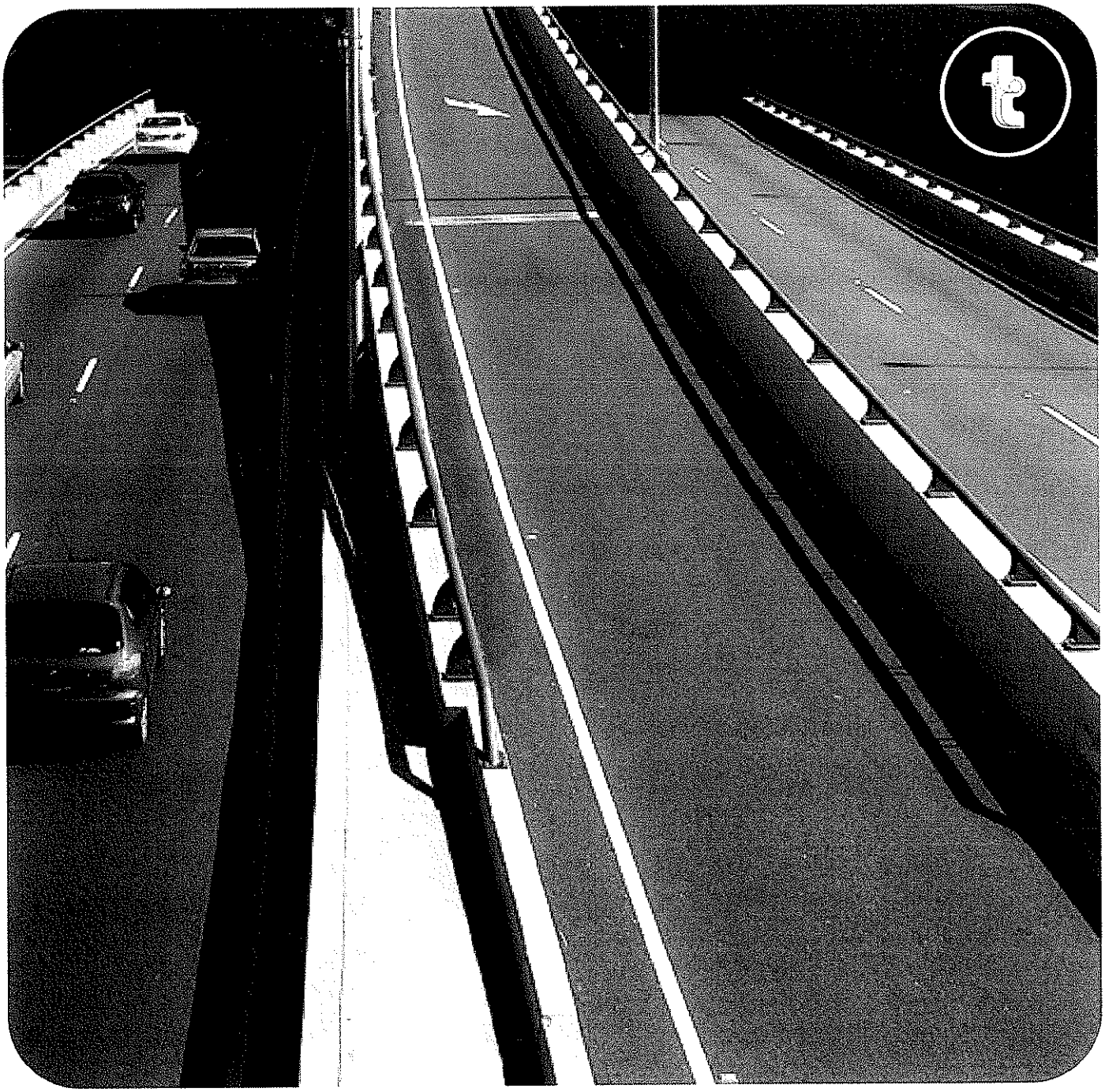

Traffic Impact Assessment

Proposed Refurbishment at 93 Edensor Road, St Johns Park

prepared on behalf of Cullinan Ivanov Partnership by **TRAFFIX** traffic & transport planners

ref: 11 029 report v3 22 March 2011

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List of Appendices

1. Introduction

TRAFFIX has been commissioned by Cullinan Ivanov Partnership, on behalf of St Johns Park Bowling Club Ltd, to undertake a traffic impact assessment in support of a development application relating to the refurbishment and expansion of the St Johns Park Bowling Club at 93 Edensor Road, St Johns Park. The development is located within the Fairfield City Council LGA and has been assessed under that Council's controls.

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects (SEE) prepared separately. The proposed expansion results in an additional 1,560m^2 of gross leasable area (GLA). In terms of parking provisions, a small reduction in the total number of spaces is proposed due to the construction of a new VIP park and construction of a new chiller plant. Accordingly the development application will not require referral to the RTA under the provisions of SEPP (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 is located within the suburb of St Johns Park, approximately 29 kilometres west of the Sydney CBD. The site lies approximately 2 kilometres south-west of the Fairfield Showground's and is situated 50 metres to the south-east of the intersection of Edensor Road and the Parramatta-Liverpool Transitway.

The site is irregular in configuration and has a site area of approximately 24,314m^2. It has a south-western frontage to Edensor Road of 190 metres, south-eastern frontage to St Johns Park of approximately 165 metres. The northern boundary of about 240 metres is formed by Green Valley Creek.

Access to the site is available via a two-way driveway crossing at Edensor Road. Off-street parking is currently available via the on-site multi-storey car park. A total of 601 parking spaces are currently provided on-site.

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.

