

# **EAST WEST LINK NEEDS ASSESSMENT RECOMMENDATIONS 1, 2, 3 & 6**

**REVIEW of the ASSUMPTIONS, DATA and ANALYSIS**

**FINAL REPORT**

August 26<sup>th</sup> 2008

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**EXECUTIVE SUMMARY**

**RAIL TUNNEL**      **Commence planning work examining the timing and routing for staged construction of a facility to provide extra track and passenger carrying capacity for the metropolitan rail services, including**

- Developing a single agreed set of rail patronage demand forecasts
- Ways to increase capacity of the rail network in the period up to the opening date of the tunnel (see also below)
- Ensuring that the rail tunnel supports and is supported by strategic spatial planning (Melbourne 2030) and urban development policies and actions, particularly in areas adjacent to stations.
- Functional and engineering design parameters, (including horizontal and vertical alignment, station locations, interchange requirements, service type)
- **The costs exclude client costs (for planning, design and project management), DoT fees and escalation.**

**TARNEIT LINK**      **In parallel with the planning work for the new Rail Tunnel, commence planning work to provide a V Line railway physically segregated from the metropolitan services between West Werribee and Southern Cross, including:**

- Refining the alignment for the new rail link from West Werribee to Deer Park
- Adding a fourth track to the MOTC third track between Sunshine and Footscray
- Works to segregate V line and metro trains between Footscray to Southern Cross.

**There is no need to commit to using the new Rail Tunnel and the Tarneit Link as the foundation for extending the rail network further to the west.**

- The key requirement in the west is to expand metropolitan rail **services**.
- The Tarneit Link will be needed within the next 5 or so years and the new Rail Tunnel within the next 10 or so years to allow this service expansion.
- The only proposed physical network extensions in the west are to Sunbury and Melton/Bacchus which are not dependent on the new Rail Tunnel.

**MAKE BETTER USE OF THE EXISTING NETWORK TO INCREASE CAPACITY** In parallel with the planning work for the new Rail Tunnel, planning work should be undertaken to identify, scope and cost ways to make the maximum use of the capacity of the existing rail network, including

- Operational changes that can be introduced at low cost in the short term (by 2010),
- Proposals requiring more major investments which could be implemented in the medium term (by 2018).

**SUNBURY ELECTRIFICATION**      **Proceed, but first review the scope, carry out detailed design, and then revise cost estimates for electrification and associated works to Sunbury, to enable work to commence.**

- The key reason to extend the metro service to Sunbury is to maximize the carrying capacity of the train paths on the Sydenham to Footscray corridor.
- Sunbury is not a growth pole in Melbourne 2030, in contrast to Melton; so the announcement should be accompanied by an announcement about the development of Sunbury/Diggers Rest, and of possible timing of electrification to Melton.

**DONCASTER RAPID TRANSIT**      **Implement the Smart Bus DART Upgrade announced in MOTC and the progressively upgrade it to provide a world class Bus Rapid Transit (BRT) service.** This requires these enhancements to the EWLNA proposal:

- Segregated median busway on the Eastern Freeway
- Permanent median bus lanes from the end of the Eastern Freeway along Hoddle Street, Victoria Parade and Lonsdale Street to the proposed terminus, irrespective of any decision to proceed with the Road Tunnel
- Loop rail station quality for the proposed terminus at Lonsdale Street
- Branding of the service as DART with buses in a distinct livery.

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**REVIEW of the ASSUMPTIONS, DATA and ANALYSIS  
EAST WEST LINK NEEDS ASSESSMENT  
RECOMMENDATIONS 1, 2, 3 & 6**August 26<sup>th</sup>, 2008

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**FINAL REPORT**

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**PURPOSE OF REPORT** This report presents the conclusions of a review of the assumptions, data and analysis of Recommendations 1, 2, 3 & 6 of the East West Link Needs Assessment (EWLNA) Report “**Investing in Transport: (The Eddington Report)**”.

**OBJECTIVES of the REVIEW**

To determine whether there are critical flaws in the assumptions, data and analysis underpinning recommendations One, Two, Three and Six in the EWLNA report. (A critical flaw means any error of such significance that it renders the recommendation(s) flowing from it non-viable.).

The review considered the published main report and supporting technical reports, supplemented by discussions with technical specialists and review of unpublished technical reports provided by them

**SCOPE OF THE REVIEW** The scope of this review was defined, but not constrained, by the Project Brief. The contractor was asked to review the technical feasibility, costings, BCR analysis, demand modelling, and other supporting work. The contractor was not asked to comment on the funding envelope for the recommendations, possible impacts on travel demand by car, or reduction in global emissions.

**NOTE ON THE RECOMMENDATIONS** The four EWLNA recommendations effectively refer to five projects, which are at the different stages of preparation. The conclusions of the review reflect these stages of project preparation, particularly in relation to the matters that need to be taken into account in the next stage of project development.

1. **Rail Tunnel** – the work to date can best be described as the pre – Feasibility Study Stage – (pre-FS).
2. **Tarneit Link** – pre FS
- 3A **Increasing system capacity** – pre FS
- 3B **Sunbury Electrification** – Full FS – Full Business Case
6. **Doncaster DART Upgrade** – Full FS – Business Case

**REVIEW DELIVERABLES****Recommendation 1**

Planning work should commence for the staged construction of a new 17 kilometre Melbourne metro rail tunnel linking Melbourne’s booming western and south-eastern suburbs and providing a major increase in the capacity of the rail network.

**Contractors Conclusions - Proceed with the Recommendation**

**Commence planning work examining the timing and routing for staged construction of a facility to provide extra track and passenger carrying capacity for the metropolitan rail services, based on the pre – Feasibility Study undertaken by the EWLNA team.**

The assumptions implicit in this recommendation are that,

- (i) the forecast growth in travel demand is such that a major increase in the capacity of the rail network is needed
- (ii) such a major increase in capacity can most effectively and efficiently be provided by the tunnel,

- (iii) the basic case for construction of a 17 kilometre tunnel has been made,
- (iv) the tunnel should link the north western and south eastern suburbs, on the indicative alignment shown in the EWNLA Report, and
- (v) it will be a “new generation” Melbourne Metro rail tunnel.

**The contractor finds that there are no critical flaws underpinning this recommendation.**

However, there are a number of issues related to the five assumptions that need to be addressed in the planning work.

- (i) There are currently two projections of travel demand, which influence the route and timing of the tunnel and the nature and timing of other works (in addition to the rail tunnel) that may be required to increase capacity. The first and higher set of forecasts from the Public Transport Division (PTD) of the Department of Transport (DoT), are based on forward projections of current market behaviours. The second set, from Veitch Lister Consulting (VLC) transport model use forecasts of population and employment growth and travel behaviours to forecast demand. There are detailed technical input assumptions in the application of both methodologies which give rise to the different demand forecasts. These need to be resolved, and a single agreed set of model based forecasts developed, which can incorporate low and high growth scenarios. This is one key task of the planning work.
- (ii) The tunnel is an effective and efficient way to increase capacity, but both demand projections show that extra capacity is needed now and in the period up to the likely opening date of the tunnel. The earliest possible date for a tunnel opening, (assuming a four year construction period) would be 6-7 years, depending on the time taken to obtain funding and undertake the necessary planning, design and procurement. A more reasonable assumption for planning purposes would be 10 years. Ways to effectively and efficiently increase network capacity that can implemented over the next 10 years should therefore be investigated. This investigation should be part of the planning work for the tunnel, and would be in line with Recommendation 3 that better use should be made of the existing network to increase capacity. The contractor is aware that PTD is already developing some proposals for capacity increases. (This matter is discussed in greater length under Recommendation 3). This is a second key task of the planning work.
- (iii) The basic case for the tunnel is dependent on the forecast growth in travel demand (which in turn is dependent on the continued growth in Melbourne and the CAD, and reduction in car usage), and the inability to provide the required capacity in any other way. These key elements need to be investigated further and a more rigorous options analysis undertaken if a well argued, evidence based case for the construction of the tunnel is to be made. This is a third key task of the planning work, which follows logically from the above two tasks.
- (iv) The assumptions about which sets of lines should be linked via the tunnel have been based largely on consideration of rail network capacity, and should be confirmed as part of the planning work. There is also a need to ensure that the route of the resulting cross city rail link supports and is supported by strategic spatial planning and urban development policies and actions. This should be a fourth key task of the planning work.
- (v) The EWNLA Report talks about a “New Generation” Melbourne Metro rail tunnel which provides the opportunity for introducing new rail technologies and longer trains, but without getting more specific on these aspects or the possible type of rail service through the tunnel. In contrast, the design standards, horizontal and vertical alignment, length, construction method and cost of the tunnel are discussed, but should only be considered as indicative at this pre-FS Stage. Review of all these aspects should be a fifth key task of the planning work.

