BOVIS LEND LEASE PTY LIMITED

TRANSPORT REPORT FOR PROPOSED COMMERCIAL DEVELOPMENT, SITE 4B, SYDNEY OLYMPIC PARK, HOMEBUSH

NOVEMBER 2006

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1. INTRODUCTION

1.1 Colston Budd Hunt and Kafes Pty Ltd has been commissioned by Bovis Lend Lease Pty Limited to prepare a report examining the transport implications of a proposed commercial development at Homebush, within Sydney Olympic Park. The site is located with frontage to Herb Elliott Avenue and Olympic Boulevarde, as shown in Figure 1.

1.2 The site is currently occupied by parking for some 100 cars (P6H). It is proposed to construct a commercial building on the site comprising some 22,180m^2. Vehicular access would be provided from a new road running south from Herb Elliott Avenue, which will ultimately be connected through to Olympic Boulevarde by Sydney Olympic Park Authority.

1.3 A masterplan[1] has been prepared for Sydney Olympic Park. The development of Site 4 is identified in the masterplan. As part of the masterplan, a draft Transport Management and Accessibility Plan[2] (TMAP) has been prepared. The TMAP sets out the strategic principles for transport and access in conjunction with development at Sydney Olympic Park and the Carter Street precinct. A traffic report[3] for Homebush Bay has examined the traffic implications of development in the area and recommends works to accommodate this development.

[1] "Sydney Olympic Park Masterplan", May 2002.

[2] "Carter Street Precinct and Sydney Olympic Park Transport Management and Accessibility Plan". Draft Final Report prepared for Planning NSW by Maunsell Australia Pty Ltd, June 2002.

[3] "Homebush Bay Traffic Assessment". Prepared by Parsons Brinckerhoff for Sydney Olympic Park Authority, September 2003.

1.4 The overall transport implications of development in the precinct, including the development of the site, have been previously assessed in these studies. This report has been prepared in the context of the masterplan and previous reports, and assesses the transport implications of the proposed development through the following chapters:

- Chapter 2 - describing the existing conditions; and
- Chapter 3 - assessing the transport implications of the proposed development.

2. EXISTING CONDITIONS

Site Location

2.1 The site of the proposed commercial development is south of Herb Elliott Avenue and east of Olympic Boulevarde as shown in Figure 1. It is known as site 4B within Sydney Olympic Park. The site is occupied by parking (P6H) for some 100 cars, with access from Herb Elliott Avenue.

2.2 Adjacent to the site, on site 4A, the Sofitel hotel development is under construction. There are hotels on the northern side of Herb Elliott Avenue, as well as commercial development sites 5, 6, and 7, which are under construction. Olympic Park Railway Station is further north, on Dawn Fraser Avenue. The Australia Centre commercial development is south and east of the site. To the west is the Superdome, Telstra Stadium and the aquatic and athletics centres.

Previous Studies

2.3 The masterplan for Sydney Olympic Park identifies the following scale of development:

- 110,000m^2 commercial;
- 45,000m^2 leisure/entertainment/retail;
- 24,000m^2 hotel;
- 1,300 dwelling units;
- 25,000m^2 cultural/institutional/urban core; and
- 10,000m^2 parklands.

2.4 Site 4B is identified for commercial development. The proposed commercial development is therefore consistent with the type of development identified in the masterplan.

2.5 The masterplan identifies the following transport objectives for development of Sydney Olympic Park:

- optimise use of the available Sydney Olympic Park infrastructure – both public transport and road based;
- generate lower than average traffic levels without compromising the commercial and competitive viability and attractiveness of the site;
- target a journey to work public transport, cycling and walking mode share of 30 to 35 per cent;
- encourage higher than usual car occupancy ratios;
- be effectively integrated with public transport planning for surrounding areas, including the Carter Street precinct; and
- encourage and support increased commuter cyclist access as a sustainable mode of transport.

2.6 The masterplan summarises a package of transport measures aimed at achieving the above objectives. The package of measures is described in more detail in the draft TMAP and includes:

- Policy measures
  - parking provision and management policies designed to support public transport use;
  - a high profile for pedestrian and cycle planning; and
  - requirements for the development and implementation of workplace travel plans.

- Regional measures
  - construction of the Parramatta – Strathfield transitway;
  - potential implementation of regular cross-regional bus services via Olympic Park;
  - potential enhancements to rail infrastructure and services; and
  - upgrades to selected arterial road intersections.

- Local measures
  - selected bus priority measures;
  - comprehensive upgrades to pedestrian and cycle facilities, particularly in Carter Street precinct;
  - localised intersection improvements; and
  - improved signage and information displays for public transport users, pedestrians and cyclists.

2.7 The traffic study undertaken for Homebush Bay identifies a list of works required to cater for future development in the area. The works include signalising the intersections of Australia Avenue with Herb Elliott Avenue/Parkview Drive and Figtree Drive. Appropriate contributions will be made by future developments in the area (including the proposed development) towards these works in accordance with SOPA's development contribution plan.

2.8 The package of measures identified in the masterplan, draft TMAP and traffic study for Homebush Bay were developed to cater for the anticipated scale of development at Sydney Olympic Park. The overall transport implications of the masterplan (including the proposed development) have therefore been previously assessed. This report concentrates on local implications with respect to access, parking provision, servicing, internal layout and local traffic effects.

Road Network

2.9 The road network in the vicinity of the site includes the M4 Motorway, Homebush Bay Drive, Hill Road, Australia Avenue, Olympic Boulevard and Herb Elliott Avenue. The M4 Motorway is west of the site. It is a major link in Sydney's road network, forming part of a route linking western Sydney to the Sydney CBD. It provides a freeway standard, four to six lane divided carriageway with grade separated intersections and interchange facilities at major junctions. Access to the M4 Motorway from the site is available via Homebush Bay Drive and Hill Road.

2.10 Homebush Bay Drive forms part of a north-south arterial route through the metropolitan area, linking the northern beaches in the north with Ryde, Homebush and Hurstville. It has interchange facilities with the M4 Motorway. Homebush Bay Drive generally provides a four to six lane divided carriageway, with two to three traffic lanes in each direction. Clearways operate in peak periods.

2.11 Hill Road links Parramatta Road and the M4 Motorway in the south with Homebush Bay and Newington. It has several signalised intersections which provide access to both precincts. At its northern end Hill Road provides access to the Homebush Bay ferry wharf.

