

Appendix E

Working paper: Traffic and transport

M5 West Widening Project Traffic and Transport Report

September 2010

Prepared for NSW Roads and Traffic Authority



M5 West Widening Project Traffic and Transport Report

Prepared for NSW Roads and Traffic Authority

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Executive Summary

Overview

This report documents the findings of the traffic and transport assessment of the proposed M5 West Widening Project. The results will demonstrate that widening of the M5 South West Motorway will provide improvements in travel conditions for car and freight trips utilising the M5 South West Motorway and adjacent parts of the road network, as well as bus routes that intersect or operate parallel to the motorway.

Background

The M5 corridor has been established as a vital part of the Sydney and State Road network, addressing a number of objectives of the strategic planning and policy of the New South Wales Government

The M5 South West Motorway is part of the F5/M5 corridor that extends from Campbelltown to Sydney Airport, where it joins the M1 and connects to the Sydney CBD. The corridor serves a population of around 1.5 million people and there are around one million jobs in the corridor.

Based on forecasts published by the Department of Planning, Sydney's population is predicted to approach six (6) million by 2036, with the population of south-western Sydney predicted to approach two (2) million. The projected growth in both population and employment will increase pressures on infrastructure, including transport.

The M5 corridor is of strategic significance being part of the Sydney Orbital Network. It caters for major freight movements to/from Sydney Airport and Port Botany in the east, and the Western Employment Lands at Eastern Creek (via the Westlink M7 Motorway) in the west, as well as other significant freight generators in the metropolitan, regional NSW and interstate areas.

The M5 motorway plays a vital role as a freight route connecting Sydney Airport and Port Botany with other sections of the orbital road network and interstate routes. Planned expansion at both of these facilities will increase the future freight task along the M5 corridor.

The M5 South West Motorway and its parallel arterial route carry very high numbers of vehicles - particularly in the peak periods, with up to 4,800 in one direction in the section of the M5 at Liverpool. The average weekday traffic volume at the Hammondville toll plaza is 91,000 (2009), including 8% heavy vehicles.

Eastbound capacity in the AM peak period is constrained by the capacity of the M5 East freeway, with its two lane tunnel, relatively steep grades and high proportion of heavy vehicles. Capacity on the alternative route of Newbridge Road, Milperra Road, and Canterbury Road is governed major intersections at Henry Lawson Drive, Stacey Street, and King Georges Road.

Future traffic conditions

The M5 South West Motorway currently caters for longer distance trips and commercial traffic and thus fulfils an important role in the road network. This role will be strengthened going forward with pressures to accommodate significant traffic growth, generated by development such as the South West Growth Centre, and as Sydney's freight task increases as a result of expansion of the port and airport facilities.

Average weekday traffic volumes are expected to increase from 91,000 in 2009 to 107,000 in 2016, and to 122,000 by 2026.

Traffic modelling has shown that, without improvement, the AM peak period travel times on M5 South West Motorway eastbound would increase by 14 minutes in the period from 2006 to 2026. Travel times on the alternative route are also expected to increase by 8 minutes over the same time period.

Without the proposed widening, Levels of Service for motorway traffic are forecast to deteriorate markedly, to the point where queues and congestion would be expected along almost the full length of the motorway, in both directions during AM and PM peak periods.

The alternative route of Newbridge Road, Milperra Road, and Canterbury Road plays an important function in conveying short distance trips to destinations within the corridor and is also serviced by buses as part of the Strategic Bus Corridor program. There is limited scope for this route to cater for any excess growth from the motorway.

The Project

To address the deteriorating travel conditions, the NSW Roads and Traffic Authority, in conjunction with the concessionaire Interlink Roads, proposes to widen about 20km of the motorway from Camden Valley Way to King Georges Road.

The objectives of the M5 West Widening Project, can be summarised as being to:

- Support growth in the South West Growth Centre;
- Improve travel efficiency between key residential and employment areas;
- Enhance the strategic road network;
- Improve freight transport capacity and efficiency;
- Minimise environmental and social impacts; and
- Improve incident management and road safety on the M5 corridor.

Impact of the Project

Traffic modelling analysis has shown that the M5 West Widening Project will:

- Provide additional capacity to accommodate future growth generated, for example, by the South West Growth Centre
- Reduce journey times on the M5 South West Motorway, by 22% in the AM peak eastbound direction in 2026, when compared with the unimproved situation
- Reduce journey times on the parallel alternative route, by 7% in the AM peak eastbound direction in 2026, when compared with the unimproved situation
- Decrease traffic on the alternative route by 5.6% in the AM peak eastbound direction and 11.1% in the westbound direction when compared with the unimproved situation.
- Improve journey times for Strategic Bus Corridors when compared with the unimproved situation

The M5 West Widening Project will also serve the growth in freight trips which is a primary strategic objective for the corridor, with freight vehicle volumes forecast to

increase by 51% in 2026 when compared with the Base Case, demonstrating the attractiveness of the motorway to commercial vehicle operators, despite the toll payment.

The M5 South West Motorway will continue to capture a significant number of longer distance trips relative to the alternative route, which caters more for shorter distance, local journeys.

Sensitivity analysis has been undertaken to illustrate the potential impact of the duplication of the M5 East project. Although this scheme is not committed to by Government, it is recognised that such a project will be considered as part of longer term planning for Sydney, given the strategic importance of the corridor.

The results suggest that the M5 West widening and the M5 East duplication are reasonably independent projects, both having significant benefits in their own right. Inclusion of the M5 East duplication resulted in significant increases in traffic east of King Georges Road, while there may be only minimal increases in traffic to the west, over and above the Project Case (i.e. with M5 West widening only). The explanation being that the M5 East duplication increases from two to four lanes where as the M5 west of King Georges Road is only three lanes in each direction, the M5 East would need to draw traffic to/from King Georges Road and Kingsgrove Road if it were to run near capacity. Furthermore, longer distance trips are already substantially captive to the motorway, thus there is limited scope to attract more long distance journeys.

