

GROWING PATRONAGE - THINK TRAM?

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ABSTRACT

The emerging congestion crisis in Melbourne is underlined by Melbourne City Council's recent prediction that visitation to the CBD will increase from current levels of around 690,000 people to one million people per day by 2017. Public transport has been identified as one of the keys to solving the demands of travel to and from the city, and to reducing the impact of traffic congestion. This has created a number of challenges for shaping patronage growth on Melbourne's public transport network, and for making trams a competitive travel option for commuters - especially when a large proportion of the tram network shares road space with other vehicles and is caught in the congestion.

The challenge of growing patronage on public transport not only requires incentives for behavioural change amongst commuters, but also for improvements to the level of service offered through tram speeds and frequency, and better access for mobility impaired passengers. This can be achieved through a program of service and infrastructure investments and by appealing to a concern for wider social responsibility (minimising the impact of car pollution, reducing congestion etc). Indeed, if public transport is to successfully address the broader issues of traffic congestion and city pollution, then it must provide the impetus for commuters to rethink their travel behaviours and create a modal shift.

This paper will examine Yarra Trams' approach to growing patronage on a tram system that shares its road space with other vehicles, and also discuss how the Think Tram program provides the foundation and the infrastructure to grow patronage by offering a service that delivers opportunities for a more consistent, accessible and efficient alternative to car travel.

BACKGROUND: PUBLIC TRANSPORT IN MELBOURNE

An increasing number of cities around the world are looking to trams as an efficient and workable modern mass transit option. Cities as diverse as Montpellier, Strasbourg, Bordeaux, Paris, Porto, Nottingham, Portland, Dallas and Philadelphia, have all either introduced or reintroduced trams to their transit mix over the past few years. This has occurred not only because trams embody the modern prerequisites of safety, accessibility and efficiency, but also because they play an active role in reducing traffic congestion and city pollution. Trams are now being incorporated into the urban planning and design futures of these cities because they can manage high volumes of commuters at a relatively low cost to urban space.

This reinforces how fortunate Melbourne is to have maintained such an extensive inner city public transport template. Its 248kms of dual track - around 68% of which operates as 'streetcars' that share road space with other vehicles - spans 1813 stops across 25 routes and is the third largest functioning tram system in the world (Currie: 2006). It now seems clearer

than ever that Melbourne needs to preserve, celebrate and strengthen the position of its trams as a preferred travel option for commuters.

Yet despite the fact that trams have existed as a part of Melbourne's transit mix for over one hundred years and are recognised as a transport icon of the city, trams are at risk of becoming marginalised on the roads by mounting volumes of vehicle traffic. The fact that car congestion is increasing at a rate faster than population growth has compounded this problem. Car travel in Melbourne has increased at a rate of 1.9% per annum since 1996, with forecasts suggesting that traffic congestion will increase by up to 20% by 2020 under a business-as-usual model (Challenge Melbourne: 2000). These increases in road activity have led to reduced tram speeds and compromised efficiency for all road users.

It is significant to note that road traffic has impacted on tram efficiency to the extent that tram speed is now in the bottom 20th percentile of system operating speeds for light rail and tram services internationally. The economic impacts of traffic congestion in Victoria are estimated at around \$3bn per annum in lost productivity, with the Department of Infrastructure estimating that a single car journey in a congested area of Melbourne costs the equivalent of \$8 per trip on society (Currie: 2005).

Average travelling speeds of trams in Melbourne are now only 15.5km/ph, compared to average speeds of 16.8kmph in Brussels, 19.1kmph in Berlin and 19.3kmph in Prague (Currie: 2006). The major difference in operational terms between Melbourne's trams and these international systems is that the overseas examples operate in urban environments that provide clear space for trams through separation and priority.