2.12 Australia Avenue is one of the main roads serving Sydney Olympic Park. It links Homebush Bay Drive in the east with Kevin Coombs Avenue in the west. It provides a four lane divided carriageway with two traffic lanes in each direction. A bicycle lane is provided each way. It provides access into Homebush Bay and access to adjacent commercial development. The intersection of Australia Avenue with Homebush Bay Drive is controlled by a large roundabout. The through movement on Homebush Bay Drive is grade separated. Overall, the site has good access to the surrounding arterial road network.

2.13 Olympic Boulevard runs from the NSW Tennis Centre and Shirley Strickland Avenue in the south to the Olympic Stadium. It provides for one traffic lane in each direction with a central median. It provides bus bays on both sides and provides access to the sporting facilities and venues within Sydney Olympic Park. North of Herb Elliott Avenue, Olympic Boulevard is closed to traffic (except buses) and provides a pedestrian precinct.

2.14 Herb Elliott Avenue provides for one traffic lane and one parking lane in each direction, clear of intersections. It is a relatively minor road within the Sydney Olympic Park network and has a 40 kilometre per hour speed limit. It provides some bus parking and access to parking areas, commercial development and the hotels. The intersections of Herb Elliott Avenue with Australia Avenue and Olympic Boulevard are priority controlled. Traffic turning from Herb Elliott Avenue must give way to traffic in these streets. As previously discussed, the intersection of Australia Avenue with Herb Elliott Avenue/Parkview Drive is proposed to be signalised by SOPA. Herb Elliott Avenue is temporarily closed at Olympic Boulevarde in association with construction of the Sofitel hotel.

Traffic Conditions

2.15 Traffic counts have been undertaken during weekday morning and afternoon peak periods (prior to Herb Elliott Avenue being closed) at the following intersections:

- Herb Elliott Avenue/Australia Avenue/Parkview Drive; and
- Herb Elliott Avenue/Olympic Boulevard.

2.16 The results of the surveys are shown in Figures 2 and 3, and summarised in Table 2.1.

Table 2.1: Existing two-way (sum of both directions) peak hour traffic flows

Road	Location	AM peak hour	PM peak hour
Australia Avenue	North of Herb Elliott Avenue	565	555
	South of Herb Elliott Avenue	810	755
Olympic Boulevard	North of Herb Elliott Avenue	325	280
	South of Herb Elliott Avenue	210	205
Herb Elliott Avenue	East of Olympic Boulevard	235	265
	West of Australia Avenue	250	240
Parkview Drive	East of Australia Avenue	335	280

2.17 Table 2.1 shows that traffic flows on Australia Avenue were some 555 to 810 vehicles per hour two-way during the morning and afternoon peak hours. Flows on Australia Avenue were higher south of Herb Elliott Avenue than north of Herb Elliott Avenue.

2.18 Flows on Olympic Boulevard, Herb Elliott Avenue and Parkview Crescent were lower at some 205 to 335 vehicles per hour two-way during peak hours.

2.19 As previously discussed, a number of other developments have been approved and are under construction within Sydney Olympic Park. These developments include commercial development sites 5, 6 and 7, the Quad 4 development and the Sofitel hotel. We prepared reports[4,5,6] for these developments.

2.20 Figures 4 and 5 show two-way peak hour traffic flows with these developments in place. A summary is presented in Table 2.2.

Table 2.2: Two-way peak hour traffic flows with other approved developments

Road	Location	AM peak hour	PM peak hour
Australia Avenue	North of Herb Elliott Avenue	775	765
	South of Herb Elliott Avenue	1,190	1,145
Olympic Boulevard	North of Herb Elliott Avenue	490	450
	South of Herb Elliott Avenue	250	255
Herb Elliott Avenue	East of Olympic Boulevard	440	475
	West of Australia Avenue	755	750
Parkview Drive	East of Australia Avenue	450	400

2.21 Table 2.2 shows that with the approved developments at sites 5, 6, 7, the Sofitel hotel and Quad 4, traffic flows on Australia Avenue and the eastern end of Herb Elliott Avenue would be some 750 to 1,200 vehicles per hour two-way during peak hours. Flows on Olympic Boulevard, the western section of Herb Elliott Avenue and Parkview Crescent would be lower at some 250 to 500 vehicles per hour two-way.

[4] Transport Report for Sydney Olympic Park Commercial Precinct Development Site Nos 5, 6 and 7, February 2004.

[5] Transport Assessment of Proposed Quad 4 Development, Parkview Drive and Bennelong Road, Australia Centre, Sydney Olympic Park, May 2005.

[6] Transport Report for Proposed Sofitel Hotel, Site 4, Sydney Olympic Park, Homebush, December 2005.

Intersection Operations

2.22 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The intersections shown in Figures 4 and 5 have been analysed using the INTANAL program. INTANAL analyses isolated intersections controlled by traffic signals, roundabouts and signs.

2.23 INTANAL simulates the operations of intersection to provide a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, INTANAL estimates the following levels of service (LOS):

- For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Good with minimal delays and spare capacity
29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays. Roundabouts require other control mode.
>70	=	"F"	Unsatisfactory and requires additional capacity

- For give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Acceptable delays and spare capacity
29 to 42	=	"C"	Satisfactory but accident study required
43 to 56	=	"D"	Near capacity and accident study required
57 to 70	=	"E"	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

2.24 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.

2.25 The INTANAL analysis found that with the approved developments in place and traffic signals as proposed by SOPA, the intersection of Herb Elliott Avenue with Australia Avenue/Parkview Drive would operate with average delays of less than 25 seconds per vehicle during the morning and afternoon peak hours. This represents level of service B, a reasonable level of service.

2.26 With the approved developments in place, the unsignalised intersection of Herb Elliott Avenue with Olympic Boulevard would operate with average delays of less than 15 seconds per vehicle during the morning and afternoon peak hours. This represents level of service A/B, a good level of service.

Public Transport

2.27 The site is adjacent to Olympic Park Railway Station. Olympic Park is on a loop from the Western Lines (Emu Plains/Richmond to North Sydney via the City). Services through Olympic Park are every 20 minutes. During special events, services are more frequent.

2.28 Local bus services are provided by Sydney Buses. Services operate along Australia Avenue and provide links to Olympic Park Station. Route 401 links Homebush Wharf, Lidcombe Station and Olympic Park Station. They provide two services per hour in each direction, Mondays to Saturdays. On Sundays, services are every 60 minutes.

2.29 Route 525 links Parramatta and Burwood. It provides a link to Olympic Park Station. It operates on a 30 minute headway. During weekday peak periods, services are more frequent.

