

Metropolitan Tram Load Standards Survey Report

May 2018

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1 Summary and Key Results

1.1 Introduction

The Metropolitan Tram Load Standards Surveys (Tram Load Surveys) are conducted each year in May to measure passenger loads against agreed load standards of rolling stock.

The survey's findings help pinpoint at which sections on each route and at which times loads exceed the desired standards, to assist in planning for rolling stock and service changes. Surveying is generally confined to the AM and PM peaks when the network is at its busiest. In this survey the peak periods are defined as 7.01am to 10.00am and 3.01pm to 7:00pm. On occasion and upon request by stakeholders, other survey times may be included.

In this report, key metrics from the May 2018 survey are outlined.

1.2 Key Results

In May 2018, a total of 8 rolling hour average loads above desired standards (breaches) were observed in the AM peak and 3 in the PM peak. This is an increase of 3 breaches in the AM peak and 0 breaches in the PM peak compared to May 2017.

Table 1 Rolling hour average loads above desired standards recorded in May 2018 survey

AM Rolling Hour	2017	2018
7:01-8:00	0	0
7:31-8:30	1	2
8:01-9:00	2	5
8:31-9:30	2	1
9:01-10:00	0	0
Total	5	8

PM Rolling Hour	2017	2018
15:01-16:00	0	0
15:31-16:30	0	0
16:01-17:00	0	0
16:31-17:30	1	0
17:01-18:00	1	1
17:31-18:30	0	1
18:01-19:00	1	1
Total	3	3

Key insights of the May 2018 Tram Load Survey include:

- The tram network is more congested in the morning peak particularly between 8 and 9 AM as evidenced by an increase in breaches compared to last year. *Elgin St / Lygon St* and *Swanston St / Flinders St (Federation Sq)* are the locations accounting for 5 of the 8 breaches reported.
- Evening breaches remain largely unchanged. Maximum demand on the network can be expected between 5 and 7 PM resulting in breaches at 2 cordons locations: *Elgin St / Lygon St* and *Swanston St Federation Square* consistent with the AM Peak.

2 Background and Definitions

2.1 Background

Tram Load Surveys have been conducted since 2000 as part of the Franchise Agreement (The Agreement) between the metropolitan tram operator and the State Government.

Decision criteria shaping the scope of the survey have a focus on cordon locations and locations previously recording rolling hour breaches (breaches). In addition, locations impacted by service changes either to the tram or train timetables may be included. Discussions with external stakeholders further influence the final list of locations, directions, times and load types (departing or arriving counts) to be surveyed.

Survey results are useful to review and re-allocate tram rolling stock across the network. In addition, transport modellers frequently rely on data gathered on average or total passenger load counts for information about demand for tram services.

2.2 Terminology

AM Peak –AM Peak Services may span different time periods for different purposes. For the Tram Load Survey and within this document, the AM Peak period refers to services that arrive at a survey point travelling in the survey direction *between 7:01am and 10:00am*.

CBD monitoring point – Any point in the Central Business District (CBD), or any other point determined by Transport for Victoria (TFV), at which passenger counts are conducted in accordance with the Agreement, utilising CBD Maximum Capacities for each vehicle.

Cordon– Historical points designed to capture the expected maximum load of passengers entering the CBD.

Corridor – A group of tram routes at a location that have or will share/d substantial sections of track and are expected to be interchangeable to passengers. The loads and capacities of these corridors are aggregated for the calculation of rolling hour breach estimates.

Counter Peak Direction – The direction opposite to which most passengers are expected to travel. In the AM Peak this is services that are travelling away from the CBD and in the PM Peak this is services that are travelling towards the CBD.

Load – For a service, the number of passengers travelling on a tram at a given point in time.

Load standard – see Maximum Capacity.

Location – A generic term indicating a survey point, with CBD or Non-CBD or Cordon as context requires.

Maximum Capacity – The desired maximum load of a tram in service. (See Appendix 4 for details of capacities for each tram class). The maximum capacity is often higher for trams operating in the CBD than for trams operating outside the CBD. This is also referred to as *desired standard* or *standard* in this report. This standard does not relate to a safety requirement but to the relative comfort level.

Non-CBD monitoring point – Any point that is not a CBD monitoring point at which passenger counts are conducted in accordance with the Agreement, utilising non-CBD Maximum Capacities for each vehicle.

Peak – Either or both the AM Peak and the PM Peak, as the context requires.

Peak Direction – The direction in which most passengers are expected to travel. Generally, in the AM Peak it refers to services that are travelling towards the CBD and in the PM Peak to services that are travelling away from the CBD.

PM Peak – PM Peak Services may span different time periods for different purposes. For the Tram Load Survey and within this document, the AM Peak period refers to services that arrive at a survey point travelling in the survey direction *between 3:01pm and 7:00pm*.

Rolling hour – Each hour from 6:31am to 6:31pm, commencing on each half-hour during that period (e.g. 6:31am to 7:30am, 7:01am to 8:00am).

Rolling hour breach (breach) – where the total passenger load within a rolling hour, at a given location, exceeds the total maximum capacity at that location within the rolling hour.

