

EARLJEST PTY LTD

**TRAFFIC AND PARKING IMPACT
FOR A CONCEPT PLAN
FOR A
PROPOSED MIXED USE DEVELOPMENT
AT
21-35 TREACY STREET, HURSTVILLE**

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Appendix B

Hurstville CBD Parking Map

Masterplan – Hurstville City Centre-Proposed Car Park Locations

1.0 INTRODUCTION

1.1 Background

An application is to be made by Earljest Pty Ltd for approval of a concept plan for a mixed use development at 21 – 35 Treacy Street, Hurstville under Part 3A of the EP and A Act. This traffic and parking report has been prepared to assess the traffic impacts of the proposed development.

It is understood from discussions with Council's Manager for Infrastructure and Planning that the proposal to change both Park Road and The Avenue from a one-way pairing to two-way traffic on both of these streets has been submitted to the RTA for approval.

The site is shown in **Figure 1 Locality Plan**. The Lot numbers and D.P.'s are shown in **Figure 2**.

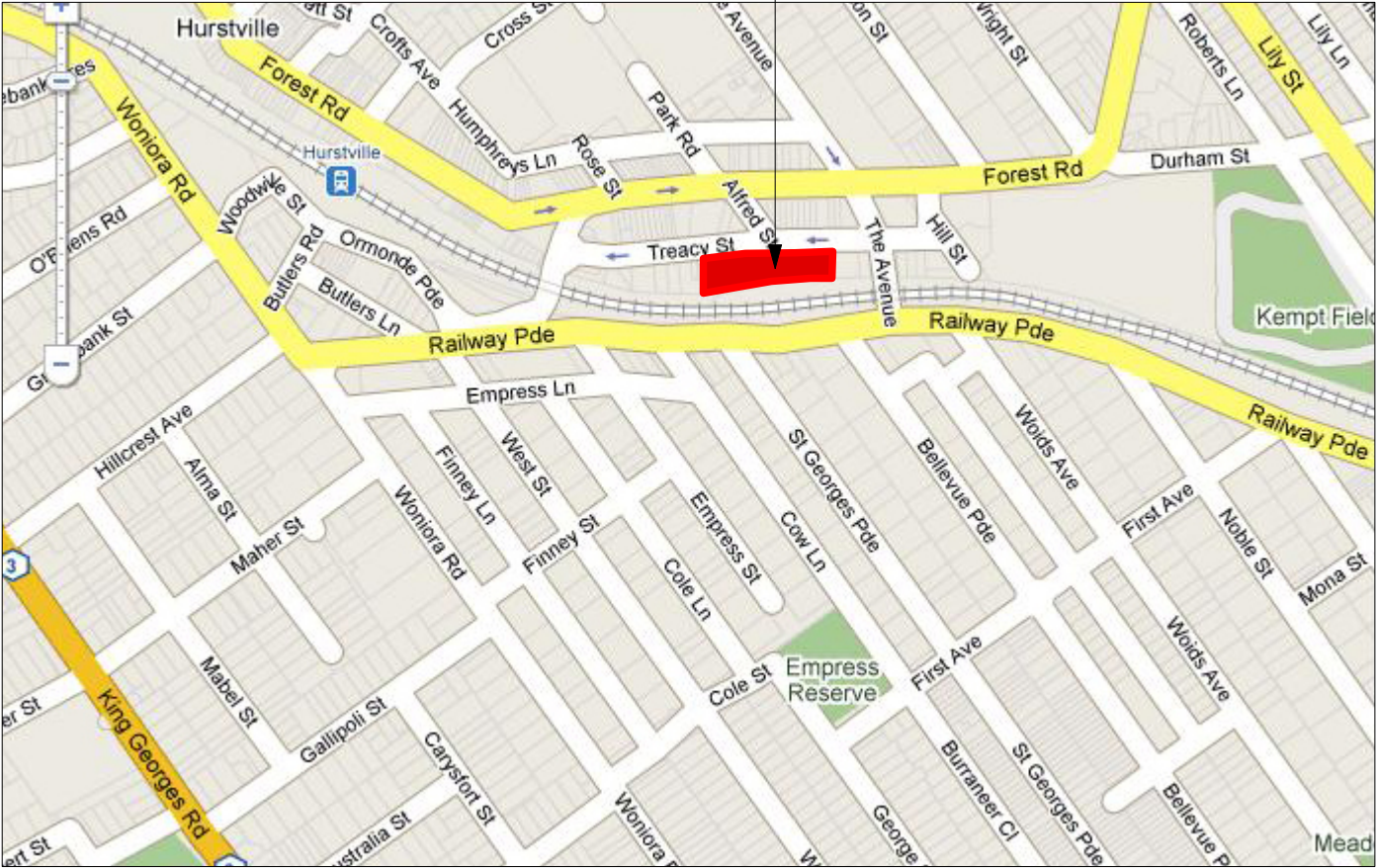
1.2 Scope of Report

This report addresses the traffic and parking issues arising from operation of the proposed mixed use development as stated in the Director General's requirements dated 8/10/2010 under Section 75 F of the EP and A Act 1979 and the RTA's requirements as stated in a letter from Transport Planning, Sydney Region to the Director, Metropolitan Projects, NSW Department of Planning dated 2 November 2010.

We have also read the following Strategy documents:-

- Better Transport and Livable Cities. NSW State Plan 2010.
- Annual Performance Report 2010 NSW State Plan
- NSW Government's Metropolitan Strategy – South West.
- Sub-region November 2007.

PROPOSED DEVELOPMENT
SITE 21-35 TREACY STREET



AERIAL LOCALITY MAP

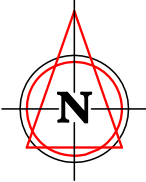
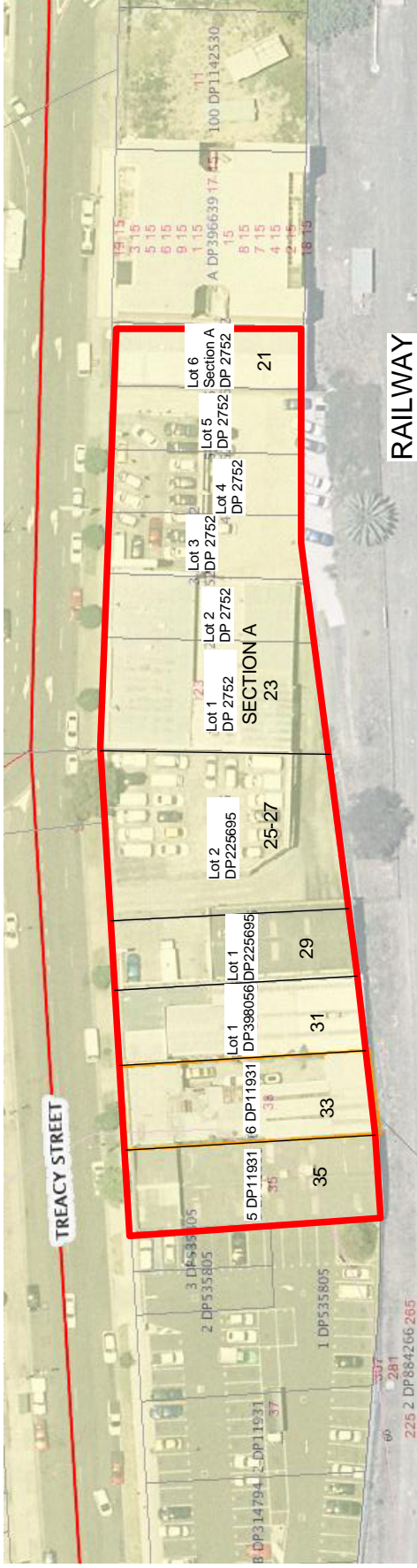


FIGURE 1: LOCALITY PLAN



NO. 23
 LOTS 1,2,3,4 & 5
 SECTION A
 DP2752



FIGURE 2: CADASTRAL PLAN

2.0 EXISTING TRAFFIC CONDITIONS

2.1 Existing Road Network

The site has a frontage of approximately **132** metres to Treacy Street and backs onto the Illawarra Railway Line. The site is located in the Hurstville CBD and is approximately **400** metres from Hurstville Railway Station.