2.30 Ferry services from Homebush Bay Wharf provide links to and from the city and Parramatta. Good pedestrian and cycle links are also provided throughout Sydney Olympic Park.

2.31 Therefore, the site is close to regular public transport services.

3. IMPLICATIONS OF PROPOSED DEVELOPMENT

3.1 It is proposed to construct a commercial building on the site comprising some 22,180m^2. Vehicular access would be provided from a new road running south from Herb Elliott Avenue. This road will initially provide access to the building, and will ultimately be connected through to Olympic Boulevarde around the site by SOPA.

3.2 This chapter assesses the implications of the proposed development through the following sections:

- public transport;
- parking provision;
- access, servicing and internal layout;
- traffic generation and effects; and
- summary.

Public Transport

3.3 As previously discussed, the site is close to Olympic Park Station and bus services which operate along Australia Avenue and adjacent to the station. The site also has public transport links to the Homebush Bay ferry wharf. Good pedestrian and cycle links are provided through Sydney Olympic Park. The development will provide secure parking for bicycles within the basement car park.

3.4 The proposed development would increase employment densities close to public transport services, strengthening the existing demand for these services.

3.5 The proposed development is therefore consistent with government policy and the planning principles of:

(a) improving accessibility to housing, employment and services by walking, cycling, and public transport;

(b) improving the choice of transport and reducing dependence solely on cars for travel purposes;

(c) moderating growth in the demand for travel and the distances travelled, especially by car; and

(d) supporting the efficient and viable operation of public transport services.

Parking Provision

3.6 The draft TMAP suggests that commercial developments in Sydney Olympic Park should provide car parking at a maximum rate of one space per 55m^2.

3.7 The proposed commercial development provides some 22,180m^2. On this basis, the development should provide a maximum of some 403 spaces.

3.8 The proposed development provides 362 spaces. This provision is in accordance with the recommendations in the draft TMAP. Reduced parking provision in an area with good access to public transport and a mix of land uses is in accordance with government policy. The proposed parking provision is therefore considered appropriate.

3.9 Some one to two per cent of parking spaces will be disabled spaces. This provision is in accordance with the Australian Standard for Parking Facilities (Part 1: Off-street car parking), AS 2890.1. Disabled parking spaces will be located close to lifts.

3.10 The masterplan indicates that bicycle parking should be provided at the rate of one space per 500m^2. 45 bicycle spaces will be provided for the development in accordance with the masterplan requirements. Bicycle parking will be a mix of secure parking for employees and short term parking for visitors. Showers and lockers will be provided in the building for bicycle and other users.

Access, Servicing and Internal Layout

3.11 Vehicular access to the development is proposed to be provided from a new road running south from Herb Elliott Avenue. The masterplan identifies access for site 4B from Herb Elliott Avenue.

3.12 In the short term, the access road will terminate at the subject site. Ultimately, SOPA will extend this road south and then west, around the site, to connect with Olympic Boulevarde.

3.13 A driveway from the new road will provide for two-way traffic to and from basement parking levels in the development. The driveway will provide for the swept paths of cars entering and exiting the building.

3.14 Three levels of basement parking are proposed. The upper level will provide 104 spaces and the lower two levels will each provide 129 spaces. Internal ramps will connect the three levels of parking.

3.15 Parking spaces will be a minimum of 2.5 metres wide by 5.4 metres long, with 5.8 metre wide aisles. Spaces with adjacent obstructions will be 0.3 metres wider. Disabled spaces will be 3.2 metres wide. Columns will be set back 750 mm from the front edge of spaces. Height clearances will be 2.2 metres generally, with 2.5 metres above disabled spaces and 2.3 metres between disabled spaces and the car park entry/exit. The dead end aisle on the upper parking level will be provided with a turning bay. These dimensions are considered appropriate, being in accordance with the Australian Standard for Parking Facilities (Part 1: Off-street car parking), AS 2890.1:2004.

3.16 A loading dock is proposed on the eastern side of the building, with access from the new road. A separate driveway will be provided to the loading dock, north of the driveway to the basement car park.

3.17 The building will be serviced by vehicles ranging in size up to large rigid trucks. The proposed loading dock has been designed to accommodate 8.8 metre medium and 12.5 metre large rigid trucks in accordance with the Australian Standard for Parking Facilities (Part 2: Off-street commercial vehicle facilities), AS 2890.2 – 2002. Service vehicles will be able to turn to and from the loading dock, manoeuvre into the service bays and exit the site in a forward direction, as shown in Figures 6 and 7.

Traffic Generation and Effects

3.18 Traffic generated by the proposed development will have its greatest effects during morning and afternoon peak periods when it combines with commuter traffic. The commercial parking spaces would be anticipated to generate up to some 0.6 vehicles per hour per space during peak hours.

3.19 Traffic generation of the proposed development would therefore be up to some 220 vehicles per hour two-way during morning and afternoon peak hours.

3.20 During the morning peak hour, the majority of vehicles would be inbound to the development. The reverse would apply in the afternoon. The majority of traffic to and from the development would use Australia Avenue. A smaller proportion would use Olympic Boulevarde.

3.21 The additional traffic has been assigned to the road network. Base peak hour traffic flows with other approved developments, plus traffic from the proposed development, are shown in Figures 4 and 5, and summarised in Table 3.1.

Table 3.1: Base two-way peak hour traffic flows plus development traffic

Road	Location	AM peak hour		PM peak hour	
		Base flow	Plus development	Base flow	Plus development
Australia Avenue	North of Herb Elliott Avenue	775	+50	765	+50
	South of Herb Elliott Avenue	1,190	+105	1,145	+105
Olympic Boulevard	North of Herb Elliott Avenue	490	+50	450	+50
	South of Herb Elliott Avenue	250	+15	255	+15
Herb Elliott Avenue	East of Olympic Boulevard	440	+65	475	+65
	West of Australia Avenue	755	+155	750	+155
Parkview Drive	East of Australia Avenue	450	-	400	-

3.22 Table 3.1 shows that traffic flows in Herb Elliott Avenue would increase by some 65 to 155 vehicles per hour two-way during the morning and afternoon peak hours. Traffic increases on Australia Avenue and Olympic Boulevard would be lower at some 15 to 105 vehicles per hour two-way.

3.23 The intersections previously analysed in Chapter 2 have been re-analysed with INTANAL for the additional development traffic flows shown in Figures 4 and 5. The analysis found that the intersection of Australia Avenue with Herb Elliott Avenue and Parkview Drive would operate with average delays of less than 25 seconds per vehicle during morning and afternoon peak hours. This represents level of service B, a good level of service.