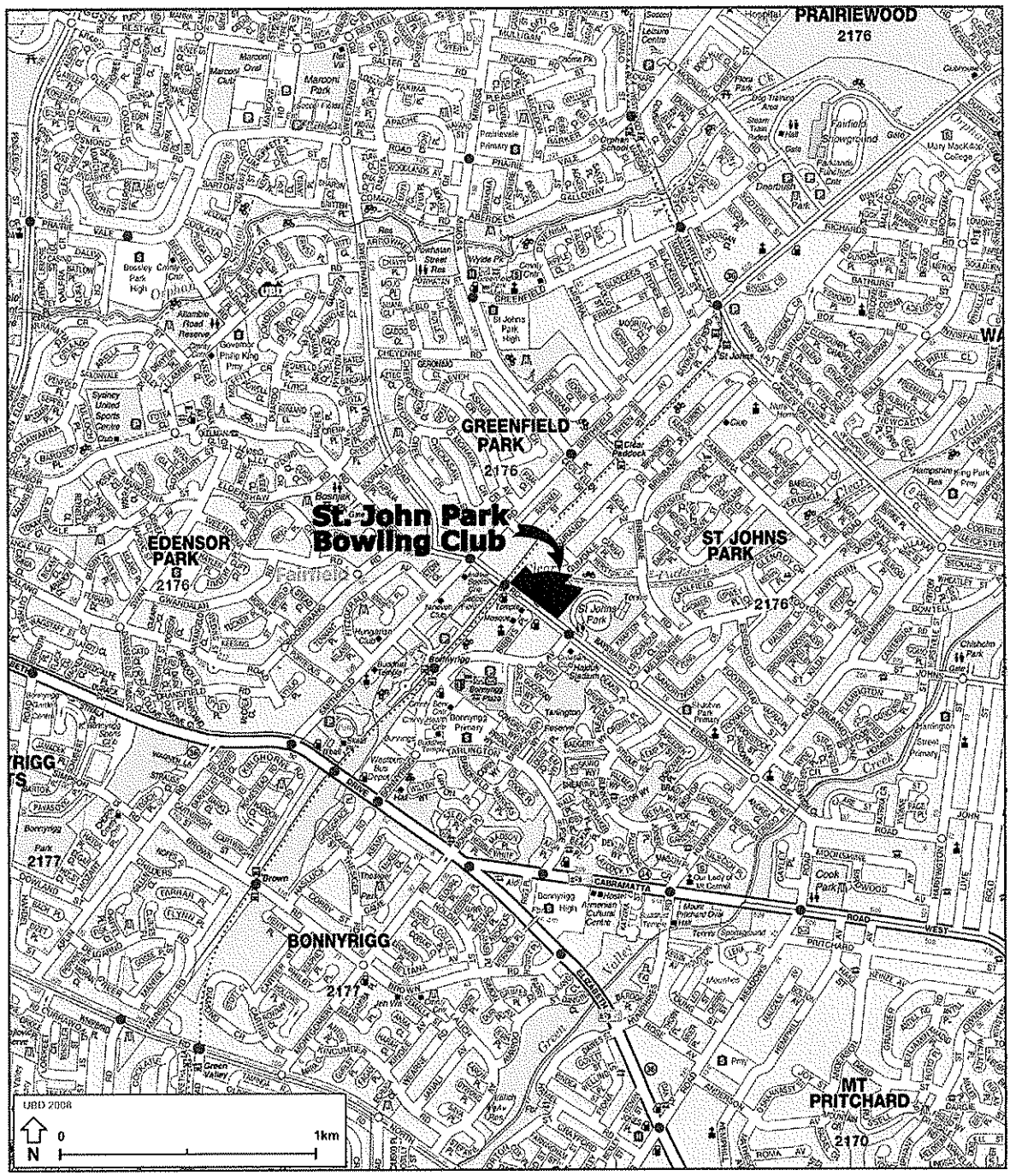


Figure 1: Location Plan

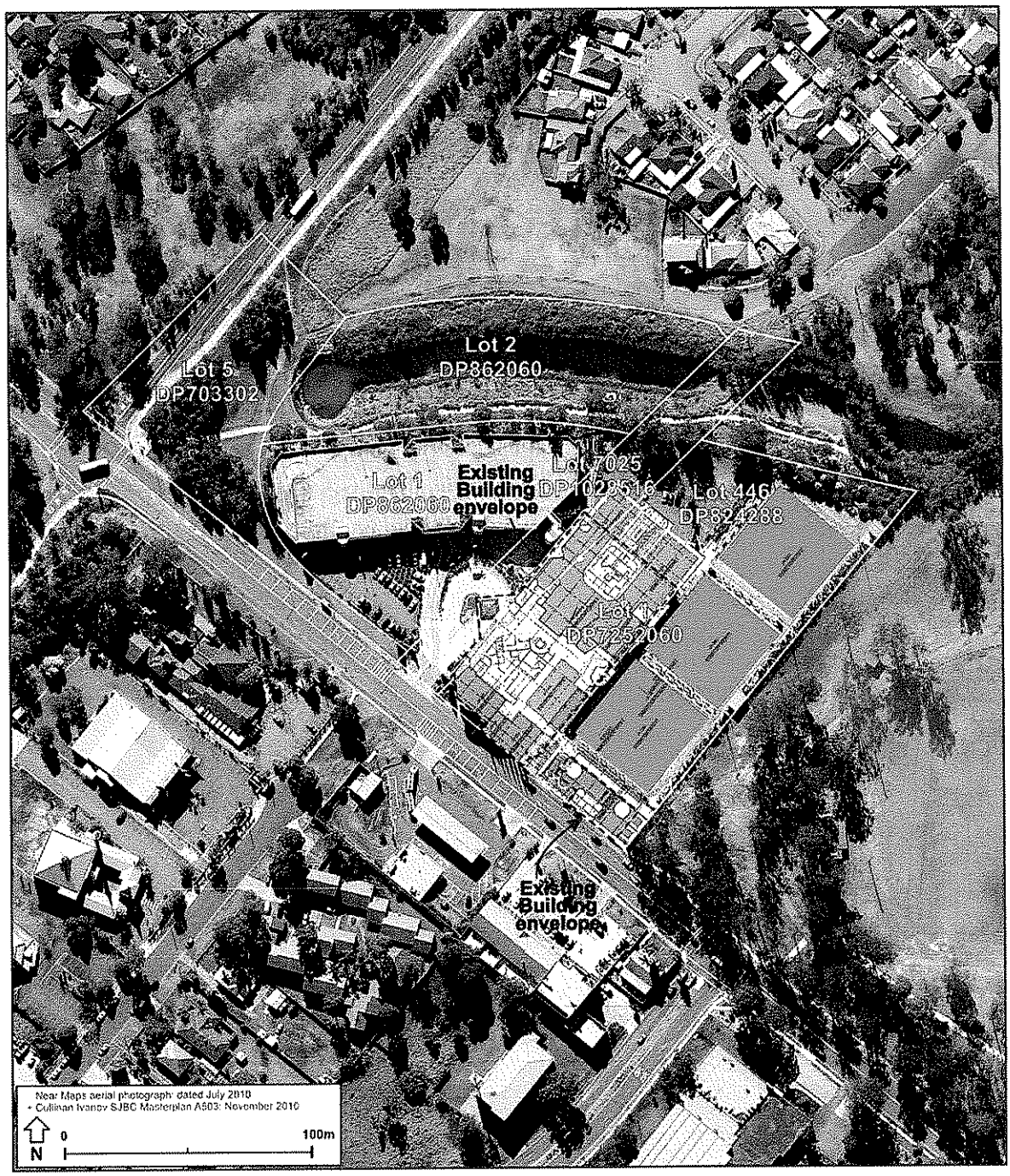


Figure 2: Site Plan

3. Existing Traffic Conditions

3.1 Road Hierarchy

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

- Elizabeth Drive: an RTA State Road (MR 535) that runs in an east-west direction connecting The Northern Road with the Hume Highway, and also crossing the Westlink M7. Elizabeth Drive is the major east-west arterial connection in the vicinity of the site and carries approximately 36,000 vehicles per day (vpd);
- Cabramatta Road: an RTA State Road (MR 534) that runs in an east-west direction connecting Elizabeth Drive to the west with the Hume Highway to the east. It carries an in the order of 15,000 vpd near its intersection with Elizabeth Drive;
- Smithfield Road: an Regional Road (RR 7220) that runs in a north-south direction that connects the Cumberland Highway to the north with Elizabeth Drive to the south. It carries an approximately 22,000 vpd;
- Edensor Road: a collector road that runs in an east-west direction and forms the south-western boundary of the site. It carries an 20,000 vpd at its intersection with Smithfield Road;
- Bonnyrigg Avenue: a local collector road that generally runs in a north-south direction between Edensor Road and Elizabeth Drive;

It can be seen from **Figure 3** that the site is conveniently located with respect to the arterial and local road systems serving the region. It is therefore able to effectively distribute traffic onto the wider road network, minimising traffic impacts.

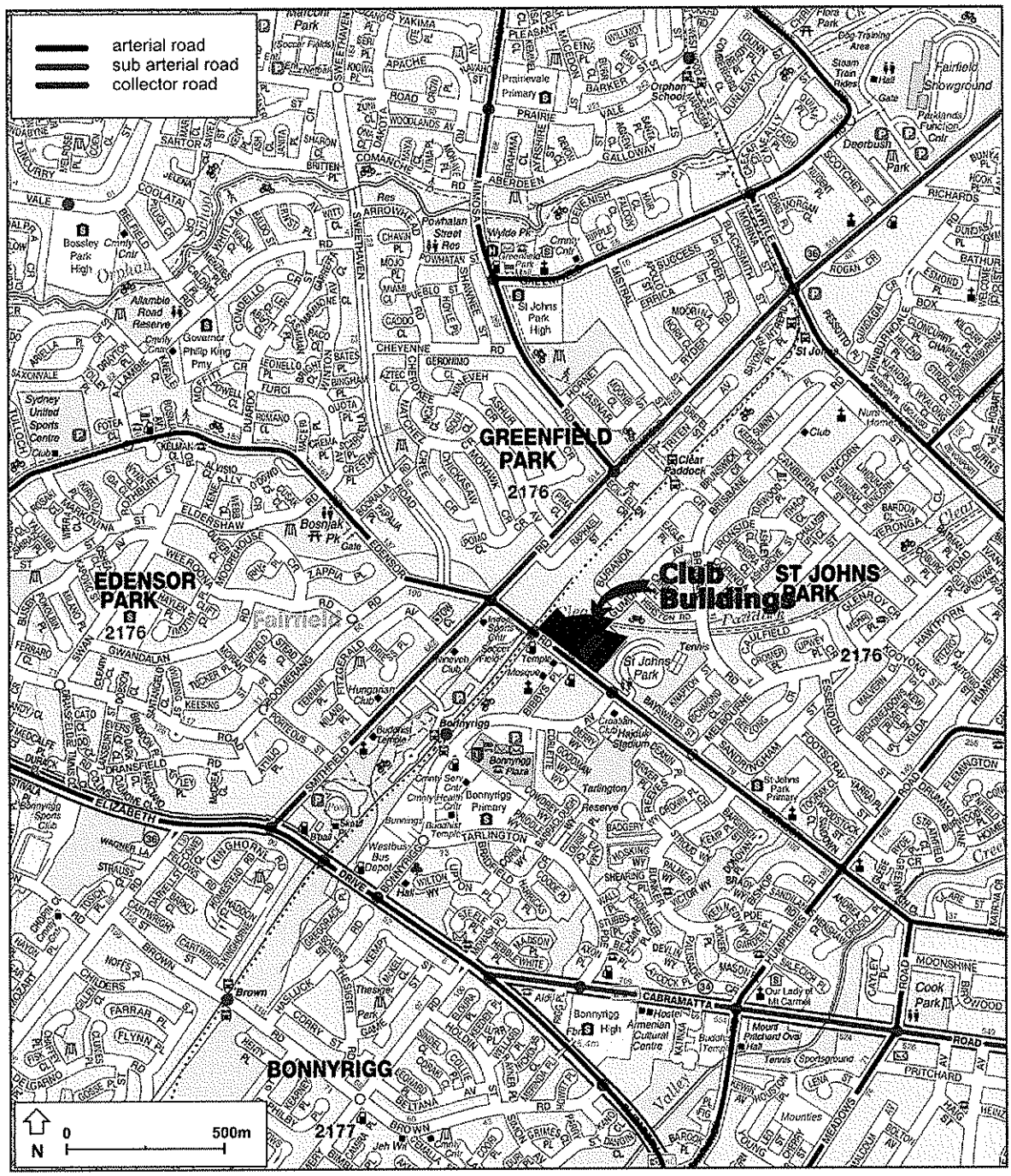


Figure 3: Surrounding Road Hierarchy

3.2 General Description of the Road Environment

Elizabeth Drive is constructed with a 28 metre wide divided carriageway incorporating a wide landscaped median and carries two lanes of traffic in each direction. It has signalised intersections with Smithfield Road, the Parramatta-Liverpool Transitway and Bonnyrigg Avenue to the southwest of the site. A left turn slip lane is provided at its signalised intersection with Cabramatta Road West for traffic travelling both eastbound on Elizabeth Drive and westbound along Cabramatta Road West.

Cabramatta Road West is constructed with a 12 metre wide carriageway and carries two lanes of traffic in each direction. It forms a signalised 'T' junction with Elizabeth Drive, one kilometre south of the site.

Smithfield Road is generally constructed with a 12 metre wide carriageway and carries a single lane of traffic in each direction. At its intersection with Edensor Road, the carriageway widens to a total of five lanes on both northern and southern approaches. This includes dedicated right turn storage lanes on both approaches of Smithfield Road.

Edensor Road is constructed with a 12 metre wide carriageway and carries two lanes of traffic in each direction between Smithfield Road and Bonnyrigg Avenue. This includes a through lane and a right turn lane for eastbound traffic on approach to Bonnyrigg Avenue. To the east of Bonnyrigg Avenue, Edensor Road carries a single lane in each direction. Edensor Road also intersects the Parramatta-Liverpool Transitway, 50 metres to the north-west of the site. A bus stop is located on both sides of Edensor Road directly opposite of the site.

Bonnyrigg Avenue is constructed with a 16.5 metre wide divided carriageway and carries two lanes of traffic in each direction. It forms signalised intersections with Edensor Road, 60 metres south-east of the site and Elizabeth Drive, 1.0 kilometre to the south-west of the site.

3.3 Public Transport

The public transport services operating in the locality are shown in **Figure 4**, below. It can be seen that a number of bus services operate in the St Johns Park area which provide regular scheduled services to surrounding suburbs including Cabramatta, Liverpool, Miller, Cecil Park and Parramatta. The Parramatta-Liverpool Transitway also operates at close proximity to the site.

Furthermore, St Johns Park Bowling Club operate a courtesy shuttle bus service from the site. Patron questionnaire surveys indicate that these services experience only moderate usage with a total mode share of only 2.5% (0.7% courtesy bus, 1.8% regular bus services). This compares to 51% for car driver.