**Risks** There are a number of risks that the planning work should seek to mitigate

- (a) The decision to proceed with the planning work could result in a continuation of the current apparent focus on a single piece of infrastructure to fix a range of operational and

- growth problems rather than on a more comprehensive response to solve these problems, of which the tunnel is one element
- (b) A failure to see that the \$7.5 – 8.5 Billion for the tunnel is only part of the overall cost of the public transport system upgrade needed to meet demands over the next 10 + years
  - (c) The tunnel is not seen as a piece of urban infrastructure to be considered as a candidate for funding along with other (transport and non transport) infrastructure necessary for growth,
  - (d) Unless it is demonstrated that better use of the existing network cannot produce the capacity required, critics will continue to argue that the tunnel is not needed.

### Recommendation 2

- A. The Victorian Government should bring forward the construction of a new rail connection from Werribee to Sunshine (the Tarneit link) to significantly improve the frequency and reliability of services from Werribee, Geelong, Ballarat and Bendigo.
- B. The Government should commit to using the new rail tunnel and the Tarneit link as the foundation for extending the metropolitan rail network further to the west within the next 15 years.

### Contractors Conclusions

**A. Proceed with this recommendation**, on the understanding that (a) the “Tarneit Link” includes not just a new rail connection from Werribee to Sunshine, but also works from Sunshine to Footscray to Southern Cross, so as to provide a V Line railway fully physically segregated from the metropolitan railway, and (b) the construction of the link can proceed independently of a decision on the construction of the tunnel. Start the planning work on the Tarneit Link in parallel with the planning work on the new rail tunnel.

**B. This is a commitment that the Government does not need to make.** The Tarneit Link is needed to expand **services** to the north and west on the existing network (with the possible extension to Sunbury) within about the next 5 years, and the tunnel to further expand these **services** within say the next 10 years (subject to the comments made above on the rail tunnel). Only the possible western extension of the metropolitan rail network to Melton/Bacchus Marsh appears to be dependent on the Tarneit Link and the tunnel. The matter should be examined as part of the planning work for the tunnel.

**The recommendation to bring forward the construction of the link is based on a pre Feasibility Study. There are a number of issues related to this recommendation which need to be addressed in the proposed planning work.**

- (i) What is meant by “the Tarneit Link”? In the EWLNA report it is described as a “proposed new rail corridor between Footscray and West Werribee via Deer Park and Tarneit.” Apart from the link itself, this would involve a new track pair from Sunshine to Footscray, effectively adding a fourth track to the third track proposed over this section in MOTC. The scope and proposed construction date of the link needs to be clarified.
- (ii) The report also says “the exact scope of works will differ according to the capacity enhancement scheme implemented between Footscray and the CBD”. The planning work should continue the work started by PTD into alternatives ways to provide this capacity enhancement. This should include provision of a two track route from Footscray to Southern Cross for V/Line trains which would be physically segregated from metropolitan trains and developed using a combination of upgraded existing track/facilities and new track/facilities.
- (iii) The alignment of the link itself. The current proposal follows the corridor in the 1990 Werribee Growth Area Plan, but is on the edge of the metropolitan urban growth boundary in Melbourne 2030, and so could cause pressure to extend the boundary. Other

- options for a new alignment should be considered. One possible option is the proposed Outer Metropolitan Transport Corridor.
- (iv) A full options analysis (including benefit cost analysis) of alternatives. This should include some assessment of the feasibility and costs of increasing capacity on the existing Werribee - Newport - Footscray corridor.
  - (v) The service plan for Geelong service, particularly if the link itself were to follow the proposed alignment, as initially this would involve some V/Line Geelong services stopping to serve the new stations proposed on the link.

### **Recommendation 3**

During the planning and construction of the rail tunnel, the Victorian Government should

- A. continue to make better use of the existing network to increase capacity, including
- B. commence work on the electrification of the network to Sunbury to boost services on the Sydenham line.

### **Contractors Conclusions**

**This recommendation really has two parts –**

- A. Make better use of the existing network to increase capacity, and**
- B. Electrification to Sunbury.**

**Make better uses of the existing network to increase capacity – proceed with recommendation and start the planning work.** The EWNLA is silent on ways to increase capacity. The contractor considers this requires short term (2010) improvements in current operational performance, and supports the approach being taken by PTD to achieve these. But is also requires developing a time based and costed plan to remove operational and capacity constraints so as to progressively raise the maximum practical reliable capacity of all lines – with a target of no less than 24 trains/hour. The contractor considers that in parallel with the planning work for the tunnel, medium term (2010 – 2018) measures to increase capacity should be identified and subjected to a subjected to pre-FS. Those that are found to feasible, economically viable, not likely to cause undue disruption during implementation, and not made redundant by construction of the tunnel, should then be subjected to moved to a full FS/Business Case Assessment.

The forecast future growth, even with the tunnel will put pressure on all lines in the network, some sooner some later, and so require that the maximum reliable use is being made of these scare resources. The approach outlined would support the options analysis aspects of the planning work for the tunnel, and help to refine the desirable opening date of the tunnel. It would also provide a contingency plan to provide extra network capacity in the event that the construction start date of the tunnel is pushed back from 6 years to 10 years, or even to 15 years. In discussions, a view was expressed that implementation of measures to improve capacity cannot be implemented in advance of the tunnel without "disrupting" the system. The contractor acknowledges this may be true but considers that the case has not been made that such disruptions would be unacceptable to stakeholders.

**B. Electrification to Sunbury – Proceed, but first review the scope, carry out detailed design, and then revise cost estimates for electrification and associated works to Sunbury, to enable work to commence.**

Sunbury electrification is an operational response to the problem of shortage of train paths and passenger carrying capacity south of Sydenham on the metro rail system. A full Business Case has been prepared. Electrification as first does not seem as the most logical solution to the problem, but none of the other options would meet the short and long term patronage demands, service and reliability standards.

**A key risk is that electrification to Sunbury (not a growth pole in Melbourne 2030) raises the question of why not also electrify to Melton (a growth pole).**

### **Recommendation 6**

Public transport in the Doncaster Region is best provided by rapid high quality bus services, additional bus priority measures, and a new bus rail interchange at Victoria Park. To deliver this standard of services, the DART upgrade announced in the 2006 MOTC plan should be introduced as soon as possible, along with additional service enhancements and bus priority measures undertaken in conjunction with Recommendation 4 (Planning work should commence on the staged construction of a new 18 kilometre cross city road connection extending from the western suburbs to the Eastern Freeway.).

### **Contractors Conclusions – Proceed with the Recommendation**

The team undertook a full Feasibility Study, including analysis of heavy rail, Light Rail Transit (LRT) and bus based options. The bus based option builds on the SmartBus DART upgrade announced in the 2006 MOTC plan. The contractor supports the Study Team findings that a bus based system has ‘the **potential** to give Doncaster a world class *bus rapid transit* service’. But the contractor considers that for this potential, and the objective of providing a “rail style public transport service” to be fully realised, some upgrading of the current proposals is required.

The Contractor proposes these enhancements to better provide a world class bus rapid transit (BRT) service:

- (a) Use of a segregated median bus way on the Eastern Freeway – instead of the proposed use of the emergency lanes. The contractor questions the view that operating speeds using the emergency lane are adequate.
- (b) Use of permanent median bus lanes from the end of the Eastern Freeway at Hoddle Street to the proposed terminus at Lonsdale Street/Spencer Street. The requirement for permanent bus lanes should be deemed not negotiable – what would be negotiable is the design of the lanes and ways to provide replacement parking (for parking removed from the bus lane), and for deliveries.
- (c) Better quality terminal arrangements at Lonsdale Street/Spencer Street –offering passengers a CAD station environment similar to that offered train passengers at the loop stations.
- (d) Branding of the service as DART with buses in a distinct livery. Overseas experience would suggest that a distinct product branding is needed, as DART should be designed to offer a quality of service superior to “SmartBus”

The contractor disagrees with the EWLNA conclusion that the service upgrades be undertaken in conjunction with construction of the proposed cross city road tunnel. Additional service enhancements and bus priority measures can and should be undertaken irrespective of any decision on the road tunnel. If a decision were made to construct the road tunnel, then the priority treatments along the Freeway and bus only ramps between the Freeway and Hoddle Street would be designed to be compatible.

**There are a number of items that should be reviewed in moving forward the design work and refining the costs for this recommendation.** These include:

- (i) The scale of the proposed bus/rail interchange at Victoria Park
- (ii) Proposals for use of Johnson Street
- (iii) Refining extent of bus lanes and SmartBus stop upgrades based on latest DART SmartBus Business Case.

