

ROUTE 100

Light Rail-

Doncaster to inner City



Victorian Transport Action Group.

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Victorian Transport Action Group

The Victorian Transport Action Group is an independent forum that addresses the challenges of transport in Victoria. The members have a range of expertise across transport, planning, State and Local Government, IT and the environment; including past employment with Government agencies, the Department of Transport and VicRoads.

The participants are familiar with the challenges of developing and implementing transport plans across all transport modes and understand the difference between blue sky ideas and the reality of funding, political interest and community support. Members are particularly conscious that limits on funding necessitate placing priorities on projects; and that in turn leads to communities competing to achieve outcomes that satisfy their needs.

VTAG has an extensive network of connections across the diversity of local government, planning and public transport that it can draw upon for insights into the complexity of transport issues and provide options for equitable, practical solutions.

VTAG views public transport as the primary solution for commuting. It recognises that PT has been neglected and needs significant investment to address deficiencies in development and maintenance. We are though committed to achieving a balance between all user needs. We evaluate all mode options; identifying the optimum transport investment strategies that generate a fair return for tax payer dollars and deliver proven and even-handed benefits to the community.

The core policies of VTAG are based on the following guidelines:

- relieving congestion by promoting people versus vehicle movement;
- stemming unnecessary, unsustainable growth in road-based traffic
- planning of traffic management must make economic sense, adopt solutions for the future, not damage urban fabric and take account of reduction in road use by improving public transport;
- promoting practical solutions across all transport modes including road development such as the North East Link, where such development helps ease congestion in the City;
- centralising planning with policy and strategy integration;
- conducting project evaluation to incorporate social justice, liveability and retain heritage elements;
- recommending transparency in relationships and contracts by PT entities and Government;
- encouraging partnerships with Local Government to achieve connected and effective local results.
- opposing costly PPPs and endorsing Government low interest borrowing in the present financial climate, with appropriate hedging safeguards against future interest rate rises to facilitate the construction of infrastructure.
- supporting co-operation between government and PT instrumentalities that addresses any conflicts of purpose and delivers beneficial outcomes for end users.
- boosting Public Transport because it is environmentally necessary as it ameliorates future impact of carbon and carcinogenic pollution and oil dependency, and has less potential for civic and domestic disruption or destruction.

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Fixing the East West Tunnel Legacy, fast!

The Victorian Transport Action Group (VTAG), an independent forum of transport experts from various disciplines, shares a vision of a highly mobile Melbourne with an increased population being effectively and sustainably serviced by a versatile, strategically expanded public transport network.

In this paper VTAG proposes Route 100 as a solution for the car dependent and congested North-Eastern suburbs. Route 100 is a Light Rail Transit (LRT) service for the Doncaster Corridor which connects into the tram network in Fitzroy.

Melbourne faces crippling and costly congestion, due in part to the transport and landuse planning failures of past decades. However, Melbourne, like other world cities can grasp the future and lay out a network that will reduce the congestion and enhance the mobility for and liveability of its residents; and Melbourne has one significant strategic advantage; it has the tramway foundation already in place.

Based on current estimates for building 12km of tramway in Sydney, a comparable city, the replacement cost of the Melbourne network would exceed \$45 billion. Many other cities closed their tram networks in latter half of the 20th century, Melbourne had sufficient foresight to retain its tram service, but now is the time to build on that heritage and strategically expand the network where it will provide the greatest economic, social and productivity returns.

Melbourne's Tram / Light Rail network is iconic, vital to the city's liveability, accessibility and cultural heritage. It is the largest tram system in the world with 250kms of track, 493 trams, 25 routes and 1,763 tram stops. However, the network is slow due to congestion and needs further separation and investment to unlock its latent potential to extend rail transport into the middle suburbs.

An expanded LRT network that extends to more of Melbourne's middle, and, over a longer time frame, outer suburbs would radically alter travel patterns and result in mode shift to Public Transport. This shift is happening around the world with movement in Queensland, ACT and NSW setting the pace in Australia (see appendix).

VTAG proposes immediate action to address one of the recognised worst congestion hotspots in Melbourne. The immediate action is vital as the recent ugly debate over the creation of an East West Tunnel is fresh in Melbourne's psyche; and the debate will not go away as long as political interests keep it alive.

The proposed East West Tunnel was an example of 20th century thinking on transportation and an extremely costly 'answer' that would only lead to further congestion and an even greater proportion of Melbournians stuck in traffic. Historically public transport deprivation has led frustrated commuters and other road users to propose even more roads, so many residents and authorities turned to the East West Tunnel as a potential solution. In practise, a fact proven globally in countless cities, it would very quickly have increased volumes, adding more vehicles to some of the worst congestion points and still leaving eastern suburban motorists even more frustrated.