Forest Road and Treacy Street are the main east-west access roads and are classified as local roads. The north-south access roads are The Avenue which intersects with Forest Road and Treacy Street and passes under the Illawarra Railway Line to Railway Parade in Kogarah, Park Road and Forest Road south of Queens Road which is one way south. Treacy Street at its western end connects to Forest Road and passes over the railway line and connects to Railway Parade.

The Avenue is one-way south and Park Road is one-way north forming a one-way pair. PJ Road and Treacy Street is one-way west and forms a one-way pair with Forest Road. Forest Road carries two-way traffic between PJ Road and Park Road. Half hour short stay parking is signposted in Treacy Street and Forest Road from **8:30am** to **6:00pm** Monday to Friday except for Forest Road eastbound between Park Road and The Avenue where parking is banned from **6:00am** to **10:00am** and from **3:00pm** to **7:00pm** Monday to Friday. 'No Stopping' is signposted in Alfred Street and The Avenue between Forest Road and Treacy Street.

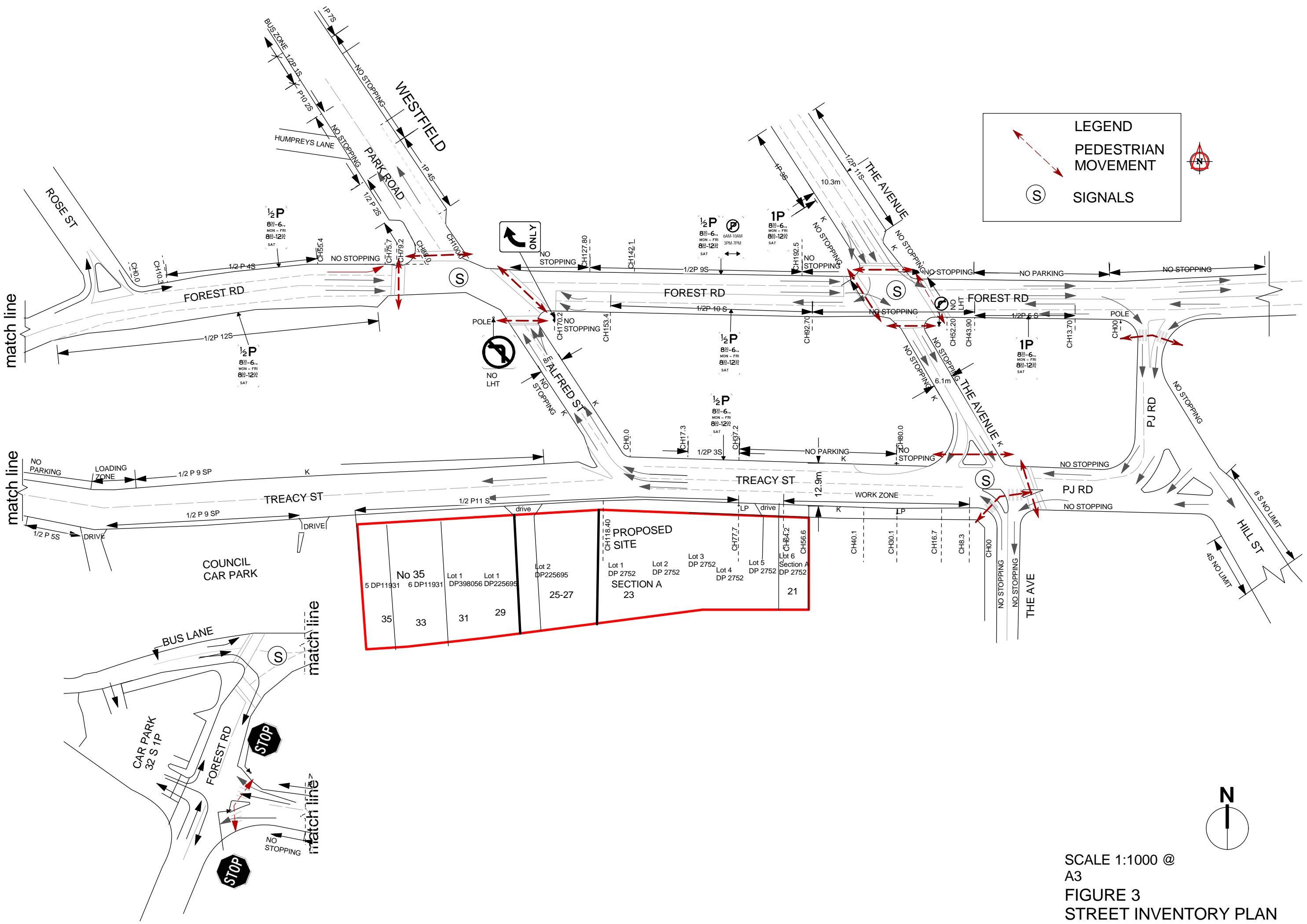
The intersection of PJ Road and Treacy Street is controlled by "Give Way" signs. The intersections at Treacy Street / The Avenue, Forest Road / Park Road and Forest Road / The Avenue are controlled by traffic signals. The tee intersection of Treacy Street and Forest Road is controlled by stop signs on the Treacy Street approach. Pedestrian movements at the signalized intersections are signalized.

The road inventory and number of traffic lanes are illustrated in **Figure 3**.

2.2 Road Inventory and Parking

There are some **3461** off-street car parking spaces in the Hurstville CBD bounded by Cross Street / The Avenue / Treacy Street and Forest Road. All spaces are approximately within **400** metres of the subject site. These off-street spaces are shown in the map "*Hurstville CBD Parking*" prepared by Hurstville City Council. This map is included in **Appendix B**.

The signposted parking restrictions 'No Parking and 'No Stopping' restrictions are shown in **Figure 3**. Within the area bounded by Cross Street / The Avenue / Forest Road / PJ Road / Hill Street/ Treacy Street / Forest Road there are some 2/P10, 100/½ hour, 19/1 hour and 12 unrestricted parking spaces on-street.



SCALE 1:1000 @
 A3
 FIGURE 3
 STREET INVENTORY PLAN

2.2 (Continued)

The pavement widths kerb to kerb, marked pedestrian crossings and traffic flow directions are marked up on **Figure 3**.

2.3 Existing Peak Hour Traffic Volumes

Traffic counts were made at the following intersections in *15 minute intervals* on **Friday 19/11/10** from **7:00am** to **9:00am** and **4:00pm** to **6:00pm** to correspond with the commuter peak hours:-

- Forest Road / PJ Road.
- Treacy Street / The Avenue.
- Treacy Street / Alfred Street.
- Forest Road / Park Road / Alfred Street.
- Forest Road / The Avenue.

Counts were made at the intersection at Forest Road / Treacy Street over the same periods on Tuesday 23/11/10.

The **am** peak hour was **8:00am – 9:00am** at all intersections. The **pm** peak hour varied and occurred as early as **4:00** to **5:00pm** and as late as **5:00 – 6:00pm**.

