M5 EXPANSION PRELIMINARY ECONOMIC ANALYSIS

TABLE OF CONTENTS

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TABLE OF CONTENTS

Submission to Infrastructure Australia

M5 Expansion

Preliminary Overview Report - Supplement

Version 1.0 (14-Nov-2008)

Motorway Projects Branch

About this document

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1.1 Purpose of Report

On 31 October 2008 the NSW Government provided to Infrastructure Australia a submission detailing the profiling and appraisal of an indicative preferred option for expanding the capacity of the M5 transport corridor between General Holmes Drive, Mascot and Camden Valley Way, Prestons to encourage Australia's economic growth whilst maintaining or improving Sydney's environmental and social development.

The submission was based upon preliminary investigations and design work undertaken for a feasibility study to be completed by March/April 2009.

The purpose of this report is to provide supplementary information to further support the submission of 31 October detailing further evaluation of strategic options, including financial and economic modelling and development of the indicative preferred option.

1.2 Background

On 13 May 2008 the Minister for Infrastructure, Transport, Regional Development and Local Government, the Hon. Anthony Albanese, announced $5 million funding in 2007-2008 for feasibility studies into the potential improvements to the M5 Transport Corridor from Port Botany/Sydney Airport to South West Sydney.

On 14 May 2008 the then NSW Premier, Morris Iemma, announced a further contribution of $10 million to investigate the viability of the M5 East Duplication. The study corridor is detailed in Figure 1

The preliminary identification and development work has been progressing for the preparation of the feasibility assessment based upon the methodology detailed below.

- Needs assessment of Sydney transport network to meet current and future transport demand
- Development of Study Objectives
- Identification of strategies for meeting future transport demand and development of strategic alternatives
- Assessment of the capabilities of the strategic alternatives to meet the study objectives through a Strategic Merit Test process
- Identification of short-list of strategic options for further evaluation
- Development of preliminary concepts for the short-listed strategic options
- Preliminary environmental assessment and traffic modelling of strategic options
- Multi-criteria analysis of short list of strategic options
- Rapid Economic Appraisal of shortlist of strategic options
- Identification of Indicative Preferred Option(s)

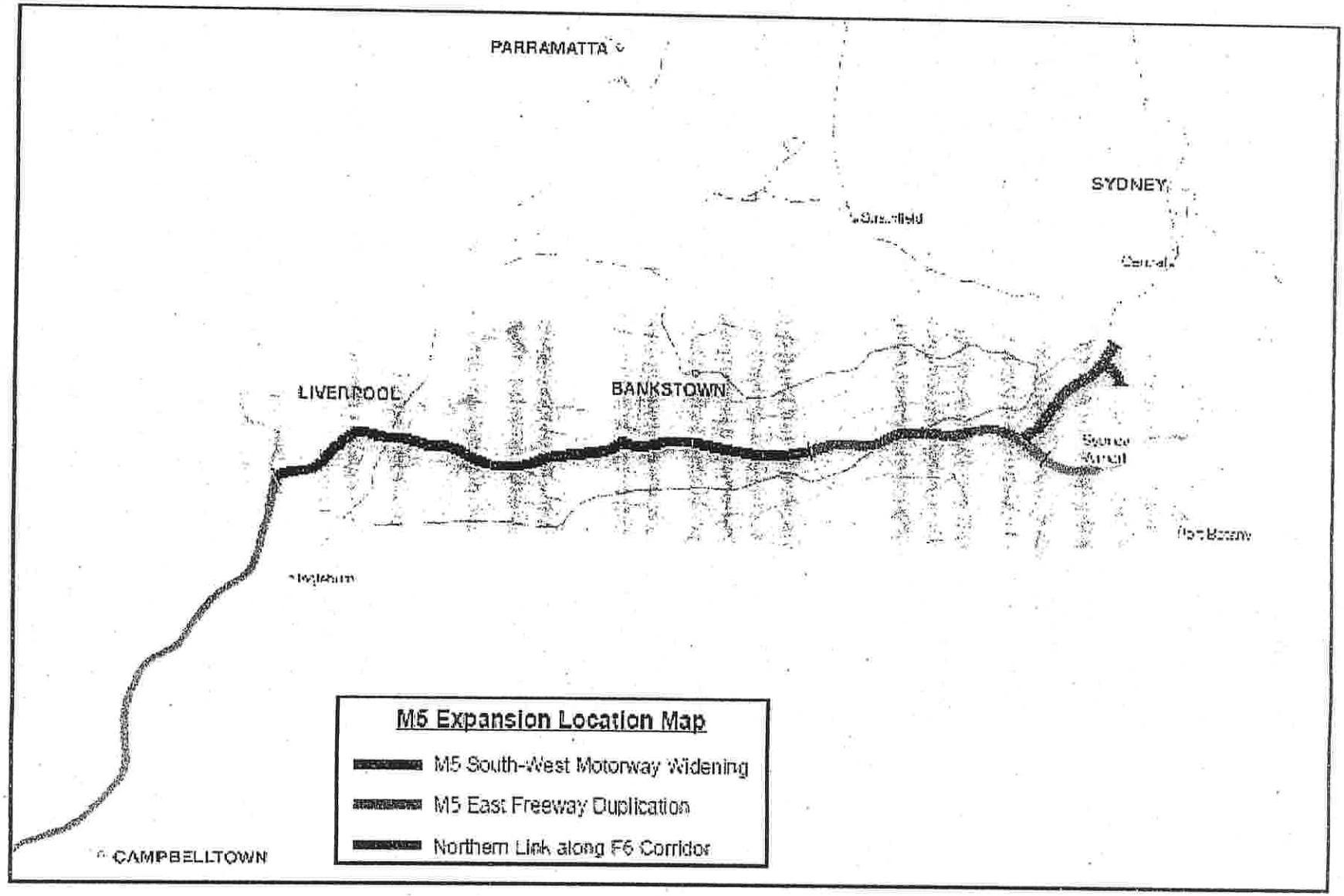

Figure 1 - Study corridor

potential strategies and actions which could be applied to the transport corridor to develop a set of strategic options which may meet the current and future transport demand. Through a Strategic Merit Test process the strategic alternatives were evaluated against the study objectives to identify a short list of strategic options for further evaluation.

The section of the M5 corridor between King Georges Road, Beverly Hills and Camden Valley Way, Prestons is owned and operated by the private sector company, Interlink Roads. Interlink Roads have provided to the RTA an unsolicited proposal to increase the capacity of the M5 South West Motorway to three lanes in each direction. The RTA is currently in discussions with regards to this proposal. As a consequence this report will be focused on enhancements to the M5 East freeway between General Holmes Drive, Mascot and King Georges Road, Beverly Hills.

