Traffic Impact Assessment

Proposed Mixed-Use Development
64 Bathurst Street, Liverpool

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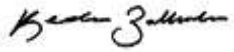
v03	16/12/2018	Shenara Wanigasekera	Kedar Ballurkar	

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Contents

1. Introduction

TRAFFIX has been commissioned by Scenic NSW Pty Ltd ATF Scenic NSW Unit Trust to undertake a Traffic Impact Assessment of a proposed mixed-use development at 64 Bathurst Street in Liverpool. Approval is sought to construct a twenty one storey mixed-use development containing 66 residential apartments as well as retail and commercial floor space.

The development is situated within the City of Liverpool local government area and has been assessed under that Council's controls, as well as *State Environmental Planning Policy No 65*.

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects prepared separately. The proposal is of a scale which does not require referral to the Roads and Maritime Services (RMS) under the provisions of *State Environmental Planning Policy (Infrastructure) 2007*.

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the proposed development
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Presents the overall study conclusions.

2. Location and Site

The site comprises of two properties at 64 Bathurst Street and 203-209 Northumberland Street in Liverpool, on the eastern side of Bathurst Street, approximately 60 metres south of Moore Street. In a regional context, it lies approximately 800 metres north-west of Liverpool Station.

The subject development area (henceforth referred to as the 'site') relates to the property at 64 Bathurst Street, which is separated from a commercial development at 203-209 Northumberland Street by the Huckstepp Serviceway.

64 Bathurst Street has a square shaped configuration with a site area of 1,331m^2. It has two frontages, one which faces west towards Bathurst Street and another that faces east towards the Huckstepp Serviceway, both measuring approximately 33m in length. The remainder of the site is bounded by an at-grade carpark to the south, and by a commercial development to the north.

The site is presently used as an at-grade private car park and accommodates 55 parking spaces. Two (2) vehicular crossings are provided on Bathurst Street (these accesses are fenced off), while a continuous layback is constructed along the Huckstepp Serviceway with two gates facilitating access.

Under the *Liverpool Development Control Plan 2008*, the site has been identified within the *'Liverpool City Centre'*.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the Photographic Record presented in **Appendix A**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

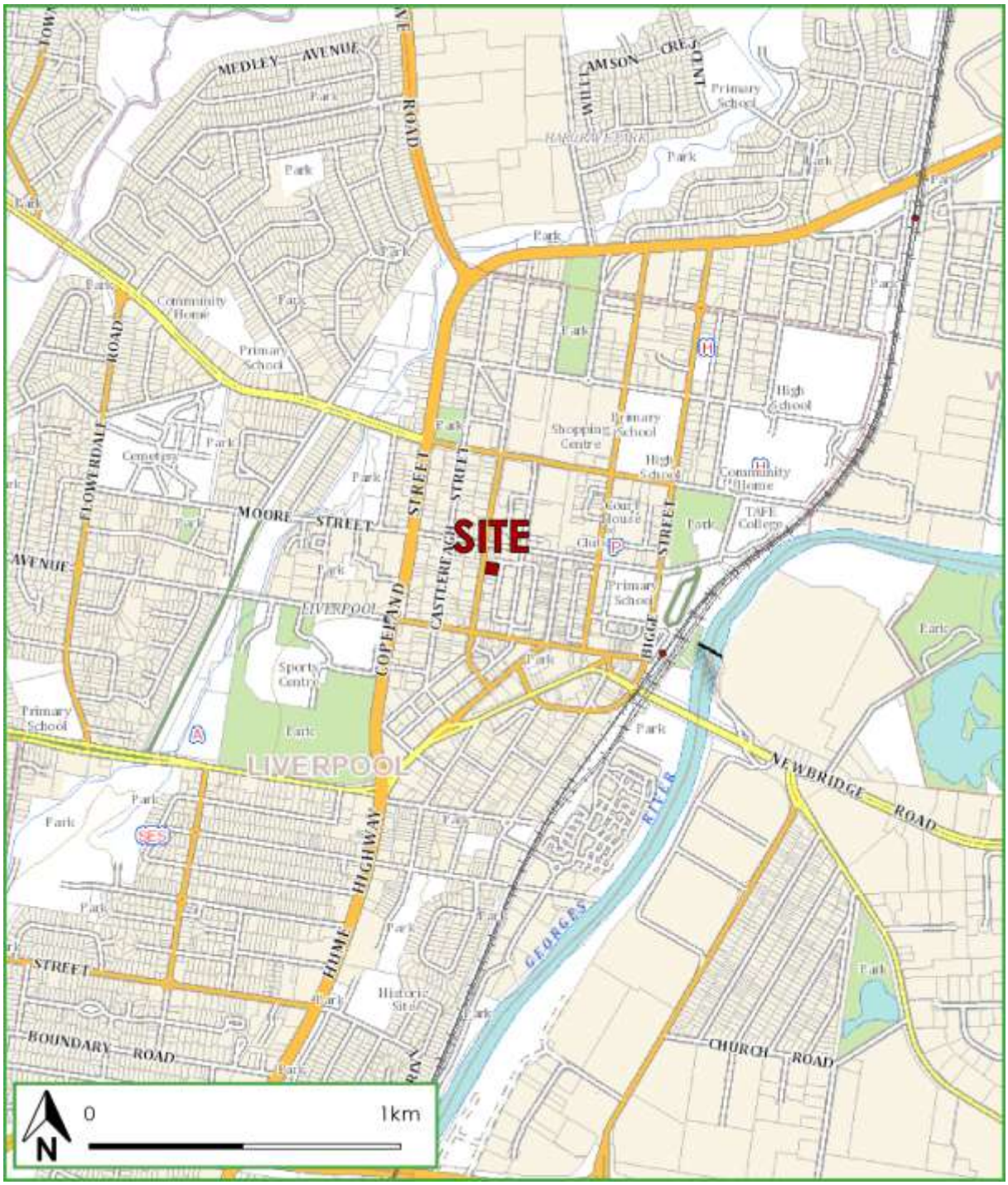


Figure 1: Location Plan

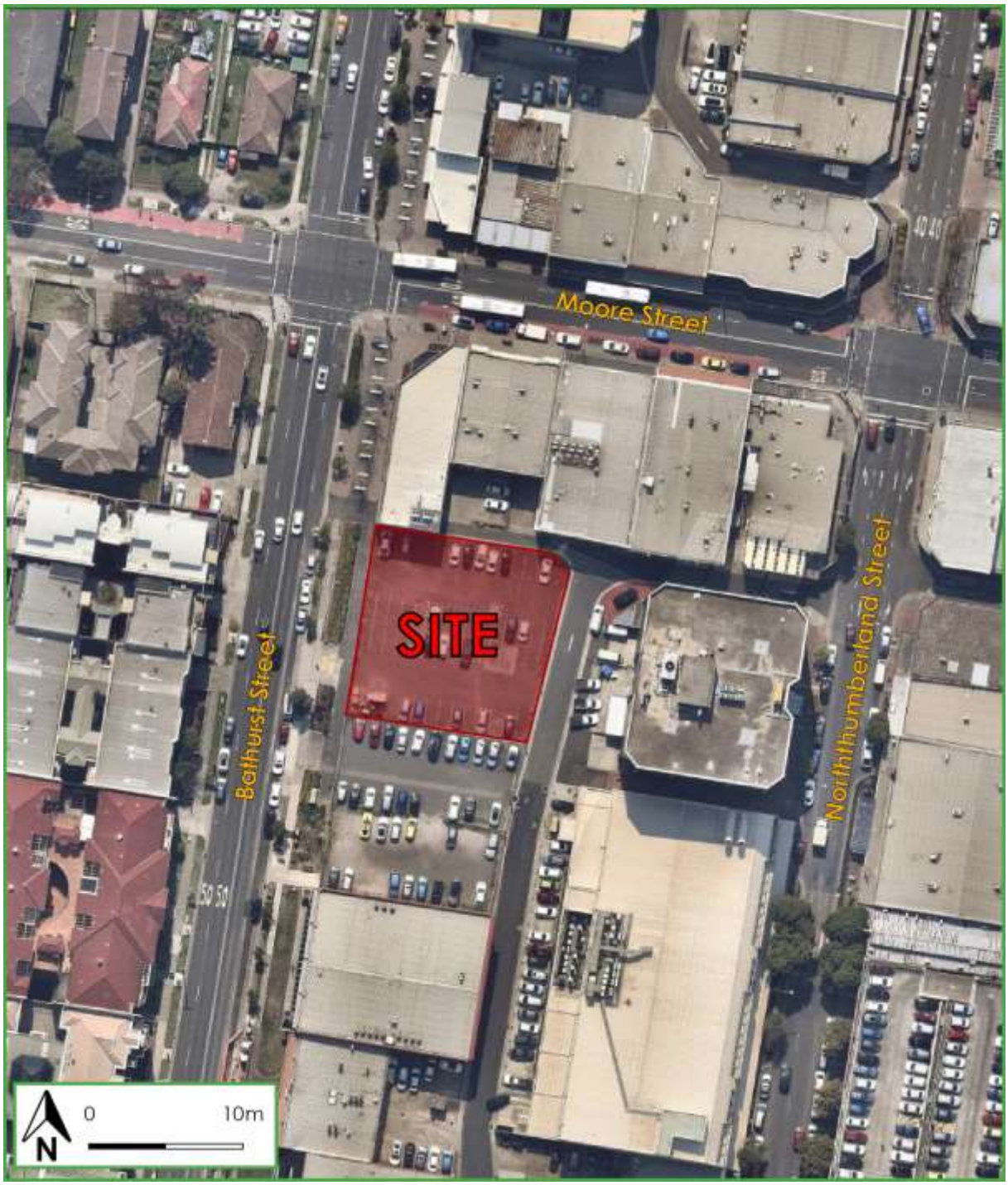


Figure 2: Site Plan

3. Existing Traffic Conditions

3.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- Hume Highway: an RMS Regional State Highway (HW2) that runs in a north to south direction within the vicinity of the site, between Parramatta Road in the north and the Victorian State Border in the south. In the vicinity of the site, it is subject to a 60 km/h speed limit and accommodates three lanes of traffic in each direction within a divided carriageway.

- Elizabeth Drive: an RMS Main Road (MR535) that generally runs in an east-west direction, between Copeland Street (Hume Highway) in the east and the Northern Road at Luddenham in the west. In the vicinity of the site, it is subject to a 60 km/h speed limit and accommodates three lanes of traffic within a divided carriageway.

- Memorial Avenue: an RMS Regional State Road (SR2106) that generally runs in an east-west direction, between Terminus Street in the east and Copeland Street in the west. This road is subject to a 50 km/h speed limit. Memorial Avenue accommodates one lane of traffic in each direction within an undivided carriageway.

- Moore Road: a local collector road that runs in an east-west direction, between the Hume Highway to the west and Bigge Street to the east. This road is subject to a 40 km/h speed limit between the intersections of Bathurst St and Northumberland Street. It accommodates one lane of traffic in each direction within an undivided carriageway.

- Bathurst Street: a local road that runs in a north-south direction between the Hume Highway in the north and Macquarie Street to the south. It accommodates a single lane of traffic in each direction within an undivided carriageway and has a posted speed limit of 50 km/h.

- Northumberland Street: a local road that runs in a north-south direction between Elizabeth Street in the north and Memorial Avenue to the south. It accommodates one lane of traffic in each direction within an undivided carriageway and has a posted speed limit of 50 km/h.

- Huckstepp Serviceway: a laneway that generally runs in a north-south direction, terminating at both ends at Northumberland Street. It accommodates a single lane of traffic permitting northbound traffic flow only. In the vicinity of the site, the Huckstepp Serviceway accommodates a continuous layback on both sides of the carriageway.

Noting that the site is currently accessed from the Huckstepp Serviceway, traffic volumes are dispersed across the road network via Northumberland Street, with entering traffic approaching from Memorial Avenue to the south and exiting traffic approaching Moore Road to the north.