Victorians have recognised for more than a generation that this hotspot must be

addressed and it is simply not possible politically to turn attention elsewhere and ignore the congestion at the city end of the Eastern Freeway. A rail solution has always been intended for this corridor and a planning reservation has been provided for but never utilised.

VTAG's solution is to activate this reservation and to provide real travel choices for people in the Doncaster Corridor by creating a LRT network that connects at both ends into existing rail networks.

The Doncaster Corridor catchment is car dominated with extremely poor rail services, not surprising then that it pours vehicles into the gridlocked Eastern Freeway. The LRT could be one of Melbourne's simplest and most cost effective transport solutions but must be tackled early while community and political attention is heavily focussed on the area.

VTAG's LRT network vision stretches beyond the Doncaster Corridor but this proposal is identified as a high priority for action as it has attracted such strong attention and has become a corridor emblematic of Melbourne's recent transport planning failures.

Some other key LRT extensions that should be considered as priorities are:

- ✓ Docklands to Footscray, along Dynon Road
- ✓ Airport Link
- ✓ Wellington/North Road to Monash University

VTAG is committed to Light Rail networks operating sustainably. Therefore, subject to appropriate scrutiny, it endorses the recent proposal by the Australian Solar Group to build solar farms to generate sufficient energy per year to power Melbourne trams. The proposal claims it would save 100,000 tonnes of greenhouse gas per year from running trams and significantly contributes to achieving a zero carbon policy.

LRT doesn't leave Melbournians stuck in traffic

The North Eastern Suburbs are very poorly serviced by public transport with most residents having little alternative but to access the CBD, inner-city Melbourne and University and Hospital precincts via the Eastern Freeway. This of course adds to the congestion both on the freeway and at egress points like Hoddle Street and all roads off Alexandra Parade and Princes Street.

Strategically, the massive cost of the East West Tunnel would have severely constrained funding for higher yielding transport projects in the metro and rural sectors. Progressive cities around the world have long ago realised that heavy investment in road spending delivers more and more vehicles to critical blockage points in and around our cities. The answer in these world cities has been rail investment coupled with educational, engineering and enforcement measures to rid the road system of unnecessary traffic.

Victoria must show leadership in moving to a rail future and project number one

should be the Doncaster Corridor where the problem is profound and long-canvassed and the call for action is becoming ever more strident and the political heat is being turned up.

The Victorian Government will find ready support from those residents of Manningham and its neighbours who are already advocating for improved public transport to enable them to commute, to access services and entertainment, to provide alternative transport to schools, to access work, health and education institutions and to engage in commercial and social activity. This movement is especially attractive to the increasing numbers of young non-drivers who are eschewing car ownership as a lifestyle choice.

Route 100 as proposed by VTAG is a Light Rail / Tram service that offers an effective public transport alternative in the East. Constructed to modern LRT standards in a separated Right of Way along the medians of the Eastern Freeway and Alexandra Parade, large Light Rail vehicles can carry 300+ occupants and 8,000-10,000 passengers per track per hour in peak periods, an effective and fast alternative mode of public transport through the Doncaster Corridor.

While Light Rail could fill the current gap in Melbourne's existing radial heavy rail network in the East, at the same time it has the flexibility to link into Melbourne's tram network at both ends of its journey - Balwyn/Doncaster Hill and Fitzroy. When operating as a tram route at the Fitzroy end, it would provide access and public transport connections throughout the inner city and CBD for residents of Melbourne's North East.

In turn, Route 100 would become a 2-way trip generator, attracting inner city passengers to the vibrant activity centre at Doncaster Hill and with coordinated land-use planning initiatives, could facilitate a transformation of Alexandra Parade into an attractive boulevard for residential and commercial uses that would see it rival St Kilda Road and Royal Parade as an attractive, active part of the city serviced by a modern rail system.

Flexible, Modern Light Rail

Light Rail Vehicles (LRV) could be described as "Super Trams", however, they display significant improvements over the traditional tram, as below:

Light Rail Vehicles –

- ✓ can carry over 300 passengers in articulated carriages;
- ✓ can travel at speeds up to 100 kilometres per hour;
- ✓ are longer (43 m), with up to 5 sections, potentially up to 56 metres in up to 7 sections;
- ✓ have capacity that is 4 times the standard single tram;
- ✓ have fewer stops than trams, and thus have shorter elapsed travel times;
- ✓ "super stops" provide easy access for the elderly, infirm or disabled;

- ✓ use the same gauge rail way as Melbourne trams currently in service, so where required trams and LRVs would share the same track;
- ✓ are a proven success internationally; the International Association of Public Transport reports that over 400 cities have Light Rail services, 60 more are under construction and another 200 are being planned.