3 Cordon Locations

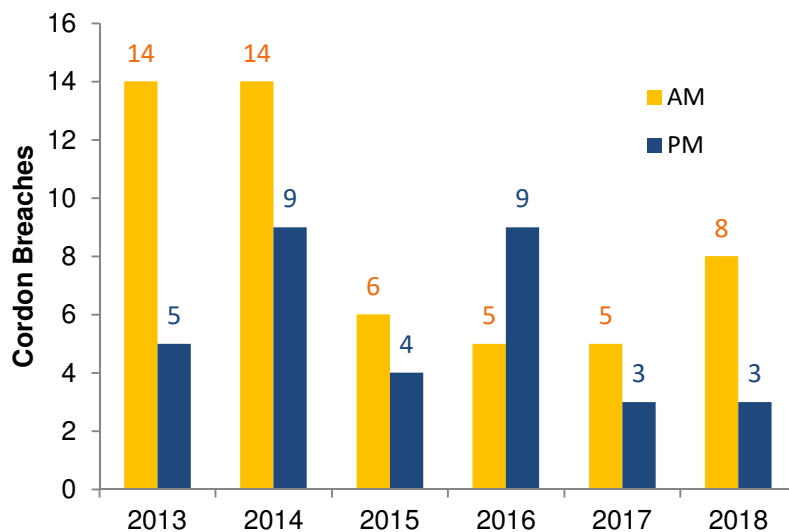
3.1 Rolling Hour Breaches – Cordon Locations

In 2018, there are 14 cordon locations that represent entry or exit points for all routes through the CBD. For most of these cordon locations, loads are counted in the direction consistent with the maximum passenger demand for services, i.e. in the peak direction. Exceptions occur at *Swanston St / Flinders St (Federation Square)*, *Clarendon St (Crown)* and *Bourke St / Spring St* where cordon breaches are reported in both directions, peak and counter-peak.

3.1.1 Key Results

In the May 2018 Tram Load Survey, the number of breaches of load standards has increased in the AM Peak period from 5 to 8 breaches compared to May 2017. This increase is not reflected in the PM Peak where breaches remained steady at 3.

Figure 1 - Rolling Hour Cordon Breaches in May - AM Peak and PM Peak - From 2013 to 2018



3.1.2 AM Peak Rolling Hour Breaches

The increase in breaches here occur at *Clarendon St (Crown Casino)* in both directions, *Swanston St / Flinders St (Federation Sq)*, *Elgin St / Lygon St* and *Wellington Pde / Jolimont Rd*.

Table 2 - Rolling Hour Cordon Load Breaches in May by Location and Route or Corridor - AM Peak

Cordon Location	Direction	Route/s	2015	2016	2017	2018
Bourke St / Spring St	East	86, 96	nr	nr	-	-
Bourke St / Spring St	West	86, 96	nr	nr	-	-
Clarendon St (Crown Casino)	North	12	nr	nr	-	1
Clarendon St (Crown Casino)	South	12	nr	nr	-	1
Collins St West End (Southern Cross Station)	West	11, 48	nr	nr	-	-
Docklands (Flinders St West End)	East	35, 70, 75	nr	nr	-	-
Elgin St / Lygon St	South	1, 6 [^]	3	2	2	3
Errol St / Victoria St	South	57	-	-	-	-
Flinders St / Russell St	West	35, 70, 75	nr	nr	-	-
Haymarket (Elizabeth St)	South	59	-	-	-	-
Peel St / Victoria St	South	58 ^{^^}	-	-	-	-
Queensbridge St (Casino East)	North	58 ^{^^}	nr	nr	-	-
St Vincents Plaza	West	112 (12) [*] , 109	-	-	-	-
Swanston St / Flinders St (Federation Sq)	South	3, 5, 6 [^] , 16, 64, 67, 72	2	1	1	2
Swanston St / Flinders St (Federation Sq)	North	3, 5, 6 [^] , 16, 64, 67, 72	nr	nr	-	-
Wellington Pde / Jolimont Rd	West	48, 75	-	2	2	1
Total			5	5	5	8

[^] - From May 1, 2017 route 55 and 8 were discontinued. Route 58 was introduced covering the Domain to Toorak section of previous route 8 and the Domain to West Coburg of previous route 55. The northern section of route 8 is serviced by extending route 6 to terminate at Moreland Station.

^{*} - From July 2015 route 112 was discontinued and routes 11 and 12 were introduced which have similar network coverage.

nr - not reported prior year(s)

The breaches reported here are highly aggregated and calculated across the route level as average total load per rolling hour over average capacity per rolling hour. The numbers in the table above may therefore understate the crowding discomfort experienced by tram passengers. Appendix 7 provides detailed results at the location, route, direction and rolling hour level.

3.1.3 PM Peak Rolling Hour Breaches

The PM Peak breach count is unchanged from 2017. The 3 breaches occur at different locations to those in 2017; whilst *Elgin St / Lygon St* continues to show insufficient capacity, *Wellington Pde / Jolimont Rd* improved although offset by a breach at *Swanston St / Flinders St (Federation Sq)*.