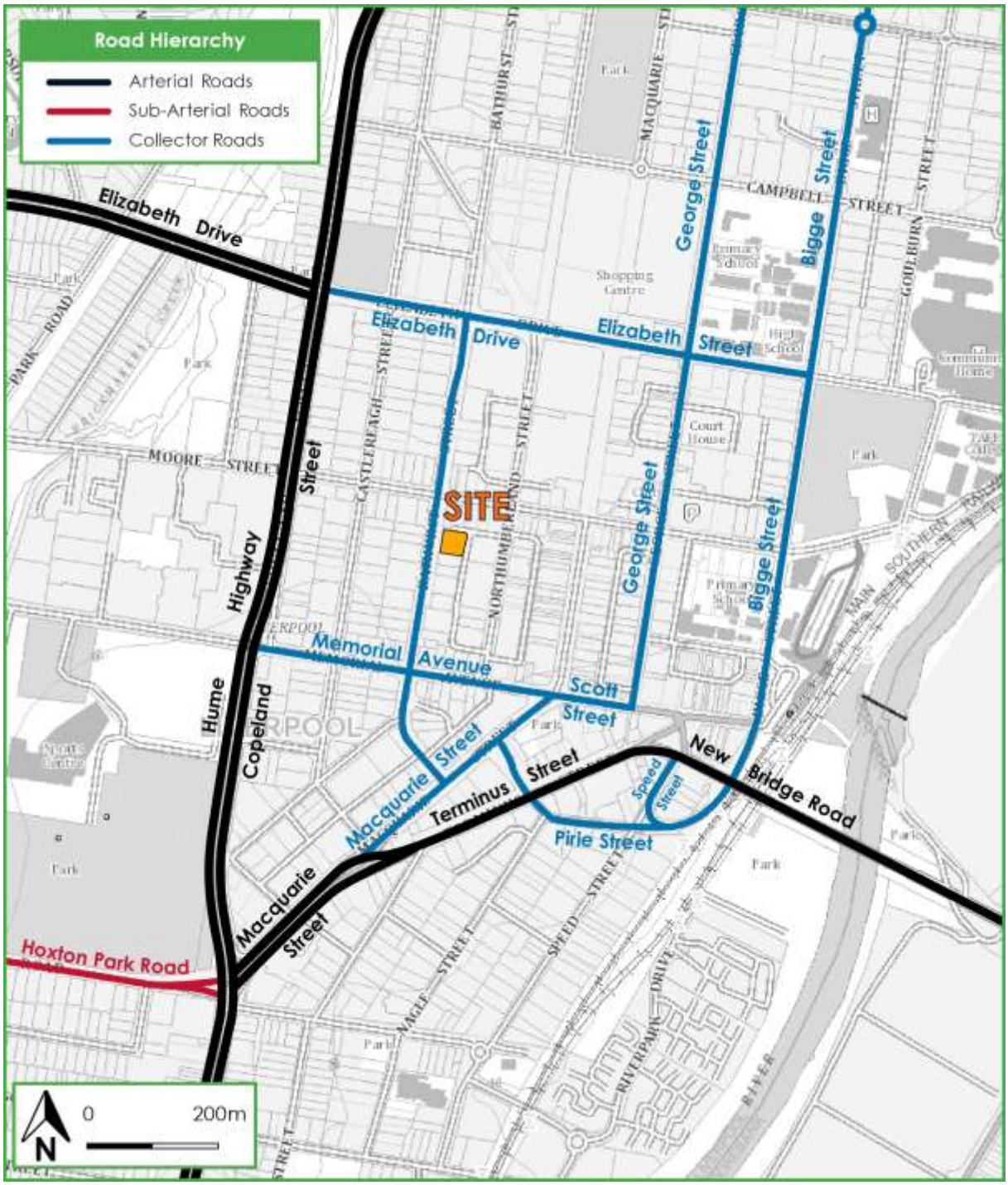


Figure 3: Road Hierarchy

3.2 Key Intersections

A description of the key intersections in the vicinity of the site are described below.

Figure 4: Intersection of Memorial Avenue and Northumberland Street

It can be seen from **Figure 4** that the intersection of Memorial Avenue and Northumberland Street forms a three-legged signalised intersection, with all legs provided with signalised pedestrian crossings. The western leg of Memorial Avenue has two approach lanes and two exit lanes. The eastern leg of Memorial Avenue also has two approach lanes and two exit lanes. Northumberland Street is a north-bound one way road providing two exit lanes.

Figure 5: Intersection of Moore Street and Northumberland Street

It can be seen from **Figure 5** that the intersection of Moore Street and Northumberland Street forms a four-legged signalised intersection, with all legs provided with signalised pedestrian crossings. The western leg of Moore Street has two approach lanes, of which one is a bus lane. This leg also has two exit lanes, with one of these being a bus lane. The eastern leg of Moore Street has two approach lanes, one of which is a bus lane, with two exit lanes including this bus lane. Northumberland Street is a one way road. The southern leg of Northumberland Street consists of four approach lanes. The northern leg of Northumberland Street provides two exit lanes.

3.3 Existing Intersection Performance

In order to assess the road network performance in the locality, traffic surveys were undertaken of the abovementioned intersections, which are considered to be most critical in relation to the site. These counts were undertaken on 6 September 2018 during the network peak periods between 7:00am and 9:00am (AM Peak Period) and 4:00pm and 6:00pm (PM peak period).

The traffic volumes resulting from these surveys provide the base case performance scenario for SIDRA software modelling purposes relating to existing traffic conditions. The SIDRA Intersection 8 modelling suite produces a range of outputs, the most useful of which are the Degree of Saturation (DoS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LoS) criteria. These performance measures can be interpreted as follows:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than 0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LoS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown in **Table 1** below.

Table 1 – Intersection Performance Indicators (RMS)

Level of Service (LoS)	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results under existing conditions is provided in **Table 2** below. Reference should also be made to the detailed SIDRA outputs included in **Appendix B**.

Table 2: Existing Intersection Performance

Intersection	Layout	Control Type	Period	Degree of Saturation	Average Delay (s)	Level of Service
Northumberland Street / Moore Street	Existing	Signals	AM	0.222	16.9	B
			PM	0.519	19.9	B
Northumberland Street / Memorial Avenue	Existing	Signals	AM	0.437	21.0	B
			PM	0.276	15.7	B

It is evident that the above intersections perform at a Level of Service of B under existing conditions. As such, they are have good operation with spare capacity under RMS guidelines. This analysis serves to provide a comparison of the relative change in the performance parameters as a result of the subject proposal. This is discussed further in Section 6.

3.4 Public Transport

The public transport network operating in the locality is illustrated in **Figure 6**. It is evident that the site is located within 800 metres of Liverpool Station which is served by the T2 Inner West & Leppington Line, T3 Bankstown Line and T5 Cumberland Line.

The site is also situated within 400 metres of bus stops which are serviced by an extensive number of bus routes operating within the surrounding region.

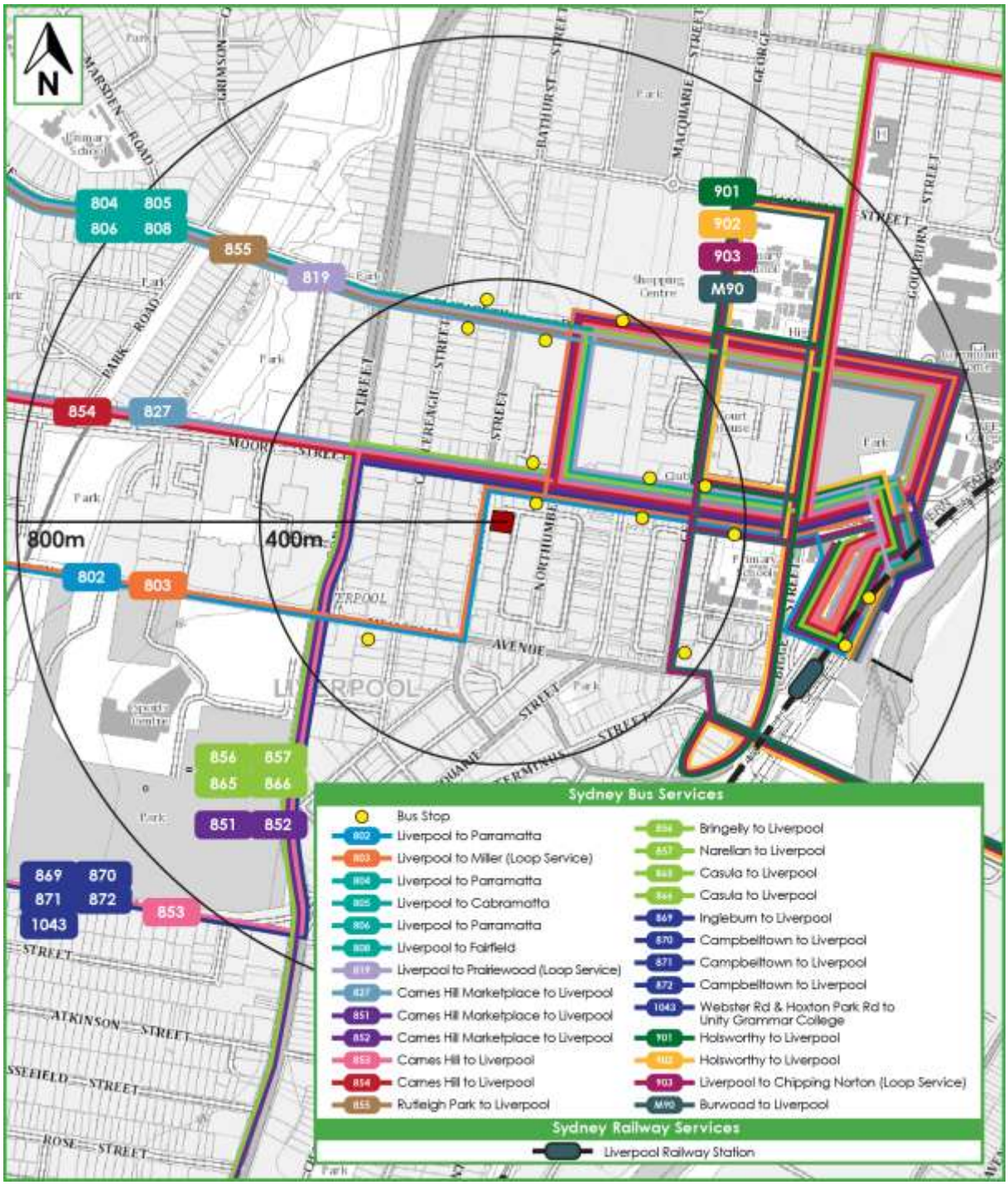


Figure 4: Public Transport

3.5 Existing Site Generation

The site is presently used as an at-grade private car park and accommodates approximately 54 parking spaces. It is estimated to generate about 32 vehicle trips per hour in the AM peak period and 27 vehicle trips per hour during the PM peak period based on respective trip rates of 0.6 trips/space/hour and 0.5 trips/space/hour, as derived from RMS Guidelines. It is emphasised that this traffic generation would be captured by the abovementioned surveys.

The car park serves other developments in the locality and it is assumed that these spaces are not required under any conditions of consent relating to these other developments. Hence, this traffic generation will be removed from the site itself. It could however potentially remain in the locality in the event that it is displaced, either to other off-street locations or to on-street locations.

Accordingly, in order to assess a worst case scenario, this traffic generation has not been removed from the road network as discussed further in Section 6, as would otherwise be permitted under RMS Guidelines.

4. Description of Proposed Development

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared separately. In summary, approval is sought for the demolition of the existing carpark on-site and for the construction of a 21 storey mixed-use development comprising of:

- A total of 66 residential apartments, comprising of:
  - 15 x one bedroom apartments;
  - 45 x two bedroom apartments; and
  - 6 x three bedroom apartments;
- 335m^2 gross floor area of retail space on Level 1 (street level);
- 2,047m^2 gross floor area of commercial space across three levels;
- Five levels of basement level car parking accessed from the Huckstepp Serviceway, containing a total of 90 car parking spaces; and
- An undercroft loading bay, accessed from the Huckstepp Serviceway, which can accommodate both a 9.5m Waste Collection Vehicle and a 6.4m Small Rigid Vehicle.

The parking requirements and traffic impacts arising from the proposed development are discussed in **Section 5** and **Section 6**, respectively. Reference should be made to the architectural plans submitted separately to Council, for which drawings of the ground and basement levels have been presented at reduced scale in **Appendix C**.

5. Parking Requirements

5.1 Car Parking

State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development (SEPP No 65) states that a consent authority must not refuse an application on parking related grounds if a development provides equal to or greater than the recommended minimum amount of parking specified in *Part 3J* of the *Apartment Design Guide*, published by the Department of Planning and Environment.

In turn, the *Apartment Design Guide* stipulates that for apartment buildings within 800 metres of a railway station in the Sydney Metropolitan Area, the minimum car parking requirement for residents and visitors should be the lesser of what is prescribed in the Roads and Maritime Services' (RMS) *Guide to Traffic Generating Developments* or by the relevant Council.

The *Guide to Traffic Generating Developments* provides two sets of parking rates for high density residential flat buildings: for developments either in *'Metropolitan Regional Centres'* or for *'Metropolitan Sub-Regional Centres'*. In a technical note included in **Appendix D**, The Department of Planning has since identified a '*Metropolitan Regional Centre'* as either as a *'CBD'*, *'Regional City Centre'* or *'Strategic Centre'* in their planning policy entitled 'A Plan for Growing Sydney'. While this plan has been superseded by the *Greater Sydney Region Plan, A Metropolis of Three Cities – A Vision to 2056*, the Department of Planning have yet to issue a revised note in relation to the new classifications. Notwithstanding, Liverpool has been identified as a *'Metropolitan Centre'* under the new policy which is comparable in significance to the classification of a 'Regional City Centre' under the old policy.

With Liverpool being a *'Regional City Centre'* (or 'Metropolitan Centre' under the new classification) and the site being situated within 800 metres of Liverpool Railway Station, the proposed development may be subjected to parking rates listed for a *'Metropolitan Regional Centre'* in the *Guide to Traffic Generating Developments*.

Accordingly, the parking rates applicable to the proposed development consists of Council's planning controls, including the *Liverpool Development Control Plan (DCP) 2008 and Liverpool Local Environmental Plan (LEP) 2008* as well as the RMS *Guide to Traffic Generating Developments* for the residential component. A summary of the parking requirements for the respective uses of the proposed development is provided in **Table 3**.

