Light Rail Fare Compliance Survey

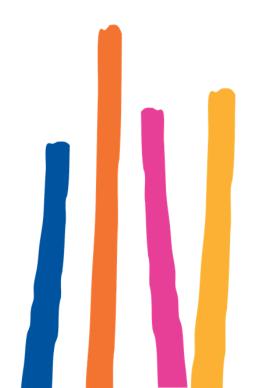
Wave 2

Transport Canberra



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Background, Objectives & Approach



Background

Transport Canberra has delivered Stage 1 of the Canberra Light Rail system with services having commenced in April 2019.

The Canberra Light Rail system comprises a 12 km light rail alignment from Gungahlin Town Centre following Hibberson Street, Flemington Road, the Federal Highway and Northbourne Avenue to the City. It is the primary transport corridor connecting Canberra's growing northern suburbs with the City and the south.

While the Territory is responsible for providing the physical Electronic Ticketing System (ETS), collection of fare revenue, setting fares and establishing fare policies, Canberra Metro Operations (CMO) is responsible for revenue protection and the minimisation of fare evasion across the light rail system.

Transport Canberra engaged Painted Dog Research to develop a methodology and conduct the Fare Compliance Surveys to assist in determining the level of Fare Evasion on the Light Rail System.

This document details the approach and fare evasion results from the Wave 2 of the Fare Compliance Survey (conducted in March 2021).

NOTE: Due to the impact of COVID-19, the planned waves for March 2020 and October 2020 could not be conducted. Therefore, it has been 18 months between the benchmark Wave and Wave 2 reported here.







The overall Strategic Aim of this research is:

To Design and Conduct Fare Compliance Surveys to assist in determining the level of Fare Evasion on the Light Rail System.

The specific objectives for this project are:



Measure Fare Compliance

To determine the overall level of Fare Compliance and ultimately Fare Evasion on the Light Rail System which will be used by the Territory to abate Canberra Metro Operations for poor performance, or reward for performance below the minimum specified KPI for fare evasion.



Determine Fare Evasion Type

To determine the types of fare evasion within the overall mix, for example complete evasion (no valid ticket; not tapped on); concessional evasion (using a concession ticket without satisfactory evidence that the passenger is entitled to use a concession ticket).



Determine Fare Evasion Trends

To identify patterns of fare evasion by time of day; day of week; location; on-board versus at stop, etc.



Time Series Analysis

To enable, a comparison of results to previous fare evasion monitors to provide a time series analysis of performance and changes over time.



Estimate Lost Revenue due to Fare Evasion

To calculate (where feasible) an annualised estimate of total revenue loss due to fare evasion using seasonally adjusted annualised daily patronage data.

Critical considerations

The survey approach incorporates consideration of a number of important variables.

Statistical Robustness

 To ensure the passenger sample surveyed provides rigorous and robust data to allow highly accurate fare evasion estimates and the ability to calculate annualised revenue losses in the future.

Service Coverage

 To ensure the approach provides coverage across each weekday and weekend day; across operational hours; across light rail vehicles; and across passenger cohorts in a balanced and proportionate manner.

Survey Validity

The approach incorporates authorised Transport
 Canberra Territory Staff and CSOs who work alongside
 the surveying team during the survey period to operate
 the ticket reading machines (froggers).

This approach provides the following benefits:

- To demonstrate to passengers that ticket checks are actually conducted
- To reinforce the validity of the survey process as an official initiative
- To send a clear message to fare evaders to rethink their future behaviour
- > To provide a security presence for our survey team

Fare Evasion Determination Rules

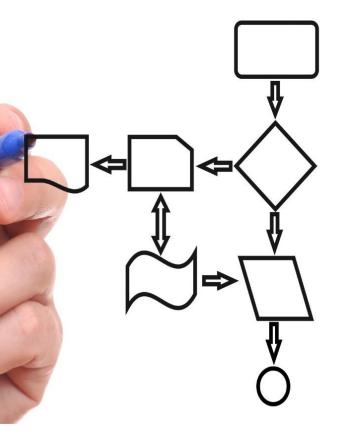
- Passengers aged 13 years and under were not included in the survey and not approached for the survey procedure.
- Fare Evasion Rules are determined based on relevant ACT legislation at the time of conducting the survey. This is currently outlined in the 'Road Transport (Public Passenger Services) Public Transport Fares Determination 2018'. Therefore, the Fare Evasion Rules may vary over the term of this contract in line with current legislation.
- The Territory, at their discretion, may request to exclude survey results from a specific demographic group in accordance with specific direction provided to Canberra Metro Operations or consequent to changed Fares Determination. Any excluded survey results will be advised to Project Co at least 90 days prior to the survey commencing.

Provision for COVID-19 Protocols

 Given the current climate in Australia, a COVID-19 Faceto-Face Interviewing Procedures Safety Plan was developed based on advice and guidelines from the Australian Research Society. The established guidelines were strictly followed by all interviewers.

The Survey Instrument

The survey form is brief and concise, to allow as many evaluations to be completed as possible. The survey for Wave 2 remains consistent with the benchmark wave in September 2019.



The structure of the survey instrument included the following:

1. Ticket Type Checked:

- MyWay
- · Paper ticket
- · No ticket provided
- Refusal

2. Passenger Survey Outcome:

- · Correct full fare paid
- · Correct concessional fare paid
- Concessional fare evasion (using a concession ticket without satisfactory evidence that the passenger is entitled to use a concession ticket)
- Complete fare evasion (MyWay not tapped on; no valid ticket)
- · Platform Validation / Ticket Machine Issue
- Card error

3. Additional Information:

- Timestamp of survey
- Location
- On-board versus at platform

Survey Methodology



> Survey Approach:

The overall approach is based on a number of critical elements:

- Wave 1: An initial half-day Pilot study to ensure all procedures and data collection processes were working as required. The data collected during the pilot study was included in the final data set following a post-pilot review of the pilot study outcomes.
- Wave 2: A two week full service survey covering 5 week days and 2 weekend days – the Wave 2 Fieldwork was conducted from Tuesday 16 to Monday 29 March 2021.
- The majority of LRV operating hours were covered (from 6:00am to 8:44pm) to ensure that over 90% of all weekday and weekend boardings were eligible to be surveyed during the survey procedure.
- A mix of on-board survey ticket checks, whereby the survey team moved through the LRVs checking all passenger tickets and on-platform survey ticket checks of disembarking passengers were conducted.
- The survey schedule was optimised to minimise the impact on the number of authorised Transport Canberra Territory Staff, Transit Officers or CSOs required at any given time, which ranged between 2 and 4 staff depending on the shift. Each Transport Canberra Territory Staff member, Transit Officer or CSO was accompanied by one of Painted Dog's field team members.
- The survey schedule was developed based on passenger boarding and alighting data to ensure broad representativeness.

> Survey Parameters:

The approach is based on the following inputs to target a desired output (based on the average 75,000-85,000 weekly boardings evidenced since formal operations began):

- 164 Survey Hours (see shift strategy detailed overleaf)
 - Each day was surveyed across a significant range of operating hours
 - The survey approach used for Peak vs. Offpeak times varied as detailed overleaf, comprising a mix of on-board and at stop surveys
 - ➤ Each team had a target to complete 50 ticket surveys per hour; the actual number achieved in Wave 2 was 75
- The total number of surveys completed was 12,371 passenger ticket checks. Based on the 140,846 MyWay boardings over this period, this represents 8.8% of all boardings, providing a highly accurate and very small margin of error of ± 0.36% around the fare evasion result (based on a 95% level of confidence).
- The sample achieved is statistically robust and the data is largely proportional to system patronage in its raw state. The data was also post-weighted back to system patronage for the actual week of data collection to create a weighted fare evasion figure.

> At-Stop Survey Procedure:

- Two to Four Transport Canberra Territory Staff / Transit Officers / CSOs were each accompanied by one of Painted Dog's survey team members and were positioned on-platform at selected stops.
- The teams covered all passenger exit points.



- The survey data and survey outcome from each ticket checked was recorded by the interviewer electronically into a data tablet.
- The data tablets continuously upload the data in real time allowing the supervisor to monitor progress.

> On-Board Survey Procedure:

- Depending on the time of day, either two or four Transport Canberra Territory Staff / Transit Officers / CSOs were each accompanied by one of Painted Dog's survey team members.
- The teams were positioned on-board the LRVs and checked as many tickets as possible before alighting or terminating.



> Weather Observations:

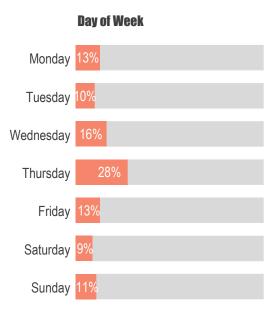
■ The official weather observations over the period of the survey are summarised below. The weather was generally clear and sunny, averaging 10.7° minimum and 20.2° maximum, with an average of 5.4mm of rain fall throughout the week, however, there was a 4-day period of heavier rainfall.