The struggle for road space between trams and other vehicles has affected the attractiveness of trams as an efficient passenger transport option for many commuters in Melbourne. Increases in car commuters therefore simply act to perpetuate this problem. 'Accessibility' and 'tram efficiency' have been identified as the main drivers for changing commuter behaviour, and as such, tram priority is high on the agendas of the State Government and Melbourne's tram operator.

POLICY

In addition to the congestion issues that have inspired a need for trams to carve their own niche on the roads, Yarra Trams must observe a number of legal requirements and strategic responses to government policy.

Disability Discrimination Act 1992

The Federal Government set a benchmark that all public transport in Australia must be fully DDA-compliant and ensure access for mobility impaired persons through improvements to infrastructure and facilities by 2012. From a tram perspective, this involves investment in low-floor trams, access ramps and other measures such as the installation of platform stops to ensure physical access to the network. However, due to the considerable difficulties associated with becoming fully accessible within the allotted timeframe, Melbourne's tram network has been given dispensation until 2032 under the Human Rights and Equal Opportunities Commission Act 1999. As part of this extended deadline, trams are required to meet interim benchmarks of 25% by 2007 and 55% by 2012 (Currie: 2006).

Melbourne 2030

The Victorian State Government's strategic policy, Melbourne 2030, maps out a framework of objectives for Melbourne's continued liveability over the coming decades and underlines the importance of public transport to its future. One of the major challenges outlined in the document is how to manage a sustainable and efficient traffic flow strategy through the CBD by addressing the way that Melburnians think about how they travel. It is proposed that tram travel times are the keys to increasing the system's competitiveness, to reducing operational costs and enabling more frequent services. (VCEC: 2005)

Meeting Our Transport Challenges

The Victorian State Government released Meeting Our Transport Challenges (MOTC) in May 2006 as a ten year vision for Melbourne's transport network. Think Tram is funded as part of MOTC (DOI: 2006).

CONSULTATION, INVESTMENT & PARTNERSHIPS

The policy instruments of government have shaped the way Yarra Trams has addressed its patronage growth agenda. The timelines of government have also affected the pace at which many of these changes must take place. It is important to emphasise that Think Tram has not been designed to marginalise the needs of other road users. Rather, it aims to strike a positive and democratic balance between regulating obstructions to tram efficiency and negotiating a safer and more efficient high capacity public transport system. Indeed, Think Tram aims to reflect the changing requirements and expectations of passengers and communities by providing a framework for improved travel times, frequency, service reliability, safety, accessibility, stop upgrades, urban design, and integration of streetscapes.

In response to DDA requirements and the impact of traffic congestion, Yarra Trams, VicRoads and the Department of Infrastructure engaged in a dialogue about how to address the various and competing design, construction, operation, maintenance, finance and risk management issues associated with producing a \$30m joint initiative tram priority project. It is significant to note that all decisions about the development of what was to be known as 'Think Tram' were made in consultation with a broad range of stakeholders (including traffic engineers, local government, motoring organisations, public transport industry representatives and the community) in order to determine which measures would create the lowest impact on passengers, pedestrians, retail, residents and motorists. Every stage of Think Tram considered the strategic directives of government, the legislative responsibilities of Yarra Trams and a negotiation of the impact on road space with VicRoads. To an extent, changes to the physical streetscape and certain trade-offs with urban amenity are unavoidable parts of meeting the policy requirements of government. It is vitally important for the project to gain support and advocacy from its various stakeholders if the objectives of tram priority are to be truly realised. The consultation, investment and partnership process as part of Think Tram has embodied the combined efforts of these stakeholders in pursuit of the most suitable outcomes.

The real challenge of implementing a successful tram priority project in areas where public transport and private vehicles share road space is to find an arrangement that has the lowest impact on the activities of stakeholders with competing interests, as well as the enforcement of road rules and new ways of thinking about urban transit. It is significant to note there was initial resistance to platform stops from retailers throughout the CBD. Many of them believed that any measures which would limit the access of cars to their retail space would negatively

impact on the success of their business. This is despite figures suggesting that 72% of CBD users access the city via public transport (MCC: 2006).