Light Rail for Eastern Suburbs

Light Rail is a practical choice that could be constructed using State funding for infrastructure and has the following advantages:

- ✓ **Operating in 3 years**, after agreement to proceed.
- ✓ **Cheaper to build**, could be constructed for under \$1.5 billion, matching pricing for three comparable projects currently in operation, construction or planning around Australia.
- ✓ **Convenient**, would commence from a terminus in the Doncaster Activity Precinct and deliver inbound and outbound access to the city.
- ✓ **Cheaper to operate**, has similar overheads to regular tram operations
- ✓ **Compared with cars**, faster access to city in peak hours, comfortable with improved amenities such as WIFI to enable mobile devices.
- ✓ **Increased capacity**, LRVs can carry over 300 passengers and up to 9,000 per hour on a 2 minute headway.
- ✓ **Flexible services to meet demand**, services can be increased or decreased more conveniently to accommodate demand fluctuation.
- ✓ **Uses existing pathways**, along the Eastern Freeway easement, then sharing the tram route into the city down Nicholson Street or other options off Alexandra Parade.
- ✓ **Minimal impact**, on land use across Cities of Manningham and Yarra.
- ✓ **Operates**, in mixed traffic situations, as cars and LRTs can intermingle. However where practical it is preferable to isolate LRT and vehicles.
- ✓ **Connectivity** to the Balwyn North tram service (Route 48), a second stage development could extend a further 3.3 km along Doncaster Rd, past the Civic Centre as far as Blackburn Rd.



- ✓ **Safe and friendly** for all Melbournians
- ✓ **Passenger comfort** with enhanced comfort levels, LRVs are both quieter and smoother than bus services.
- ✓ **Improved amenities** for residents of Brunswick, Clifton Hill, Collingwood, and Fitzroy to access the retail stores of Doncaster Shopping Town and of course for retailers at that venue to encourage and profit from increased patronage from the inner suburbs.
- ✓ **Funding opportunity**, rarely is there a better time than now to fund the construction of public transport infrastructure by State borrowing, whilst interest rates are historically low, and rates can be protected by the adoption of suitable hedging instruments.

Achieving LRT Route 100

VTAG calls for a target date for completion of Route 100. Let's use The Gold Coast Light Rail *GoldLinQ* as our benchmark; it was proposed in 2008 and opened in 2014. Route 100 can open in 2020.

What steps must be taken as we strive to meet that target?

1. reserve the median strip along the Eastern Freeway for the LRT
2. extend the Route 48 tram service to Doncaster Hill
3. enhance the Doncaster Area Rapid Transit (DART) Bus service, but not in any way that compromises the timely opening of Route 100
4. continue to roll out priority for buses and trams in the inner city to achieve timetable reliability for passengers
5. investigate the Doncaster Park and Ride site for development opportunities including commercial enterprise and additional parking
6. improving the frequency of feeder bus services in preparation for the opening of Route 100
7. progressing the provision of a major bus / train interchange in the vicinity of Victoria Park Station
8. commence planning to provide a direct connection to Melbourne University, RMIT and the major hospitals

Light rail, frequency and capacity

Shown below are the comparisons between DART and Light Rail:

	Peak services	Peak frequency	Capacity per hour
Existing DART and other buses	45 buses	80 secs.	3150 (a)
DART potential	60 buses	60 secs.	4200 (a)(d)
Light Rail	30 LRVs at commissioning (b)	2 mins	9000 (c)

a) Buses, Standard - 70 passenger capacity.

b) Initial launch with 30 LRVs, increasing numbers as patronage rises.

c) European style LRVs with 300+ passenger capacity.

d) Doubling the numbers of bus services to achieve similar capacity to LRT would be impractical for both headway and capacity of city roads.

Travel Time

Light Rail would receive the majority of its passengers from feeder bus services. The transfer time from feeder service to Light Rail at Doncaster Park and Ride would be nominal as they will depart at 2 minute headways in the peak. Some DART routes, such as those entering at Bulleen Rd, should continue to operate in parallel with Light Rail.

Travel time from Shoppingtown to Victoria Park including one intermediate stop would be approximately 13 minutes for an LRV. This is significantly faster in peak hour than travel by private vehicle on the Eastern Freeway over the same path, as congestion can increase vehicle journeys by 20-30 minutes.

For city-bound passengers who stay on the LRV the journey from Victoria Park to the City will add approximately 15 minutes to central CBD to their journey; trains take between 6 and 8 minutes from Victoria Park to Flinders Street to which would have to be added two minutes minimum transfer time.