Table 3: Parking Rates and Provision

Type	Number / GFA	DCP Parking Rates	SEPP65 Minimum Parking Rates	Council Requirement	Minimum RMS Requirement	Spaces Provided
Residential Flat Building[1]						
1 Bedroom	15	1 spaces per dwelling	0.4 spaces per dwelling	69	45	**63**
2 Bedroom	45		0.7 spaces per dwelling			
3 Bedroom	6	1.5 spaces per dwelling	1.2 spaces per dwelling			
Visitor	66	1 space per 10 dwellings or part thereof	1 space per 7 units	7	10	**10**
			Sub-Total	**76**	**55**	**73**
Ground Level[2] (Retail)	335 m^2	Minimum of one space per 200m^2 GFA	N/A	2	N/A	**17**
Non-Ground[3] Level (Commercial)	2,047m^2	Minimum of one space per 150m^2 GFA	N/A	14	N/A	
			Sub-Total	**16**		**17**
			Total	**92**	**71**	**90**

[1] Parking rate adopted from Part 4: Development in Liverpool City Centre of DCP.

[2] Parking rate adopted from Clause 7.3(2)(a) of the LEP.

[3] Parking rate adopted from Clause 7.3(2)(b)(ii) of the LEP.

It can be seen that the proposed development generates a minimum requirement for 92 parking spaces under the DCP and LEP, noting that the residential component is nominally required to provide exactly 76 spaces. Notwithstanding, the parking requirement for the residential component under the RMS *Guide to Traffic Generating Developments* was assessed to be for a minimum of 55 spaces, which is less than the quantum specified under Council's controls. Accordingly, the RMS requirement prevails under Part 3J of the *Apartment Design Guide*, as enabled by the provisions of SEPP No 65.

Having regard for the above, a parking provision in the range of 55 – 76 spaces is satisfactory for the residential component, whilst the commercial and retail components require a minimum provision of 16 parking spaces as per the LEP.

In response, the proposed development provides a total of 73 parking spaces for the residential component and 17 spaces for the commercial component. These provisions thus comply with both SEPP No 65 and the LEP.

5.2 Accessible Parking

For developments in the Liverpool City Centre, Section 4.3 of the DCP stipulates that a minimum of 2% of the total demand generated by a development for parking spaces should be allocated as accessible spaces. This equates to a requirement for two (2) accessible parking spaces in the case of the proposed development, which contains 90 car parking spaces.

In response, the proposed development provides eight (8) accessible parking spaces within the basement car park, including seven (7) spaces for residential use and a single space for commercial use.

5.3 Motorcycle Parking

For developments in the Liverpool City Centre, Section 4.3 from the DCP requires a motorcycle parking space to be provided at a rate of one (1) space for every 20 car parking spaces provided. This equates to a requirement for five (5) motorcycle parking spaces in the case of the proposed development, which contains 90 car parking spaces.

In response, the proposed development provides four (4) motorcycle parking spaces within the basement car park. While nominally deficient by one (1) motorcycle parking space, the car parking provision is noted to be superior to the minimum requirements of SEPP No 65 and the LEP. Accordingly, the shortfall is considered to be acceptable as motorcycle riders may alternatively park in a car space.

5.4 Bicycle Facilities

For developments in the Liverpool City Centre, Section 4.3 from the DCP requires bicycle parking for residential and retail uses to be provided in accordance with the rates shown listed in **Table 4**.

Table 4: Bicycle Parking Rates

Type	No / Area	Minimum Parking Rate	Minimum Spaces Required	Spaces Provided
Residential Flat Building				
Resident	5,896 m^2	1 space per 200m^2 of GFA. 15% of this requirement is to be accessible for visitors	30	30
Retail/Commercial				
Staff	2,382 m^2	1 space per 200m^2 of GFA. 15% of this requirement is to be accessible for visitors	12	14
		Totals	**42**	**44**

It can be seen from Table 4 that the proposed development is nominally required to provide 42 bicycle parking spaces. In response, plans for the basement levels indicate provision for 44 bicycle parking spaces, thus complying with the DCP. These spaces are provided in the form of rails and comply with the space dimensions under AS2890.3 (2015).

5.5 Service Vehicle Parking

For residential developments in the Liverpool City Centre, Part 4.3 of the DCP stipulates that for a one (1) service vehicle space be provided per 40 dwellings, up to a maximum of four (4) spaces (including car wash bays). For other uses, no service vehicle rates are published, although the DCP states that adequate parking should be provided for the needs of the development. In response provision for five (5) service vehicle spaces are provided, including:

- An undercroft loading bay accessed from the Huckstepp Serviceway, which can accommodate at anytime:
  - A 9.5m waste collection vehicle; and
  - A 6.4m Small Rigid Vehicle;
- Two (2) loading spaces on Basement Level 5 (adjacent to storage areas) which can accommodate a large van (based on a B99 design vehicle); and
- One (1) car wash bay situated on Basement Level 2.

These provisions are expected to accommodate all service demands including waste collection, removalists as well as medium term parking for contractors (e.g. trade utes and vans).

6. Traffic Impacts

6.1 Trip Generation

6.1.1 Residential

The RMS *Technical Direction TDT 2013/04a* provides traffic generation rates for high density residential uses based upon surveys conducted during 2012. It recommends an average Sydney trip rate of 0.19 vehicle trips per unit during the AM peak hour and 0.15 vehicle trips per unit during the PM peak hour. Application of the above rates to the proposed 66 residential apartments results in the following traffic being generated:

- 13 vehicle trips per hour during the AM peak period (3 in, 10 out); and
- 10 vehicle trips per hour during the PM peak period (8 in, 2 out).

6.1.2 Retail

The RMS Guide to Traffic Generating Developments provides traffic generation rates for secondary retail developments, which it defines as retail stores tending not to be the primary attractor to the development and thus are applicable to the retail component of the proposed development. The guide recommends a maximum peak hour trip generation rate of 4.6 vehicle trips per 100m^2 gross leasable floor area of retail space, occurring during the PM peak hour on Thursdays. This peak rate does not apply to mornings, where it is envisaged that traffic generated before 9:00am would be relatively low and mostly consisting of staff arrivals. Therefore in adopting an AM peak period rate of a third of the PM peak period rate, the proposed 335 m^2 gross floor area of retail space is expected to generate the following traffic:

- 5 vehicle trips per hour during the AM peak period (4 in, 1 out); and
- 15 vehicle trips per hour during the PM peak period (8 in, 7 out).

6.1.3 Commercial

The RMS *Technical Direction TDT 2013/04a* publishes updated traffic generation rates for commercial developments based on surveys conducted during 2010. It recommends a summary hourly trip generation rate of 1.6 vehicle trips per 100m^2 gross floor area during the AM peak period and 1.2 vehicle trips per 100m^2 gross floor area during the PM peak period. Application of these rates to the proposed 2,047m^2 gross floor area of commercial space results in the following traffic generation:

- 33 vehicle trips per hour during the AM peak period (26 in, 7 out); and
- 25 vehicle trips per hour during the PM peak period (5 in, 20 out); and

6.1.4 Combined Trips

Having regard for the trip generation rates for the above uses, the proposed development is expected to generate the following traffic during peak periods:

- 51 vehicle trips per hour during the AM peak period (33 in, 18 out); and
- 50 vehicle trips per hour during the PM peak period (21 in, 29 out).

It is emphasised that this generation has been assessed as a net additional increase over the existing traffic volume surveys and intersection performances, with no correction made for the existing site traffic generation as discussed in Section 3.5. This reflects a holistic approach to the network, rather than a localised assessment, so the below analysis represents a worst case impact scenario.

6.2 Peak Period Intersection Performance

The performance of key signalised intersections in the vicinity of the site having regard for the additional traffic generated by the indicative development is summarised in **Table 4** below. This modelling incorporates the following distribution of development traffic:

- Intersection of Northumberland Street and Moore Street:
  - 33% of traffic to turn left from Northumberland Street onto Moore Street;
  - 33% of traffic to proceed straight on Northumberland Street; and
  - 33% of traffic to turn right from Northumberland Street onto Moore Street;
- Intersection of Northumberland Street and Memorial Avenue:
  - 50% of traffic to turn left from Memorial Avenue onto Northumberland Street; and
  - 50% of traffic to turn right from Memorial Avenue onto Northumberland Street.

Reference should also be made to the detailed SIDRA outputs included in **Appendix B**.

Table 5: Existing and Future Intersection Performance

Intersection	Layout	Control Type	Period	Degree of Saturation	Average Delay (s)	Level of Service
Northumberland Street / Moore Street	Existing	Signals	AM	0.222	16.9	B
			PM	0.519	19.9	B
	Future		AM	0.222	17.4	B
			PM	0.447	21.0	B
Northumberland Street / Memorial Avenue	Existing	Signals	AM	0.437	21.0	B
			PM	0.276	15.7	B
	Future		AM	0.554	20.4	B
			PM	0.286	15.8	B

It can be seen from Table 5 that the intersections of Northumberland Street with Moore Street and Northumberland Street with Memorial Street will continue to operate with a Level of Service of B, with minimal increases to delays. This reflects the fact that overall generation is moderate, while trips are also dispersed onto all available access routes.

Hence, even on the adopted worst case scenario, the proposed development is expected to have minimal traffic impacts on the surrounding road network.

7. Access & Internal Design Aspects

7.1 Access

The proposed development contains 90 (Class 1A) parking spaces, with access to the Huckstepp Serviceway (local road). It therefore requires a Category 2 driveway under AS2890.1 (2004), defined as a combined entry-exit driveway of width 3.0m to 5.5m. In response, the proposed development proposes a 3.0m entry access and a 3.0m exit access, separated by a 1.1m median. This arrangement is superior to the requirements of the standard and will also facilitate secure access to the basement with an intercom to be place on the median island. A swept path analysis has been undertaken with the results in **Appendix E** demonstrating adequate geometry for a B99 to enter and exit the access.

The Huckstepp Serviceway will also facilitate truck movements for the undercroft loading bay. It is noted that the laneway has a continuous layback, and in this regard it is proposed that service vehicles reverse park into the bays. The swept path analysis in **Appendix E** demonstrates that each bay can be independently accessed by a 9.5m Waste Collection Vehicle or a 6.4m Small Rigid Vehicle. The arrangement is considered to be consistent with off-street parking for other developments on the Huckstepp Serviceway, which is commonly accessed directly from the carriageway.

7.2 Internal Design

The basement car park and loading area complies with AS2890.1 (2004), AS2890.2 (2002) and AS2890.6 (2009), with the following noteworthy:

7.2.1 Parking Modules

- All parking spaces have been designed in accordance with a Class 1A user and are provided with a minimum space length of 5.4m a minimum width of 2.4m and a minimum aisle width of 5.8m.
- All accessible parking spaces have been designed in accordance with AS2890.6 (2009) and are provided with a minimum space width of 2.4m that is adjacent to a 2.4m wide shared area.
- All spaces located adjacent to obstructions of greater than 150mm in height are provided with an additional width of 300mm.
- Dead-end aisles are provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1.

7.2.2 Ramps

- All ramps accessing the basement car park have a maximum gradient of 20% (1 in 5) with transitions of 12.5% (1 in 8).
- The first 6.0m inside the property is limited to a maximum gradient of 1:20 (5%). This requirement is identical for control points and the gradient has been extended to the intercom.

7.2.3 Clear Head heights

- A minimum clear head height of 2.2m is to be provided for all areas within the basement car park as required by AS2890.1 (2004).
- A minimum clear head height of 2.5m is to be provided above all accessible spaces and shared areas as required by AS2890.6.

7.2.4 Loading Area

- A minimum loading bay width of 3.5m is required under AS2890.2 (2002). The undercroft loading area has a minimum width of 7.0m and can thus accommodate two (2) parked trucks.
- The gradient of the loading dock has been calculated to be 1.6% and complies with AS2890.2 (2002), which stipulates a maximum grade of 1:25 (4%).
- A minimum clear head height of 4.5m is required for the undercroft loading area to comply with AS2890.2 (2002).

In summary the internal design of the proposed development complies with AS2890.1 (2004), AS2890.2 (2002) and AS2890.6 (2009). It is however envisaged that a condition of consent would be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

8. Conclusions

The following matters are noteworthy:

- The Development Application seeks approval for the construction of a 21 storey mixed-use development at 64 Bathurst Street in Liverpool. It will consist of 66 residential apartments, 2,047m^2 gross floor area of commercial space and 335m^2 of retail space.

- The site is located within the Liverpool City Centre and is in close proximity to Liverpool Railway Station and excellent public transport. Frontages are provided at Bathurst Street and The Huckstepp Serviceway, the latter road allowing for dispersed traffic movements to and from the site.

- The proposed development requires in the order of 70-92 parking spaces to comply with the relevant parking rates as permissible under State Environmental Planning Policy No 65 and Council's planning controls. In response, provision for 90 parking spaces is made and is compliant. It is also noted that the quantum for individual land use components are also compliant.