LOW FLOOR TRAMS

One of the 'easiest' ways to improve access to the tram network and to nurture patronage growth is through investment in new high capacity low-floor rolling stock. The low-floor Citadis and Combino trams only require single-step boarding, compared with the three steps required to board the older fleet vehicles. Low floor trams now represent nearly 20% of Melbourne's tram fleet, with 95 low-floor vehicles having been purchased between September 2001 and December 2004. Tram procurement projects have mapped out an increase in the proportion of low-floor trams as the older vehicles are replaced by the deadline of 2032.

Not only do low-floor trams provide substantially improved boarding access for mobility impaired passengers, they also increase opportunities for patronage growth across the network because they have higher passenger capacities. The Citadis 3-section and Combino 3-section articulated low floor vehicles (160 persons per tram) have a higher carrying capacity than the Z Class and A Class vehicles, while the Combino 5-section articulated low-floor trams can carry up to 250 people per vehicle. Certainly, one of the most important functions of growing patronage and providing the infrastructure to inspire mode shift, is to ensure that the fleet has enough space to cope with higher volumes of passengers!

Route 109 has experienced substantial growth since the introduction of low floor rolling stock and investment in new infrastructure from 2000. There was a 19.5% increase in patronage between 2002 and 2003, with only 5% of this growth attributed to the Mont Albert to Box Hill extension (Booz-Allen: 2006). Route 109 has averaged patronage growth of 8.6% per annum over the past six years, compared to the projected average of around 2.5% growth for the entire network. There were also increases in patronage along routes 5, 6, 72, and 96 following the introduction of low-floor trams (Booz-Allen: 2006). The correlation between the provision of higher capacity fleet and patronage growth has been quite pronounced. However, it is important that once a passenger has made a mode shift to trams, or public transport more generally, that the service itself is seen to be preferable to its alternatives in terms of efficiency, cost, convenience and comfort.

The following section outlines a series of initiatives undertaken by Yarra Trams, VicRoads and the Department of Infrastructure as part of Think Tram which have triggered changes to the relationship between trams and other vehicles on the road. It will discuss how these changes have affected the streetscape, car drivers and patronage growth.

THINK TRAM

Think Tram has seen treatments in three main areas across the network: on road priority/separation, traffic light cycles and tram stops. These changes have also been greatly affected by the State Government's investment in low-floor vehicles across the fleet in recent years. Low floor trams have improved access to trams for mobility impaired persons and thus broadened the scope for patronage growth.

Think Tram's infrastructure improvement projects include:

- Traffic separation
- Separation Kerbing
- Part-Time Tram Lanes
- Right turn bans
- Traffic Light Cycles
- Platform Stops

It is anticipated that these initiatives will achieve:

- A net benefit of tram passenger-minutes
- Improved tram, pedestrian and general traffic safety
- Improved urban amenity
- Equitable access for all tram users

Traffic Separation

To start, Think Tram targeted the most congested corridors of the network as 'priority' areas for treatment. These areas possess the highest potential for speed improvements, regularity and scope for patronage growth (Yarra Trams: 2005).

Separation Kerbing

In most cases along identified tram priority routes where there were already two or more traffic lanes in operation on either side of the tramway, separation strips and raised track treatments were identified as a low-cost method of creating tram-only spaces. Although these strips are a 'soft' separation technique (ie. they can be easily mounted by cars), this type of treatment acts as a deterrent. To this point, separation kerbing has been implemented along parts of Royal Parade, Flemington Road, Bridge Road & Spencer Street to create a clearer demarcation between trams and other vehicles. Tram lane signage has also been installed overhead to alert motorists to the new road conditions.