AM Peak times	Pines to P+R By bus	Interchange time ^{a)}	Doncaster P+R to Hoddle St	Hoddle St to Swanston Street	TOTAL TRIP
Existing DART Route 908 The Pines To City	24 mins	0	14 mins No stops	18 mins (b) With bus lane	56 -74 mins
Light Rail	24 mins	+4	11 mins (c)	15 mins (d)	44 mins

- a) Half the interval between services plus 2 minutes' walk-time for light rail and 4 minutes to reach the underground station for rail
- b) Timetabled duration of bus trip, but trip times can double with congestion.
- c) With no stops between Doncaster Park and Ride and Hoddle Street
- d) Time is taken from the timetable for the 96 tram –junction of Alexandra Parade and Nicholson Street to Swanston St

Route 100 Overview

VTAG recommends a thorough consultation process to determine the final route to be taken by the LRT service, to be known as Route 100. The outline that follows aims to paint a broad-brush picture of the service. Options need to be developed along the proposed route and to be thoroughly canvassed with all affected parties.

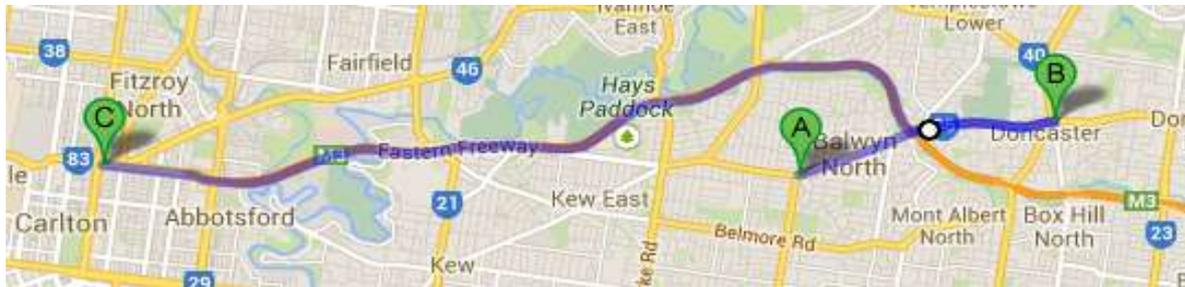
In essence it is proposed to commence in the heart of the Doncaster Activity Centre and then proceed down Doncaster Road, past the new Eastern Golf course development and access the Eastern Freeway via an underpass to Doncaster Road with access to the Park and Ride; a distance of 2 kilometres.

The LRT service would then travel along the northern edge of the eastern freeway reservation before crossing into the freeway median at Bulleen Road and run down the median reservation of the Eastern Freeway before passing under the road and rail services at Hoddle Street to Alexandra Parade; a distance of 11 kilometres. It would then continue down Alexandra Parade as far as Nicholson Street; a distance of 1.3 kilometres. At the western end the Light Rail could connect to tram Route 96 which it could share on the existing route on Nicholson Street for 2 kilometres.

Alternatively, following due local, consultative process it could leave Route 96 at Johnson Street and run via Barkly and Rathdowne Streets to Latrobe Street. These or other options could give speedy and direct access to central Melbourne. In the city

Latrobe Streets and/or Bourke Street are positioned to distribute commuters into the CBD and return them home after work.

Total travel distance from Doncaster Hill to CBD is 16.3 kilometres on 12.3 kilometres of new track.



It would deliver a reliable, rapid and comfortable service, and as noted above, without massive expenditure; and with the huge advantage that it can be engineered rapidly and in service within three years of reaching agreement to proceed. It is the missing link that would deliver a connected light rail service for public transport users around the north and eastern suburbs.

Route 100 in detail:

Doncaster Activity Centre

The service would commence at the Doncaster Activity Centre at the summit of Doncaster Hill, where there are various possible sites for a terminus.

Engineers have confirmed that both trams and LRVs could climb the incline up Doncaster Hill and can negotiate the average gradient of 4% over 2,250 metres from Koonung Creek to Doncaster Hill. It is within the 5% gradient accepted as the maximum incline for Light Rail.

The Route 48 extension through Greythorn, past Doncaster Park and Ride would provide the path and share the tracks up to Shopping Town.

Doncaster Park and Ride, major transport hub

Doncaster Park and Ride would become a major transport hub for buses from Doncaster, Box Hill, and Warrandyte and beyond. It is a substantial site, already Government owned and ripe for development as presented above (Doncaster Park and Ride).

Bulleen Junction to Hoddle Street

The LRT route from Doncaster Park and Ride to Bulleen Road would run on its northern side with possibly a stop at Estelle Street footbridge, if justified by potential patronage. It would then cross the centre reservation by an underpass or an overpass. Note that the Freeway intersection at Bulleen and Thompson Roads is poorly engineered and

is overdue for a complete redesign. This junction is also the starting point for the North East Link, the missing link, between the Eastern Freeway and the Western Ring Road.

As recently highlighted by the RACV building the North East Link would reduce congestion at Hoddle Street and be substantially more cost effective than the now abandoned East West Tunnel.

The LRT would then run a further eight kilometres from Bulleen Rd to Hoddle Street down the adequately wide central reservation. The centre reservation of the Freeway is an ideal location for the relatively narrow tramway. Only nominal engineering is required as the freeway bridges are of sufficient width and height to facilitate a Light Rail.