A survey was conducted on Tuesday 23/11/10 of all traffic movements into and out from the premises from No 21 to No 35 from 7am to 9am and from 4pm to 6pm. The traffic movements were as follows:-

TIME INTERVAL	IN	OUT	TOTAL
7-8am	10	2	12
8-9am	19	8	27
4-5pm	11	16	27
5-6pm	2	5	7

The **am** and **pm** peak hour traffic volumes and pedestrian counts are illustrated in **Figures 4** and **5** respectively.

2.4 Intersection Performance

The signalized intersections have been analysed using SIDRA Version 2011

The network performance is determined by the Level of Service (**LoS**) Average Vehicle Delay (**AVD**), Degree of Saturation (**DoS**) and maximum delay on the critical movement at the intersections during peak hours. The Level of Service criteria for intersections are explained in **Table 4.2** taken from the *RTA Guide to Traffic Engineering Developments*.

2.5 Current Uses of Existing Site

The current uses are as follows:-

No. 21	Huber Mechanics – 3 hoists plus 3 car spaces.
No. 23	Fergusons Toyota – Two storey office building and open Car Sales Yard for 16 cars, open car park at rear for 19 cars, covered workshop with 3 hoists plus 5 car spaces.
No 25 to 27	Fergusons Toyota – Open Car Sales Yard for 18 cars and single storey sales office. Workshop at basement level with 4 hoists plus 8 car spaces.
No. 29	Fergusons Car Sales. Open Car Yard at front for 6 cars plus covered showroom for 8 cars and 2 wash-bays at basement level.
No. 31	Unknown
No. 33	Unknown
No. 35A	Health Therapist ground floor
No. 35	Dance Studio at first floor+

Summary:

Workshops	10 Hoists
	2 Wash Bays.
	16 car spaces.
Car Sales Spaces	48 spaces.
Parking at Rear	19 spaces.

The buildings and driveways along the complete Treacy Street frontage are shown in **photographs P1 to P8**.

2.6 Vehicle Driveway Access to Site

There are single driveways to No. 21, single lane entry driveway to car park and workshops at the rear of Nos. 23 to 27, single driveway to car yard at front of No. 23, single driveway to car sales at front of Nos. 25-27, single lane exit driveway from rear of No. 23 to 29, single lane entry driveway to car sales yard at front of No. 29, single lane driveway access to roller shutter doors at Nos. 31, 33 and 35 Treacy Street. There are **9** driveway crossings in total.

2.7 Public Transport

The site is well served by public transport services. The Hurstville railway station on the Illawarra line has regular *7 day services* and is approximately **400** metres from the site.

There are **4** bus companies that have regular *7 day services* within walking distance of the site. The services and service providers are:-

2.7 (Continued)

Pioneer Coaches	Treacy St / Forest Rd	Route 452	Beverley - Rockdale
		Route 453	Hurstville - Rockdale
Sydney Buses	Forest Road	Route 499	Hurstville - Drummoyne
Southtrans	Forest Road	Route 947	Hurstville - Dolls Point - Kogarah
		Route 948	Hurstville- Bankstown via Peakhurst
Punchbowl Bus Co.	Forest Road- Park Rd	Route 450	Hurstville- Strathfield.
		Route 943	Hurstville – Lugarno.
		Route 940	Hurstville – Bankstown via Riverwood.
		Route 941	Hurstville – Bankstown via Greenacre.

2.8 Bicycle Lanes in CBD

The CBD is well served by on-road cycle lanes.

In the vicinity of the site there are marked on-road cycle lanes in The Avenue / Forest Road / PJ Road / Treacy Street / Alfred Street and Park Road. The cycle network is shown on a Concept Master Plan for Hurstville City Centre.

3.0 TRANSPORT AND TRAFFIC ISSUES TO BE ADDRESSED

3.1 Director General's Requirements

The key issues relating to *traffic and parking* were stated in a letter dated 8th October 2010 from the Director, Metropolitan Projects, Department of Planning to the Director Economica PDS Pty Ltd and as follows:-

7. Traffic Impacts (Construction and Operational)

Prepare a traffic impact study in accordance with the RTA's Guide to Traffic Generating Developments considering traffic generation any required road / intersection upgrades, access, loading dock(s) and car parking arrangements, measures to promote public transport usage and pedestrian and bicycle linkages.

8. Parking

The EA must demonstrate the adequate provision of on site car parking for the proposal having regard to local EPI controls and RTA guidelines. (**Note:** the Department supports reduced car parking rates in areas well-served by public transport).

3.2 RTA's Requirements

The RTA's requirements were stated in a letter dated 2nd November 2010 from Transport Planning, Sydney Region to the Director, Metropolitan Projects, NSW Department of Planning in reference to the proposed Concept Plan for a residential /retail development at 21-35 Treacy Street, Hurstville. The requirements relevant to the Concept Plan are as follows:-

"The RTA would like the following issues to be included in the transport and traffic impact assessment of the proposed development:

1. It is noted that the Metropolitan Strategy has designated Hurstville as a Major Centre and a focal point for regional transport connections and jobs growth. It is important that the development of the proposed retail and residential development takes into consideration and contributes to the achievement of, transport objectives contained in this and other high level NSW Government strategies.

These strategies include the NSW State Plan and draft South West Sub-regional Strategy. These policies share the aims of increasing the use of walking, cycling and public transport; appropriately co-locating new urban development with existing and improved transport services; and improving the efficiency of the road network.

By addressing both the supply of transport services and measures to manage demand for car use, the EA report should demonstrate how users of the proposed retail and residential development, will be able to make travel choices that support the achievement of relevant State Plan targets.

3.2 (Continued)

2. Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need / associated funding for upgrading or road improvement works (if required).
3. Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle widths, etc).
4. Proposed number of car parking spaces and compliance with the appropriate parking codes.
5. Details of service vehicle movements (including vehicle type and likely arrival and departure times).
6. The RTA requires the EA report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location –specific sustainable travel plan (eg ‘Travelsmart’ or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.

4.0 TRAFFIC EFFECTS OF PROPOSED DEVELOPMENT

4.1 Floor Areas and Uses

The gross floor areas for the retail and residential components and the gross leasable floor areas for the retail components have been calculated by Stanistic Associates. These areas and the number and type of each residential unit on each level are contained in **Table 4.1**.

USE	LEVEL	Gross Floor Area M ²	Gross Leasable Floor Area M ²			
RETAIL COMPONENT				1BR.	2BR.	3BR
Retail Shops	Lower Ground	761	699			
Harris Farm Supermarket	Lower Ground	1180	1085			
Retail Food Court	Ground Level	1002	866			
Retail Shops	Ground Level	1219	1053			
Retail Shops	Level 1	389	327			
RESIDENTIAL COMPONENT						
	LEVEL					
	1	1503		5	11	
	2	1892		5	18	
	3	1945		7	11	
	4	1691		7	12	
	5	1691		6	12	
	6	1691		6	13	
	7	1584		4	12	
	8	1584		3	14	
	9	1584		3	13	
	10	1680		6	10	2
	11	1680		5	10	2
	12	1680		5	11	2
	13	1416		4	7	2
	14	1416		4	9	2
	15	1416		4	8	2
				74	171	12

4.2 Estimated Residential and Workforce Population

The residential population has been estimated assuming that there will be **1.5** persons in each 1 BR unit, **2.0** persons in each 2 BR unit and **2.5** persons in each 3BR unit. The total population is **483** and the average persons per dwelling of **1.88** compared with **2.78** for Hurstville from the 1996 Census.

4.2 (Continued)

The workforce population has been estimated from **Table 5.11** Employees per m² for retail and commercial uses in the *Hurstville Section 94 Contributions Plan No. 1* Traffic Management and Car Parking as follows:-

Retail Use	Employee per m ² GFA	GFA m ²	Number of Employees
Retail Shops	1 per 20.3	3371	166
Supermarket	1 per 48	1180	25

4.3 Car Parking Requirements and Provision

4.3.1 Residential Parking

The site is located in Blocks 29B, C, D and E in Treacy Street as stated in Section 4.2 in DCP NO. 2. The residential parking rate for these blocks is 1 space per 100m² GFA plus 1 visitor space per 4 units. The total residential gross floor area is 24453m² and the total site parking requirement is 245 spaces. The parking requirement for visitors is 65 spaces (rounded up).