Importantly, there are a number of breaks between the dividing strips at median openings and intersecting streets, which means that separation kerbing has not altered the ability of cars to make right hand turns on these roads. Although this fact has countered some of the benefits of creating a tram-only space, it is still a manageable compromise that has produced small gains in tram efficiency along these routes. Separation kerbing has been more successful along Spencer Street following the introduction of right hand turn bans along certain sections. Although cars still can – and do – mount the kerbing to make turns, this has decreased substantially since the installation of these strips.

Part-Time Tram Lanes

In addition to the introduction of raised dividing strips as a method for tram separation, there are also 33 part time tram-only lanes operating in Melbourne during peak periods. Clearways operate in identified tram priority areas during morning and evening peaks in an attempt to not only increase the efficiency of trams travelling through these corridors during the busiest periods, but to also maintain two functional driving lanes for cars. There has been some resistance from retailers about the use of clearways along certain routes where these treatments have been implemented because of the amenity issues affecting sidewalk cafes.

Good consultation and information processes are therefore vitally important to supporting and representing the needs of these groups. These lanes are currently indicated by overhead tram lane signs and a continuous yellow line alongside tram tracks.

Although there is increasing advocacy on the issue of tram priority in the identified pilot areas of Sydney Road, Brunswick Street, Smith Street and St Kilda Road, the whole dialogue about tram priority lanes has raised philosophical arguments about the justification for enforcing tram priority – and subsequent clearways in adjacent lanes - when trams only occupy these sections of road space for a very brief period. In response, a number of traffic signal projects have been implemented to combat the obvious potential issues that can arise between motorists and trams and to ensure greater efficiency for all road vehicles.

Traffic Light Cycles

Sydney Road has been one of the most extensive pilot projects as part of Think Tram to this point. The treatments and improvement works along Sydney Road include:

- Coordination of changes to traffic light sequence works to improve traffic flow;
- Tram detection loops to clear intersections for approaching trams; and
- Installation of yellow safety separation strips adjacent to tram tracks.

These traffic signal improvements not only accumulate to produce sizeable gains in tram efficiency, but they also have positive impacts on motorists. Traffic flow improves for motorists with fewer tram delays, while vehicles making right hand turns in front of trams now have an additional right turn arrow, which makes turning conditions safer.

Following changes made by VicRoads to most intersection traffic signals and pedestrian crossings along Sydney Road between December 2004 and April 2005, Yarra Trams introduced a two month trial timetable with shorter travel times. On weekdays there were travel time improvements of up to 76 seconds between Moreland Road and Bell Street (Booz-Allen: 2005). During the trial, there was a 5% reduction in average tram travel times along the entire length of Sydney Road, with these treatments having delivered real tram travel time improvements on Route 19 (Yarra Trams: 2005).

Similar traffic signal improvements on Collins Street have seen light cycle times reduced from 90 to 75 seconds per cycle. This has minimised tram waiting times and enabled trams to extend the ‘green’ cycle. A traffic modeling project is also currently being undertaken between Melbourne City Council and the State Government to model the entire network and travel patterns in the CBD.

Platform Stops

In addition to the changes to road space and traffic light cycles to improve tram journey times, a number of major infrastructure projects have made *Think Tram* a more visual presence on the street. The purchase of low-floor trams across Melbourne’s tram fleet has been complemented with the introduction of ramp-access raised platform stops that allow level-boarding for people waiting at stops. Not only does the roll out of these stops greatly improve access for mobility impaired commuters (the elderly, physically disabled commuters, parents with prams etc), but the direct access between platforms and trams has also resulted in reduced boarding times. Platform stops have reduced dwell times, whilst improving patronage growth, tram efficiency and safety.

The bolstered public amenity function of these platforms has also equated to higher usage in the CBD, with evidence to suggest that commuters are prepared to walk further to use platform stops as opposed to safety zones. The stops themselves have been equipped with real time passenger information displays to strengthen their function as accessible pieces of transport infrastructure, and have improved urban amenity and safety for passengers waiting to board trams, through better lighting conditions in the evenings.