**There are a number of risks that the next stage of design work should seek to mitigate:**

- (i) Unless a full rail style world class bus rapid transit service is provided, the pressure for an LRT or even a heavy rail line will continue
- (ii) All day bus lanes from Eastern Freeway into the CAD are an essential part of the project. Possible objections from councils to implementation of these lanes will need to be overcome.

If necessary, as the EWLNA Report recommends, the State Government should use its powers to ensure public transport priority. The risk arises if the State Government is unwilling to do this.

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EAST WEST LINK NEEDS ASSESSMENT  
RECOMMENDATIONS 1, 2, 3 & 6**August 26<sup>th</sup> 2008

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**FINAL REPORT**

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**INTRODUCTION**

**Purpose of Report** This draft report presents the conclusions of a review of the assumptions, data and analysis of Recommendations 1, 2, 3 & 6 of the East West Link Needs Assessment (EWLNA) Report “**Investing in Transport:** (The Eddington Report).

**Recommendation 1**

Planning work should commence for the staged construction of a new 17 kilometre Melbourne metro rail tunnel linking Melbourne’s booming western and south-eastern suburbs and providing a major increase in the capacity of the rail network.

**Recommendation 2**

The Victorian Government should bring forward the construction of a new rail connection from Werribee to Sunshine (the Tarneit link) to significantly improve the frequency and reliability of services from Werribee, Geelong, Ballarat and Bendigo.

The Government should commit to using the new rail tunnel and the Tarneit link as the foundation for extending the metropolitan rail network further to the west within the next 15 years.

**Recommendation 3**

During the planning and construction of the rail tunnel, the Victorian Government should continue to make better use of the existing network to increase capacity, including commencing work on the electrification of the network to Sunbury to boost services on the Sydenham line.

**Recommendation 6**

Public transport in the Doncaster Region is best provided by rapid high quality bus services, additional bus priority measures, and a new bus rail interchange at Victoria Park. To deliver this standard of services, the DART upgrade announced in the 2006 MOTC plan should be introduced as soon as possible, along with additional service enhancements and bus priority measures undertaken in conjunction with Recommendation 4 (Planning work should commence on the staged construction of a new 18 kilometre cross city road connection extending from the western suburbs to the Eastern Freeway.).

**Objective** As set out in the Project Brief (See **Annex 1**), the objective of the review is to determine whether there are critical flaws in the assumptions, data and analysis underpinning recommendations 1, 2, 3 & 6 in the EWLNA report. A critical flaw in this context means any error of such significance that it renders the recommendation(s) flowing from it non-viable. The review is to have a particular focus on the following dimensions of the recommendations:

- Costs;
- Transport demand assumptions and findings
- Economic outcome
- Technical feasibility; and
- Relationship to Government’s preferred urban planning outcomes ( especially with reference to Melbourne 2030)

The review considered the published main report and supporting technical reports, supplemented by discussions with technical specialists and review of unpublished technical reports provided by them. The list of publications is set out in **Annex 2**, and the persons consulted are listed in **Annex 3**. The report indicates in bold italics *matters which will require particular consideration if a full business case were to proceed.*

**Approach to the Review** The four recommendations under review all concern **projects**. In undertaking the review, the contractor has therefore adopted the following fairly standard approach to analysis of projects

- (i) Determine the objective of recommendation, either as stated explicitly in the EWNLA Report, as assessed by the contractor
- (ii) Define the problem the recommendation is trying to solve, or other main reason
- (iii) Determine the options considered to address this problem and meet the objective.
- (iv) Review whether the options analysis is methodologically sound, and the recommended option appears to be the most appropriate, taking into account forecast future travel demand, technical and operational feasibility, costs, local planning and environment, and expected benefits.
- (v) Suggest matters that need to be taken into account in the next stage of project development.

**Status of Preparation of Projects** The four recommendations effectively refer to five projects, which are at the different stages of preparation. The conclusions of the review reflect these stages of project preparation, particularly in relation to the matters that need to be taken into account in the next stage of project development.

1. **Rail Tunnel** – the work to date can best be described as the pre – Feasibility Study Stage – (pre-FS).
2. **Tarneit Link** – pre FS
- 3A **Increasing system capacity** – pre FS
- 3B **Sunbury Electrification** – Full FS – Full Business Case
7. **Doncaster DART Upgrade** – Full FS – Business Case

**Scope of the Review** The scope of this review was defined, but not constrained, by the Project Brief. In particular the contractor was not asked to comment on the funding envelope for the recommendations, possible impacts on travel demand by car, or reduction in global emissions.

It is equally important to note that the review took place in the context of the scope of the EWNLA, and current State Government Transport and Planning policy, particularly Meeting our Transport Challenges (MOTC) and Melbourne 2030 . However as part of the review, the contractor has made comments on the inter-relationships between these three.

**Report Contents** In order to provide the deliverables requested in the Project Brief, the report has an Executive Summary, followed by four chapters, one for each recommendation, and each chapter generally contains the following sections.

- Assessment of the Objective of the recommendation
- Assessment of the main reasons for the recommendation
- Analysis of Assumptions and Findings
  - Methodologies Used
  - Travel Demand Assumptions and Findings
  - Technical Feasibility – Feasibility Studies, Operational Planning and Costs
- Relationship to Urban Planning (including Melbourne 2030)
- Key Risks to Timing and Costings
- Matters that will require particular attention if a full feasibility study and business case were to proceed.
- Advice on other important issues as assessed by the contractor

**Foreward** The recent upsurge in public transport (especially rail) patronage the problems this has created and the recommendations in the EWNLA Report to address these problems, and the funding requirements these imply have to be seen in a longer term context. Public transport (PT) patronage has been growing slowly for a long period, and has effectively doubled over the past twenty

years. This slow growth has provided little incentive to spend significant resources on planning and less incentive to invest in expanding the capacity of the existing system. Within the metropolitan rail system, the large capital programs in the 80's, 90's and 2000's were largely for replacement and modernisation of life expired equipment, rolling stock and maintenance facilities (including Jolimont Decentralisation), with some expansion of the network. These investments provided the basic facilities for the continued provision of a metropolitan rail serve, with little increase in capacity. They did not however address (nor were they intended to) the basic questions that the recommendations are seeking to address – what needs to be done to get the maximum reliable capacity out of the current system, and if this capacity is not enough to meet future travel demands, what else needs to be done to provide the necessary capacity. This review should be read in this context.

**RECOMMENDATION 1 THE NEW RAIL TUNNEL****Recommendation 1**

Planning work should commence for the staged construction of a new 17 kilometre Melbourne metro rail tunnel linking Melbourne's booming western and south-eastern suburbs and providing a major increase in the capacity of the rail network.

**Contractors Assessment of the Objective of the Recommendation**

Provide a major increase in the capacity of the rail network linking Melbourne's booming western and south-eastern suburbs.

**Contractors Assessment of the main reasons for the recommendation**

The tunnel is predicated on the basis of

- (i) forecasts of future demand based on the recent large annual growth in rail patronage after many years of limited growth and
- (ii) a lack of capacity in the existing rail system to accommodate this growth in demand.

**Analysis of Assumptions and Findings****Travel Demand Assumptions and Findings**

Recommendation 1, (as well as Recommendations 2 & 3) all rely on a combination of (i) Forecasts of growth in travel demand by the Public Transport Division (PTD) of the Department of Transport (DoT), based on a continuation of current market behaviours and demand modelling by Veitch Lister Consultants (VLC) using a conventional four step transport model. The issue that has arisen is that the PTD approach results in higher estimates of future travel demand than the VLC model. In turn this means that providing extra capacity to meet the PTD demand forecasts requires earlier implementation of the tunnel and other system upgrades than if the the VLC forecasts are used.

PTD has done extensive analysis of the underlying causes of recent growth in rail travel. It found that much of the increase can be attributed to changes in the known parameters of travel demand – overall growth in population, growth in employment opportunities in CAD and environs, and increases in the generalised cost of car travel (including increases in petrol prices). Discussion in focus groups also suggested that the **combined effect** of increased congestion, parking charges and petrol prices is causing a greater reduction in car usage than was previously recorded and modelled. This is a valid approach to forecasting short term (3-5 year) travel demands. However, despite the quality of the analysis, it is not a methodology that would be generally accepted as robust enough for forecasting longer term demand.