It is expected that these mode shares would be maintained post development and this assumption has been included in the modelling included in this assessment.

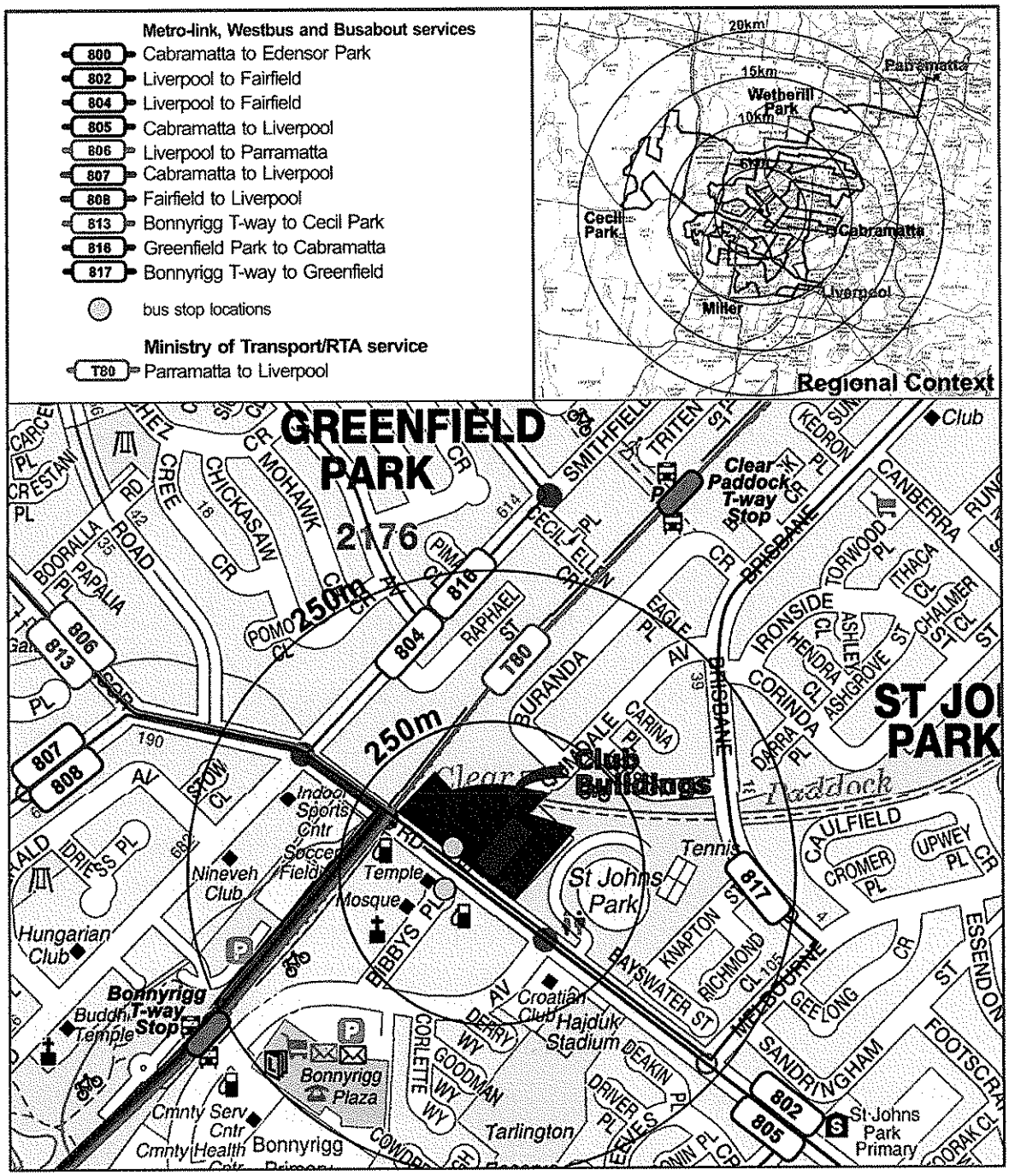


Figure 4: Public Transport Routes

3.4 Existing Site Generation

The existing St Johns Park Bowling Club (93 Edensor Road) typically consists of a 3 level building, multi-storey car park and three bowling greens. The Club building itself is comprised of an auditorium, several gaming rooms, bistro, club facilities, licensed areas and offices. The existing GLA is estimated at 2,978m^2 comprising of 2,322m^2 of club and community facilities and 656m^2 of restaurants and cafes.

The RTA's *Guide to Traffic Generating Developments* provides no generation rates for clubs. Rather, it states that assessment is to be based on surveys of the site for extensions to existing clubs and this is certainly appropriate in the case of the expansion of the existing club. Data collected from a recent survey of the club undertaken on a typical peak demand night of Friday, the 25th February 2011, indicated a peak evening traffic generation for the site of 113 veh/hr (65 in, 48 out).

The site currently has a 3 storey car park, as well as two on-ground car parks at the front and rear of the site, with a total of 601 spaces.

3.5 Existing Intersection Performance

For the purposes of assessment of the traffic impacts of this development, surveys were undertaken of the most critical intersections adjacent to the site, being:

- Edensor Road and Smithfield Road; and
- Edensor Road and Bonnyrigg Avenue.

The results of these surveys, included in **Appendix B**, were analysed using the SIDRA computer program to determine their performance characteristics 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:

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. 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.

A summary of the modelled results are provided in **Table 1** below.

Table 1: Existing Intersection Performances: PM Peak Hour

Intersection	Period	Control Type	Degree of Saturation	Intersection Delay	Level of Service
Edensor Road and Smithfield Road	PM	Traffic Signal	1.032	54.2 sec	LOS D
Edensor Road and Bonnyrigg Avenue		Traffic Signal	0.741	24.1 sec	LOS B

It can be seen from **Table 1** that both intersections operate satisfactorily under the existing 'base case' scenario, with a level of service of D and B, respectively, during the PM peak period and with acceptable delays.

Nevertheless, 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 Section 6.

4. Description of Proposed Development

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared separately. In summary, the development for which approval is now sought comprises the following components:

- Refurbishment and expansion of the existing club building, with a total increase in GLA of 1,560m^2, comprising of:
  - 78m^2 GLA of restaurants and cafes; and
  - 1,482m^2 GLA of club and bar/lounge/gaming facilities.
- Reconfiguration of the rear car park and new undercover spaces;

It should be noted that a significant proportion of the bar/lounge/gaming expansion relates to increased gaming area, however the number of machines remains unchanged at 398.

The parking and traffic impacts arising from the development are discussed in Sections 5 and 6, respectively. Reference should be made to the plans submitted separately to Council which are presented at reduced scale in **Appendix D**.

5. Parking Requirements

5.1 Council Controls

Parking for the proposed development has been assessed in accordance with the requirements of Fairfield City Council's DCP (Chapter 12) – Car Parking, Vehicle and Access Management. The parking requirements in accordance with Councils DCP are set out in **Table 2**;

Table 2: Council DCP Parking Rates

Area Type	Increase in GLA	DCP Rate	Parking Required
Club and Community Facilities	1,482m^2	1 / 5m^2 GLA	296.4
Restaurants and Cafes	78m^2	1 / 7m^2 GLA	11.1
		Total	**308**

It can be seen that under Fairfield DCP guidelines, there is a 'nominal' requirement to provide an additional 308 spaces. However, this is based on generic rates for Clubs from outdated research and does not take into consideration the specific character of the existing club in its current context. Indeed, assessment based upon surveys is the recommended approach outlined in the RTA's *Guide to Traffic Generating Developments*. In this regard, the parking demands will be substantially lower than that required under Council's controls, as discussed in the following Sections.

5.2 Surveyed Existing Parking Demand

A recent parking survey was conducted of the site on a typical peak Friday evening of 25th February 2011 between 5pm and 9pm. A summary of the results is detailed in **Table 3** below.

Table 3: Existing Evening Peak Period Parking Demand

Time	Parking Demand	Vacancy (%)	Number of Vacant Spaces
7:00 pm	253	58%	348
7:30 pm	289	52%	312
8:00 pm	248	59%	353
8:30 pm	245	59%	356

It can be seen from Table 3 that a peak parking demand for 289 spaces occurred at 7:30pm. At this time there were still a total of 312 vacant spaces. With the total demand during the evening peak period at only 48% of the total capacity, the site can readily accommodate extra parking demands. Notwithstanding, seasonal variations are a factor that need to be considered, as discussed below.

5.3 Seasonal Variation

As recent survey results are being used to evaluate the existing number of car spaces at the site, it is necessary to ensure the survey results are giving a true representation of typical daily traffic volumes. In this regard, customer count data was used to compare the number of customers at the site on the day of the survey, against the 85th percentile of the daily number of customers over a one year period. A summary of the results is detailed below in **Table 4**.

Table 4: Comparison of Customer Numbers

Description	Number of Customers	Correction Factor
Day of Survey Number of Customers	1,387	1.09
85th Percentile Daily Number of Customers	1,513	

It is assumed that customer numbers are directly proportional to parking demands (i.e: an increase in customer numbers will result in the same increase in parking demands).

The comparison found Club patronage on the day of the survey was moderately lower (9%) than what is considered the appropriate 85th percentile 'design demand'. Therefore a correction factor of 1.09 has been applied to the recent survey parking data as outlined in **Table 5** below, to establish the appropriate demand at the 'design' level.

Table 5: Factored Evening Peak Period Parking Demand

Time	Parking Demand	Vacancy (%)	Number of Vacant Spaces
7:00 pm	276	54%	325
7:30 pm	315	48%	286
8:00 pm	270	55%	331
8:30 pm	267	56%	334

Results from the correction of the evening peak parking demands shows the factored peak parking demand to be 315 spaces. This equates to a parking rate of 1 spacer per 9.45m^2 GLA when considering the existing area of 2,978m^2. This is within the typical range of large clubs based on other studies.

5.4 Proposed Parking Provision

Application of the above rate to the proposed expansion of 1,560m^2 results in an increased parking demand for 165 spaces, to a total of 480 spaces.

Due to the expansion of the building to the north-east, the rear car park is to be reconfigured due to the construction of the new chiller plant and now includes an undercover parking area. A minor reduction (6 spaces) in the total number of parking spaces results, with the total parking provision reduced to 595 spaces.

In summary, the development proposes a total parking provision of 595 spaces which is more than sufficient to accommodate the increased parking demand associated with the proposed expansion. With a design demand for only 480 spaces, the proposed parking (595 spaces) provides additional spare capacity for any potential 'non-design' occasions, in the unlikely event that they were to occur.

