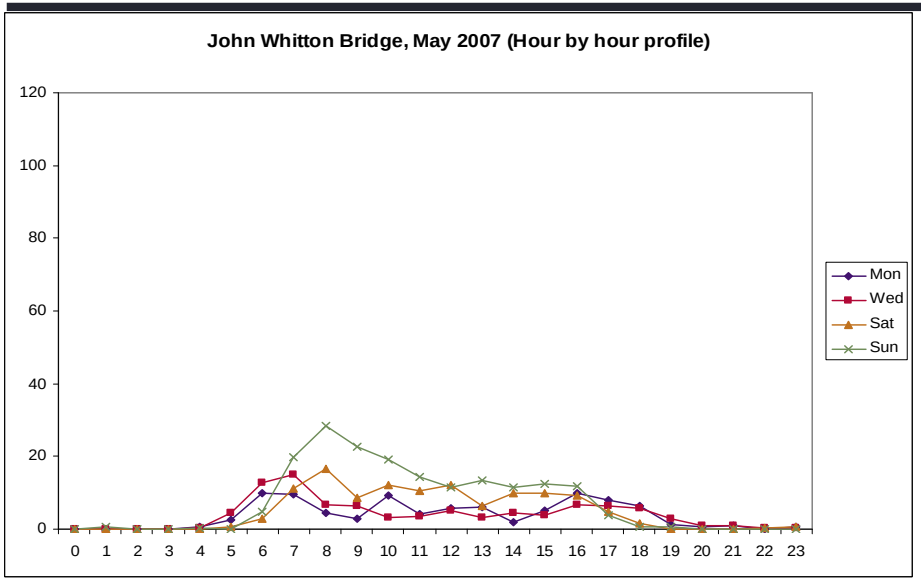


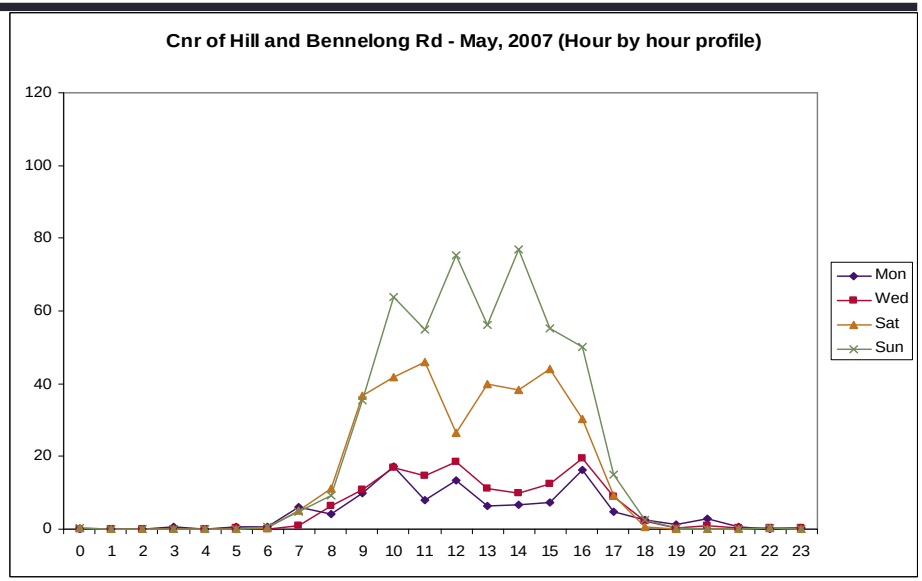


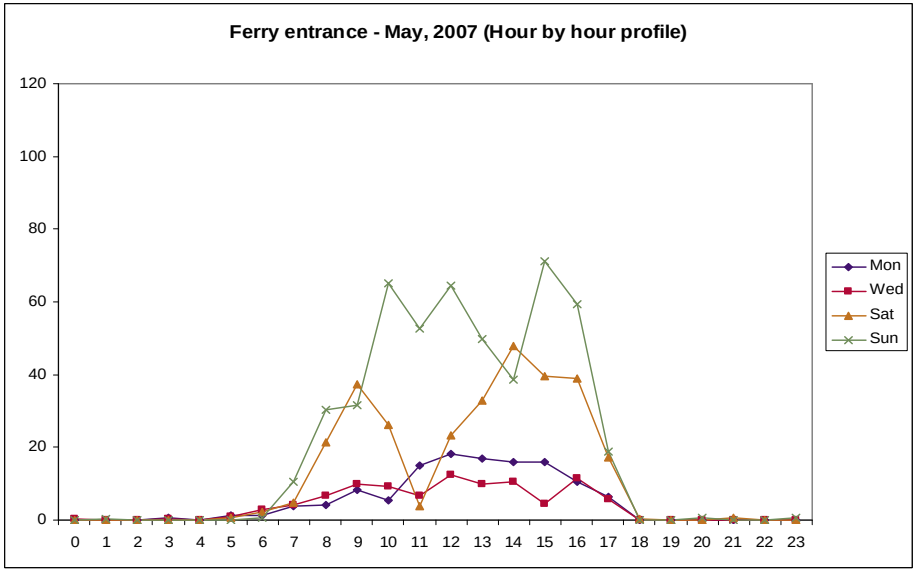


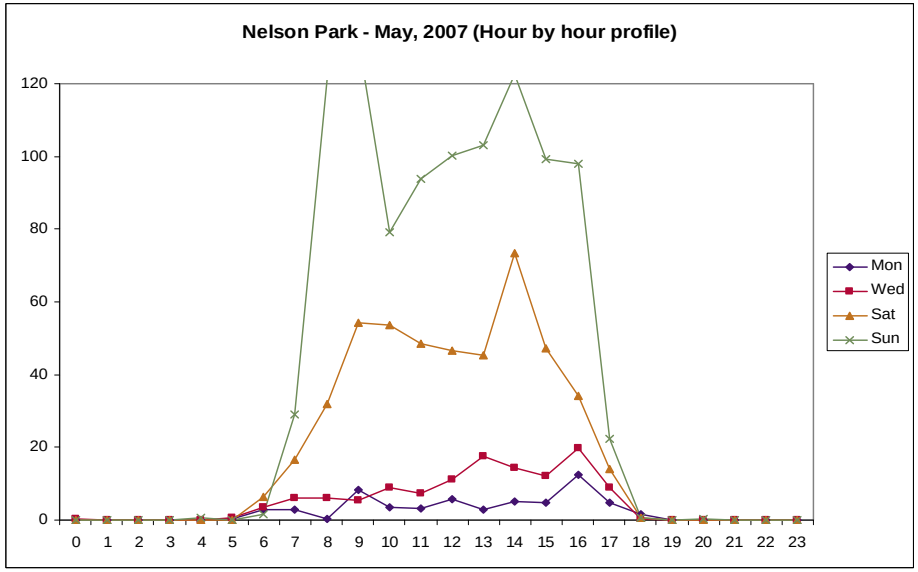


May, 2007 (Hour by hour profile)