Table 3 - Rolling Hour Cordon Breaches in May by Location and Route or Corridor - PM Peak

Cordon Location	Direction	Routes/s	2015	2016	2017	2018
Bourke St / Spring St	East	86, 96	nr	nr	-	-
Bourke St / Spring St	West	86, 96	nr	nr	-	-
Clarendon St (Crown Casino)	North	12, 96, 109	nr	nr	-	-
Clarendon St (Crown Casino)	South	12, 96, 109	nr	nr	-	-
Collins St West End (Southern Cross Station)	East	11, 48, 12	-	-	-	-
Docklands (Flinders St West End)	West	35, 70, 75	nr	nr	-	-
Elgin St / Lygon St	North	1, 6 [^]	1	3	1	2
Errol St / Victoria St	North	57	nr	nr	-	-
Haymarket (Elizabeth St)	North	19, 59	nr	nr	-	-
Peel St / Victoria St	North	58	nr	nr	-	-
Queensbridge St (Casino East)	South	58	nr	nr	-	-
St Vincents Plaza	East	112 (12) *, 109	nr	nr	-	-
St Vincents Plaza	West	112 (12) *, 109	nr	nr	-	-
Swanston St / Flinders St (Federation Sq)	North	3, 5, 6 [^] , 16, 64, 67, 72	-	2	-	1
Swanston St / Flinders St (Federation Sq)	North	1	-	-	-	-
Swanston St / Flinders St (Federation Sq)	South	1	nr	nr	-	-
Wellington Pde / Jolimont Rd	East	48	3	4	2	-
Total			4	9	3	3

[^] - From May 1, 2017 route 55 and 8 were discontinued. Route 58 was introduced covering the Domain to Toorak section of previous route 8 and the Domain to West Coburg of previous route 55. The northern section of route 8 is serviced by extending route 6 to terminate at Moreland Station.

* - From July 2015 route 112 was discontinued and routes 11 and 12 were introduced which have similar network coverage.

nr - not reported prior year(s)

3.2 Average Daily Passenger Loads - Cordon Locations

Survey counts at cordon locations are used to estimate of the number people arriving in the CBD by tram in the AM Peak and the number of people departing the CBD by tram during the PM Peak.

In this section, cordon loads in the peak direction are reported. Counter peak loads for cordon locations can be found in Section 4.2.

3.2.1 AM Peak Passenger Loads

There was low growth (0.8 per cent) in passenger loads arriving at CBD cordon location in the AM Peak. The top 5 busiest stops were:

- Swanston St / Flinders St (Federation Sq)
- Clarendon St (Crown Casino)
- St Vincents Plaza
- Bourke St / Spring
- Haymarket (Elizabeth St)

which jointly account for over 60 per cent of arriving morning passengers.

Table 4 - May Cordon Passenger Loads by Location with Growth Rates - AM Peak – From 2016 to 2018

Cordon Loads- May - AM Peak Direction							
						% Change in Load	
Location	Routes	Direction	2016	2017	2018	2016 to 2017	2017 to 2018
Bourke St / Spring St	86, 96	West	5,053	4,395	4,751	-13.0	8.1
Clarendon St (Crown Casino)	12*, 96, 109	North	4,801	4,770	5,181	-0.6	8.6
Collins St West End (Southern Cross Station)	11*, 48	East	1,504	1,753	2,300	16.6	31.2
Docklands (Flinders St West End)	35, 70, 75	East	525	595	663	13.3	11.4
Docklands (LaTrobe St West End)	30, 35, 86	East	866	973	786	12.4	-19.2
Elgin St / Lygon St	1, 6 [^]	South	3,130	3,283	3,529	4.9	7.5
Errol St / Victoria St	57	South	1,087	1,267	1,129	16.6	-10.9
Flinders St / Russell St*	70	West	638	661	600	3.6	-9.2
Haymarket (Elizabeth St)	19, 59	South	4,366	4,484	3,894	2.7	-13.2
Peel St / Victoria St	58 [^]	South	2,686	2,219	2,435	-17.4	9.7
Queensbridge St (Casino East)	58 [^]	North	1,258	1,608	1,344	27.8	-16.5
St Vincent's Plaza [#]	11*, 12*, 109	West	4,911	4,762	4,850	-3.0	1.8
Swanston St / Flinders St (Federation Sq)	1, 3, 5, 6 [^] , 16, 64, 67, 72	North	6,525	6,852	6,438	5.0	-6.0
Wellington Pde / Jolimont Rd	48, 75	West	2,801	3,018	2,830	7.7	-6.2
Total			40,151	40,643	40,731	1.3	0.2

[^]From May 1, 2017 route 55 and 8 were discontinued. Route 58 was introduced covering the Domain to Toorak section of previous route 8 and the Domain to West Coburg of previous route 55. The northern section of route 8 is serviced by extending route 6 to terminate at Moreland Station.

Route 30 was not counted in 2018 at St Vincent's Plaza

+ Only route 70 is reported at Flinders St / Russell St from 2018 forward. Prior reports may have included loads from all routes passing this location.

Of the 14 stops surveyed, *Swanston St / Flinders St (Federation Square)* remained the most frequented tram cordon (15 per cent of passenger arrivals into the CBD) with an estimated 6,438 passengers travelling through this location between 7 and 10am. This represents a decline of 6 per cent (414 fewer passengers) on May 2017.

The greatest percentage growth came from *Collins St West End (Southern Cross Station)*, which increased by 33 per cent (an additional 584 passengers to a total of 2337) continuing the pattern observed in the previous 2 years.

Other changes include *Bourke St / Spring St* and *Peel St / Victoria St*, which reversed 2017 declines, while *Docklands (LaTrobe St West End)* shows a 19 per cent drop in passenger loads.

3.2.2 PM Peak Passenger Loads

Passenger loads departing the cordon in the PM peak have increased 2.6 per cent in May 2018 compared to May 2017. This is more than double the growth of the prior year.