- The proposed development has been assessed to generate 51 vehicle trips per hour during the AM peak and 50 vehicle trips per hour during the PM peak period. Software modelling using SIDRA Intersection 8 has demonstrated that the performance of signalised intersections on Northumberland Street (at Moore Street and Memorial Street) will operate with negligible increases in delays even based on the worst case scenario as modelled which ignores the existing site generation. As such, the traffic impacts of the proposed development are minimal and have no adverse impacts.

- The design of the basement car park and loading areas comply with AS2890.1 (2004), AS2890.2 (2002) and AS2890.6 (2009), with a swept path analysis demonstrating satisfactory geometry for critical vehicular movements.

It is therefore concluded that the proposed development is supportable on transport planning grounds and will operate satisfactorily.

Appendix A

Photographic Record

View looking west towards Moore Street and Northumberland Street intersection.

View looking south onto Bathurst Street and Memorial Avenue Intersection.

View looking east towards Northumberland Street and Memorial Avenue Intersection..

View looking south down Huckstepp Serviceway from subject site.

View looking north along Huckstepp Serviceway from subject site.

View looking south along Bathurst Street, towards subject site.

View looking north-east from entrance of Huckstepp Serviceway.

View looking north-east from exit of Huckstepp Serviceway.

Appendix B

SIDRA Intersection Analysis

USER REPORT FOR SITE

Project: 18.031m01v02 TRAFFIX Northumberland St Network

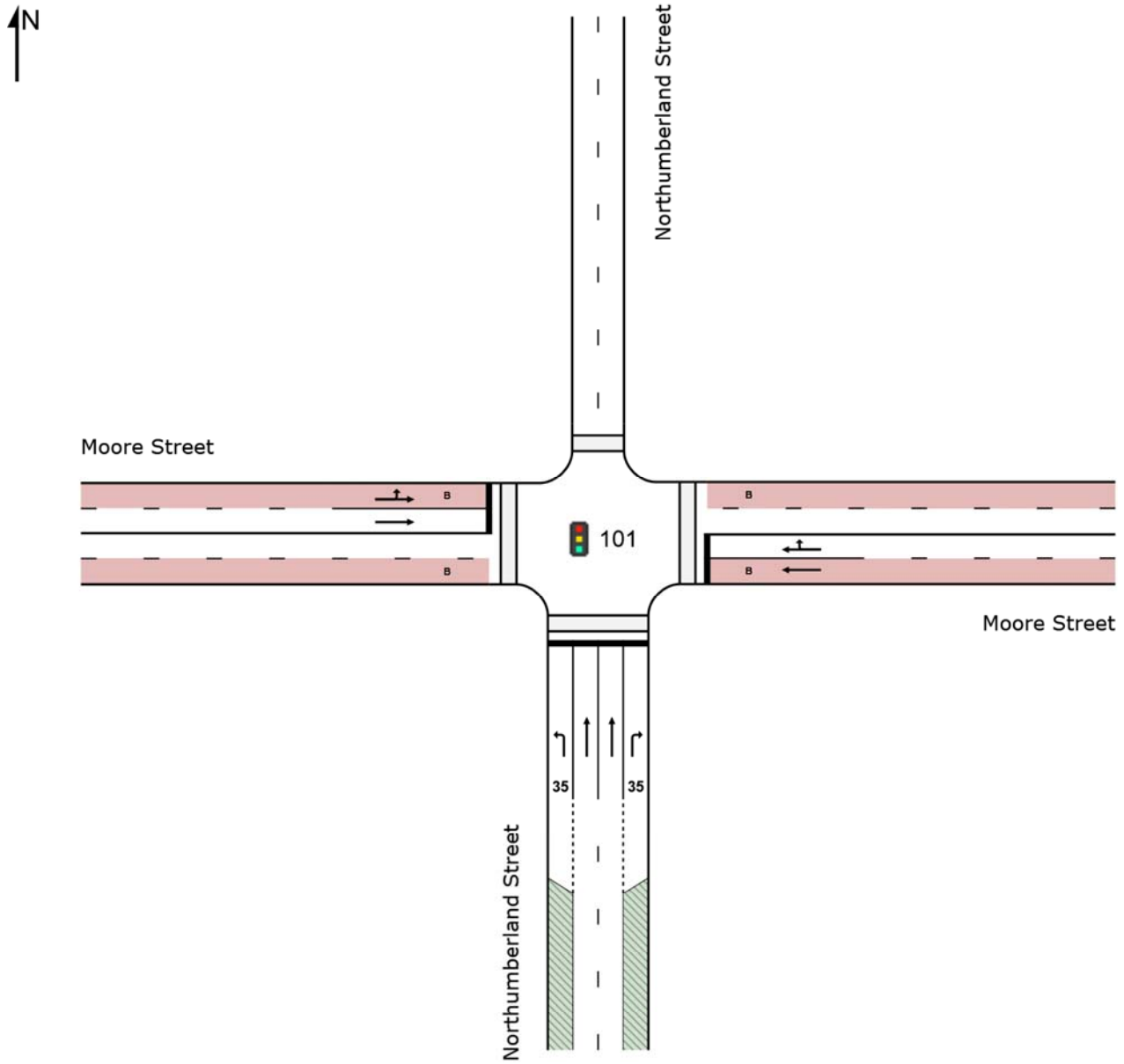
Template: Default Site User Report

Site: 101 [Northumberland St Moore St EX AM]

Intersection: Northumberland Street and Moore Street
Site Category: Exisitng AM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout



USER REPORT FOR SITE

Project: 18.031m01v02 TRAFFIX Northumberland St Network **Template: New User Report**

Site: 101 [Northumberland St Moore St EX AM]

Intersection: Northumberland Street and Moore Street
Site Category: Exisitng AM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland Street												
1	L2	44	2.4	0.115	34.7	LOS C	1.6	11.3	0.84	0.71	0.84	18.9
2	T1	183	3.4	0.207	30.3	LOS C	3.3	23.6	0.84	0.67	0.84	23.8
3	R2	23	0.0	0.059	34.2	LOS C	0.8	5.7	0.83	0.68	0.83	18.7
Approach		251	2.9	0.207	31.4	LOS C	3.3	23.6	0.84	0.67	0.84	22.6
East: Moore Street												
5	T1	111	23.8	0.222	8.0	LOS A	3.6	26.5	0.46	0.48	0.46	25.7
6	R2	98	11.8	0.222	12.0	LOS A	3.6	26.5	0.48	0.54	0.48	29.7
Approach		208	18.2	0.222	9.9	LOS A	3.6	26.5	0.47	0.51	0.47	28.0
West: Moore Street												
10	L2	123	7.7	0.152	11.0	LOS A	2.7	23.1	0.44	0.54	0.44	30.2
11	T1	143	19.1	0.152	6.9	LOS A	2.7	23.1	0.42	0.38	0.42	27.8
Approach		266	13.8	0.152	8.6	LOS A	2.7	23.1	0.43	0.45	0.43	29.2
All Vehicles		725	11.3	0.222	16.9	LOS B	3.6	26.5	0.58	0.55	0.58	25.4

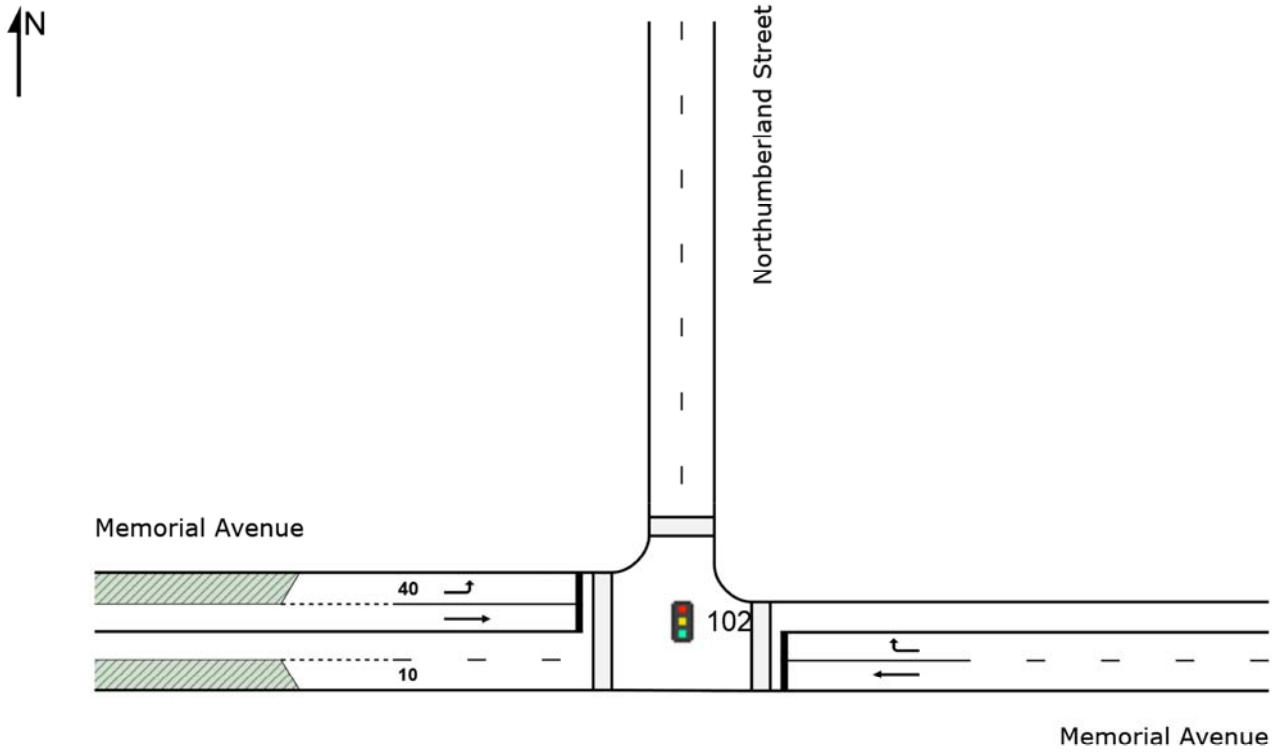
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 102 [Memorial Ave Northumberland St EX AM]

Intersection: Memorial Avenue and Northumberland Street
Site Category: Exisitng AM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout



Site: 102 [Memorial Ave Northumberland St EX AM]

Intersection: Memorial Avenue and Northumberland Street
Site Category: Exisitng AM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Memorial Avenue												
5	T1	75	9.9	0.054	2.9	LOS A	0.8	6.2	0.27	0.21	0.27	40.5
6	R2	295	2.5	0.355	15.0	LOS B	7.0	50.2	0.63	0.76	0.63	26.9
Approach		369	4.0	0.355	12.6	LOS A	7.0	50.2	0.56	0.65	0.56	28.1
West: Memorial Avenue												
10	L2	346	0.3	0.519	27.7	LOS B	11.7	81.9	0.82	0.80	0.82	22.0
11	T1	126	2.5	0.177	20.0	LOS B	3.7	26.3	0.70	0.57	0.70	19.3
Approach		473	0.9	0.519	25.6	LOS B	11.7	81.9	0.79	0.74	0.79	21.5
All Vehicles		842	2.3	0.519	19.9	LOS B	11.7	81.9	0.69	0.70	0.69	24.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 201 [Northumberland St Moore St EX PM]

Intersection: Northumberland Street and Moore Street
Site Category: Existing PM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland Street												
1	L2	278	0.4	0.437	27.2	LOS B	9.3	65.4	0.81	0.77	0.81	21.3
2	T1	298	0.4	0.204	20.2	LOS B	4.4	30.8	0.71	0.58	0.71	27.5
3	R2	63	0.0	0.096	24.2	LOS B	1.8	12.9	0.70	0.69	0.70	22.1
Approach		639	0.3	0.437	23.7	LOS B	9.3	65.4	0.75	0.68	0.75	24.5
East: Moore Street												
5	T1	178	22.5	0.435	16.9	LOS B	8.5	62.6	0.69	0.64	0.69	19.2
6	R2	146	10.8	0.435	21.6	LOS B	8.5	62.6	0.72	0.70	0.72	24.1
Approach		324	17.2	0.435	19.0	LOS B	8.5	62.6	0.70	0.66	0.70	21.8
West: Moore Street												
10	L2	96	7.7	0.173	17.8	LOS B	3.2	28.0	0.60	0.60	0.60	26.0
11	T1	103	30.6	0.173	13.4	LOS A	3.2	28.0	0.57	0.49	0.57	21.8
Approach		199	19.6	0.173	15.2	LOS B	3.2	28.0	0.59	0.54	0.59	24.2
All Vehicles		1162	8.3	0.437	21.0	LOS B	9.3	65.4	0.71	0.65	0.71	23.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 202 [Memorial Ave Northumberland St EX PM]

Intersection: Memorial Avenue and Northumberland Street
Site Category: Existing PM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Memorial Avenue												
5	T1	158	1.3	0.108	3.1	LOS A	1.8	12.8	0.28	0.23	0.28	40.2
6	R2	188	1.1	0.184	10.3	LOS A	3.0	21.2	0.45	0.70	0.45	30.2
Approach		346	1.2	0.184	7.0	LOS A	3.0	21.2	0.37	0.49	0.37	32.7
West: Memorial Avenue												
10	L2	154	0.7	0.276	30.6	LOS C	5.2	36.5	0.81	0.76	0.81	20.9
11	T1	79	0.0	0.137	24.8	LOS B	2.5	17.7	0.77	0.60	0.77	16.9
Approach		233	0.5	0.276	28.6	LOS C	5.2	36.5	0.79	0.71	0.79	19.9
All Vehicles		579	0.9	0.276	15.7	LOS B	5.2	36.5	0.54	0.58	0.54	25.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [Northumberland St Moore St PROP AM]

