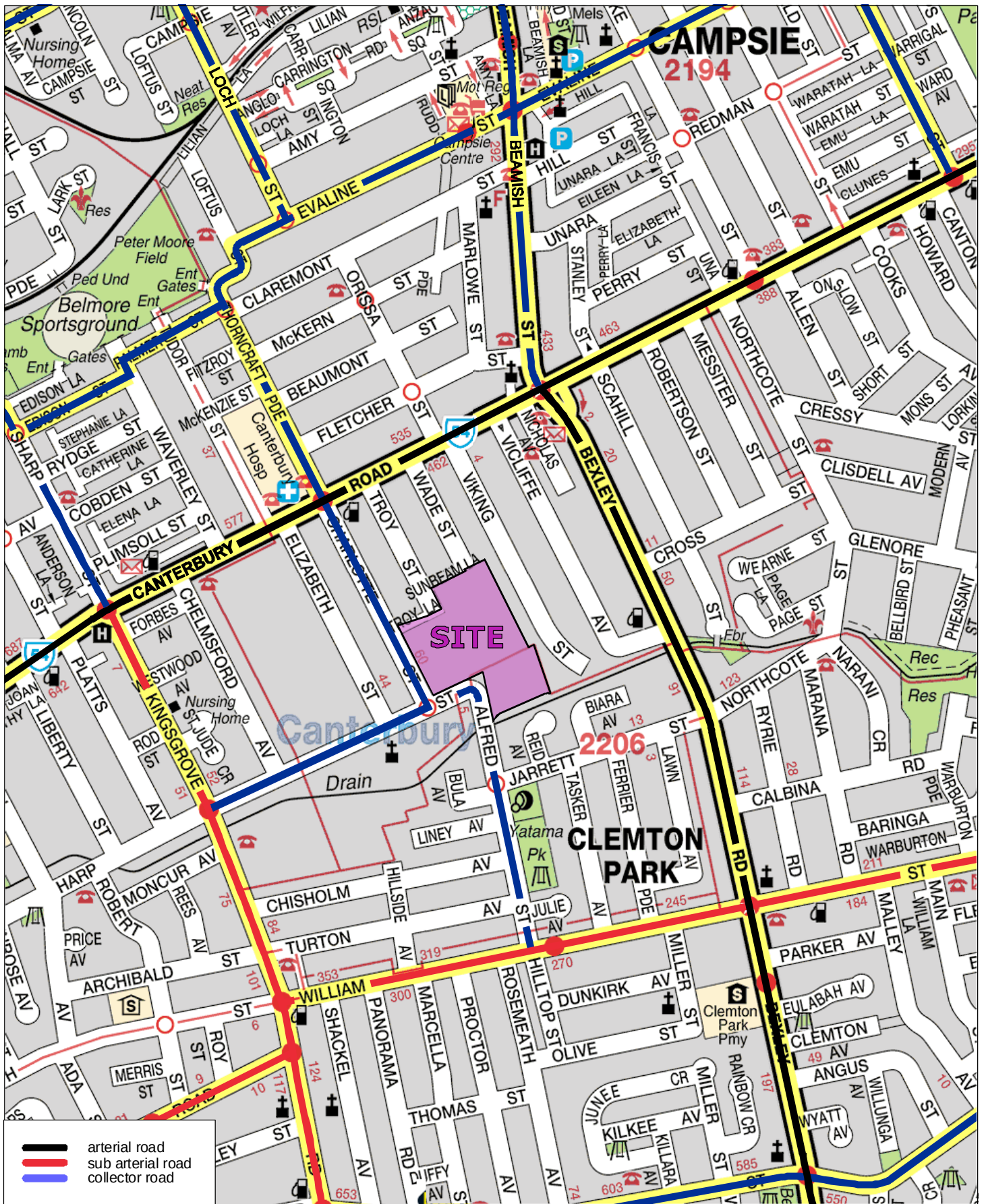




concept plan application: mixed use development
60 charlotte street, clemton park

figure 3
road hierarchy

prepared on behalf of davids group
by traffic traffic & transport planners





□ Charlotte Street is a local collector road that connects Canterbury Road to the north of the site with Harp Street to the south of the site. It runs north-south along the western site boundary and carries about 5,000 vpd.

It can be seen from figure 3 that the site is conveniently located with respect to the arterial road system serving the region, while local access is available using the above routes.

3.2 overview of existing traffic conditions

Canterbury Road is constructed with a 12.8 metre wide carriageway, with 3.6 metre wide footpaths along both sides. It carries two through traffic lanes in each direction, with 'No Parking' and AM/PM 'Clearways' signposted on both sides.

Bexley Road and Beamish Street together form a four-way junction with Canterbury Road and this is a major intersection in the locality which is under traffic signal control. West of this intersection, Charlotte Street and Thorncraft Parade together form a four way junction with Canterbury Road and this intersection is also under traffic signal control. However, there is a right turn prohibition at this intersection for the movement from Canterbury Road into Charlotte Street (west to south). Accordingly, right turns from Canterbury Road occur at Kingsgrove Road, which is also under traffic signal control.

Harp Street forms a four way signal-controlled junction with Kingsgrove Road to the west of the site. A roundabout is provided at the intersection of Charlotte Street with Harp Street adjacent to the site, which provides single lane circulating traffic flow. To the east of this roundabout, Harp Street undertakes a sharp right bend into Alfred Street. This bend incorporates a short length of concrete median to provide channelisation of traffic.



Further to the south along Alfred Street, local access routes are available onto Bexley Road via Jarrett Street and William Street. Jarrett Street is not a favourable route for traffic exiting the subject site due to the fact that all traffic must turn left from Jarrett Street into Bexley Road.

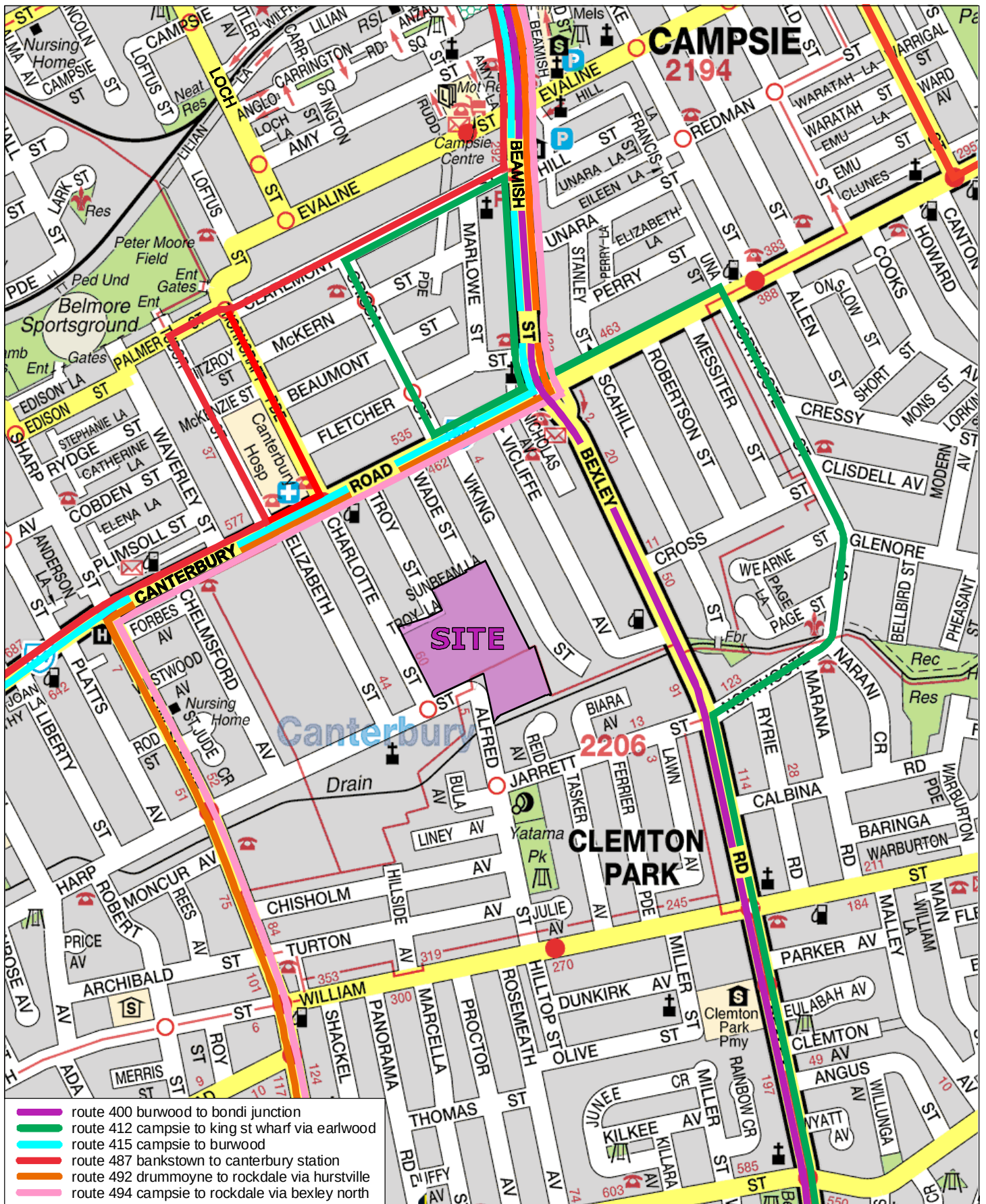
3.3 existing site generation

Access to the existing site is currently available via driveways onto Harp Street, Charlotte Street, Troy Street and Wade Street. The Wade Street access is to be closed under the Concept Plan, while Troy Street is to be relied upon for access to a small part of the site (for predominantly residential uses) to preserve and protect its environmental amenity.