The top 5 busiest cordon stops were the same as in the AM peak:

- *Swanston St / Flinders St (Federation Sq)*
- *Clarendon St (Crown Casino)*
- *St Vincents Plaza*
- *Bourke St / Spring*
- *Haymarket (Elizabeth St)*

As in previous years, *Swanston St / Flinders St (Federation Square)* remains the busiest cordon location with an average of 8,996 passengers departing the CBD between 3 and 7pm. This stop also shows a reduction in passenger load by 2.6 per cent year on year.

Passenger loads at 6 of the 14 cordon stops show year on year growth, the stops at the western CBD locations *Collins St West End (Southern Cross Station)*, *Docklands (Flinders St West End)* and *Docklands (LaTrobe St West End)* jointly account for around 75 per cent of the observed growth.

Declining passenger loads observed last year have been reversed at *Bourke St / Spring St*, *Elgin St / Lygon St* and *St Vincents Plaza*.

Lastly, at the *Wellington Pde / Jolimont Rd* cordon, load counts declined by 16 per cent partially explaining the lack of observed breaches in 2018.

Table 5 - May Cordon Passenger Loads by Location with Growth Rates - PM Peak - From 2016 to 2018

Cordon Loads - May - PM Peak Direction							
Location	Routes	Direction	2016	2017	2018	% Change in Load 2016 to 2017	% Change in Load 2017 to 2018
Bourke St / Spring St	86, 96	East	6,164	5,526	6,013	-10.4	8.8
Clarendon St (Crown Casino)	12*, 96, 109	South	5,989	6,017	6,311	0.5	4.9
Collins St West End (Southern Cross Station)	11*, 48	West	1,676	2,102	2,630	25.4	25.1
Docklands (Flinders St West End)	35, 70, 75	West	1,306	1,261	1,562	-3.4	23.9
Docklands (LaTrobe St West End)	30, 35, 86	West	1,382	1,378	1,747	-0.3	26.8
Elgin St / Lygon St	1, 6^	North	3,808	3,645	3,680	-4.3	1.0
Errol St / Victoria St	57	North	1,301	1,273	1,264	-2.2	-0.7
Flinders St / Russell St+	70	East	1,012	990	1,103	-2.2	11.5
Haymarket (Elizabeth St)	19, 59	North	5,531	5,502	5,076	-0.5	-7.7
Peel St / Victoria St	58^	North	2,104	2,383	2,196	13.2	-7.8
Queensbridge St (Casino East)	58^	South	981	1,365	1,366	39.1	0.0
St Vincents Plaza#	11*, 12*, 109	East	5,363	5,205	6,058	-0.3	16.4
Swanston St / Flinders St (Federation Sq)	1, 3, 5, 6^, 16, 64, 67, 72	South	8,805	9,238	8,996	4.9	-2.6
Wellington Pde / Jolimont Rd	48, 75	East	3,532	3,484	2,896	-1.4	-16.9
Total			48,954	49,368	50,899	1.1	3.1

^From May 1, 2017 route 55 and 8 were discontinued. Route 58 was introduced covering the Domain to Toorak section of previous route 8 and the Domain to West Coburg of previous route 55. The northern section of route 8 is serviced by extending route 6 to terminate at Moreland Station.

Route 30 was not counted in 2018 at St Vincents Plaza

+ Only route 70 is reported at Flinders St / Russell St from 2018 forward. Prior reports may have included loads from all

4 Non-Cordon Locations

4.1 Rolling Hour Breaches – Non-Cordon Locations

While the cordon locations are consistently recorded to provide a long-term time series on load standard breaches and to analyse the impact of network changes, other, non-cordon locations are included after consultation with stakeholders from TfV (Network Planning) and Yarra Trams.

Selection of non-cordon locations may occur for several reasons: a need to understand tram load bottlenecks outside the CBD or to provide before and after analysis for planned network changes. Breaches and the total loads in these locations are reported below.

In the May 2018, 15 non-cordon locations were surveyed in the AM and PM peaks.

4.1.1 AM Peak Rolling Hour Breaches

A total of 2 rolling hour average loads above desired standards (breaches) were observed in the AM peak at non-cordon locations, as shown in Table 6. Both of these occurred on Route 82 at *Droop St / Ballarat Rd*. This route was never previously surveyed.

Table 6 - Rolling Hour Non-Cordon Breaches in May by Location and Route or Corridor - AM Peak - From 2016 to 2018

Location	Direction	Route/s	2016	2017	2018
Droop St / Ballarat Rd	South	82	X	X	2

X = Not surveyed in this year.

4.1.2 PM Peak Rolling Hour Breaches

In the PM peak, there were no breaches observed at non-cordon locations.

4.2 Average Daily Passenger Loads – Non-cordon Locations

4.2.1 AM Peak Passenger Loads

The busiest non-cordon stops observed in the AM peak in May 2018 were *Swanston St / Flinders St (Federation Sq)* in the counter-peak direction, *St Kilda Rd / Toorak Rd* and *Flemington Rd / Abbotsford St*.

The largest decline in passenger loads was observed on south bound loads from *Clarendon St (Crown Casino)*, *St Kilda Rd / Toorak Rd*⁺⁺ and *Haymarket (Elizabeth St)*. There is also a drop of in recorded loads for route 58 at *Queensbridge St (Casino East)* for passengers travelling in the northern (to the CBD) direction.

Note that at *Swanston St / Flinders St (Federation Sq)* the AM passenger loads into the CBD (6,438) are substantially less compared to counter-peak loads travelling towards the St Kilda Rd business district (9,862), which are 53 per cent more.