Glossary

Term	Definition		
AADT	Average Annual Daily Traffic (7-day average), expressed in		
	vehicles per day		
Alternative Route	The Alternative Route to the M5 South West Motorway,		
	comprising Canterbury Road from Wiley Park to Bankstown,		
	Milperra Road to Milperra, Newbridge Road to Liverpool, and		
	Hume Highway to Casula.		
BITRE	Bureau of Infrastructure, Transport and Regional Economics		
BTS	Bureau of Transport Statistics (formerly Transport Data Centre)		
CBD	Central Business District		
CCTV	Closed Circuit Television		
СТМР	Construction Traffic Management Plan – a plan that outlines how		
	traffic generated by construction activity will be managed		
F5	The South Western Freeway south of Camden Valley Way		
	through Campbelltown		
GMA	Greater Metropolitan Area		
Grade separated	The separation of intersecting roads using a bridge and underpass		
intersection	configuration		
HCV	Heavy Commercial Vehicle		
Inter-peak period	The period of the day between the AM and PM peak periods		
	(typically 10:00 AM to 3:00 PM)		
LCV	Light Commercial Vehicle		
LGA	Local Government Area		
M5 East	The M5 freeway section between King Georges Road at Beverly		
	Hills and General Holmes Drive at Mascot		
M5 West	The M5 South West Motorway between King Georges Road at		
	Beverly Hills and Camden Valley Way at Casula		
M7	The Westlink M7 Motorway between Camden Valley Way at		
	Casula and the M2 Motorway at Seven Hills		
OMCS	Operations Management Control System - a system of devices		
	and controlling software that allows monitoring of traffic and		
	interventions to address problems		
RTA	NSW Roads and Traffic Authority		

Term	Definition
SBC	Strategic Bus Corridors
SSD	Sydney Statistical Sub-Division
STA	State Transit Authority of NSW

Director-General's Requirements Checklist

Item	Location in this EA
General Requirements	
An assessment of the key issues , with the following aspects addressed for each key issue (where relevant):	
• description of the <i>[transport]</i> existing environment;	Section 2
• assessment of the potential [traffic] impacts (direct, indirect and cumulative) of the project for both construction and operation stages, in accordance with relevant policies and guidelines;	Section 8 (effects of M5 West Widening Project) and Section 10 (construction impacts)
Key Issues	
4. Strategic justification outlining the strategic need and justification of the project	Section 1.4
5. Project justification including an assessment of travel demand, induced traffic, traffic congestion, road network efficiency and wider transport interactions.	Section 3, Section 4, Section 6 and Section 8.8 (induced traffic)
6. Operational traffic impacts including impacts (volumes, speeds, intersection performance, freight volumes) on the M5 motorway and the surrounding road network.	Section 8, specifically Section 8.2 (volumes), Section 8.5 (travel speeds), and Section 8.7 (freight)
6a. Traffic and operational implications for public transport (particularly with respect to strategic bus corridors and bus routes) and opportunities to improve public transport patronage.	Section 2.6.2 and 2.6.3 (existing public transport situation) and Section 8.9 (impact of the Project)
6b. Impacts on cyclists and pedestrian access and safety and opportunities to integrate cycleway and pedestrian elements with surrounding networks.	Sections 2.7 and 2.8 (existing facilities), Section 7.4 (proposed physical changes), Section 8.6 (impact of the Project), and Section 10.6.2 and Section 10.6.3

Location in this EA

(impact during construction)

7. Construction traffic impacts including route identification, scheduling of transport movements, number, size and frequency of construction related vehicles.

Item

Section 10

1 Introduction

1.1 Background

A traffic and transport assessment has been undertaken of the effects of the proposed M5 West Widening Project. This report presents the findings of the traffic and transport assessment.

The M5 South West Motorway is the key route between central Sydney and the southwestern suburbs connecting to the F5 Freeway, the M5 East Freeway and the Westlink M7. The motorway is approximately 21 kilometres in length, extending from King Georges Road in Beverley Hills to the Camden Valley Way in Casula.

The M5 South West Motorway provides for a variety of travel markets including a high volume of commercial and freight-related trips. Compared to other parts of the Sydney road network, the M5 South West Motorway is among the most heavily congested corridors in Sydney.

In 2010, the motorway concessionaire, Interlink Roads, submitted a proposal to the NSW Roads and Traffic Authority to widen about 20km of the M5 South West Motorway between King Georges Road, Beverly Hills and the Camden Valley Way, Casula (the Project). Interlink Roads has developed a preliminary concept design for the proposal and the NSW Roads and Traffic Authority (RTA) is preparing an environmental assessment.

A summary of the key elements of the preliminary concept design is provided in **Section 7**.

1.2 Purpose of this Report

The purpose of this report is to document the traffic and transport analysis and assessment of the proposed M5 West Widening Project. The findings in this report will inform the traffic and transport component of the Environmental Assessment, which is required under Part 3A of the Environmental Planning and Assessment Act.

The analysis, assessment methods and reporting has been guided by the Director General's Requirements (DGRs) as detailed on page xi.

1.3 Policy Context for the M5 West Widening Project

In March 2010, the NSW Government released Sydney Towards 2036, a discussion paper reviewing the 2005 Metropolitan Strategy. This followed the release in February 2010 of the Metropolitan Transport Plan 2010. These are complementary documents which together outline the future strategic land use and transport plans for Sydney.

Sydney Towards 2036¹ concluded that by 2036, Sydney's population (including the Central Coast) is forecast to grow from 4.3 million in 2006 to 5.7 million in 2031 and to 6 million in 2036. This means an extra 770,000 houses and apartments, and an extra 760,000 jobs by 2036 to cater for such a population increase. Approximately 70% of housing growth is planned to be in existing areas, with the remaining 30% located primarily in the North West and South West growth sectors. Correspondingly, job growth in western Sydney is to be reinforced in the Metropolitan Strategy Review, in order to encourage shorter commuting distances and provide jobs and services closer to home.