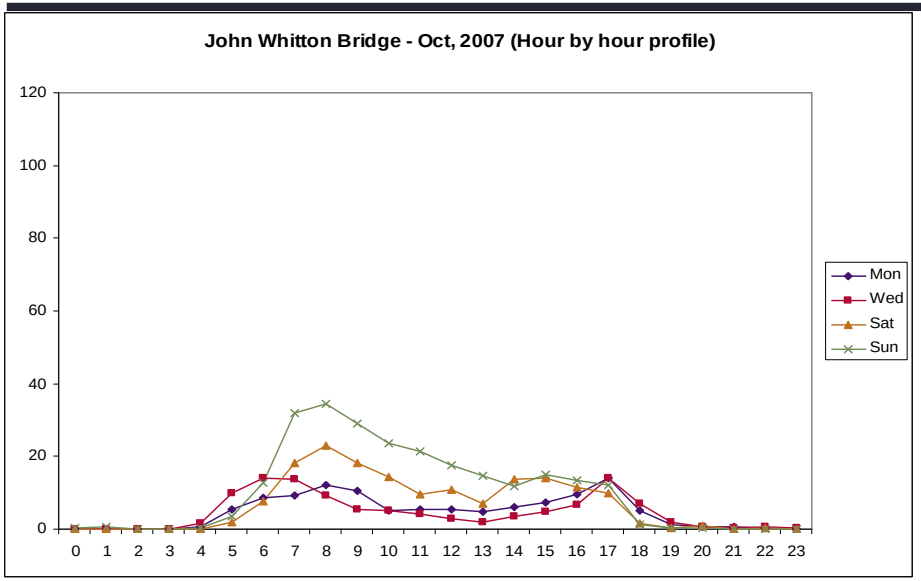


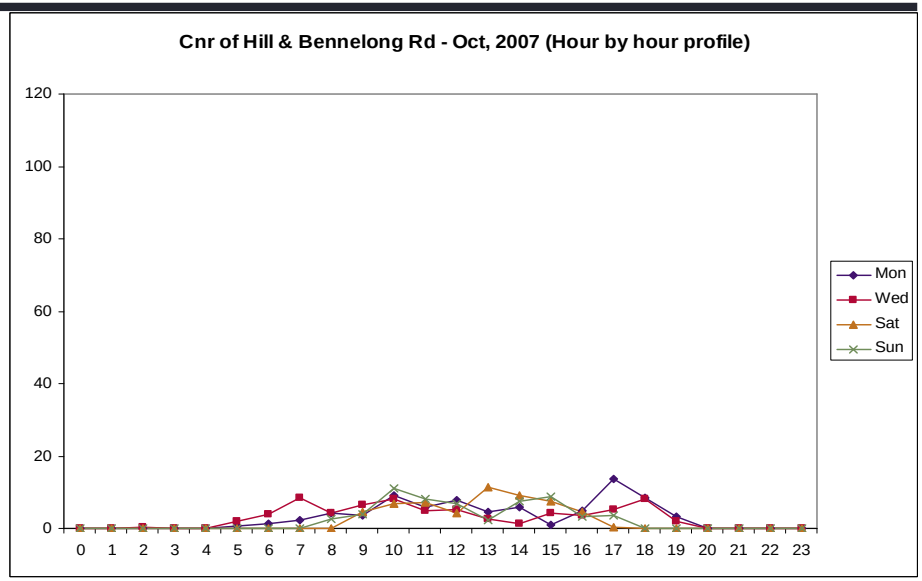


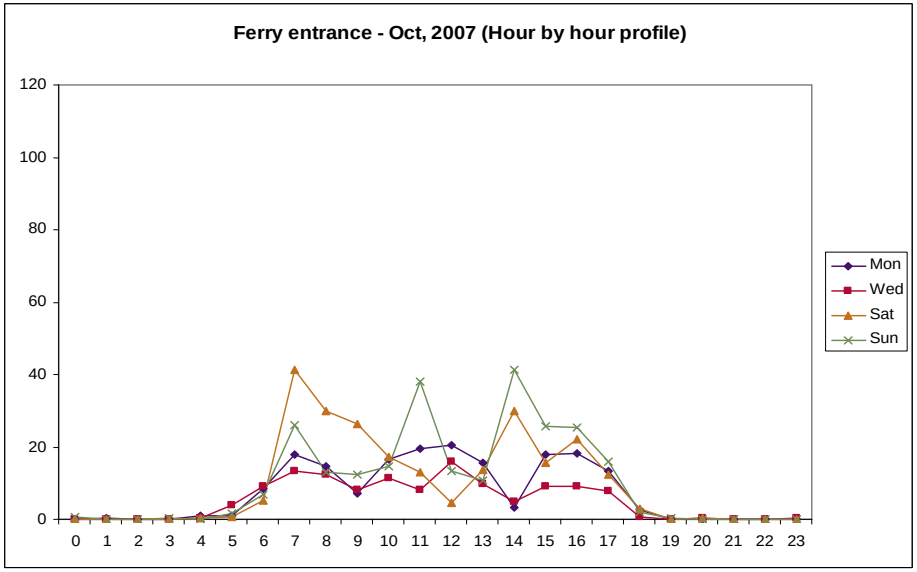


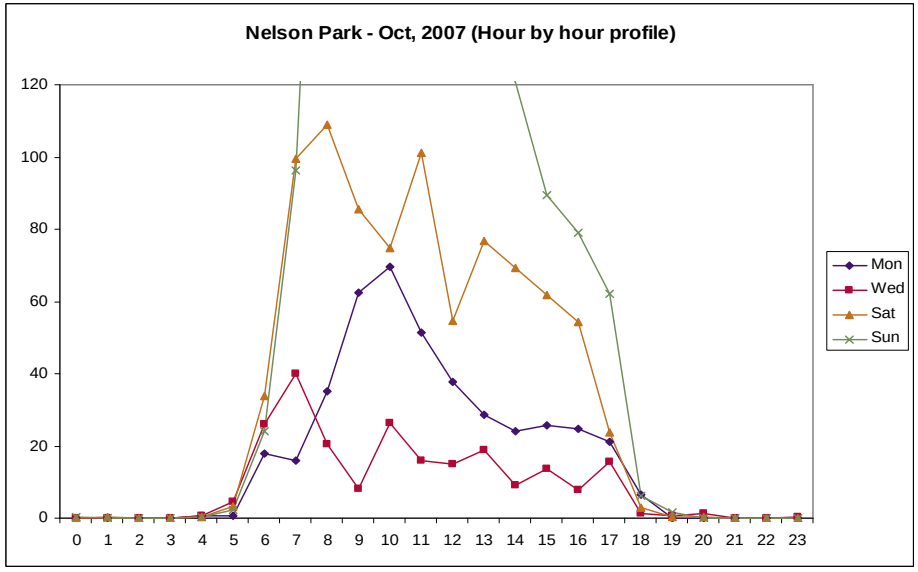


Oct, 2007 (Hour by hour profile)

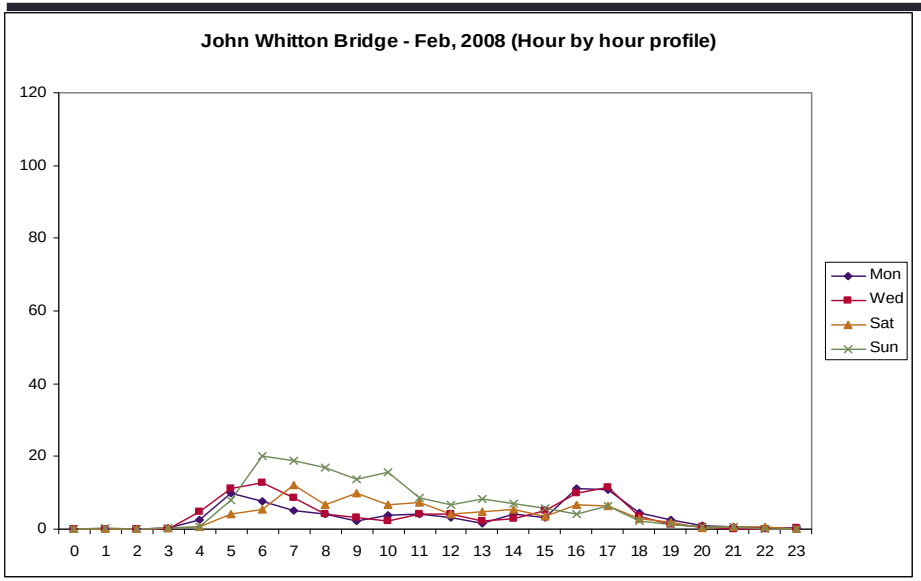


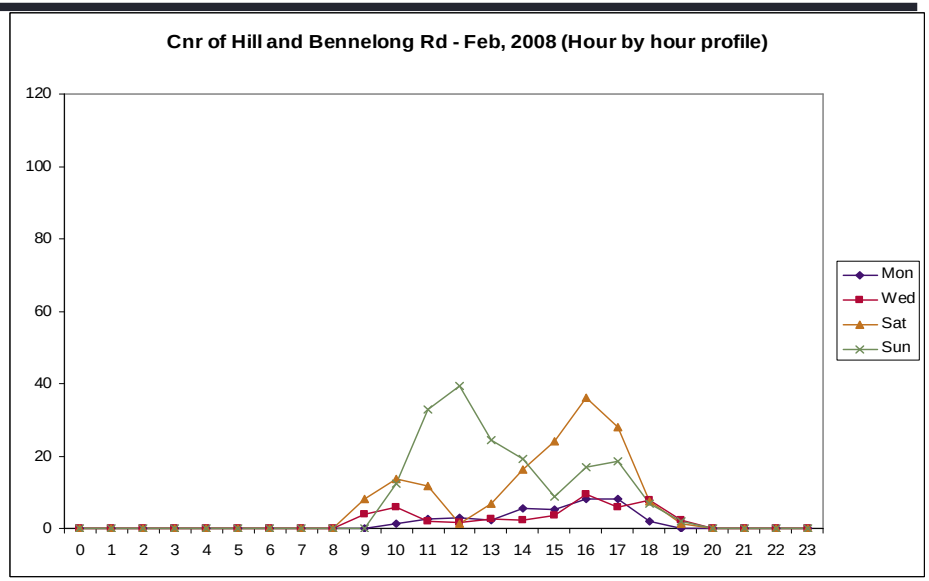


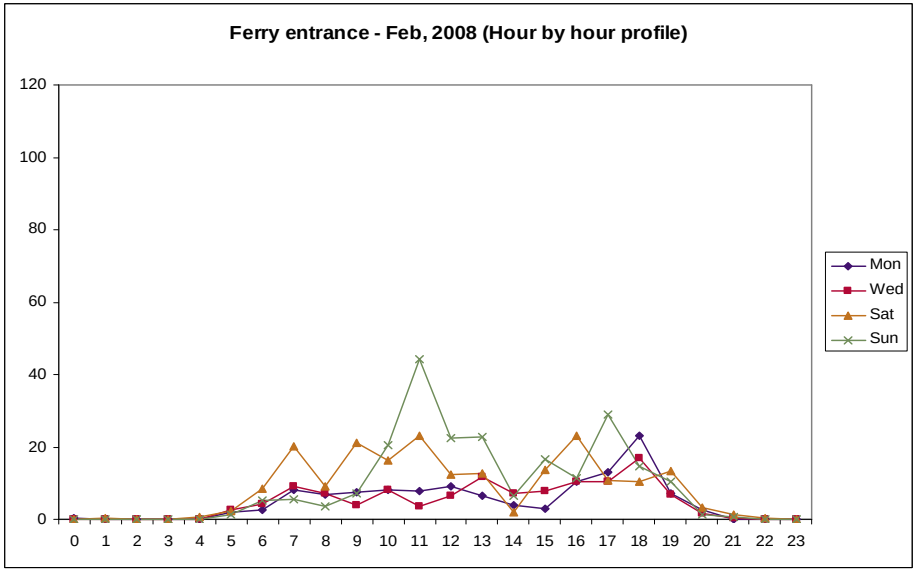


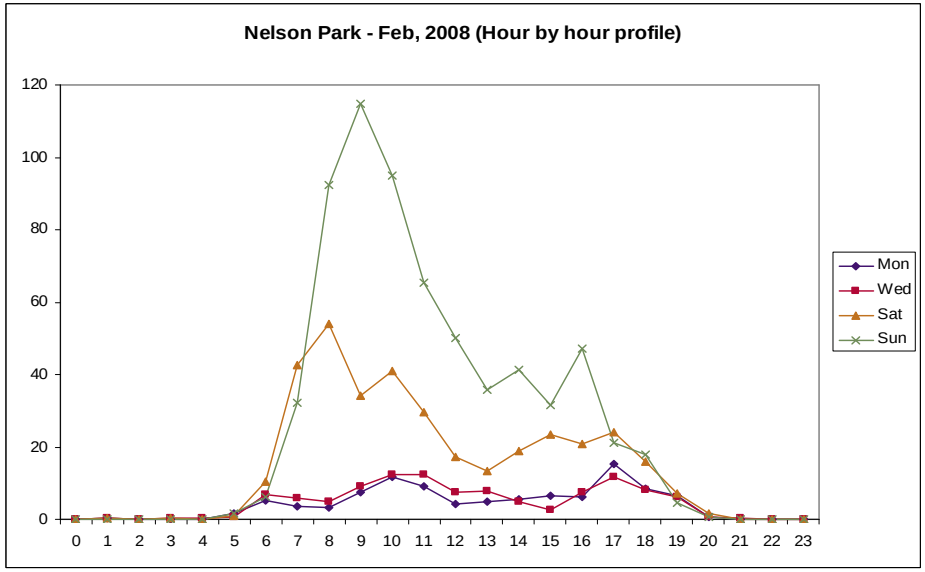


Feb, 2008 (Hour by hour profile)