It is noted that the former use of the site by Sunbeam has been previously assessed as being 480 veh/hr during peak periods. This is based upon an assumption that the site accommodated some 2,500 workers, with 640 parking spaces. This is considered a conservative assessment as it ignores on-street parking impacts. The Sunbeam operations are understood to have employed over 1,000 people during the main day shift and the vast majority would have driven to/from work, with full use of on site parking and with overflow parking onto residential streets, including Charlotte Street, Harp Street, Troy Street and Wade Street. Having regard for this, it is reasonable to conclude that the site would have generated over 600 veh/hr during peak periods (with more at shift changeover times) and this provides a context for the Environmental Assessment. In addition, significant activity also occurred on weekends and particularly on Saturdays.

3.4 existing public transport services

The site benefits from good access to bus services as shown in **figure 4**. These services are important for both the journey-to-work as well as shopping and other trips, with direct services provided to the Sydney CBD, Rockdale, Bondi Junction, Bankstown, Drummoyne and Five Dock. Existing bus stops are located on Canterbury Road and Bexley Road within a reasonable walking distance of the site. It is expected that following approval, the potential to divert and/or augment services will be investigated in response to the Concept Plan and subsequent Project Applications.



0 500m

concept plan application: mixed use development

60 charlotte street, clemton park

figure 4
transport routes

prepared on behalf of davids group
by traffic traffic & transport planners





This includes improved links to Campsie Railway station which is located about 1.6km to the north of the site.

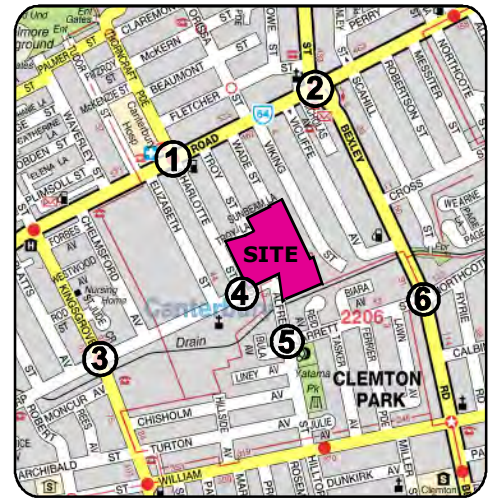
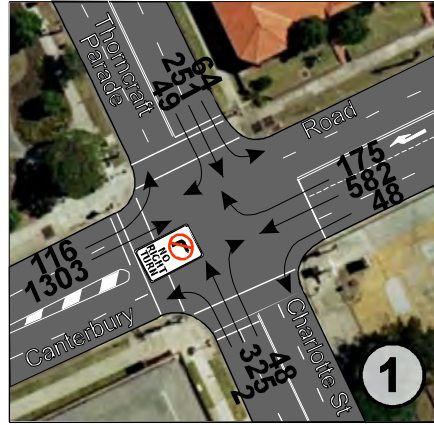
3.5 existing intersection performances

For the purposes of the assessment of traffic impacts of this development, surveys were undertaken to establish the performance of the existing road system during the AM and PM peak periods. These surveys confirmed that no change has occurred since the previous 2004 and 2006 traffic studies undertaken for this site, with no effective growth on the local road system. This is also supported by a review of traffic conditions at the RTA's nearby permanent count station (Station 24.213) which shows that the annual average daily traffic (AADT) has reduced from 47,778 on 1999 to 42,056 in 2005 (which is in fact less than traffic volumes that occurred in 1993) and this is largely attributable to the influence of the M5 Motorway. The key intersections in the locality that are of interest and were surveyed are as follows:

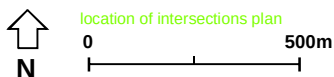
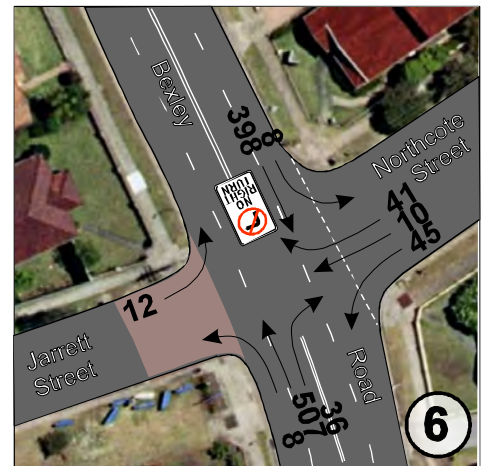
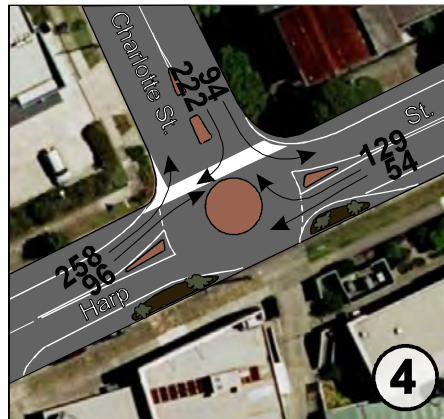
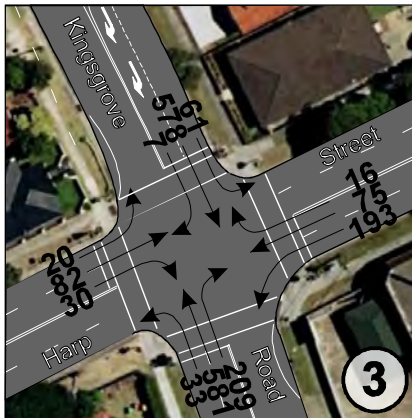
- The intersection of Charlotte Street with Canterbury Road,
- The intersection of Bexley Road with Canterbury Road;
- The intersection of Bexley Road with Jarrett Street;
- The intersection of Jarrett Street with Alfred Street;
- The intersection of Harp Street with Charlotte Street; and
- The intersection of Harp Street with Kingsgrove Road.

These intersections also include those requested to be assessed by the RTA. The results of the survey are presented in **figures 5 & 6**, which show the peak flows over the surveyed period for the AM and PM peaks respectively. Based on these survey results, the above intersections were analysed using the SIDRA computer program to determine their performance under existing traffic conditions.

The SIDRA model 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 using the following explanations:



location of intersections plan

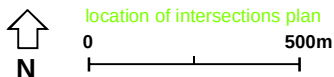
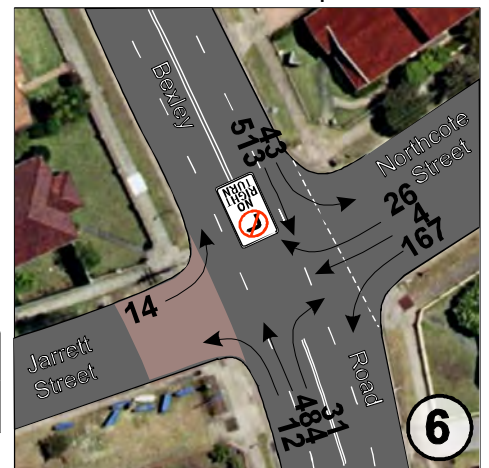
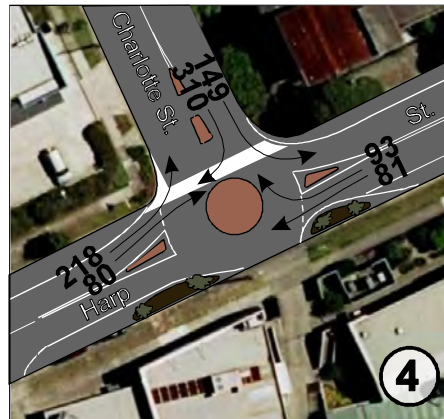
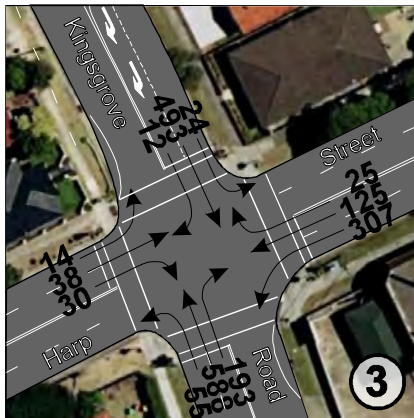
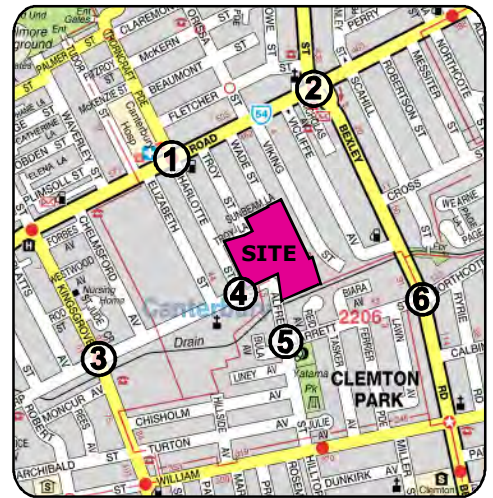
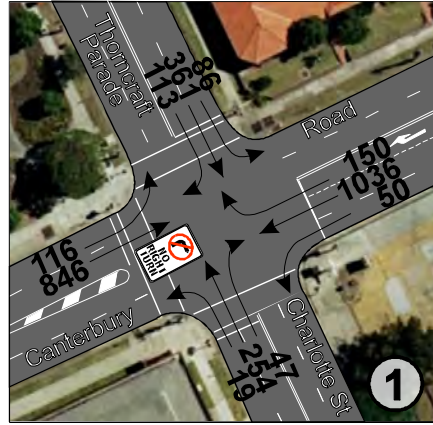


concept plan application: mixed use development
60 charlotte street, clemton park

figure 5
existing am peak traffic volumes

prepared on behalf of davids group
by traffic & transport planners





concept plan application: mixed use development
60 charlotte street, clemton park

figure 6
existing pm peak traffic volumes

prepared on behalf of davids group
by traffic & transport planners





- DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DS approaches 1, it is usual to attempt to keep DS to less than 0.9. When DS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. 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 below:

Level of Service	Average Delay per Vehicle (secs/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.