3.24 The intersection of Olympic Boulevard with Herb Elliott Avenue would continue to operate at its existing good level of service A/B, with average delays of less than 15 seconds per vehicle during peak periods. Intersections would operate with spare capacity to cater for future development in the area envisaged in the masterplan.

Summary

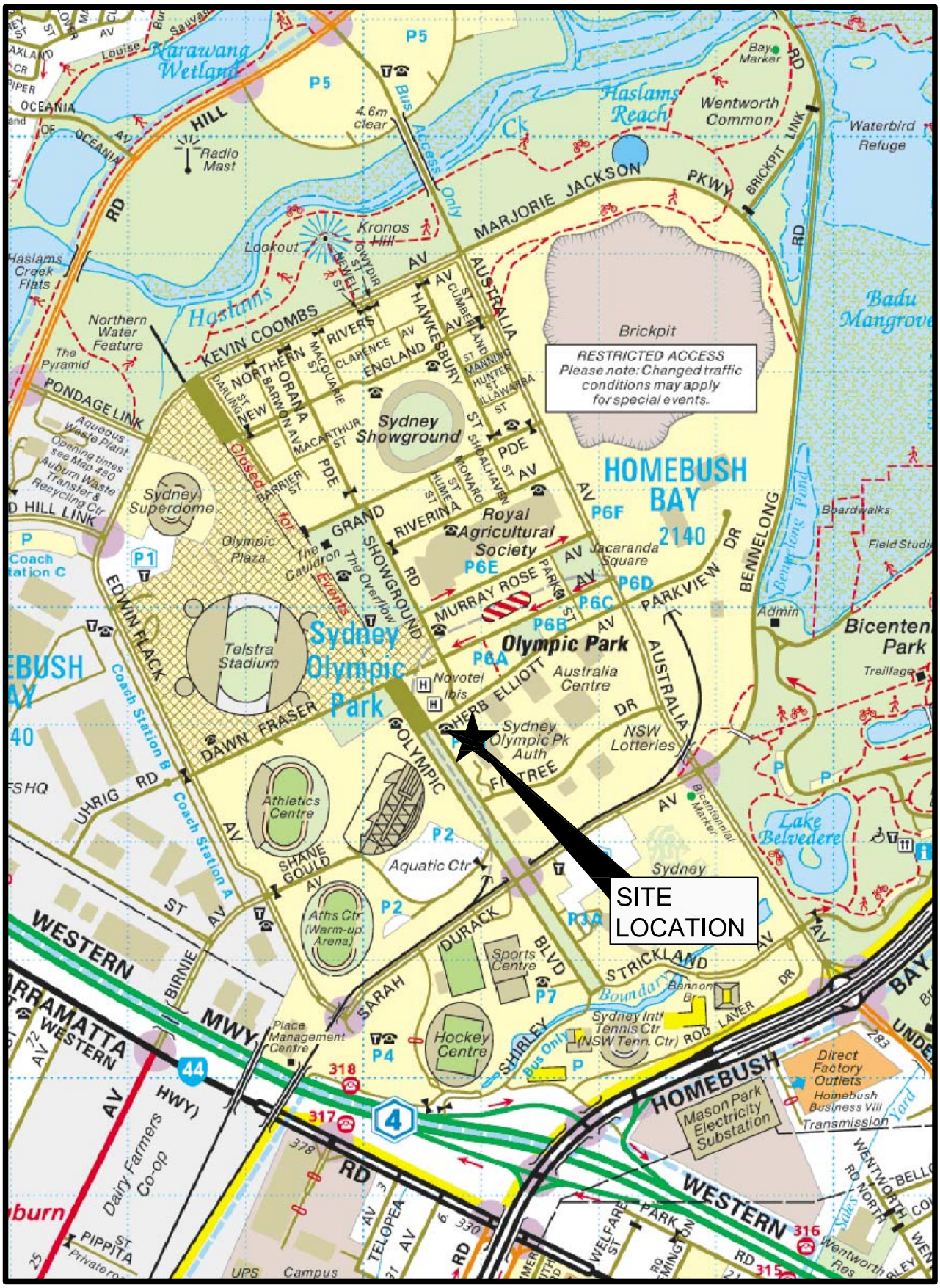
3.25 In summary, the main points relating to the transport implications of the proposed development are as follows:

i) the proposal would strengthen demand for existing public transport services in the area;

ii) the proposed parking provision is considered appropriate;

iii) access, servicing and layout are considered appropriate and will be will be provided in accordance with AS 2890.1:2004 and AS 2890.2 - 2002; and

iv) the road network will be able to cater for the traffic generated by the proposed development.



LOCATION PLAN

1

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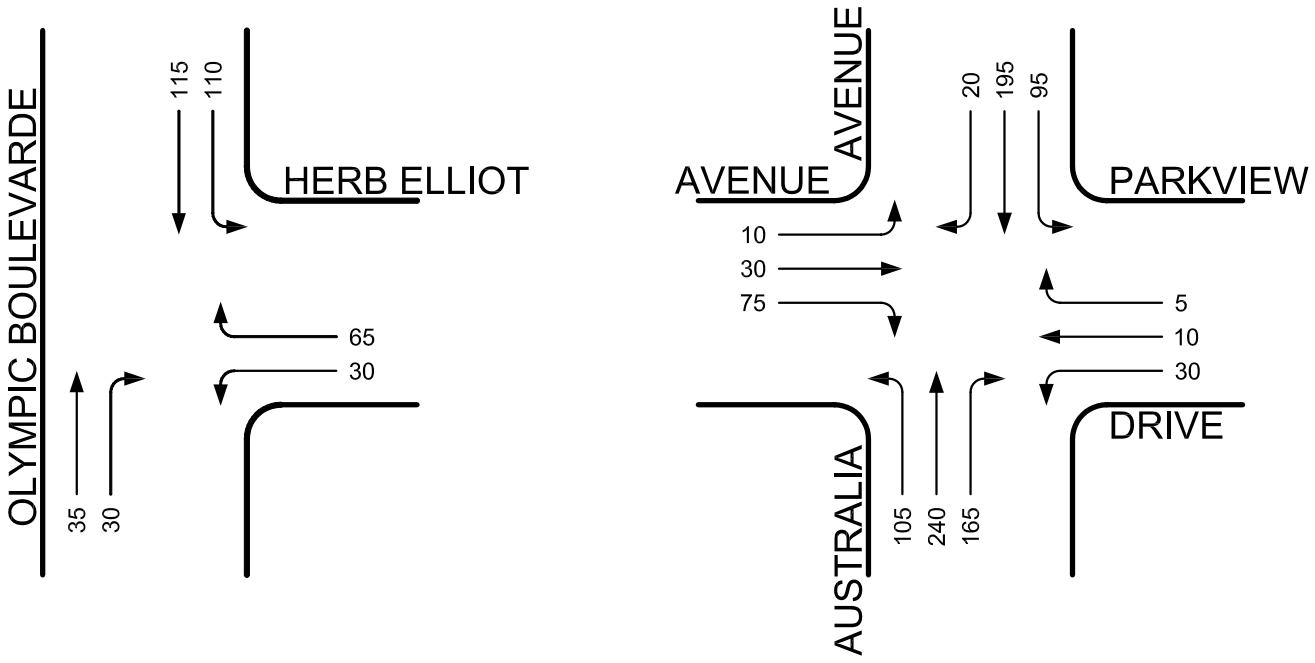