Peak inbound traffic to Sydney CBD

AM peak for Iron Cove Bridge occurs earlier than AM peak for Anzac Bridge

About 23 % or less of AM peak volume on Anzac Bridge passes Iron Cove Bridge which means more traffic are generated from Leichardt, Rozell and Balmain area

More people ride bicycle on Sunday rather than Saturday

2006-2008		7-day peak hour				Weekday peak hour				Weekend peak hour					
		AM		*PM*		*AM*		*PM*		*AM and PM*		**Peak weekday**		**Peak weekend**	
Location	Direction	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Day	Count (Avg)	Day	Count (Avg)
Iron Cove Bridge	*East*	7	24	16,17	12	6,7	28	17	13	9	18	Wed	181	Sun	187
Anzac Bridge	*East*	7	102	17	28	7	121	17	32	8	24	Wed	558	Sun	274
Sydney Harbour Bridge	*South*	7	87	17	40	7	113	17	52	8,9,10	24	Wed	596	Sun	275
Anzac Parade	*North*	7	39	17	34	7	51	17	43	12,16	16	Tue	401	Sun	197

Inbound cycling volume on Anzac Parade at both am and pm peak in 7-day period are larger than outbound cycling volume

Peak outbound traffic from Sydney CBD

2006-2008		7-day peak hour				Weekday peak hour				Weekend peak hour					
		AM		*PM*		*AM*		*PM*		*AM and PM*		**Peak weekday**		**Peak weekend**	
Location	Direction	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Day	Count (Avg)	Day	Count (Avg)
Iron Cove Bridge	*West*	7	12	16,17	24	6	12	17	29	9	18	Wed	194	Sun	204
Anzac Bridge	*West*	7	14	17	79	7	12	17	82	9,15,16	10	Wed	424	Sun	155
Sydney Harbour Bridge	*North*	7	48	17	73	7	59	17	92	8	24	Tue	591	Sun	282
Anzac Parade	*South*	7,8	15	17	27	7,8	18	17	35	16	10	Wed	289	Sat	133

Peak traffic on both directions of Sydney CBD

Traffic volume of peak Weekday and Weekend are similar

Traffic from Iron Cove Bridge contributes traffic volume on Anzac Bridge

Peak weekday travel for all locations occurs on Tue or Wed

2006-2008		7-day peak hour				Weekday peak hour				Weekend peak hour		Peak weekday		Peak weekend	
		AM		PM		AM		PM		AM and PM					
Location	Direction	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Time	Count (Avg)	Day	Count (Avg)	Day	Count (Avg)
	East	7	24	16,17	12	6,7	28	17	13	9	18	Wed	181	Sun	187
	West	7	12	16,17	24	6	12	17	29	9	18	Wed	194	Sun	204
Iron Cove Bridge	*Both direction*	7	36	16	37	6	40	17	42	9	36				
	East	7	102	17	28	7	121	17	32	8	24	Wed	558	Sun	274
	West	7	14	17	79	7	12	17	82	9,15,16	10	Wed	424	Sun	155
Anzac Bridge	*Both direction*	7	116	17	107	7	133	17	114	8	33				
	South	7	87	17	40	7	113	17	52	8,9,10	24	Wed	596	Sun	275
	North	7	48	17	73	7	59	17	92	8	24	Tue	591	Sun	282
Sydney Harbour Bridge	*Both direction*	7	135	17	113	7	172	17	148	8	49				
	South	7,8	15	17	27	7,8	18	17	35	16	10	Wed	289	Sat	133
	North	7	39	17	34	7	51	17	43	12,16	16	Tue	401	Sun	197
Anzac Parade	*Both direction*	7	54	17	62	7	69	17	78	16	26				

Relatively large number of people commutes to North shore area through or from CBD area

Relatively large number of people commutes to North shore area through or from CBD area