On this basis the strategic options identified for the expansion of the M5 East freeway comprise:

Section 1	**M5 East Motorway – Port Botany and Airport to Bexley Road, Bexley**
Option A	Widen existing tunnels to three lanes between Marsh Street and Bexley Road.
Option B	New two lane westbound tunnel constructed between Marsh Street and west of Bexley Road. Existing westbound tunnel converted to a tidal flow tunnel
Option C	New twin two lanes tunnels between Foreshore Road and west of Bexley Road
Option D	New twin two lanes tunnels between Southern Cross Drive and west of Bexley Road
Option E	New three lane westbound tunnel between Marsh Street and west of Bexley Road Existing westbound tunnel converted to eastbound tunnel Existing eastbound tunnel provides access only to Princes Highway and Marsh Street

Figures 1 to 5 detail the main features of Options A to E.

Section 2	**M5 East Motorway - Bexley Road, North Bexley and King Georges Road, Beverley Hills** Dependent upon the strategic option selected from Section 1 and the location of the tunnel portal between Bexley Road and King Georges Road, the remaining Motorway to King Georges Road would be widened to provide sufficient lanes in each direction to balance tunnel capacity and the traffic flow onto the expanded M5 South West Motorway

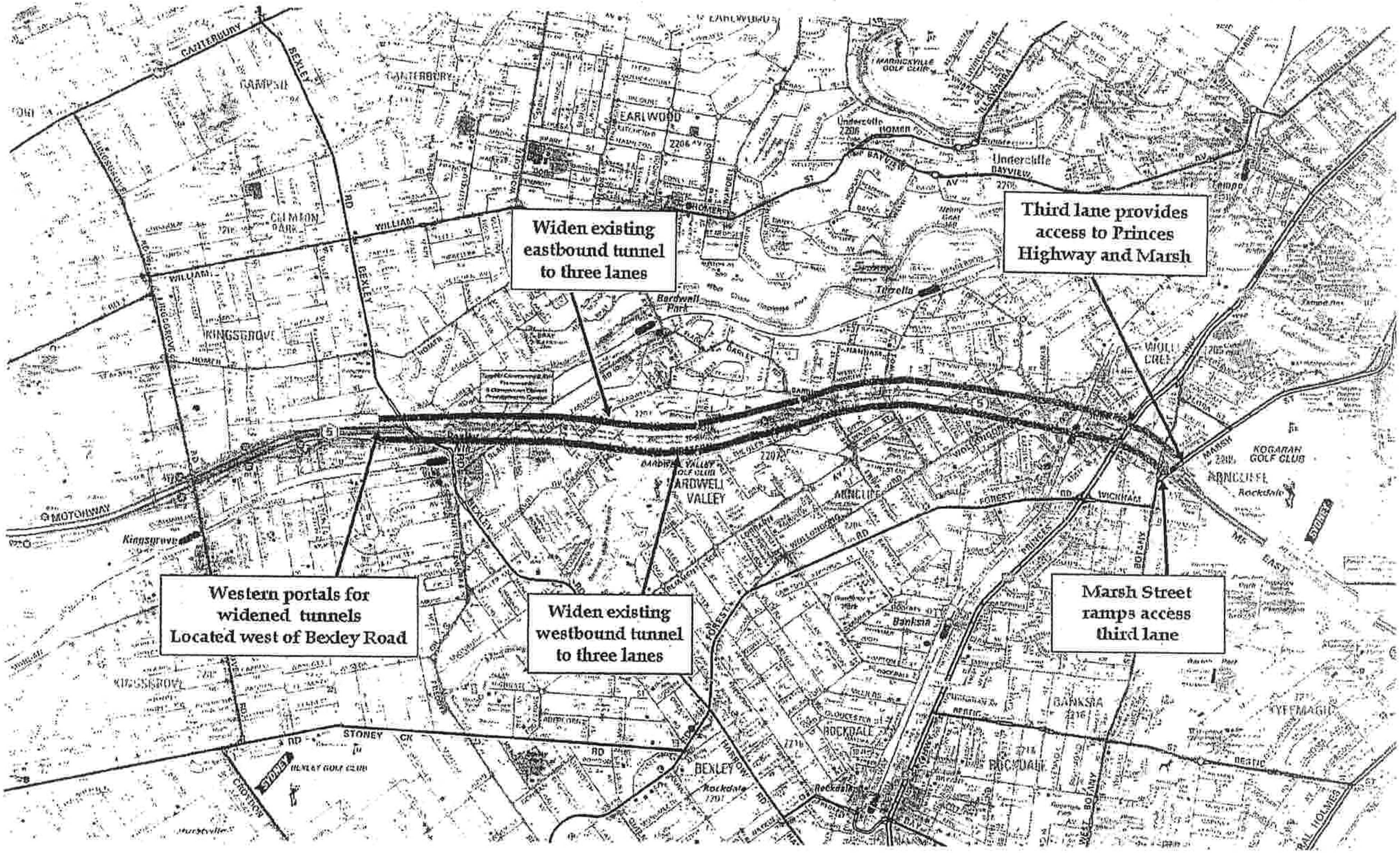

Figure 2 - Strategic Option A – Widen existing tunnel to three lanes in each

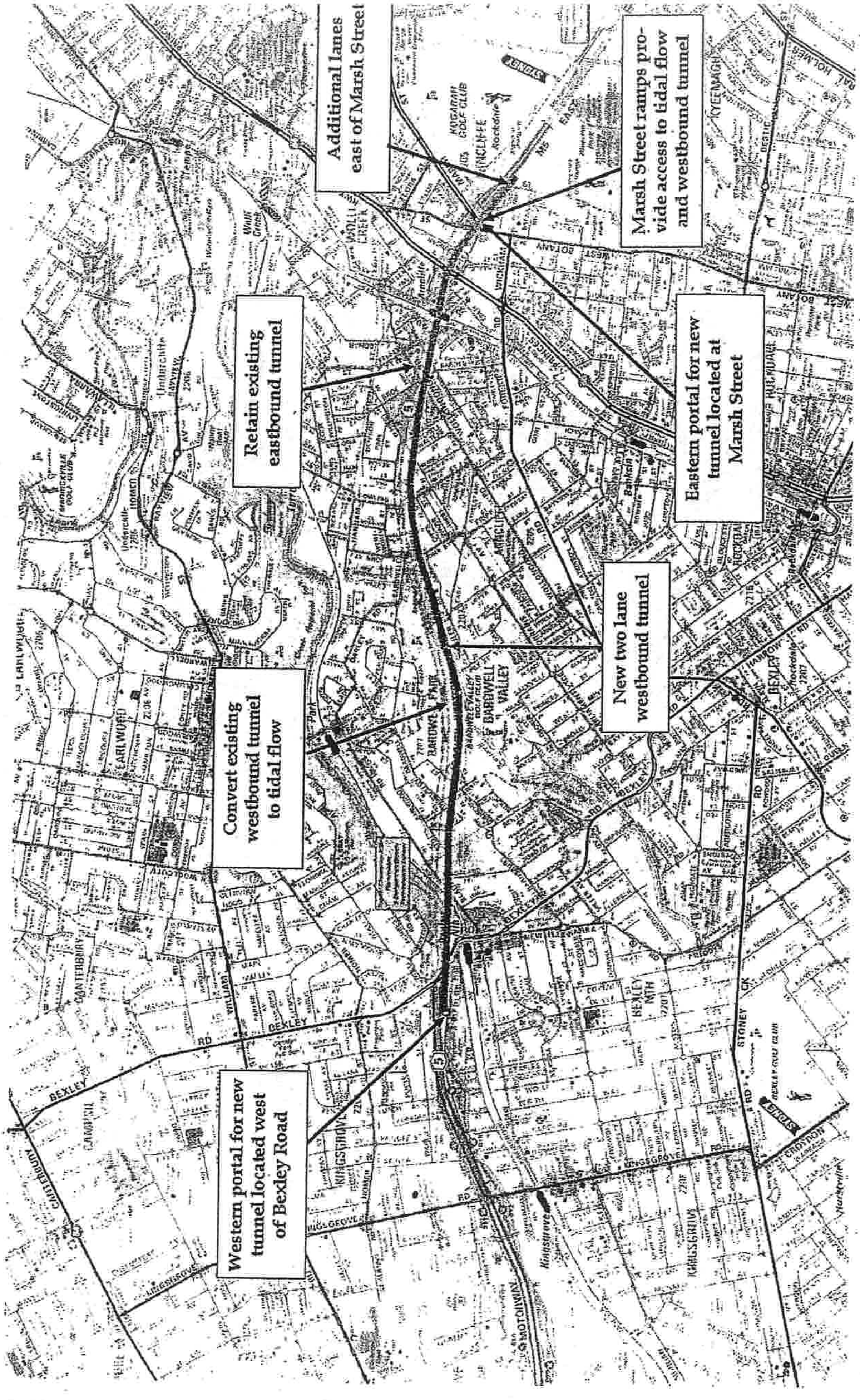

Figure 3 - Strategic Option b - Two lane tidal flow tunnel

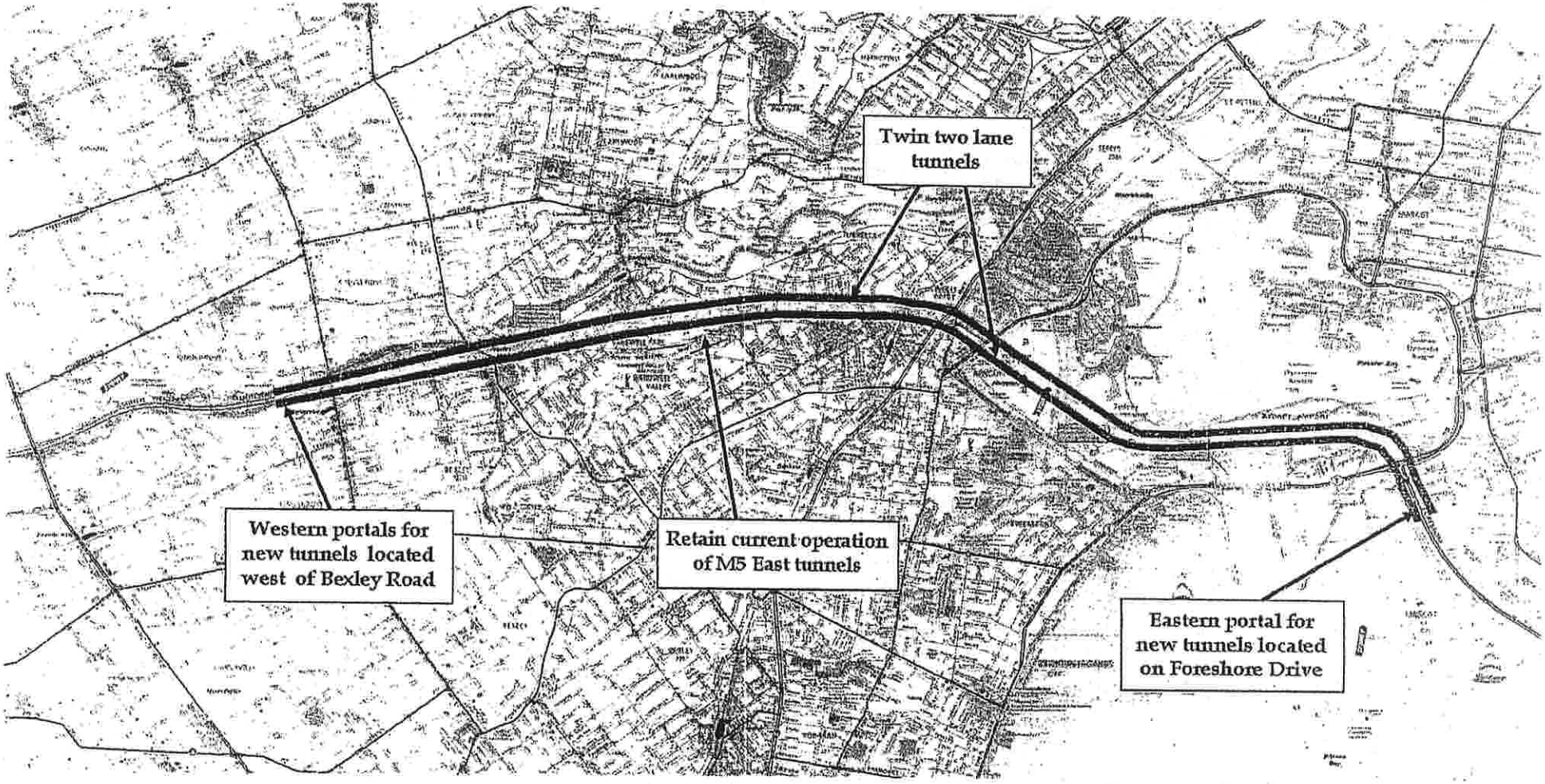

Figure 4 - Strategic Option C - Twin two lane tunnels from M5 East freeway, west of Bexley