Intersection: Northumberland Street and Moore Street
Site Category: Exisitng AM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland Street												
1	L2	51	2.1	0.131	34.8	LOS C	1.8	13.0	0.85	0.71	0.85	18.8
2	T1	189	3.3	0.214	30.3	LOS C	3.4	24.5	0.85	0.67	0.85	23.8
3	R2	29	0.0	0.076	34.4	LOS C	1.0	7.3	0.83	0.69	0.83	18.6
Approach		269	2.7	0.214	31.6	LOS C	3.4	24.5	0.84	0.68	0.84	22.5
East: Moore Street												
5	T1	111	23.8	0.222	8.0	LOS A	3.6	26.5	0.46	0.48	0.46	25.7
6	R2	98	11.8	0.222	12.0	LOS A	3.6	26.5	0.48	0.54	0.48	29.7
Approach		208	18.2	0.222	9.9	LOS A	3.6	26.5	0.47	0.51	0.47	28.0
West: Moore Street												
10	L2	123	7.7	0.152	11.0	LOS A	2.7	23.1	0.44	0.54	0.44	30.2
11	T1	143	19.1	0.152	6.9	LOS A	2.7	23.1	0.42	0.38	0.42	27.8
Approach		266	13.8	0.152	8.6	LOS A	2.7	23.1	0.43	0.45	0.43	29.2
All Vehicles		744	11.0	0.222	17.4	LOS B	3.6	26.5	0.59	0.55	0.59	25.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 102 [Memorial Ave Northumberland St PROP AM]

Intersection: Memorial Avenue and Northumberland Street
Site Category: Exisitng AM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Memorial Avenue												
5	T1	75	9.9	0.054	2.9	LOS A	0.8	6.2	0.27	0.21	0.27	40.5
6	R2	312	2.4	0.380	15.8	LOS B	7.8	55.8	0.66	0.77	0.66	26.4
Approach		386	3.8	0.380	13.4	LOS A	7.8	55.8	0.59	0.66	0.59	27.5
West: Memorial Avenue												
10	L2	364	0.3	0.554	28.0	LOS B	12.4	87.2	0.83	0.80	0.83	21.9
11	T1	126	2.5	0.177	20.0	LOS B	3.7	26.3	0.70	0.57	0.70	19.3
Approach		491	0.9	0.554	25.9	LOS B	12.4	87.2	0.79	0.74	0.79	21.5
All Vehicles		877	2.2	0.554	20.4	LOS B	12.4	87.2	0.70	0.71	0.70	23.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 201 [Northumberland St Moore St PROP PM]

Intersection: Northumberland Street and Moore Street
Site Category: Existing PM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland Street												
1	L2	288	0.4	0.446	26.5	LOS B	9.5	67.1	0.80	0.77	0.80	21.6
2	T1	308	0.3	0.205	19.6	LOS B	4.5	31.4	0.70	0.58	0.70	27.8
3	R2	74	0.0	0.109	23.6	LOS B	2.1	14.9	0.69	0.69	0.69	22.3
Approach		671	0.3	0.446	23.0	LOS B	9.5	67.1	0.74	0.67	0.74	24.7
East: Moore Street												
5	T1	178	22.5	0.447	17.7	LOS B	8.7	64.0	0.70	0.64	0.70	18.8
6	R2	146	10.8	0.447	22.4	LOS B	8.7	64.0	0.74	0.70	0.74	23.7
Approach		324	17.2	0.447	19.8	LOS B	8.7	64.0	0.72	0.67	0.72	21.4
West: Moore Street												
10	L2	96	7.7	0.177	18.4	LOS B	3.2	28.7	0.61	0.61	0.61	25.6
11	T1	103	30.6	0.177	14.0	LOS A	3.2	28.7	0.58	0.50	0.58	21.3
Approach		199	19.6	0.177	15.8	LOS B	3.2	28.7	0.60	0.55	0.60	23.8
All Vehicles		1194	8.1	0.447	21.0	LOS B	9.5	67.1	0.71	0.65	0.71	23.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 202 [Memorial Ave Northumberland St PROP PM]

Intersection: Memorial Avenue and Northumberland Street
Site Category: Existing PM
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Memorial Avenue												
5	T1	158	1.3	0.108	3.1	LOS A	1.8	12.8	0.28	0.23	0.28	40.2
6	R2	199	1.1	0.197	10.8	LOS A	3.3	23.4	0.47	0.70	0.47	29.9
Approach		357	1.2	0.197	7.4	LOS A	3.3	23.4	0.39	0.50	0.39	32.4
West: Memorial Avenue												
10	L2	165	0.6	0.286	29.9	LOS C	5.5	38.8	0.80	0.76	0.80	21.2
11	T1	79	0.0	0.132	23.9	LOS B	2.5	17.4	0.75	0.59	0.75	17.3
Approach		244	0.4	0.286	28.0	LOS B	5.5	38.8	0.78	0.71	0.78	20.3
All Vehicles		601	0.9	0.286	15.8	LOS B	5.5	38.8	0.55	0.58	0.55	25.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix C

Architectural Drawings (Reduced Scale)

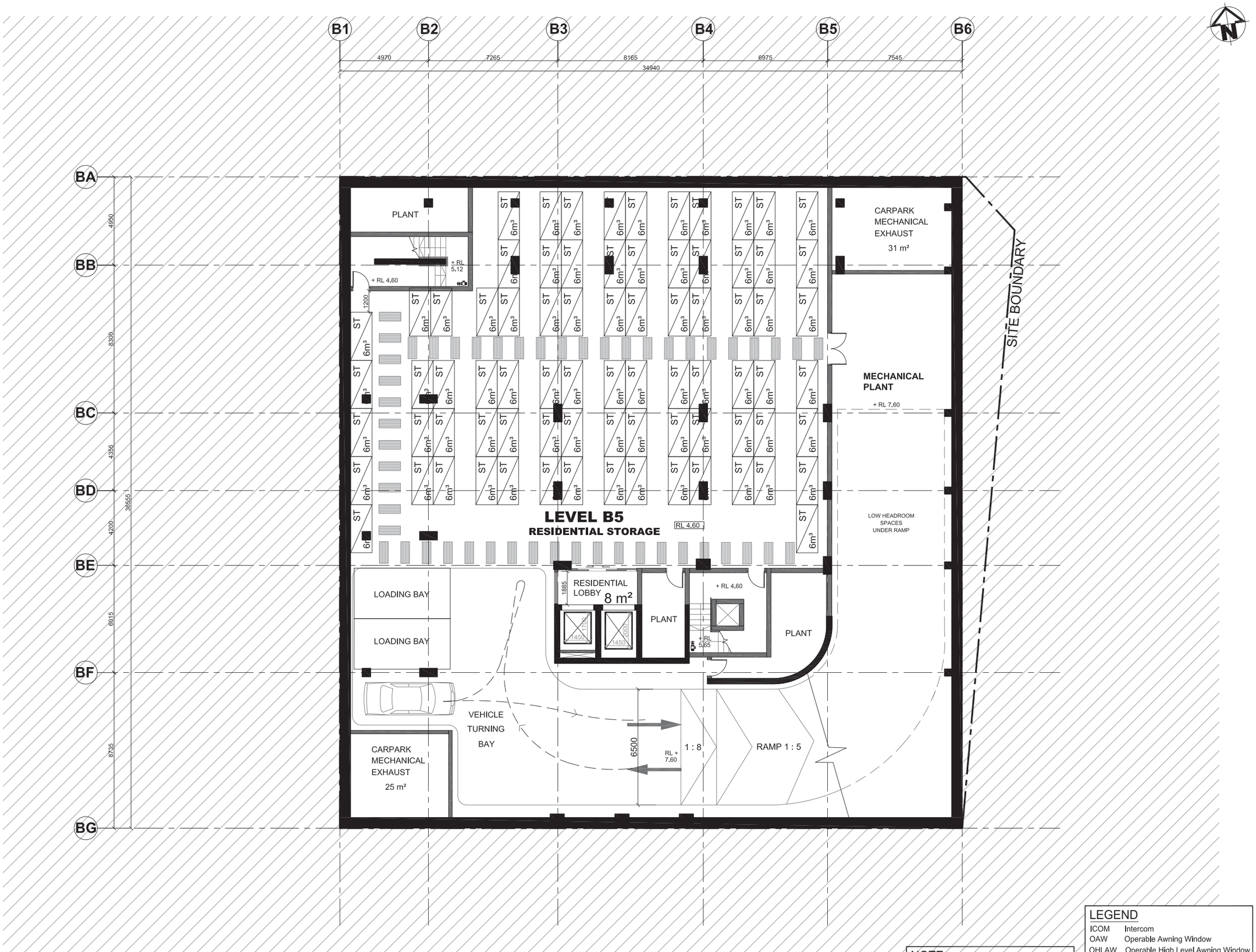
NOTES

THIS DOCUMENT NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED & ISSUED FOR CONSTRUCTION.

DO NOT SCALE, WORK ONLY FROM FIGURED DIMENSIONS.

BASIX CERTIFICATION

REFER TO BASIX REPORT PREPARED BY SLR CONSULTING DATED XX/XX/20XX



1 BASEMENT LEVEL 5 FLOOR PLAN

1 : 100

NOTE

ALL DESIGNATED ADAPTABLE APARTMENT UNITS ARE DESIGNED ACCORDING TO AS 1428.1 & AS 4299.

LEGEND

ICOM	Intercom
OAW	Operable Awning Window
OHLAW	Operable High Level Awning Window
FHLW	Full Height Louvred Window
FHOGP	Full Height Opaque Glazing Panel
A/C	Air-conditioning Split unit
FHR	Fire Hydrant Hose Reel

NO.	DATE	ISSUE
A	11/12/2018	ISSUE FOR COORDINATION

PROPOSED MIXED USE DEVELOPMENT FLAT BUILDING

64 BATHURST STREET, LIVERPOOL, NSW 2170

FOR INFORMATION

Accessibility Consultant:
ABE Consulting Pty Ltd
Level 1, 280 Norton Street, Leichhardt, NSW 2040
TEL: (02) 8065 0400

BCA Consultant:
Essential Certifiers
Level 1, 405 Hume Highway, Liverpool NSW 2170
TEL: (02) 9612 5000

Traffic Engineering Consultant:
TRAFFIX
Suite 2.08 50 Holt St, Surry Hills, NSW, 2010
TEL: (02) 8324 8700

Hydraulics Consultant:
SCOTT COLLIS Pty Ltd
Suite 4A, Level 2, 90 Phillip Street, Parramatta NSW, 2150
TEL: (02) 8824 9500

Waste Management Consultant:
Elephants Foot Recycling Solutions
Unit 10, 50 Parker Court, Pinkenba QLD 4008
TEL: (02) 9780 3576

Geotechnical Engineering Consultant:
EI Australia
Suite 6.01, 55 Miller Street, Pyrmont, NSW 2009
TEL: (02) 9516 0722

Electrical Engineering Consultant:
AA power Engineering Consultant
Suite 4, 15-17 Forest Road, Hurstville, NSW 2220
TEL: (02) 9553 1857

Landscape Consultant:
Habit8
Studio 25, 13-29 Nichols Street, Surry Hills, NSW 2010
TEL: (02) 9360 7771

Wind Consultant:
SLR Consulting Australia Pty Ltd
2 Lincoln Street, Lane Cove, NSW 2066
TEL: (02) 9427 8100

Structural Engineering/Stormwater Consultant:
Xavier Knight Consulting Engineers
Level 2, 90 Phillip street Paramatta NSW 2150
TEL: (02) 8810 5800

Quantity Surveyor:
Newton Fisher Group
Suite 11, 1051 Pacific Highway, Pymble, NSW 2073
TEL: (02) 9488 1200

Site Survey:
Lean Lackenby & Hayward Liverpool Pty Ltd
Level 1, 209 Nothumberland Street, Liverpool
TEL: (02) 9602 1200

Architect:
Saunders Global Pty Ltd
Suite 104, 26-32 Pirrama Road , Pyrmont NSW 2009
TEL: (02) 9566 4437

Planners:
Elton Consulting
Level 6, 332-342 Oxford Street, Bondi Junction NSW 2022, Australia
TEL: (02) 9387 2600

Client:
Bradfield Building Group
Suite 1, Level 3, 203-209 Northumberland Street, Liverpool
TEL: (02) 9734 7389