The M5 corridor has been established as a vital part of the Sydney and State Road network. It addresses a number of strategic planning and policy objectives of the New South Wales Government, as documented in the following:

- NSW State Plan;
- NSW State Infrastructure Strategy;
- Metropolitan Strategy City of Cities;
- Metropolitan Transport Plan;
- Metropolitan Sub Regional Strategies;
- Sydney-Melbourne Corridor Strategy;
- Sydney Urban Corridor Strategy;
- Action for Air; and
- Local Government local environmental plans.

¹ NSW State Government, 2010, Metropolitan Strategy Review: Sydney Towards 2036, Sydney

These policy and strategy documents set the framework to facilitate and manage Sydney's growth and development over the coming years.

For the M5 South West Motorway, the relevant elements of the Metropolitan Strategy that support the need for an expanded motorway are:

- The South West Subregion (mainly in the Liverpool and Camden LGAs) is expected to experience the highest level of population growth at 113% over existing levels;
- The West Central Subregion (which includes the Fairfield and Bankstown LGAs) is expected to have a population growth of 32%;
- Employment lands have already been rezoned for Hoxton Park Aerodrome Industrial Area (88 ha), Oran Park and Turner Road (114 ha), and Yarrunga/Prestons Industrial Area (140 ha), with employment lands proposed for North Leppington;
- Revitalising the Campbelltown-Macarthur Major Centre and strengthening the Liverpool Regional City; and
- Continued recognition of the Global Economic Corridor from Macquarie Park through North Sydney to Sydney Airport and Port Botany, as a major source of employment and activity.

Widening of the M5 (West) is included in the Metropolitan Transport Plan 2010, in reflection of its key role in connecting the following centres:

- Liverpool Regional City;
- Bankstown Airport-Milperra Specialised Centre;
- Bankstown Major Centre;
- Sydney Airport and Port Botany Specialised Centres; and
- Intermodal freight terminals at Ingleburn and Enfield (existing) and Moorebank (potential)

The M5 South West Motorway forms part of a link between other centres in Sydney such as those along the Westlink M7 Motorway (especially the Western Sydney Employment Area near the M7/M4 interchange); the Hurstville and Kogarah Major Centres; Randwick Education and Health Specialised Centre and the planned Green Square Major Centre. It also forms part of key access routes for other local industrial

lands such as Ingleburn, Moorebank and Hoxton Park, with the latter having an additional 88 ha of industrial lands rezoned in 2009, as noted in the Metropolitan Strategy.

Figure 1-1 illustrates the key role the M5 South West Motorway plays in the metropolitan transport system. The major transport elements surrounding the motorway include the F5 Freeway, M5 East tunnel, the East Hills Line and the Airport Line. The M5 South West Motorway and M5 East form part of the Sydney Orbital Motorway.



Figure 1-1 M5 corridor in the context of Sydney's Metropolitan Strategy

1.4 Strategic Justification

The strategic justification for undertaking this widening proposal is addressed in detail in Chapter 3 of the Environmental Assessment report prepared by the RTA. The traffic and transport assessment contained within this report provides a substantive element of the justification for the project.

The M5 South West Motorway supports the economic development of the state and national economy by providing a vital link between Sydney Airport / Port Botany and the major employment centres to the west of Sydney as well as linking into the national highway network. It also provides an important freight connection for local intermodal terminals and industrial lands.

The M5 South West Motorway is part of the F5/M5 corridor that extends from Campbelltown to the Sydney CBD. It serves a population of around 1.5 million people, representing around 30 per cent of Sydney's population and almost eight per cent of Australia's population. There are around one million jobs in the corridor, representing around 45 per cent of Sydney's jobs and 10 per cent of Australia's jobs. Based on updated forecasts published by the Department of Planning (DoP, 2010), Sydney's population is predicted to approach six million by 2036, with the population of southwestern Sydney predicted to increase by 464,000.

Between 2001 and 2006, Sydney's South West Subregion, which encompasses the Camden, Campbelltown, Liverpool and Wollondilly local government areas, experienced a 12 percent annual growth in jobs. In order to provide jobs in the Sydney region, a target of over 550,000 new jobs by 2031 has been set, with around half of these new jobs expected to be located in western Sydney.

The forecast growth in population and jobs and associated travel demand cannot be expected to be served by public transport alone as not all trip origins and destinations are, or can be, served by public transport efficiently or effectively. As such, development of Sydney's road network must compliment developments in public transport provision in order to adequately cater for Sydney's future travel demands.

The existing heavy rail network serves regional public transport demand surrounding the M5 South West Motorway. Sections of the rail network have been upgraded in recent years, including the quadruplication of sections between Turrella and Revesby, the commencement of the South West Rail Link and major upgrades to interchanges. Bus services in the south-west region are focused on providing cross regional connections along the Strategic Bus Corridors, connecting residents and workers to local and regional jobs, facilities and services. There is also a strong connection to the rail system for commuters. A dedicated heavy rail line between Port Botany and Enfield/Chullora services rail freight with a freight line extension to Sefton. This is currently being extended as part of the \$309 million Southern Sydney Freight Rail Line, which will provide a dedicated 36-kilometre freight line between Sefton and Macarthur in Sydney's south and south west.

The M5 corridor has been established as a vital part of the Sydney and State Road network. It provides critical access from Port Botany and the Sydney Airport to South Western Sydney and the orbital road network.

In recognition of this role and in anticipation of future traffic growth, the original design of the M5 South West Motorway made a provision for widening of the motorway at some point in the future.

In respect of the project's strategic justification, this traffic and transport assessment focuses on the following:

- Validating the land use projections and traffic generation;
- Consideration of the freight task and future growth;
- Assessment of the current road network performance; and
- Analysing the effectiveness of the proposal in meeting the strategic travel needs associated with the anticipated population and employment growth, within the context of government policy and strategic objectives, inter alia, the strategic objectives outlined above.

1.5 Project Objectives

The objectives of the M5 West Widening Project can be summarised as follows:

- Support growth in the South West Growth Centre;
- Improve travel efficiency between key residential and employment areas;
- Enhance the strategic road network;

- Improve freight transport capacity and efficiency;
- Minimise environmental and social impacts; and
- Improve incident management and road safety on the M5 corridor.