The results of the modelling for each intersection are summarised in table 1 for all approaches. It will be noted in this regard that conditions at all other times will be improved, with lower delays.



table 1: existing intersection performances during AM & PM peak periods

Intersection Description	Control	Time Period	Degree of Saturation	Intersection Delay (secs)	Level of Service
Charlotte/Canterbury	Signals	AM	0.79	20.6	B
		PM	0.71	18.2	B
Bexley/Canterbury	Signals	AM	0.97	33.3	C
		PM	1.00	38.1	C
Kingsgrove/Harp	Signals	AM	0.65	21.1	B
		PM	0.90	29.0	C
Charlotte/Harp	Roundabout	AM	0.19	10.5	A
		PM	0.19	11.1	A
Alfred/Jarrett	Roundabout	AM	0.06	11.2	A
		PM	0.12	11.5	A
Jarrett/Bexley	Signals	AM	0.22	7.1	A
		PM	0.46	15.5	B

It is noted that the delays above relate to average delays in the case of traffic signals, and to the most disadvantaged movement in the case of roundabouts and priority-controlled intersections. With regard to the latter, these delays typically occur only with minor movements and overall performance is superior, with reduced delays. It can be seen from table 1 that all of the above intersections operate generally satisfactorily during both the AM and PM peak periods. Reference should be made to the SIDRA outputs provided in appendix 3 which show the performance of individual approaches at these intersections.

In this regard, it is stressed that the most relevant use of this analysis is to compare the relative change in the performance parameters as a result of the proposed development. This is discussed further in the following sections.



4. description of proposed concept plan development

A detailed description of the Concept Plan application is provided in the Environmental Assessment report prepared by Project Planning Australia. In summary, the Concept Plan development for which approval is now sought relates to the establishment of uses and building envelopes, road layout and landscaping across the subject site. The proposal comprises the following components:

- Development of a road network to serve individual buildings, which will form part of the public road network;
- Creation of five (5) lots to be developed in four (4) stages as follows:
 - Application 1: Lot 1 (Bulky Goods) and Lot 3 (Residential and child care);
 - Application 2: Lot 2 (Retail/Residential);
 - Application 3: Lot 5 (Seniors Living); and
 - Application 4: Lot 4 (Residential).
- These developments will result in an indicative floorspace yield of 87,332 square metres. This will include a range of other uses as discussed in the following sections;
- The uses and yields are generally consistent with the development concept adopted for assessment in the Preliminary Environmental Assessment report prepared in April 2008;
- The resulting overall yields include the following land use components (having regard for the different floor areas used in the parking and traffic assessment):
 - 18,011m² lettable area of bulky goods uses, including 3,165m² of trade bulky goods;
 - 5,948m² of commercial office floor area;
 - 2,500m² of lettable supermarket area (2,585m² of floor area);
 - 3,069m² of lettable specialty and convenience shops (4,001m² of floor area);
 - 3,719m² of medical centre floor area.



- 1,253m² of gymnasium floor area;
- A 75 place childcare centre;
- 302 residential units;
- 92 high care seniors living units;
- 84 independent seniors living units; and
- Parking for a total of 1,507 spaces (subject to later application/s)

The parking and traffic impacts arising from the Concept Plan are discussed in the following sections. Reference should be made to the plans submitted separately to the Department of Planning, some of which are presented at reduced scale in **appendix 2** for ease of reference.

It is emphasised that the above uses have a synergy so that parking and particularly traffic generation is reduced by virtue of linked trips (where patrons will divert from their existing trips) and multi-purpose trips (where one vehicle trip will involve visits to several uses). In addition, many people using the on-site facilities will be drawn from the on-site population, so that there will be a high proportion of walking trips, thereby containing external travel demand.



5. parking requirements

5.1 parking rates and provision

The site is subject to the controls of Canterbury Council's Parking DCP No. 20 (Car Parking), although regard needs also to be given to the requirements of the RTA's Guideline as well as other survey-based assessments where these are of assistance. Specifically, the Director General's requirements seek to reduce parking as far as possible while promoting other (non-car) travel modes. This however needs to be balanced against the practical reality that some car-dependent uses (notably bulky goods uses) are car-dependent and need to provide sufficient parking to ensure that on-street demands do not occur, which would have amenity impacts. The required parking levels for each land use component is considered separately below.

Bulky Goods Retail

There is a total of 18,011m² of bulky goods retail lettable floor area within the site, which includes 3,165m² of trade retail area. Council's DCP does not provide a rate for this use but rather requires an assessment based approach. It is therefore instructive to review the RTA's Guidelines which has an average rate of 1.9 spaces/100m² GLFA, but with a significant range of 0.3 and 5.1 spaces/100m² GLFA. It is considered that reliance on the average rate of 1.9 spaces/100m² would be inappropriate for some tenants and adoption of a rate of 2.4 spaces/100m² will suppress car usage to a reasonable degree and is in line with surveys of similar developments. Accordingly, adoption of a rate of 2.4 spaces/100m² is recommended for this (car dependent) use, resulting in a need for 432 spaces.

Specialty Retail and Other Shops

Council's DCP requires 1 space/22m² of floor area which when applied to the overall 4,001m² of floor area results in a need for 182 parking spaces. This does not take account of the fact that the retail will serve the residents and employees in the locality to a significant extent, with these people walking to the shops. In these circumstance, adoption of a rate of 1 space/34m² is recommended, which is a reduction of about 35%. This approach is in accordance with the objectives of the DCP as well as the Director General's requirements and results in a need for a total of about 115 spaces. These will be shared between Lots 1 and 2.



Supermarket

Council's DCP requires 1 space/22m² floor area which when applied to the overall 2,585m² of floor area results in a need for 118 parking spaces. This compares with a rate of 1 space/24m² based on the RTA's Guidelines which would result in a comparable level of provision. In the circumstances, having regard for the Director General's requirements to reduce parking, the fact that the supermarket will to a significant extent serve the local residents and employees, but having regard also for the car-dependent nature of supermarkets, a slightly reduced rate of 1 space/28m² is recommended, resulting in a need for about 90 spaces.

Commercial

Council's DCP requires 1 space/40m² of floor area which is the same as the RTA's requirement. Adoption of this rate is considered appropriate to ensure that on-street parking does not occur, which would impact on the amenity of the locality, notably existing residents. With 5,948m² of commercial floor area, a need for 149 spaces results and 147 spaces are provided which is acceptable, particularly as commercial visitors will be able to share retail spaces if necessary.

Gymnasium

Council's DCP recommends a rate of 7.5 spaces/100m² of floor area as a guide. With an area of 1,253m², this would result in a need for 94 spaces. This does not take account of the fact that the gym will serve the residents and employees in the locality to a significant extent, with these people walking to the gym. In these circumstance, adoption of a lower rate is recommended, particularly as the RTA's Guidelines minimum rate is 4.5 spaces/100m². It is therefore proposed to provide 60 spaces, which equates to a rate of 4.8 spaces/100m². This approach is also in accordance with the objectives of the DCP as well as the Director General's requirements.

Childcare Centre

The childcare centre accommodates 75 children. Council's DCP requires 1 space per 2 staff, with a minimum of 2 spaces. It is assumed that the centre will employ up to 15 staff (on site at any one time) so that a need for 8 spaces results. It is relevant that this level of provision makes no allowance for parents/carers and based on the RTA's Guideline, a 75 place centre would require 19 spaces, including 8 staff spaces and 11 parent/carer spaces (note that the RTA's Guideline does not provide a split between staff spaces and parent/carer spaces). It is therefore proposed to provide 8 staff



spaces, with 5 on-street spaces for set-down and pick-up. The demand for parent set-down and pick up is reduced from the RTA's requirement due to the fact that many parents will live or work within the site and will walk to the childcare centre.