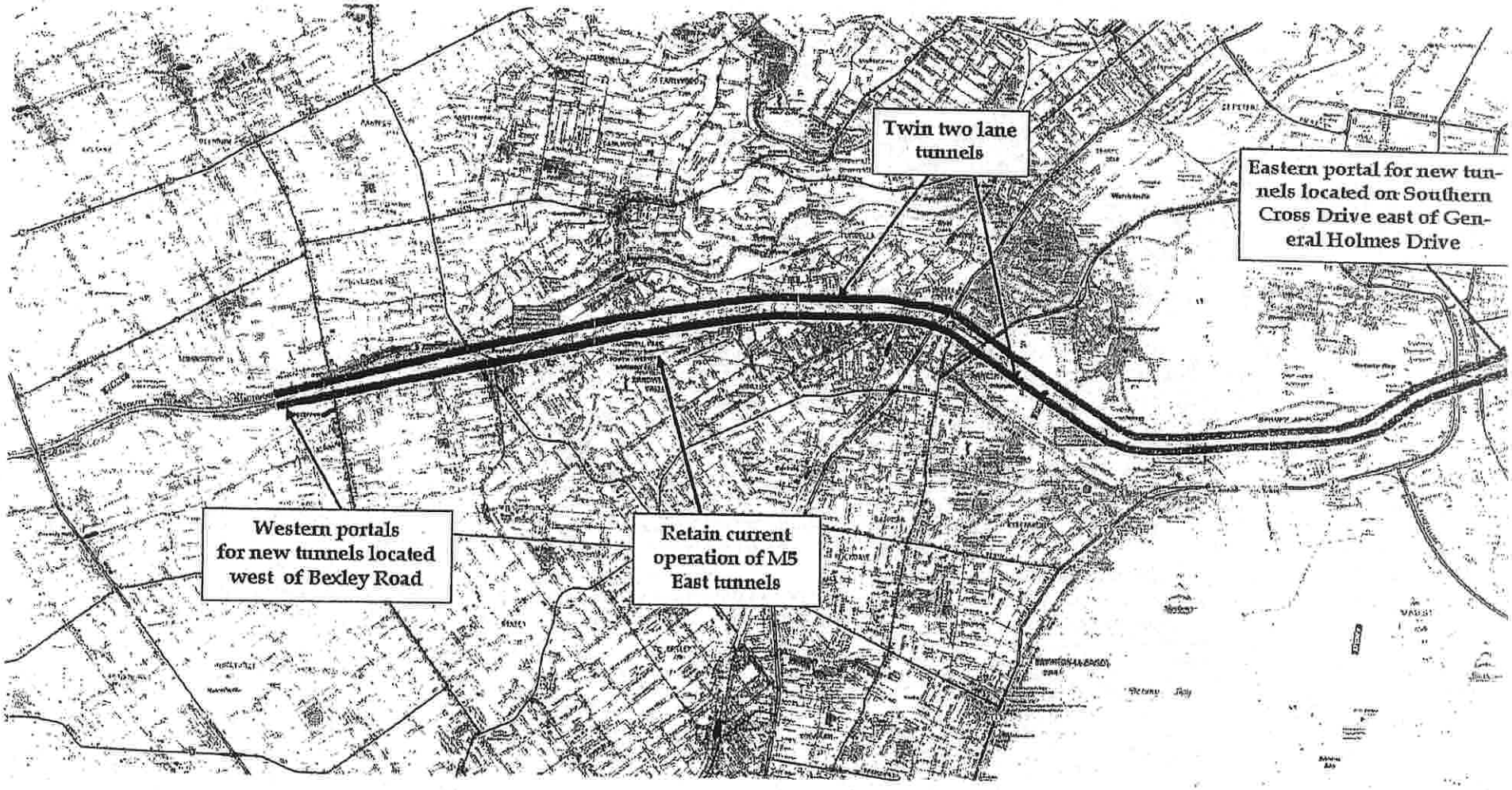

Figure 5 - Strategic Option D - Twin two lane tunnels from M5 East freeway, west of Bexley

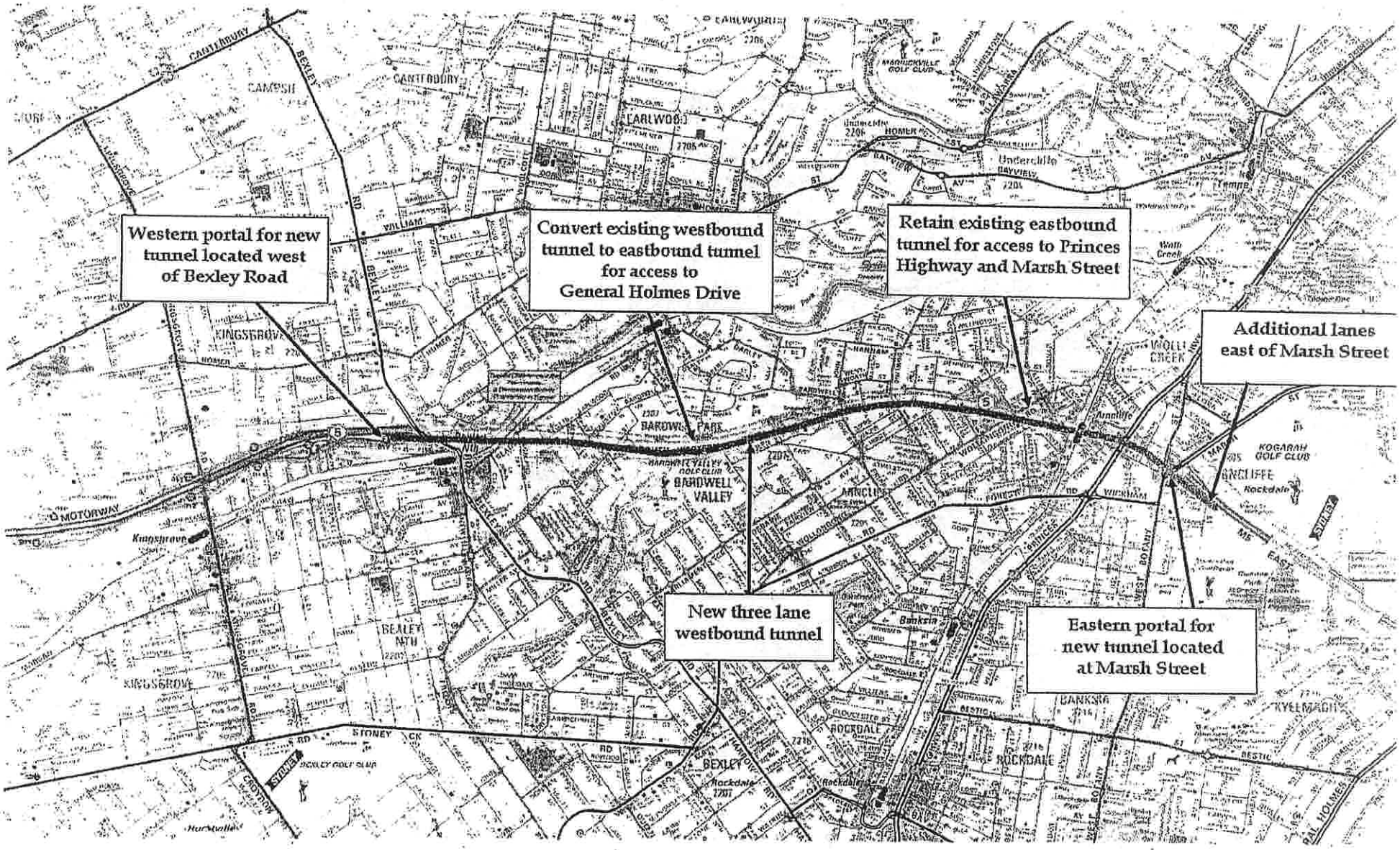

Figure 6 - New three lane westbound tunnel

A rapid economic analysis of Option E , as the indicative preferred option, was included in the Preliminary Overview Report submitted to Infrastructure Australia on 31 October 2008. This report includes similar rapid economic analysis of the remaining strategic options and an evaluation of all options combining the outcomes of the multi-criteria analysis and the rapid economic appraisal.