The Town Hall platform stop on Collins Street received the John Truscott Design Award for excellence in urban design in 2002 in recognition of its contribution to urban amenity. The Box Hill terminus also received a landscape architecture award for its design which incorporated trees and grass as part of the Route 109 extension that same year.

Platform Stop Configuration

The configuration of platform stops is a variable and balancing act that has been mapped out in accordance with what will have the lowest impact on laneway access, environmental costs, connectivity with other modes of transport, consultation with the community and compliance with DDA benchmarks. The network of platform stop configuration types through the CBD has come about through significant research and consultation with VicRoads, the Department of Infrastructure and Melbourne City Council. Differing conditions at each of the intersections in the CBD has meant that a uniform approach to building platform stops will not necessarily create the most positive outcomes for all road users.

The configuration options for platform stops are:

- Paired stops (both stops on the same side of an intersection);
- Approach side stops (where a platform stop is located before an intersection); and
- Departure side stops (where a platform stop is located after an intersection).

Research undertaken on the impact that these various configurations have on parking allocation and access to laneways demonstrates that a mix of these designs along Collins and Bourke Streets would produce the least inconvenience for cars and trucks. The mix of platform stop configuration types used along Collins Street has not only ensured DDA-compliance at these stops, but also that stops have a smaller footprint, use less materials and lower associated costs. It is important to punctuate at this point that the vision for complete DDA-compliance in the CBD has produced a number of challenges – as described in the following section.

Mid-Block Stops: A Case Study

The road gradient at the western end of the intersection between Collins and Russell Streets does not provide the conditions necessary to build a cost-effective and completely DDA-compliant platform stop. Further, the potential for building a set of paired platform stops at the eastern end of the Collins and Russell Street intersection did not make sense if adjacent stops were also to be built as platforms. This is because a platform stop at the intersection of Collins and Exhibition Streets would end up being less than 50m from either the Russell Street or Spring Street platforms, regardless of whether they were placed at the eastern or the western end of that intersection.

A compromise was reached after discussions with council, VicRoads and all other relevant stakeholders to allow a pair of platform stops on Collins Street between the intersections of

Exhibition and Russell Streets. The trade-off to be made with the 101 Collins platform stop was simply to decide whether or not it was more important to have two safety zone stops at consecutive intersections, or to have one set of DDA-compliant platform stops in the middle of the block? Patronage at the new mid-block stop – now called “101 Collins” – has shown no decline in usage since its installation.

Economic Impacts of Platform Stops

Between 2004 and 2006, Yarra Trams commissioned an external consultant, SKM, to conduct a number of business impact assessments on the effects of platform stops along Collins Street, Bourke Street and Victoria Parade. The studies audited and assessed the net benefit of providing platform stops for both commuters and non-commuters on the physical streetscape. The primary effects on passengers were measured as travel times, walking distances and accessibility for those using the relocated tram stops. It factored improved boarding and alighting times from the level access provided in the synergy between low floor vehicles and platform stops, and concluded that there was no effect on passenger waiting times. It found that existing average journey times improved, with reduced dwell time for boarding and alighting, and there were less traffic delays due to traffic priority. (SKM: 2004)

Central Island Platforms

The problem with having platforms on either side of the tram tracks to collect and deposit commuters travelling in either direction has had obvious impacts on the amount of road space remaining for non-tram commuters. The philosophical trade-off with providing platform stops has been described throughout this paper as a compromise between meeting disability access benchmarks and using urban space in a democratic way to encourage patronage growth. This philosophical trade-off has led to the development of the counter-directional central island stop.

This type of DDA-compliant ramp access platform is positioned at the centre of the road between the sets of tram tracks, as opposed to being positioned on the ‘outside’ lane. It therefore takes up less road space because it caters for commuter traffic in either direction. Thus, there is an additional 0.5m of road space on either side of the tram lanes that can be used for the introduction of bike-only lanes.