Medical Centre

Council's DCP requires 2 spaces per health consulting room. This level of detail is not available at Concept Plan application stage and it is therefore considered that reliance on the RTA's Guideline is a more appropriate basis for assessment. The Guideline recommends a minimum provision of 4 spaces/100m² of GFA. Based on the proposed 3,719m² of GFA, a need for 149 spaces results. However, this does not take account of the fact that many visitors will be residents and employees who will walk to the centre. In addition, the peak retail parking demands will typically occur on a Thursday evening or Saturday morning so that peak medical centre demands, which occur throughout the day, will be able to share this parking. With some 670 retail parking spaces available within the site, provision of 90 medical centre spaces is proposed which equates to a theoretical discount of 40%, but will effective full provision subject to the sharing of only 9% of the retail parking.

Residential Units

Council's DCP requires one space per 1 bedroom unit or studio unit; 1.2 spaces per unit for a 2 bedroom unit; and 2 spaces per unit for a 3 (or more) bedroom unit. Additional visitor parking is required at a rate of 1/5 units. The overall site accommodates 302 units, including 57 one bedroom units, 225 two bedroom units and 20 three bedroom units. Hence, the parking requirement will be for 427 spaces as follows:

	57 units @ 1.0/unit	57 spaces; plus
	225 units @ 1.2/unit	270 spaces; plus
	20 units @ 2.0/unit	40 spaces; plus
	302 units @ 1/5 units	60 spaces

High Care Seniors Living Units

Council's DCP does not provide a parking rate for this use category. The RTA's Guideline 1 space /10 units for residents, plus 1 space/10 units for visitors, if it is assumed that the development is a self-contained, subsidised development. With 92 high care units, a need for 18 spaces results. It is



considered that this would be appropriate whether the development was self-funded or subsidised, as defined by the RTA.

The requirements of the SEPP (Housing for Seniors) 2004 also need to be considered. This requires 1/10 beds plus 1/2 employees. The 92 beds therefore require 10 spaces. Preliminary estimates indicate that there will be a total of 130 staff associated with the high care accommodation and it is assumed that this would include up to 60 staff during the main day shift. This would result in a need for 30 staff spaces. Hence, a need for a total of 40 spaces is required for the high care facility.

Independent Seniors Living Units

Council's DCP does not provide a parking rate for this use category. The RTA's Guideline recommends 2 spaces/3 units for residents, plus 1 space/5 units for visitors, if it is assumed that the development is a self-contained, resident funded development. With 84 ILU's, a need for 73 spaces results, comprising 56 resident spaces and 17 visitor spaces.

The requirements of the SEPP (Housing for Seniors) 2004 also need to be considered. This requires 0.5 spaces/bedroom; with no specific requirement for visitor parking. With 80 two bed and 4 one bed units (164 beds) this results in a need for 82 resident spaces. Some visitor parking is recommended having regard for the location of these uses (Lot 5, south of New Harp Street), whereby reliance on other parking on site will be relatively remote so that sharing will not be practicable. Overall, provision of 82 resident spaces and 8 visitor spaces is considered satisfactory for this component, particularly as reliance on on-street parking will be possible.

Summary of Parking Requirements

The above assessment results in the need for parking as shown in table 2. The table also includes the level of provision shown on the Concept Plan application drawings and associated schedules.



table 2: parking allocations to individual lots

Lot	Use	Yield (GFA unless stated otherwise)	Spaces Required (as assessed above)	Spaces Proposed
1	Bulky Goods	18,011m ² GLFA	432	432
	Gym	1,253m ²	93	60
	Specialty Retail	1,250m ²	42	62
	Commercial	5,884m ²	149	147
			714	701
Lot 2	Residential	180 units	252	252
	Shops	2,751m ²	92	55
	Supermarket	2,585m ²	92	90
	Medical Centre	3,719m ²	149	90
			585	487
Lot 3	Residential	58 units	85	85
	Childcare	75 places	8	8
			93	93
Lot 4	Residential	64 units	90	96
Lot 5	High Care Seniors Living	92 units	40	40
	Independent Living	84 units	90	90
			130	130
TOTAL			1,614	1,507

Note 1: Includes discounts for local trips and sharing as discussed

The above allocations provide satisfactory parking for each lot which will ensure that each stage of development (lot combinations) is self sufficient, so that on-street parking demands will not occur. It is noted that based on the RTA's Guidelines, the above uses would require significantly more parking based on the 'unrestrained' demand for parking. The proposed parking provision is about 7% below Council's requirements (even with the reduced rates and with sharing), which is considered an appropriate outcome for the development, which responds to the Director General's requirements to



minimise parking provision. This is achieved even though this is limited in scope due to the car-dependent nature of several uses on the site.

5.2 disabled parking

This is a matter for assessment during later Project Application/s and compliance with relevant Australian standards is proposed. Refer to Project Application reports for details on Lots 1 and 3.

5.3 servicing

The road system has been developed to ensure safe and convenient access to all parts of the site, based on the required Design Vehicle. The largest commercial vehicle is an articulated truck in the case of Lot 1, with a 12.5m rigid truck for other service areas. This is similarly a matter for assessment during later Project Application/s and compliance with relevant standards is proposed.

Servicing of the residential component of the development will be accommodated on-street by Councils garbage services, which will be assessed for all relevant Project Applications. Refer to Project Application reports for details on Lots 1 and 3.



6. traffic impacts

6.1 traffic generation rates

It is usual practice to adopt trip rates published by the Roads and Traffic Authority for individual land use components, as set out in the document entitled “Guide to Traffic Generating Developments”. While this is appropriate for some land uses, it is not appropriate for the proposed trade centre bulky goods component. In this regard, this use is a relatively new concept which has unique attributes that do not reflect any of the land use categories in the Guideline. In these circumstances the Guideline recommends that comparisons be made with similar developments. In recognition of this methodology TRAFFIX has previously undertaken extensive surveys of trade centres that are similar to that proposed. The sites surveyed were as follows:

- The Chatswood Business Centre
- Your Home Centre, Castle Hill
- The Enterprise Centre, Artarmon
- The Business Centre, Artarmon

These surveys were undertaken on Thursday evenings and Saturday mornings and the aggregated results are result in the following trip rates for the trade component:

- | | | |
|---|------------------|----------------------------------|
| □ | Weekday AM Peak | 0.58 trips/100m ² GFA |
| □ | Weekday PM Peak | 1.04 trips/100m ² GFA |
| □ | Saturday AM Peak | 1.09 trips/100m ² GFA |

In addition, the development concept incorporates a normal ‘public’ bulky goods area and the trip rates for this have been assessed on the basis of averaging over several sources, including the RTA’s Guideline, other surveys held by TRAFFIX in relation to the Moore Park SuperCenta, Caringbah SupaCenta; and recent surveys of the existing Mitre 10 hardware store at Narellan. This latter development is very similar to this component of the proposed concept as there is a likelihood that this could be a hardware store with a shared trade and public use, as occurs at Narellan. Having regard for this, the adoption of average rates below potentially overstates the level of traffic generation. The aggregation of these sources has resulted in the adoption of the following trip rates for the public bulky goods component:



□	Weekday AM Peak	0.70 trips/100m ² GFA
□	Weekday PM Peak	2.50 trips/100m ² GFA
□	Saturday AM Peak	4.00 trips/100m ² GFA

The trip rates adopted for the other uses have been based on the RTA's Guideline rates. In addition to the above, it is expected that an extensive public transport management plan is capable of reducing private car use to a significant extent. This would include policies aimed at maximising ride sharing, providing public transport incentives, and increasing services to key centres. These policies target significant reductions in private car use and by way of example, the Optus development at Ryde has a 40% public transport target, which compares with about 15% under current travel patterns. On this basis, it is considered reasonable to allow a moderate 10% reduction in the above rates across all uses. Finally, the following adjustments have been made for individual land uses:

- 50% of places within the childcare centre are assumed to be associated with on-site employees or residents; or will occur as linked trips and will generate no additional traffic movements;
- The convenience retailing serves the needs of passing traffic (linked trips), as well as multi-purpose trips. These are not additional trips on the road network and the RTA's Guideline permits a discount of 25% in trip rates for these factors. This use also has reduced parking;
- 50% of traffic generated by the gymnasium is assumed to be associated with on-site employees and residents; or will occur as multi-purpose or linked trips. These people will generate no additional traffic movements and will walk to the gym;
- 50% of traffic generated by the medical centre is assumed to be associated with on-site employees, apartment residents or retirees; or will occur as multi-purpose or linked trips. These people will generate no additional traffic movements.
- The commercial offices will generate trips at a rate of 1.5 trips/space (compared with 2.0 under the RTA's Guidelines) as it is intended to allocate 20% of all commercial parking as visitor parking to reduce employee car use and in addition, improvements are expected in the medium to long term in response to a Transport Access Guide. This will include measures to promote high car occupancies, to promote public transport and other travel modes and would be prepared in response to a suitable condition on any consent. The resultant traffic generation for the overall development concept is shown in table 3, based on lettable area only for the retail uses. This includes rates for the critical weekday peak period, as well as for Saturday morning.



table 3: adopted trip rates and traffic generation for concept plan

Use	GFA or NFA (m ²)	Weekday AM Peak		Weekday PM Peak		Saturday AM Peak	
		Rate (Trips/100m ²)	Trips (veh/hr)	Rate (Trips/100m ²)	Trips (veh/hr)	Rate (Trips/100m ²)	Trips (veh/hr)
Lot 1							
Bulky Retail	14,846	0.57	84	2.0	296	3.3	488
Gym	1,253	4.05	50	4.05	50	4.05	50
Trade Retail	3,165	0.52	16	0.94	30	0.94	30
Specialty Retail	1,204	0.63	8	2.25	28	3.60	46
Commercial	5,884	1.5	87	1.5	87	nil	nil
TOTAL			245		491		614