Options B, C, D and E can include an eastern surface road connection utilizing the existing F6 transport corridor reservation (termed the Northern Link in this report). The optimum concept design for this section will be confirmed by April 2009. An early strategic cost estimate and benefits estimates for this section are included at Section 5 of this report.

Preliminary traffic modelling has been undertaken on the strategic options to assess the change in traffic volumes along the corridor over time, as measured by traffic volumes, vehicle kilometres travelled (VKTs) and vehicle hours travelled (VHTs) in 2006, 2016 and 2026.

The modelling used in this submission includes TDC 2006 Trips Tables (using the 2001 base case) with traffic generation for Sydney Airport derived from the Sydney Airport 2003 Masterplan and accompanying documents.

For this modelling the trips distribution to the airport is based on the TDC Airport trip distribution which is in turn derived from Journey to Work Data. This provided a reasonable estimate of distribution when compared to the regional trip distribution provided by Sydney Airport.

This modelling also assumes that the trip distribution to Sydney Airport remains constant over time. In the 2003 Masterplan or accompanying documentation SACL do not provide any estimates of how this distribution is likely to change into the future.

Currently the model is being updated to include figures from the Sydney Airport 2008 Masterplan, and updated trip distribution based on interview surveys undertaken at the airport.

The 1-hour AM and PM peak traffic volumes from the preliminary traffic modelling of the "Do Nothing" alternative and the strategic options are detailed in Table 1 and Table 2 respectively. Additionally Table 3 contains a summary of the change in vehicle kilometres travelled and vehicle hours travelled for the options.

The traffic volumes indicate that by 2106 the existing M5 East tunnel will be operating significantly over its theoretical capacity during peak periods, with this situation degrading further by 2026. The outcomes of the high traffic volumes will be increased congestion, which is reflected in the increase in VKTs, reduced travel speeds, reflected by the increase in VHTs and a resultant potential for increased incidents in the tunnel potentially requiring closure of the tunnel.

The traffic modelling for the strategic options indicate:

"Do Nothing"	The M5 East is already at capacity and would be operating significantly above theoretical capacity by 2016 (114% and 115%), with performance deteriorating further by 2026 (121% and 120%).
Option A	In 2016 the eastbound and westbound tunnels will be operating near their theoretical capacity during peak periods (95% and 94%)and will be operating at capacity during peak periods in 2026 (105% and 102%)
Option B	In 2016, during peak periods, both the eastbound and westbound tunnels show an acceptable level of utilisation (90% and 93%) however this option leads to nominally exceeding the theoretical capacity of the tunnels by 2026 (112% and 104%). This options has the best level of contrapeak utilisation (at 61% to 68% by 2016 and 51% to 82% by 2026).

theoretical capacity. In the contrapeak direction the tunnels are significantly under utilised with utilisation rates of less than 30% in 2016 and not reaching 50% utilisation by 2026. By 2026 the tunnels are operating at an acceptable utilisation level, with the highest in the AM peak of 95 to 96%. In the mean time the existing tunnels are operating at or near capacity in the peak periods, particularly in 2026.

Option E

In 2016 the westbound tunnel in the PM peak is operating near capacity (95%) whilst the eastbound in the AM peak is operating at a much lower utilisation (75%). By 2026 the westbound tunnel is operating nominally over capacity (102%) with the eastbound remaining at acceptable utilisation of 85%. As with Options C and D, both eastbound and westbound tunnels are underutilized in the contrapeak direction. However, utilisation levels of the westbound tunnel in the contrapeak are higher than in Options C and D (at above 50%).

Overall Options C and D, based on the preliminary traffic modelling, are significantly under utilised in the contrapeak directions not even reaching 50% utilisation by 2026. Additionally, the westbound tunnel is utilised at less than 50% of its theoretical capacity in 2016 and this only increases to less than 70% in 2026.

The network statistic from the preliminary traffic modelling include vehicle kilometres travelled (VKT) and vehicle hours travelled (VHT) are summarised in Table 3. The main observations from these statistics are:

- All options indicate a minimal change in VKT's in 2016, in the range between 0.44% and 0.48% for AM peak and between -0.02% and 001% in the PM peak,, as compared to the Do Nothing modelling
- Similarly an even smaller change in VKT's is indicated in 2026 with AM peak changing between 0.02% and 0.04% for the AM peak and 0.00% and 0.06% for the PM peak
- All options indicate a reduction in vehicle hours travelled in 2016 and 2026 for both the AM and PM peaks

Overall the preliminary traffic modelling of the strategic options indicate although there is an increase in the volume of traffic travelling on the M5 corridor there is only a minor increase in the vehicle kilometres travelled across the Sydney road network and a reduction in the vehicle hours travelled, which could be interpreted to conclude that traffic on the M5 corridor will have reduced travel times.

As an indication of the change in travel times Table 1 below details the predicted change in the average travel speed on the M5 East freeway between the 20026 "Do Nothing" case and Option E. These results indicate a continued reduction in travel speed between 2006 and 2026 under the "Do Nothing" case.

With the introduction of the M5 expansion Option E there is a significant increase in the travel speed over both the AM and PM peak periods.