1.6 Structure of this Document

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The remainder of this report is structured as follows:

Section	Contents
2	Existing transport environment
3	Freight task
4	Existing road network performance within the study area
5	Traffic forecasting approach
6	Future base traffic conditions
7	Description of the Project and key objectives
8	Analysis of the traffic impacts of the M5 West Widening Project
9	Effects of M5 East duplication proposal
10	Traffic impacts during construction
11	Conclusions

2 Existing Transport Environment

This section describes the existing transport network and regional travel demand, and provides an understanding of the transport task within the corridor.

Because of its significance, the freight task is separately described in Section 3.

2.1 The Study Area

The study area is shown in Figure 2-1. It encompasses the M5 South West Motorway from King Georges Road, Beverly Hills to Campbelltown Road, Casula, as well as the immediate surrounding suburbs and main arterial roads.



Figure 2-1 Study Area

2.2 Existing Land Use

Figure 2-2 and Figure 2-3 illustrate the existing population and land use densities within the wider Sydney area, centred on the M5 corridor.

As can be seen, population density increases with proximity to the CBD. It also increases with proximity to major public transport corridors – notably rail lines – brought about by Government transport land use and planning policies. Consequently, regions at the western end of the M5 corridor and along its fringes generally have low population densities, as shown in Figure 2-2 below. There is a high degree of correlation between population density and mode share, whereby a low population density will generally reflect a high car mode share (for trip origins).



Source: 2006 Census, Bureau of Transport Statistics

Figure 2-2 2006 Population Density

Figure 2-3 shows that employment is concentrated in the CBD, North Sydney and the surrounding suburbs. Some relatively high density employment areas can also be observed along the M5 corridor from Sydney Airport out to the M5 / M7 interchange. In the M5 and F5 corridor principal employment areas include Campbelltown, Liverpool/Moorebank, Milperra, Bankstown and Padstow.



Source: 2006 Census, Bureau of Transport Statistics Figure 2-3 2006 Employment Density

In general terms population is evenly distributed throughout the outer metropolitan area with higher concentrations towards Sydney CBD and the major centres. In contrast, employment is concentrated toward Sydney's east and around employment hubs such as major regional centres and industrial zonings. In the M5 corridor this includes Sydney Airport, Port Botany, Bankstown, Liverpool and Hurstville.

2.3 Existing Mode Share

As with other major cities in Australia, Sydney has a very high propensity for car use relative to public transport. This is in part a consequence of low population densities and the concentration of employment in centres. Across the Greater Metropolitan Area (GMA), the public transport mode share for trips to work (commuter trips) is 16%. The trend, as might be expected, is one of car mode share progressively increasing with distance from the CBD. However, the rail corridors serve to reduce the car mode share in the immediate vicinity of train stations.

Figure 2-4 below shows the car mode shares by trip origin for the journeys to work of Sydney residents in 2006 (Census). With the exception of those areas along the East Hills and Southern rail lines, car mode share based on a person's origin (place of residence) is largely in excess of 80%.



Source: 2006 Journey to Work Data, BUREAUE OF TRANSPORT STATISTICS Figure 2-4 Car Share Proportion for Journey to Work Trip Origins

Given the radial nature of the public transport services to and from the CBD, which also pass through other major centres, such as Parramatta and North Sydney, the commuter's trip will predominantly have its destination in one of these centres. Consequently, those with employment locations outside of the major employment centres will have a high car mode share as shown in the figure below. In the M5 and F5 corridor, the only centres with car mode share less than 90% are Liverpool, Bankstown and Roselands.

Public transport already captures a significant proportion to of work trips to the CBD, with limited scope for increased public transport mode share to this destination (76% public transport mode share in the peak hours, Bureau of Transport Statistics).

While improvements to public transport through the provision of the MetroBus service, Strategic Bus Corridors and integrated bus networks will help achieve the Sydney Journey to Work mode share target of 25 percent by 2016 (NSW State Plan), the road network will continue to carry the bulk of non-CBD destination commuter transport demand.



Source: 2006 Journey to Work Data, Bureau of Transport Statistics Figure 2-5 Car Share Proportion for Journey to Work Trip Destinations

2.4 The Corridor Motorway System

The M5 and F5 corridor is the main road freight, commercial and passenger route between Port Botany, Sydney Airport, and south-west Sydney. It is part of the National Highway Network connecting Sydney, Canberra and Melbourne.

The existing M5 and F5 corridor can be divided into three sections:

 M5 East Motorway – a ten kilometre road connecting the M5 South West Motorway with General Holmes Drive/Eastern Distributor. The M5 East Motorway currently includes two four kilometre tunnels between Bexley Road, Earlwood and Marsh Street, Arncliffe. Each tunnel contains two lanes of traffic.

- M5 South West Motorway a 21 kilometre tolled road with two lanes in each direction between Camden Valley Way, Casula, and King Georges Road, Beverly Hills, operated by Interlink Roads.
- 3. F5 Freeway from the interchange of the M5 South West Motorway and the Westlink M7 Motorway at Casula, south towards Campbelltown and then on to Mittagong.

2.4.1 M5 South West Motorway

The M5 South West Motorway comprises two 7 metre wide carriageways, each with two lanes. Both carriageways have a 2.5 metre wide offside shoulder and a 1 metre wide nearside shoulder and are separated by an 8 metre wide median.

From east to west, the M5 South West Motorway's road corridor passes through the suburbs of Beverly Hills, Narwee, Riverwood, Padstow, Revesby, Panania, Milperra, Hammondville, Holsworthy, Moorebank, Wattle Grove, Liverpool, Casula, Lurnea, and Prestons.

The M5 South West Motorway begins at King Georges Road (where the M5 East terminates) and all of its intersections are grade-separated. It terminates at its connection to the F5 and M7 Motorway at Camden Valley Way.

The M5 South West Motorway is a tolled facility with the main toll plaza located at Hammondville. Toll plazas are also located on the east facing on and off ramps at Fairford Road, River Road and Henry Lawson Drive. All toll plazas contain electronic toll lanes and cash lanes.