Lot 3							
Childcare	75 places	0.36/child	26	0.32/child	24	nil	Nil
Units	58 units	0.36/unit	22	0.36/unit	22	0.2/unit	12
TOTAL			48		46		12

Lot 2							
Units	180	0.36/unit	66	0.36/unit	66	0.2/unit	36
Shops	1,865	2.0	36	4.5	84	4.5	84
Supermarket	2,500	2.0	50	6.8	170	6.8	170
Medical Centre	3,719	3.96	148	3.96	148	2.0	74
TOTAL			300		468		364

Lot 5							
High care	92 units	0.1/unit	10	0.1/unit	10	0.1/unit	10
Normal Care	84 units	0.2/unit	16	0.2/unit	16	0.2/unit	16
TOTAL			26		26		26



Use	GFA (m ²)	Weekday AM Peak		Weekday PM Peak		Saturday AM Peak	
		Rate (Trips/100m ²)	Trips (veh/hr)	Rate (Trips/100m ²)	Trips (veh/hr)	Rate (Trips/100m ²)	Trips (veh/hr)
Lot 4							
Units	64 units	0.36/unit	24	0.36/unit	24	0.2/unit	12
TOTAL			24		24		12

TOTAL ALL LOTS			643		1,055		1,028
-----------------------	--	--	------------	--	--------------	--	--------------

It can be seen from table 3 that the development will result in moderate traffic volumes during the AM peak period, with peak demands occurring on a Thursday evening or Saturday morning. These trips are also very similar to those established in the 2006 traffic report and the Preliminary Environmental Assessment and have been previously accepted in principle.

6.2 traffic distribution

The impact of the above traffic generation and distribution onto the surrounding intersections is indicated by the future performance of the surrounding critical intersection. These intersections have been previously assessed under existing traffic conditions in section 3.

It can be seen that predicted flows on a weekday AM Peak would be similar to those that have historically occurred. Flows during the weekday PM peak and on weekends would be higher, although the latter occur at a time when 'background' traffic volumes on the road system are lower than on a weekday peak period. The critical period for assessment is therefore the weekday PM peak period, although Saturday morning conditions have also been assessed. The above trips have been assigned to the road network on the basis of the following distributions:



Arrivals

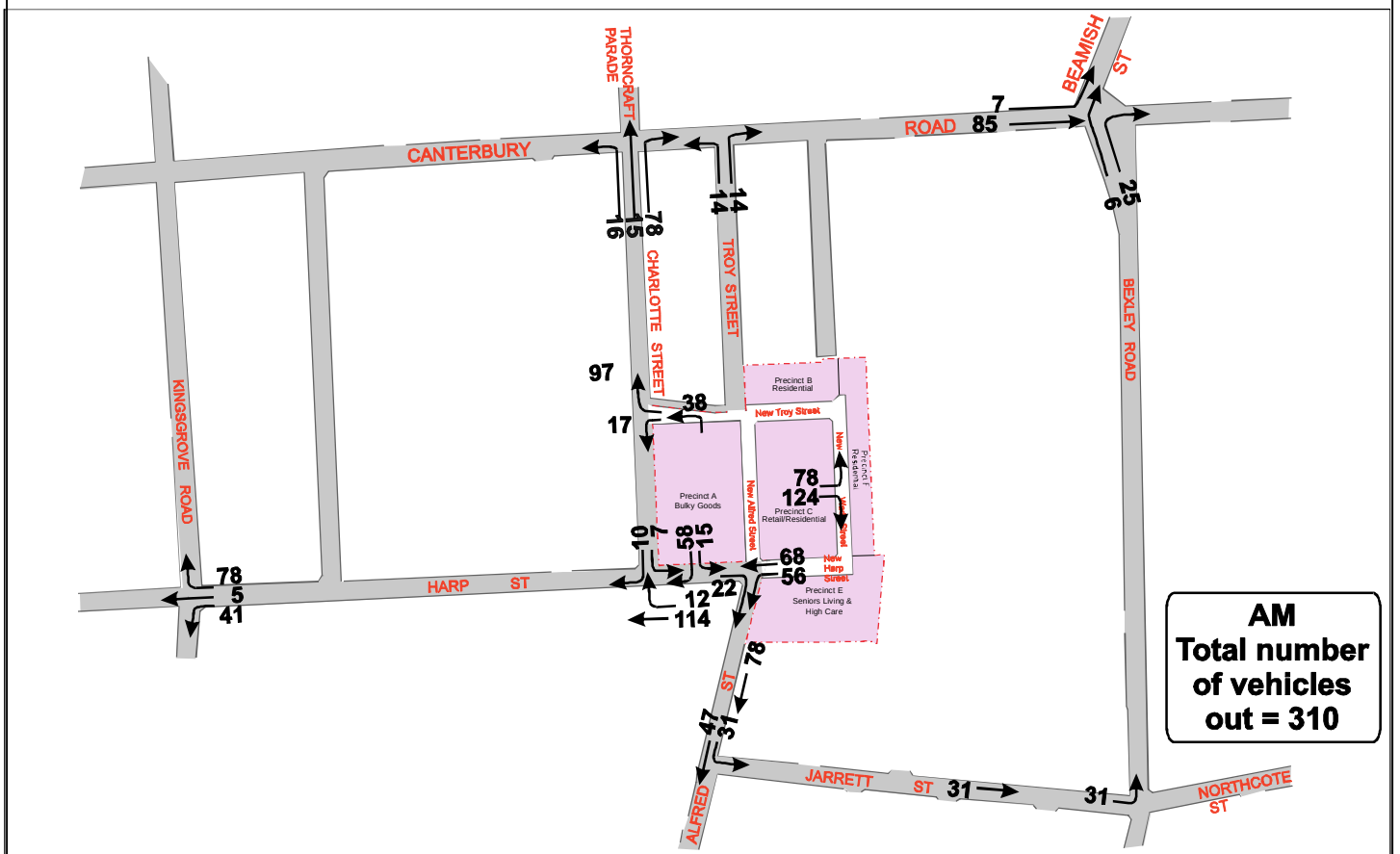
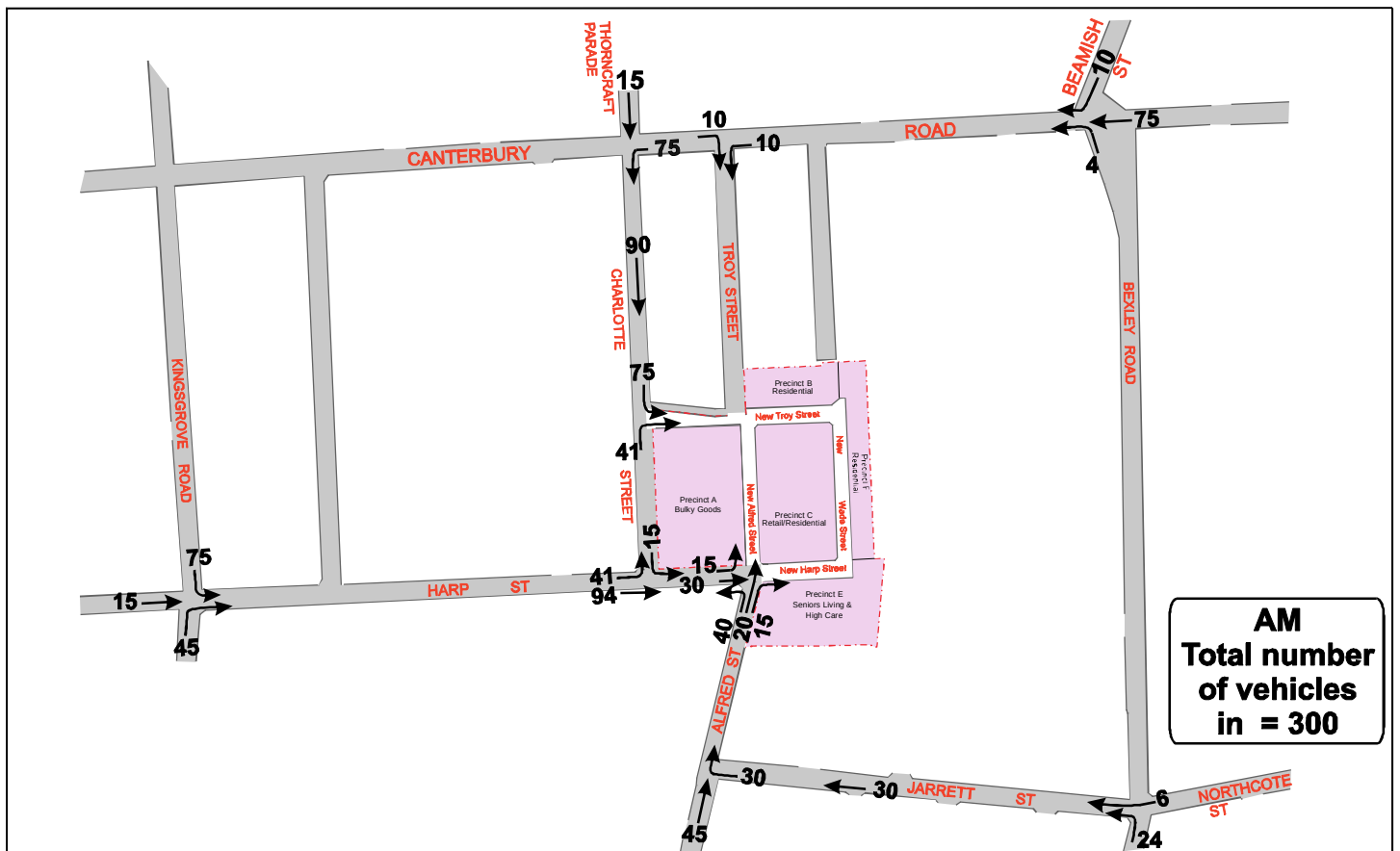
- 25% in from the east via Canterbury Road and Charlotte Street;
- 5% in from the north via Thorncraft Parade;
- 30% in from the west via Harp Street and Kingsgrove Road;
- 15% in from the south via Kingsgrove Road;
- 15% in from the south via William Street and Alfred Street; and
- 10% in from the east via Bexley Road and Jarrett Street