On overseas tram networks where centre island platform stops have been introduced as part of the stop configuration mix, an automatic driving mechanism has been installed in vehicles to ensure that tram doors will only open on the ‘platform’ side of the tram carriage at these stops. This system is designed to override the actions of tram drivers and to remove the chance of human error that may lead to safety risks for passengers. Yarra Trams is currently developing this software for the introduction of a central island platform stop on Flinders Street. The cost of the pilot is extensive, with a number of additional costs required to reconstruct areas of track to accommodate platforms, deal with the logistics of curves in the tracks, and manage overhead wires.

The trade-off here is potentially with passenger safety. Due to the nature of the central island configuration, passengers must walk across both a section of track and a section of road in order to reach the footpath in either direction. Although these platforms are signposted and will provide guide rails, it is noteworthy that passengers will have additional traffic flows to negotiate. So, whilst central island platforms are a feasible alternative to other platform configurations, there still need to be questions asked about whether they provide greater

benefits than paired platforms, especially given the financial cost of installing them, splitting tracks, and so on.

Driver Education

Obviously, one of the most important aspects of a project such as Think Tram is ensuring driver advocacy. Steps taken to educate car drivers about tram priority lanes to this point have included flashing signs along the central median, the installation of electronic signs and red road pavement at roundabouts, red painted pavement areas in tram lanes, and the installation of synchronised traffic signals and pedestrian crossings to prevent queuing of outbound vehicles in the median. Road users have also been advised of program works and changing traffic conditions through signage, local newspapers, brochures and information sessions.

SAFETY

As discussed, Think Tram has been an exhaustive process of weighing up the costs and benefits of its various infrastructure projects. In many instances these infrastructure projects have had unexpected or unanticipated benefits – such as reduced accidents between vehicles and pedestrians at stops. In 2006, there were no recorded accidents between motor vehicles, trams and people boarding or alighting trams from safety zones in the CBD. This is possibly because the physical impost of platform stops on road space has led to reduced average driving speeds.

Prior to the introduction of platform stops, there was an average of around 1000 reported collisions between trams and motor vehicles each year. These accidents lead to service delays, have a financial cost on the business and ultimately affect the perceived safety of catching trams (Trams Speed Improvement Plan: 2006). Recent figures show that since 2004, collisions involving trams have fallen by 27%, derailments have reduced by 55% and trips or falls by tram passengers have reduced by 31% (Yarra Trams: March 2007). Many of these decreases can be directly attributed to the infrastructure changes and service quality issues discussed in this paper. Infrastructure-related delays on the tram system have also been reduced by 35% since 2004. Yarra Trams has complied with, or exceeded, all the asset management obligations placed on it by the state, and its renewals program has beaten government targets.

ACHIEVEMENTS

A total of 155 platform stops have been installed throughout the Melbourne metropolitan area as part of Think Tram, the 109 project and the DDA2 program. Of these, 41 have been located in the central business district, with a further ten platforms under construction on Flinders Street, Bourke Street, Spencer Street and Elizabeth Street. These will be completed mid-2007 (DDA Stop Summary June 2007).

A number of platform stops have also been installed in the surrounding inner city areas and major feeder routes into the CBD. It is envisaged that Yarra Trams will eventually install around 400 platform stops across the entire network as part of meeting its responsibilities for DDA compliance. The following table outlines the number of infrastructure changes that have been made as part of Think Tram across the network:

Project Type	Completed
Separation kerbing/raised track	23 sites (13km)
Part Time Tram Lanes	2
Traffic Signal Remodels	185
Turn bans	9
Roundabout modifications	7
Red pavement at tram stops	36
Platforms (pairs)	13
Widened safety zones	2
Hook Turns	4
Tram Stop Optimisation Investigations	8
TOTAL	266

Figure Error! No text of specified style in document.-1: Think Tram program snapshot, Feb 2007

Feedback

In October 2006, Sweeney Research surveyed retailers along Collins and Bourke Streets to understand their attitudes and opinions of tram stops and platform stops in particular. Two thirds of retailers now feel that trams have a positive effect on their business. This attitude is most strongly held among Bourke Street traders (82%), while this feeling was also prevalent amongst Collins Street (67%) traders. Retailers are more likely to agree (53%) than disagree (23%) that the recent changes to tram stops are beneficial to retail businesses.