It is noted that the above surveyed demands also include bowling green usage. In this regard, any parking demands associated with the bowling greens during the survey period have been attributed to the Club floor areas. This assumption has the effect of increasing the parking demand so that the adopted rate may be considered a worst case scenario.

5.5 Disabled Parking

Council DCP requires that parking for persons with a disability be provided at a rate of 2 spaces per 100 parking spaces provided. This results in a minimum requirement for 12 disabled spaces for the redeveloped club, with minimum widths of 3.8 metres.

The site currently provides a total of 13 disabled spaces; two with a width of 4.0 metres. The remaining 11 spaces do not satisfy Council's minimum width requirements; nor the requirements of AS 2890.6. The acceptability of the current disabled spaces should therefore be reviewed having regard for the fact that the majority of these spaces are capable of complying with the requirements of AS2890.6, subject to minor changes to linemarking. This is therefore a minor matter that can be conditioned; thereby allowing certification in accordance with AS2890.6 which we note is soon to be adopted by the BCA.

Nevertheless, it is recognised that these are existing spaces and currently provide a reasonable level of amenity for disabled visitors.

5.6 Servicing

All servicing, including garbage collection, of the site will be undertaken from the loading dock area at the north-western corner of the club building. Access and manoeuvrability to this dock is discussed further in Section 7. Deliveries should generally occur during the mid-morning period when traffic

flows within the car park will be reduced. Any increase in truck movements is as a result of the proposed development is expected to be relatively minor and therefore the use of Edensor Road for deliveries will result in minimal change to the amenity of surrounding residents.

6. Traffic Impacts

6.1 Trip Generation

The existing site generates 113 veh/hr (65 veh/hr in, 48 veh/hr out) during the evening peak period as discussed in Section 3. This corresponds to an existing area of 2,978m^2 GLA. No traffic generation rates are specified in the RTA for this type of development and in any event, such a rate would be inferior to a survey based assessment. Therefore an estimate of the traffic generation rate is produced using the relationship between existing traffic generation and GLA.

Having regard for the above, the existing site traffic generation rate equates to 3.8 trips per 100m^2 GLA of floor area. This increases to 4.1 trips per 100m^2 GLA when consideration is given to the seasonal variation as discussed in Section 5.3 in relation to car parking.

Application of this factored rate of 4.1 trips per 100m^2 GLA to the proposed development 4,538m^2 GLA of results in a total site generation of 186 veh/hr. This represents a net additional traffic generation of 73 veh/hr above that of the surveyed volumes.

This additional traffic generation is quite moderate and will be distributed onto the external road network making use of all possible access routes, with impacts on the external road network discussed below.

6.2 Peak Period Intersection Performances

Recent survey data showed the existing evening peak period traffic generation to be 113 veh/hr and this is included within the existing surveys and analysis reported upon in Section 3. /. For this peak one hour period, 57 vehicles arrived from or departed to the north, whilst 56 vehicles arrived from or departed to the south. This shows an approximate 50:50 split in the direction of travel to/from the site from either direction along Edensor Road. The same split is therefore assumed for the net additional traffic generation of 73 veh/hr, which results in 37 veh/hr will travel north to the intersection of Edensor Road and Bonnyrigg Avenue, and 36 travelling south to the intersection of Edensor Road and Smithfield Road.

The net increase of approximately 37 veh/hr at each of the subject intersections is negligible in comparison to the total existing traffic 'throughput' at these intersections. However, the net additional traffic generation was included in the SIDRA model for both intersections with the results detailed in **Table 6** below.

Table 6: Future Intersection Performances: PM Peak Hour

Intersection	Period	Control Type	Degree of Saturation	Intersection Delay	Level of Service
Edensor Road and Smithfield Road	PM	Traffic Signal	1.032	54.3 sec	D
Edensor Road and Bonnyrigg Avenue		Traffic Signal	0.890	24.9 sec	B

It is evident that the proposed development will have negligible impacts on the existing road network with no change to existing Levels of Service. Minor increases in average intersection delay will be less than 1 second which is also very moderate.

The traffic impact of the development is therefore moderate and readily able to be readily accommodated by the surrounding roads and does not require any external improvements or changes to the road network.

7. Access & Internal Design Aspects

7.1 Access

The development will retain the existing access to Edensor Road which includes a 6 metre entry and exit driveway, separated by a median. This satisfies the requirements of AS2890.1 for a Category 4 driveway.

Adequate visual splays are provided and the existing driveway is understood to operate safely and efficiently. As such, no changes are considered necessary as a result of the proposed development.

7.2 Internal Design

The internal car park design requires some revision to ensure it complies with the requirements of AS2890.1 (2004), with the following characteristics noteworthy:

- All spaces satisfy the minimum clear width of 2.5 metres, length of 5.4 metres and aisle width of 5.8 metres, fulfilling the requirements of AS2890.1 (2004) for a User Class 2 development;
- Column and wall locations for a number of spaces within the existing multi-storey car park do not satisfy the parking space design envelope shown in Figure 5.2 of AS2890.1 (2004). Notwithstanding, these are existing spaces and currently provide a level of amenity and function for users. In this regard, the subject proposal will not result in any significant change to these existing conditions and the design of this area is assumed to have been certified previously;
- Columns in the proposed VIP car park are not setback the full 750mm as nominally required in Figure 5.2 of AS2890.1 (2004). However the aisle width is superior to the minimum requirements and as such these spaces do effectively satisfy the requirements of AS2890.1;
- Spaces adjacent to wall obstructions in the VIP car park have been widened in accordance with AS2890.1,
- Reference should be made to the sketch, included in Appendix D for clarity, which indicates the required changes to the car park as a result of the proposed new chiller plant location. This

effectively results in a localised change to existing flows whereby a relatively short section will now accommodate two-way flow. Appropriate signage and linemarking will be sufficient to ensure that these changed conditions in the vicinity of the new chiller room will operate safely and efficiently as demonstrated by the swept paths included in **Appendix E**; and

- Eleven (11) of the existing disabled parking spaces do not satisfy the minimum width requirements detailed in AS2890.6 (2009) as discussed above. The acceptability of the current disabled spaces should be reviewed to ensure spaces are satisfactory and in this regard, it is noted that alternative linemarking within the car park may be sufficient to enable compliance with the relevant standards. This is therefore a minor matter that can be conditioned.

In summary, all proposed changes to the car park satisfy AS2890.1 and are supportable. A number of minor design issues are evident with the existing car park design although these are existing deficiencies that need not be revisited and the proposal will not impact on the existing performance or safety of the car park. Furthermore, it is expected that any minor deviation from the standards could be addressed through an appropriate condition of consent requiring compliance with AS2890.1 and AS2890.6 for accessible spaces.

8. Conclusions

In summary:

- The parking and traffic generation arising from the proposed refurbishment and expansion of the St Johns Park Bowling Club has been assessed based on the recent survey data of the site which has been factored to account for seasonal variations;

- The development will result in an increase of 64 veh/hr during the evening peak period above that of the existing club. This increases to 73 veh/hr when seasonal factors are taken into account. This is moderate and in addition, it represents combined entries and exits and is split into all available routes. Based on the modelling undertaken, the additional traffic will have minimal impact on the performance of the surrounding road network and can be readily accommodated;

- Council's DCP 'nominally' requires an additional 308 spaces, although this is a generic rate that is not considered to reflect the character of the site. It is considered inappropriate for this application and the recommended approach is to undertake surveys, as recognised in the RTA's Guidelines. This approach is far superior and is able to accurately reflect the character of the existing Club which has been demonstrated to experience significantly lower demands than indicated by Council's parking rate;

- Based on the surveyed demands and with adjustment for seasonal factors, the proposed development will result in a total demand for up to 480 spaces (an effective increase of 165 spaces) which can be readily accommodated by the proposed parking provision of 595 spaces. Indeed, there will be ample spare parking capacity to accommodate extraordinary (non-design) peaks as may occur on an infrequent basis;

- The internal design of all new car parking areas is considered satisfactory and will operate safely and efficiently. Minimal changes are proposed to the remainder of the existing car park and any minor deficiencies are not considered within the scope of this development, as discussed in Section 7; and

- The existing access locations and design arrangements satisfy the requirements of AS2890.1 (2004), and provide adequate lines of sight for entry and exit movements.

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

Appendix A

Photographic Record

View looking north-west along Edensor Road, across site frontage.

View looking north-east at access driveway on Edensor Road.

View looking south-east along Edensor Road, at the intersection with Bonnyrigg Avenue.

View looking north-west along Edensor Road, on approach to the intersection with Bonnyrigg Avenue. .

View looking south-east along Edensor Road, at intersection with Smithfield Road.

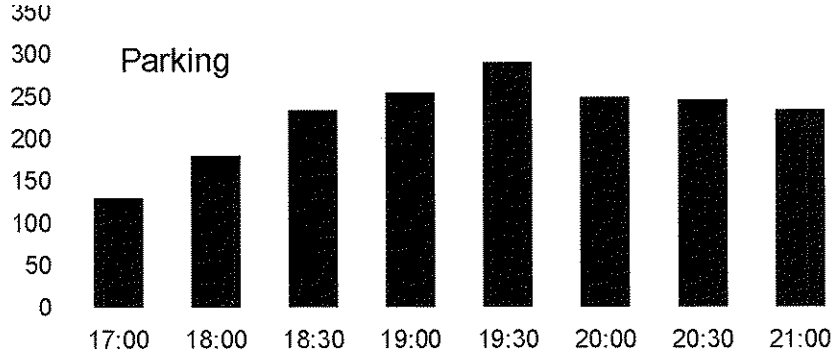
View looking south-west along Smithfield Road, at the intersection with Edensor Road.