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Pyrmont NSW 2009
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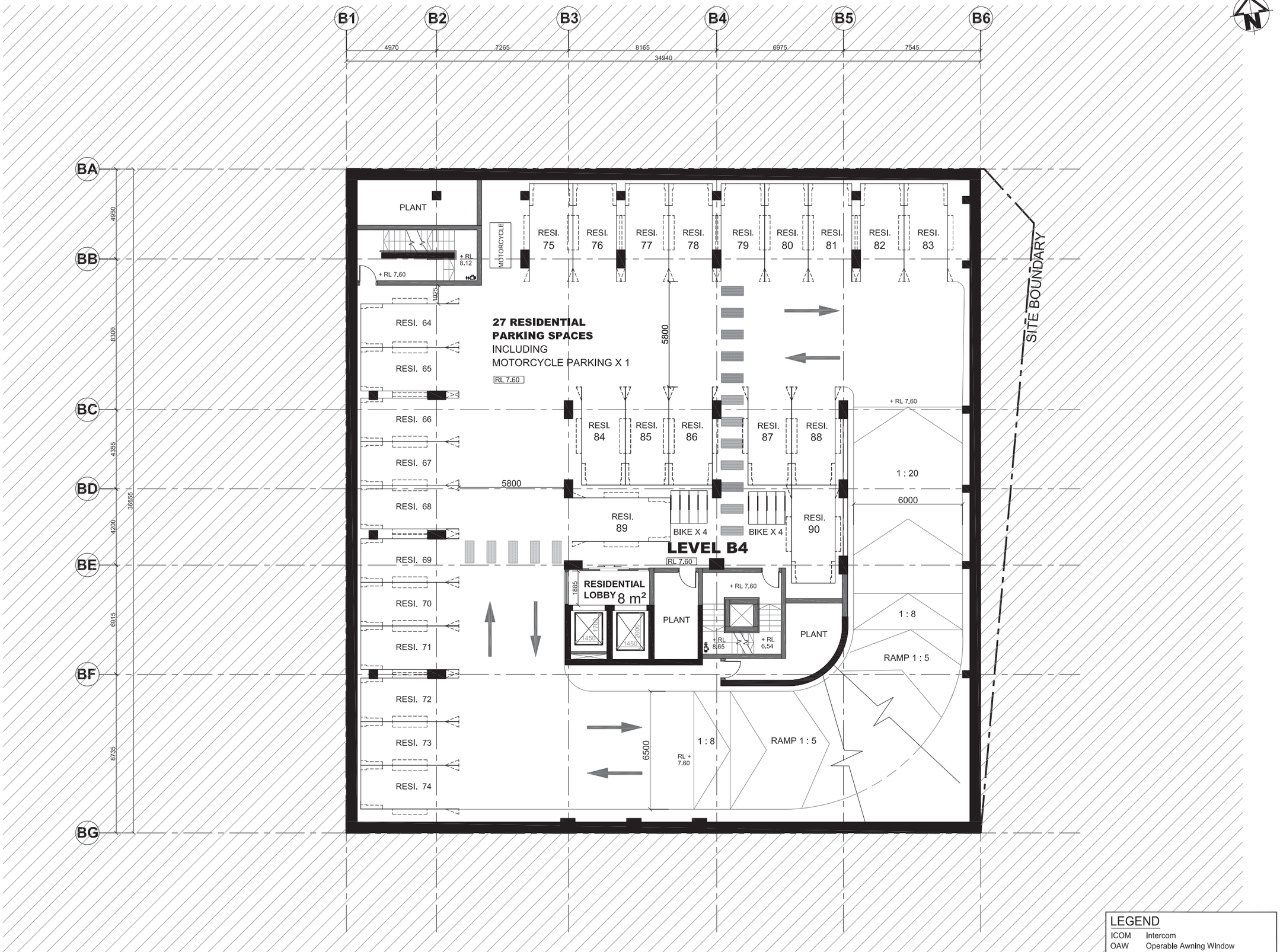
E: info@saunders.com.au
www.saunders.com.au
Nominated Architect:
Erik PT Leung (NSW 8713)

drawn	EL
arch	EL
scale	1:100 @A1
no.	002.001

BASEMENT LEVEL 5

Drawing	Issue
DA04	A



1 BASEMENT LEVEL 4 FLOOR PLAN

1 : 100

NOTE

ALL DESIGNATED ADAPTABLE APARTMENT UNITS ARE DESIGNED ACCORDING TO AS 1428.1 & AS 4299.

LEGEND

ICOM	Intercom
OAW	Operable Awning Window
OHLAW	Operable High Level Awning Window
FHLW	Full Height Louvred Window
FHOGP	Full Height Opaque Glazing Panel
A/C	Air-conditioning Split unit
FHR	Fire Hydrant Hose Reel

NOTES

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PROPOSED MIXED USE DEVELOPMENT FLAT BUILDING

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arch	EL
scale	
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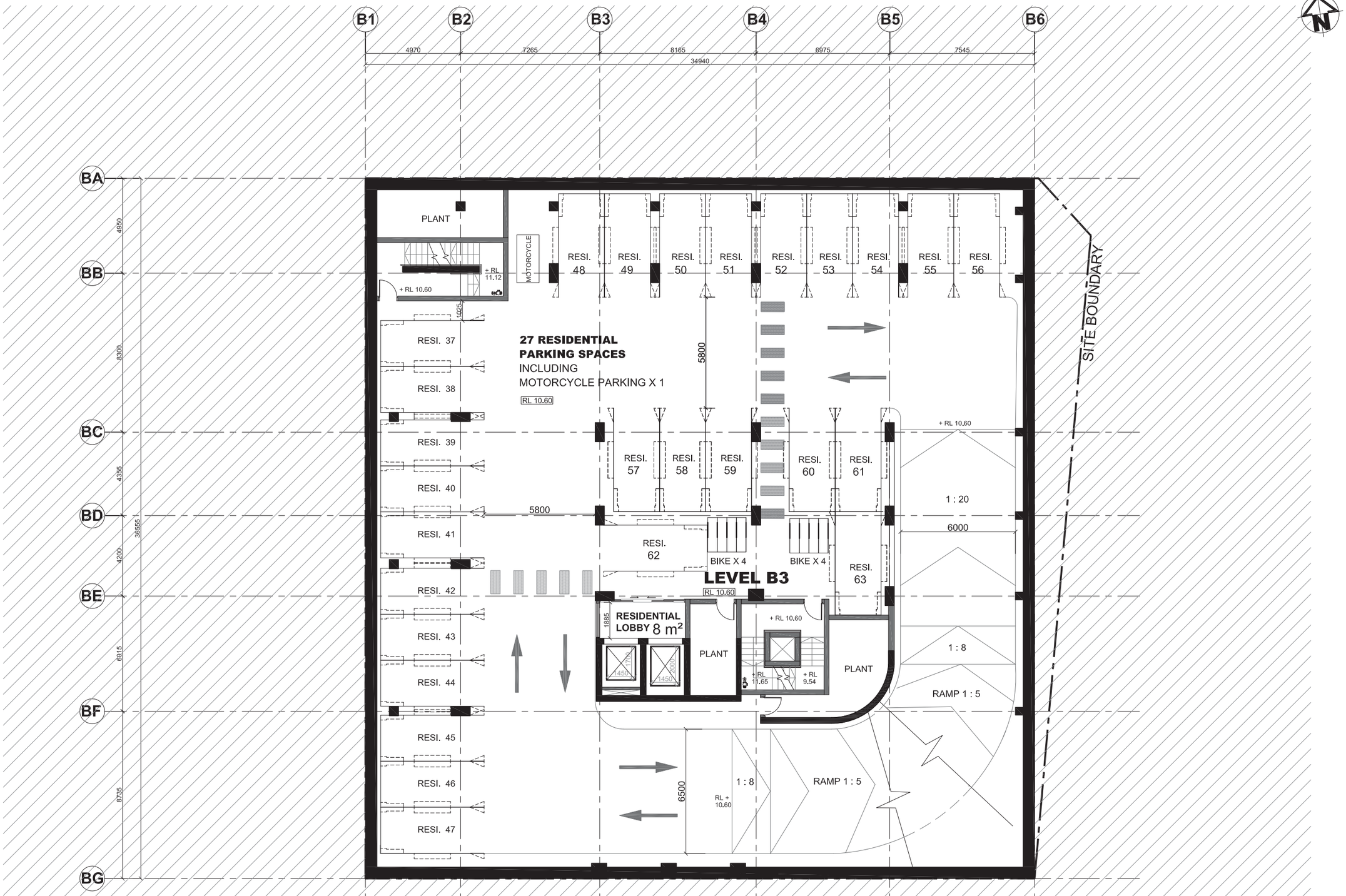
BASEMENT LEVEL 4

Drawing	Issue
DA05	A



1 BASEMENT LEVEL 3 FLOOR PLAN

1 : 100

NOTE

ALL DESIGNATED ADAPTABLE APARTMENT UNITS ARE DESIGNED ACCORDING TO AS 1428.1 & AS 4299.

LEGEND

ICOM	Intercom
OAW	Operable Awning Window
OHLAW	Operable High Level Awning Window
FHLW	Full Height Louvred Window
FHOGP	Full Height Opaque Glazing Panel
A/C	Air-conditioning Split unit
FHR	Fire Hydrant Hose Reel

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Nominated Architect
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drawn	EL
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scale	
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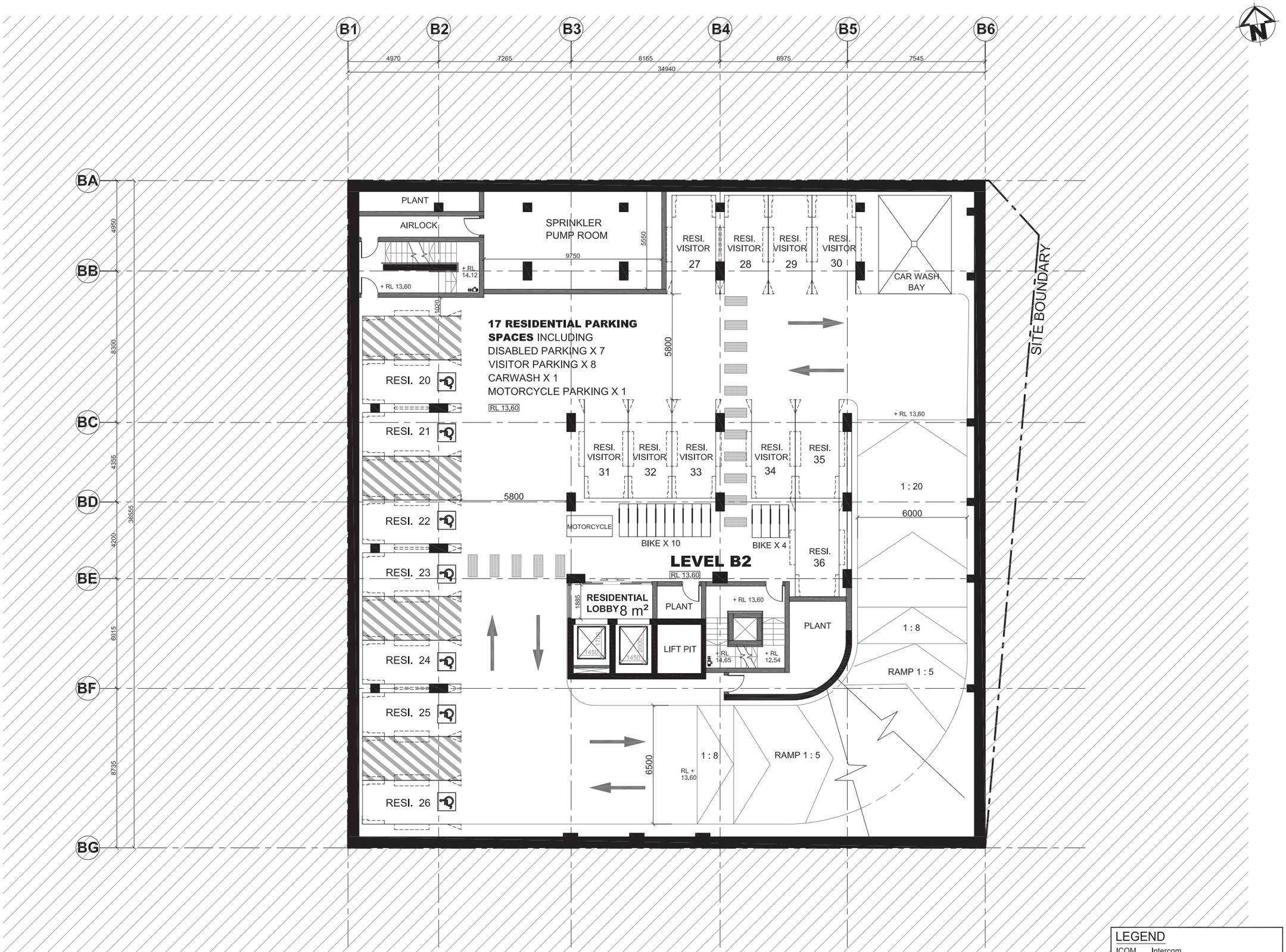
BASEMENT LEVEL 3

Drawing	Issue
DA06	A



1 BASEMENT LEVEL 2 FLOOR PLAN

1 : 100

NOTE

ALL DESIGNATED ADAPTABLE APARTMENT UNITS ARE DESIGNED ACCORDING TO AS 1428.1 & AS 4299.