The forecasting in the VLC Zenith model is appropriate. The model forecasts of the future travel demand have been questioned as being underestimates on the basis that some of the input parameters do not reflect current market behaviours, and in particular the issues emerging from the focus groups as discussed above. This is a valid criticism of some of the parameters of the model, but it is a technical problem that can be addressed, and should be fixed as a key task of the planning work for the tunnel. (Similar problems are reported in modelling undertaken in current studies in Sydney.).

*This matter will require particular consideration if a full business case were to proceed*

The Local Government Unit (LGU) population data projections are robust and based on Government Victoria in the Future (VIF)/Melbourne 2030 forecasts. However the nature and extent of Government support for the LGU employment opportunity forecasts used in the model is not clear. The contractor is concerned that for each population scenario (Base Case, Low Growth, High Growth, and Carbon Constrained) only one spatial distribution of population appears to have been tested, with limited use of the model for examining the implications of different distributions of population/employment and mode share or for testing/designing rail network options.

The conclusion reached is that neither the PTD nor the VLC forecasts inform the decision making process of when travel demand may be such that a tunnel is needed, or assist in the design of infrastructure and services/operational plans to meet future demand.

***This matter will require particular consideration if a full business case were to proceed***

Reviews of input and output data from the models used would suggest that IF Melbourne 2030 forecasts of MSD population and Inner Area employment are achieved and IF public transport mode share is at least maintained, then the future demand for rail services could increase by 50%. If an increase of 50% in rail mode share by 2030 is forecast (reflecting a continuation of the current changes in travel behaviour) then demand for rail services could increase by 75%. The consensus view emerging from discussions with transport analysts, planners and operators is that this level of increase is beyond the capacity of the existing rail system even after undertaking all other capacity increasing initiatives, including targeted capital works activities to remove specific constraints, and introduction of new generation trains. From their published submission to the EWLNA, the incumbent operator appears to share this view.

## **Technical Feasibility**

**Feasibility Studies** The standard approach to examining technical feasibility of a project is through Feasibility Studies (FS). There are two stages in an FS. In the first, the problem is identified, the objective of the project is set, and a number of options to solve the problem and meet the objective are identified. These options are then subjected to an options analysis including engineering, environment, costing and (for Public Transport), service planning. Public consultation and environmental assessment are an integral part of the process. The options are evaluated, and a preferred option selected which is then subjected to more detailed study in the second stage.

The supporting technical papers provide what could be termed a pre FS, that provides limited information on the problems, options and costs, but concludes that the tunnel is the most appropriate solution to the capacity problem. There appears to have been limited examination of ways to increase the capacity of the existing network through a range of operational changes and investments. (The contractor is aware that PTD is preparing some proposals for operational changes to provide increase in capacity by 2010). The assumptions regarding reliable practical line capacity in terms of trains/hour and of passenger capacity/hour using different rolling stock and revisions to loading standards in particular require robust investigation and discussion. This is a critical flaw in the methodology, which can and should be addressed as part of the planning work.

***This matter will require particular consideration if a full business case were to proceed.***

The contractor has concerns on a number of the rail tunnel design criteria assumed.

***This matter will require particular consideration if a full business case were to proceed***

**Operational Planning** A key aspect of any FS for PT projects is operational planning. This is the process of designing the services that will run on the new/ungraded infrastructure. It is based on travel demand forecasts by OD zone or station pair and service design standards and constrained by line capacity/train paths. It is unfortunate that so much of the discussion on future planning related to the recommendations 1, 2 & 3 is limited to discussions on train paths. But it is reassuring that there is a measure of discussion of design options for use of train paths.

Data from 2006 surveys on station to station travel demand is available for operational planning of services. The contractor understands this includes data on loadings per train by line section, which would enable more precise definition of the overloading problem. The contractor also understands that this data is now being used in the current exercise to define operational changes to provide increase in capacity by 2010). The contractor supports this approach.

Service design standards include seated and standing passengers per train, length of time standing, crush loading (persons/m), stopping patterns, operating speeds, acceleration and braking rates, length

of train, and dwell times. The existing 800 passenger/train load standard and dwell times are quoted in discussions, but in the current environment of lack of capacity, and the impacts of V/line services on metro services, there should be more discussion of standards for both metro and V/line services, in particular those from Geelong, Ballarat and Bendigo. The contractor is aware that PTD has work in process addressing these issues.

*This matter will require particular consideration if a full business case were to proceed.*

As well as the operational planning for the short term (2010), operational planning for the medium and longer term is taking place as part of part of the PTD response to EWLNA, This planning is looking at loading standards, and is also making some assumptions on works required to remove operating constraints. However the results need to be integrated with other tasks of the FS process discussed above.

### Costs

The costs for the tunnel are based on costs of comparable works in Australia and New Zealand. They include expenditure on track, signalling, power supplies, and stations. Three separate estimates were obtained from different consultants and compared. The quoted cost of \$7.5 – 8.5 Billion includes \$1.5 Billion for the Tarneit Link. **The costs** are based on contractor sale (market) prices and include risk and a 20% allowance for contingencies, but **exclude client costs (for planning, design and project management), DoT fees and escalation.** They should therefore be accepted for what they are – best estimate concept costs based on a concept scope of works for a tunnel to be built shortly.

*This matter will require particular consideration if a full business case were to proceed.*

### Relationship to Urban Planning (including Melbourne 2030)

The tunnel project would facilitate the continuation of the Melbourne CAD and environs as the predominant tertiary employment centre in Melbourne, as envisaged in Melbourne 2030. But the reverse is also true – the extra train capacity into the Central Activities District (CAD) is only required if Inner Melbourne employment continues to grow as forecast in the inputs used for the VLC transport demand modelling.

The tunnel would also improve cross city accessibility and the size of the labour market, but the contractor has yet to review the extent of this increase compared to through/cross centre running which is being considered for introduction in the short term.

The contractor understands from PTD that the planning of the alignment and the station locations through the CAD has been done in conjunction with the local planning authority, but has not had any separate discussions with planning authorities. Good practice is to use new stations to stimulate economic regeneration, with developments on stations providing a source of funding for the station construction.

*This matter will require particular consideration if a full business case were to proceed.*

The extent to which strategic planning of the future rail services across the network and the associated infrastructure has been discussed with the Department of Planning and Community Development (DPCD) is unclear. There is a need to ensure that the proposed cross city rail link supports and is supported by strategic spatial planning and urban development policies and actions

*This matter will require particular consideration if a full business case were to proceed.*

### Key Risks to timing and costings

The key risks on timing are likely to be

- (i) the amount of time to secure the funding required, and depending on the requirements of the funding agency, the amount of time required to prepare the case for funding, and

- (ii) the amount of time to complete the planning and engineering studies to fix the alignment, underground station locations, and vent shafts,

To avoid unnecessary expenditure, these activities should be completed before detailed engineering design is started.

The key risk to costing is that the current estimates can only be considered as concept design estimates for a tunnel to be built shortly.

**Contractors Conclusion** Based on this review, planning work for new rail capacity into the inner area should commence/continue, including a cross CAD tunnel.

**Matters that require particular consideration if a full feasibility study and business case were to proceed.**

- (i) The planning work for the tunnel should include consideration of length, alignment, connections to the existing rail network and station locations with a view to minimising the tunnel length (and hence costs) and maximising the patronage.
- (ii) The alignment proposed is not unreasonable but other alignments should be considered with a view to supporting development in areas adjacent to the CAD.
- (iii) Updating and recalibration of the VLC model for use in the planning work and then extensive use of the model for demand modelling including “what if” scenario testing of land use distributions and modal share assumptions.
- (iv) Preparation of a realistic time based schedule for all activities leading to commissioning of the tunnel. As a working assumption, the planning work for the tunnel should assume that the earliest opening date would be in 10 years (2018), with later opening dates more likely.
- (v) The type of services to be operated through the tunnel. It is suggested that operations planning should assume that the tunnel should be used for RER type services (regional, with longer distance between stations – a combination of current metro express and V/line regional services) rather than “metro” style services with approx 1 km between stations.
- (vi) The ways to integrate the tunnel and the associated NW-SE railway into the Melbourne 2030 Strategy as part of integrated urban development and infrastructure proposals for the implementation of Melbourne 2030. (The parallels to be drawn here would be the RER/La Defense in Paris and Jubilee Line/London Docklands).

**RECOMMENDATION 2 THE TARNEIT LINK****Recommendation 2**

- A. The Victorian Government should bring forward the construction of a new rail connection from Werribee to Sunshine (the Tarneit link) to significantly improve the frequency and reliability of services from Werribee, Geelong, Ballarat and Bendigo.
- B. The Government should commit to using the new rail tunnel and the Tarneit link as the foundation for extending the metropolitan rail network further to the west within the next 15 years.