Appendix B

Survey Results

Curtis Traffic Surveys

Job: 110206tx
Day, date 25/02/11
Location: St John's Park Bowling Club
Weather: Fine
Surveyor



Parked vehicles

	at grade near Edensor Rd	lower level	second level	third level	roof	at grade near greens	Total parking
17:00	22	71	21	3	0	12	129
18:00	23	94	43	3	0	16	179
18:30	23	128	52	2	0	28	233
19:00	23	132	62	3	0	33	253
19:30	34	142	68	3	0	42	289
20:00	23	113	67	4	0	41	248
20:30	23	116	60	4	0	42	245
21:00	23	112	54	4	0	40	233

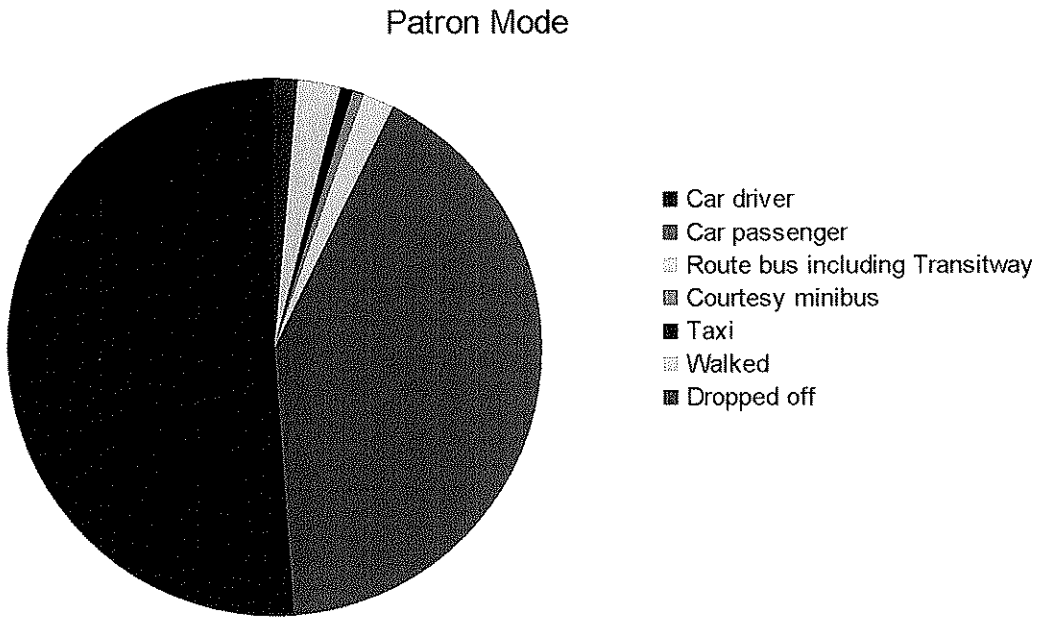
Curtis Traffic Surveys

Patron interviews

Job:	110206tx
Day, date	25/02/11
Location:	St John's Park Bowling Club
Weather:	Fine
Client:	Traffix

Mode

Car driver	139
Car passenger	113
Route bus including Transitway	5
Courtesy minibus	2
Taxi	2
Walked	7
Dropped off	4
Total interviews	272



Curtis Traffic Surveys

Turning movement count

Job:	110206tx
Day, date	25/02/11
Location:	St John's Park Bowling Club
Weather:	Fine
Client:	

Peak Volumes	in	out
	18	16

Numbers in white are the average of previous numbers

Car park

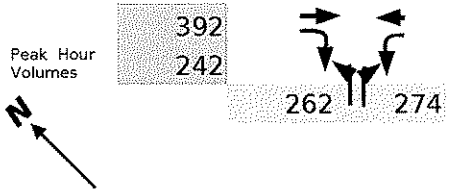
Time Period	left in	right in	left out	right out	IN	OUT	Total	
17:00 to 17:15	6	6	8	7	12	15	27	
17:15 to 17:30	8	10	11	5	18	16	34	peak
17:30 to 17:45	13	6	1	4	19	5	24	
17:45 to 18:00	9	7	7	5	16	12		
Total	36	29	27	21	65	48	113	

Curtis Traffic Surveys

Turning movement count

Job: 110206tx
Day, date 25/02/11
Location: Edensor Rd & Bonnyrigg Av
Weather: Fine
Client: Traffix

Peak Hour Volumes



Time Period	From Edensor Rd west 1	2	From Bonnyrigg Av 3	4	From Edensor Rd east 5	6	Total
16:00 to 16:15	100	65	64	78	87	135	529
16:15 to 16:30	89	55	71	68	79	149	511
16:30 to 16:45	95	78	84	81	94	158	590 peak
16:45 to 17:00	108	44	43	47	62	142	446
17:00 to 17:15	95	45	43	46	59	119	407
17:15 to 17:30	104	32	56	54	71	150	467
17:30 to 17:45	114	36	53	55	79	134	471
17:45 to 18:00	94	36	48	39	47	124	388
Total	799	391	462	468	578	1111	
Hourly summary							
16:00 to 17:00	392	242	262	274	322	584	2076 peak hour
16:15 to 17:15	699	326	398	390	491	976	1954
16:30 to 17:30	610	271	327	322	412	827	1910
16:45 to 17:45	515	193	243	241	318	669	1791
17:00 to 18:00	407	149	200	194	256	527	1733

Curtis Traffic Surveys

Turning movement count

Job: 110206tx

Day, date 40599

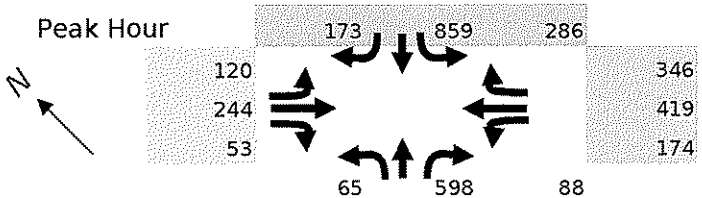
Location: Smithfield Rd & Edensor Rd

Weather: Fine

Client: Traffix

All motor vehicles

Peak Hour



Time Period	From Smithfield Rd north			From Edensor Rd west			From Smithfield Rd south			From EdensorRd east			Total vehicle movements	
	left	through	right	left	through	right	left	through	right	left	through	right		
16:00 to 16:15	68	218	39	28	61	9	19	155	22	42	97	82	840	
16:15 to 16:30	72	212	48	23	48	10	18	168	21	38	108	79	845	
16:30 to 16:45	71	208	45	32	59	15	16	154	19	53	94	97	863	
16:45 to 17:00	75	221	41	37	76	19	12	121	26	41	120	88	877	Peak
17:00 to 17:15	70	203	49	30	75	25	11	131	22	24	118	67	825	
17:15 to 17:30	87	216	69	39	78	15	15	125	21	32	94	66	857	
17:30 to 17:45	71	221	44	36	72	21	10	124	17	28	75	57	776	
17:45 to 18:00	81	256	73	38	98	13	9	119	23	24	82	49	865	
Totals	595	1755	408	263	567	127	110	1097	171	282	788	585		
16:00 to 17:00	286	859	173	120	244	53	65	598	88	174	419	346	3425	Peak Hour
16:15 to 17:15	288	844	183	122	258	69	57	574	88	156	440	331	3410	
16:30 to 17:30	303	848	204	138	288	74	54	531	88	150	426	318	3422	
16:45 to 17:45	303	861	203	142	301	80	48	501	86	125	407	278	3335	
17:00 to 18:00	309	896	235	143	323	74	45	499	83	108	369	239	3323	

Appendix C

SIDRA Results

Appendix C-1

SIDRA Results - Existing

MOVEMENT SUMMARY

Site: Edensor Road and Bonnyrigg Avenue-PM

Edensor Road and Bonnyrigg Avenue
Signals - Fixed Time Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Edensor Road											
21	L	339	0.0	0.734	18.6	LOS B	6.8	47.9	0.59	0.82	39.7
22	T	615	0.0	0.682	18.2	LOS B	19.9	139.1	0.84	0.75	37.9
Approach		954	0.0	0.734	18.4	LOS B	19.9	139.1	0.75	0.78	38.5
North West: Edensor Road											
28	T	413	0.0	0.339	7.6	LOS A	9.3	65.1	0.51	0.45	47.7
29	R	255	0.0	0.741	38.4	LOS C	11.5	80.2	1.00	0.96	29.1
Approach		667	0.0	0.741	19.4	LOS B	11.5	80.2	0.70	0.64	38.4
South West: Bonnyrigg Avenue											
30	L	276	0.0	0.660	38.9	LOS C	11.8	82.8	0.96	0.84	26.8
32	R	288	0.0	0.690	39.6	LOS C	12.5	87.2	0.97	0.86	26.5
Approach		564	0.0	0.690	39.2	LOS C	12.5	87.2	0.97	0.85	26.6
All Vehicles		2185	0.0	0.741	24.1	LOS B	19.9	139.1	0.79	0.75	34.5

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P9	Across SE approach	53	29.8	LOS C	0.1	0.1	0.86	0.86
P13	Across NW approach	53	32.4	LOS D	0.1	0.1	0.90	0.90
P15	Across SW approach	53	32.4	LOS D	0.1	0.1	0.90	0.90
All Pedestrians		159	31.5				0.89	0.89

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS D. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Edensor Road and Smithfeild Road-PM

Edensor Road and Smithfield Road
Signals - Fixed Time Cycle Time = 124 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Edensor Road											
21	L	183	0.0	0.482	47.3	LOS D	14.3	100.3	0.88	0.84	26.4
22	T	496	0.0	0.482	27.4	LOS B	18.7	131.0	0.77	0.67	32.4
23	R	309	0.0	1.032	129.4	LOS F	29.4	206.1	1.00	1.18	13.2
Approach		988	0.0	1.032	63.0	LOS E	29.4	206.1	0.86	0.86	21.6
North East: Smithfield Road											
24	L	301	0.0	0.880	49.8	LOS D	37.5	262.2	0.99	1.07	26.0
25	T	904	0.0	0.879	48.8	LOS D	37.5	262.2	1.00	1.04	24.4
26	R	182	0.0	1.013	118.4	LOS F	17.1	119.6	1.00	1.15	14.1
Approach		1387	0.0	1.013	58.1	LOS E	37.5	262.2	1.00	1.06	22.6
North West: Edensor Road											
27	L	126	0.0	0.417	47.2	LOS D	10.8	75.4	0.85	0.82	26.4
28	T	257	0.0	0.417	41.9	LOS C	11.7	81.9	0.88	0.73	26.6
29	R	56	0.0	0.350	62.7	LOS E	4.5	31.3	0.95	0.77	22.0
Approach		439	0.0	0.417	46.0	LOS D	11.7	81.9	0.88	0.76	25.9
South West: Smithfield Road											
30	L	68	0.0	0.640	40.4	LOS C	14.8	103.6	0.86	0.90	29.5
31	T	629	0.0	0.640	37.0	LOS C	20.8	145.8	0.90	0.79	28.4
32	R	93	0.0	0.515	67.6	LOS E	7.2	50.2	0.99	0.78	21.0
Approach		791	0.0	0.640	40.9	LOS C	20.8	145.8	0.91	0.80	27.4
All Vehicles		3605	0.0	1.032	54.2	LOS D	37.5	262.2	0.93	0.91	23.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P9	Across SE approach	53	39.5	LOS D	0.1	0.1	0.80	0.80
P11	Across NE approach	53	55.2	LOS E	0.2	0.2	0.94	0.94
P13	Across NW approach	53	39.5	LOS D	0.1	0.1	0.80	0.80
P15	Across SW approach	53	55.2	LOS E	0.2	0.2	0.94	0.94
All Pedestrians		212	47.4				0.87	0.87