MORNING PEAK HOUR
TRAFFIC FLOWS

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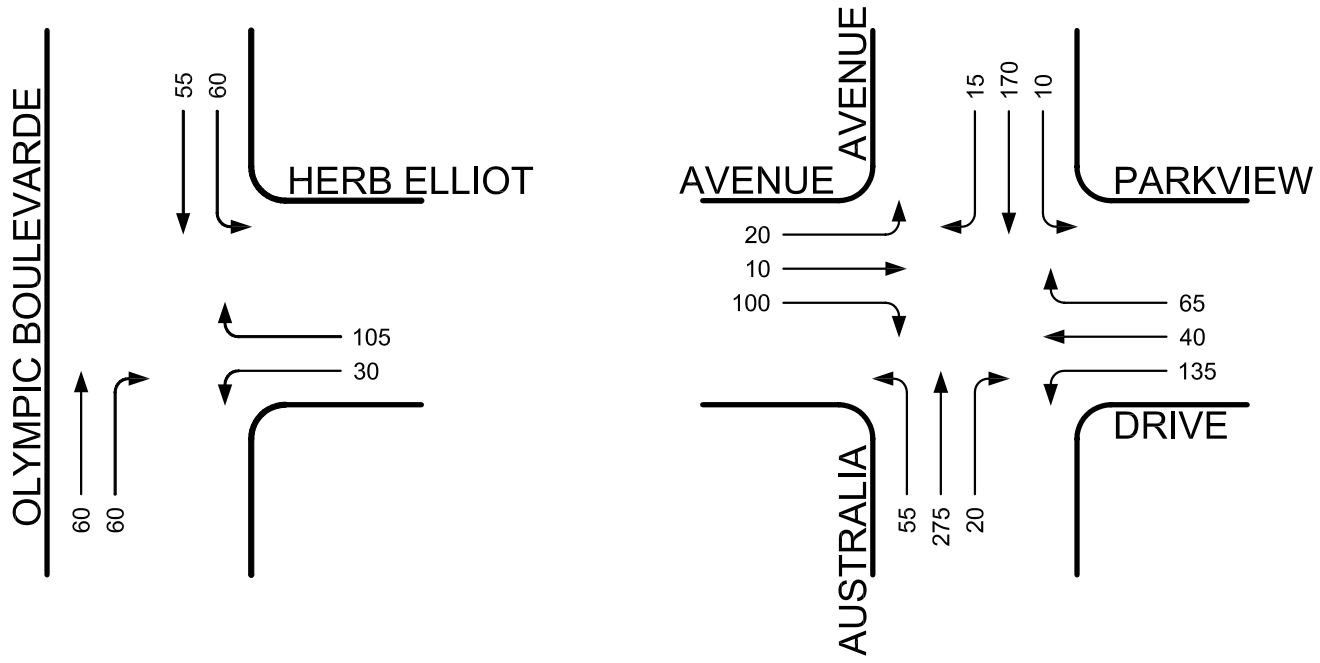

AFTERNOON PEAK HOUR
TRAFFIC FLOWS

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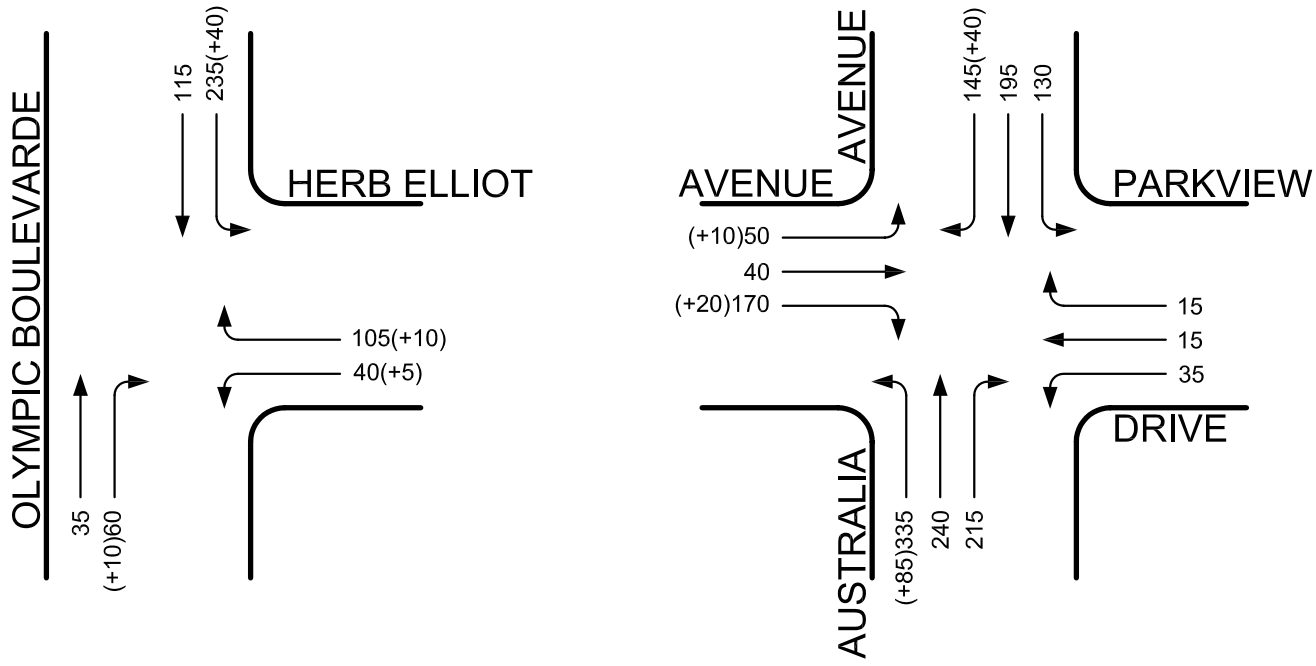