Weekend peak hour for Anzac parade occurs in the afternoon

Cycling in New South Wales

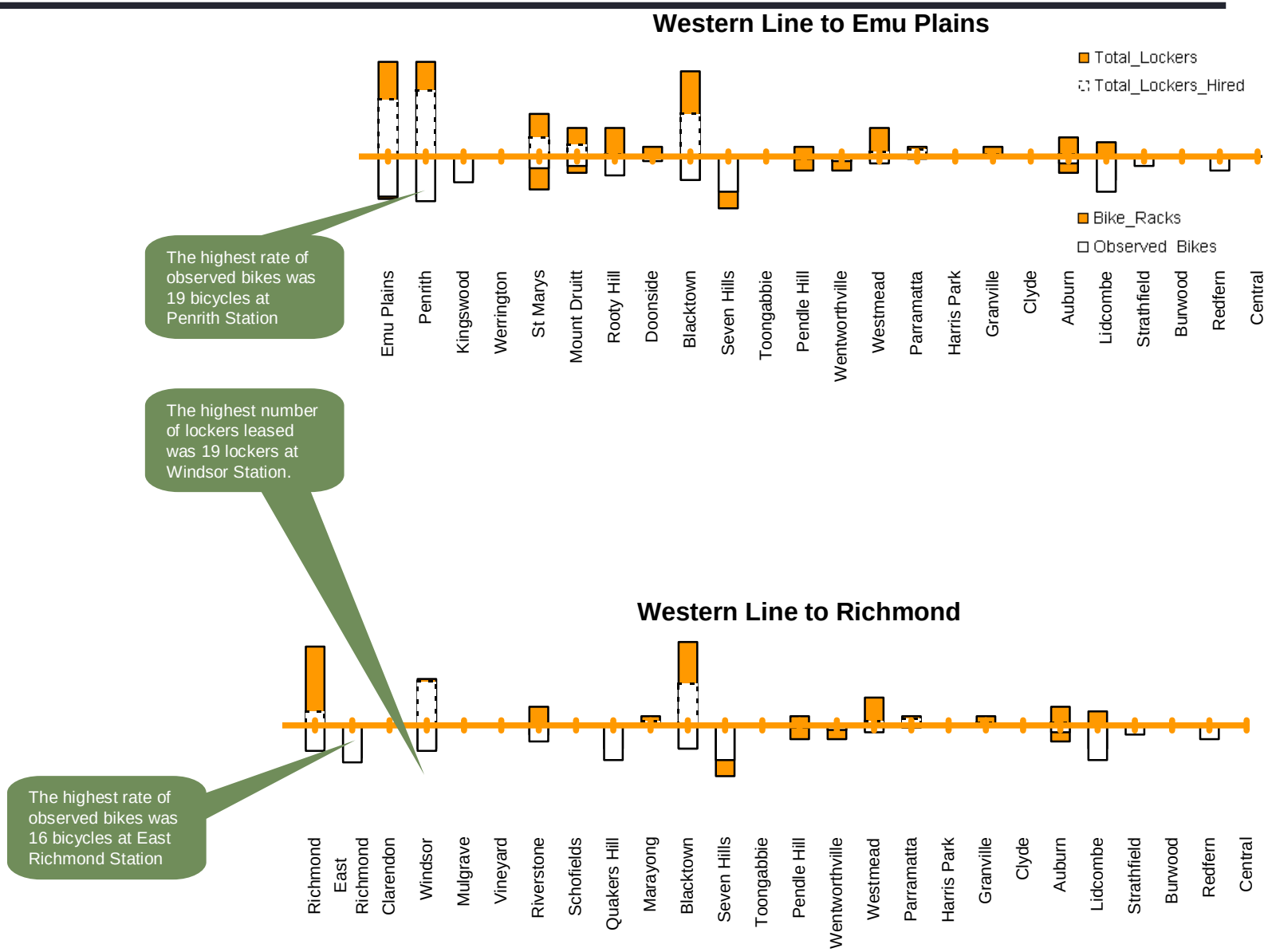
What the data tells us

Appendix B: Rail station bicycle parking supply and demand

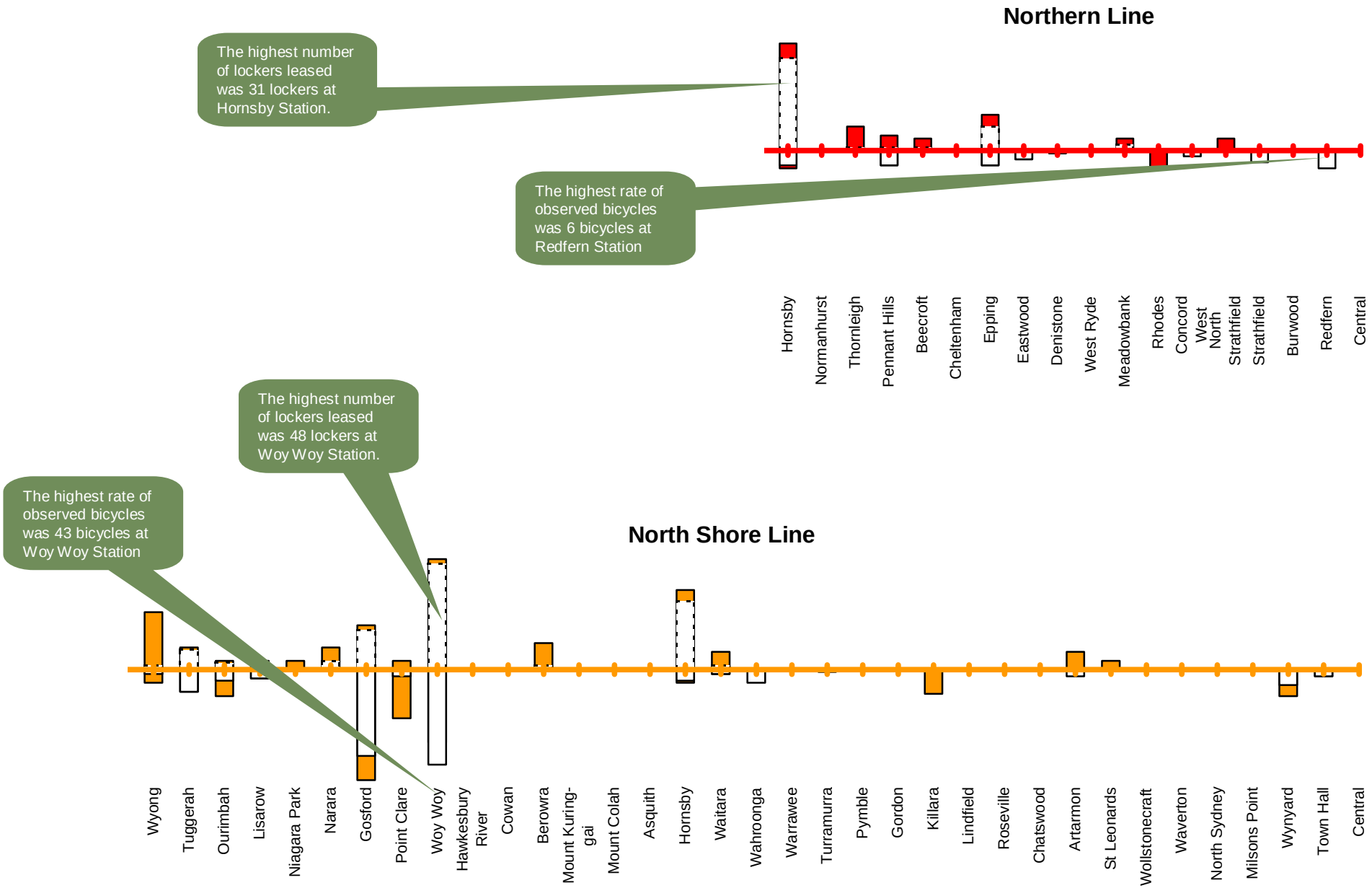
Prepared for the Premier's Council for Active Living

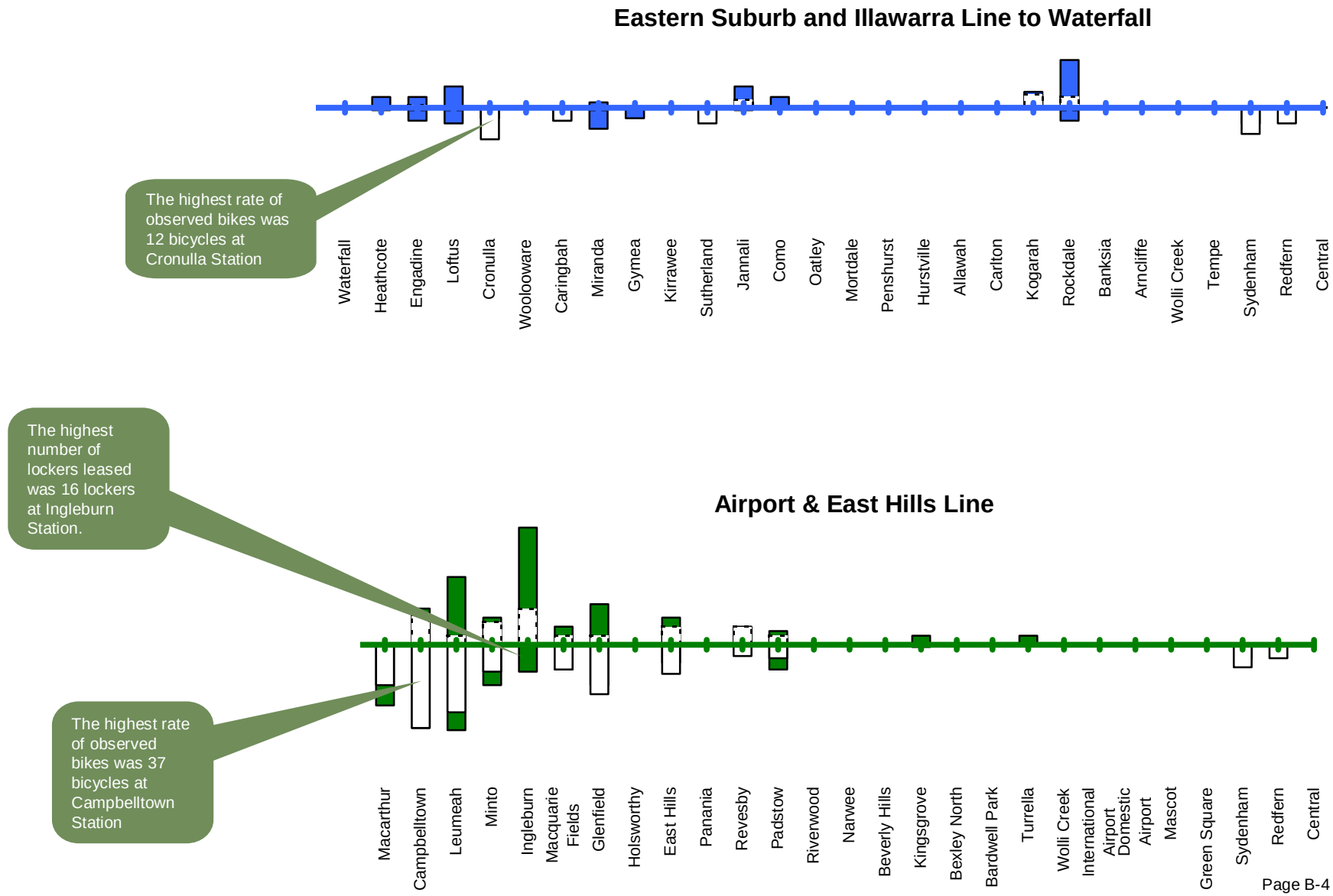
December 2008

Appendix B: Bicycle parking and demand at CityRail stations

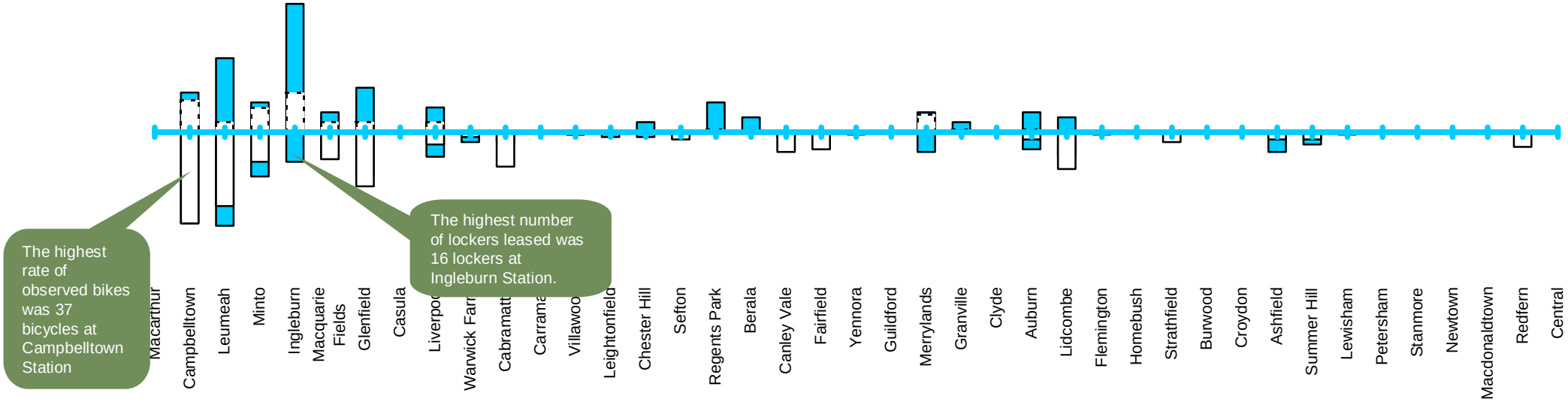


Appendix B: Bicycle parking and demand at CityRail stations

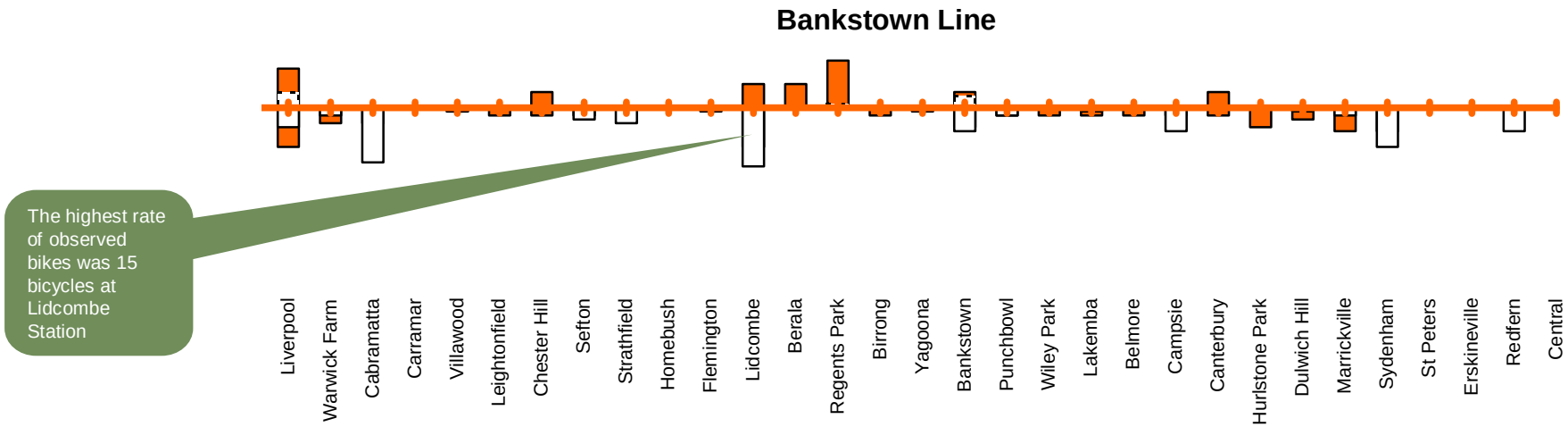



Eastern Suburb and Illawarra Line to Waterfall
The highest rate of observed bikes was 12 bicycles at Cronulla Station
Waterfall
Heathcote
Engadine
Loftus
Cronulla
Woolooware
Caringbah
Miranda
Gymea
Kirrawee
Sutherland
Jannali
Como
Oatley
Mortdale
Penshurst
Hurstville
Allawah
Carlton
Kogarah
Rockdale
Banksia
Arncliffe
Wolli Creek
Tempe
Sydenham
Redfern
Central
The highest number of lockers leased was 16 lockers at Ingleburn Station.
Airport & East Hills Line
The highest rate of observed bikes was 37 bicycles at Campbelltown Station
Macarthur
Campbelltown
Leumeah
Minto
Ingleburn
Macquarie Fields
Glenfield
Holsworthy
East Hills
Panania
Revesby
Padstow
Riverwood
Narwee
Beverly Hills
Kingsgrove
Bexley North
Bardwell Park
Turrella
Wolli Creek
International Airport
Domestic Airport
Mascot
Green Square
Sydenham
Redfern
Central