Canberra Weather Observations (Source: bom.gov.au)					
	Minimum °C	Maximum °C	Rainfall mm		
Tuesday March 16	6.7	20.5	0		
Wednesday March 17	10.5	17.5	0		
Thursday March 18	13.3	21.7	0.2		
Friday March 19	13.9	20.7	0.2		
Saturday March 20	14.1	20.7	2.6		
Sunday March 21	15.5	17.9	11.2		
Monday March 22	14.9	16.7	5.8		
Tuesday March 23	14.3	18.6	30.6		
Wednesday March 24	15.6	19.8	23.8		
Thursday March 25	14.0	22.6	0		
Friday March 26	4.4	21.4	0		
Saturday March 27	5.9	21.6	0		
Sunday March 28	4.4	21.0	8.0		
Monday March 29	3.2	22.4	0		

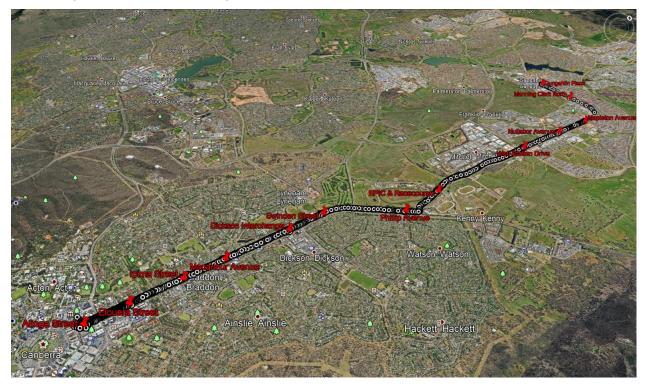
Sampling



12,371 surveys were completed over the fieldwork period – with an even split between on-board and at stop locations.



The GPS map below plotting each survey location shows that surveys were conducted across the system:



Results



Total Boardings & Surveys Conducted



119,331 MyWay Boardings and 114,321 Alightings were recorded across the survey weekdays (Monday to Friday). The total MyWay boarding figure excludes paper tickets.

The peak boarding period was between 8:00am and 8:14am with 5,565 MyWay boardings recorded during this 15 minute period across the weekdays.

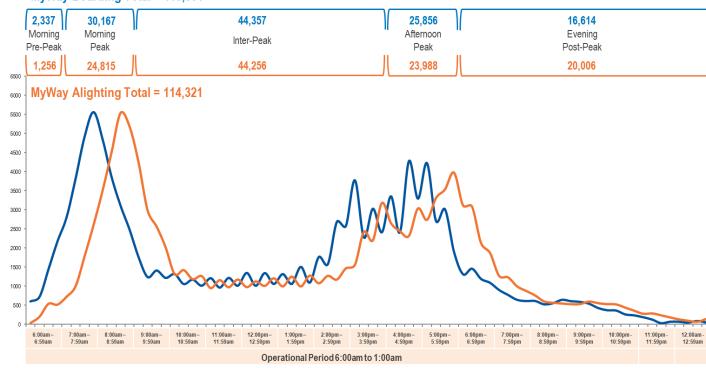
The peak alighting period was between 8:45am and 8:59am with 5,542 alightings recorded during this 15 minute period across the weekdays.

The difference between total MyWay boardings and alightings reflects passengers forgetting to tap off (5,010).

Passenger MyWay Boardings and MyWay Alightings: Weekday Total

(6:00am to 1:00am)

MyWay Boarding Total = 119,331



21,515 MyWay Boardings and 19,845 Alightings were recorded across the survey weekends (Saturday and Sunday). The total MyWay boarding figure excludes paper tickets.

The peak boarding period was between 3:00pm and 3:14pm with 474 MyWay boardings recorded during this 15 minute period across the weekend.

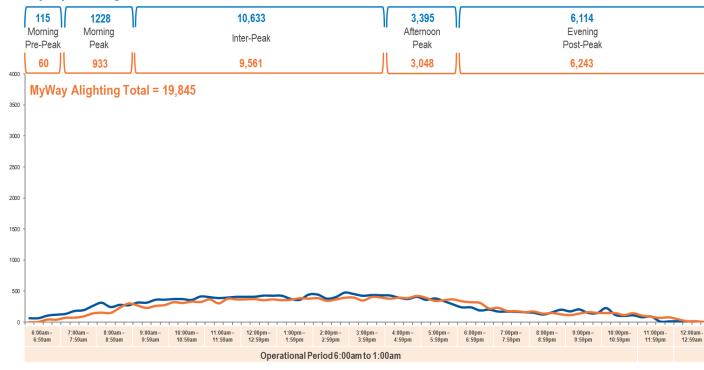
The peak alighting period was between 5:00pm and 5:14pm with 421 alightings recorded during this 15 minute period across the weekend.

The difference between total MyWay boardings and alightings reflects passengers forgetting to tap off (1,670).

Passenger MyWay Boardings and MyWay Alightings: Weekend Total

(6:00am to 1:00am)

MyWay Boarding Total = 21,515



9,929 passenger surveys were conducted across the survey weekdays (Monday to Friday). The passenger surveys were conducted across the majority of LRV operational hours, from 6:00am to 8:44pm.

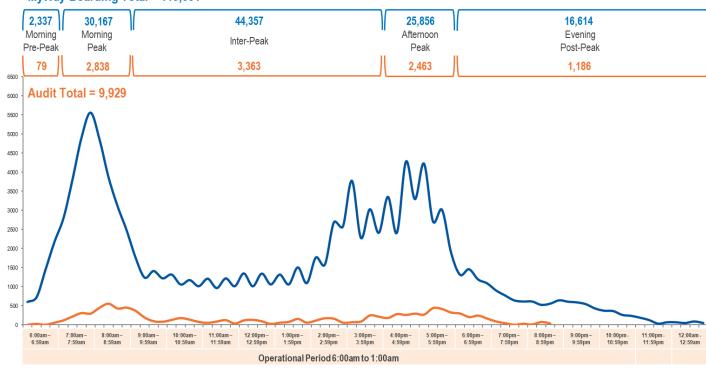
The peak survey period was between 8:30am and 8:44am with 557 surveys conducted during this 15 minute period across the weekdays.

The proportion of surveys collected during key operational periods was designed to reflect MyWay boarding percentages as closely as possible.

The under and over-representations of survey percentages to MyWay boarding percentages were taken into account when calculating the weighted fare evasion figure.

Passenger MyWay Boardings and Audits: Weekday Total (6:00am to 1:00am)

MyWay Boarding Total = 119,331



2,442 passenger surveys were conducted across the survey weekends (Saturday and Sunday).

The passenger surveys were conducted across a high proportion of LRV operational hours, from 8:00am to 7:00pm over the weekend.

The peak survey period was between 2:15pm and 2:29pm with 121 surveys conducted during this 15 minute period across the weekend.

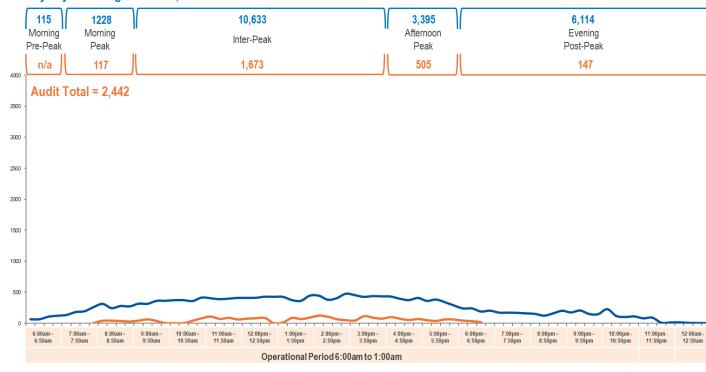
The proportion of survey percentages collected during key operational periods was designed to reflect MyWay boarding percentages as closely as possible.

The under and over-representations of survey percentages to MyWay boarding percentages were taken into account when calculating the weighted fare evasion figure.