Light Rail stops could be built at various crossing points of the Eastern Freeway including at Bulleen Road and Chandler Highway; but only if justified by a full scale patronage assessment and with parking for vehicles and/or cycles. Access would be via lifts and ramps from the existing bridge structures. Note that buses do not stop on the freeway and travel time for the whole journey would improve substantially with no stops.

The LRT would then pass under the rail and road bridges at Hoddle Street. Here the central reservation narrows significantly to accommodate the outbound access road to the Eastern Freeway from Hoddle Street. This could be overcome by widening the Freeway into the "emergency" lane or preferably a complete redesign of the Hoddle Street with Eastern Freeway junction.

Connection to rail at Clifton Hill line

A significant proportion of passengers could disembark at the junction with Hoddle Street rail service to board City bound trains at the proposed integrated Light Rail/ Heavy Rail interchange at Victoria Park. However, please note that heavy rail capacity is limited for peak hour travel to the city.

The Metro train station at Victoria Park should be modified so it can be accessed directly from the Light Rail stop in the freeway median below, potentially via four 60+ person elevators. This would enable a smooth interchange to Metro Trains to the City and northern suburbs.

Whilst it is recognised that commuters may prefer a single mode of transport into the city, experience in other metropolitan conurbations is that commuters have no issues with changing modes providing it reduces the duration of their commute.

Alexandra Parade

The Light Rail service would then continue down the median strip on Alexandra Parade, over Wellington and Brunswick Streets to Nicholson Street, where it would co-share the Route 96 tramway towards the city.

The construction of a LRV track could be the catalyst to develop the Parade into a boulevard style avenue with architectural and social merit.

The long overdue service down Alexandra Parade also opens up many more tram options for accessing the city and northern suburbs via interchanges at Smith Street Route 86 and Brunswick Street, Route 11 and 112 and as above to Route 96 at Nicholson Street and provide a direct link to the activity centre at Doncaster.

Local residents may express unease about a tram line down their “nature strip” on Alexandra Parade. However, Alexandra Parade presently lacks any form of east-west public transport and the benefits of convenient transport should offset their reasonable concerns.

It should be noted that the advent of Light Rail has given rise to urban development in many cities, including the Gold Coast. Alexandra Parade offers such an opportunity to replace out dated and outmoded low rise buildings with both domestic and commercial precincts to complement boulevard style landscaping of the median strip. It would enhance amenities for local residents and significantly increase land use and values for stakeholders.

Nicholson Street to city

From the junction of Alexandra Parade and Nicholson Street the service would turn left inbound, into Nicholson Street. The most appropriate corridors for entry into the CBD require detailed assessment and local consultation, however, a merger with Route 96 for about 600 metres between Princes Street and Johnston Street and thence via Barkly, Rathdowne and Latrobe Streets to Melbourne Central Station and Docklands is one of several obvious options.



Integration with Tram Services

Linking the eastern suburbs with the City via Freeway and Kew could provide a massive boost for the wider transport network. Subject to thorough examination by all stakeholders the following links are envisaged:

- The VTAG proposal would facilitate a 2.0 kilometre extension of Route 48 from its current terminus at Balwyn Road, North Balwyn to the Doncaster Park and Ride and then sharing the tracks with Light Rail to Doncaster Shopping Town.
- This connection to the metropolitan tram network would reflect public demand and deliver the long overdue and popular link between Doncaster, Kew and other parts of Melbourne for shoppers, school children and commuters. It would also increase patronage on City bound Light Rail services.
- The service shares Light Rail tracks from Doncaster Park and Ride to Doncaster Shopping Town.
- It links Doncaster, Kew and inner Melbourne for shoppers, school children and commuters.
- The road from the terminus at Balwyn and Doncaster Roads is about 15 metres wide from Balwyn Road to the freeway junction; this is same width along Doncaster Road as utilised between Bulleen and Balwyn Road for the existing tramway in North Balwyn. Doncaster Road widens to around 30 metres, up the hill to Shoppingtown. Road width is therefore ample to accommodate a tramway through the Greythorn Shopping precinct to Doncaster Park and Ride and up the hill to Doncaster Shopping Town.
- Potential to link to the Yarra Trams service at Camberwell (Route 72) if this route is extended to Doncaster Road.
- Options to connect to Tram services at Smith Street (Route 86), and at Brunswick Street (Route 11).
- From Nicholson Street, the Light Rail shares tracks with the Route 96 services, at least as far as Johnson Street. There are also connectivity options to Docklands, St Kilda, Port Melbourne routes.
- Potential for connection to a future tram hub at University of Melbourne.