Table 1 - Strategic options traffic volumes 2016 and 2026 AM 1 hour peak[1]

	2016						2026					
AM Peak	Do Nothing	Option A	Option B	Option C	Option D	Option E	Do Nothing	Option A	Option B	Option C	Option D	C
Eastbound Tunnel	4,561	5,689	3,422	3,322	3,320	3,108	4,859	6,285	3,706	3,728	3,668	
Westbound Tunnel[2]	2,339	3,221	1,990	2,149	2,012	2,838	2,447	3,993	2,046	2,374	2,039	
Tidal Flow Tunnel			2,445 (61%)						2,987 (75%)			
New Eastbound Tunnel				3,311 (83%)	3,386 (85%0					3,842 (96%)	3,994 (99%)	
New Westbound Tunnel				579 (14%)	785 (20%)	3,236 (54%)				1,211 (30%)	1,586 (40%)	(
Total Eastbound Traffic	**4,561 (114%)**	**5,689 (95%)**	**5,412 (90%)**	**6,633 (83%)**	**6,706 (84%)**	**5,946 (75%)**	**4,859 (121%)**	**6,285 (105%)**	**6,693 (112%)**	**7,570 (95%)**	**7,662 (96%)**	(
Total Westbound Traffic	**2,339 (58%)**	**3,221 (54%)**	**2,445 (61%)**	**2,728 (34%)**	**2,797 (35%)**	**3,236 (54%)**	**2,447 (61%)**	**3,993 (67%)**	**2,046 (51%)**	**3,585 (45%)**	**3,625 (45%)**	(

Table 2 - Strategic option traffic volumes 2016 and 2016 PM 1 hour peak

	2016						2026					
PM Peak	Do Nothing	Option A	Option B	Option C	Option D	Option E	Do Nothing	Option A	Option B	Option C	Option D	O
Eastbound Tunnel	3,750	2,835	2,737	2,080	2,111	1,683	3,944	3,559	3,288	2,536	2,582	
Westbound Tunnel	4,590	5,651	3,110	4,183	3,912	1,134	4,785	6,142	3,472	4,309	4,149	
Tidal Flow Tunnel			2,453 (61%)						2,746 (68%)			
New Eastbound Tunnel				829 (21%)	807 (20%)					1,220 (31%)	1,158 (29%)	
New Westbound Tunnel				1,314 (33%)	1,823 (46%)	5,651 (94%)				2,409 (60%)	2,744 (69%)	((1
Total Eastbound Traffic	**3,750 (94%)**	**2,835 (47%)**	**2,737 (68%)**	**2,909 (36%)**	**2,918 (36%)**	**2,817 (35%)**	**3,944 (99%)**	**3,559 (59%)**	**3,288 (82%)**	**3,756 (47%)**	**3,740 (46%)**	(
Total Westbound Traffic	**4,590 (115%)**	**5,651 (94%)**	**5,563 (93%)**	**5,497 (69%)**	**5,735 (72%)**	**5,651 (95%)**	**4,785 (120%)**	**6,142 (102%)**	**6,218 (104%)**	**6,718 (84%)**	**6,893 (86%)**	((1(

[1] Percentage in brackets indicates tunnel utilisation based upon 2,000 vehicles per hour per lane under free flow conditions

[2] C n E – The existing westbound tunnel is converted t dditional eastbound tunnel.

B.3 Sensitivity Testing

TABLE 3: BCR SENSITIVITY TESTING RESULTS FOR DIRECT USER BENEFITS

Test #	Variation	BCR	% Increase from '0'
0	Starting result excluding WEB's	1.28	0%
1	Opex +10%	1.27	-1%
2	Opex -10%	1.30	+2%
3	Benefits +10%	1.41	+10%
4	Benefits -10%	1.15	-10%
5	Benefits +30%	1.67	+30%
6	Residual value +10%	1.28	0%
7	Residual value -10%	1.28	0%
8	Capex +10%	1.18	-8%
9	Capex -10%	1.41	+10%
10	Opening date 1 year early	1.30	+2%
11	Opening date 1 year later	1.27	-1%

Part C – Non-Monetised Benefits and Costs

TABLE 4 – NON-MONETISED BENEFITS AND COSTS

Cost/Benefit	Description	Rating
	Visual Amenity	Highly beneficial
	Noise reduction from surface roads	Highly beneficial
	Improved road side air quality	Moderately beneficia
	Social amenity	Moderately beneficia
	Social cohesion	Highly beneficial
	Agglomeration	Highly beneficial

Note: These assessments used the information contained in the Appendix C, Summary of Initiative Profiling, to assist in the assignment of rating.

Part D – Appraisal Summary Table (AST)

Currently under consideration

Part E –Information Sources

(A copy of all of the information sources is provided separately on CD)

- Economic Analysis Manual. Version 2, July 1999 as amended NW Roads and Traffic Authority – Refer Appendix B – Economic Parameters for 2007
- 2007 Sydney Urban Corridor Strategy, Auslink
- National Guidelines for Transport System Management in Australia. Australian Transport Council 2006 – 4 Urban Transport
- NSW Premier's State Plan – November 2006
- City of Cities – A plan for Sydney's Future, Metropolitan Strategy – December 2005
- NSW Government Urban Transport Statement, November 2006
- NSW Government State Infrastructure Strategy – 2006-07 to 2015-16
- Review of Future Provision of Motorways in NSW – December 2005
- Sydney Airport Master Plan – Preliminary Draft – 2009
- CityRail – A Compendium of CityRail Travel Statistics – Six Edition, June 2008
- Sydney Ports - Logistics Centre at Enfield
- Sydney Ports - Port Botany Container Terminal Expansion Overview
- M5 Transport Corridor – Needs Background Paper – October 2008
- Review of Urban Congestion Trends, Impacts and Solutions by the Competition and Regulation Working Group – December 2006
- RTA Annual Report- 2007
- Austroads Report. Update of RCU Unit Values to June 2007

Submission to Infrastructure Australia

M5 Expansion

Infrastructure Australia Proformas - Supplement

Version 1.0 (14-Nov-2008)

RTA Motorway Projects Branch

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Table of contents

Section 1 – Summary of Initiative Appraisal:

M5 East Duplication plus Northern Link

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Summary of Initiative Appraisal - Key Results and Assumptions

Part A - Overview

Title of Initiative – M5 Expansion: M5 East Duplication plus Surface Road Link

The summary of the initiative appraisal focuses on two elements of the project being: the expansion of the 10 kilometre M5 East Freeway connecting the M5 Motorway at King Georges Rd, Beverly Hills with General Holmes Drive and on to the Eastern Distributor, and the surface road link connecting Marsh Street to Euston Road, St Peters. The scope of the proposed project includes:

- A new three lane westbound tunnel with portals in the vicinity of the current ones;
- The existing eastbound tunnel connected to the Princes Highway and Marsh Street only;
- The existing westbound tunnel converted to eastbound and connected to General Holmes Drive only;
- Widening to three lanes each way at the western end from the portals to the King Georges Road ramps;
- Maintaining two lanes each way at the western end under King Georges Road;
- Maintaining two lanes each way at the eastern end from the portals to General Holmes Drive; and
- A surface Road Link connecting Marsh Street to Euston Road, St. Peters.

The first stage of the M5 Expansion, a widening of the M5 South West Motorway between the F5 Freeway and King Georges Road, is assumed to be completed first and therefore the benefits are assumed in both the base case and the proposed case.