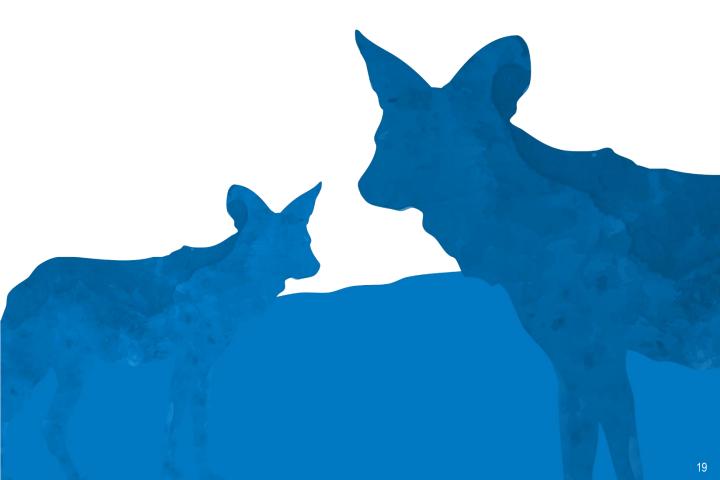
Passenger MyWay Boardings and Audits: Weekend Total

(6:00am to 1:00am)

MyWay Boarding Total = 21,515



Fare Compliance & Fare Evasion Rate



The overall weighted fare evasion result is 4.8%.

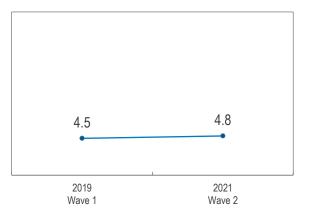
The results from the Wave 2 survey of 12,371 passengers have been weighted to be representative of actual boardings in relation to when the surveys were conducted across key travel time periods during the survey week. The weighted fare evasion calculation is shown overleaf.

The fare evasion estimate is highly accurate with a low margin of error of $\pm\,0.36\%$ based on a 95% level of confidence.

NOTE: This data is weighted for the overall fare evasion result. All other results in this document are based on the unweighted fare evasion result. Due to the very low margin of error (±0.36%) the results remain statistically reliable and highly accurate, with minimal variation compared to the weighted result.

Overall Weighted Fare Evasion % Wave 2 4.8 95.2 Correct Fare Paid Fare Evasion

Overall Weighted Fare Evasion % Wave on Wave



Weighted Fare Evasion Calculation

The table below summarises the weighting procedure, which takes into account the relativities between the passenger boarding profile and the passenger survey profile – separate tables for the weekday and weekend survey results are shown.

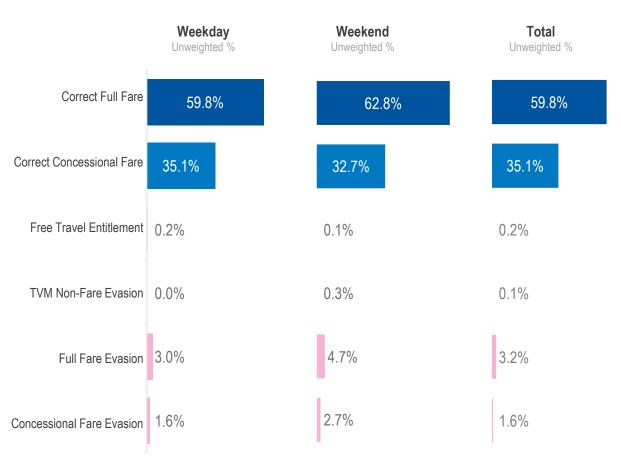
The total week weighted fare evasion result of 4.8% used this data and adjusted for the relative contribution of weekday patronage versus weekend patronage.

Weekday							
TOTAL WEEKDAY	MyWay Boarding %	Audit %	Fare Evasion	Weighted Fare Evasion			
Morning Off Peak (6:00am - 7:00am)	2.0%	0.8%	8.9%	0.2%			
Morning Peak (7:00am - 9:00am)	25.3%	28.6%	2.8%	0.7%			
Inter Peak (9:00am - 4:00pm)	37.2%	33.9%	5.5%	2.1%			
Afternoon Peak (4:00pm - 6:00pm)	21.7%	24.8%	4.5%	1.0%			
Evening off Peak (6:00pm - 11:30pm/1am Friday)	13.9%	11.9%	3.9%	0.5%			
TOTAL WEEK	100.0%	100.0%	4.3%	4.5%			

Weekend							
	MyWay Boarding %	Audit %	Fare Evasion	Weighted Fare Evasion			
Morning Off Peak (6:00am - 7:00am)	0.5%	0.0%	n/a	n/a			
Morning Peak (7:00am - 9:00am)	5.7%	4.8%	4.3%	0.2%			
Inter Peak (9:00am - 4:00pm)	49.4%	68.5%	7.3%	3.6%			
Afternoon Peak (4:00pm - 6:00pm)	15.8%	20.7%	7.3%	1.2%			
Evening off Peak (6:00pm - 1am)	28.6%	6.0%	6.1%	1.7%			
TOTAL WEEK	100.0%	100.0%	7.1%	6.8%			

While the large majority paid the correct fare, full fare evasion was the most common evasion type among those who didn't.

The survey indicated a higher incidence of fare evasion on weekends.



Note: TVM non-Fare Evasion refers to reported TVM issues that have been confirmed.

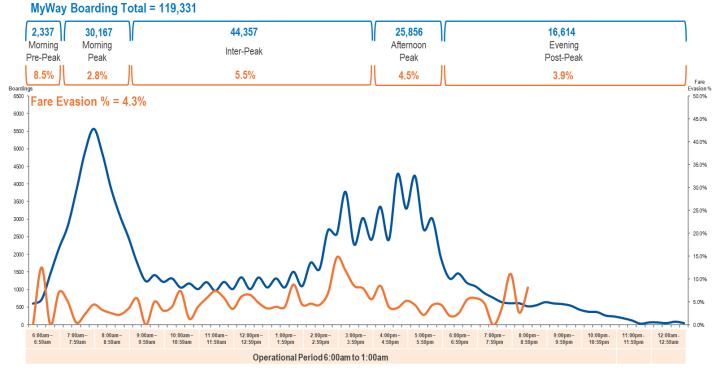
An overall fare evasion percentage of 4.3% was recorded across the weekday surveys (Monday to Friday).

The level of recorded fare evasion ranges between 0% and 14.7% during any given 15 minute period across the weekdays.

The peak fare evasion period was between 3:00pm and 3:14pm at 14.7% across the weekdays.

Overall fare evasion was lowest during the morning peak period (2.8%) and highest during the morning pre-peak period (8.5%) across the weekdays.

Passenger MyWay Boardings & Fare Evasion Percentage: Weekday Total (6:00am to 1:00am)



An overall fare evasion percentage of 7.1% was recorded across the weekend surveys (Saturday and Sunday).

The level of recorded fare evasion ranges between 0% and 15.6% during any given 15 minute period across the weekend.

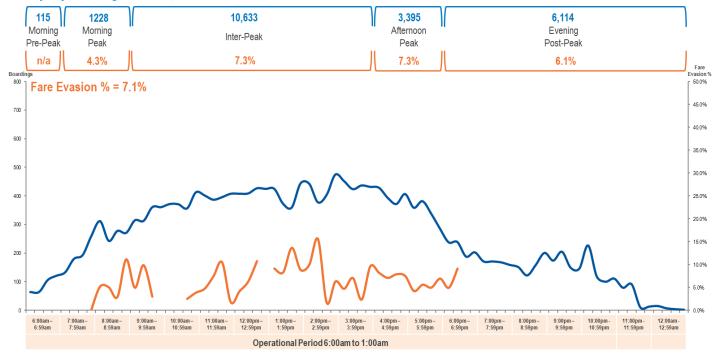
The peak fare evasion period was between 2:30pm and 2:44pm at 15.6% across the weekend.

Overall fare evasion was lowest during the morning peak period (4.3%), and highest during the inter-peak and afternoon-peak period (7.3%) across the weekend.

Passenger MyWay Boardings & Fare Evasion Percentage: Weekend Total

(6:00am to 1:00am)





Appendix



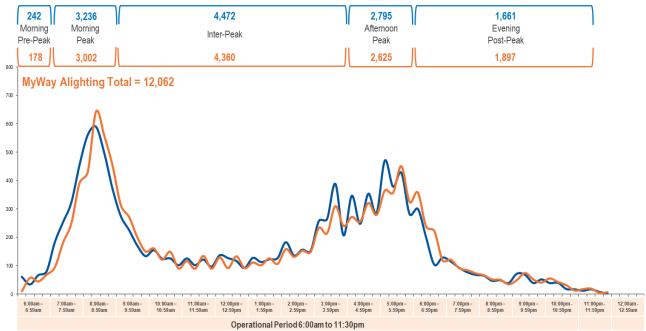
Boardings & Alightings: By Day



Passenger MyWay Boardings and MyWay Alightings: Tuesday Week 1

(6:00am to 11:30pm)