There are two toll classes on the M5:

- Class 2 (three axle vehicles under 2.0 metres in height or two axle vehicles under 2.8 metres in height); and
- Class 4 (all other vehicles).

For the purpose of the analysis documented in this report June 2009² toll values have been adopted; being \$3.80 for Class 2 vehicles and \$8.20 for Class 4 vehicles. All toll increases are linked to the Consumer Price Index (CPI).

The NSW Government introduced the M5 Cashback Scheme on 1 January 1997. Cashback allows NSW residents to claim back the value of tolls (excluding GST) paid while using privately registered vehicles for private trips on the M5 motorways.

2.5 Local Road Network

Principal arterial road routes parallel to the M5 South West Motorway include:

- Canterbury Road, Milperra Road and Newbridge Road, from Roselands to Liverpool
- Campbelltown Road and Hume Highway, from Liverpool to Casula

Principal arterial routes intersecting with the motorway are shown in Table 2-1:

² The modelling assessment predates recent June 2010 changes to toll values.

 Table 2-1
 Arterial Routes Intersecting with M5 South West Motorway

Route/Location	Interchange Arrangement		
King Georges Road, Beverly Hills	full diamond interchange		
Belmore Road	west facing ramps		
Fairford Road	full diamond interchange		
The River Road	full interchange		
Henry Lawson Drive	full interchange		
Heathcote Road	east facing ramps and west facing off-ramp and		
	west facing left turn on slip lane		
Moorebank Avenue	full diamond interchange		
Hume Highway	east facing ramps		
Camden Valley Way	north facing ramps and south facing off-ramp		

2.6 Public Transport Services

2.6.1 Rail

In the vicinity of the M5 South West Motorway, there are three passenger rail lines:

- South/Inner West Line, from Redfern to Glenfield via Lidcombe and Regents Park. This line has four trains per hour in the AM peak in the westbound direction and 6 trains per hour in the city bound direction. The busiest stations in the study area are Cabramatta and Liverpool.
- Bankstown Line, from Sydenham to Bankstown and on to Regents Park (where it joins the South Line). This line has six trains per hour in the AM peak, with Bankstown the busiest station. There are six trains per hour in peak direction (city bound) in the busiest AM peak hour, with three services from Regents Park.
- East Hills Line, from Turrella to Campbelltown. This line has eight trains per hour from Glenfield in the AM peak city bound direction, with an additional four trains per hour after East Hills. In the contra-peak direction there are four trains per hour with an additional four trains terminating at Revesby. The busiest stations are Glenfield, Holsworthy and Padstow.

On all three lines, the principal destination is the Sydney CBD, accounting for around 48% of all AM peak period trips. Other significant destinations are the Inner West and Lower North Shore³.

2.6.2 Bus

With the exception of one the State Transit Authority (STA) bus route from Canterbury to Bankstown, all bus services in the study area are provided by private sector operators under contract from the NSW Government. These services are focussed on the activity centres of Roselands, Bankstown, and Liverpool. Most services connect with railway stations if they are on the route, thus facilitating connections from homes, workplaces and education facilities. From checks of timetables, peak period frequencies on most routes are two per hour, while off-peak and weekend frequencies are once per hour. A limited number of routes have four services per hour in the peak periods and two per hour at other times. Some routes operate Monday to Friday only because they service workplaces and education institutions.

The numbers of bus routes interacting with motorway interchange roads are as follows:

- King Georges Road two routes
- Belmore Road two routes
- Fairford Road one route
- The River Road four routes
- Henry Lawson Drive one route
- Moorebank Avenue one route
- Hume Highway eight routes
- Camden Valley Way five routes

2.6.3 Strategic Bus Corridors

Following the Unsworth Review⁴ a series of Strategic Bus Corridors (SBC) have been identified, and some implemented, within the Sydney Metropolitan area. The main purpose of the strategic bus corridors is to provide high frequency, reliable linkages between key major centres. They will also provide an important service for demand generated along the routes as well as providing key, cross-regional transport linkages.

³ CityRail Compendium of Travel Statistics June 2008.

⁴ Unsworth, 2004, Review of Bus Services in NSW.

Several SBCs run either parallel to the M5 South West Motorway, or cross the motorway. From east to west, these SBCs are listed in Table 2-2 and illustrated in Figure 2-6.

Table 2-2	Ke	y Strategic Bus Corridors in the Study Area
Corridor		Description
23		Miranda to Bankstown
25		Hurstville to Bankstown
28		Bankstown to Burwood
31		Liverpool to Campbelltown
33		Liverpool to Bankstown



Figure 2-6 Sydney Strategic Bus Corridors

The efficiency of Corridor 25 is affected by traffic conditions at the King Georges Road interchange; Corridor 23 by the Fairford Road interchange; and Corridor 31 by the

Hume Highway interchange. Corridor 28 is not directly affected by the motorway, while Corridor 33 can be affected by traffic conditions at the intersection of Canterbury Road, Milperra Road and The River Road, which is very close to the interchange of The River Road with the motorway. Corridor 33 is also affected by the large volume of traffic exiting the M5 at Moorebank Avenue (eastbound in the AM) to access Liverpool.

2.7 Pedestrians

Pedestrian access is prohibited along the length of the M5 South West Motorway. Since the road is a high speed motorway facility, this is appropriate.

Pedestrian crossing facilities are provided at all of the M5 South West Motorway's interchanges with the surface road system. However, not all pedestrian crossing movements are catered for at these sites. The provision and maintenance of footpaths on both sides of the approach roads to the M5 are the responsibility of the local council. However, in some instances, footpaths have not been provided on the approach roads.

Parallel shared pedestrian and bicycle paths surrounding the M5 include Welfare Avenue South in Narwee and Salt Pan Creek; and Moorebank Avenue and the Hume Highway.

2.8 Cyclists

Existing bicycle access along the M5 South West Motorway and its parallel routes varies in level of quality and provision. The M5 South West Motorway has a primary shoulder lane facility, appropriate for more confident cyclists. In addition, there are some facilities parallel to the motorway – both formal and informal.