In the following discussions, the term “Tarneit Link” is taken to mean

- a) A new two track railway from West Werribee to Deer Park (the link itself)
- b) Addition of a fourth track between Sunshine and Footscray (in addition to the third track proposed under MOTC).

The Engineering Design and Costing Report (page 47) says “The exact scope of the works will differ according to the capacity enhancement scheme implemented between Footscray and the CBD.” The contractor understands that the scope and costs of the Tarneit Link in the EWLNA make no provision for such capacity enhancement. However, the contractor has been advised that PTD are now investigating alternatives ways to provide a two track route from Footscray to Southern Cross for V/Line trains which would be physically segregated from metropolitan trains and developed using a combination of upgraded existing track/facilities and new track/facilities.

**Contractors Assessment of the Objective of the Recommendation** To significantly improve the frequency and reliability of services from Werribee, Geelong, Ballarat and Bendigo, in response to increased demand

**Contractors Assessment of the main reasons for the recommendation**

The link is predicated on the basis that

- (i) Future travel demand to the CAD from Geelong and Werribee will require extra train services that cannot be accommodate on the existing tracks (even with currently proposed upgrades) and
- (ii) Future travel demand from Melton/Bacchus Marsh and Sunbury/Sydenham to the CAD will require extra trains, which combined with requirements from Ballarat and Bendigo cannot be accommodated on the two existing tracks from Sunshine to Footscray.
- (iii) Construction of two new tracks from Sunshine to Footscray (one of which is already included in MOTC) and on to Southern Cross provides the capacity to meet future travel demands from all three lines (Bendigo/Sunbury, Ballarat/Melton and Geelong), and enables V/Line and metropolitan services to be physically separated on their own dedicated tracks.
- (iv) Geelong trains need the Tarneit Link itself to access this extra capacity provided between Sunshine and Southern Cross.

**Analysis of Assumptions and Findings****Travel Demand Assumptions and Findings**

Future travel demand into the CAD from Werribee is highly dependent on a continuation of the current rate of growth in the City of Wyndham, and lack of intervening employment opportunities. The increase in demand assumed on the Werribee line is accord with the EWNLA forecast population and employment growth, which shows a continuing shortfall of 20,000 jobs in Wyndham, even in 2031.

Similar comments apply to Geelong, where demand is forecast to increase by 40%.

However for Geelong services, the question then arises of the services that need to be provided to meet this demand. There are currently five trains/hour. It is envisaged this would rise to eight trains/hour in 2027. Using larger trains is also being considered.

Demand for services from Ballarat (excluding Bacchus Marsh) and Bendigo is assumed to double over 20 years, which is far greater than population. (Increased demand from intermediate points principally Sunbury and Melton is shown as occurring earlier and being catered for by “metro” not regional services – see further discussion below). However the question (as in Geelong) is more one of what frequency and level of service should be offered at peak. This is a matter that is not discussed in EWNLA

*This matter will require particular consideration if a full business case were to proceed.*

But the overall conclusion is that there are no flaws in the demand projections for Werribee, Geelong, Ballarat and Bendigo.

## Technical Feasibility

**Feasibility Studies** No evidence has been presented that it is not feasible to provide extra capacity on the Geelong/Werribee corridor by constructing an extra two tracks from Werribee to Footscray. The published material discusses the provision of a third track. Site investigation by the contractor suggests that the most critical section for provision of four tracks (or even a third track) would be in Yarraville, from Francis Street to Somerville Road. The Yarraville Station precinct is a particularly sensitive area. .

The proposed alignment for the “Tarneit Link” itself follows the corridor in the 1990 Werribee Growth Area Plan. However, it is on the edge of the metropolitan urban growth boundary in Melbourne 2030, and so could cause pressure to extend the boundary. Other options for a new alignment should therefore be considered. One possible option is the proposed Outer Metropolitan Transport Corridor.

The key requirements to improve reliability on the Ballarat and Bendigo lines are considered by PTD (and their advisors) to be

- (i) Separating the regional services from the increasing numbers of metro services, particularly west of Footscray.
- (ii) Continuing the separation of metro and regional services between Footscray and Southern Cross

It is proposed that (i) can be achieved by construction of two extra tracks Sunshine – Footscray (as indicated in the EWLNA Report) and a rail over rail flyover at Sunshine. This proposal is in effect an expansion of the proposal in MOTC to provide a third track over this section. The pre – FS investigations undertaken for the EWLNA concluded that this was feasible, but no concept designs were prepared.

The assumption in the EWLNA was that (ii) would be achieved by placing two tracks for metro services into the new Rail Tunnel, and so no other proposals were put forward. As noted above, PTD are now investigating alternative ways to provide a two track route from Footscray to Southern Cross for V/Line trains which would be physically segregated from metropolitan trains. One option being considered is use of an upgraded Bunbury Tunnel – but this is considered to be only a short term solution due to the increasing use of the tunnel for Rail Freight.

*These matters will require particular consideration if a full business case were to proceed.*

## Costs

The costs of \$1.5 billion include not just the Tarneit Link, but the works for upgrading the tracks and other works between Sunshine and Footscray, as well as rail over rail flyovers at West Werribee, Deer Park and Sunshine.

As for the new Rail Tunnel, **the costs quoted of \$1.5 billion** are based on contractor sale (market) prices and include risk and a 20% allowance for contingencies, but **exclude client costs (for planning, design and project management), DoT fees and escalation**. They should therefore be accepted for what they are – best estimate concept costs based on a concept scope of works for construction to be undertaken shortly.

*These matters will require particular consideration if a full business case were to proceed.*

### **Relationship to Urban Planning (including Melbourne 2030)**

The alignment of the Tarneit Link is on the edge of the urban growth boundary shown in Melbourne 2030 and confirmed in the recent Audit. PTD advises that activity centres to service development adjacent to the line are included in the planning for the stations.

The initial assessment of the contractor is that such arrangements would lead to pressure for development north of the link up to the Western Highway. The contractor understands that local government covering the Tarneit area would be in favour of development outside the urban growth boundary.

These concerns on the alignment of the link would be mitigated if the alignment for the link could be moved further east (starting east of Werribee) so that it is within the urban area – if a suitable corridor could be identified. Alternatively, the link could be moved further west so that it passes entirely through rural areas well outside the urban growth boundary, linking into the Ballarat/Bacchus Marsh line near Rockbank/Caroline Springs.

*These matters will require particular consideration if a full business case were to proceed.*

### **Key Risks to timing and costings**

The key risk to timing is considered to be the urban planning issue discussed above. If that is resolved, a subsequent risk would be delays in compulsory land acquisition.

The key risk to costing is that the costs are concept costs based on a concept scope of works for construction to be undertaken shortly.

### **Contractors Conclusion**

- A. Proceed with the recommendation to bring forward the construction of the Tarneit Link, and start planning work in parallel with planning work for the rail tunnel.
- B. This is a commitment that the Government does not need to make, as the link and the rail tunnel are needed to expand services on the existing network (extended to Sunbury), not the metropolitan rail network itself.

### **Matters that require particular consideration if a full feasibility study and business case were to proceed.**

- (i) Confirmation (or otherwise) by DPCD that the proposed alignment for the Tarneit Link is in accord with Melbourne 2030. Subject to the response, detailed planning and design studies for the link should be undertaken. In the event that the currently proposed alignment of the Tarneit Link is not acceptable, investigate whether other alignments can be identified either fully within or completely outside the urban growth boundary.
- (ii) Continuation of the planning, engineering design and service design work for the proposals to significantly improve the frequency and reliability of services from Ballarat

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- and Bendigo (as well as Sunbury/Sydenham and Melton) by construction of two extra tracks Sunshine – Footscray and a rail over rail flyover at Sunshine
- (iii) Rigorous investigation of the options for separating these V/Line services and metro services between Footscray and Southern Cross including the potential for upgrading and use of the Bunbury Tunnel in the short term.
  - (iv) Further engineering feasibility studies into ways to improve the frequency and reliability of services from Werribee and Geelong, in the rail corridor from Werribee via Newport to Footscray (including the Altona loop), including through provision of four tracks over this section. The feasibility and cost of this option should be compared with item (i) construction of the “Tarneit Link” itself.
  - (v) Development of a Strategic Plan for V/Line train services to/from Ballarat, Bendigo and Geelong (as well as Seymour and the Latrobe Valley), including operational planning of future requirements for train services to/from Ballarat, Bendigo and Geelong and the impact on the use of lines and train paths in the metro area, taking account of
    - (a) a review of forecasts of the future travel demand based on updated demographic and travel behaviour information,
    - (b) rail service options to meet this demand be developed, including the stopping patterns, assuming use of 6 car trains, and
    - (c) use of new DMU trains with operational (acceleration/braking) characteristics similar to “new generation metro EMU so that they would use less train paths where metro and regional services have to share lines (prior to complete separation of services).