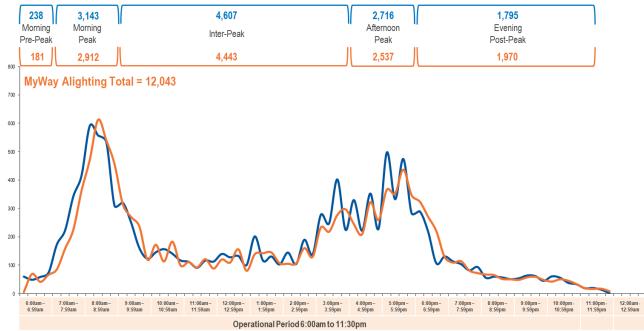




Passenger MyWay Boardings and MyWay Alightings: Wednesday Week 1

(6:00am to 11:30pm)

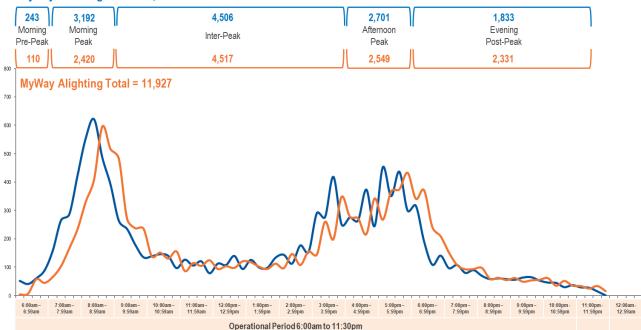
MyWay Boarding Total = 12,499



Passenger MyWay Boardings and MyWay Alightings: Thursday Week 1

(6:00am to 11:30pm)

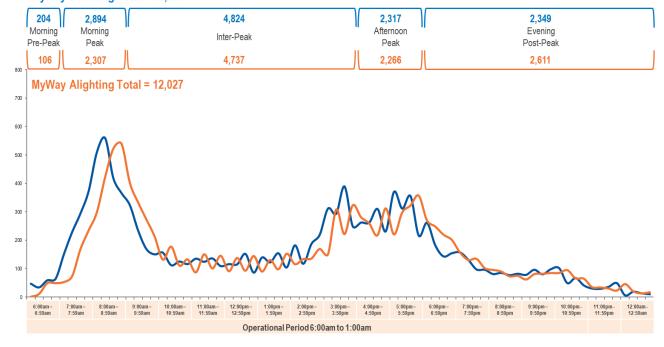




Passenger MyWay Boardings and MyWay Alightings: Friday Week 1

(6:00am to 1:00am)

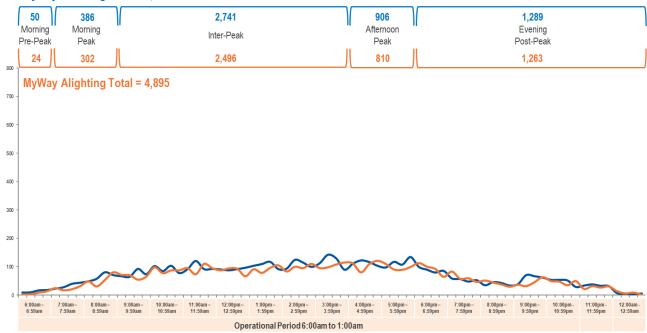
MyWay Boarding Total = 12,588



Passenger MyWay Boardings and MyWay Alightings: Saturday Week 1

(6:00am to 1:00am)

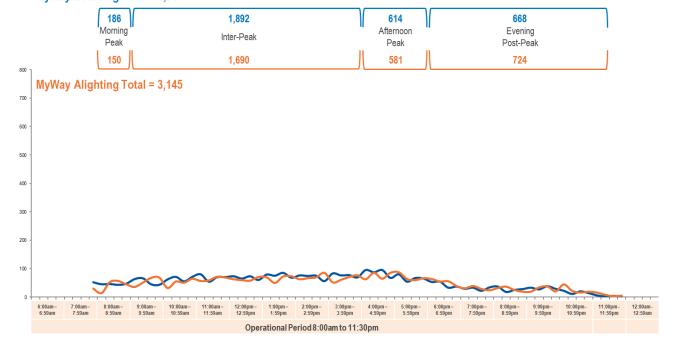




Passenger MyWay Boardings and MyWay Alightings: Sunday Week 1

(8:00am to 11:30pm)

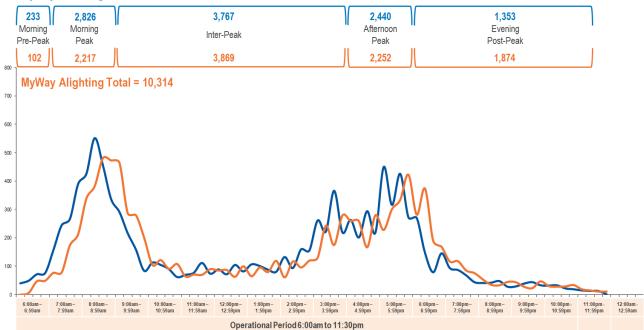
MyWay Boarding Total = 3,360



Passenger MyWay Boardings and MyWay Alightings: Monday Week 2

(6:00am to 11:30pm)

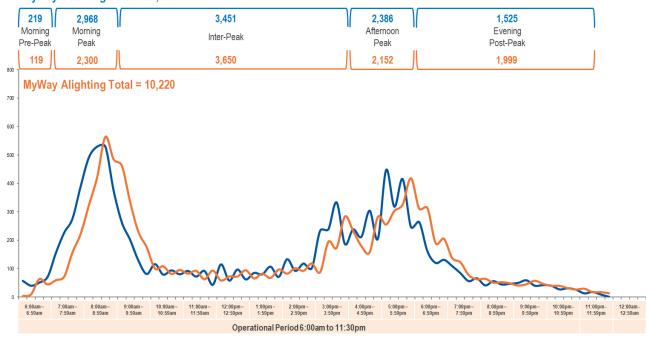




Passenger MyWay Boardings and MyWay Alightings: Tuesday Week 2

(6:00am to 11:30pm)

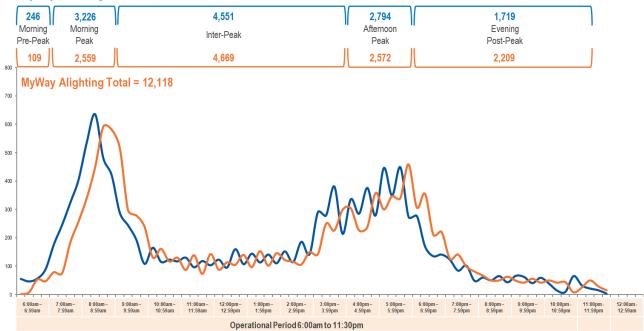
MyWay Boarding Total = 10,549



Passenger MyWay Boardings and MyWay Alightings: Wednesday Week 2

(6:00am to 11:30pm)

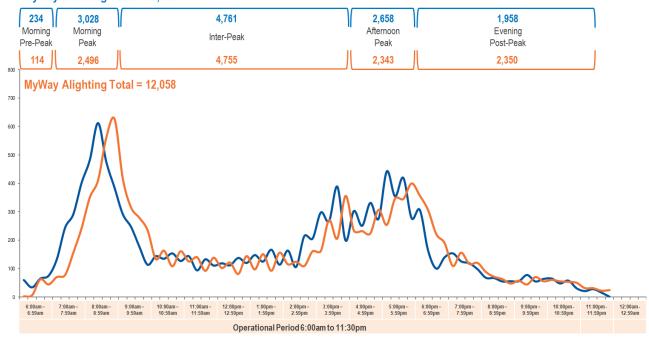




Passenger MyWay Boardings and MyWay Alightings: Thursday Week 2

(6:00am to 11:30pm)

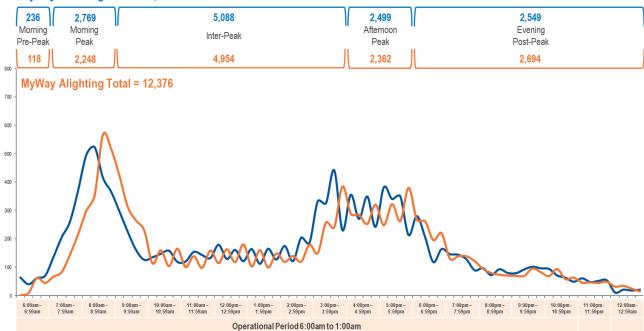
MyWay Boarding Total = 12,639



Passenger MyWay Boardings and MyWay Alightings: Friday Week 2

(6:00am to 1:00am)

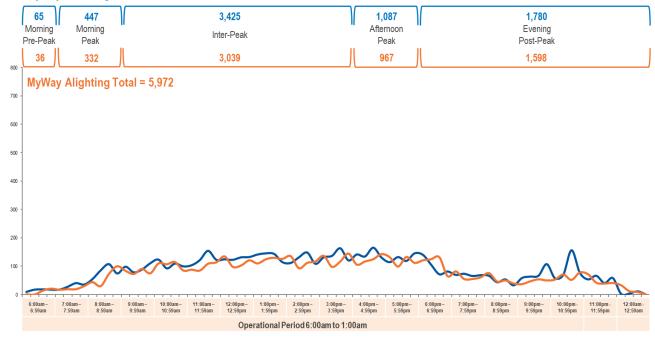




Passenger MyWay Boardings and MyWay Alightings: Saturday Week 2

(6:00am to 1:00am)