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Summary of submission

The M5 Expansion and Surface Road Link project delivers substantial economic benefits to the Sydney Metropolitan area by addressing key areas of network congestion and future travel demands from and to the Port Botany and Sydney Airport. The M5 Expansion provides quicker and safer journeys between Sydney's south-west and the city, Sydney Airport, Port Botany and surrounding areas. Cutting up to 20 minutes from a trip between Liverpool and Sydney Airport, the M5 Expansion bypasses more than 20 sets of traffic lights. Local communities also benefit, with freight and other traffic removed from nearby residential streets.

The capital cost for the scope of the proposed project is estimated to cost $3 billion:

- $2 billion for the M5 East duplication (as submitted to Infrastructure Australia on 31 October 2008); and
- $1 billion for the surface road link.

Construction is forecasted to take place from 2012 to 2014.

The BCR of the project is 1.67. The main economic benefit is travel time saving with a net present value of $3.8 billion over the 30 year operating period. This demonstrates significant network congestions benefits.

This analysis indicates a lower BCR of 1.67 for the M5 East duplication plus surface road link compared to 2.12 for the M5 East duplication alone. This is because the preliminary traffic modelling indicates minimal traffic volumes in the PM peak along the link compared to quite substantial traffic flows in the AM peak travelling north along the link.

Further traffic modelling is required as part of the feasibility study, including updating the traffic model based on the revised Sydney Travel Model from the NSW Transport Data Centre incorporating 2006 census data, identifying anomalies in either the road network or the traffic model which may be constraining flows, identifying potential improvements to the existing arterial road network between Euston road and the CBD, and considering improved connections between the M5 and the surface road link.

The economic viability of the M5 East duplication plus surface road link will then need to be reassessed, although it is expected that the feasibility study and updated traffic numbers will only serve to increase the BCR and hence the economic viability this project.

The RTA's BCR calculations generally are conservatively based due to the following reasons:

- The land use and demographics data used in the analysis does not incorporate the recent Australian Bureau of Statistics data which estimates a significantly higher Sydney Metropolitan population by 2036 which will result in significantly higher growth in transport demand than currently forecast, and
- The base case analysis does not take into account the impact of increased network volatility as capacity is reached which may reduce base case volumes as people change or defer trips.

Part B – Cost Benefit Analysis (CBA) – Monetised Benefits and Costs

B.1 Key Assumptions

Item	Assumption
Key drivers	The M5 transport corridor is part of the Auslink National Network and also forms part of the Sydney Orbital Network, which connects western and south western Sydney to Port Botany, Sydney Airport and the CBD. The road corridor has significant traffic congestion and operates at design capacity, particularly during current peak periods with AADT of approximately 100,000 vehicles. The congestion problem will only worsen with the future expansion of Port Botany and Sydney Airport and the population growth in western Sydney. The average travel speed in the eastbound direction during AM peak along the corridor has been measured at 32.6 kph (RTA Travel Time Surveys March 2004 and March 2007). Several of the employment centres along the corridor, Campbelltown/Macarthur, Liverpool and Sydney Airport/Port Botany are predicted to grow between 2006 and 2031 by 22%, 73% and 40% respectively (TDC Employment Forecasts, 2006). The 2006/07 container trade through Port Botany was 1.6 million TEU and is predicted to exceed 3 million TEU by 2020 with the expansion of Port Botany. Future intermodal terminals identified for development in the future will be located in Moorebank and Enfield which are accessible by the M5 corridor. Air freight from the Sydney Airport in 2007 was 471,000 tonnes and is predicted to increase by 129% to 1,077,000 tonnes by 2029 (Sydney Airport Master Plan 2009, Preliminary Draft, September 2009). The current freight trips of 25,880 during a 2 hour AM peak period are predicted to increase 46% to 37,700 in 2021 and 85% to 47,935 in 2031. Movements of freight to and from Botany Bay will increase by 187% and 196% respectively from movements in 2006 (TDC Freight Database 2006).

Item	Assumption
	In 2007, 31.9 million passengers travelled through Sydney Airport and this is forecasted to increase by 149% to 78,9 million passengers by 2029 (Sydney Airport Master Plan 2009, Preliminary Draft, September 2009). The predicted increases of population growth centres between 2006 and 2031 are Campbelltown- South West Growth Centre (2.54% growth) and Liverpool- Campbelltown North (1.2% growth) (TDC Population Forecasts, 2006). Increasing the capacity of the M5 corridor aims to: • Reduce travel times; • Improve access, speed, efficiency and reliability; and • Draw traffic from surrounding arterial road network and improve overall amenity and quality of life for residents along the corridor. The M5 Expansion proposal meets transport deficiencies identified by both the Federal and NSW State Governments through planning studies for the Sydney Region and connections between the expanding Port and Airport and the National Road Network. The AusLink Sydney Urban Corridor Strategy (p.20) identifies east/west connectivity as a short-term deficiency in Sydney with peak periods especially congested. The identified strategic response to this priority is to "enhance the east-west road corridors to service the Airport/Port Precinct, for example, the M5 and M5 East corridor. Further, the AusLink Sydney Urban Corridor Strategy (p.26) identifies as a short term priority (to 2016) the need to "improve road and rail links from Port Botany and Sydney Airport to western Sydney". The M5 Expansion project presented herein would implement this strategic response.

Item	Assumption
Base case	Without the M5 Expansion, the base case shows a significant deterioration in travel times in the corridor resulting from a reduction in current average travel speeds. Incorporated in the base case of this project is that the first stage assumes that the concession holder of the M5 Motorway, Interlink Roads, will widen the M5 Motorway to increase capacity by 50%. Without the M5 Expansion, the M5 East will become a bottleneck in the whole M5 corridor. The base case does not incorporate the building of the M4 Extension. The base case model for this project is based on the Sydney Metro Strategic traffic model. This model is maintained by the RTA's independent traffic modellers (Halcrow MWT). The model is developed in EMME/2 software which is an interactive multi-modal transport planning modelling package which provides information on Vehicle Kilometres Travelled (VKT) and Vehicle Hours Travelled (VKT) which are the drivers of the assessed economic benefits. The model takes land use planning information and modal share information prepared by NSW governments Transport Data Centre's strategic model. This information is then calibrated against current actual traffic counts from RTA's network of Sydney Basin traffic count stations. Overlayed against this information is a forecast of the baseline network expansion projects currently planned. These projects are primarily targeted to meeting the forecast demands from the North West and South West growth areas and also to complete the links around Menai. It includes future transport projects in the TDC strategic transport model for all model runs including:

Item	Assumption
	• Epping to Chatswood Rail Link • North West Rail Link • South West Rail Link. • Clearways Rail Timetable. • Northwest Transitways. • Unsworth Report Bus Services • Main North Line Upgrade The same traffic model is used to output Annual Average Daily Traffic (AADT) used in PPP financial and economic analyses.
First year of construction	2012
Last year of construction	2014
Discount rate	Base case discount rate is 7%; Sensitivity testing has been undertaken at 4% and 10%
Appraisal period	Appraisal period is from construction period (2012 to 2014) and 30-year operating timeline as advised by Infrastructure Australia.
Remaining life	Tunnel structures are designed to have useful lives of 100 years, therefore the project will have an estimated 70 years remaining life after the 30-year operating timeline. Elements of other components of the project will have similar remaining life at the end of the operating period.