Because this site is located within 400 metres of Hurstville Railway Station and frequent 7 day bus services it is not proposed to provide parking for the 1 bedroom units in order to encourage public transport usage and alternative forms of transport use.

A new bus/rail interchange is currently under construction on the eastern side of Hurstville Railway Station.

4.3.2 Retail Parking

The parking requirement for retail shops is specified in **Section 4.2 DCP No. 2** for Blocks **29B, C, D** and **E** as **1** space per **25m²** GLA with a minimum of **70%** on site. We have extracted the travel modes from home origin in the Hurstville CBD core to work destinations elsewhere from the 2006 Census Journey to Work data. The car driver rate is 71.4% of the car driver travel mode for Hurstville LGA. To allow for the lower car usage, and the continuing trend, the car parking provision for retail shops has been reduced by **33** per cent as shown in **Table 4.2** following. In our opinion the car driver travel mode to and from the CBD has fallen due to the construction of high density residential flat buildings in the CBD area since the 2006 census. The car parking requirement of **113 spaces** on site has thus been reduced to **79 spaces**.



PHOTO P1 No. 21.

Driveway Entrance
To Workshops.

No. 23 Car Sales



PHOTO P2 No. 23 Car Sales and Office Building.



PHOTO P3 No. 23 Office Building



PHOTO P4 No. 25 and 27 Car Sales



PHOTO P5 Driveway Exit from Workshops No. 29 Car Sales.



PHOTO P6 No. 31.



PHOTO P7 No. 33



PHOTO P8 No. 35A and No. 35.

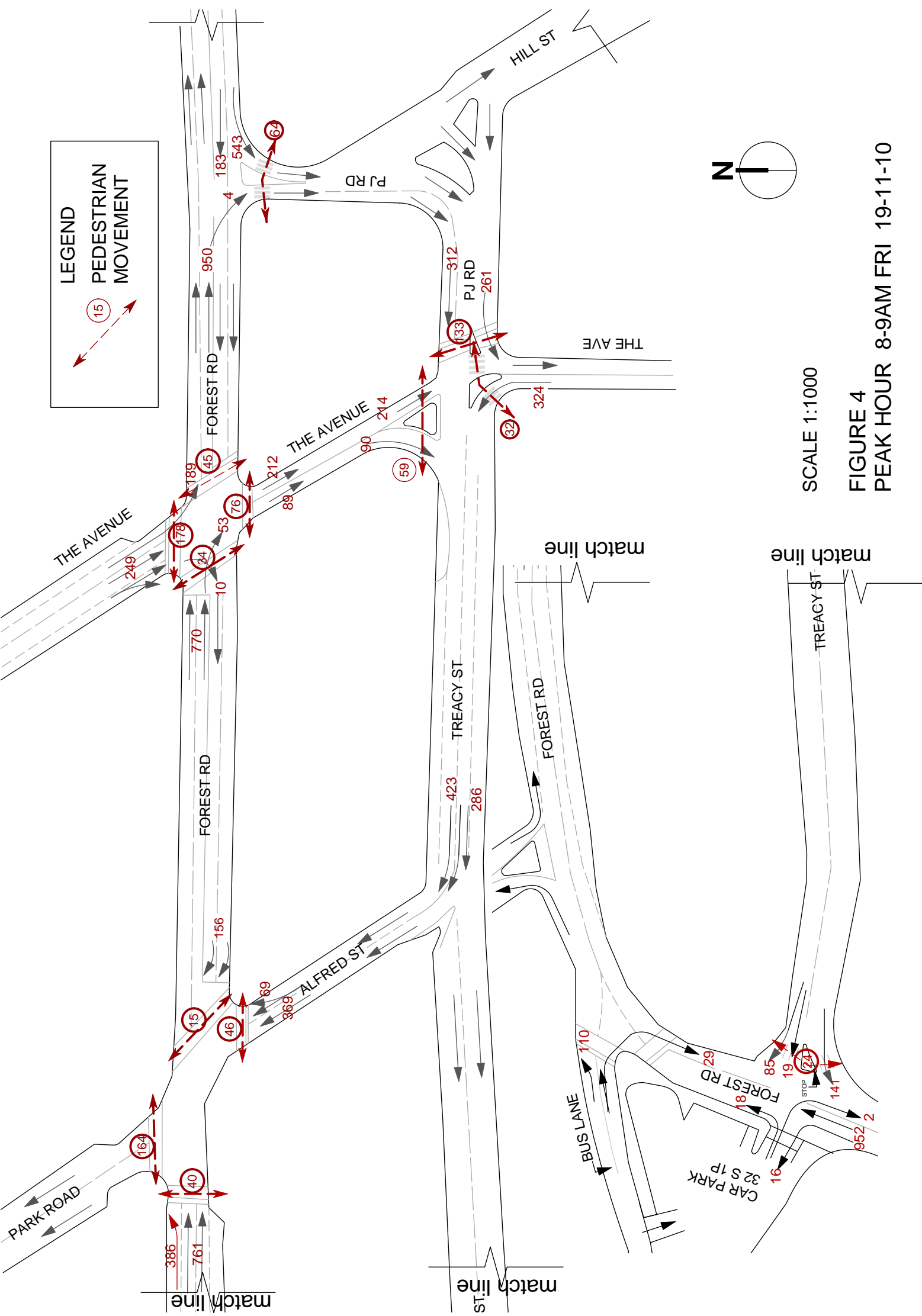
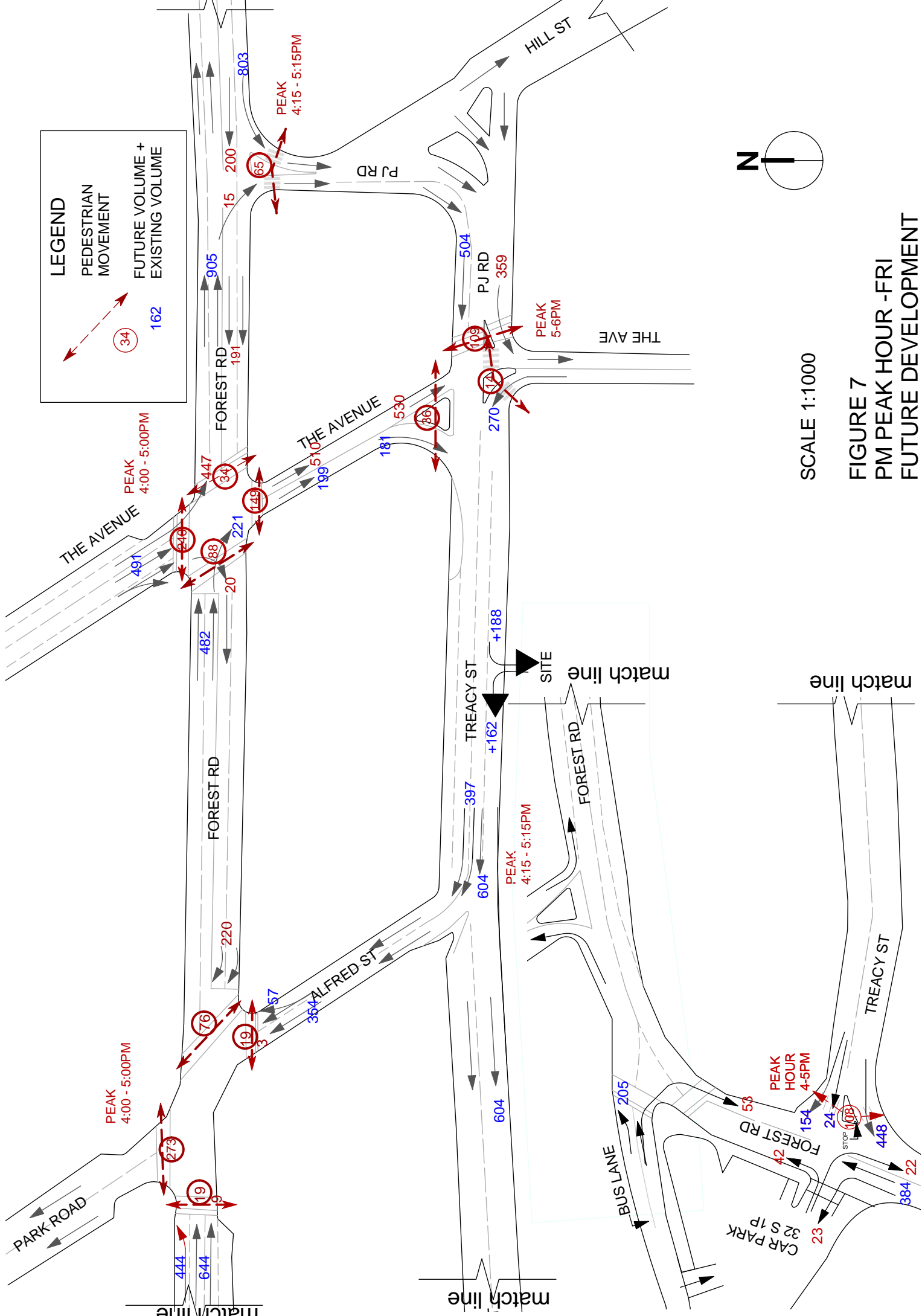