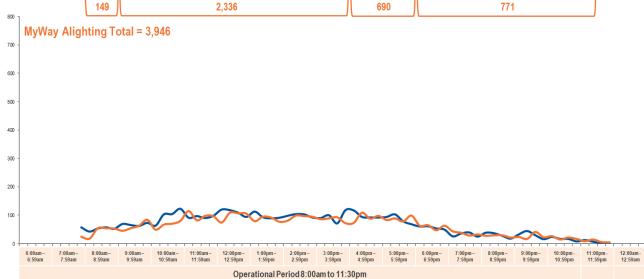
MyWay Boarding Total = 6,804



Passenger MyWay Boardings and MyWay Alightings: Sunday Week 2



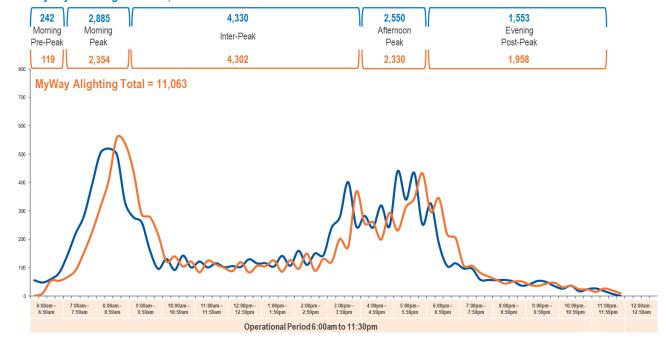




Passenger MyWay Boardings and MyWay Alightings: Monday Week 3

(6:00am to 11:30pm)

MyWay Boarding Total = 11,560



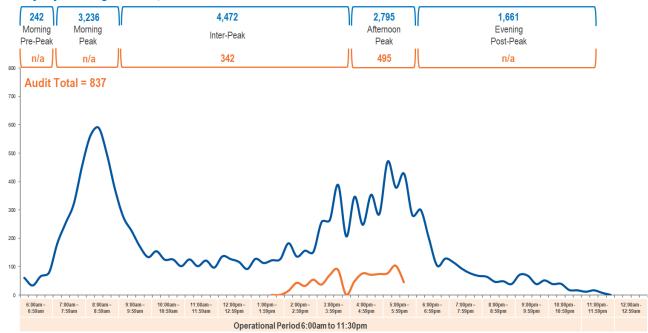
Boardings & Audits Conducted: By Day



Passenger MyWay Boardings and Audits: Tuesday Week 1

(6:00am to 11:30pm)

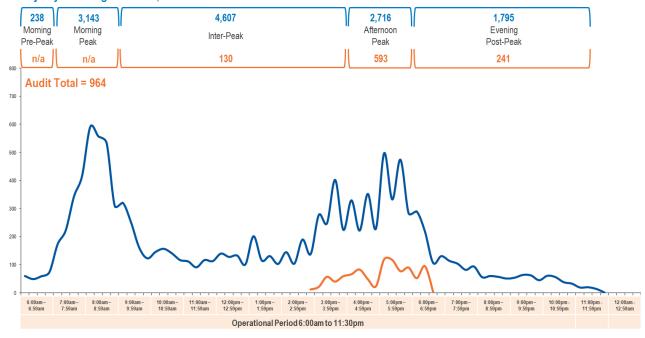
MyWay Boarding Total = 12,406



Passenger MyWay Boardings and Audits: Wednesday Week 1

(6:00am to 11:30pm)

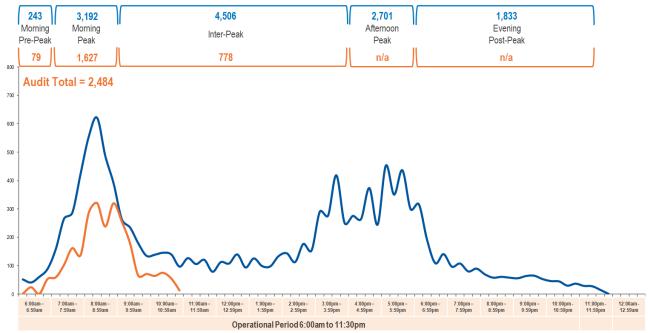
MyWay Boarding Total = 12,499



Passenger MyWay Boardings and Audits: Thursday Week 1

(6:00am to 11:30pm)



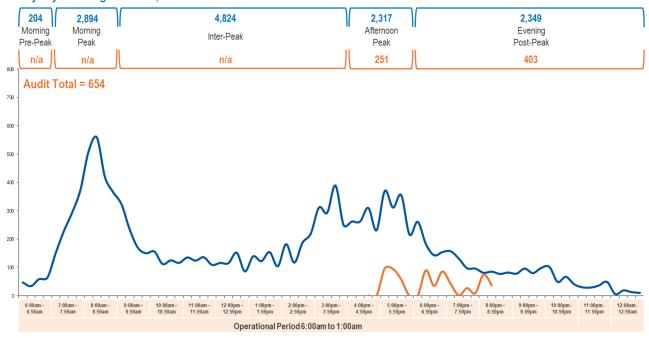


Passenger MyWay Boardings and Audits:

Friday Week 1

(6:00am to 1:00am)

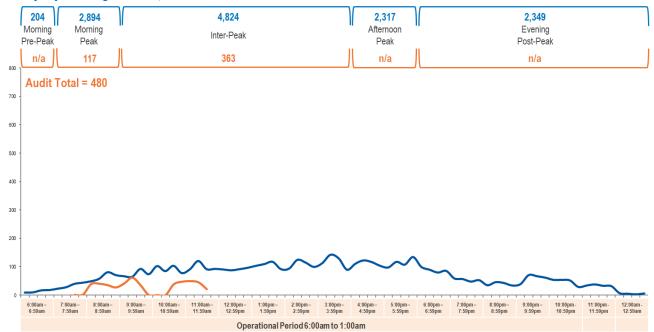
MyWay Boarding Total = 12,588



Passenger MyWay Boardings and Audits: Saturday Week 1

(6:00am to 1:00am)

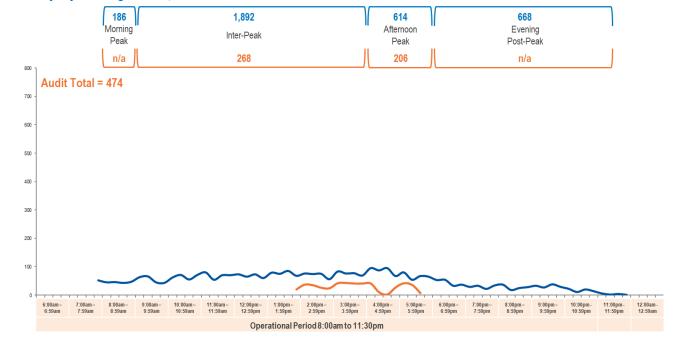




Passenger MyWay Boardings and Audits: Sunday Week 1

(6:00am to 11:30pm)

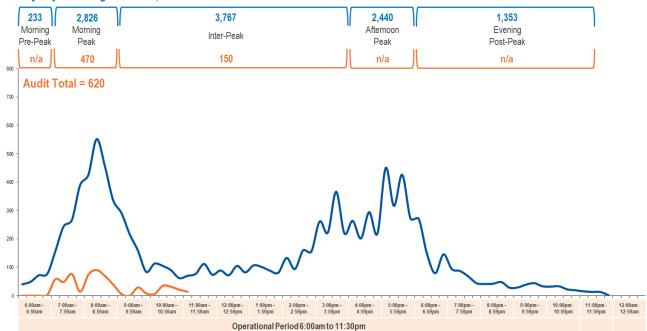
MyWay Boarding Total = 3,360



Passenger MyWay Boardings and Audits: Monday Week 2

(6:00am to 11:30pm)

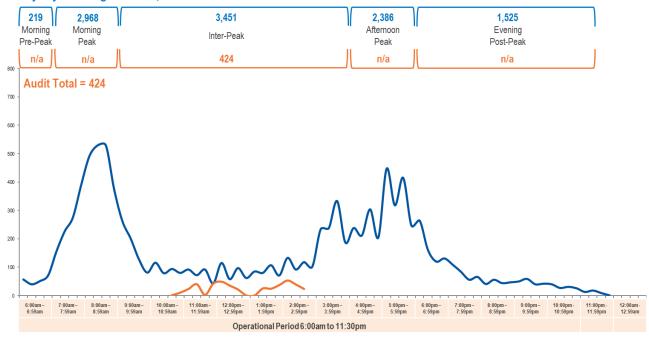
MyWay Boarding Total = 10,619



Passenger MyWay Boardings and Audits: Tuesday Week 2

(6:00am to 11:30pm)