2.8.1 Primary facility

The M5 South West Motorway between Camden Valley Way and King Georges Road has a primary bicycle facility as a freeway shoulder lane in both directions. Access to this facility is via the grade separated interchanges at Camden Valley Way, Beech Road (from the east), Hume Highway (to/from the east); Lakewood Crescent (to the south); Moorebank Avenue; Heathcote Road; Henry Lawson Drive; The River Road; Fairford Road; Belmore Road (to/from the west) and King Georges Road.

On the eastern side this facility connects to the M5 East, and to the Westlink M7 in the west.

The existing facility appears to have been constructed according to Section 7.5 the NSW Bicycle Guidelines.⁵

2.8.2 Parallel Facilities

Bicycle facilities parallel to the M5 South West Motorway include marked on-road bicycle lanes, shared bicycle/traffic lanes and shared paths. Liverpool, Bankstown, Canterbury, and Hurstville local governments all have local bicycle facilities that, in sections, parallel the M5.

Parallel shared pedestrian and bicycle paths exist in sections of the M5 South West Motorway between Welfare Avenue South in Narwee and Salt Pan Creek; and between Moorebank Avenue and the Hume Highway.

2.8.3 Connections to Public Transport

Connections for bicycle riders to public transport from the M5 South West Motorway are via existing ramps and interchanges. Public Transport with bicycle parking facilities within easy cycling distance of the M5 corridor includes:

- Padstow: 4 bicycle lockers accessible via the Fairford Rd interchange;
- Revesby: 8 bicycle lockers accessible via the River Road interchange;
- Liverpool: 5 bicycle lockers accessible via the Hume Highway Interchange;
- Holsworthy: 24 bicycle lockers accessible via the Heathcote Road Interchange;
- East Hills: 4 bicycle lockers accessible via the Henry Lawson Interchange;
- Kingsgrove: 3 bicycle lockers accessible via the M5 East; and
- Bankstown: 4 bicycle lockers accessible via the River Road interchange.

The Liverpool and Bankstown public transport interchanges also provide access to buses and trains servicing South West Sydney and the Sydney CBD.

⁵ Roads and Traffic Authority of NSW, 2002, NSW Bicycle Guidelines v1.2, Sydney, pg 59

Local bicycle routes provided by the relevant local councils offer access to these locations from the M5 South West Motorway.

2.8.4 Connections to Shopping and Educational Facilities

Key regional shopping and educational facilities within easy cycling range of the M5 corridor include:

- University of Western Sydney Bankstown Campus accessible via the Henry Lawson Drive interchange;
- Westfield Liverpool and Liverpool CBD accessible via the Hume Highway Interchange;
- Roselands Shopping Centre accessible via the King Georges Road Interchange;
- Bankstown Airport accessible via the Henry Lawson Drive interchange;
- Bankstown CBD and shopping centre accessible via the River Road interchange;
- South Western Sydney Institute of TAFE
 - o Liverpool Campus accessible via the Hume Highway Interchange;
 - Bankstown and Padstow Campuses accessible via either the River Road or Fairford Road interchanges.

Each of these centres provides bicycle parking facilities as per the requirements of the relevant local council.

2.9 Summary

The study area covers the M5 South West Motorway and its alternative routes from Beverly Hills in the east to Casula in the west. The M5 South West Motorway forms a key part of the F5 and M5 corridor, which is the main freight, commercial and passenger route between Port Botany, Sydney Airport and south-west Sydney.

The area is serviced by three rail lines and multiple private sector bus routes. However, there are currently no regular passenger transport bus services that utilise the motorway carriageway.

The M5 South West Motorway caters for some cycling trips along the hard shoulder, and there are opportunities for pedestrians to cross the motorway although, for safety reasons, pedestrian movements along the length of the motorway are prohibited.

3 Freight Task

3.1 Introduction

Freight, being the commercial transport of goods or produce, is a vital and significant part of the Sydney economy. Sydney is the key hub for interstate freight movements along the eastern seaboard and NSW intrastate freight⁶. Across the metropolitan area, (in line with Bureau of Infrastructure, Transport and Regional Economics (BITRE) forecasts), freight volumes are expected to increase significantly between 2006 and 2036.

In general, freight consists of:

- bulk freight e.g. minerals and agricultural products such as coal, grain and fertilizer, comprising 84% of the total freight task, and
- non-bulk or containerised freight, including general merchandise, food, cars and livestock.

The M5 corridor is strategically important in the Sydney freight network. It is part of the Sydney Orbital Network, with the motorway carrying freight traffic from Sydney Airport and Port Botany in the east, and the Western Employment Lands at Eastern Creek (via the Westlink M7 Motorway) in the west, as well as other significant freight generators in the metropolitan, regional NSW and interstate areas.

The M5 South West Motorway traverses and indirectly services several significant industrial areas, including:

- Kingsgrove (accessed via King Georges Road interchange from the M5)
- Riverwood (accessed via Belmore Road)
- Padstow (accessed via Fairford Road)
- Milperra (accessed via Fairford Road and Henry Lawson drive)
- Moorebank (accessed via Moorebank Avenue)
- Ingleburn (accessed via Brooks Road and Campbelltown Road)

⁶ Sydney Metropolitan Transport Plan, 2010

Heavy vehicles currently comprise approximately 8% of the M5 South West Motorway traffic volumes (average annual weekday traffic).

The Sydney freight network and anticipated freight growth is summarised below and further details of key land use developments, including freight generating locations, within the study are provided in Section 5.

3.2 Sydney Metropolitan Freight Network

The Sydney freight network (road and rail) is illustrated in Figure 3-1. At present the majority of freight in Sydney is carried by road (86%⁷), which is deemed a more flexible alternative to rail, given its capacity for door-to-door delivery. It is also more suited for the transport of perishable, fragile or time-sensitive freight, with rail freight tending to dominate the bulk freight task⁸.

For the most part, freight carried by road utilises the motorway and major arterial network. The Roads and Traffic Authority publishes Reduced Access Vehicle (RAV) maps, providing details of roads approved for special freight vehicles (B-Doubles, 4.6m High Vehicles, and Road Trains). The M7 Motorway is the most heavily utilised motorway in terms of absolute heavy vehicle volumes⁹.