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

Appendix C-2

SIDRA Results – Existing + Development

MOVEMENT SUMMARY

Site: Edensor Road and Bonnyrigg Avenue-PM_EX+DEV

Edensor Road and Bonnyrigg Avenue
Period: PM
Scenario: Existing + Development
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Edensor Road											
21	L	339	0.0	0.889	26.5	LOS B	8.2	57.5	0.55	0.86	34.7
22	T	631	0.0	0.754	19.8	LOS B	20.1	141.0	0.91	0.84	36.8
Approach		969	0.0	0.890	22.1	LOS B	20.1	141.0	0.78	0.85	36.0
North West: Edensor Road											
28	T	422	0.0	0.361	7.7	LOS A	9.0	63.3	0.55	0.48	47.5
29	R	261	0.0	0.808	40.6	LOS C	10.9	76.5	1.00	1.02	28.3
Approach		683	0.0	0.808	20.2	LOS B	10.9	76.5	0.72	0.68	37.7
South West: Bonnyrigg Avenue											
30	L	283	0.0	0.667	35.2	LOS C	11.0	76.7	0.96	0.85	28.0
32	R	288	0.0	0.680	35.5	LOS C	11.2	78.3	0.97	0.86	27.9
Approach		572	0.0	0.679	35.3	LOS C	11.2	78.3	0.97	0.86	28.0
All Vehicles		2224	0.0	0.890	24.9	LOS B	20.1	141.0	0.81	0.80	34.0

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS C. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P9	Across SE approach	53	26.6	LOS C	0.1	0.1	0.87	0.87
P13	Across NW approach	53	29.3	LOS C	0.1	0.1	0.91	0.91
P15	Across SW approach	53	29.3	LOS C	0.1	0.1	0.91	0.91
All Pedestrians		159	28.4				0.90	0.90

Level of Service (Aver. Int. Delay): LOS C. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS C. LOS Method for individual pedestrian movements: Delay (HCM).

MOVEMENT SUMMARY

Site: Edensor Road and Smithfeild Road-PM_EX+DEV

Edensor Road and Smithfield Road
Period: PM
Scenario: Existing + Development
Signals - Fixed Time Cycle Time = 124 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Edensor Road											
21	L	186	0.0	0.493	47.4	LOS D	14.6	102.4	0.88	0.84	26.3
22	T	508	0.0	0.493	27.6	LOS B	19.2	134.2	0.78	0.68	32.3
23	R	309	0.0	1.032	129.1	LOS F	29.4	205.8	1.00	1.18	13.2
Approach		1003	0.0	1.032	62.5	LOS E	29.4	205.8	0.86	0.86	21.7
North East: Smithfield Road											
24	L	312	0.0	0.882	50.3	LOS D	38.0	266.1	0.99	1.08	25.8
25	T	904	0.0	0.882	49.2	LOS D	38.0	266.1	1.00	1.04	24.3
26	R	182	0.0	1.013	118.4	LOS F	17.1	119.6	1.00	1.15	14.1
Approach		1398	0.0	1.013	58.5	LOS E	38.0	266.1	1.00	1.06	22.5
North West: Edensor Road											
27	L	126	0.0	0.428	47.3	LOS D	11.0	77.1	0.86	0.82	26.4
28	T	266	0.0	0.427	42.0	LOS C	12.0	83.8	0.89	0.74	26.6
29	R	56	0.0	0.358	62.8	LOS E	4.5	31.4	0.95	0.77	22.0
Approach		448	0.0	0.428	46.1	LOS D	12.0	83.8	0.89	0.76	25.9
South West: Smithfield Road											
30	L	68	0.0	0.640	40.4	LOS C	14.8	103.6	0.86	0.90	29.5
31	T	629	0.0	0.640	37.0	LOS C	20.8	145.8	0.90	0.79	28.4
32	R	96	0.0	0.533	67.8	LOS E	7.4	51.7	1.00	0.78	21.0
Approach		794	0.0	0.640	41.0	LOS C	20.8	145.8	0.91	0.80	27.3
All Vehicles		3643	0.0	1.032	54.3	LOS D	38.0	266.1	0.93	0.91	23.5

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P9	Across SE approach	53	39.5	LOS D	0.1	0.1	0.80	0.80
P11	Across NE approach	53	55.2	LOS E	0.2	0.2	0.94	0.94
P13	Across NW approach	53	39.5	LOS D	0.1	0.1	0.80	0.80
P15	Across SW approach	53	55.2	LOS E	0.2	0.2	0.94	0.94
All Pedestrians		212	47.4				0.87	0.87

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM).
Level of Service (Worst Movement): LOS E. LOS Method for individual pedestrian movements: Delay (HCM).

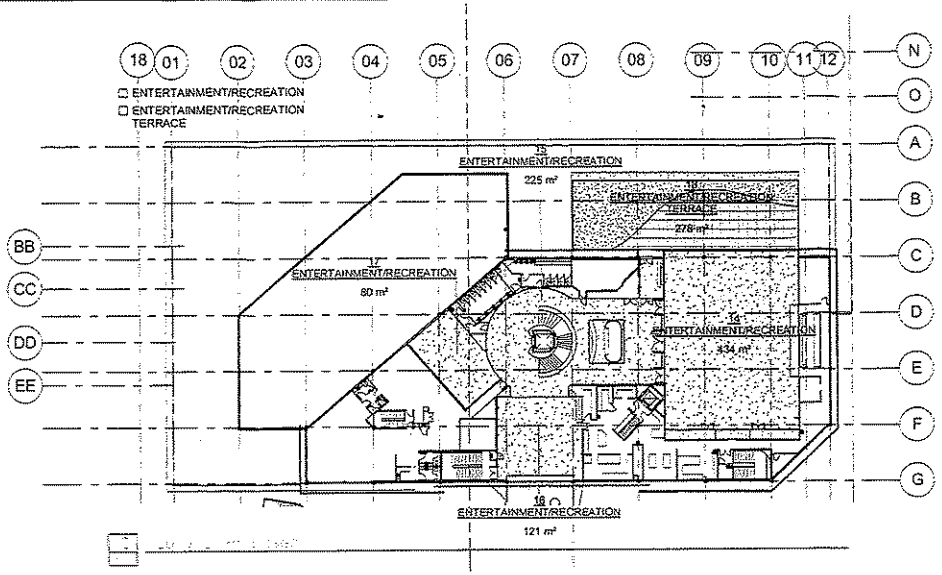
Appendix D

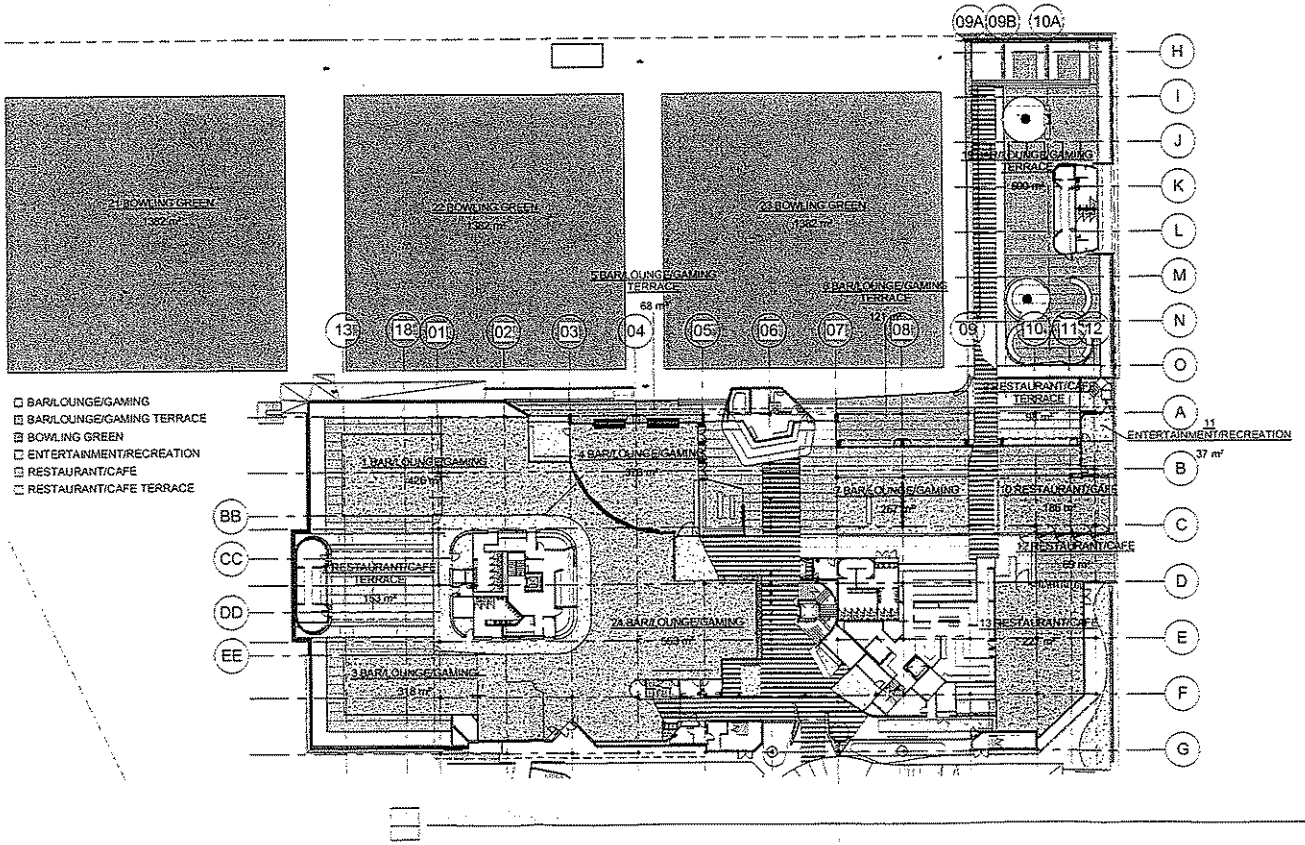
Reduced Plans

Area Schedule (GLA Council Parking - Clubs/Community Facilities)			
Name	Level	Area	Parking Spaces (1 space/ 5m2)
BAR/LOUNGE/GAMING	Level 1	1940 m²	388
		1940 m²	388
BAR/LOUNGE/GAMING TERRACE	Level 1	689 m²	138
		689 m²	138
ENTERTAINMENT/RECREATION	Level 1	37 m²	7
ENTERTAINMENT/RECREATION	Level 2	860 m²	172
		897 m²	179
ENTERTAINMENT/RECREATION TERRACE	Level 2	278 m²	56
		278 m²	56
		3804 m²	761