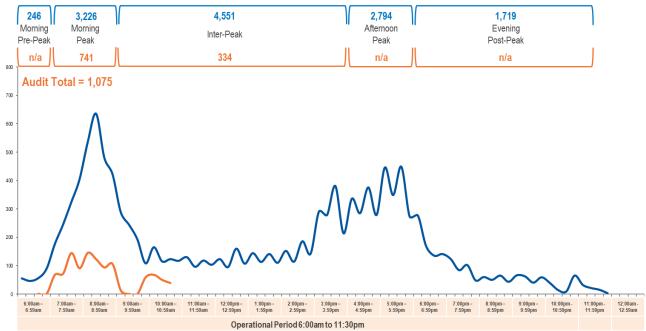
MyWay Boarding Total = 10,549



Passenger MyWay Boardings and Audits: Wednesday Week 2

(6:00am to 11:30pm)



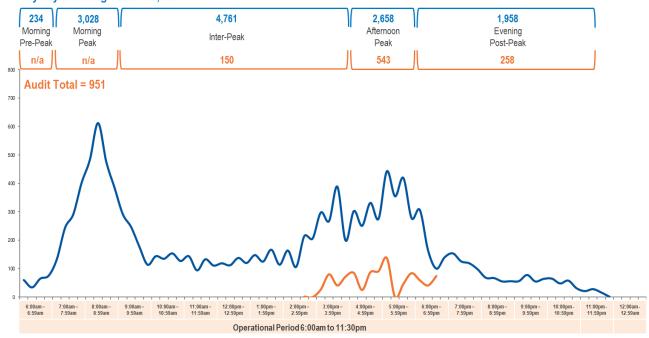


Passenger MyWay Boardings and Audits:

Thursday Week 2

(6:00am to 11:30pm)

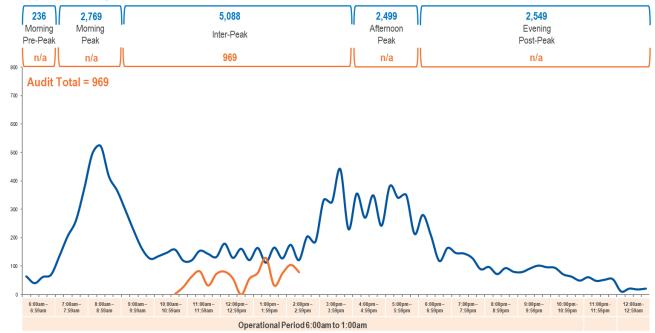
MyWay Boarding Total = 12,639



Passenger MyWay Boardings and Audits: Friday Week 2

(6:00am to (6:00am to 1:00am)

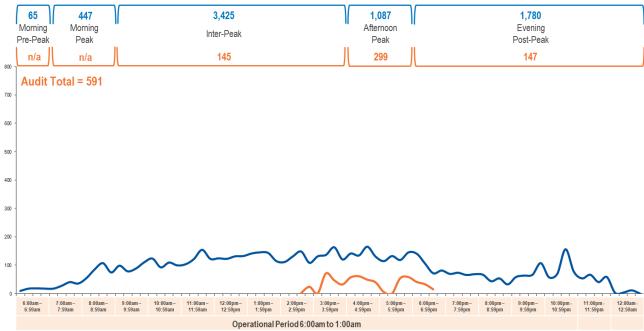




Passenger MyWay Boardings and Audits: Saturday Week 2

(6:00am to 1:00am)

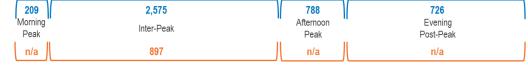
MyWay Boarding Total = 6,804

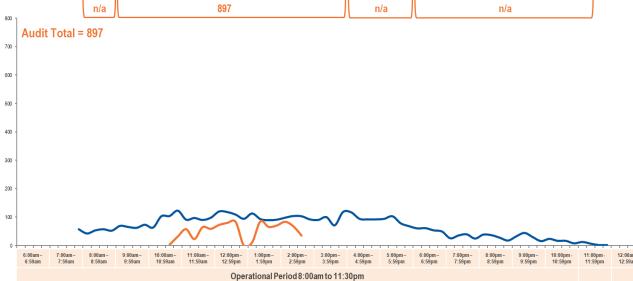


Passenger MyWay Boardings and Audits: Sunday Week 2

(6:00am to 11:30pm)



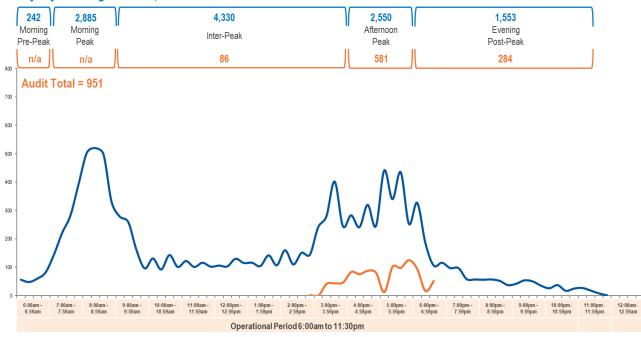




Passenger MyWay Boardings and Audits: Monday Week 3

(6:00am to 11:30pm)

MyWay Boarding Total = 11,560



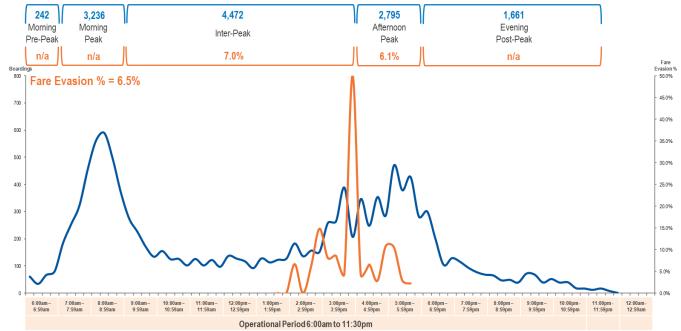
Fare Evasion: By Day



Passenger MyWay Boardings & Fare Evasion Percentage: Tuesday Week 1

(6:00am to 11:30pm)

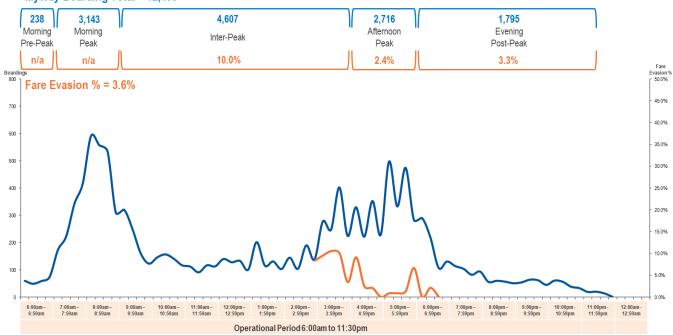




Passenger MyWay Boardings & Fare Evasion Percentage: Wednesday Week 1

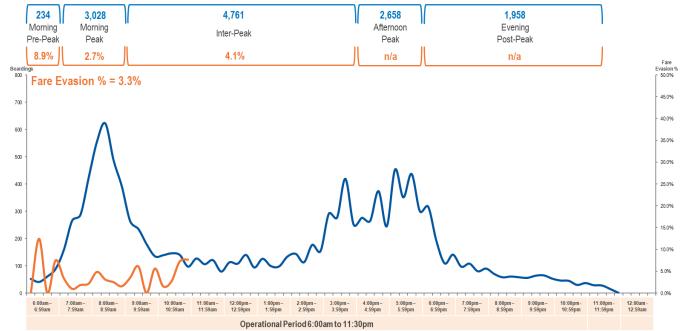
(6:00am to 11:30pm)

MyWay Boarding Total = 12,499



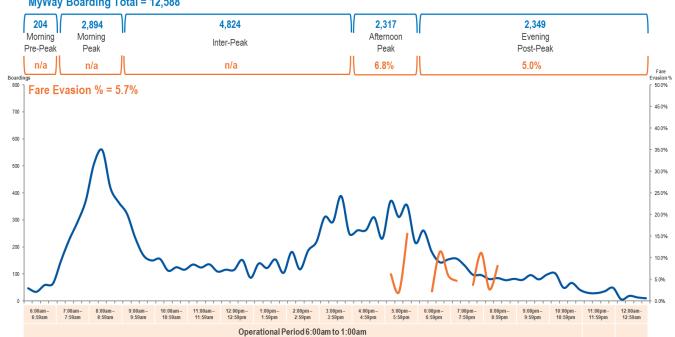
Passenger MyWay Boardings & Fare Evasion Percentage: Thursday Week 1