FIGURE 4
PEAK HOUR 8-9AM FRI 19-11-10

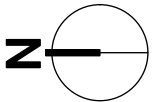


LEGEND

PEDESTRIAN MOVEMENT

FUTURE VOLUME + EXISTING VOLUME

(34) 162



SCALE 1:1000

FIGURE 7

PM PEAK HOUR - FRI

FUTURE DEVELOPMENT

4.3 (Continued)

LEVEL	FACILITY	Parking Rate Hurstville Council DCP	Gross Floor Area Refer to Note 2	Gross Leasabl e Area	Only 70% of spaces required for commercial and retail. Refer to Note 1.	No Of Required Parking Spaces 70% concession Section 4 of DCP No 2	Reduction of car parking of 33% due to higher walk travel mode and lower car driver travel mode in CBD Core	Total Car parking required	
Lower Floor	Retail Shops	1 space per 25m ²	761	699		19.57	6.52	13.05	
Lower Floor	Harris Farm Supermarket	1 space per 25m ²	1180	1085		30.38	10.13	20.25	
Ground Floor	Retail Food Court	1 space per 25m ²	1002	866		24.25	8.08	16.16	
Ground Floor	Retail Shops	1 space per 25m ²	1219	1053		29.48	9.83	19.66	
Level 1	Retail Shops	1 space per 25m ²	389	327		9.16	3.05	6.10	
Total Parking required			4551	4030		112.84	37.61	75.23	
Disabled Parking Requirement	2% of total number of spaces						2.26	Allow	79

As car parking for residential visitors is likely to occur mainly in the evenings and on weekends at times when the retail shops are trading below peak capacity, it has been assumed that visitors travelling by car will be able to access vacant retail parking spaces. A high percentage of visitors are expected to travel by train due to the close proximity of Hurstville Railway Station and bus services. Therefore, no provision has been made for allocated visitor parking.

This approach will encourage visitors who come from residential apartments within the CBD to walk or to use other alternative forms of transport.

4.4 Bicycle Storage Facilities

In order to encourage the use of bicycles by residents and workforce it is proposed to provide bicycle storage racks/rails and bicycle lockers within the basement car park to encourage commuter and recreational cycling.

Hurstville City Council has no requirement for bicycle facilities in its Transport and Parking DCP's. It is considered appropriate to adopt the standards adopted by Willoughby Council in DCP No. 2 as Chatswood and Hurstville are regional centres in relatively flat terrain and both Councils have a network of bicycle lanes on roads. The suggested storage facilities are provided as a guide for the proposed development

	Bicycle Lockers		Bicycle rail/racks
Residential	1 per 10 units	PLUS	1 per 12 units
Retail/Restaurant	1 per 450m ²	PLUS	1 per 150m ²

4.5 Internal Parking Layout and Circulation

The two way (combined) driveway is shown on Drawing CD14 and extends from ground level RL60.32 to Basement B1 at RL53.50. As the number of car spaces is less than 300, the class of parking is predominantly residential 1A residential and employee car parking and Treacy Street is a local road, a combined driveway is permissible for an access driveway Category 2 in Table 3.1 in AS/NZS 2890.1 – 2004. The driveway width is 7.2 metres and the pavement width between kerbs is 6.6 metres. At the 90 degree bend the driveway width has been increased to permit a B99 vehicle to pass a B85 vehicle.

The driveway gradient has been checked and can be designed at 5% over the first 6 metres and then at approximately 13 percent to reach RL53.5 where it passes under the delivery dock area at RL56.5. The minimum headroom requirement is 2.2 Metres to comply with Section 2.4 Headroom in AS/NZS 2890.6 – 2009 Parking Facilities Part 6: Off Street parking for people with disabilities.

The parking bay dimensions are 2.4 by 5.4 for the residential User Class 1A but the aisle width is 6.1 metres and exceeds the standard 5.8 metres.

The parking bay dimensions required in the retail car park are 2.7 by 5.4 metres to comply with User Class 3A in Figure 2.2 in AS/NZS 2890.1. The aisle width is 6.1 metres. The column locations have not been determined so the parking lay out is conceptual and all dimensions need to be confirmed in the detail design. It is understood that all 79 retail parking spaces will be on basement B1.

The car park is a split level car park with 2 way ramps 7.2 metres wide on a grade of 1 in 8. Swept paths of a B85 and B99 turning concurrently at the top and bottom of the standard ramp design will be checked in the detail design. There is scope to widen the ramp width if necessary. Circulation is clockwise down from B1 to basements B2 and B3. The residential car spaces are predominantly on levels B2 and B3. The long dead end aisle on Levels B1, B2 and B3 is considered satisfactory for allocated residential parking spaces.

4.6 Estimated Traffic Generation

The proposed building is a high density residential flat building in a regional centre. Based upon the traffic generation rates in the RTA Guide to Traffic Generating Developments the 257 units are expected to generate 0.24 vehicle trips in the peak hours. Based upon surveys conducted by this from the directional distribution for the residential traffic is 75% out and 25% in in the am peak hour and 67% in and 33% out in the pm peak hour.

4.6 (Continued)

For the retail shops and supermarket the RTA traffic generation rates in the peak period 4.30pm – 5.30pm on Thursday and Friday show that for this retail mix the traffic generation on Friday is marginally higher than Thursday.

In the am peak hour the traffic generation by the retail shops and supermarket will be mainly due to staff arriving for work. The number of retail employees is estimated to be 191 as shown in Section 4.2. The GFA for the retail shops and supermarket are 2945m² and 1085m² as shown in Table 4.1. A further allowance of 10% of the pm peak generation has been allowed for shoppers in the am peak. The directional distribution assigned for retail shopper trips is 50% in and out. The estimated traffic generation is shown in Table 4.6.

Table 4.6 Peak Hour Traffic Generation by Proposed Mixed Use Development.