Table 8 - May Non-Cordon Passenger Loads by Location with Growth Rate - AM Peak - From 2016 to 2018

						% Change in Load	
Location	Routes	Direction	2016	2017	2018	2016 to 2017	2017 to 2018
Abbotsford St Interchange	57	South Bound	X	923	913	na	-1.1
Bourke St / Spring St	86, 96	East Bound	X	X	1,559	na	na
Bridge Rd / Yarra Blvd	48, 75	West Bound	X	2,008	1,890	na	-5.9
Clarendon St (Crown Casino)	12, 96, 109	South Bound	X	4,076	3,139	na	-22.9
Clarendon St / Park St	12	North Bound	X	752	758	na	0.8
Collins St West End (Southern Cross Station)	11, 48	West Bound	3,321	2,846	2,769	-14.3	-2.7
Docklands (Flinders St West End)	35, 70, 75	West Bound	X	X	887	na	na
Docklands (LaTrobe St West End)	30, 35, 86	West Bound	X	X	519	na	na
Droop St / Ballarat Rd	82	South Bound	X	X	516	na	na
Flemington Rd / Abbotsford St	58 [^] , 59	South Bound	X	4,803	4,625	na	-3.7
Haymarket (Elizabeth St)	19, 59	North Bound	X	X	3,822	na	na
Haymarket (Elizabeth St)	19, 59	South Bound	4,366	4,484	3,894	2.7	-13.2
Holmes St / Mitchell St (Donald St)	1, 6 [^]	North Bound	X	X	1,064	na	na
Lygon St / Brunswick Rd	1, 6 [^]	South Bound	2,285	2,422	2,476	6.0	2.3
Maribyrnong Rd / Hotham St	57, 82	East Bound	X	X	756	na	na
Park St / Clarendon St	1	North Bound	X	772	678	na	-12.1
Peel St / Victoria St	58 [^]	North Bound	X	X	1,076	na	na
Plenty Rd / Dundas St	86	South Bound	1,343	X	1,391	na	na
Queensbridge St (Casino East)	58 [^]	North Bound	1,258	1,608	1,344	27.8	-16.5
Queensbridge St (Casino East)	58 [^]	South Bound	X	X	913	na	na
Riversdale Junction	70, 75	West Bound	X	X	1,255	na	na
St Kilda Rd / Toorak Rd++	3, 5, 6 [^] , 16, 58 ^{**} , 64, 67, 72	North Bound	5,919	5,572	6,412	not comparable	
St Kilda Rd / Toorak Rd++	3, 5, 6 [^] , 16, 58 ^{**} , 64, 67, 72	South Bound	6,347	7,165	6,123	not comparable	
St Kilda Rd / Union St	3, 5, 16, 64, 67	North Bound	X	X	3,869	na	na
St Vincent's Plaza*	11, 12, 109	East Bound	X	X	2,880	na	na
Swanston St / Flinders St (Federation Sq)	1, 3, 5, 6 [^] , 16, 64, 67, 72	South Bound	9,133	9,204	9,862	0.8	7.1

						% Change in Load	
Location	Routes	Direction	2016	2017	2018	2016 to 2017	2017 to 2018
Sydney Rd / Brunswick Rd	19	South Bound	X	2,393	2,548	na	6.4
Victoria St / Burnley St	12, 109	West Bound	X	X	1,093	na	na

^From May 1, 2017 route 55 and 8 were discontinued. Route 58 was introduced covering the Domain to Toorak section of previous route 8 and the Domain to West Coburg of previous route 55. The northern section of route 8 is serviced by extending route 6 to terminate at Moreland Station.

* Route 30 was not counted in 2018 at St Vincent's Plaza

** Route 58 was not counted at Domain Interchange in 2017

++During April 2018, the former Domain Interchange platform was demolished to prepare for the construction of Anzac Station. The data prior to 2018 represent Domain Interchange counts. Route 58 was not counted in 2017 at Domain.

4.2.2 PM Peak Passenger Loads

The busiest non-cordon stops observed in the PM peak in May 2018 were *Swanston St / Flinders St (Federation Sq)* in the counter-peak direction, *St Kilda Rd / Toorak Rd*, *Collins St West End (Southern Cross Station)*, *Haymarket (Elizabeth St)* and *Clarendon St (Crown Casino)*.

Where comparable data existed in 2017, growth was highest at *Collins St West End (Southern Cross Station)* at 11 per cent year on year, while *Flemington Rd / Abbotsford St* had the lowest growth at -14.0 per cent year on year.

Table 9 - Non-Cordon Passenger Loads by Location with Growth Rate - PM Peak - From 2016 to 2018