LEGEND

100 - Peak Hour Flows with Approved Development

(+10) - Additional Development Traffic

MORNING PEAK HOUR TRAFFIC FLOWS
WITH APPROVED DEVELOPMENT, PLUS
DEVELOPMENT TRAFFIC

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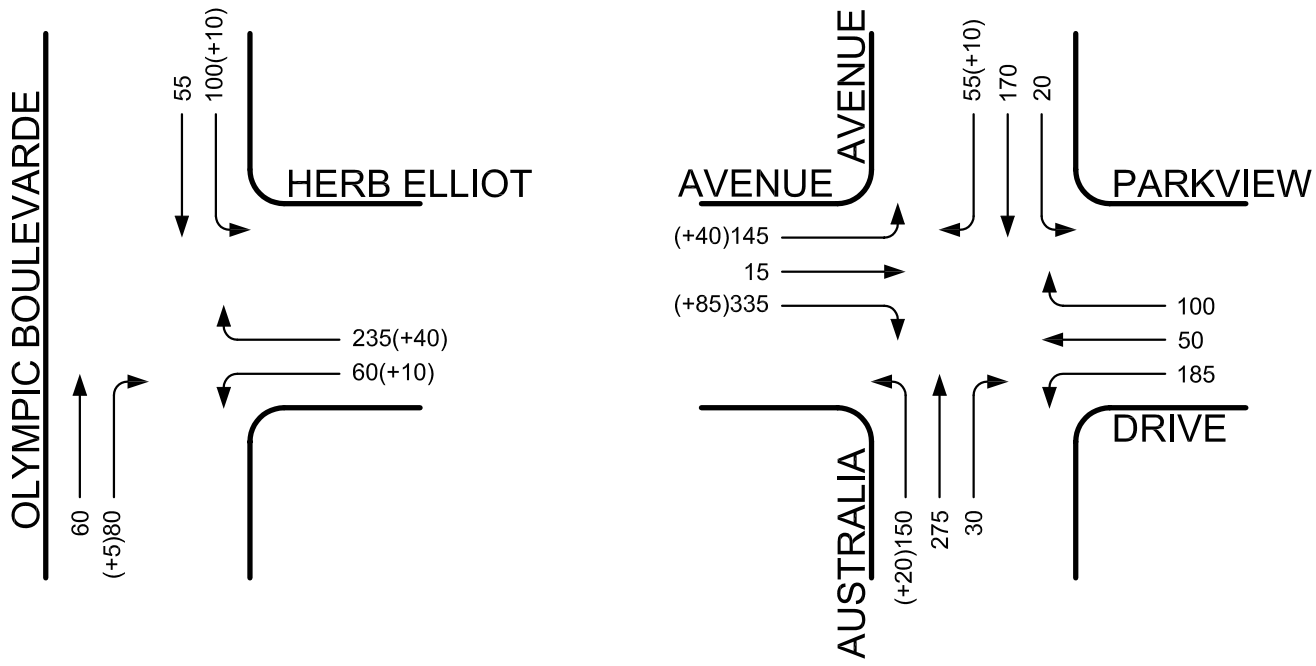

LEGEND

100 - Peak Hour Flows with Approved Development

(+10) - Additional Development Traffic

AFTERNOON PEAK HOUR TRAFFIC FLOWS WITH APPROVED DEVELOPMENT, PLUS DEVELOPMENT TRAFFIC

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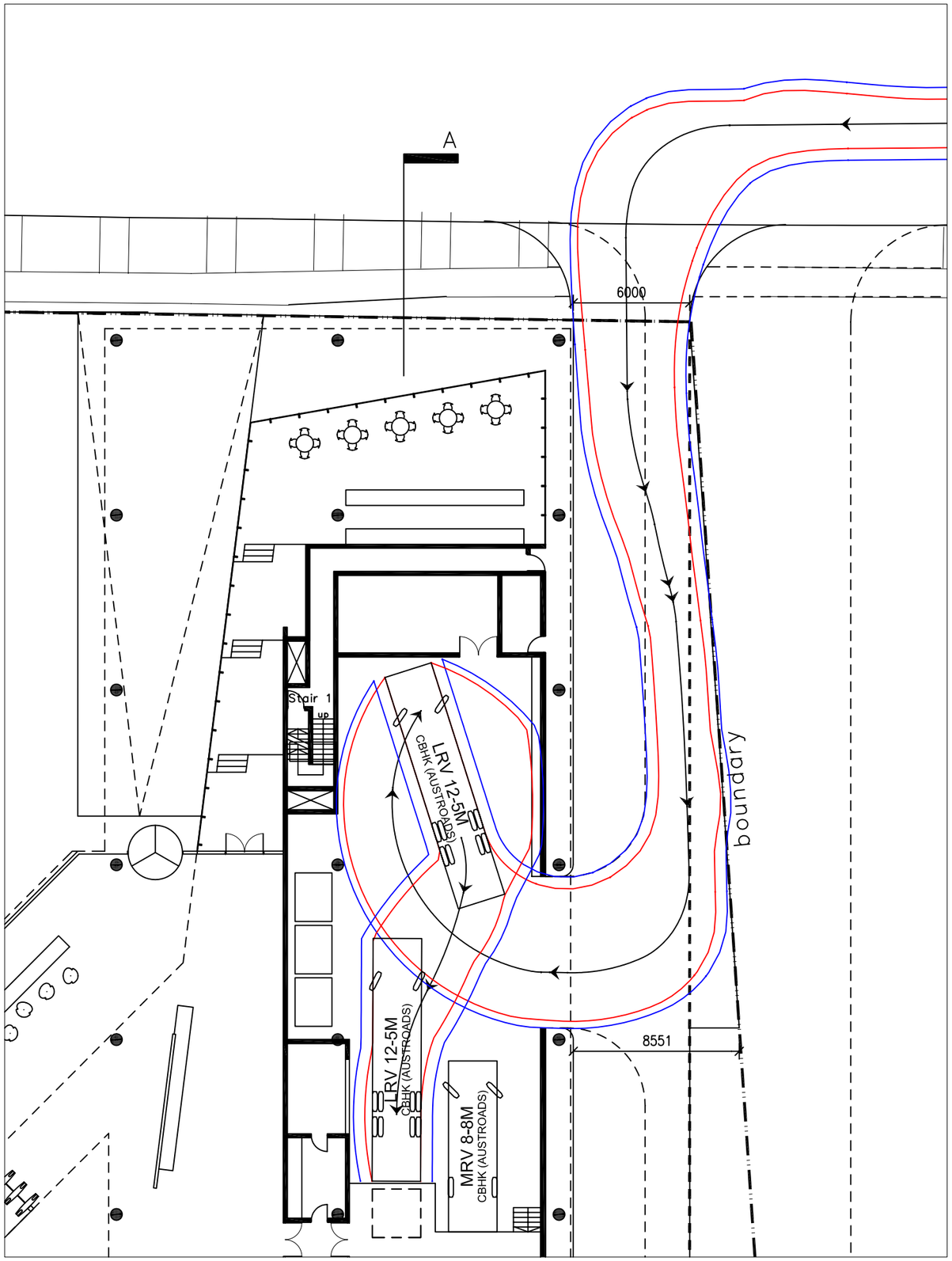