Area Schedule (GLA Council Parking - Restaurants/Cafes)			
Name	Level	Area	Parking Spaces (1 space/7m2)
RESTAURANT/CAFE	Level 1	482 m²	69
		482 m²	69
RESTAURANT/CAFE TERRACE	Level 1	252 m²	36
		252 m²	36
		734 m²	105

Area Schedule (GLA Council Parking - Bowling Greens)			
Name	Level	Area	Parking Spaces (30 / green 1, 15 / green 2,3)
BOWLING GREEN	Level 1	1382 m²	30
BOWLING GREEN	Level 1	1382 m²	15
BOWLING GREEN	Level 1	1382 m²	15
		4147 m²	60
		4147 m²	60





CULLINAN IVANOV PARTNERSHIP

T F

NO	Description	Date
A	PRELIMINARY TRAFFIC ISSUE	14.03.11

CLIENT
ST JOHNS PARK BOWLING CLUB

PROJECT
MASTERPLAN

DRAWING
GROSS LEASABLE AREA

Drawn	RC	Checked	Checker
Date	28.01.11	Scale	1 : 350
Revision	A	Project Number	09016

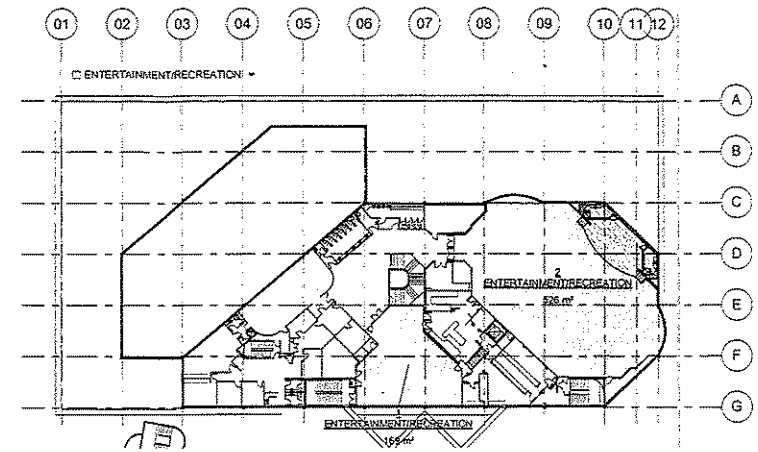
SK014

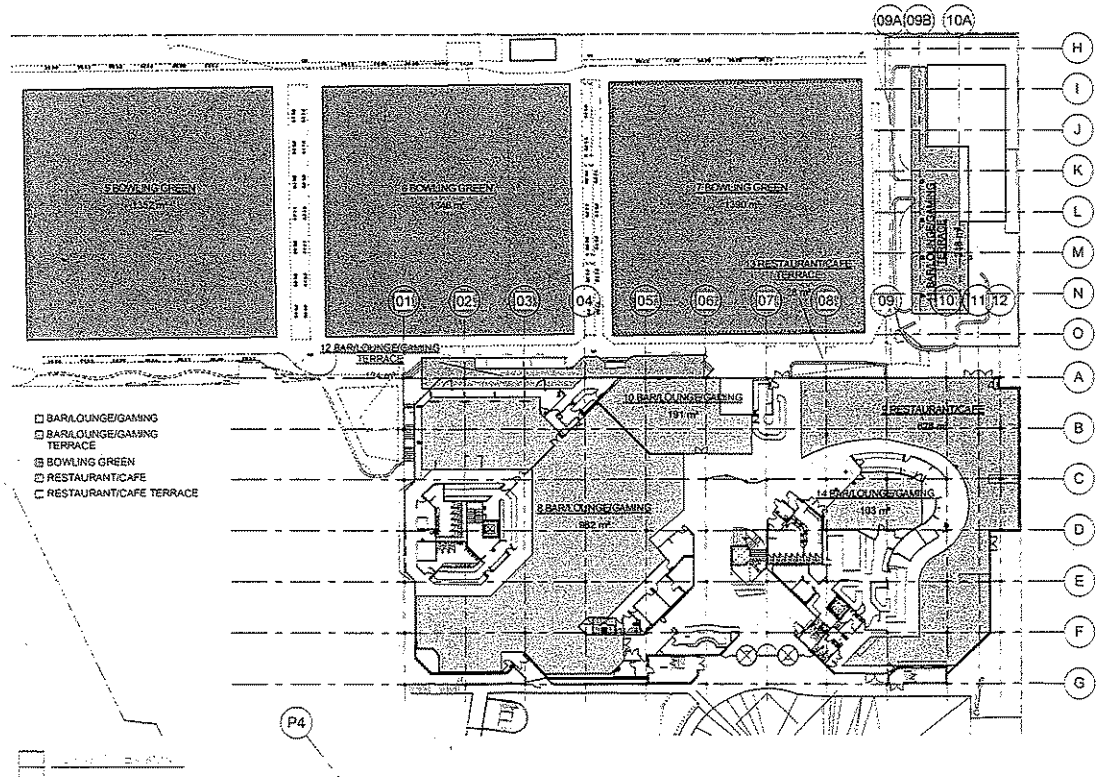
14/03/11 11:00:24 AM

Area Schedule (GLA Existing - Clubs/Community Facilities)			
Name	Level	Area	Parking Space (1 space/5m2)
BAR/LOUNGE/GAMING	Level 1 - Existing	1275 m²	255
		1275 m²	255
BAR/LOUNGE/GAMING TERRACE	Level 1 - Existing	352 m²	70
		352 m²	70
ENTERTAINMENT/RECREATION	Level 2 - Proposed	695 m²	139
		695 m²	139
		2322 m²	464

Area Schedule (GLA Existing - Restaurant/Cafe)			
Name	Level	Area	Parking Spaces (1 space/7m2)
RESTAURANT/CAFE	Level 1 - Existing	628 m²	90
		628 m²	90
RESTAURANT/CAFE TERRACE	Level 1 - Existing	28 m²	4
		28 m²	4
		656 m²	94

Area Schedule (GLA Existing - Bowling Greens)			
Name	Level	Area	Parking Spaces (30 / green 1, 15 / green 2,3)
BOWLING GREEN	Level 1 - Existing	1352 m²	30
BOWLING GREEN	Level 1 - Existing	1346 m²	15
BOWLING GREEN	Level 1 - Existing	1390 m²	15
		4088 m²	60
		4088 m²	60





CULLINAN IVANOV PARTNERSHIP

No	Description	Date

CLIENT
ST JOHNS PARK BOWLING CLUB

PROJECT
MASTERPLAN

DRAWING
EXISTING GROSS LEASABLE AREA

Drawn	Author	Checked	Checker
Date	28.01.11	Scale	1 : 350
Revision		Project Number	09016