## RECOMMENDATION 3 MAKE BETTER USE OF THE EXISTING NETWORK AND SUNBURY ELECTRIFICATION

### Recommendation 3

During the planning and construction of the rail tunnel, the Victorian Government should continue to make better use of the existing network to increase capacity, including commencing work on the electrification of the network to Sunbury to boost services on the Sydenham line.

### Contractors Assessment of the Objective of the Recommendation

- (i) To make better use of the existing network to increase capacity,
- (ii) To boost services on the Sydenham line

### Recommendation 3A

#### Make better use of the existing network to increase capacity

### Contractors Assessment of the main reasons for the recommendation

- (i) A consensus amongst transport analysts, planners and operators that more capacity could be provided by the current system, particularly in the inner core (CLIC). *(The views of current incumbent operator are not known at this stage).*
- (ii) Limited previous attempts over a number of years to increase capacity when demand was not increasing, and consequently limited investment.

### Analysis of Assumptions and Findings

Lack of growth in demand until the upsurge experienced in the past few years provided limited incentives to analyse ways to make more efficient use of the existing system through changes in operating practices and investments to remove capacity constraints. Even so, MOTC did propose one operational change (reversal of the Clifton Hill loop) and a number of investments in track and signalling.

It is unfortunate that EWNLA did not focus more on analysing the constraints to making better use of existing capacity and to the scope, cost and timing measures needed to remove these constraints, since they can be progressively implemented as demand grows earlier than the proposed tunnel. This requires firstly short term (2010) improvements in current operational performance, and the contractor supports the approach being taken by PTD to achieve these. But it also requires developing a time based and costed plan to remove operational and capacity constraints so as to progressively raise the maximum practical reliable capacity of all lines – with a target of say no less than 24 trains/hour. The contractor considers that pre-FS planning studies for potential medium term (2010-2018) improvements should be undertaken in parallel with the planning work for the tunnel.

### Planing Work Required.

In parallel with the planning work for the tunnel, medium term (2010 – 2018) measures to increase capacity should be identified and subjected to a subjected to pre-FS. Those that are found to be feasible, economically viable, not likely to cause undue disruption during implementation, and not made redundant by construction of the tunnel, should then be subjected to moved to a full FS/Business Case Assessment.

The forecast future growth, even with the tunnel will put pressure on all lines in the network, some sooner some later, and so require that the maximum reliable use is being made of these scarce resources. The approach outlined would serve to identify what needs to be done to achieve the

maximum reliable capacity of the system, the time it would take, the potential disruptions while the work is being carried out, and the costs involved. It would support the options analysis aspects of the planning work for the tunnel, and help to refine the desirable opening date of the tunnel.

It would also provide a contingency plan to provide extra network capacity in the event that the construction start date of the tunnel is pushed back from 6 years to 10 years, or even to 15 years. In discussions, a view was expressed that implementation of measures to improve capacity cannot be implemented in advance of the tunnel without "disrupting" the system. The contractor acknowledges this may be true but considers that the case has not been made that such disruptions would be unacceptable to stakeholders.

*These matters will require particular consideration if a full business case were to proceed.*

**Contractors Conclusion** During the planning of the rail tunnel, the Victorian Government should continue the *investigation, planning, design and implementation of operational changes and investments* to make better use of the existing network and to increase capacity.

### **Matters that require particular consideration if a full feasibility study and business case were to proceed.**

- (i) Review and justification of all current assumptions used for operational planning, including line capacity, dwell times, train loading standards, service patterns for both metro and regional trains.
- (ii) Identification of all operational capacity and reliability constraints, with an indication of possible solutions.
- (iii) Screening of solutions and cost efficient FS on those which can be implemented within a 10 year time frame.
- (iv) Use of upgraded VLC model as appropriate to undertake "what if" tests of travel demand of different operational scenarios.

### **Recommendation 3 B Electrification to Sunbury**

#### **Contractors Assessment of the main reasons for the recommendation**

- (i) Travel demand in the Sydenham corridor has been increasing and it is considered to be a more efficient use of resources (especially trains and train paths) to meet this demand through the extension of the metro services from Sydenham/Wintergardens to Sunbury, rather than through the development of an upgraded V Line DMU service from Sunbury.
- (ii) Electrification to Sunbury has featured in Government proposals at least since MetPlan in 1988, although was not included in MOTC.

#### **Analysis of Assumptions and Findings**

**Demand Projections.** The demand projections for patronage from Watergardens south are based on the PTD methodology. As noted elsewhere in this report, this approach is acceptable for forecasting short term increases in demand. The demand forecasts show the need for further increases in metro services in the short term beyond the increase from six to nine trains/hour proposed as part of the 2009 timetable.

The projections for demand from Sunbury and Diggers Rest in the "with project" scenario make use of lessons learned about patronage increases from the recent extension of electrification to Craigieburn. These indicate that electrification and the associated increase in service frequency could result in a doubling of current patronage from the Sunbury/Diggers Rest area. The net result is that

the short term “with project” demand projections justify the proposal to provide four metro services/hour at peak from Sunbury.

### Technical Feasibility

The key arguments for this proposal relate to the most efficient way to cater for the increasing demand for rail services from Sydenham (and to a lesser extent Sunbury). Sunbury is currently serviced at peak by three diesel powered trains with average loads around 330 passengers, which use three train paths to reach the CAD. The preferred solution is to bring Sunbury into the area covered by metro services, and replace these V/Line services with four 800 passenger capacity electric multiple unit (EMU) metro trains providing metro style stopping services.

A number of other options were considered, but were not written up in detail in the Final Business Case Report. The other option most advocated would be to operate the Sunbury service using a 6 car V/Line Diesel Multiple Unit (DMU) with similar operating characteristics to the EMU, operated as a metro stopping service inbound from Sydenham to serve growing demand. The difficulties with this option are that the current (and on order) V/line Velocity trains have insufficient doors per carriage to meet the passenger load/unload times required for metro services. They also have fewer seats per train and would require a major refit to provide an equivalent number of seats to metro trains.

Purchase of new higher capacity Velocity trains would overcome these difficulties, but such trains could not be available for five years, and this proposal would not fit with the overall agreed strategy for rail services which envisages electrified metro services operating to Sunbury and Melton. The contractor has also discussed a number of other possible short term solutions using V/Line rolling with PTD, but none would meet the metro service design and reliability standards.

**Operational Planning** – See comments made above (in discussing the Tarneit Link) in relation to services from Ballarat and Bendigo. Services from Wintergardens are proposed to be increased from 6 to 9 trains per hour in the next timetable revision. DoT considers that mix of these 9 metropolitan services together with the 8 V/Line services currently operating in the corridor will use all the reliable practical capacity of the line. Replacing three of these V/line services (from Sunbury) with metro EMU would gain an extra train path and enable a total of 13 metro services per hour to be operated south of Watergardens.

**Costs** – In contrast to the new Rail Tunnel and the Tarneit Link, the cost estimates presented in the full business case report are based on a fairly detailed but still outline scope of works, and the DoT estimating methodology.

The scope of works appears to cover all infrastructure items, including train stabling, but not the extra EMU rolling stock that would be required. The contractor considers that a number of the items should be subjected to closer scrutiny and justification as part of the next stage if design. The road works in particular.

The DoT estimating methodology adds to the basic construction costs risks and a comparable percentage for contingencies to that assumed for Rail Tunnel and Tarneit Link. **However the costs also includes provision for client costs (for planning, design and project management), DoT fees and escalation which are not included in the costs quoted in the EWLNA for the Rail Tunnel and the Tarneit Link.** The cost of \$215 million for Sunbury electrification should therefore be considered as an upper limit.

### Relationship to Urban Planning (including Melbourne 2030)

- (i) Sunbury is not identified in Melbourne 2030 as a Regional Growth Pole – the improved services that would result from electrification would make Sunbury more attractive as a residential location and increase development pressure. So an announcement on the proposal should be accompanied by a statement about future growth in Sunbury and Diggers Rest.

- (ii) It will also not be obvious to many observers why electrification to Sunbury is specifically mentioned, but not electrification to Melton - which is also not mentioned in MOTC (even though Melton is listed as a growth area in Melbourne 2030). So an announcement on the proposal should be accompanied by discussion of proposals for electrification to Melton.