Passenger MyWay Boardings & Fare Evasion Percentage: Friday Week 1

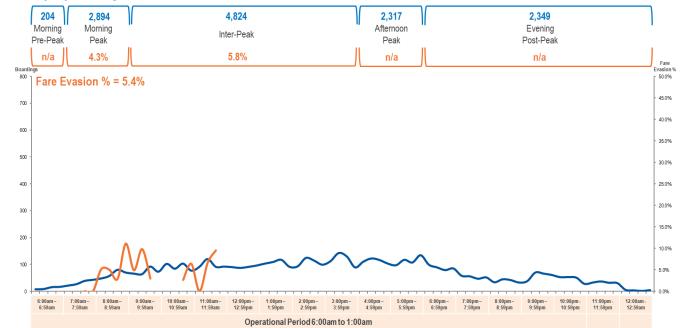
MyWay Boarding Total = 12,588



Passenger MyWay Boardings & Fare Evasion Percentage: Saturday Week 1

(6:00am to 1:00am)

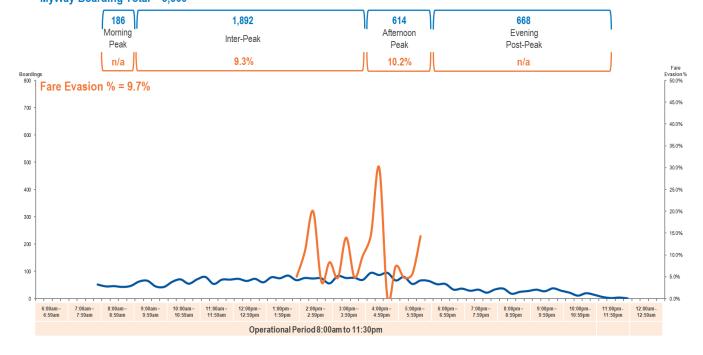




Passenger MyWay Boardings & Fare Evasion Percentage: Sunday Week 1

(8:00am to 11:30pm)

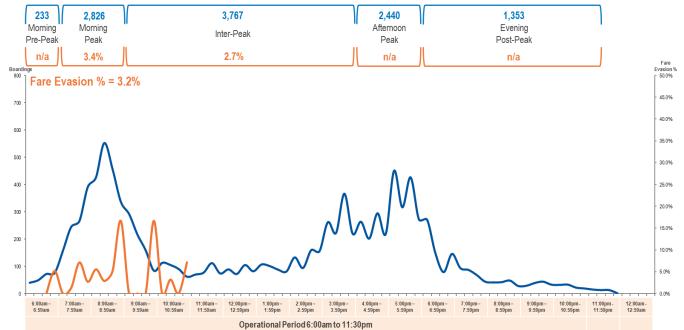
MyWay Boarding Total = 3,360



Passenger MyWay Boardings & Fare Evasion Percentage: Monday Week 2

(6:00am to 11:30pm)

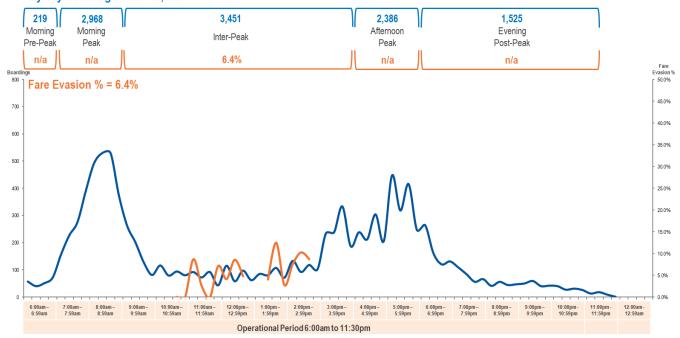




Passenger MyWay Boardings & Fare Evasion Percentage: Tuesday Week 2

(6:00am to 11:30pm)

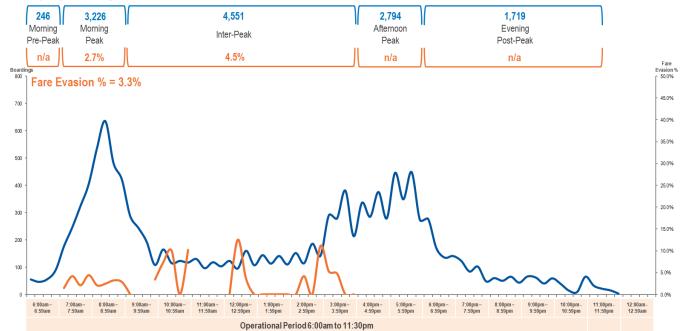
MyWay Boarding Total = 10,549



Passenger MyWay Boardings & Fare Evasion Percentage: Wednesday Week 2

(6:00am to 11:30pm)

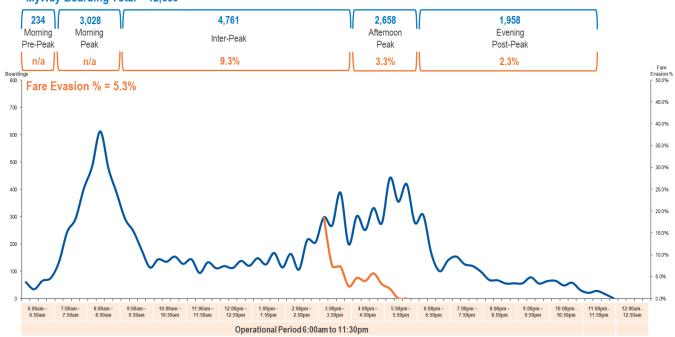




Passenger MyWay Boardings & Fare Evasion Percentage: Thursday Week 2

(6:00am to 11:30pm)

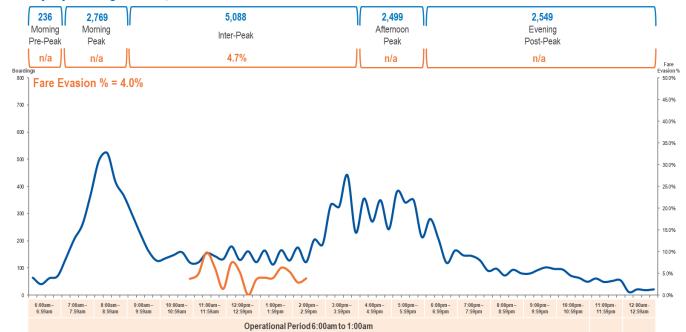
MyWay Boarding Total = 12,639



Passenger MyWay Boardings & Fare Evasion Percentage: Friday Week 2

(6:00am to 1:00am)

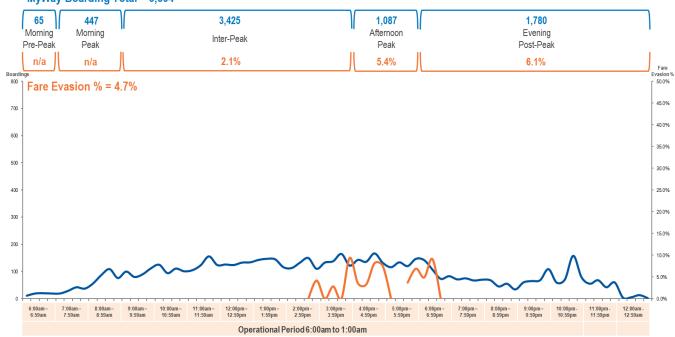




Passenger MyWay Boardings & Fare Evasion Percentage: Saturday Week 2

(6:00am to 1:00am)

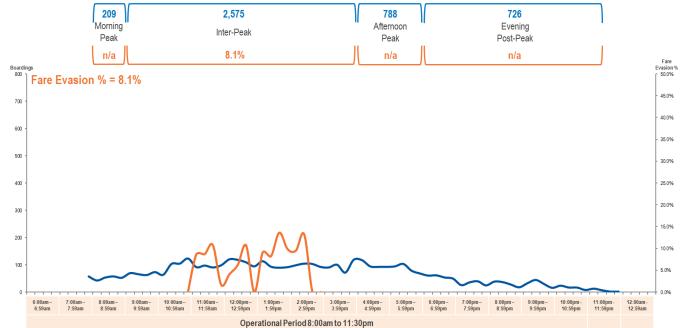
MyWay Boarding Total = 6,804



Passenger MyWay Boardings & Fare Evasion Percentage: Sunday Week 2

(8:00am to 11:30pm)