Use	Peak Hour	Generation Rate/Unit	No.of Units	Traffic Generation		
				IN	OUT	TOTAL
Residential Units	8.00-9.00am 4.00-5.00pm	0.24 trips/hr “	257 “	15.5 41.5	46.5 20.5	62 62
Retail		Rate per 1000m²	GLAm²			
Small shops	8.00-9.00am		2945	8.25	8.25	16.5
Supermarket	“		1085	7.5	7.5	15
Retail employees	“		191	136	0	136
Small shops	4.00-5.00pm	56 A (SS)	2945	82.5	82.5	165
Supermarket	4.00-5.00pm“	138 A (SM)	1085	75	75	150
Sub Total am peak hour				167	108	275
Less existing development				19	8	27
TOTAL				148	100	248
Sub Total pm peak hour				199	178	377
Less existing development				11	16	27
TOTAL				188	162	352

Note: A (SS) Gross Leasable Area of small shops
A (SM) Gross Leasable Area of supermarket
Employee Car Driver and Trucks Travel Mode 71.2%

4.7 Intersection Performance

The additional traffic volumes in the am and pm peak hours have been distributed to the road network in the study area based upon the turning volumes at the intersections shown in **Figures 4** and **5**. The future am and pm peak hour traffic volumes are shown in **Figures 6** and **7**. The signalized intersections have been analysed using SIDRA Version 2011. The results are set out in **Table 4.7**.

Table 4.7 Intersection Performance

Intersection	Peak Hour	Level of Service LOS	Degree of Saturation DOS	Average Delay per Veh.secs.	Critical Movement Delay per Veh. Secs.
Forest Rd / PJ Rd.	8.00-9.00am	A (<i>WORST A</i>)	0.343	2.6 secs	(7.9) RT from Forest Rd into PJ Rd
	4.15-5.15pm	A (<i>WORST A</i>)	.455	3.1 secs.	(8.1) RT from Forest Rd into PJ Rd.
Treacy St / The Avenue	8.00-9.00am	A (<i>WORST B</i>)	.39	18.4	(24.1) LT from Treacy St into The Avenue
	5.00-6.00pm	A (<i>WORST B</i>)	.71	13.6	(23.1) LT from Treacy St into The Avenue
Forest Rd / Park Rd / Alfred Rd	8.00-9.00am	C (<i>WORST D</i>)	.84	40.3	(53.4) RT from Forest into Park
	4.00-5.00pm	D (<i>WORST D</i>)	.88	43.6	(56.4) As above
Forest Rd / The Avenue	8.00-9.00am	B (<i>WORST D</i>)	.775	26.8	(48.1) LT from The Avenue into Forest Rd
	4.00-5.00pm	F (<i>WORST F</i>)	1.09	78.8	(142.6) RT from Forest Rd into The Avenue
Forest Rd / Treacy St	8.00-9.00am	A (<i>WORST C</i>)	0.78	5.0	(42.2) RT from car park into Forest Rd
	4.00-5.00pm	A (<i>WORST C</i>)	0.79	6.7	(29.0) As above

- 1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
- 2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
- 3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets

The intersection at Forest Road / The Avenue is unsatisfactory in the pm peak hour and requires additional capacity or reduction in the traffic volume turning right into The Avenue. The intersection at Forest Road / Park Road (Alfred Street is at capacity in the pm peak hour). All other intersections have spare capacity.

4.8 Delivery / Service Vehicles

The proposed development has a gross retail floor area of 4551m² and 257 residential units.

Based upon Table 5.1 in the RTA Guide to Traffic Generating Developments the minimum number of unloading bays for the retail shops is 5 plus 1 space per 1000m² over 2000m² GFA. The requirement for the residential units is 4 plus 1 per 100 units over 200. The total requirement is 10 bays.

Based upon a paper prepared by J B Watters for a M Eng Sc thesis in 1972 the arrival rates in Sydney suburbs from surveys were:-
 Supermarket – 4.5 arrivals per 929m² NFA or GLFA (λ)
 Mixed small shops – 3.5 arrivals per 929m² GLFA (λ)

4.8 (Continued)

The average service rate where the driver unloads the truck only was 8.5 to 10.5 vehicles per hour (μ).

The estimated arrival rate for the supermarket 1085m² GLA and small shops 2945m² GLA is 5.26 and 11.09 respectively.

The total arrival rate 16.36 divided by the service rate of 10 vehicles per hour (μ) is 1.64. Based upon a 5% probability that all bays will be full and no waiting bays the number of bays required is 4.5 for the retail. If 2 waiting spaces are provided on the entry driveway the number of bays required for the retail is reduced to 3 leaving 2 spaces for the residential units. The majority of retail deliveries are made in the mornings before 12 noon. A management plan is required so that the residential unloading / loading requirements are carried out after the busy retail deliveries period and on weekends.

The swept path diagram showing the MRV truck entering a loading bay and a SRV vehicle exiting concurrently from a loading bay is shown in **Figure 8**.

The driveway gradients to the loading dock do not comply with Table 3.2 in AS 2890.2 Part 2 Off Street commercial vehicle facilities. If the driveway can be lengthened by moving it west to the end of Building D the gradients can be made compliant. This problem will be rectified in the second submission.

4.9 Provision of Alternative Transport

It is recommended that a "Green Travel Plan" be adopted for this development to reduce car based travel to encourage employees in the retail tenancies to make greater use of public transport, cycling, walking and car sharing for the journey to work.

The following initiatives are recommended:-

1. Bicycle storage, showers and changing facilities be provided to encourage cycling by employees and bicycle storage for residents.
2. Provide train and bus timetables to staff and residents.
3. Reduce retail car parking to account for the lower car travel mode to the CBD.
4. No provision of on site parking for 1 bedroom units. (This has been implemented in the car parking provision.)
5. The Strata Management to consider the provision of a small commuter vehicle to transport elderly and infirm residents to Hurstville railway station and for local shopping trips etc. to the CBD.

Hurstville City Council has commenced construction of a new bus/rail interchange facility on the eastern side of Hurstville railway station.

4.0 (Continued)