Integration with feeder Bus Services and commuters

The feeder bus services across Manningham and surrounding municipalities should be co-ordinated with Light Rail services. The lack of co-ordination between different modes of transport and providers is a major criticism of current services and defeats the adoption of mode transfer from private vehicles to public transport.

As noted above additional all day parking must be thoroughly assessed. It should be close to feeder bus stops. Also secure bicycle storage on a much larger scale is required urgently by bus stops to accommodate the needs of growing numbers of commuters. The bike parks are essential in areas of higher density with level access to bus, tram and rail stops. Wherever practical, shelter should be provided to improve the amenity of travel by public transport and increase patronage prospects.

Shuttle Service

The requirement to move large numbers of passengers during the peak hours is likely to necessitate that some Light Rail services operate as a shuttle service between Doncaster and the vicinity of Victoria Park or Alexandra Parade, and not run into the City. The shuttle facility would return to Doncaster to handle peak hour volumes.

Some services would switch tracks to return to Doncaster and vice versa. This would facilitate sufficient numbers of LRV units where required to carry the volume of commuters in the critical morning and evening rush hours. A shuttle-bus service from Victoria Park up the Johnston Street bus lane to Melbourne University should also be provided.



Maintenance & Operation

The \$6m unit cost of the E Class trams being presently supplied to Yarra trams includes maintenance until 2017. A similar build and maintain arrangement would be desirable for the Eastern Freeway service with long term maintenance needing a stand-alone depot and maintenance facility which would add \$100 m.

50 additional drivers¹ are required costing around \$3.5 million per year, plus loading.

30 – 45 additional units, delivered progressively would be sufficient to support the expected increase in passenger numbers, subject to headway.

There are several prospective locations for where a LRV depot might be located – including the existing Government owned bus depot in Doncaster Road.

Costing

The entire project could be delivered for less than \$1.5 billion dollars. This amount is manageable for the State Government, and would have minimal impact on AAA credit rating. Further investment in Light Rail has been supported by Infrastructure Australia in the past.

Costings are summarised below:

- Track work, 16.7 kilometres, Termini work at \$400 million based on current the current cost of like projects.
- Additional LRV depot would be budgeted at \$100 million
- Rolling stock would cost around \$200 million for an initial 30 LRVs.
- The redesign of the junctions at Bulleen Road and Hoddle Street, sundry work to accommodate the line down the freeway would require expenditure of up to \$700 million, but deliver additional benefits relieving congestion outbound on Hoddle Street and free flow of traffic to the future North East Link.

Engaging the community

Melbourne has a recent history of quality public engagement around developing a city plan. Melbournians are passionate about their city and its evolution and demand and expect opportunity to be involved. The Melbourne 2030 engagement reached out to all sections of the community and received a strong message back that the city needed to be hard-edged, it needed to achieve sensitive medium density and it needed high quality, reliable and regular public transport.

VTAG is committed to a process of engagement with local governments and their

¹ It should be noted that tram drivers can be trained to operating standard in about six months, which provides improved flexibility in hiring suitable staff.

communities along the proposed Route 100 to ensure the best possible outcomes and the actual route that maximises the advantages of the introduction of a new rail system. The final route should be determined through a consultation exercise which thoroughly canvasses all appropriate options. Lord Mayor Robert Doyle's consultation exercise about the future design of Swanston St is an example that could be followed.

Outcomes – eased congestion, happy commuters and more votes!

VTAG submits that it is critical that provision for a future Light Rail service is incorporated in all planning and development schemes for Melbourne.

It further submits that action should be taken immediately to adopt the VTAG recommendations for a multi-tiered strategy to improving public transport to reduce traffic volume.

VTAG proposals would provide a realistic boost to the DART service that would double daily patronage.

The Light Rail service with half the bus services still using the freeway would boost daily capacity to around 100,000 passengers. This would mean an extra 65,000 passengers a day –the equivalent of 54,000 cars a day (similar to the projected increased demand)

In the peak hour, it would mean around 5,000 cars an hour could potentially be removed – the equivalent of clearing two freeway lanes.

Ironically under the VTAG proposals public transport will deliver the unfulfilled East West Link promise to reduce congestion on Eastern Freeway each rush hour.

The proposals would significantly improve public transport facilities across the Eastern Suburbs, particularly between the City and the Doncaster Activity Centre and vice versa.

Victorian Transport Action Group

Appendix 1 it's already happening!

Several Australian cities have already committed to take advantage of the many benefits of light rail services. Though light rail has its critics whilst initial scoping and construction takes place there are significant changes in perception as the service delivers enhanced passenger experience, urban renewal and property value uplift.