						% Change in Load	
Location	Routes	Direction	2016	2017	2018	2016 to 2017	2017 to 2018
Abbotsford St Interchange	North Bound	57	X	966	1,001	na	3.6
Bourke St / Spring St	West Bound	86, 96	X	X	3,291	na	na
Bridge Rd / Yarra Blvd	East Bound	48, 75	X	2,245	2,330	na	3.8
Clarendon St (Crown Casino)	North Bound	12, 96, 109	X	5,481	5,141	na	-6.2
Clarendon St / Park St	South Bound	12	X	799	835	na	4.5
Collins St West End (Southern Cross Station)	East Bound	11, 48	4,848	5,056	5,621	4.3	11.2
Docklands (Flinders St West End)	East Bound	35, 70, 75	X	X	1,852	na	na
Docklands (LaTrobe St West End)	East Bound	30, 35, 86	X	X	1,834	na	na
Droop St / Ballarat Rd	North Bound	82	X	X	828	na	na
Flemington Rd / Abbotsford St	North Bound	58 [^] , 59	X	5,056	4,346	na	-14.0
Haymarket (Elizabeth St)	South Bound	19, 59	X	X	5,226	na	na
Holmes St / Mitchell St (Donald St)	South Bound	1, 6 [^]	X	X	1,057	na	na
Lygon St / Brunswick Rd	North Bound	1, 6 [^]	2,492	2,378	2,383	-4.6	0.2
Maribyrnong Rd / Hotham St	West Bound	57, 82	X	X	878	na	na
Park St / Clarendon St	South Bound	1	X	851	804	na	-5.5
Peel St / Victoria St	South Bound	58 [^]	X	X	1,957	na	na
Plenty Rd / Dundas St	North Bound	86	X	X	1,368	na	na
Queensbridge St (Casino East)	North Bound	58 [^]	X	X	1,362	na	na
Riversdale Junction	East Bound	70, 75	X	X	1,518	na	na
St Kilda Rd / Toorak Rd++	North Bound	3, 5, 6 [^] , 16, 58 ^{**} , 64, 67, 72	7,286	9,888	8,735	not comparable	
St Kilda Rd / Toorak Rd++	South Bound	3, 5, 6 [^] , 16, 58 ^{**} , 64, 67, 72	7,699	7,302	7,849	not comparable	
St Kilda Rd / Union St	South Bound	3, 5, 16, 64, 67	X	X	4,606	na	na
St Vincent's Plaza*	West Bound	11	X	X	4,087	na	na
Swanston St / Flinders St (Federation Sq)	North Bound	1, 3, 5, 6 [^] , 16, 64, 67, 72	13,451	11,908	11,971	-11.5	0.5
Sydney Rd / Brunswick Rd	North Bound	19	X	2,713	2,759	na	1.7
Victoria St / Burnley St	East Bound	12	X	X	1,212	na	na

[^]From May 1, 2017 route 55 and 8 were discontinued. Route 58 was introduced covering the Domain to Toorak section of previous route 8 and the Domain to West Coburg of previous route 55. The northern section of route 8 is serviced by extending route 6 to terminate at Moreland Station.

* Route 30 was not counted in 2018 at St Vincent's Plaza

** Route 58 was not counted at Domain Interchange in 2017

++During April 2018, the former Domain Interchange platform was demolished to prepare for the construction of Anzac Station. The data prior to 2018 represent Domain Interchange counts. Route 58 was not counted in 2017 at Domain.

X = Not surveyed in this year

5 Data Collection and Analysis

Data were collected between the 1st and 24th of May 2018 on Tuesdays, Wednesdays and Thursdays, by independent surveyors from a contracted labour supply company.

Passenger counts were undertaken between 7.01 am and 10.00 am and between 3.01 pm and 7.00 pm at selected tram stops across the network, with all services under the Master Timetable surveyed.

In accordance with the Agreement each survey location was surveyed at least 3 times, on different weekdays, to form a Sampled Service Set. Survey observations made at locations impacted by significant network disruptions were excluded and these survey shifts rescheduled.

At most locations passenger counts consisted of arrival loads when the tram headed into the city in the morning and departure loads when leaving the CBD in the evening. However, at specific locations where high bi-directional passenger loads are known to occur, surveying was conducted in both directions.

Between 1 and 6 surveyors counted loads at each tram stop, depending on the frequency and volume of services at the stop. If more than 1 surveyor was present, surveyors worked in pairs with 1 recording the information and the other conducting the passenger count.

Surveyors recorded tram number, route number, arrival time and arrival or departure load. Exceptions occurred by stakeholder requests (see Appendix 2 for a list of survey locations).

On lightly loaded trams, each passenger was counted. On heavily loaded trams, the number of people standing and the empty seats were counted. The number of standing passengers was added to the known number of seats on the tram and the number of empty seats subtracted. Information on the seating capacity of each tram type is included in the table at Appendix 4.

Most routes passing through the CBD, and other routes that share substantial sections of track, have been combined into corridors. A list of the routes aggregated into corridors is at Appendix 3.

The average load for a route or corridor at each survey location was calculated by adding together the total number of passengers on each service surveyed in a rolling hour, and dividing that by the number of services in that rolling hour. The average passenger loads are then measured against the average maximum capacity or load standard.

The average maximum capacity is calculated by totalling the individual maximum capacities of each service on each route and dividing that by the number of services for each rolling hour. Maximum capacity for each tram class is considered greater at CBD locations than at non-CBD locations (refer to Appendix 4).