Item	Assumption
Residual value	$1.2 billion; the residual value has been calculated using the methodology as set out in the RTA's Economic Analysis Manual which estimated the remaining useful life of the assets and applies this percentage against the original capital cost to determine a terminal value.
Benefit ramp up	The expansion in this proposal opens to traffic in full at one time, therefore no benefit ramp up during construction period is modelled.
Capital cost	$3.0 billion. The capital cost is based on a strategic cost estimate which includes property acquisition costs, roadwork on the existing M5 East, the three tunnel link and roadworks on connecting roads. These costs include contingency factors. The out-turn dollar cash flows are based on 2008 dollars which have been factored up by 2% per year to allow for escalation in construction costs above inflation. The capital cost for the base case is for a set of projects which are primarily targeted to meeting the forecast demands from the North West and South West growth areas and also to complete the links around Menai. These projects are the same in both the base case and the enhancement case, and therefore are excluded from the CBA results to isolate only the benefits from this project.
Maintenance costs	Based on historic costs of maintaining the M5 East (which is a similar sized project). These are estimated at $16m every 5 years
Operating costs	Based on historic costs of operating the M5 East (which is a similar sized project). These are estimated to be $42m p.a.

Item	Assumption
Benefit components	The majority of the benefits are derived by commuters who receive travel time benefits from the expanded capacity. In addition, freight movement around the Port and Airport receive benefits in both travel time and vehicle operating cost. The assumptions used in the calculation of these benefits are described below: Travel time benefits – the calculation of travel time benefits is travel time savings x hourly rate. Travel time savings are calculated by a network model used to calculate traffic on the extension. The model looks at hours of travel at a base case AM peak for different types of roads and compares that against modelled vehicle hours. This calculated value is then expanded out to annual amount of travel time hours saved. The expansion factor used is 3,000, as advised by Halcrow MWT. As per the RTA's Economics Analysis Manual Appendix B, the travel time hourly rate is calculated by taking into consideration: the types of vehicle using the roads (i.e. average vehicle compositions private cars 76%, business cars 11%, light commercial 9% and heavy commercial 4%), the number of occupants per vehicle and their relative value for travel time saved. (i.e. average assumed vehicle occupancy and average daily travel time values for private cars 1.53;$11.55 business cars 1.3; $25.29 light commercial 1.3; $18.54 (including freight) and heavy commercial 1.0; $45.53 (including freight)), This analysis is supported by Austroads methodology (Update of RUC Unit Values to June 2007 Austroads Project TP8349). The methodology used results in an average hourly rate of $23.08 per hour. The result of this calculation is that approximately $3.8 billion of travel time would be saved by the proposal over the 30 year operating period ($274m in the first year in 2015) which will provide a substantial reduction on the projected urban congestion costs in Sydney.

Item	Assumption
	The recent COAG Report on Urban Congestion in December 2006 (page 5) forecast urban congestion cost ir Sydney to be $7.5 billion per annum by 2020 an increase o 123% over the estimate for 2005. These benefits represent approximately 100% of the total economic benefits projected. Vehicle operating costs, safety and externalities – the benefits are due to lower vehicle operating costs from less stop start and better flow, lower crash rates on freeway conditions and lower air pollution and noise. This project results in a small disbenefit in reliable operatin costs as smoother traffic flow benefits are offset by cars travelling a further distance to use the tunnel thus travelling further kilometres and burning more fuel.
Cost and benefit time streams	See attached detailed worksheet
Related initiatives	The M5 Expansion project assists in relieving traffic congestion around the Port Botany and Sydney Airport area In addition, the NSW Government is also submitting the M4 Extension project which also services these strategic asset Economic modelling has been undertaken of staging optior which demonstrated that the economic benefits of the project are not significantly altered through the incorporatio of this project.

B.3 Sensitivity Testing

TABLE 3: BCR SENSITIVITY TESTING RESULTS FOR DIRECT USER BENEFITS

Test #	Variation	BCR	% Increase from '0'
0	Starting result excluding WEB's	1.28	0%
1	Opex +10%	1.27	-1%
2	Opex -10%	1.30	+2%
3	Benefits +10%	1.41	+10%
4	Benefits -10%	1.15	-10%
5	Benefits +30%	1.67	+30%
6	Residual value +10%	1.28	0%
7	Residual value -10%	1.28	0%
8	Capex +10%	1.18	-8%
9	Capex -10%	1.41	+10%
10	Opening date 1 year early	1.30	+2%
11	Opening date 1 year later	1.27	-1%

Part C – Non-Monetised Benefits and Costs

TABLE 4 – NON-MONETISED BENEFITS AND COSTS

Cost/Benefit	Description	Rating
	Visual Amenity	Highly beneficial
	Noise reduction from surface roads	Highly beneficial
	Improved road side air quality	Moderately benefici
	Social amenity	Moderately benefici
	Social cohesion	Highly beneficial
	Agglomeration	Highly beneficial

Note: These assessments used the information contained in the Appendix C, Summary of Initiative Profiling, to assist in the assignment of rating.

Part D – Appraisal Summary Table (AST)

Currently under consideration

Part E –Information Sources

(A copy of all of the information sources is provided separately on CD)

- Economic Analysis Manual. Version 2, July 1999 as amended NW Roads and Traffic Authority – Refer Appendix B – Economic Parameters for 2007
- 2007 Sydney Urban Corridor Strategy, Auslink
- National Guidelines for Transport System Management in Australia. Australian Transport Council 2006 – 4 Urban Transport
- NSW Premier's State Plan – November 2006
- City of Cities – A plan for Sydney's Future, Metropolitan Strategy – December 2005
- NSW Government Urban Transport Statement, November 2006
- NSW Government State Infrastructure Strategy – 2006-07 to 2015-16
- Review of Future Provision of Motorways in NSW – December 2005
- Sydney Airport Master Plan – Preliminary Draft – 2009
- CityRail – A Compendium of CityRail Travel Statistics – Six Edition, June 2008
- Sydney Ports - Logistics Centre at Enfield
- Sydney Ports - Port Botany Container Terminal Expansion Overview
- M5 Transport Corridor – Needs Background Paper – October 2008
- Review of Urban Congestion Trends, Impacts and Solutions by the Competition and Regulation Working Group – December 2006
- RTA Annual Report- 2007
- Austroads Report. Update of RCU Unit Values to June 2007