Gold Coast's GoldLinQ opened in July 2014



- ✓ The Gold Coast Light Rail *GoldLinQ* was proposed in 2008 and opened in 2014;
- ✓ Commissioned in July 2014, Stage 1 of the Gold Coast Light Rail network extends 13km and connects the Gold Coast Health and Knowledge Precinct at Parklands with Southport, Surfers Paradise and Broadbeach.
- ✓ Gold Coast Light Rail Stage 2 is a planning study that proposes to extend the existing light rail system from Parklands station (Stage 1) to connect with the heavy rail network on the northern end of the Gold Coast, addressing light rail and heavy rail network connectivity.
- ✓ Fast, frequent trams connect 16 stations along a 13 kilometre route from Broadbeach to Gold Coast University Hospital.
- ✓ 14 air-conditioned trams, each carrying up to 309 passengers, operate every 7.5 minutes at peak times, from 5am to midnight on weekdays, and 24 hours at weekends (Friday and Saturday nights). As well as providing dedicated space for wheelchairs and prams, trams also include a very Gold Coast feature - surfboard racks.
- ✓ In August 2012 the cost of the 13 kilometres (8.1 mi) light rail was estimated at \$1.6 billion.
- ✓ Post-implementation, the Gold Coast business community is demanding the State Government give early approval to the extension of Gold Coast light rail to connect with QR at Helensvale. It demonstrates that LRT delivers benefits for the whole community.

- ✓ Light Rail is recognised as a catalyst for attracting investment in both domestic and commercial property around stops and along routes. The permanent aspect of LRTs fixed infrastructure provides certainty for developers. It also offers the ability to closely integrate into the community and very efficiently bring people into the centre of high activity areas like Doncaster Hill. This is demonstrated on the Gold Coast where the recently commissioned LRT has already encouraged development, increased land values in the vicinity of the GoldLinQ service and improved liveability and amenity for residents.

- ✓ GoldLinQ has carried 5 million passengers, far more than forecast, since it started in July 2014 while patronage on nearby bus services have been maintained.

It's already happening...Canberra

Capital Metro is out to tender



- ✓ Capital Metro construction is planned to commence in 2016 and be operational in 2019;
- ✓ Phase One was envisaged in 2012 as a 12 kilometre line between the northern suburb Gugahlin and the city centre in Civic.
- ✓ Already an enhanced scope announced by ACT Government to extend the line from Civic to Russell Offices and is expected to raise patronage by 30%;
- ✓ Initial patronage forecasts are 15,120 passengers per day by 2021
- ✓ The route links to bus interchanges to integrate with the existing bus network;
- ✓ Existing pedestrian and cycling networks will also link into the route to increase the catchment area of Capital Metro;
- ✓ Park and ride facilities will also be developed to encourage patronage over a wider region.
- ✓ The project has an anticipated Benefit Cost Ratio of 1.2, a return of \$1.20 for every dollar spent, per Capital metro Business Case by ACT Government.

It's already happeningSydney

CBD and South East Light Rail



- ✓ In 2012 the NSW Government began the extension of the Inner West Light Rail line and announced the CBD and South East Light Rail project.
- ✓ Construction of the 5.6 kilometre inner West Light Rail Extension to connect Dulwich Hill to the CBD was completed in March 2014.
- ✓ The CBD and South East Light Rail lines will link key sites running north from Central to Circular Quay along George Street, west to Pyrmont and Dulwich Hill, and south east through Surry Hills to Moore Park, Randwick and Kingsford.
- ✓ Major construction of the project is expected to finish in 2018, and services scheduled to commence in early 2019.
- ✓ The service will operate 67 metre coupled pairs of light rail vehicles that will each carry 450 people, around nine standard buses.

It's happened overseas - Dublin

Luas, Dublin



- ✓ Luas (Irish for "speed") or Dublin Light Rail System is an LRT system serving the capital of Ireland and was the first such system in the decades since the closure of the last of the tramways.
- ✓ In 2013, the system carried 30.5 million passengers, up 3.7% from 29.4 million passengers in 2012. Daily ridership is 83,500.
- ✓ Patrons are serviced by multiple Park and Ride adjacent to the lines.
- ✓ At January 2014, the system has 54 stations and 36.5 kilometres (22.7 mi) of service track.
- ✓ Three extensions to the existing Luas lines have been completed and construction has begun of another 6 km extension.

It's happened overseas – L.A.

Metro Rail moves Los Angeles



- ✓ Metro Rail is an urban rail system serving Los Angeles County, California. It consists of six lines, four light rail lines plus two rapid transit subway lines serving 80 stations. It is 1405 kilometres long and several further extensions are under development.
- ✓ With 4 million inhabitants, Los Angeles is the centre of a metropolitan area which is home to some 14 million people within a narrow stretch of land between the Pacific Ocean and the Santa Monica and San Gabriel Mountain ranges in Southern California.
- ✓ After all streetcar (Tram) lines had been closed down by 1963, Los Angeles became a car centric highly congested city. Finally in the 1980's, the county and region decided to return to rail-based public transport and to build a network of metro and light rail lines.
- ✓ The LRT and Rapid transit lines are fully integrated with both the Metro Liner bus rapid transit system and with the Metrolink commuter rail system.
- ✓ Metro Rail, which has an average daily weekday ridership of 362,904 as of June 2012, is owned and operated by the Los Angeles County Metropolitan Transportation Authority (Metro) and started service in 1990.