Rail freight is primarily carried on the South Line through Glenfield, Liverpool, Cabramatta and Sefton. Work is currently underway to construct an extra track over this section which will be dedicated to freight trains - the Southern Sydney Freight Line. This new track will service the industrial areas around Campbelltown, Minto and Ingleburn, adjacent to the Hume Highway and up towards Yenora. From Sefton junction, freight trains can access the rail freight yards at Chullora, Enfield, and Clyde, St Peters and Port Botany. This network also provides access to the Main North and Main West railway lines, enabling freight movements into and out of Sydney.

Given the anticipated growth in freight movements across Sydney, the Government has made a commitment to increase the amount of freight carried by rail. This is stated explicitly in the Sydney Metropolitan Strategy, which has identified a number of

⁷ Rail Freight Transport in NSW, Briefing Paper No 8/09, November 2009.

⁸ Australian Government Productivity Commission, 2006, Road and Rail Freight Infrastructure Pricing, Melbourne.

⁹ RTA traffic count data, 2006 to 2008

initiatives designed to encourage the use of rail in transport freight. However, it should be noted that moving freight by rail can easily be substituted for road based movements due to the location of ware housing, distribution and manufacturing centres.



¹⁰ Sydney Ports Corporation, Port freight Logistics Plan: A framework to improve road and rail performance at Port Botany, June 2008:

3.3 Freight Trip Growth

Figure 3-2 shows freight vehicle movements in Sydney are forecast to increase by 2.2% per annum between 2006 and 2036 – twice the rate of forecast growth of Light Commercial Vehicle trips, population and employment.



Figure 3-2 Indexed Growth in Freight Trips, Population and Employment 2006 – 2031

The forecast freight vehicle movements shown in Figure 3-2 are produced by Bureau of Transport Statistics (BTS)¹¹ and are taken from the 2010 Release Heavy Vehicle Forecasts, which, in turn, are based on the October 2009 Release Employment Forecasts¹².

Between 2006 and 2036, Blacktown South-West, Fairfield-West, Penrith-East, Liverpool-East and Blacktown South-East are identified as being the areas that will experience the highest growth in heavy vehicle trips.

Table 3-1	Forecast	Growth	in Daily	Heavy	Vehicle	Movemen	ts (Origins	and
Destinations)							

LGA	2006	2036	Growth
Blacktown	45,300	181,300	136,000
Fairfield	41,700	87,700	46,000

¹¹ The BTS heavy vehicle forecasts are produced from the Sydney Freight Movement Model (FMM). The FMM produces base year and forecast estimates of heavy commercial travel movements for the Sydney Greater Metropolitan Area (GMA) at travel zone level. ¹² The Department of Communications, Information Technology and the Arts produced productivity projections in its publication Forecasting Productivity Growth 2004 to 2024, March 2006.

LGA	2006	2036	Growth
Penrith	17,600	57,900	40,300
Liverpool	37,300	76,100	38,800
Bankstown	42,700	62,300	19,600
Campbelltown	14,600	34,100	19,400
Holroyd	27,000	43,200	16,300
Wollongong	17,200	29,800	12,600
Ryde	8,700	21,200	12,500
Baulkham Hills	15,100	27,000	11,900
Auburn	18,600	29,100	10,600
Warringah	11,200	21,200	10,000
Sydney	35,000	44,800	9,800
Wyong	7,200	16,600	9,400
Camden	4,600	12,700	8,200
Botany Bay	14,600	22,700	8,100
Others	217,800	325,200	107,400
Total	576,200	1,092,900	516,900

Source: Bureau of Transport Statistics

The extent of freight growth across the Metropolitan region is highlighted in Figure 3-3 and Figure 3-4, which present the daily heavy vehicle volumes on Sydney's roads in 2006 and 2026 respectively (with 2016 being the design year for the assessment of the M5 South West Widening Project). While the most noticeable growth is seen on the M4, M7 and Hume Highway, the maps clearly show a significant increase in heavy vehicle movements on the M5 and its parallel route (Newbridge Road). This suggests that with the growth related to the proposed intermodal terminal at Moorebank (described in more detail in the following section) and more efficient use of land along the corridor, vehicles will increasingly be using the parallel (non-motorway) route.

There are a number of industrial zones within the study area, notably the areas around Moorebank (Holsworthy), and South of Bankstown. Nearby intermodal terminals include Chullora, Yennora and Minto. There is also a planned intermodal terminal at Moorebank, which will impact on freight movements along the M5 South West Motorway.

The M5 also forms part of a vital route for travel to and from Sydney Airport Terminals and Port Botany. Both of these facilities are expanding to accommodate increasing demand, which will necessarily increase the landside access requirements and traffic volumes on the local road network.



Source: Halcrow Sydney Metropolitan Traffic Model (SMTM)

Figure 3-3 Heavy Vehicle Trips – 2006 Average Weekday

Freight Task

Freight Task





Figure 3-4 Heavy Vehicle Trips – 2026 Average Weekday

3.4 Summary

The efficient movement of freight is vital to the economic and commercial prosperity of the region and ensuring efficient freight travel in the corridor is of high priority for sustained economic growth in Sydney.

The freight task in the corridor is significant; driven by major economic generators such as Sydney Airport, Port Botany, major employment hubs in Sydney's west and significant industrial areas including Moorebank, Ingleburn and Milperra.

Forecasts indicate that freight is set to increase by 2.2% per annum between 2006 and 2036; underlining the need for improvements in transport infrastructure to accommodate such growth.

Improvements to the M5 South West Motorway are desirable to allow this route to continue to service local and strategic freight movements. Without the widening project it is likely that some heavy vehicle movements will be diverted to the other less appropriate local routes.

4 Existing Road Network Performance

4.1 Introduction

This section describes the current traffic conditions on both the M5 South West Motorway and its primary Alternative Route, and provides an understanding of network performance.

For the purpose of this report the Alternative Route is the parallel arterial route along Campbelltown Road, Hume Highway, Newbridge Road, Milperra Road and Canterbury Road.