LEGEND

ICOM	Intercom
OAW	Operable Awning Window
OHLAW	Operable High Level Awning Window
FHLW	Full Height Louvred Window
FHOGP	Full Height Opaque Glazing Panel
A/C	Air-conditioning Split unit
FHR	Fire Hydrant Hose Reel

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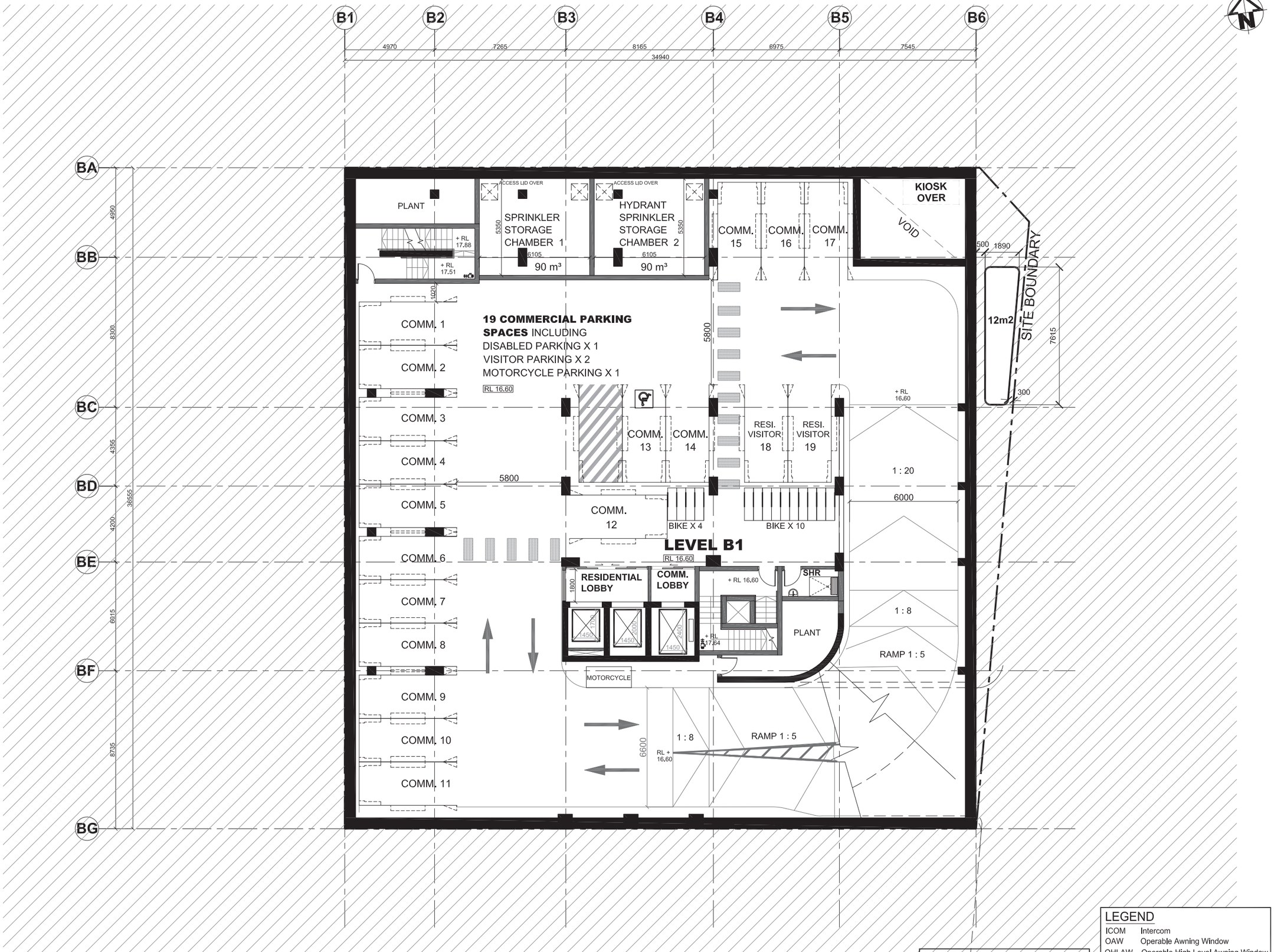
drawn	EL
arch	EL
scale	
no.	002.001

BASEMENT LEVEL 2

Drawing	Issue
DA07	A



1 BASEMENT LEVEL 1 FLOOR PLAN

1 : 100

NOTE

ALL DESIGNATED ADAPTABLE APARTMENT UNITS ARE DESIGNED ACCORDING TO AS 1428.1 & AS 4299.

LEGEND

ICOM	Intercom
OAW	Operable Awning Window
OHLAW	Operable High Level Awning Window
FHLW	Full Height Louvred Window
FHOGP	Full Height Opaque Glazing Panel
A/C	Air-conditioning Split unit
FHR	Fire Hydrant Hose Reel

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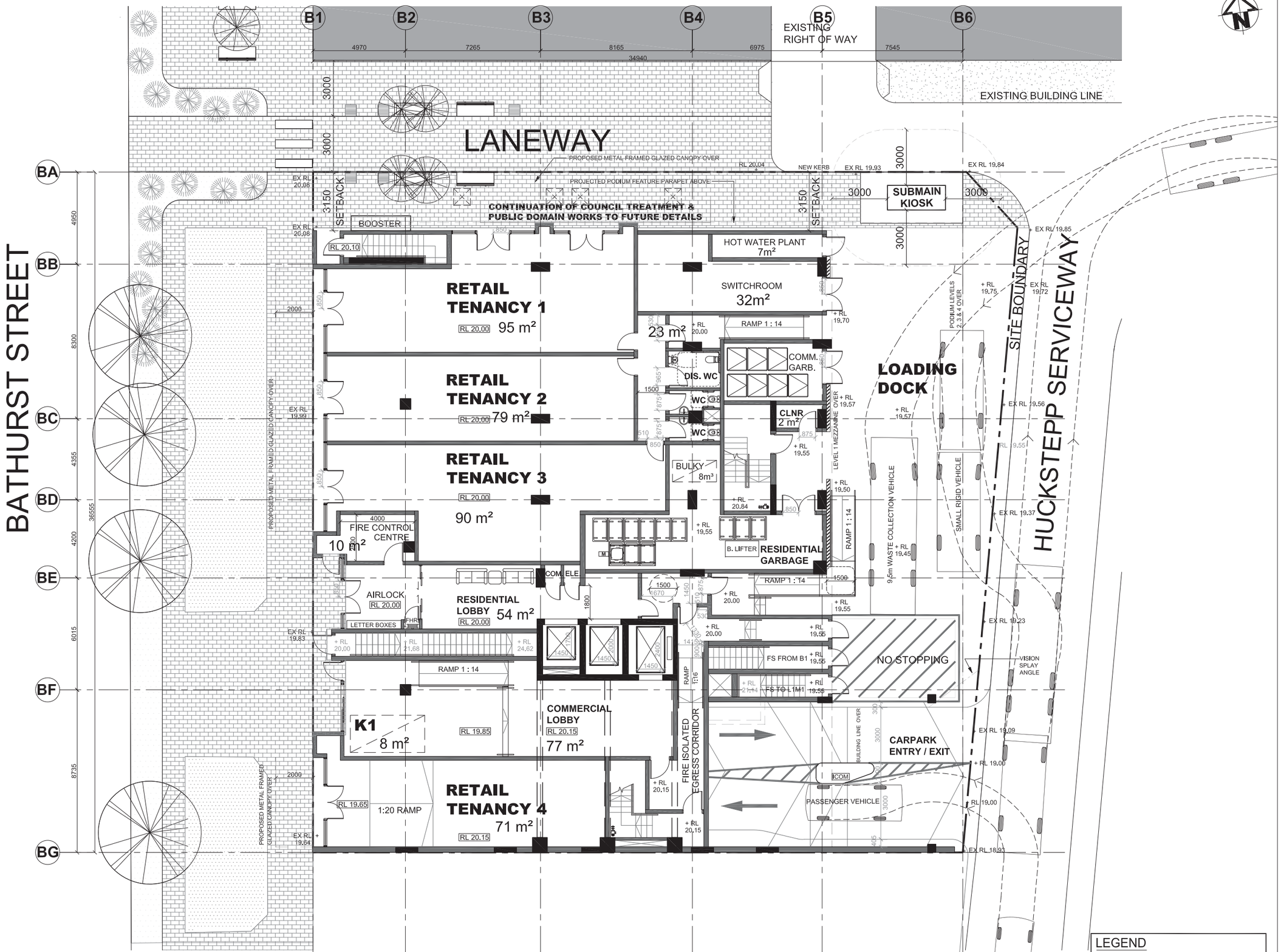
Nominated Architect:
Erik PT Leung (NSW 8713)

drawn	EL
arch	EL
scale	
no.	002.001

BASEMENT LEVEL 1

Drawing	Issue
DA08	A



1 LEVEL 1 (GROUND LEVEL) FLOOR PLAN

1 : 100

NOTE

ALL DESIGNATED ADAPTABLE APARTMENT UNITS ARE DESIGNED ACCORDING TO AS 1428.1 & AS 4299.

LEGEND

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OAW	Operable Awning Window
OHLAW	Operable High Level Awning Window
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arch	EL
scale	
no.	002.001

LEVEL 1 GROUND LEVEL FLOOR PLAN

Drawing	Issue
DA09	A

Appendix D

Technical Note (Department of Planning)

Car parking requirements in SEPP 65

This technical note provides guidance on the application of the car parking requirements of *State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development* (SEPP 65) and the Apartment Design Guide.

Car parking in residential apartment developments

The location, form and organisation of parking is designed considering site constraints, local context, apartment types, regulatory car parking requirements and feasibility.

Parking requirements should be determined in relation to the availability, frequency and convenience of public transport, or proximity to a centre in regional areas.

In designated accessible Sydney locations and nominated centres in regional NSW, the Apartment Design Guide applies a minimum requirement that is the lesser of either the relevant rate set out in the *Guide to Traffic Generating Developments* (GTTGD) or the council car parking requirement for residential apartment development.

Car parking requirements of the Apartment Design Guide

Part 3J Bicycle and car parking of the Apartment Design Guide sets out a range of objectives, design criteria and design guidance for car parking, car park design and facilities for other modes of transport in apartment developments. The guide introduces parking requirements for some sites in Metropolitan Sydney and nominated regional centres.

Objective 3J-1 states:

> *Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas*

The design criterion sets out measurable requirements for how this objective can be achieved in apartment developments, as follows:

> *For development in the following locations:*
>
> - *On sites that are within 800m of a railway station or light rail stop in the Sydney Metropolitan Area; or*
> - *On land zoned, and sites within 400m of land zoned, B3 Commercial Core, B4 Mixed Use or equivalent in a nominated regional centre*
>
> *The minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less*
>
> *The car parking needs for a development must be provided off street*

The nominated regional centres to which this design criteria applies are set out in Table 3 of the Apartment Design Guide. They are: Albury, Ballina, Batemans Bay, Bathurst, Bega, Bowral, Cessnock, Charlestown, Coffs Harbour, Dapto, Dubbo, Glendale-Cardiff, Gosford, Goulburn, Grafton, Lismore, Maitland, Morisset, Newcastle, Nowra, Orange, Port Macquarie, Queanbeyan, Raymond Terrace, Shellharbour, Tamworth, Taree, Tuggerah-Wyong, Tweed Heads, Wagga Wagga, Warrawong and Wollongong.

The Guide does not set any parking requirements for other locations in Sydney or regional NSW. In these areas, car parking requirements continue to be set by the relevant council.

Applying the rates of the Guide to Traffic Generating Developments

The Apartment Design Guide references the rates contained in the GTTGD, the following explains how the GTTGD rates are to be applied in Metropolitan Sydney and nominated regional centres.

The GTTGD prescribes car parking rates for residential flat buildings based on both the scale of development (whether it contains up to 20 units, or 20 or more units), as well as on location – whether the centre is a *Metropolitan Regional Centre (CBD)* or *Metropolitan Subregional Centre*.

While the GTTGD does not define either of these terms, this classification of centres relates to an earlier publication referenced in the GTTGD, namely Part 9 of the *Metropolitan Parking Policy* (Roads and Traffic Authority, November 1988).

Centres in Metropolitan Sydney

It is appropriate to use the current metropolitan strategy for Sydney, *A Plan for Growing Sydney*, to define the scale of centres. This approach is consistent with the policy intent of both the Metropolitan Parking Policy and the GTTGD.

Therefore, those centres defined in A Plan for Growing Sydney as a CBD, Regional City Centre or Strategic Centre should apply the *Metropolitan Regional Centre (CBD)* rates of the GTTGD, while the remaining Sydney centres serviced by railway or light rail stations should be classified as a *Metropolitan Subregional Centre* for the purposes of the GTTGD.

Nominated centres in regional NSW

Outside Sydney, a number of regional centres throughout NSW have been identified in Table 3 of the Apartment Design Guide as centres to which the design criteria for car parking applies. These regional centres have been nominated based on their status under the relevant regional strategies.

In these nominated regional centres the *Metropolitan Subregional Centre* rate should be applied for the purposes of the GTTGD.