*These issues will require particular consideration if electrification to Sunbury were to proceed*

<b>Contractors Conclusion</b> Review scoping, carry out detailed design, and then revise cost estimates for electrification and associated works to Sunbury, to enable work to commence.
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**Matters that require particular consideration if electrification to Sunbury were to proceed**

- (i) Items listed above in relation to Urban Planning
- (ii) Preparation of a rail strategic plan including metro system expansion/electrification projects in support of Melbourne 2030, and justifying electrification to Sunbury in this context.

## RECOMMENDATION 6 DONCASTER MOTC DART UPGRADE WITH ADDITIONAL ENHANCEMENTS

### Recommendation 6

Public transport in the Doncaster Region is best provided by rapid high quality bus services, additional bus priority measures, and a new bus rail interchange at Victoria Park. To deliver this standard of services, the DART upgrade announced in the 2006 MOTC plan should be introduced as soon as possible, along with additional service enhancements and bus priority measures undertaken in conjunction with Recommendation 4 (Planning work should commence on the staged construction of a new 18 kilometre cross city road connection extending from the western suburbs to the Eastern Freeway.).

### Contractors Assessment of the Objective of the Recommendation

To provide a high capacity rapid transit system for the Doncaster Region, with the quality and popular features of rail services, to meet the growing demands for travel by public transport into the CAD.

### Contractors Assessment of the main reasons for the recommendation

- (i) A bus based rapid transit system would provide for the forecast level of demand at a fraction of the cost of a heavy rail or LRT option. (However it noted that the peak demand forecast for a bus system is only 80% of the demand for a rail or LRT service)
- (ii) The MOTC DART upgrades do not provide sufficient service enhancements to meet the objective
- (iii) The EWLNA considers that extra road space is required for east west traffic between the western end of the CAD to the Hoddle Street terminus of the M3 Eastern Freeway before road space can be allocated exclusively for buses through the designation of all day bus lanes.

### Methodology

The recommendation is based on a standard FS methodology which compares the costs and benefits of three options for meeting the objective – namely heavy rail, LRT and a bus based system. Options analysis results in the bus based option being selected. The concept design of this option is then refined, taking as a starting point the design for the DART SmartBus. Additional service enhancements and bus priority measures are proposed, mostly in the city end of the route. The contractor considers that this methodology is sound and robust, but has queries on some of the assumptions made on the design and forecast patronage of the bus based option, as discussed below.

### Analysis of Assumptions and Findings

#### Overview

The contractor supports the EWLNA conclusion that heavy rail and LRT do not represent as good value for money as bus, and so a bus based option is the preferred alternative.

- (i) Heavy Rail can be ruled out on grounds of costs and insufficient patronage. This would reconfirm the decision made in mid 80s when the rail reservation to Doncaster was abandoned.
- (ii) Potential patronage is sufficient to sustain either Bus Rapid Transit (BRT) or Light Rail Transit (LRT), but LRT can be ruled out on cost grounds when compared to bus as the infrastructure and vehicle costs would be higher. The operating costs would also be higher.

The contractor supports the Study Team Findings that a bus based system has ‘the **potential** to give Doncaster a world class *bus rapid transit* service’. But the contractor considers that for this potential

to be fully realised, and for the objective of providing a “rail style public transport service” to be fully realised, some upgrading of the current proposals is required.

The upgradings proposed to provide a world class bus rapid transit (BRT) service are:

- (a) Use of a segregated median bus way on the Eastern Freeway – instead of the proposed use of the emergency lanes. The contractor questions the view that operating speeds using the emergency lane are adequate.
- (b) Use of permanent median bus lanes from the end of the Eastern Freeway at Hoddle Street to the proposed terminus at Lonsdale Street/Spencer Street. The requirement for permanent bus lanes should be deemed not negotiable – what would be negotiable is the design of the lanes and ways to provide replacement parking (for parking removed from the bus lane), and for deliveries.
- (c) Better quality terminal arrangements at Lonsdale Street/Spencer Street – offering passengers a CAD station environment similar to that offered train passengers at the loop stations.
- (d) Branding of the service as DART with buses in a distinct livery. Overseas experience would suggest that a distinct product branding is needed, as DART should be designed to offer a quality of service superior to “SmartBus”

The contractor disagrees with the EWLNA conclusion that the service upgrades be undertaken in conjunction with construction of the proposed cross city road tunnel. Additional service enhancements and bus priority measures can and should be undertaken irrespective of any decision on the road tunnel. If a decision were made to proceed with the road tunnel, then the priority treatments along the Freeway and bus only ramps between the Freeway and Hoddle Street would be designed to be compatible.

*These issues related to provision of a world class bus rapid transit service will require particular consideration if a full business case were to proceed.*

## **Travel Demand Assumptions and Findings**

The assumptions made in the PRC Reports for the travel forecasts for the SmartBus are reasonable. However these forecasts were largely focused on short term growth. The peak demand forecast in EWLNA for a bus system would justify a full BRT. However (as indicated above), the forecast travel demand for BRT is only 80% of the demand for a rail or LRT service. The basis for these different travel demand forecasts needs to be reviewed.

*Travel demand forecasts will require particular consideration if a full business case were to proceed.*

## **Technical Feasibility**

**Feasibility Study** As noted above the basic technical feasibility of the proposal has been demonstrated. The following remarks relate to the more detailed “Business Case” feasibility study that is underway for the initial the DART upgrade announced in the 2006 MOTC plan.

1. DoT has developed a PRC 3 Report Business Case for a Doncaster SmartBus which provides for increased span of services, increased services in the AM peak and bus lanes in Doncaster Road, Hoddle Street, Victoria Parade and Lonsdale Street.
2. The key additions in the EWLNA proposal include
  - (i) a ramp from the Eastern Freeway into Tulle Street,
  - (ii) a new rail bridge on Truro Street and a Victoria Park multi model Interchange.
  - (iii) upgrading of the bus lanes on Johnson Street.

From an initial review item (ii) works do not seem justified. However neither PRC 3 nor EWLNA give sufficient data on the scope of works to make a considered judgement

3. The PRC 3 Report is for a SmartBus Upgrade to the existing services - which (as the report points out) is effectively EWNLA Doncaster Stage 1.
4. Specific issues that should be looked at in more detail in developing the Business Case and the detailed engineering and service design for the EWLNA Proposal are
  - (i) What has been assumed about on street journey times and the priority measures to reduce delays for the SmartBus Upgrade and the EWLNA? The objectives should be to (a) increase operating speeds/reduce journey times to the maximum extent possible, to give overall door to door journey times comparable to a train journey, and (b) for buses to be highly visible in getting priority over other traffic.
  - (ii) Treatments on Eastern Freeway – the assumption to date is a continuation of the existing operating practice with buses on the emergency lane, where there is an advisory 70k/h speed limit and conflicts with general traffic at entry and exit ramps. To achieve the objectives above, the buses should be the right hand transit lane (with regulations revised to remove the T2 facility) and then in a busway built into the wide median – and operating close to 100k/h. Bus only ramps could be provided from the Freeway to Hoddle Street, or Tulle St.
  - (iii) Possible routes for buses and bus priority measures from Eastern Freeway to Lonsdale Street terminus – the EWLNA Report felt that there could be some resistance to providing all day getting bus lanes over this section of the route. DoT mentioned in particular the possible reluctance of the City of Yarra to removal of parking on Victoria Parade and Hoddle Street. The contractor suggests that use of median bus lanes in Hoddle Street and right hand/edge of median lanes in Victoria Parade (removing the parking lane), should be evaluated. In Lonsdale St median bus lanes (removing the parking but keeping the trees) should be evaluated. If this is not feasible, then means to ensure priority in the kerb side lanes should be developed. Alternatives links from Victoria Parade to Lonsdale Street may need to be considered. But it would be desirable to provide easy passenger access to the St Vincent Hospital Tram Plaza.
  - (iv) The EWLNA Report assumes the use of Johnson Street, and removal of eastbound traffic to allow retention of one lane of parking. If Johnson Street were to be used, these design assumptions would need to be revisited.
  - (v) The EWLNA Report assumes the need for Victoria Park interchange – but gives no data on potential interchange passengers. With the road layout assumed (including a new bridge under the Clifton Hill rail line) this would probably quite expensive, so needs to be justified in its own right.
  - (vi) Lonsdale Street does not have easy connections to any loop station, and the proposed terminus at Lonsdale Street/Spencer Street is some way from Southern Cross Station. This may not be a problem, but is a design issue to be addressed.
  - (vii) Off bus ticketing

### Operational/Service Planning

No operational service planning appears to have been undertaken for the EWLNA proposal. ***This matter will require particular consideration if a full business case were to proceed.***

### Costs

The PRC 3 Costs for the Doncaster SmartBus is \$40M (down from \$80M at PRC 2 Stage). The cost of additional works proposed by EWLNA is \$200 m. When added to the costs from the PSC 3 works, the total cost of DART becomes \$ 240 m. DoT advise that the PRC 3 proposal is constrained by operating and capital budget limits.