SK020

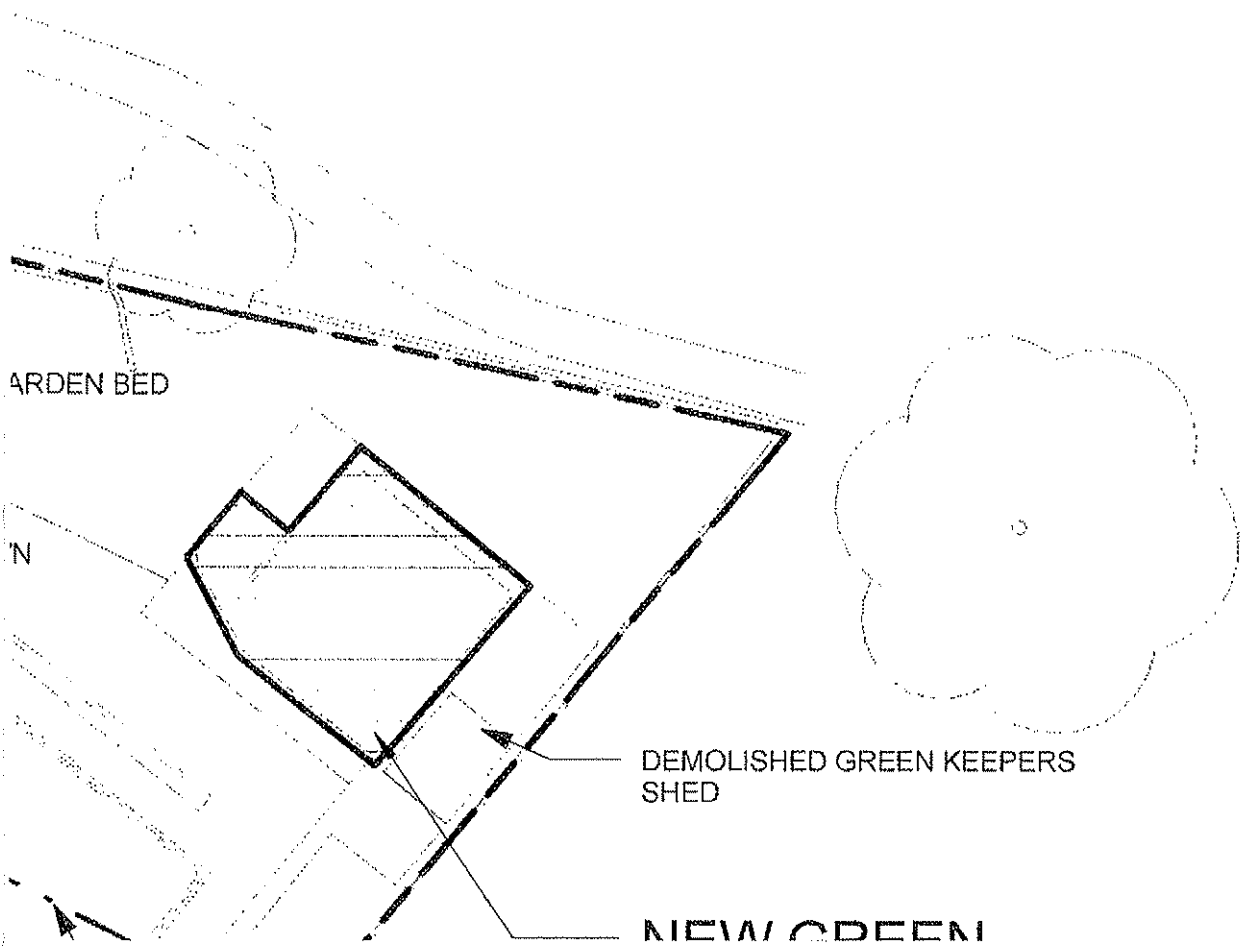
09/03/11 5:36:21 PM

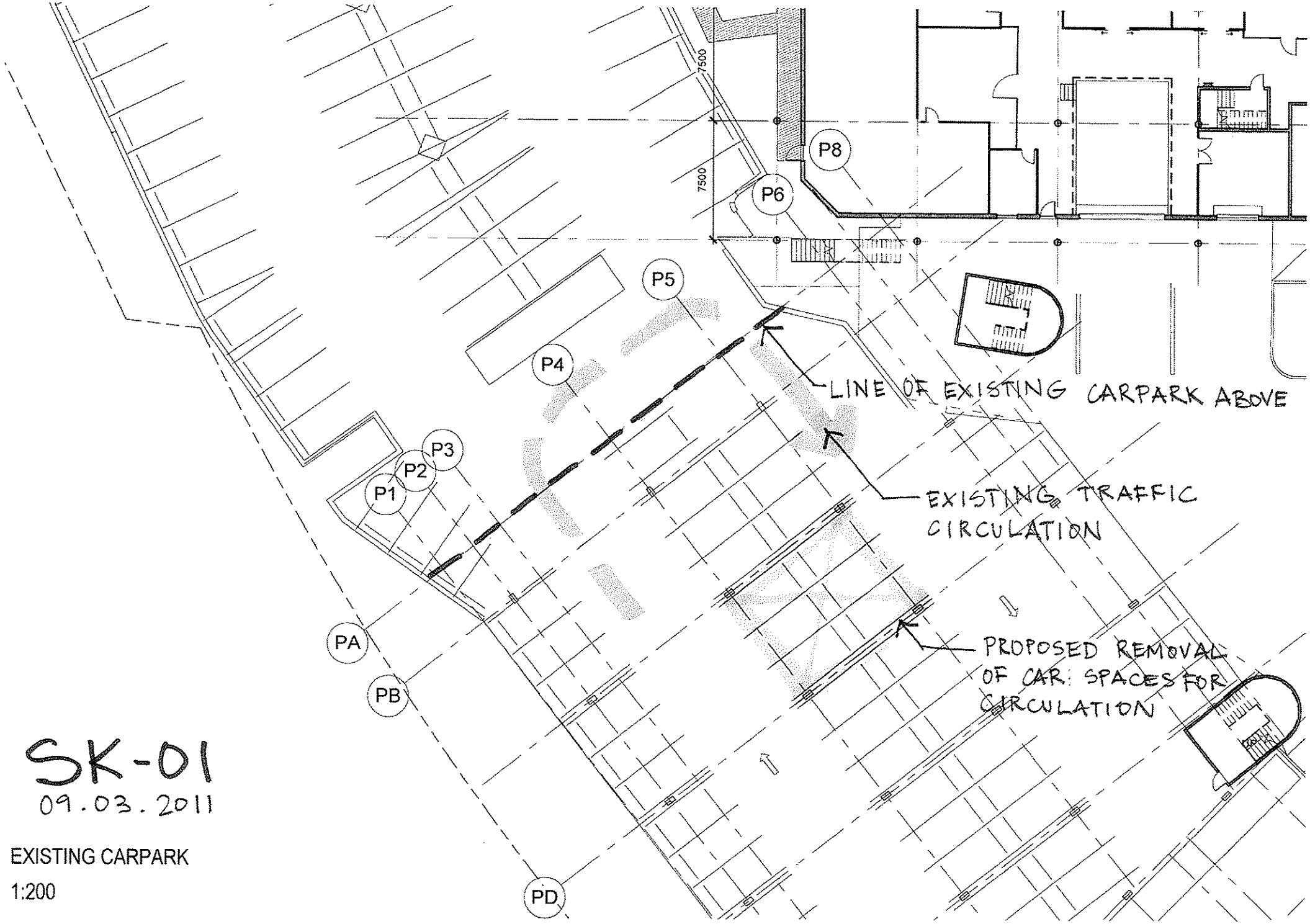
PARKING SCHEDULE EXISTING	
Comments	Count
CARPARK LEVEL 1	123
CARPARK LEVEL 2	111
CARPARK LEVEL 3	122
CARPARK LEVEL 4	135
FRONT-PARKING LOT	35
REAR - PARKING LOT	75

Grand total: 601

PARKING SCHEDULE PROPOSED	
Comments	Count
CARPARK LEVEL 1	123
CARPARK LEVEL 2	111
CARPARK LEVEL 3	122
CARPARK LEVEL 4	135
FRONT-PARKING LOT	35
REAR - PARKING LOT	43
VIP CARPARK	26

Grand total: 595





SK-01

09.03.2011

EXISTING CARPARK

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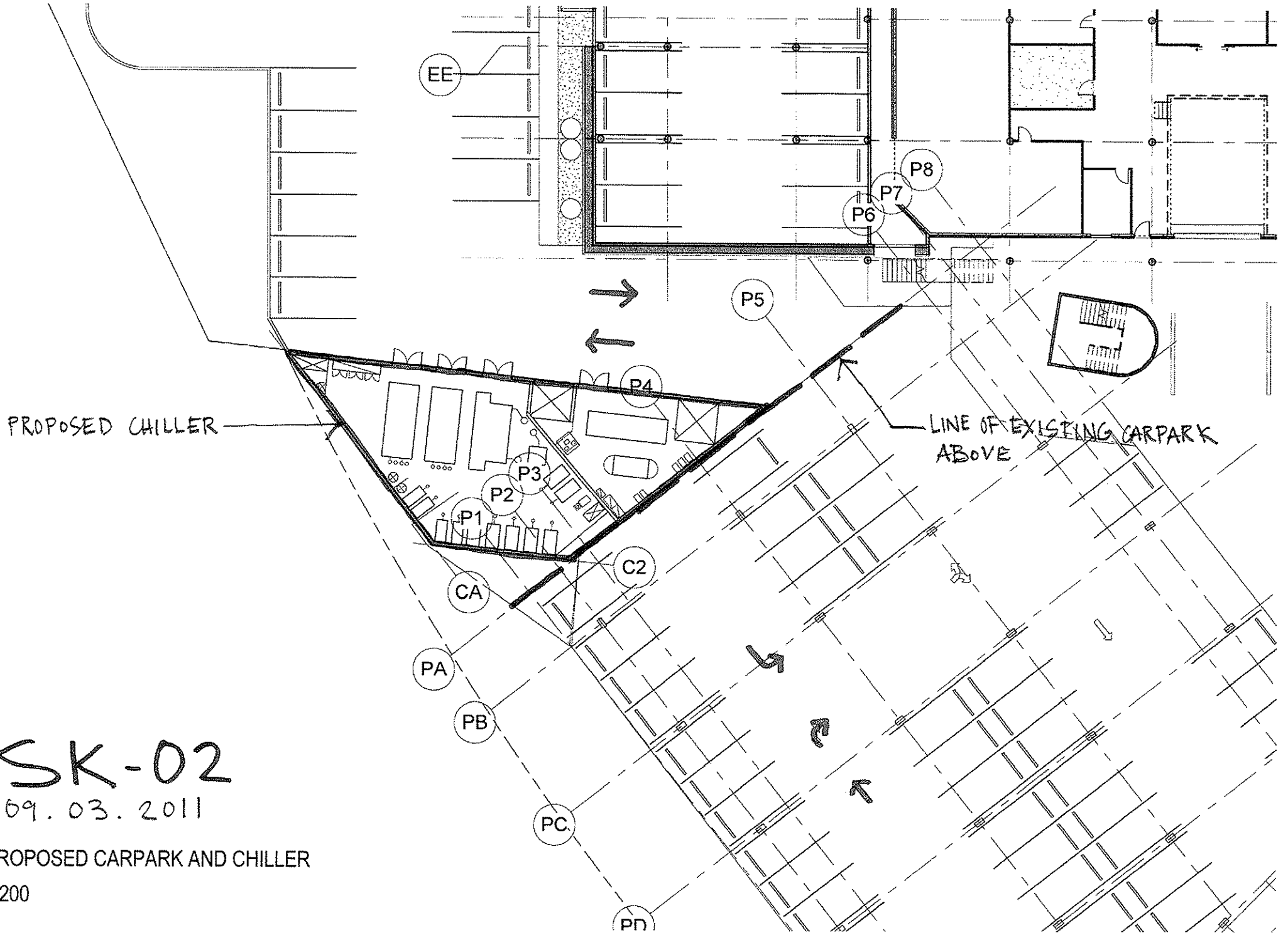

SK-02

09.03.2011

PROPOSED CARPARK AND CHILLER

1:200

Appendix E

Swept Paths

no. revision note by. date

architect
Cuffnar Ivanov Partnership
Ground Fl, Waverton Street, Surry Hills, NSW, 2010
t: +61 2 9332 3500

client
St Johns Park Bowling Club Ltd

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

project
St Johns Park Bowling Club
Edensor Road, St Johns Park

drawing prepared by
TRAFFIX
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Surry Hills NSW 2010
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traffix
traffic & transport planners

drawing title
Swept Paths
B99 & B85 Cars Passing Adjacent to New Chiller Room

drawn:	initials	checked:	-	date:	date

11 029	-	TX.01	-
project no.	drawing chase.	drawing no.	rev