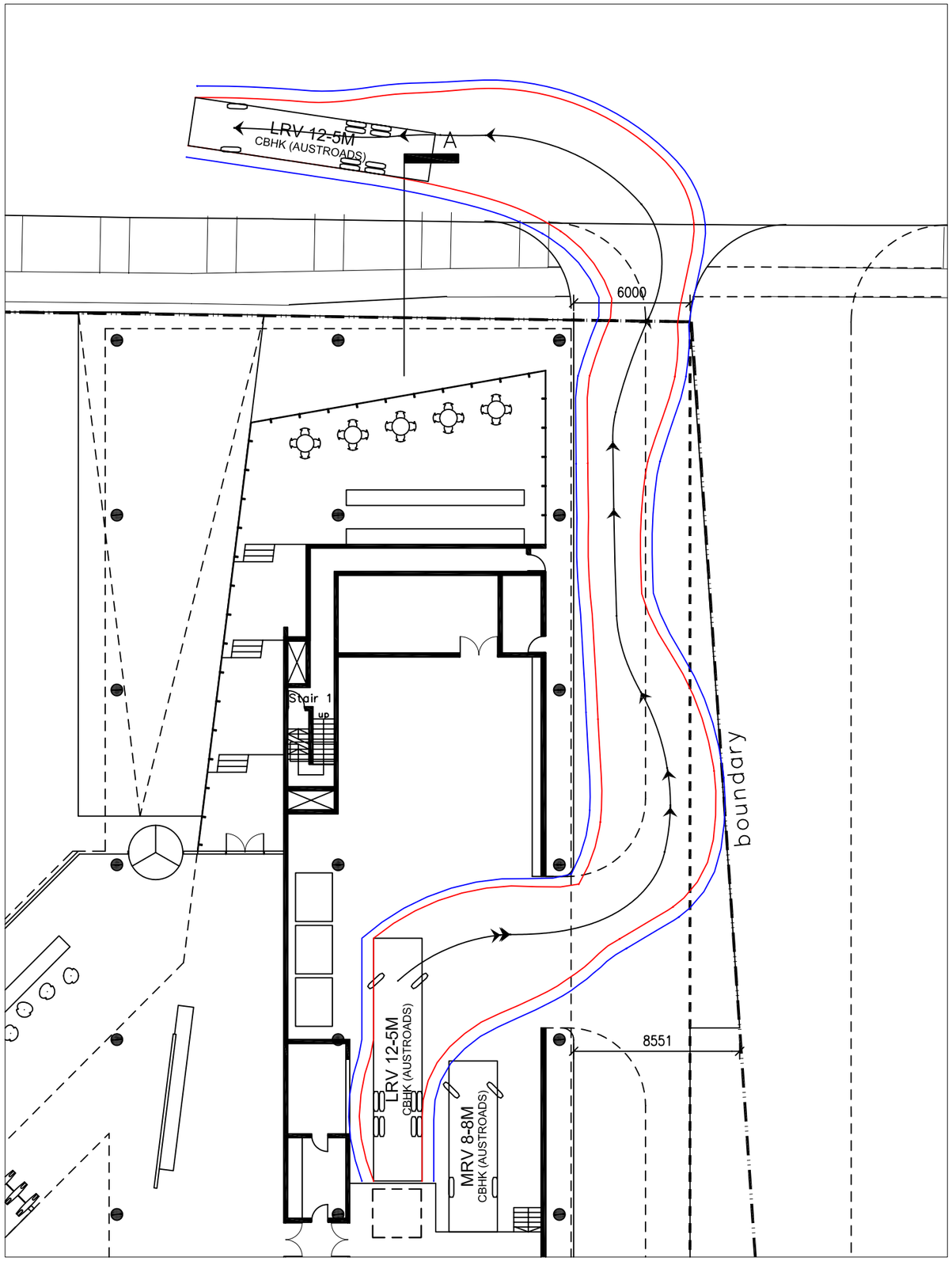

NOTE:
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12.5m LARGE RIGID VEHICLE SWEPT PATHS