Departures

- 25% out to the east via Charlotte Street and Canterbury Road;
- 5% out to the north via Thorncraft Parade;
- 5% out to the west via Charlotte and Canterbury Road;
- 25% out to the west via Kingsgrove Road and Canterbury Road;
- 15% out to the south via Kingsgrove Road;
- 15% out to the south via Alfred Street and William Street; and
- 10% out to the east via Alfred Street and Jarrett Street

6.3 weekday peak period traffic impacts

The trips shown in table 3 (1,055 veh/hr) have been distributed onto the road system based on the above distributions. The additional traffic on available access routes is shown in **figures 7 and 8**. The resulting performance of all intersections assessed in Section 3 is provided in table 4. This also shows the performance of the intersections of Charlotte Street with New Troy Street; and New Harp Street with New Alfred Street, which are both newly-created intersections arising from the developed public road system.



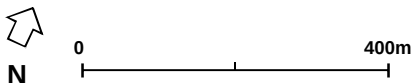
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concept plan application: mixed use development
60 charlotte street, clemton park

figure 7
additional am traffic volumes

prepared on behalf of davids group
by traffic & transport planners





concept plan application: mixed use development
60 charlotte street, clemton park

figure 8
additional pm traffic volumes

prepared on behalf of davids group
by traffic & transport planners





table 4: future intersection performances during AM & PM peak periods

Intersection Description	Control	Time Period	Degree of Saturation	Intersection Delay (secs)	Level of Service
Charlotte/Canterbury	Signals	AM	0.91	35.1	C
		PM	0.91	39.9	C
Bexley/Canterbury	Signals	AM	0.97	33.0	C
		PM	1.00	37.6	C
Kingsgrove/Harp	Signals	AM	0.83	26.1	B
		PM	1.00	37.7	C
Charlotte/Harp	Roundabout	AM	0.33	10.8	A
		PM	0.50	12.0	A
Alfred/Jarrett	Roundabout	AM	0.10	11.6	A
		PM	0.21	11.2	A
Jarrett/Bexley	Signals	AM	0.22	8.8	A
		PM	0.30	15.6	B
Charlotte/New Troy	Priority	AM	0.49	32.8	C
		PM	0.44	23.8	B
New Harp/New Alfred	Priority	AM	0.04	10.4	A
		PM	0.19	14.9	B

The above results are based upon the following improvements:

- At the intersection of Charlotte Street and Canterbury Road, a split phase has been introduced for northbound traffic in Charlotte Street;
- At the intersection of Kingsgrove Road and Harp Street, a split phase has been introduced for westbound traffic in Harp Street;
- At the intersection of New Harp and New Alfred Street, a four-way priority-controlled intersection is proposed; and
- At the intersection of Charlotte Street with New Troy Street, a passing bay is proposed to provide a safe right turn entry into the site and to overcome on street queuing effects.



Based on the above improvements, traffic conditions remain relatively unchanged overall, with only moderate increases in delays at all intersections examined and with no change in levels of service other than at the intersection of Canterbury Road and Charlotte Street which changes from level of service B to level of service A during both peaks, which is acceptable.

6.4 Saturday AM traffic impacts

The development is predicted to generate a peak flow of 1,028 veh/hr on a Saturday morning as shown in table 3, which is less than the levels generated on a busy weekday evening. Sample surveys undertaken on a Saturday morning indicate that existing flows on the road system are about 25% less than occur during the weekday peak period, due to spreading. This is a consequence of the predominant industrial nature of the locality. Hence, these flows can be accommodated.

6.5 Sunday traffic impacts

Traffic generation on a Sunday will only relate to the public bulky goods use. This is expected to generate about 500 veh/hr which is moderate and occurs at a time when background volumes are lower. This is also evidenced by the available AADT data which shows that Sunday volumes on Canterbury Road are 19% lower than occur on a weekday. It is therefore concluded that these volumes can also be readily accommodated with no significant road capacity impacts and with good intersection levels of service.

6.6 environmental amenity impacts

The assessment of environmental impacts within residential areas is an important consideration. In this regard, traffic volumes on key roads will alter as shown in table 5, based on the flow increases shown in figures 7 and 8.



table 5: existing and future mid block traffic volumes (veh/hr two-way combined)

Street	Status	Period	Existing	Additional	Total	% Increase
Charlotte Street (north of site)	Collector	AM	642	199	841	30%
		PM	579	339	918	58%
Harp Street (west of site)	Collector	AM	690	244	934	35%
		PM	513	443	956	86%
Arthur Street (south of site)	Collector	AM	337	153	490	45%
		PM	376	261	637	69%

The above increases are significant in relative terms but importantly, as collector roads they are considered to remain within acceptable limits in absolute terms. In this regard, these streets are not exclusively residential streets by virtue of the presence of non-residential uses in the locality, including the subject site with its industrial zoning. Accordingly, the 6,000 veh/day environmental threshold that typically applies to residential collector streets (refer AMCORD 1990) is not relevant for adoption, other than for reference purposes. This is particularly the case for Harp Street, which is predominantly within an established industrial precinct. Hence, flows significantly in excess of 6,000 vpd (or 600 veh/hr) would reasonably be expected for comparable streets.

It is considered that the impacts on Charlotte Street and Harp Street are a direct consequence of the intensification of this underutilised site and that the previous use of the site, which generated some 480 veh/hr during peak periods, would have had similar impacts, particularly during the AM peak period. The provision of efficient site accesses, via the permeable public road system that is proposed, will also mitigate against any adverse local traffic impacts.

Traffic volume increases will be more noticeable on Saturdays and Sundays due principally to the bulky goods uses. However, these will be below the current traffic levels that occur on weekdays, with the most notable impacts occurring at the proposed site accesses. However, these operate efficiently, so that queuing effects will be moderate.



Traffic volume impacts on Troy Street relate only to Lot 3 which incorporates 58 residential units and the child care centre. These will generate minimal traffic activity, which will have a significantly lower impact than the historic and current industrial uses on the site that rely on this route.

6.7 demolition traffic impacts

It is anticipated that a detailed demolition management plan, incorporating a demolition construction traffic management plan, will be prepared following approval and this is anticipated as a condition on any consent that may be issued. It is expected that traffic activity will be limited to Charlotte Street and Harp Street as far as practicable.

At this stage, the preferred access arrangement for all heavy vehicle movements will be via Harp Street to/from Kingsgrove Road, to void intrusion into residential areas. This will make use of the existing driveway crossing onto Harp Street and signage will be installed to require heavy vehicles to turn right on exit from the site. The preferred access arrangement can also be incorporated into contractual arrangements with all sub-contractors, to ensure compliance and enforcement if necessary.

6.8 construction traffic impacts

It is anticipated that a detailed demolition and construction traffic management plan will be prepared as part of individual Project Applications, taking due account of proposed development stages. Refer to Project Application reports for details on Lots 1 and 3.



7. access & internal design aspects

7.1 site access arrangements

The development will make reliance on the developed road system as shown on the submitted Concept Plan documentation (refer to appendix 2). All accesses comply with relevant standards and will operate safely and efficiently.

The newly-created intersection of Harp Street with Alfred Street/New Alfred Street is proposed as a four way junction, with priority to the east-west movement along Harp Street under stop sign control. This will have the effect of discouraging through traffic movement along Alfred Street to the south of the site, which is considered desirable. Nevertheless its performance has been assessed assuming no reduction of existing traffic volumes and is acceptable.

Troy Street is proposed to be closed at its intersection with New Troy Street. This will protect the amenity of residents in Troy Street and reduce conflicts at its intersection with New Alfred Street.