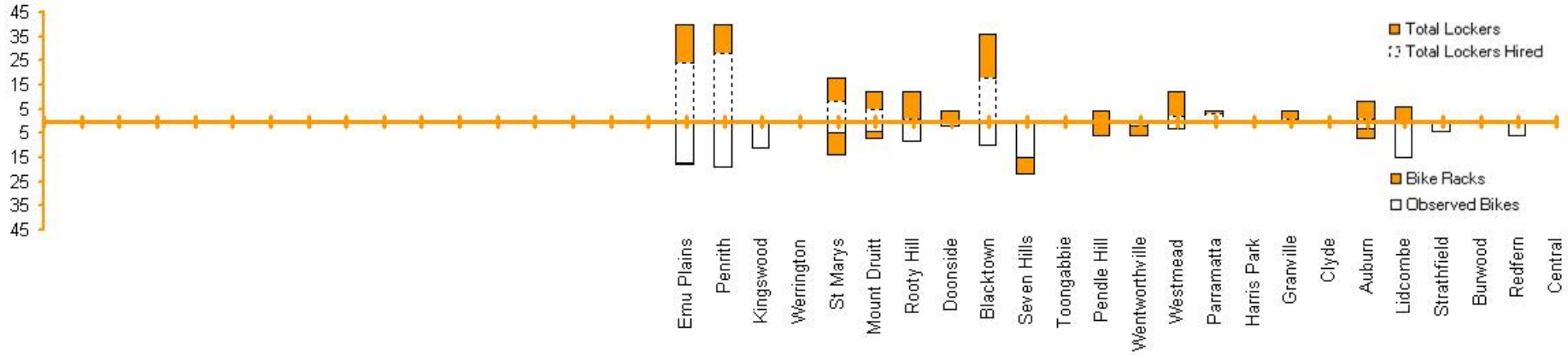
Inner West Line_South Line



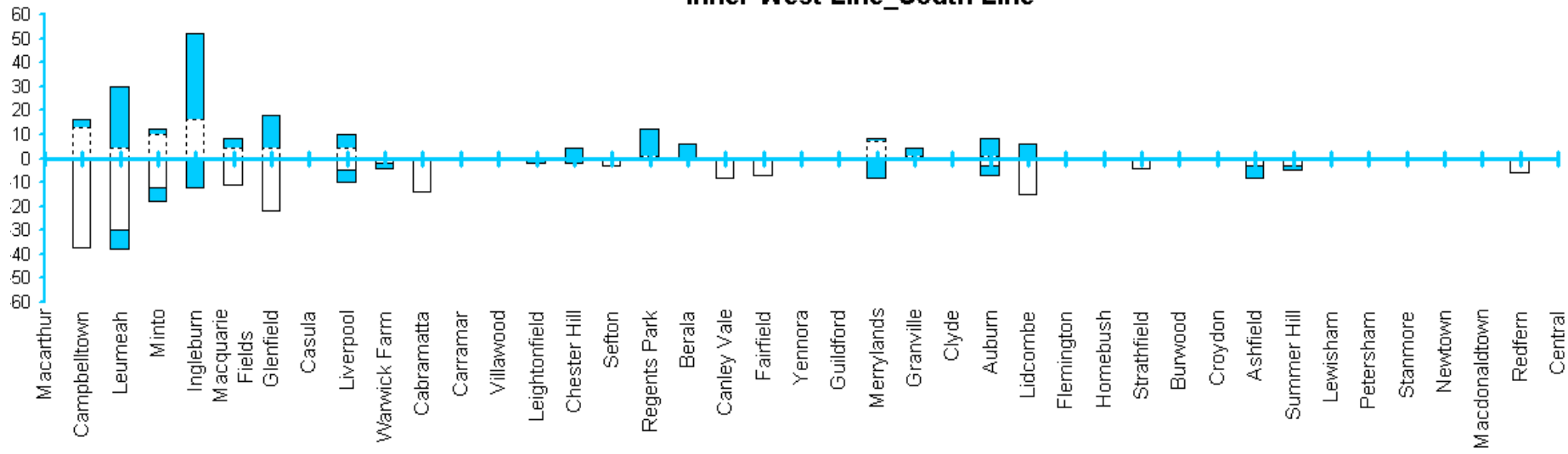
Bankstown Line



Western Line to Emu Plains



Inner West Line_South Line



Cycling in New South Wales

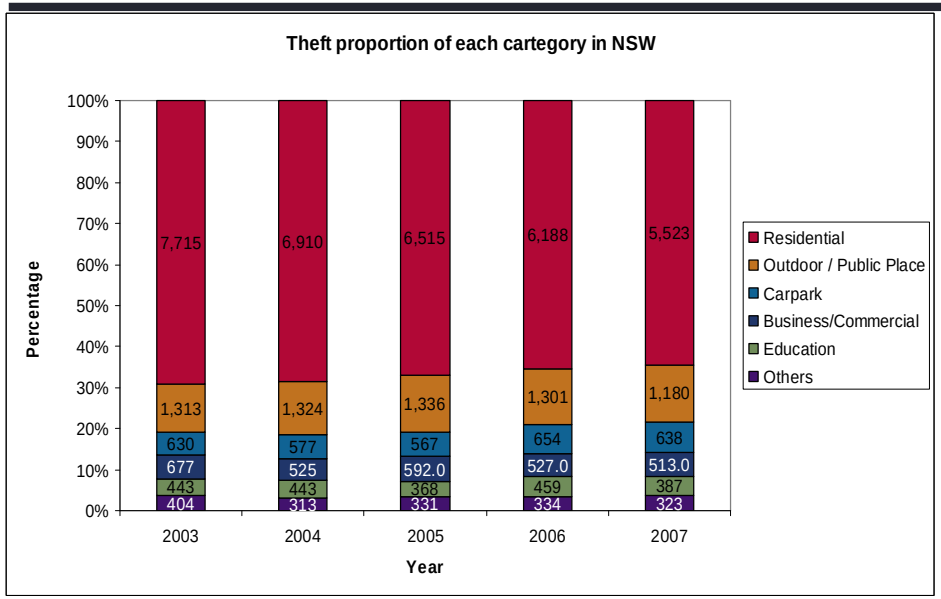
What the data tells us

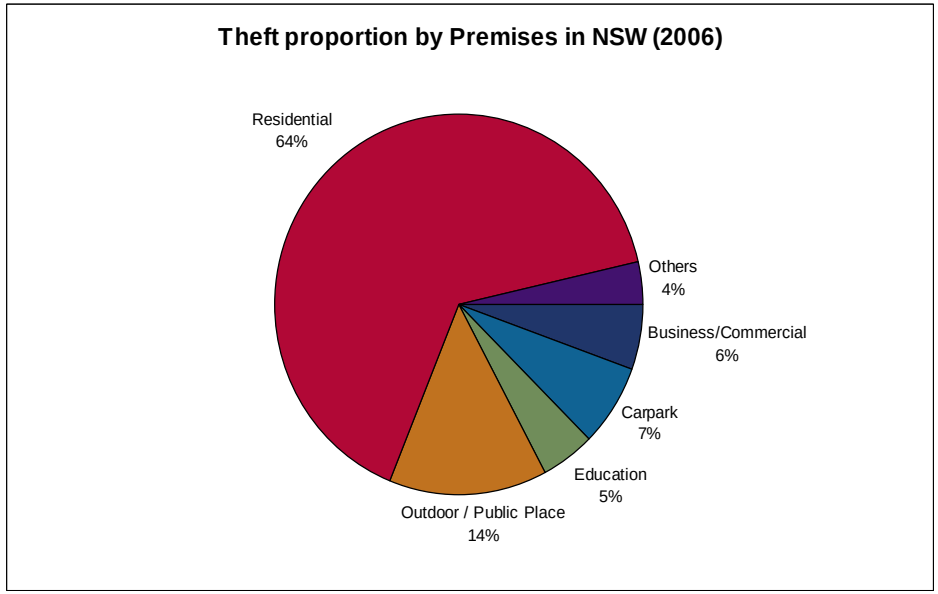
Appendix C: Bicycle theft and cyclist traffic infringement data