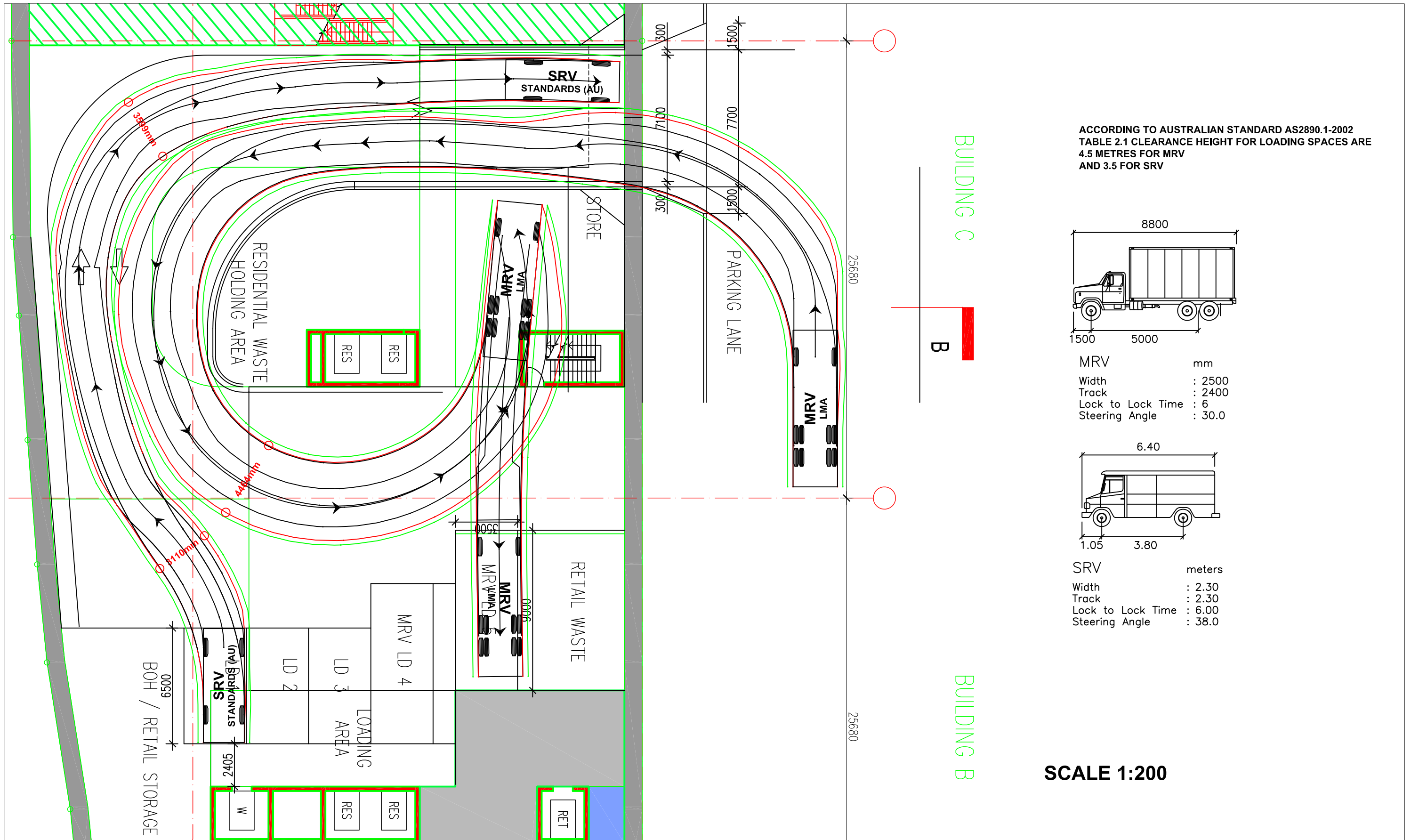
4.10 Traffic Impacts During Construction

The traffic impacts during construction will be assessed in more detail for the Project Application when the construction staging, construction period, truck movements and truck sizes are considered.

Treacy Street has *one* traffic lane and *one* kerbside *parking lane* along the site frontage. An Application will be made for a 'Construction Zone' along the site frontage of approximately **130 metres** in the *kerbside parking lane*. Trucks *approaching* the site will be expected to approach from the east along Forest Road or along Railway Parade, The Avenue and turn left into Treacy Street. Trucks approaching from the south and *west* will be expected to use King Georges Road Railway Parade, The Avenue and left into Treacy Street.

Trucks *departing* from the site will be expected to travel *west* along Treacy Street, *cross* the railway overbridge and *turn right* into Railway Parade. These routes will avoid the busy retail shopping precinct in forest Road west of The Avenue.

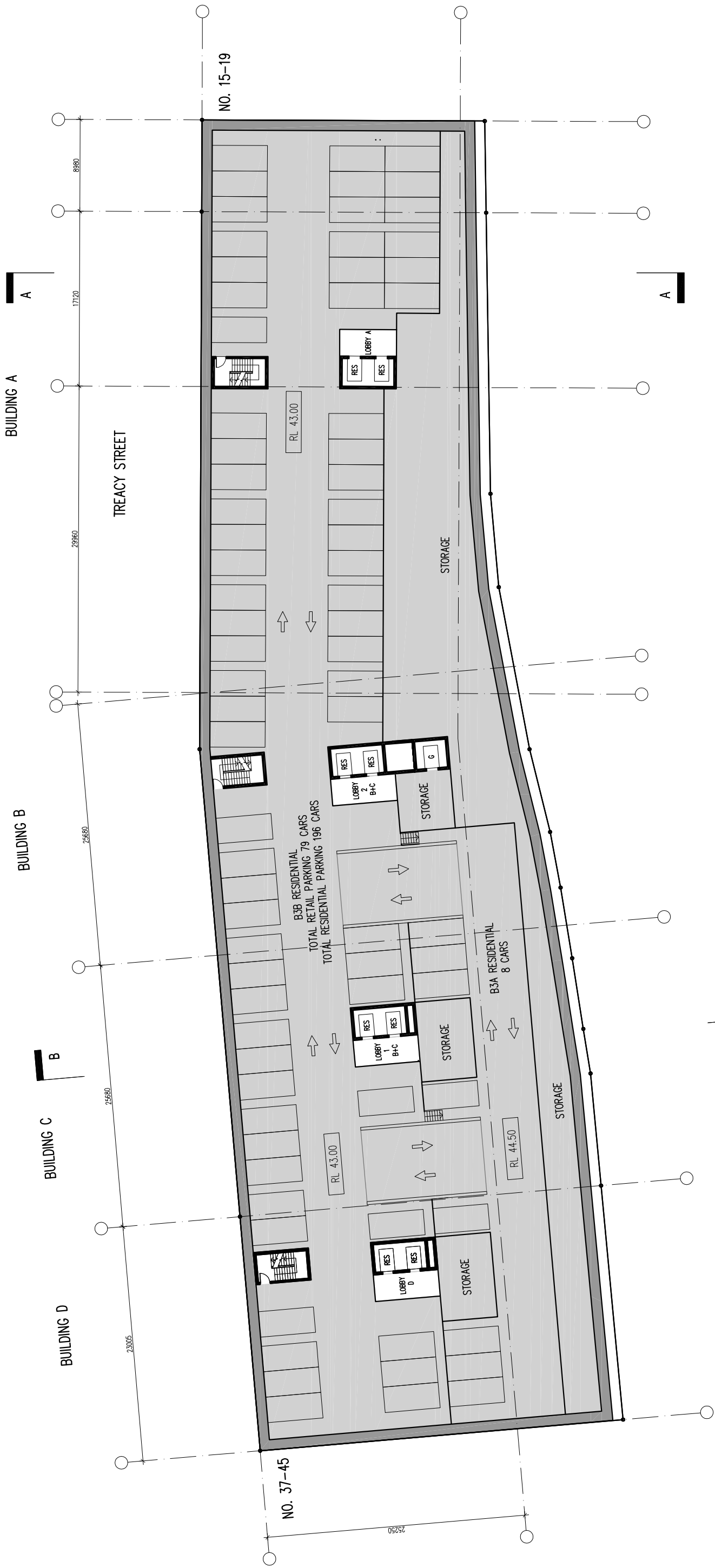
Traffic Control Plans will be required for traffic management in Treacy Street for *each stage* of the construction period.