The following accesses are proposed:

- Car access to Lot 1 is available via a combined entry-exit driveway onto Harp Street, serving the proposed public bulky goods use. A separate exit is provided onto New Troy Street. Servicing of Lot 1 is via a single access onto Charlotte Street, south of New Troy Street;
- Car access to Lot 2 is available via a combined entry-exit driveway onto both New Alfred Street and New Wade Street. Service vehicle access is available via a separate one-way driveway system, with entry via New Harp Street and exit onto New Wade Street;
- Car access to Lot 3 is available via Troy Street. Servicing demands for the development on this lot (58 units and a child care centre) will be negligible and can occur on-street;



- Car access to Lot 4 is available via three separate driveways onto New Wade Street. Servicing demands for the development on this lot (64 units) will be negligible and can occur on-street; and
- Car access to Lot 5 is available via two separate driveways, with one via New Harp Street and one via Alfred Street. Servicing demands for the development on this lot (seniors living units) will be moderate and can occur on-street using the drive-through area proposed.

Sight distances to/from the proposed driveways exceed the requirements of AS2890.1 and AS 2890.2 and the driveways will operate safely.

7.2 internal design & carriageway widths

The internal road network and road cross-sections are shown in the plans provided in appendix 2. The available geometry has been reviewed using the AutoTurn computer program from the appropriate design vehicle and operates satisfactorily (refer to **appendix 4**). On street parking is also designed to comply with Austroads requirements. The detailed design of individual Project Applications will be subject to separate assessment and compliance with AS 2890.1.

Troy Street will terminate in a cul-de sac west of New Troy Street. This will require the creation of a turning facility for general traffic, with No Stopping restrictions for a short distance. This will require consideration by Council's Traffic Committee in due course, presumably in response to an appropriate condition of consent.

7.3 pedestrian and bicycle facilities

The development of the public road network within the site provides an internal system of footpaths that will allow pedestrians to move freely within and through the site. This system links with the existing pedestrian network external to the site. Two pedestrian crossings are proposed across New Alfred Street which are located on expected desire-lines, which link Lots 1 and 2 at grade. Finally, the



entire road system incorporates kerb blisters and landscaping to provide an attractive streetscape; and to slow traffic.

It is expected that cyclists will use the road carriageways that are provided as a shared facility. In addition, shower facilities will be available within buildings and bicycle storage provision is to be made in accordance with Council's requirements. Refer to Project Application reports for details on Lots 1 and 3. The predominant bulky goods use is expected to generate only moderate demand for bicycles.



8. conclusions

The following matters are noteworthy:

- The proposed Concept Plan follows the principles and level of intensity foreshadowed in the Preliminary Environmental Assessment report;
- Traffic impacts have been assessed on the basis of the land use scenario outlined in this report and can be accommodated, subject to the public road system being developed as proposed and the improvements outlined in the report. A Transport Access Guide is also recommended and can be prepared in response to a suitable consent condition;
- Traffic conditions have been assessed on weekdays, Saturdays and Sundays and can be accommodated by the road system in terms of its capacity;
- The traffic impacts create no unacceptable environmental amenity concerns having regard for then predominant industrial character of the area. The volume increases in the locality are significant when compared with existing flows (with the site essentially dormant) but as all road frontages are collector roads they remain within acceptable limits;
- The overall parking provision (1,507 spaces) is 7% less than Council's DCP requirement as assessed (1,614 spaces, even assuming a reduced rate and with discounts for staring) and this accounts for the synergy between the uses and the ability to share parking where peak demands do not overlap. The level of provision is also intended to promote alternate travel modes and is responsive to the Director General's requirements;
- The access and internal design arrangements will be able to comply with the requirements of AS 2890.1 and AS 2890.2, subject to further assessment in the Stage 2 and 3 development applications;

It is therefore concluded that the proposed Concept Plan is supportable on traffic planning grounds and will operate satisfactorily. The Plan establishes a comprehensive framework to facilitate subsequent staged Project Application/s.



appendix 1: photographic record



View looking west in Harp Street adjacent to the site with the Charlotte Street roundabout in the distance.



Reverse view looking east in Harp Street on approach to the sharp bend (which will be eliminated and replaced with a cross junction).





View looking north along Alfred Street towards the bend adjacent to the site.



View looking south along Bexley Road at its intersection with Jarrett Street.





View looking south along Kingsgrove Road on approach to Harp Street.

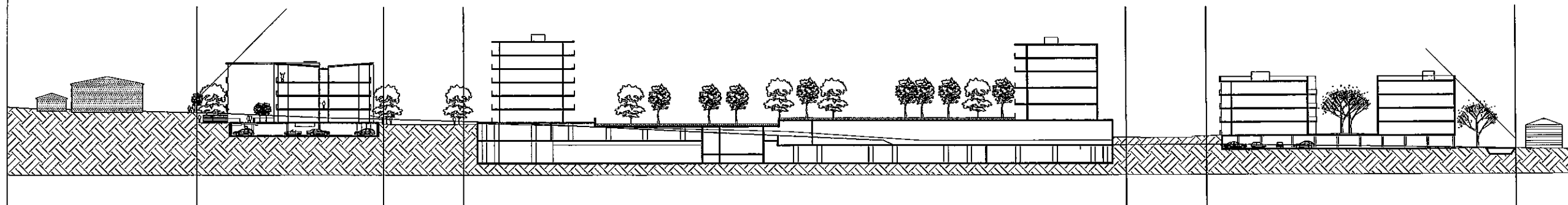


View looking east along Jarrett Street on approach to Bexley Road.





appendix 2: concept plan (extracts)



CLEMTON PARK - CONCEPT SCHEME

60 Charlotte Street, Clemton Park, NSW 2206

DA DOCUMENTATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE	SCALE	ISSUE
DA 1.01	CONCEPT PLAN COVERSHEET	NTS	B
DA 2.01	CONCEPT PLAN ROOF LEVEL	1:500 @ A1	B
DA 2.02	CONCEPT PLAN LEVEL B	1:500 @ A1	B
DA 2.03	CONCEPT PLAN LEVEL 1	1:500 @ A1	B
DA 2.04	CONCEPT PLAN LEVEL 2	1:500 @ A1	B
DA 2.05	CONCEPT PLAN LEVEL 3	1:500 @ A1	B
DA 2.06	CONCEPT PLAN LEVEL 4	1:500 @ A1	B
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DA 2.08	CONCEPT PLAN LEVEL 6	1:500 @ A1	B
DA 2.09	CONCEPT PLAN LEVEL 7	1:500 @ A1	B
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DA 3.02	CONCEPT PLAN SECTIONS 2	1:500 @ A1	B

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TRAFFIC	TRAFFIX
LANDSCAPE ARCHITECT	HABITATION PTY LTD
CIVIL & INFRASTRUCTURE	HYDER CONSULTING
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WIND	WINDTECH CONSULTANTS PTY LTD

DIAGRAMS

SITE ANALYSIS	NTS
LOCALITY AND CONTEXT PLAN	NTS
STAGING PLAN	NTS
HEIGHT STUDY	NTS
SHADOW DIAGRAMS	NTS
LAND USE PLAN	NTS
PRIMARY AND SECONDARY STREETS	NTS
PROJECT APPLICATION PLAN	NTS
PEDESTRIAN MOVEMENT	NTS
MASSING MODEL	NTS
VIEW ANALYSIS	NTS
BUILT FORM	NTS
AREA SCHEDULES	NTS