It's happened overseas - Portland

MAX Light Rail in Portland, Oregon



- ✓ MAX Light Rail, or Metropolitan Area Express, is a Light Rail system consisting of four separate lines serving 87 stations in the Portland, Oregon.
- ✓ The system has had an average weekday ridership between 115,000 and 130,000 since Fiscal Year 2010. It is owned and operated by TriMet and began service in 1986.
- ✓ From its inception until 2004, about \$3 billion was invested in light rail in Portland.
- ✓ The system currently has a total of 87 stations.
- ✓ Trains run every 15 minutes from early in the morning Monday through Friday until late at night, and every 18 minutes at weekends.
- ✓ At many stations, a live reader-board shows the destination and time-to-arrival of the next several trains, using data gathered by a vehicle tracking system.

Appendix 2 - The East West Link Debacle

VTAG conducted an impartial review of the case for East West Link (EWL). The Business Case indicates that growing traffic flow on the Eastern Freeway towards the city delivers significant opportunity to increase public transport patronage. In the current two-hour peak (AM) travel destinations measured at the end of the Eastern Freeway,

Percentage of total road users	Primary Destination	Secondary destination
54%	CBD (50%)	Immediate north of CBD, Parkville (50%)
12%	Northern suburbs	
6%	Southern suburbs	5% is to the St Kilda Road precinct, South Melbourne and nearby
3%	Collingwood, Abbotsford & Richmond	
10%	South of Yarra and west of CBD (Port Melbourne, Fishermans Bend)	
2%	Werribee/Geelong	
6%	Footscray & Western Suburbs	
7%	North West suburbs	Airport

The Business Case does not appear to publish details of current absolute vehicle numbers. However a reasonable flow rate for a freeway lane is capacity for approximately 1,800 vehicles per hour which at average occupancy of 1.2 = 2160 people per hour.

Anecdotally it appears that at the Hoddle Street end the flow rate is far less than this but the current five westbound lanes at that point would optimistically have capacity of perhaps 10,000 people per hour.

Perhaps less than exhaustive investigation suggests that up to 50% of current and projected peak period Eastern Freeway car travel (i.e. to the CBD, near CBD) is theoretically contestable by Public Transport if there are attractive PT alternatives to

both the CBD, University and Hospital precincts. However, taking account of factors such as decreasing car usage, high petrol prices, a desire to reduce pollution as Climate Change becomes the accepted norm all conspire to suggest that a more realistic target would be for PT to achieve 60-70% of that potential. This reinforces the contention by VTAG to expand DART services immediately and commence planning of the launch of a Light Rail service.

Appendix 3 - Heavy Rail, not needed?

VTAG concluded that a Heavy Rail service as tabled in the *Doncaster Rail Study* (DRS) <http://www.doncasterrailstudy.com/> was not a practical solution in the next two decades for the following reasons:

- The DRS recommended solution Rapid Transit 1 is estimated to cost between \$4 and \$6 billion. However, Heavy Rail cannot proceed as funding cannot be justified by patronage projections; further other transport initiatives of higher priority will precede the implementation of Doncaster Heavy Rail.
- Heavy Rail starts at the Park and Ride, not Shopping Town. This due to the design standards established by the DOT for Heavy rail set a maximum gradient of 2% precluding that service from climbing the average 4% gradient to Shopping Town.
- To terminate at Shopping Town, like LRT, therefore requires construction of a tunnel and 50 metres deep station; estimated at \$1 billion by DRS.
- Congestion of Metro Rail services at Clifton Hill impedes the frequency of services from Doncaster. The Clifton Hill to City section is already heavily used with 16 peak hour Hurstbridge/South Morang line services planned to increase to 22 by 2021. Expected increase in patronage from existing routes precludes pathways for even between 2 and 4 services per hour from Doncaster.
- To reduce congestion significant investment is needed including either the decoupling the South Morang/Mernda Line by constructing a separate tunnel between Clifton Hill and the CBD, and/or installation of "moving block" high capacity signalling, likely to be similar to the cost of RT1. Note: LRT engineering standards are quite different to heavy rail standards, hence infrastructure can be provided at much lower cost
- DRS modelling indicated patronage of 56,000 passengers per typical week day, around 7,000 per hour. This would require 12 trains per hour each carrying 600 passengers. LRT vehicles can accommodate up to 9000 passengers per hour as shown above. VTAG submits that potential patronage is substantially higher and would increase with fast reliable services like LRT and could not be accommodated by Heavy Rail.