Almost all retailers on Bourke Street felt that platform stops have enhanced the look of the Mall. In addition, 63% of respondents either 'agreed' or 'strongly agreed' that platform stops improved the visual streetscape compared to safety zones. The vast majority of Collins Street traders agree that platform stops provide modern facilities, with three quarters of retailers stating that the changes have provided better access for all users. Two thirds agreed that platform stops have improved pedestrian safety. (Sweeney: 2006)

Face to face surveys were also conducted with tram users in late 2006. The research findings were based on results 514 city tram users. It found that:

- 94% of respondents rate platform stops as 'very good' (48%) or 'good' (46%)
- The main reasons these respondents gave for their positive rating were:
 - Improved pedestrian safety (92%)
 - Easier access to trams for people with limited mobility or prams (93%)
- Eight in ten respondents (79%) prefer platform stops to safety zones.
- More than eight in ten (83%) respondents agree that it would be good to have more tram stops in the city upgraded to platform stops.

The Department of Infrastructure's quarterly customer surveys also show customer satisfaction with tram services is at a record high, despite a general dip in satisfaction with public transport overall from service delivery and overcrowding on the train system. More specifically, the surveys indicate that platform stops have had a positive impact on urban amenity. Customers said they demonstrated: "an amazing transformation of an area which until now looked 'old' and 'tired'", and "Since the platform stop was completed, there is a new 'clean' feeling to one of the busiest intersections in the city". (Sweeney: 2006)

Herald Sun/The Age Poll on Tram Priority

Perhaps the most satisfying results we have had to this point was the feedback from a Herald Sun readers' poll in April 2007, entitled 'Should trams be given more space at the expense of motorists?' The poll essentially asked readers about the trade-off between trams and motorized traffic on the roads, with 58.1% of the total 1025 responses to the poll saying they believed trams should be given more space on the roads, thus indicating that there is a high-level acknowledgement and agreement that tram priority is a good idea. (Herald Sun: April 2007). Considering how 'loaded' this question is, Yarra Trams sees these results as very encouraging signs that Think Tram is reflecting a deep need within the community for an efficient and high priority public transport system.

CONCLUSION

Trams offer a vision for the future for so many progressive cities around the world because they are seen to be a sustainable high capacity public transport option. Yet in Melbourne, where they are an incontestable icon of the city, progress has been hard fought. The mounting volumes of vehicle traffic through the inner city region have had severe impacts on the ability of Melbourne's iconic tram system to find its own path amongst the crush. Think Tram aims to strike a positive balance in the reallocation of scarce road space between motor vehicles and public transport in an attempt to generate more efficient traffic flow.

The methods applied through Think Tram aim to create a safer, more reliable and time efficient tram service that will ultimately lead to patronage growth. The case studies provided in this paper demonstrate the range of conundrums and compromises that have been made throughout the consultation, investment and partnership phases of Think Tram. Mid-block stops, for example, represent a philosophical trade-off between meeting the demands of a growing commuter base versus traffic flow and walking distances. Ultimately, however, there seems to be growing support in the community for decisive action to be taken on tram priority and improvements to Melbourne's public transport system, more generally.

As the population of Melbourne continues to grow at an unprecedented rate and the effects of peak hour gridlock are ever worsening, it is clear there needs to be greater investment in providing a workable high capacity public transport system. Think Tram makes a gesture toward the possibilities for public transport patronage growth in Melbourne through a suite of initiatives that have ultimately improved journey times along parts of the network. Indeed, if the system is to provide real opportunities for growth, it also needs to offer the capacity to grow.

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