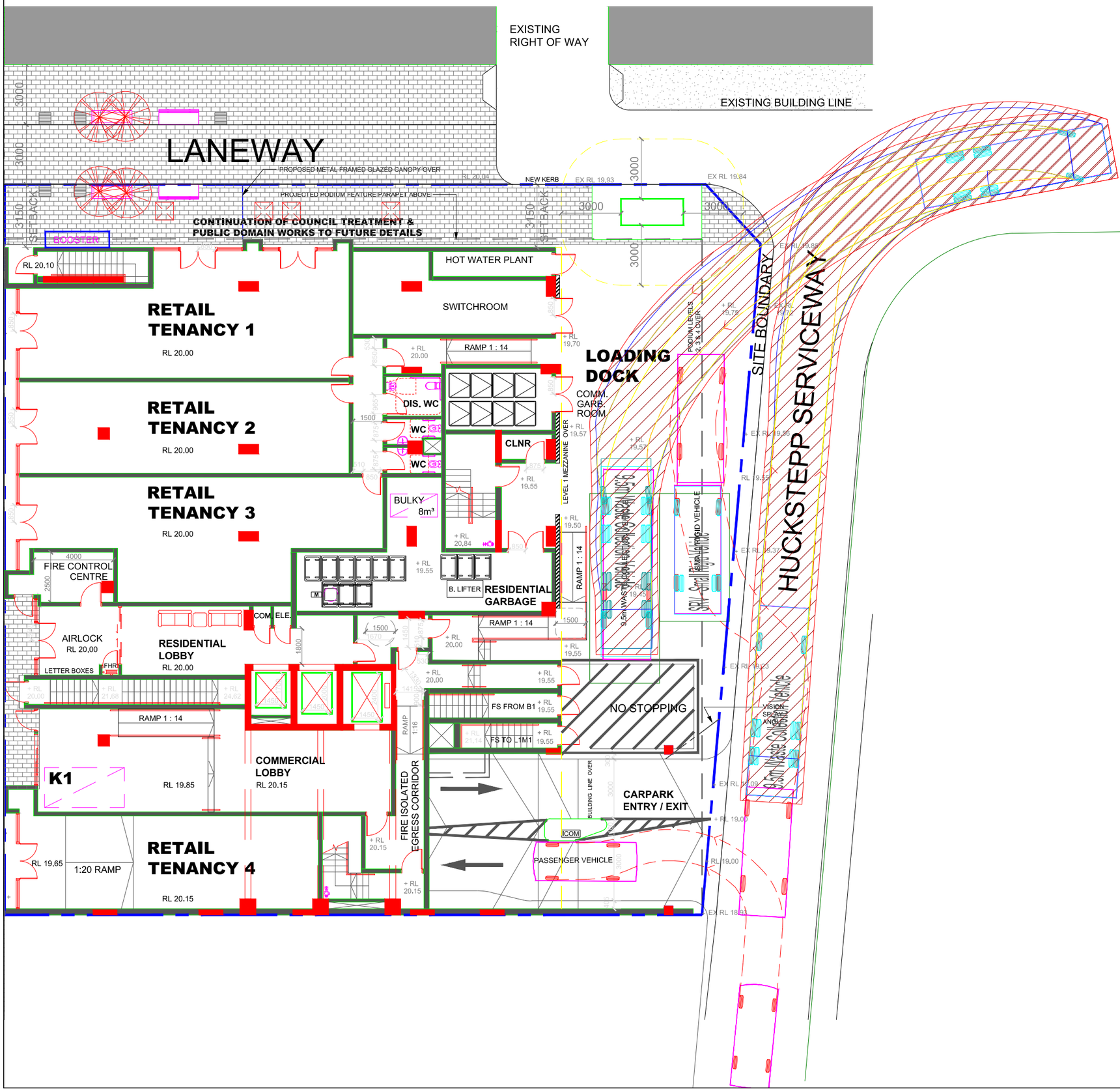
Further Information

The Guide to Traffic Generating Developments (version 2.2, dated October 2002) is available from Roads and Maritime Services. For convenience, a link to the document is also provided on the Department of Planning and Environment's website at http://planning.nsw.gov.au/betterapartments

For further information please contact the Department of Planning and Environment's information centre on 1300 305 695 or email sepp65@planning.nsw.gov.au

Appendix E

Swept Path Analysis



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Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1-2004 Parking facilities - Off-street car parking*, and/or *AS 2890.2-2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

no.	revision note	by.	date

Swept Path Legend:

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

architect
Saunders Global

client
Bradfield Building Group Pty Ltd

scale
1:200 @ A3
0m 2 4 6 8

project
64 Bathurst Street, Liverpool

drawing prepared by
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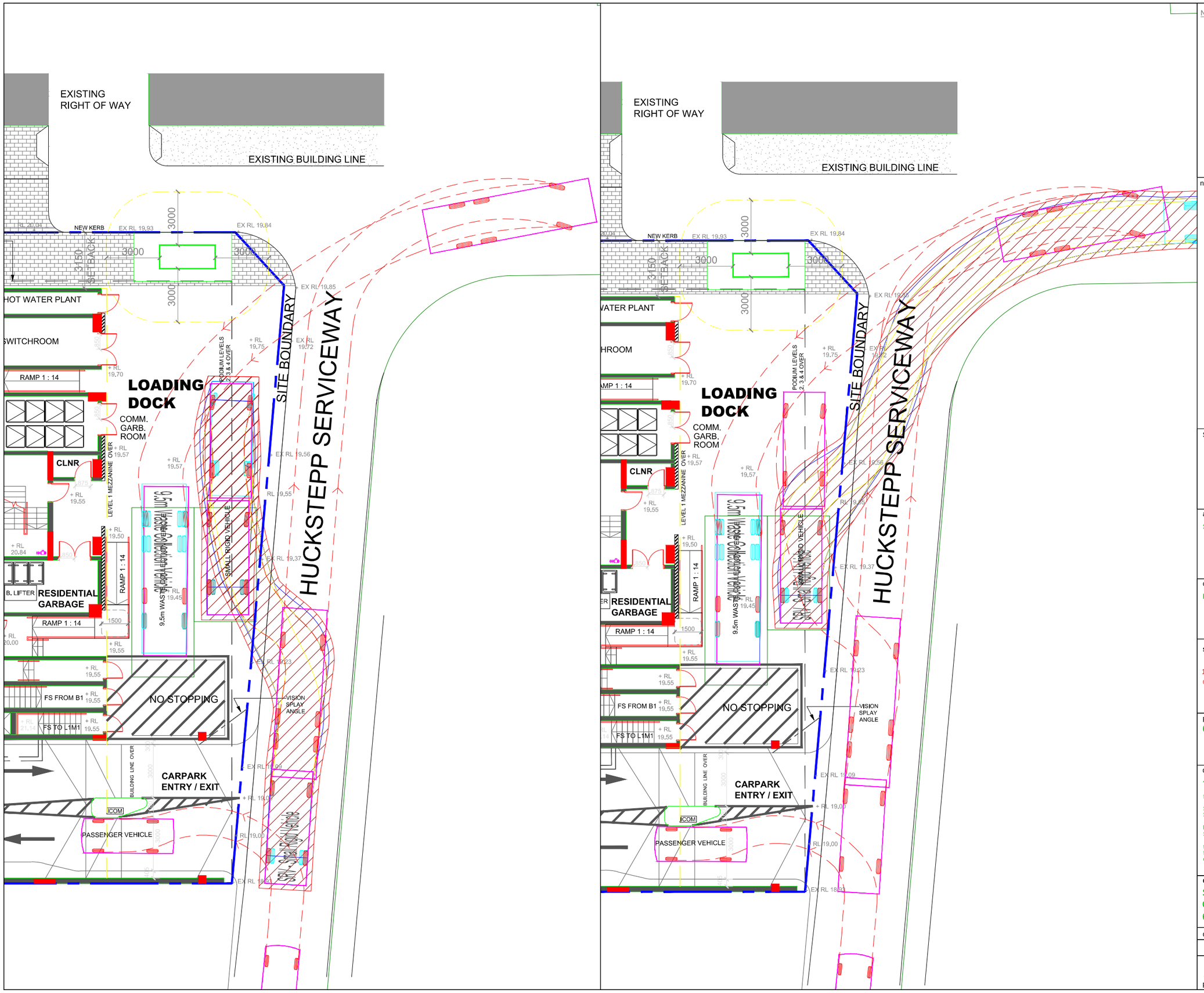
drawing title
Swept Path Analysis
Ground Level
9.5m Waste Collection Vehicle

drawn:	checked:	date:
SW	KB	14 Dec 18

18.031	-	SK.01	-
project no.	drawing phase.	drawing no.	rev



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- Vehicle Body Envelope
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architect
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scale
1:200 @ A3
0m 2 4 6 8

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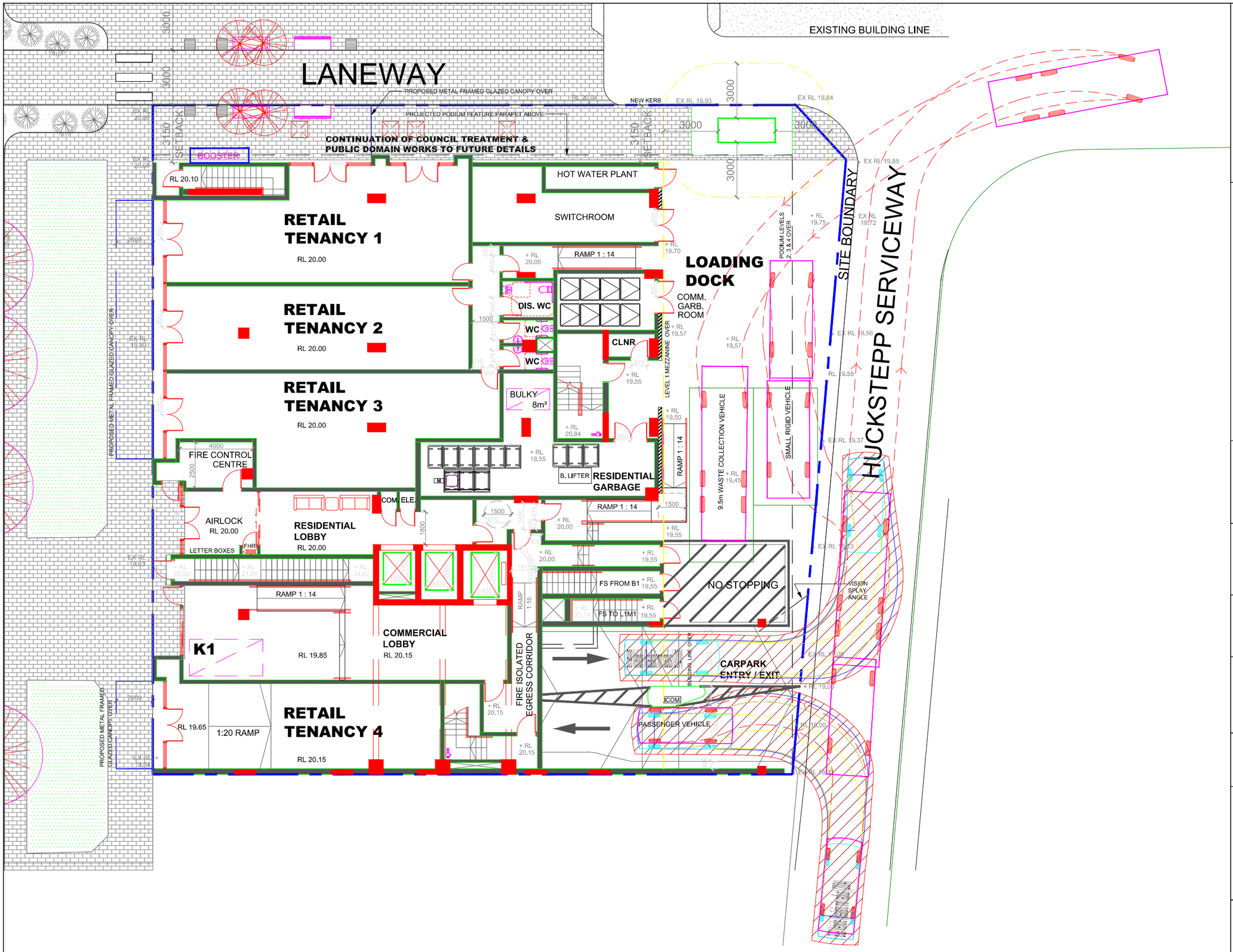
drawing title
Swept Path Analysis
Ground Level
6.4m Small Rigid Vehicle

drawn:	checked:	date:
SW	KB	14 Dec 18

18.031	-	SK.02	-
project no.	drawing phase.	drawing no.	rev



Notes

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1-2004 Parking facilities - Off-street car parking*, and/or *AS 2890.2-2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

no.	revision note	by.	date

Swept Path Legend:

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

architect
Saunders Global

client
Bradfield Building Group Pty Ltd

scale
1:200 @ A3
0m 2 4 6 8

project
64 Bathurst Street, Liverpool

drawing prepared by
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drawing title
Swept Path Analysis
Ground Level
B99 Vehicle

drawn:	checked:	date:
SW	KB	14 Dec 18

project no.	drawing phase.	drawing no.	rev
18.031	-	SK.03	-