Prepared for the Premier's Council for Active Living

December 2008

Bicycle theft

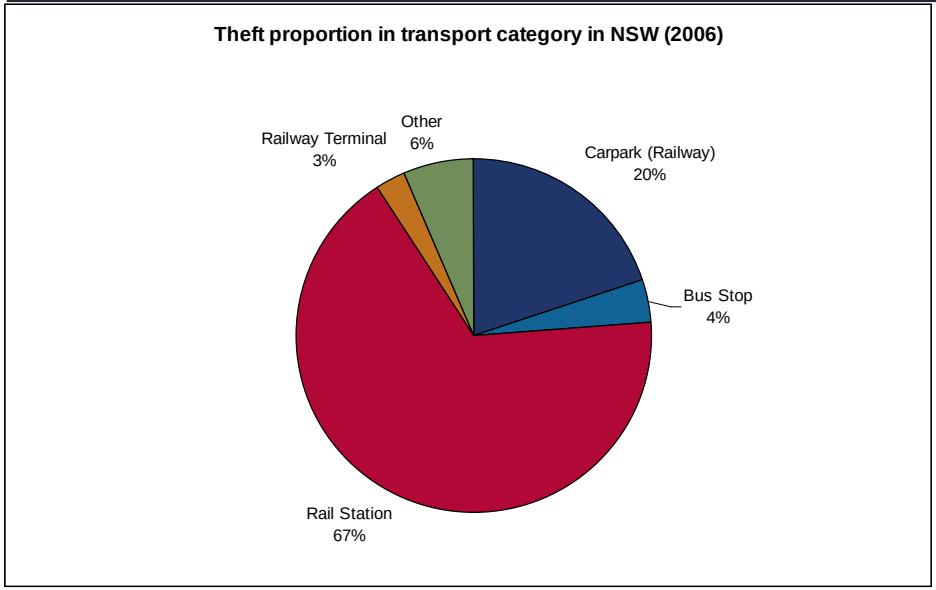


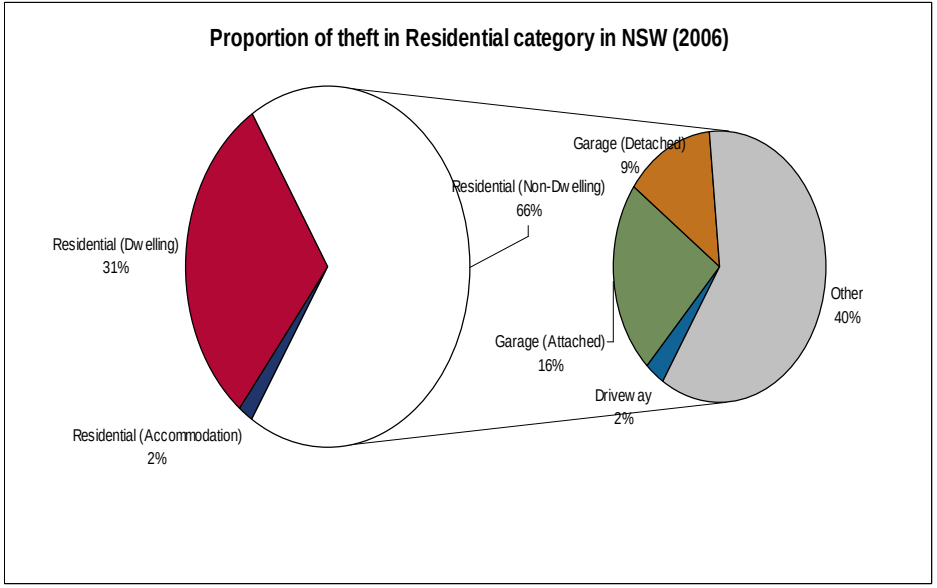


About the data

1. Most thefts occurred in residential or outdoor / public areas
2. 'Others' includes categories such as vehicle, utilities, rural industry, religious, marine transport, transport, licensed premise, recreation, law enforcement, industrial, health and unknown
3. Most theft occurred from residences (64% of all reported theft in 2006)
4. There were no significant changes in theft by premises in NSW during 2003 and 2007

Bicycle theft



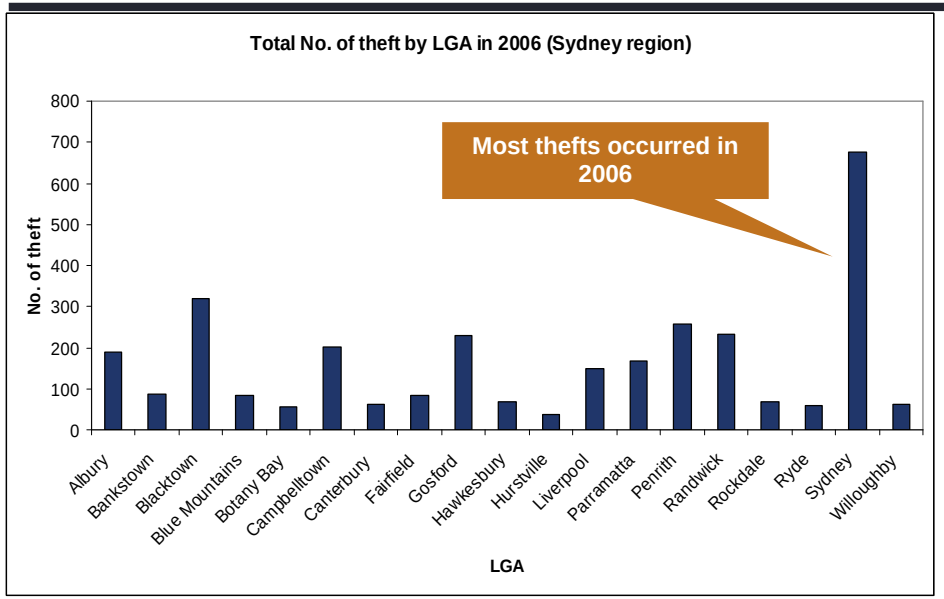


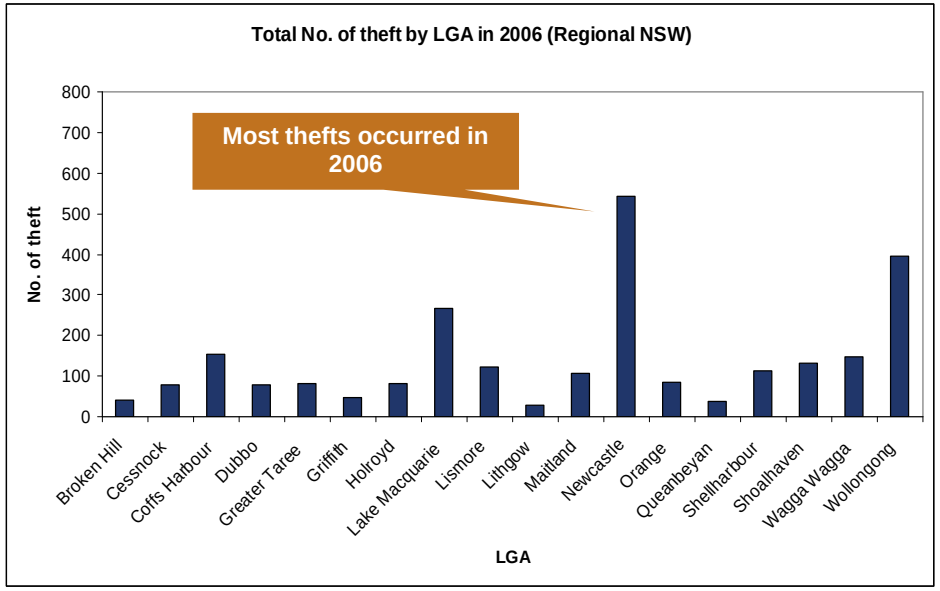
About the data

Findings in residential category

1. Most theft occurred in dwelling (31% in 2006) and non-dwelling (66% in 2006) categories
2. 60% of total theft in non-dwelling category has occurred at garage, which is detached or attached, and drive way

Bicycle theft





Possible factors in theft share trends

Increase

More police reports or insurance claims have been made

People may leave their bicycles in unsecure places

Bicycle demand may have increased but the supply of bicycles remained unchanged

In a less populous LGA, the rate of theft may higher per person

Bicycle sales increased in the area which may lead more chance of theft in general (Actual bicycles available for use has increased)

Possible factors in theft share trends

Decrease

Fewer police reports or insurance claims have been made

People may not report theft to the police

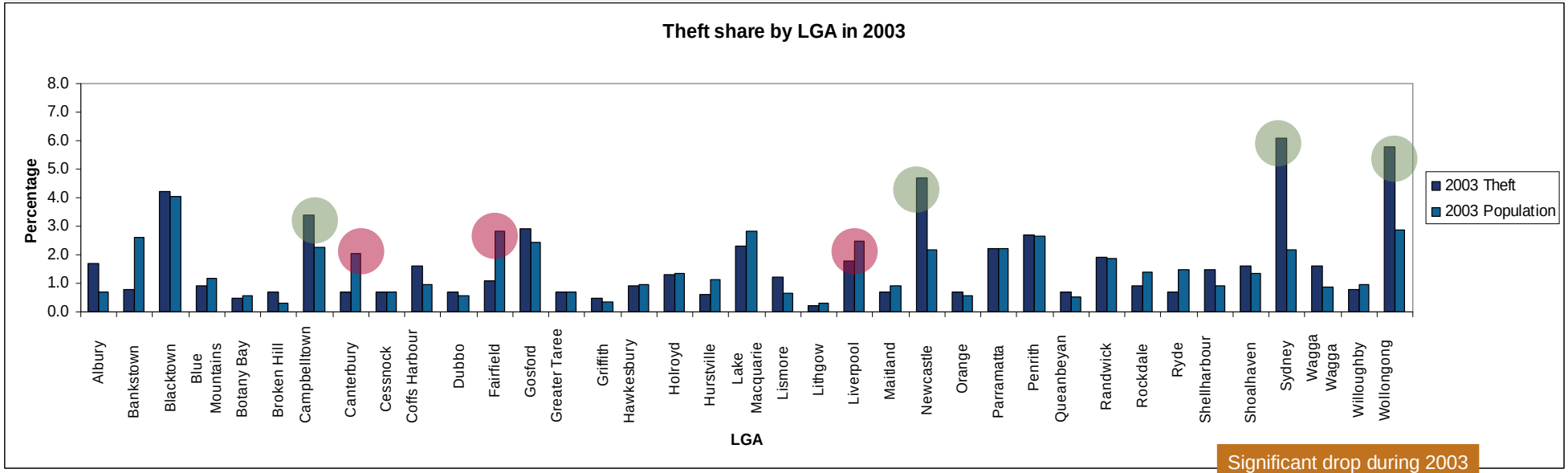
Insurance claim cost may exceed the cost of bicycle