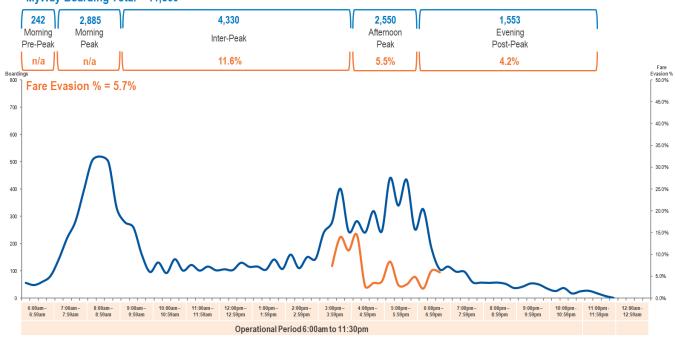




Passenger MyWay Boardings & Fare Evasion Percentage: Monday Week 3

(6:00am to 11:30pm)

MyWay Boarding Total = 11,560



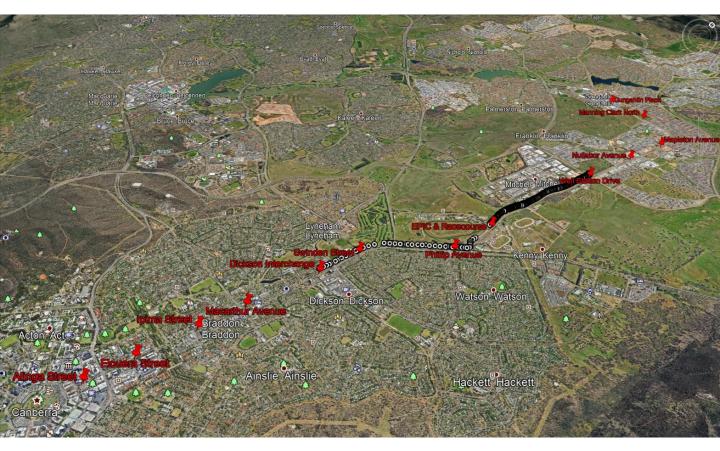
Geographic Maps



Tuesday Week 1



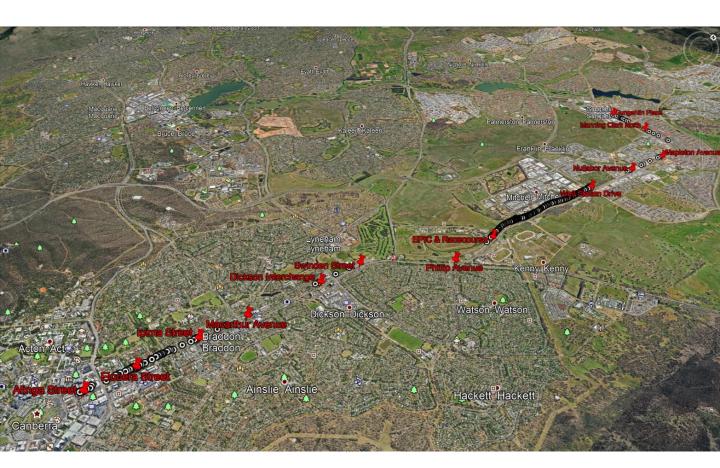
Wednesday Week 1



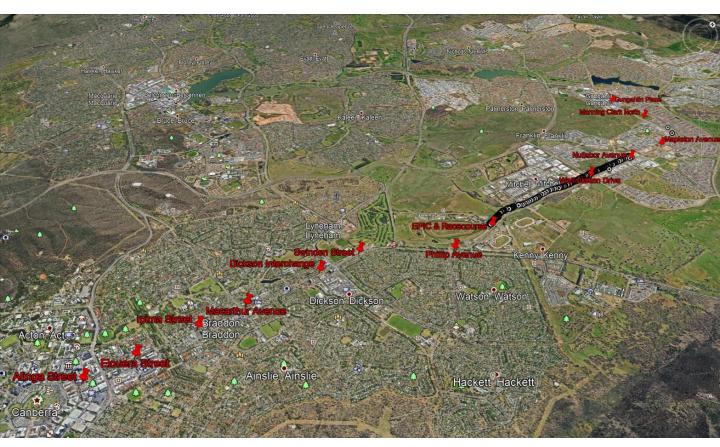
Thursday Week 1



Friday Week 1



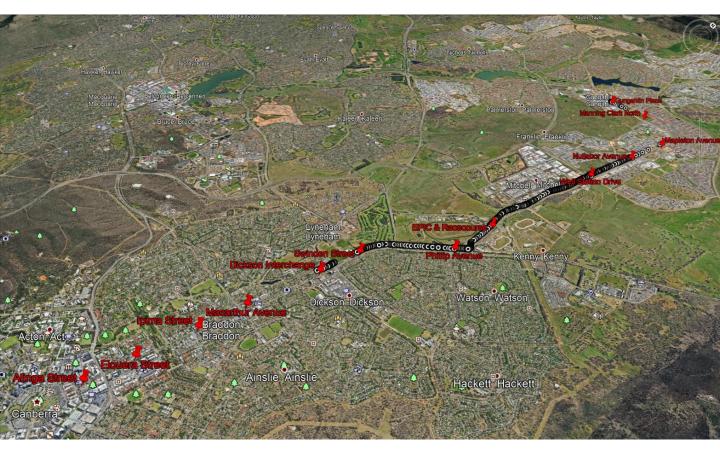
Saturday Week 1



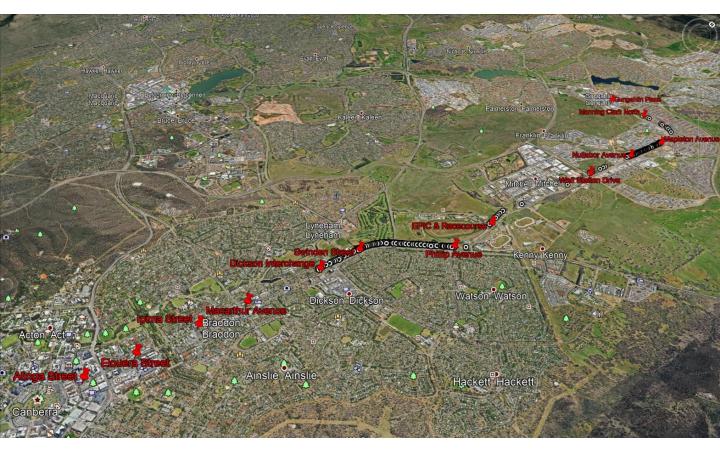
Sunday Week 1



Monday Week 2



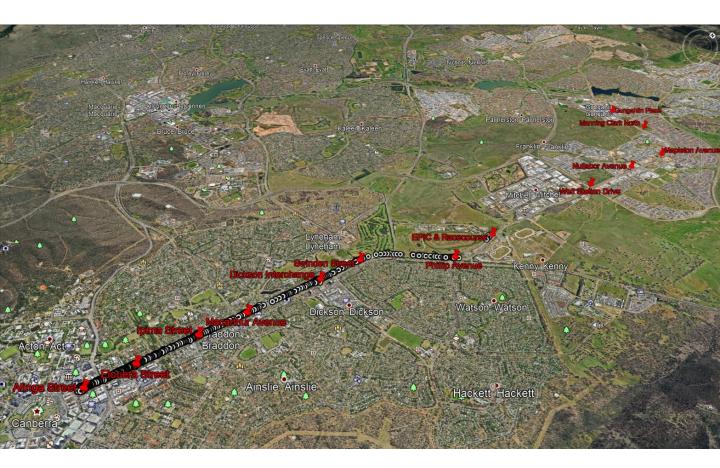
Tuesday Week 2



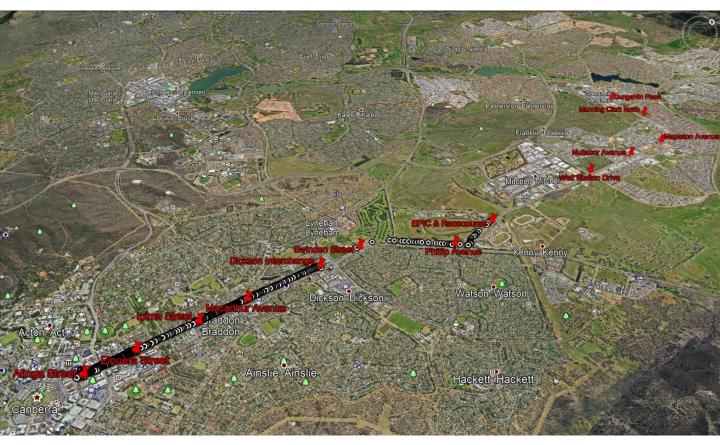
Wednesday Week 2



Thursday Week 2



Friday Week 2



Saturday Week 2



Sunday Week 2



Monday Week 3



Hunt Smarter.