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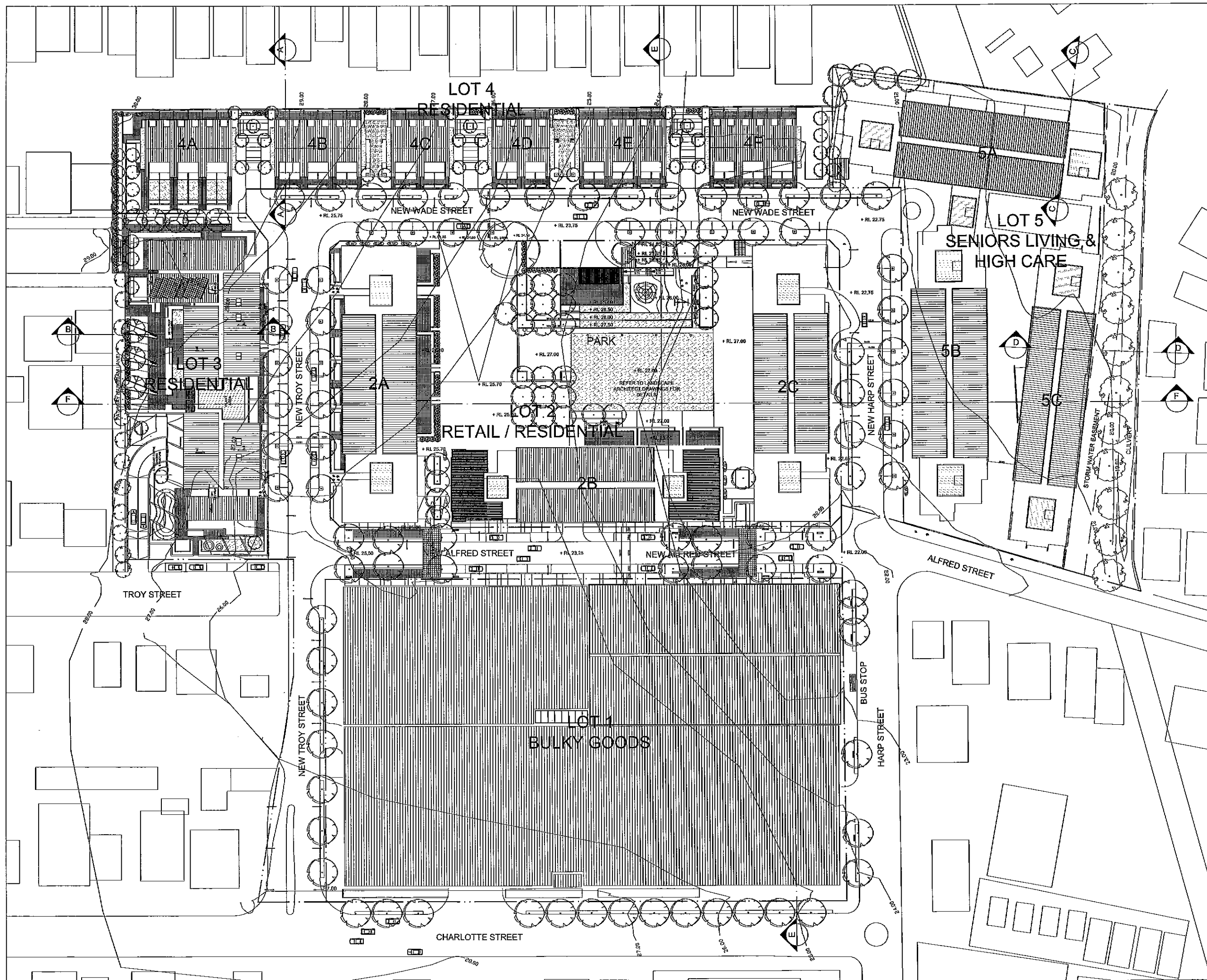
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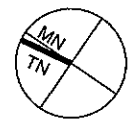
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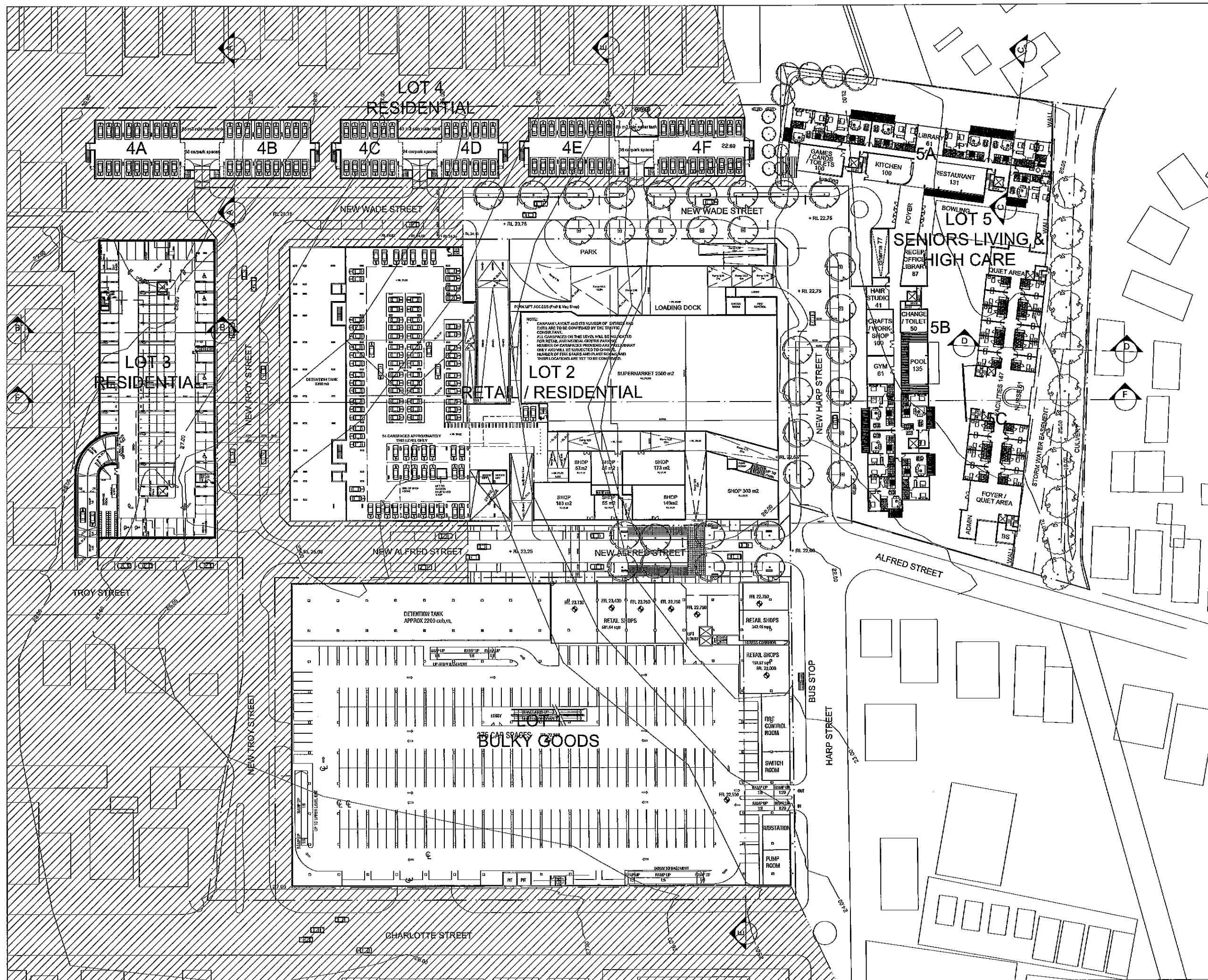
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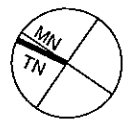
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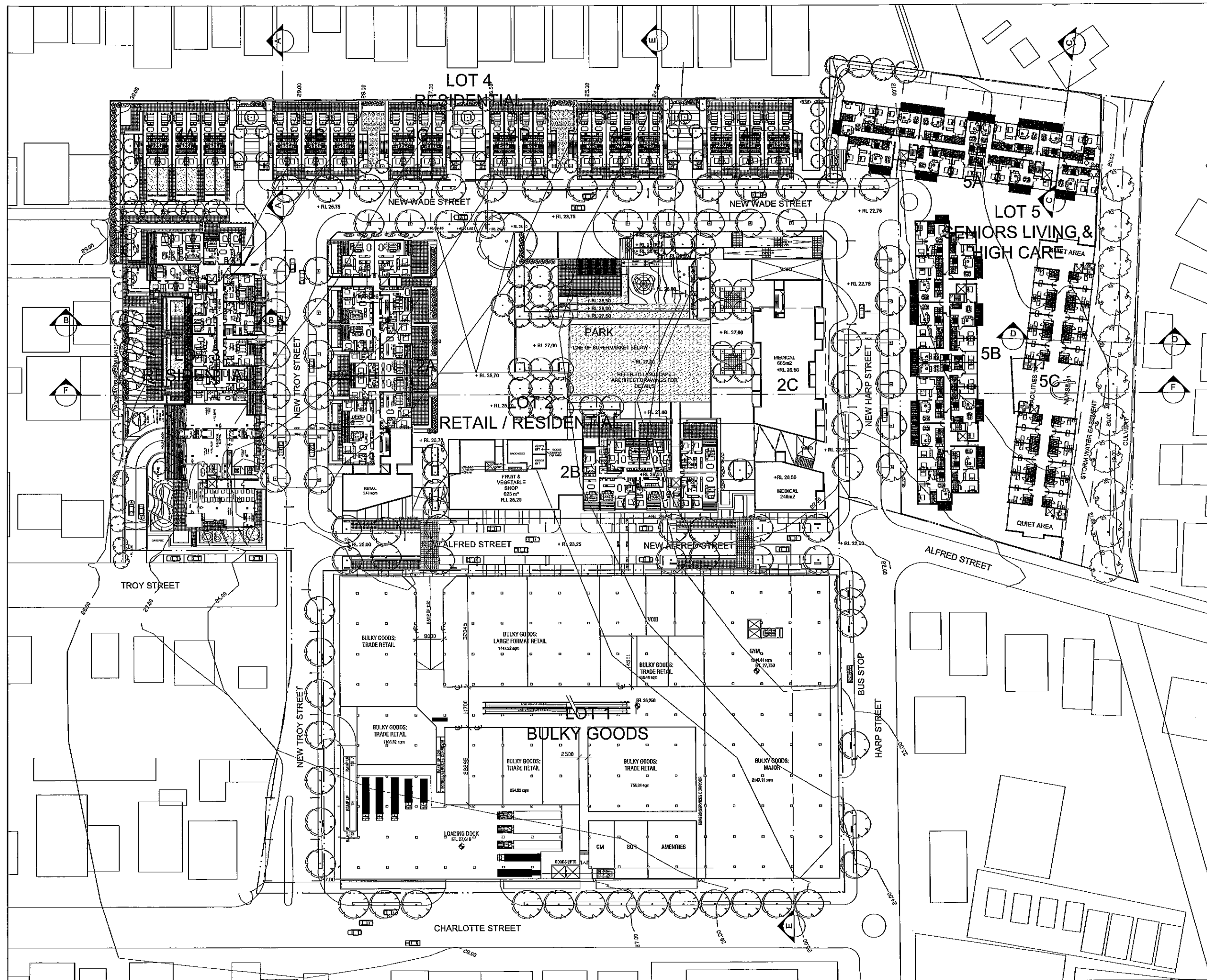
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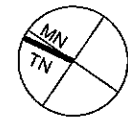
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