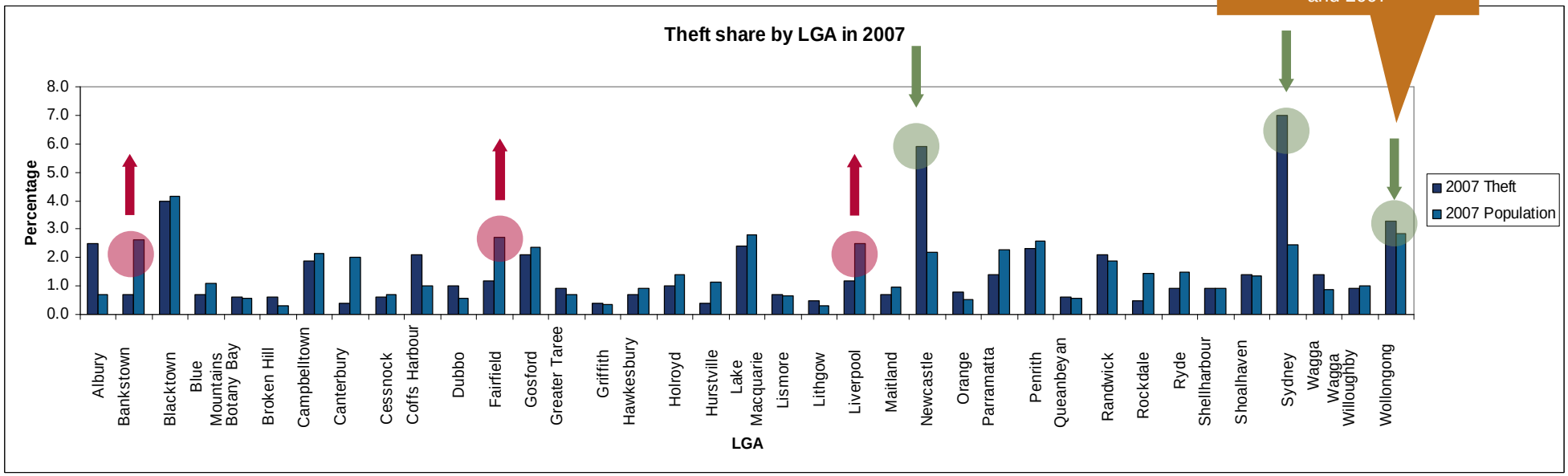
Actual number of cyclists may have decreased (less chance of theft)

Public security (surveillance) may have improved in the area

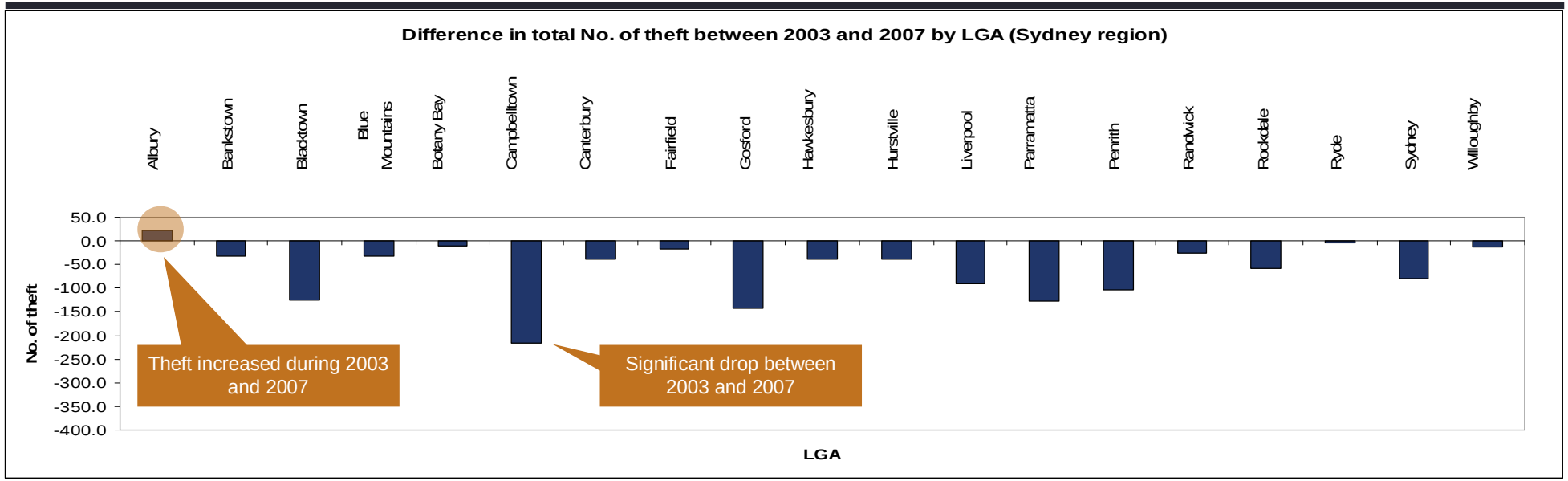
In a more populous LGA, the rate of theft may lower per person

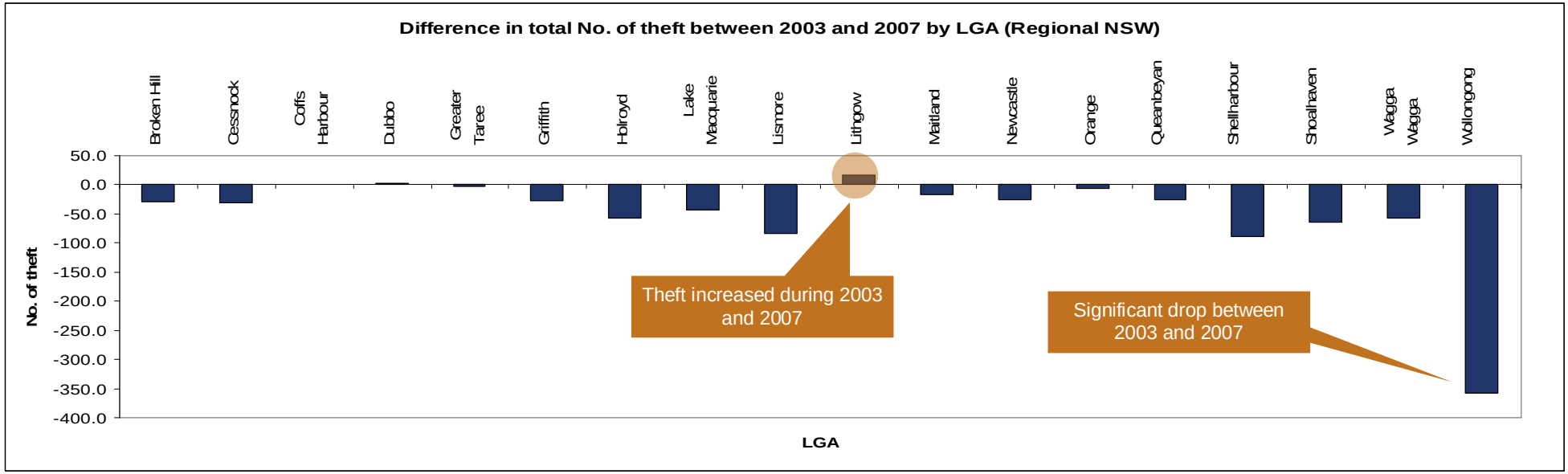
Urban areas have higher rates of bicycle theft



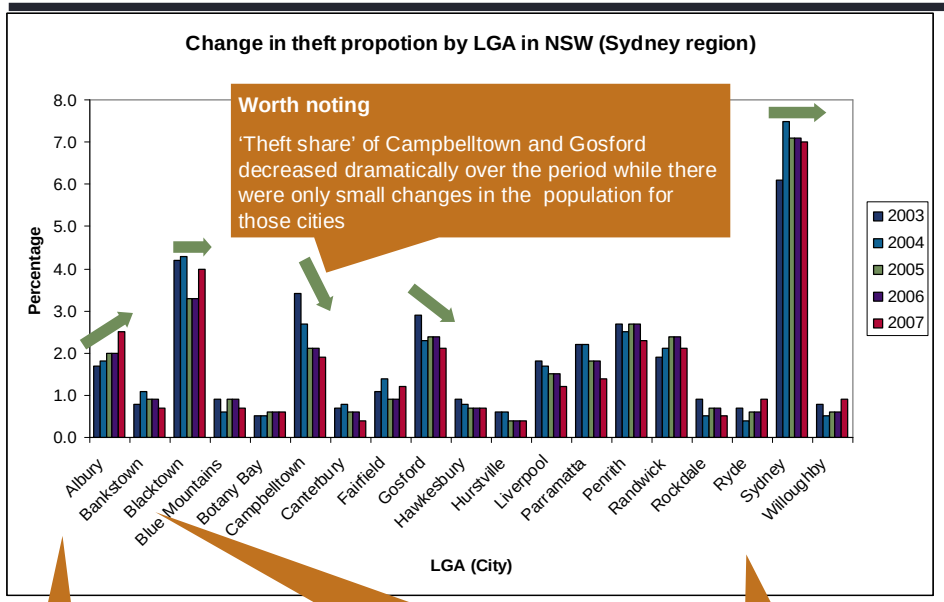


Bicycle theft





Bicycle theft



Worth noting

'Theft share' of Campbelltown and Gosford decreased dramatically over the period while there were only small changes in the population for those cities