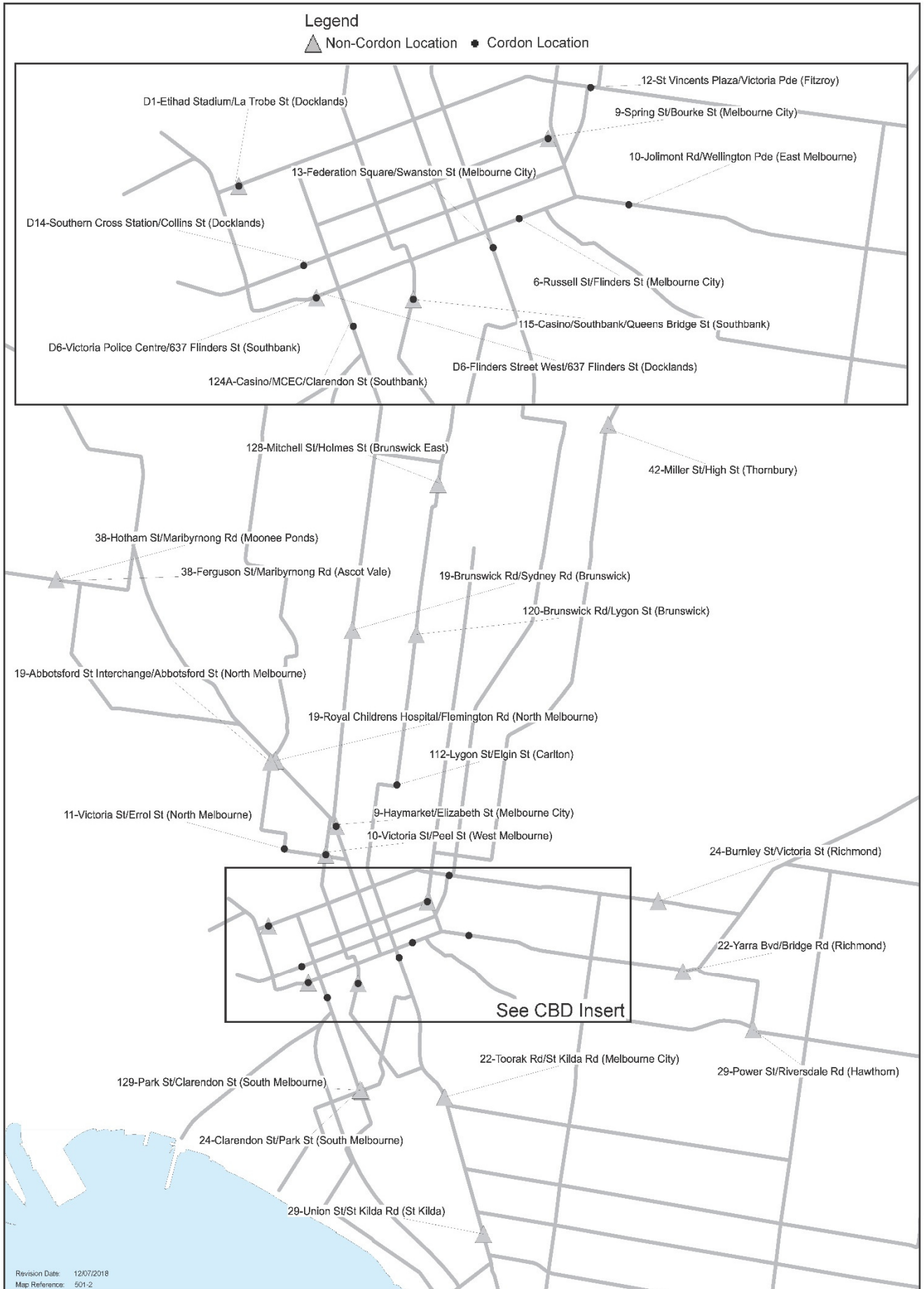
5.1 Limitations of manual counts for determining loads

Loads for each vehicle are estimated by surveyors, and thus subjective. Factors such as glare, advertising signage, and variations of seating capacity within otherwise identical rolling stock create additional challenges to estimate occupancy accurately.

Surveys are conducted over a limited timeframe and results may therefore not be representative of the entire year. Flow on effects from network disruptions may lead to year on year variations in loads and patronage that are not indicative of a sustained trend.

The future of load standard reporting requires moving away from manual counts, and instead using technology. Vehicle loads can be inferred from analysis of myki transactions, or in some cases measured directly with automatic passenger counters. In addition to addressing the limitation of manual counts outlined above, technology based solutions have the advantage of providing information on loads all year round, on any given day, and at any location in the network. DEDJTR has started development of automated load standard models for metropolitan train and tram, with a view to replacing manual counts in the medium to long term.