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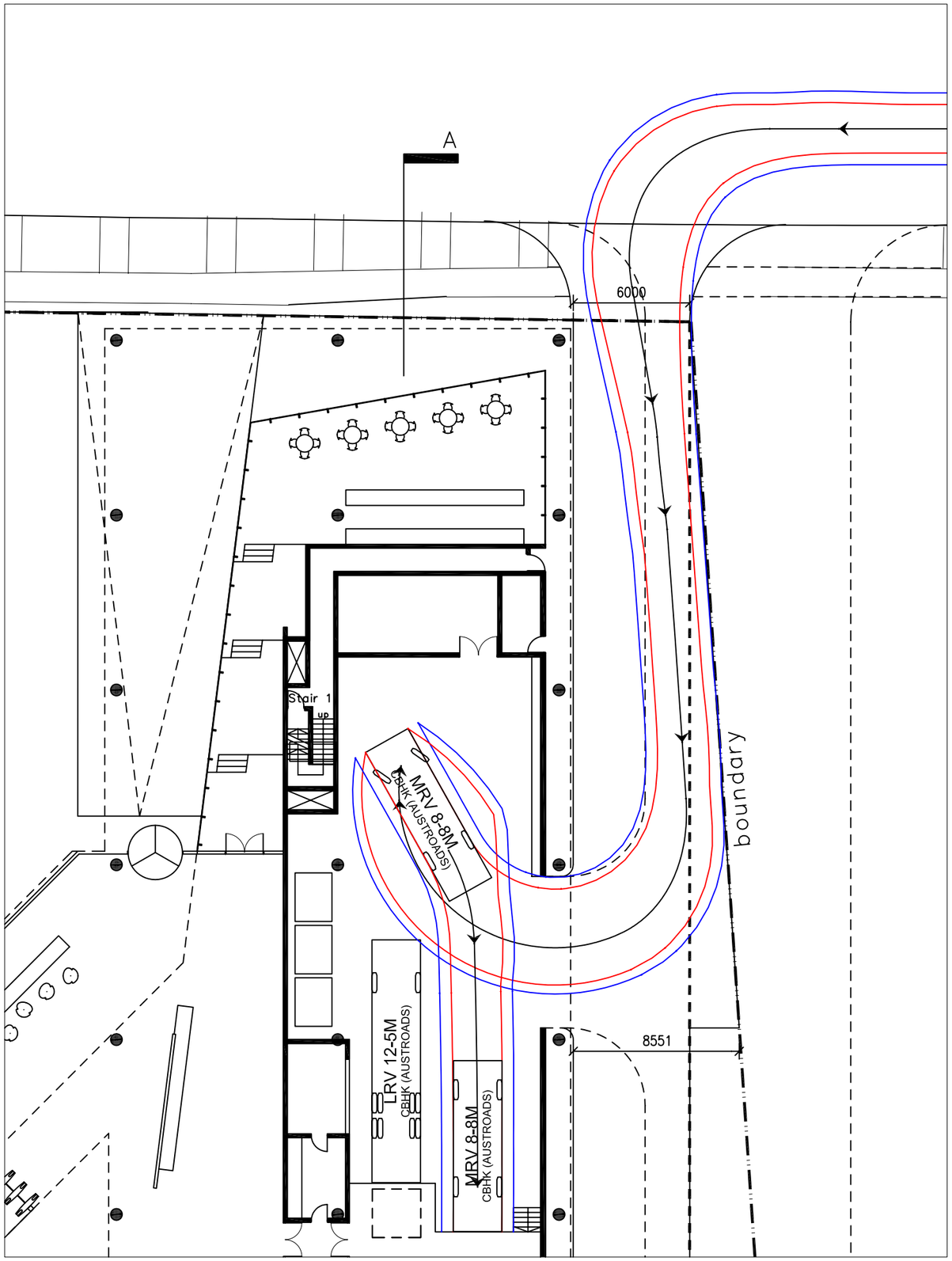

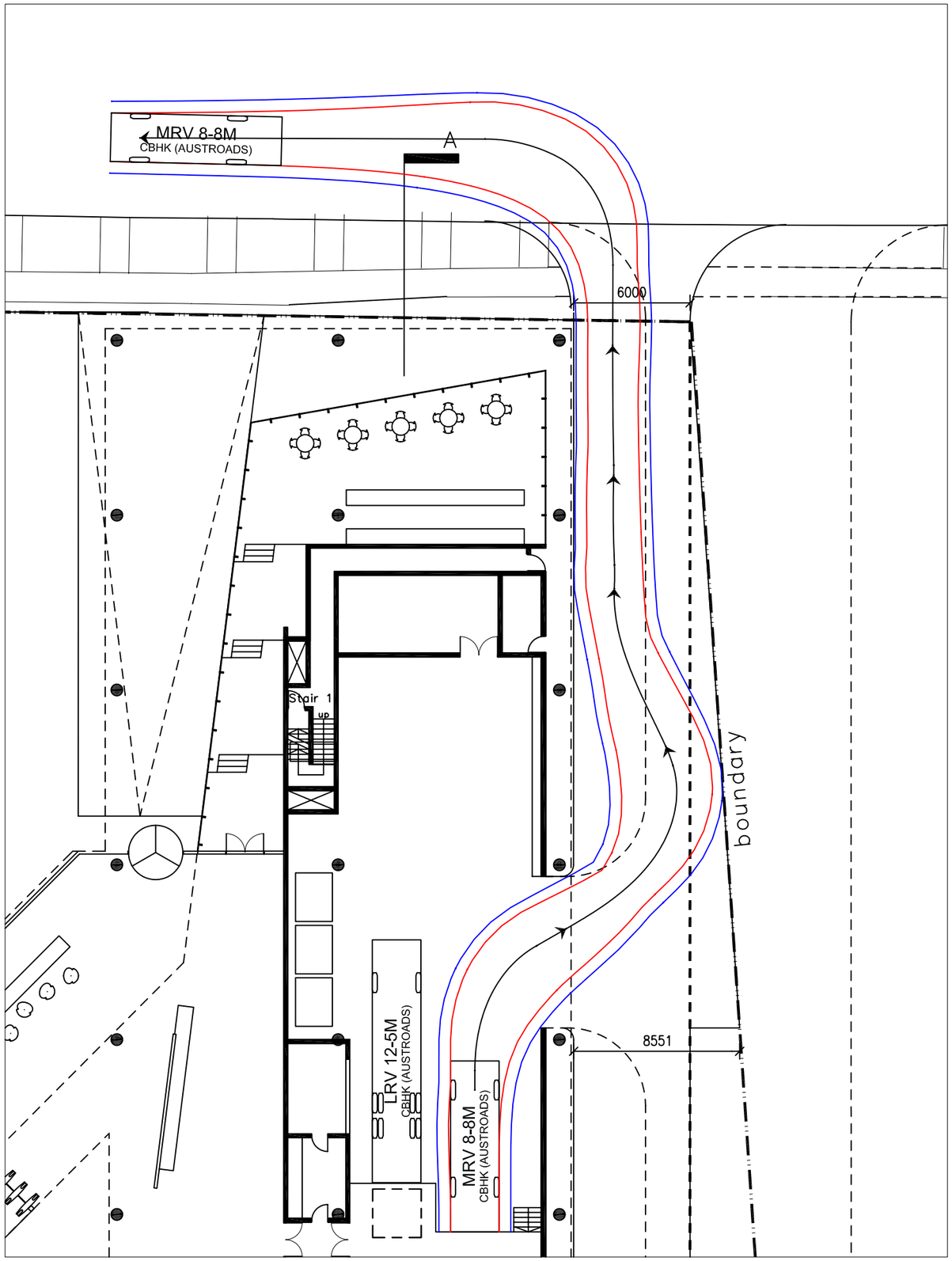

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8.8m MEDIUM RIGID VEHICLE SWEPT PATHS

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