Worth noting

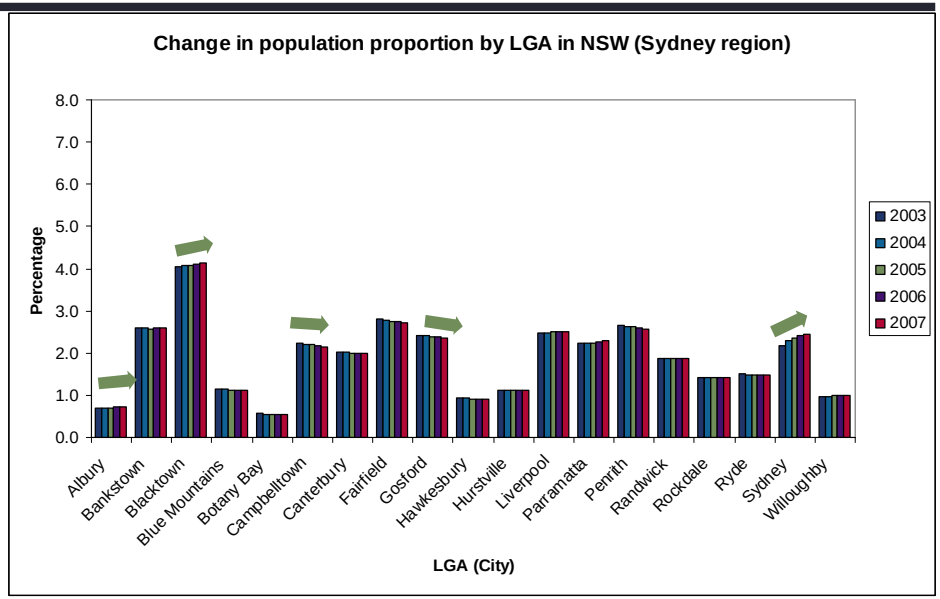
Albury has relatively large proportion of 'theft share' and it increased over the period despite of Albury's small population

Worth noting

During 2004 to 2005, 'Theft share' of Blacktown dropped significantly and it remained steady for an year despite of slight population growth over the same period

Worth noting

Sydney CBD has relatively large proportion of 'theft share' despite of Sydney's relatively small population

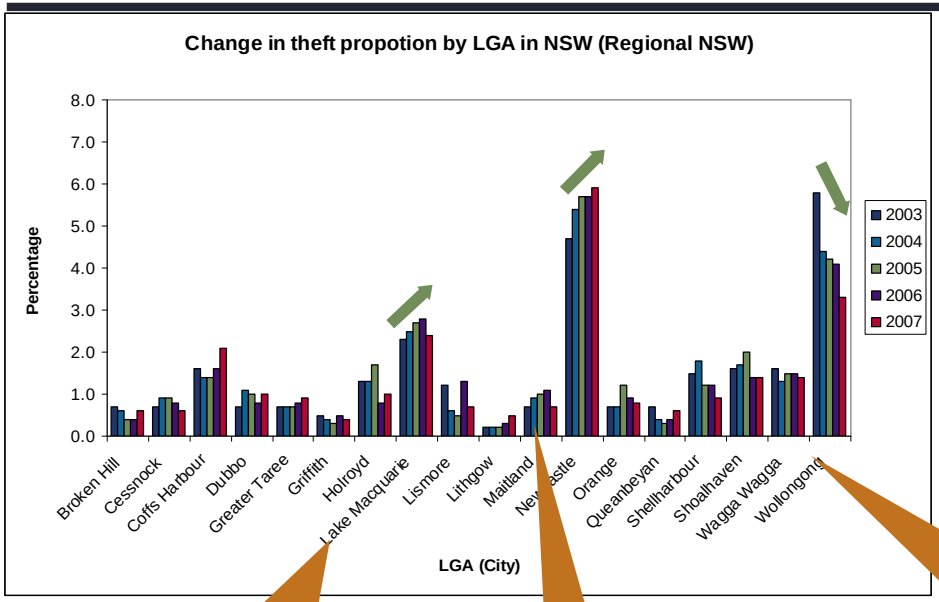


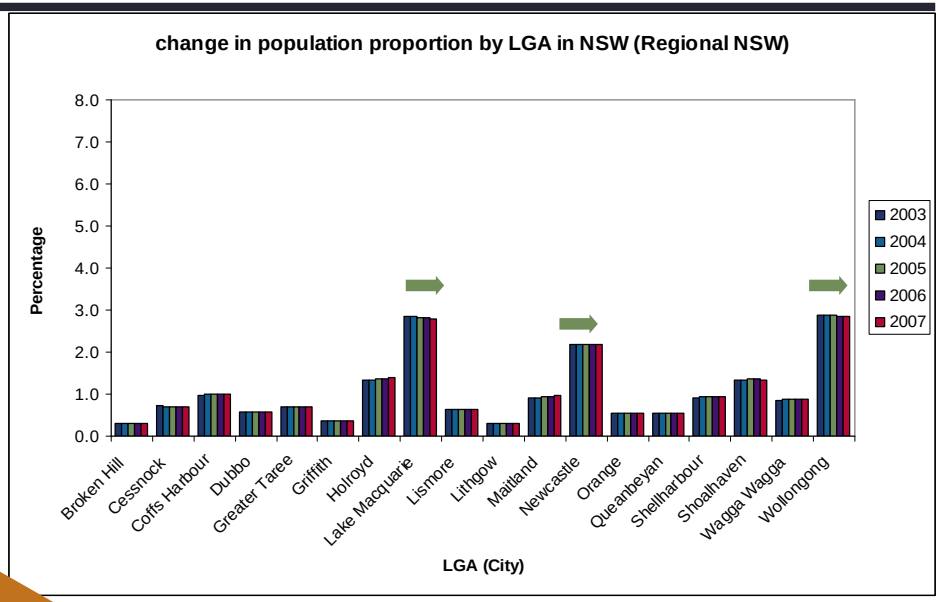
About the data

PB tested whether an individual LGA had a higher proportion of the total NSW bicycle thefts in the LGA.

Each LGA bicycle theft numbers were examined as a proportion of the NSW thefts. LGAs with significant change are noted with green arrows.

Bicycle theft





Worth noting

Lake Macquarie has a relatively small proportion of 'theft share' and it increased during despite of Lake Macquarie's relatively small population

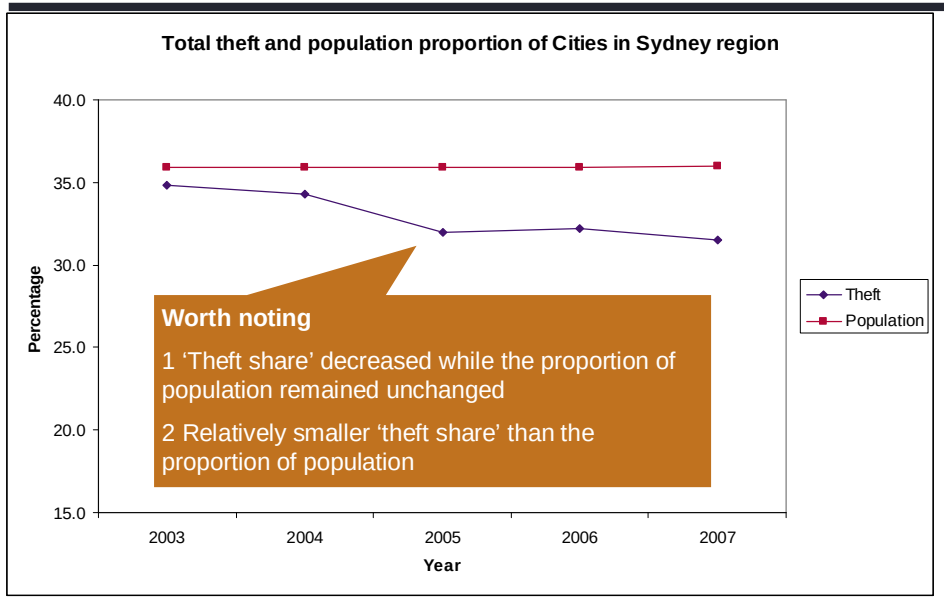
Worth noting

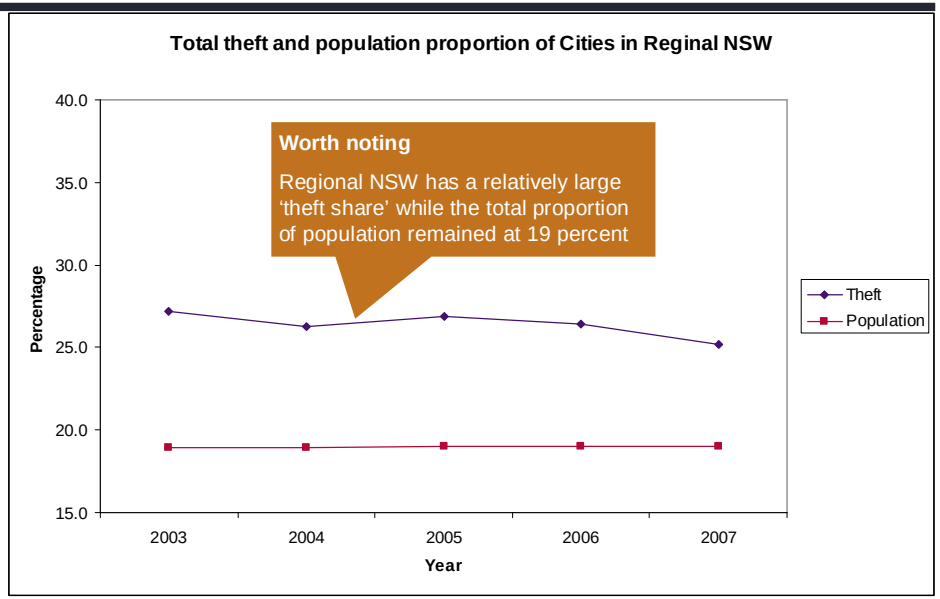
Newcastle has relatively large proportion of 'theft share' and it increased over the period despite of Newcastle's relatively small population

Worth noting

'Theft share' of Wollongong decreased dramatically over the period while there were only small changes in the population of Wollongong

Bicycle theft is a crime opportunity





About the data and charts

PB tested 'theft share' by LGA by comparing them to the population in each LGA

37 LGA regions were tested in two categories; Sydney region and Regional NSW

Findings in overall

- In 2006, the population of city areas(54.9% of Australian population) accounted for 58.6% of total theft in NSW
- Urban areas in regional NSW have more 'theft share' than those in Sydney region
- Dramatic increase and decrease occurred in some cities and also disproportionately high theft record for some cities which may have other factors rather than population factor (Further studies may required)
- In NSW, the trend of theft in general was in downturn during 2003 and 2007