**FIGURE 8: LOADING DOCK
TURNING SWEEP PATH FOR MRV
8.8 METRE LONG TRUCK ENTERING
DOCK**

APPENDICES

APPENDIX A

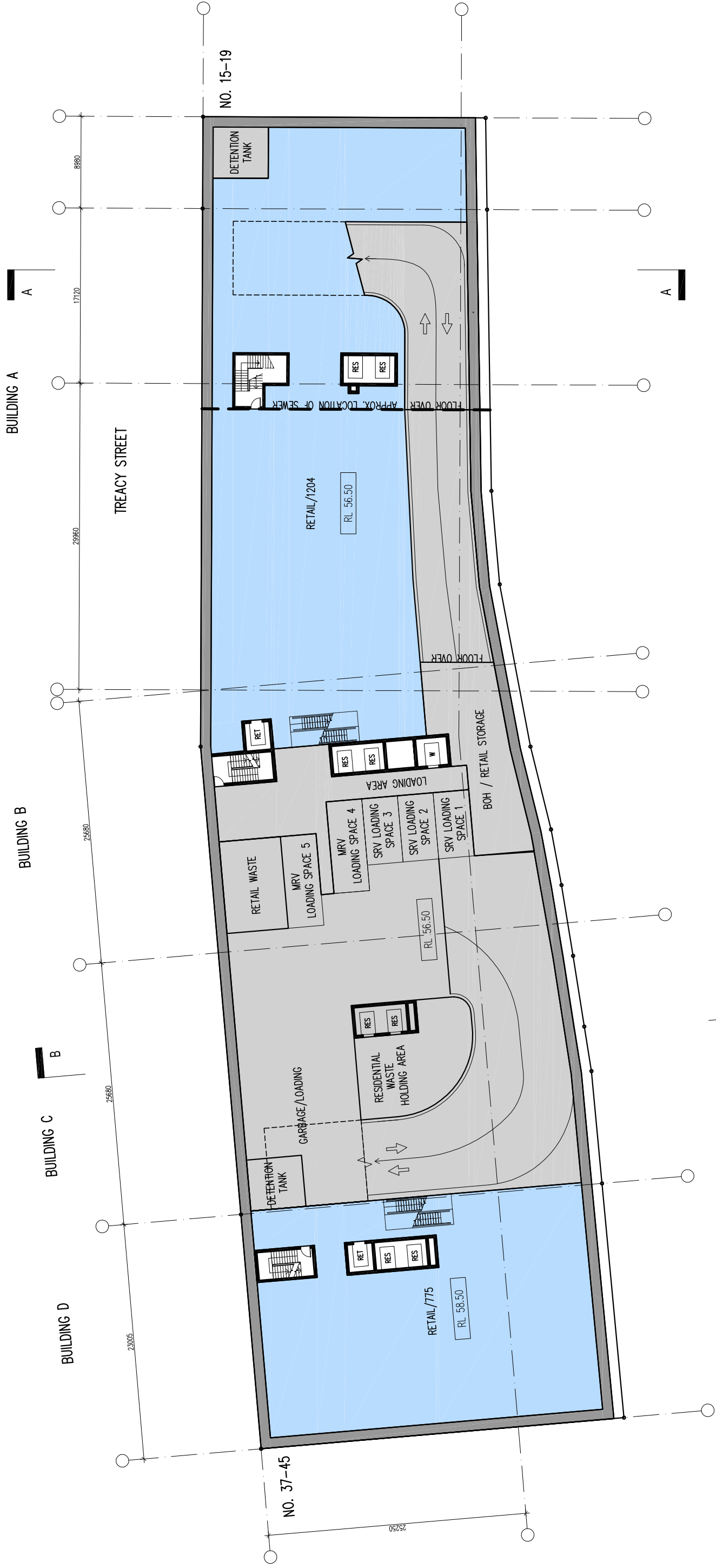


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STANISIC ASSOCIATES ARCHITECTS LEVEL 3, 346 KENT STREET SYDNEY NSW 2000 T. 02 9299 7871 F. 02 9299 7872 E. info@stanisic.com.au www.stanisic.com.au		PROJECT	CLIENT	No.	DATE	REVISION / ISSUE DETAILS	DRAWING TITLE	SCALE: 1:400@A3	DATE: 29.11.10	DRAWN: OD
		21-35 TREACY STREET HURSTVILLE NSW	EARLJEST PTY LTD ATF HURSTVILLE UNIT TRUST	-	29.11.10	CONCEPT PLAN	BASEMENT 3	PROJECT NUMBER: 10 011	DRAWING NUMBER: CD10	REVISION: -



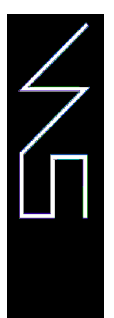

ALFRED STREET

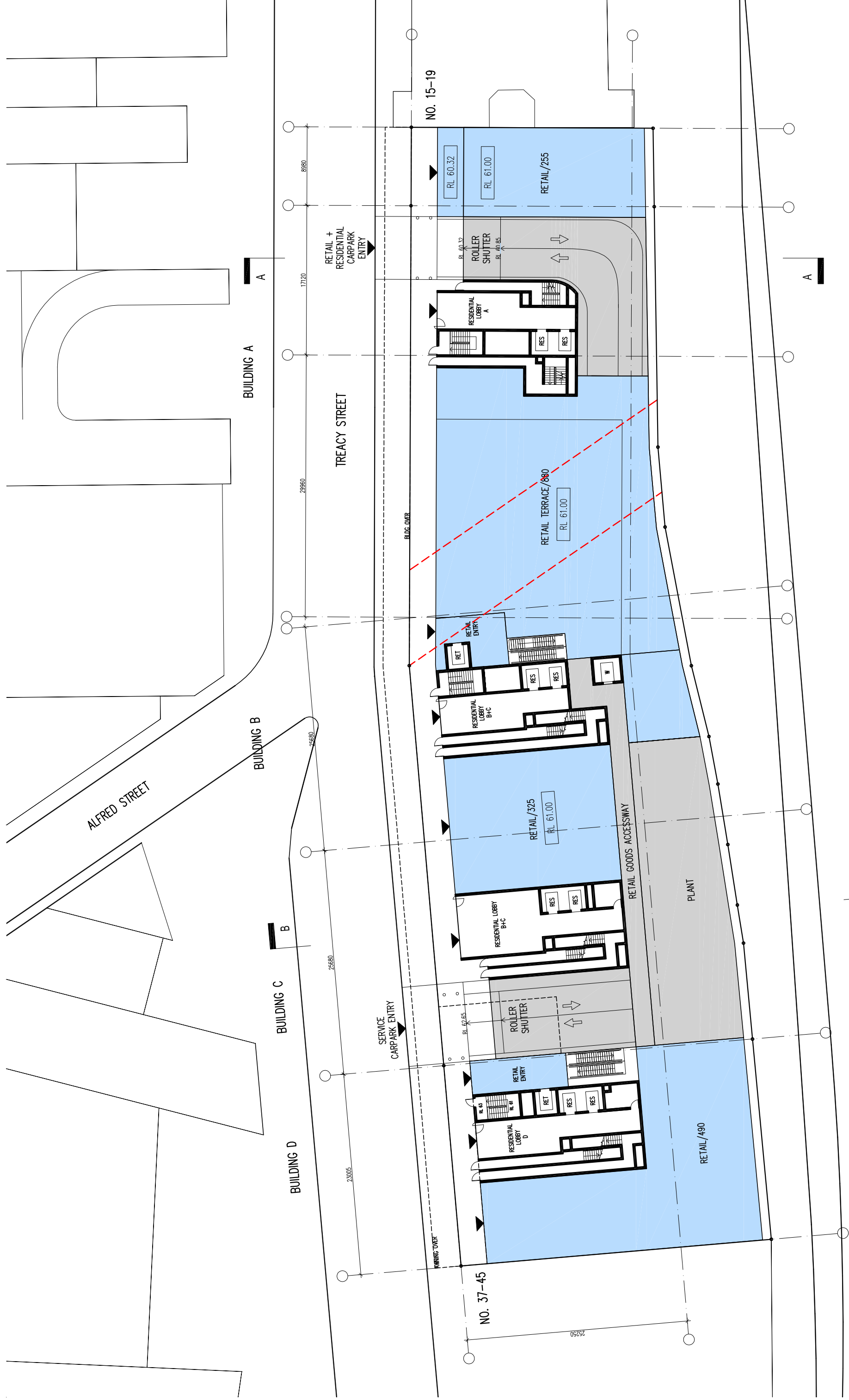


B



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		NO. 37-45 NO. 15-19										



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APPENDIX B