The contractor has reviewed the scope of works and costs for the EWLNA proposal. A number of items in the scope of works should be reviewed as part of the next stage of design work (as noted

below). Pending this further scope review, the estimated cost of \$200 million for the works proposed by EWLNA may be considered as the upper limit.

*This matter will require particular consideration if a full business case were to proceed.*

### **Relationship to Urban Planning (including Melbourne 2030)**

The EWNLA noted that the proposed Victoria Park Interchange could form part of redevelopment of the existing station and amenity improvements in the surrounding area. The Study Team also considered that the proposals for upgraded bus lanes in Johnson Street could provide a stimulus to its commercial revitalisation. The contractor has no comment to make on either suggestion at this stage.

### **Key Risks to timing and costings**

The contractor has not identified any risks to timings at this stage.

The key risk to costings is that the scope of the works from Doncaster Road along the Eastern Freeway to Hoddle Street and then on the Lonsdale Street Terminus requires review as part of the next stage of design work.

There are other risks:

- (i) Unless a full rail style world class bus rapid transit service is provided, the pressure for an LRT or even a heavy rail line will continue
- (ii) All day bus lanes from Eastern Freeway into the CAD are an essential part of the project. Possible objections from councils to implementation of these lanes will need to be overcome. If necessary, as the EWLNA Report recommends, the State Government should use its powers to ensure public transport priority. The risk arises if the State Government is unwilling to do this.

**Contractors Conclusion** – Proceed with the recommendation to introduce the DART upgrade announced in the 2006 MOTC plan as soon as possible, along with additional bus priority measures and service enhancements, but independently of any decision to proceed with the road tunnel, and through the enhancements upgrade DART to a full BRT.

### **Matters that require particular consideration if a full feasibility study and business case were to proceed.**

- (i) Enhancements required to provide a world class bus rapid transit service
- (ii) Travel demand forecasts
- (iii) On street journey times and overall requirements for priority measures
- (iv) Treatments on the Eastern Freeway
- (v) Scale of the Victoria Park Interchange
- (vi) Possible routes for buses and bus priority measures from Eastern Freeway to Lonsdale Street terminus, including use of Johnson Street
- (vii) Lonsdale Street Terminus
- (viii) Extensive use of off bus ticketing
- (ix) Operational service planning
- (x) Scope of works and cost

**Annex 1**

**PROJECT BRIEF**  
**Edward Dotson Contractor**  
**REVIEW OF ASSUMPTIONS, DATA AND ANALYSIS IN THE EAST WEST LINK**  
**NEEDS ASSESMENT RECOMMENDATIONS**

**BACKGROUND**

In 2006, the Victorian Government asked Sir Rod Eddington to undertake a comprehensive study into improving east-west transport connections across Melbourne. In April 2008, Sir Rod Eddington completed the East West Link Needs Assessment (EWLNA) and delivered his report to the government. The EWLNA recommendations – and the evidence supporting them – are summarised in an Overview document and set out in detail in an extensive main report. A number of supporting documents and reports are also available.

The Government has committed to responding to the EWLNA by the end of 2008 and has provided opportunity for public comment on the report and its recommendations. The output of this project will inform Government in the development of its response.

**PROJECT OBJECTIVES**

To determine whether there are critical flaws<sup>1</sup> in the assumptions, data and analysis underpinning recommendations One, Two and Three in the EWLNA report.

**Recommendation 1**

Planning work should commence for the staged construction of a new 17 kilometre Melbourne metro rail tunnel linking Melbourne's booming western and south-eastern suburbs and providing a major increase in the capacity of the rail network.

**Recommendation 2**

The Victorian Government should bring forward the construction of a new rail connection from Werribee to Sunshine (the Tarneit link) to significantly improve the frequency and reliability of services from Werribee, Geelong, Ballarat and Bendigo.

**Recommendation 3**

During the planning and construction of the rail tunnel, the Victorian Government should continue to make better use of the existing network to increase capacity, including commencing work on the electrification of the network to Sunbury to boost services on the Sydenham line.

With regard to recommendations One and Two and given the impact that these projects could have on urban development, provide an evaluation of the reasons given for rejecting other options considered by Eddington.

Material to be reviewed includes:

- The main report and recommendations; and
- Supporting technical reports

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<sup>1</sup> Critical flaw – means any error of such significance that it renders the recommendation(s) flowing from it non-viable.

The project is to have a particular focus on the following dimensions of the recommendations:

- Costs;
- Transport demand assumptions and findings
- Economic outcome
- Technical feasibility; and
- Relationship to Government's preferred urban planning outcomes ( especially with reference to Melbourne 2030)

The EWLNA report grouped recommendations for the purposes of BCR analysis. This project will be required to disaggregate the BCR analysis and provide it for each recommendation and, in relation to recommendation one, for the stages defined in the report.

## SCOPE

Recommendation	Review Technical Feasibility	Review Costings	Review BCR analysis	Review Demand Modelling	Review other supporting work
1 - New rail tunnel stage 1 stage 2	yes	yes	yes	yes	yes
2 - New Tarneit rail line	yes	yes	yes	yes	yes
3 – Electrification to Sunbury	yes	yes	yes	yes	yes

## PROJECT DELIVERABLE

The project will produce a report that will include:

- advice to Government on the merits of the methodologies used in the report and supporting technical reports
- analysis of the assumptions and findings behind recommendations 1,2 and 3 leading to the identification of any critical flaws
- key risks to the timing and costings of recommended projects
- advice on shortcomings that will require particular consideration if a full feasibility study and business case were to proceed
- advice on any urban development repercussions arising from the project
- provide an evaluation of the reasons given for rejecting other options considered by Eddington; and
- advice on any other important issues as assessed by the contractor.

## PROJECT COMPLETION DATE

The project completion date is 29/July/ 2008.

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**Annex 2****List of Documents Reviewed****Published Reports**

1. Investing in Transport – East West Link Needs Assessment March 2008.
  - (i) Overview
  - (ii) **Man Report**
  - (ii) Technical Reports
2. Melbourne 2030, October 2002
3. Melbourne Transport Plan November 2004
4. Meeting our Transport Challenges, May 2006
5. Melbourne 2030 Audit Expert Group Report, March 2008
6. Planning for all of Melbourne – The Victorian Government response to the Melbourne 2030 Audit.

**Background Technical Papers and Presentations**

7. East West Study - Option D Cost Plan based on elemental costs at June 2007
8. Melbourne Railway Master Plan – A Rail Operators Perspective of a Master Plan for Melbourne’s Railway – March 2008, Department of Infrastructure
9. The Peak Hour Challenge Facing Melbourne’s Railway System - Patronage Growth, Network Capacity, New Infrastructure Proposals, The Eddington Report DRAFT - Version 5 – June 18, 2008 DoT
10. Rail Network Capacity Issues, Presentation to the Department of Transport, 30 June 2008
11. Executive Summary – Network Capacity and the Eddington Report: Version 3 and Passenger Rail Investment Plan 2008 to 2018. Simon Lane 30 June 2008
12. East West Rail Tunnel: Detailed Operations Planning Workshop 1st July 2008 SKM
13. Understanding and Forecasting Metropolitan Public Transport Patronage Full Version 3.0 - July 2008 PTD, DoT.

**Business Case Reports**

1. Sunbury Electrification Project Final Business Case 25 February 2008
2. Doncaster SmartBus Project PRC Report 23 July 2008

### Annex 3 Persons Consulted

<b>Name</b>	<b>Position</b>	<b>Organisation</b>
Meredith Sussex	Director Integrated Transport Planning	Department of Transport (DoT)
Robert Aboud	Manager Project Coordination	Public Transport Division (PTD), DoT
Joe Cavanagh	Project Manager	PTD, DoT
Miranda Fan	Manager Programs	PTD, DoT
Graham Gosby		EWLNA Response Team
Paul Hamer	Project Manager	PTD, DoT
Ray Kinnear	Director Public Transport Policy and Planning	PTD, DoT
Pat Kelly	Deputy Director Public Transport	PTD, DoT
Andrew Kor	Transport Planner	EWLNA Response Team
Simon Lane	Rail Operations Advisor	PTD, DoT
Hector McKenzie	Director Public Transport	DoT
Hugh Millichip	Senior Transport Planner	Sinclair Knight Mertz (SKM)
Leanne Seddon		VicRoads (EWLNA Team)
Praveen Thakur	Associate Director	SGS Economics and Planning
Charles Waingold		PTD, DoT