Appendix 1 – Map of Survey Locations



Appendix 2 – List of Survey Locations

Loc_ID	Location Description	Routes	Stop	Tram Tracker Id	Direction	Cordon
3102	Abbotsford St Interchange	57	19	3829	D	No
3102	Abbotsford St Interchange	57	19	3929	U	No
3081	Bourke St / Spring St	86, 96	9	3209	U	Yes
3081	Bourke St / Spring St	86, 96	9	3309	D	Yes
3060	Bridge Rd / Yarra Blvd	48,75	22	1922	U	No
3060	Bridge Rd / Yarra Blvd	48,75	22	2922	D	No
3063	Clarendon St (Crown Casino)	12, 96, 109	124A	3257	U	Yes
3063	Clarendon St (Crown Casino)	12, 96, 109	124A	3357	D	Yes
3161	Clarendon St / Park St	12	129	1396	D	No
3161	Clarendon St / Park St	12	129	2396	U	No
3073	Collins St West End (Southern Cross Station)	11, 48	D14	3400	D	Yes
3073	Collins St West End (Southern Cross Station)	11, 48	D14	3500	U	Yes
3074	Docklands (Flinders St West End)	35, 70, 75	D6	3600	D	Yes
3074	Docklands (Flinders St West End)	35, 70, 75	D6	3700	U	Yes
3075	Docklands (LaTrobe St West End)	30,35,86	D1	3550	D	Yes
3075	Docklands (LaTrobe St West End)	30,35,86	D1	3650	U	Yes
3021	Droop St / Ballarat Rd	82	59	4259	D	No
3021	Droop St / Ballarat Rd	82	59	4359	U	No
3022	Elgin St / Lygon St	1, 6	112	1224	U	Yes
3022	Elgin St / Lygon St	1, 6	112	2224	D	Yes
3024	Errol St / Victoria St	57	11	3821	D	Yes
3024	Errol St / Victoria St	57	11	3921	U	Yes
3025	Flemington Rd / Abbotsford St	58,59	19	3074	D	No
3025	Flemington Rd / Abbotsford St	58,59	19	3177	U	No
3104	Flinders St / Russell St	35, 70, 75	6	3606	D	Yes
3104	Flinders St / Russell St	35, 70, 75	6	3706	U	Yes
3028	Haymarket (Elizabeth St)	19, 59	9	3809	D	Yes
3028	Haymarket (Elizabeth St)	19, 59	9	3909	U	Yes
3236	Holmes St / Mitchell St (Donald St)	1, 6	128	1208	D	No
3236	Holmes St / Mitchell St (Donald St)	1, 6	128	2208	U	No
3047	Lygon St / Brunswick Rd	1, 6	120	1216	U	No
3047	Lygon St / Brunswick Rd	1, 6	120	2216	D	No
3165	Maribyrnong Rd / Hotham St	57, 82	38	1338	U	No
3165	Maribyrnong Rd / Hotham St	57, 82	38	2338	D	No
3129	Park St / Clarendon St	1	24	1234	D	No
3129	Park St / Clarendon St	1	24	2234	U	No
3098	Peel St / Victoria St	58	10	3067	D	Yes
3098	Peel St / Victoria St	58	10	3169	U	Yes
3224	Plenty Rd / Dundas St	86	42	1842	U	No
3224	Plenty Rd / Dundas St	86	42	2842	D	No
3099	Queensbridge St (Casino East)	58	112	3057	D	Yes
3099	Queensbridge St (Casino East)	58	112	3159	U	Yes
3234	Riversdale Junction	70, 75	29	1929	U	No
3234	Riversdale Junction	70, 75	29	2929	D	No
3233	St Kilda Rd / Toorak Rd	3, 5, 6, 16, 58, 64, 67, 72	22	1022	D	No
3233	St Kilda Rd / Toorak Rd	3, 5, 6, 16, 58, 64, 67, 72	22	2022	U	No
3053	St Vincents Plaza	11, 12, 109	12	3412	D	Yes
3053	St Vincents Plaza	11, 12, 109	12	3512	U	Yes
3032	Swanston St / Flinders St (Federation Sq)	1, 3, 5, 6, 16, 64, 67, 72	13	3013	U	Yes
3032	Swanston St / Flinders St (Federation Sq)	1, 3, 5, 6, 16, 64, 67, 72	13	3113	D	Yes
3109	Sydney Rd / Brunswick Rd	19	19	1419	U	No
3109	Sydney Rd / Brunswick Rd	19	19	2419	D	No
3166	Victoria St / Burnley St	12, 109	24	1724	U	No
3166	Victoria St / Burnley St	12, 109	24	2724	D	No
3090	Wellington Pde / Jolimont Rd	48, 75	10	3610	D	Yes
3090	Wellington Pde / Jolimont Rd	48, 75	10	3710	U	Yes

Appendix 3 – Locations at which Routes are combined into Corridors for Breach Reporting

Corridor Routes (Aggregated Counts)	Location	CBD
Excluded from CBD Aggregation	Bourke St / Spring St	Yes
All Routes - CBD Locations	Clarendon St (Crown Casino)	Yes
Excluded from CBD Aggregation	Collins St West End (Southern Cross Station)	Yes
All Routes - CBD Locations	Docklands (Flinders St West End)	Yes
All Routes - CBD Locations	Docklands (LaTrobe St West End)	Yes
Route 70	Flinders St / Russell St	Yes
Routes 1 and 6	Elgin St / Lygon St	No
Routes 1 and 6	Lygon St / Brunswick Rd	No
Routes 12 and 109	St Vincents Plaza	No
Routes 3, 5, 6, 16, 64, 67, 72	St Kilda Rd / Toorak Rd (previously Domain)	Yes
Routes 3, 5, 6, 16, 64, 67, 72	Swanston St / Flinders St (Federation Sq)	Yes
Routes 48 and 75	Wellington Pde / Jolimont Rd	No
Routes 3, 67	St Kilda Rd / Union St	No
Routes 5, 64	St Kilda Rd / Union St	No

Appendix 4 – Maximum Capacities by Tram Type

Vehicle type	Seating capacity	Maximum planning capacity (non CBD)	Maximum planning capacity (CBD)
A	40	55	65
Z	40	60	70
W	46	65	75
B1	52	110	120
B2	40	110	120
C1	36	110	120
C2	54	160	180
D1	40	80	90
D2	58	130	140
E	64	180	180

Appendix 5 Cordon Locations - Comparison of Routes and Locations/Directions with Rolling Hour Average Loads above and within 10% desired Standards, May 2017 and 2018

Available on request.

Appendix 6 Non-Cordon Locations - Comparison of Routes and Locations/Directions with Rolling Hour Average Loads above and within 10% desired Standards, May 2017 and 2018

Available on request.

Please contact

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