The following measures have been used to assess the performance of the motorway and key parts of the connecting and surrounding network:

- Travel speeds and times
- Levels of Service of road links
- Levels of Service at intersections
- Crash rate

4.2 Traffic Flows on the M5 South West Motorway

4.2.1 Daily Traffic Flows

The M5 South West Motorway is used by around 91, 000 vehicles (2009) on an average weekday, including 8% heavy vehicles, according to traffic counts at the Hammondville Toll Plaza. Average weekday traffic flows by time period and annual total (for 2009) at the four toll locations are presented in Table 4-1 to Table 4-4.

Unless otherwise stated, one hour traffic volumes are presented, representing the average hour within each of the following peak periods:

- AM Peak 7am to 9am
- Inter Peak 11am to 1pm
- PM Peak 3pm to 6pm

Time Period	Direction	Car	Truck	Total
AM Peak	Eastbound	2,860	200	3,060
AM Peak	Westbound	2,950	230	3,180
PM Peak	Eastbound	2,920	120	3,040
PM Peak	Westbound	3,480	200	3,680
Inter Peak	Eastbound	2,030	280	2,310
Inter Peak	Westbound	1,920	300	2,210
Annual Total	Two-Way	29,221,100	1,923,200	31,144,300

 Table 4-1
 M5 Hammondville Toll Plaza – 2009 Traffic Count

 Table 4-2
 M5 Henry Lawson Drive East Facing Ramps – 2009 Traffic Count

Time Period	Direction	Car	Truck	Total
AM Peak	Eastbound	170	40	210
AM Peak	Westbound	330	40	370
PM Peak	Eastbound	380	30	410
PM Peak	Westbound	220	40	260
Inter Peak	Eastbound	260	60	320
Inter Peak	Westbound	250	60	310
Annual Total	Two-Way	2,943,100	366,000	3,309,200

Table 4-3 M5 The River Road East Facing Ramps – 2009 Traffic Count

Time Period	Direction	Car	Truck	Total
AM Peak	Eastbound	180	10	190
AM Peak	Westbound	310	20	330
PM Peak	Eastbound	330	10	340
PM Peak	Westbound	210	10	220
Inter Peak	Eastbound	230	20	250
Inter Peak	Westbound	210	30	230
Annual Total	Two-Way	2,628,700	138,800	2,767,500

Time Period	Direction	Car	Truck	Total
AM Peak (7am to 9am)	Eastbound	240	30	270
AM Peak (7am to 9am)	Westbound	370	30	400
PM Peak (3pm to 6pm)	Eastbound	430	20	450
PM Peak (3pm to 6pm)	Westbound	330	20	350
Inter Peak (11am to 1pm)	Eastbound	350	40	390
Inter Peak (11am to 1pm)	Westbound	310	40	350
Annual Total	Two-Way	3,749,300	230,000	3,979,300

 Table 4-4
 M5 Fairford East Facing Ramps – 2009 Traffic Count

The highest directional flows are in the PM peak westbound direction with 3,680 vehicles passing the through the Hammondville Toll Plaza. However, it is known that AM peak eastbound direction experiences considerable congestion and it is assumed in this instance that the downstream capacity issues travelling eastbound have resulted in a lower counted flow through the toll plaza.

4.2.2 Traffic Flow Profile

Traffic count data for 2009 has been used to determine the average weekday hourly distribution for cars and trucks at the following M5 South West Motorway sites:

- Hammondville Toll Plaza
- West of Fairford Road
- East of Fairford Road
- East Facing Ramps at Henry Lawson Drive
- East Facing Ramps at The River Road
- East Facing Ramps at Fairford Road

The temporal distribution of traffic flows for the M5 South West Motorway mainline and its ramps are shown in Figure 4-1 to Figure 4-4 below. Traffic profiles have been broken down by direction (eastbound and westbound) and by vehicle class (car and truck). Car traffic in the eastbound direction quickly increases in the period immediately prior to 6am and remains relatively constant (high) through the morning peak period with this peak flow volumes being largely governed by capacity constraints. Traffic levels fall during the inter peak period, before reaching a maximum between 5pm and 6pm, then decreasing rapidly from 7pm onwards. In the westbound direction the peak periods are more marked, whereby the morning peak is shorter and slightly more intense, and with a greater decrease in traffic during the inter peak period.

Truck traffic is found to be greater in the inter-peak period compared to the morning and evening peaks. Trucks predominantly use the motorway during the day – with little truck traffic found to use the motorway at night time.



Figure 4-1 M5 South West Motorway Mainline Weekday Flow Profile - Cars



Figure 4-2 M5 South West Motorway Mainline Weekday Flow Profile – Trucks



Figure 4-3 M5 South West Motorway Ramp Weekday Flow Profile - Cars



Figure 4-4 M5 South West Motorway Ramp Weekday Flow Profile – Trucks

4.2.3 Peak Hour Traffic Flow

Figure 4-5 shows traffic flows at key locations along the M5 South West Motorway during the morning peak. Truck volumes are also shown at the same locations in brackets. Traffic flow observations along the M5 South West Motorway show that the magnitudes of both eastbound and westbound flows are very similar during the morning peak period.

The highest morning peak hour flows on the M5 South West Motorway are experienced between the Hume Highway and Moorebank Avenue with up to 4,800 vehicles in the eastbound direction and 4,100 vehicles in the westbound direction. However, capacity constraints on the eastern end of the Motorway result in the hourly volumes decreasing to 2000 in the eastbound direction and 2,900 in the westbound direction.

Significant volumes are also evident on the parallel route, with 3,300 eastbound vehicles on the Hume Highway (south of the M5); Newbridge Road carrying 3,200 vehicles in the eastbound direction (west of Henry Lawson Drive); and 2,400 vehicles on Canterbury Road in the eastbound direction (east of The River Road).

Additionally, there is a significant volume of traffic entering and leaving the M5 South West Motorway at most interchanges, with the exception of Belmore Road and The River Road, which have relatively low levels of traffic entering and leaving.



Figure 4-5 M5 South West Motorway Interchange Traffic Volumes (8am-9am)