AFC HOLDINGS PTY LTD

TRAFFIC REPORT: PLANNING PROPOSAL TO PERMIT MIXED RETAIL/COMMERCIAL DEVELOPMENT AT 60A GRAY STREET, 2-8 PRINCES HIGHWAY & 1-9 ROCKY POINT ROAD KOGARAH

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1. INTRODUCTION

1.1. Colston Budd Hunt & Kafes Pty Ltd has been commissioned to prepare a report on the traffic implications of the Planning Proposal for the rezoning of land on the corner of Princes Highway and Rocky, Kogarah, to allow a mix of retail/commercial development. The site is located as shown on Figure 1.

1.2. The site is located on the southern corner of the intersection of Rocky Point Road and Princes Highway. The site also has frontage to Gray Street, Gray Avenue and Gray Lane. The site is currently occupied by a number of commercial uses. The site has approval for some 17,500m^2 GFA of commercial, medical and bulky goods uses with parking for some 391 cars located in four levels of basement parking with access via Gray Lane to Gray Street. As part of the approved development, the eastern section of Gray Lane connecting to Rocky Point Road would be closed.

1.3. This report assesses the traffic implications of the development through the following chapters:-

- Chapter 2 - Describing the existing conditions;
- Chapter 3 - Assessing the implications of the development.

2. EXISTING CONDITIONS

Site Location

2.1. The site is located on the southern corner of the intersection of Rocky Point Road and Princes Highway. The site also has frontage to Gray Street and Gray Lane. The site is currently occupied by a number of commercial uses with minimal on site parking and access to/from Princes Highway. Gray Lane separates the eastern and western parts of the site. It connects Gray Avenue with Rocky Point Road. Surrounding land use comprises a mix of commercial and retail development to the east, south and west. North of the site is Moorefield Girls High School and St George Hospital.

Road Network

2.2. The road network in the vicinity of the site includes Princes Highway, Rocky Point Road, Gray Street, Gray Avenue and Gray Lane. Princes Highway is a major arterial road travelling in a north south direction to the west of the site. In the vicinity of the site it is generally a six lane divided road with separate turn lanes at major intersections. Kerb side parking is generally permitted clear of intersections outside of the weekday morning and afternoon peak periods. The section of the highway between Gray Street and Rocky Point Road has three through lanes northbound and two through lanes southbound.

2.3. Rocky Point Road runs in a north south direction east of the site. In the vicinity of the site it provides two through lanes in each direction with kerb side parking permitted outside of the weekday morning and afternoon peak periods, clear of intersections. The intersection of Rocky Point Road and Princes Highway is traffic signal controlled.

2.4. Gray Street runs in an east west direction to the south of the site. In the vicinity of the site it provides one traffic and one parking lane in each direction, clear of intersections. Gray Street connects the Princes Highway with Kogarah town centre. The intersection of Gray Street and Princes Highway is traffic signal controlled. About midway between Rocky Point Road and Princes Highway, Gray Street turns to the south at the intersection with Gray Avenue and a lane way. This intersection is a four way priority controlled intersection with Gray Street (west) and Gray Avenue having priority.

2.5. Gray Avenue is a continuation of Gray Street to the east along the southern side of the site. It provides one traffic and one parking lane in each direction, clear of intersections. The intersection of Gray Avenue and Rocky Point Road is traffic signal controlled.

2.6. Gray Lane separates the eastern and western parts of the site. It connects Gray Avenue with Rocky Point Road. It some six to seven metres wide and caters for two way traffic. It provides rear access to a number of properties with frontage to Princes Highway and Rocky Point Road.

Existing Traffic Flows

2.8 In order to establish existing traffic flows in the area, counts were undertaken during the weekday morning and afternoon peak periods at the following intersections:

- Rocky Point Road/Princes Highway;
- Rocky Point Road/Gray Avenue;
- Princes Highway/Gray Street; and
- Gray Street/Gray Avenue.

2.9 The results of the counts are set out on Figures 2 and 3. The two-way peak hour flows on the surrounding road network are summarised in Table 2.1.

Table 2.1 : Existing Two-Way (sum of both directions) Peak Hour Traffic Flows

Location	Thursday Afternoon	Saturday Midday
Princes Highway		
- north of Rocky Point Road	4575	4930
- north of Gray Street	3055	3655
- south of Gray Street	3085	3745
Rocky Point Road		
- north of Gray Avenue	1465	1555
- south of Gray Avenue	1860	1835
Gray Street		
- west of Gray Avenue	545	440
- west of Princes Highway	825	865
- south of Gray Avenue	120	45
Gray Avenue		
- west of Rocky Point Road	470	410

2.10 Examination of Table 2.1 reveals that:

- Princes Highway carried some 3,100 to 4,930 vehicles per hour (two way) in the peak periods. Traffic flows were higher in the afternoon peak period and north of Rocky Point Road;
- Rocky Point Road carried some 1,450 to 1,850 vehicles per hour (two way) in the peak periods;
- Gray Street carried some 50 to 850 vehicles per hour (two way) in the peak periods. Traffic flows were highest west of Princes Highway; and
- Gray Avenue carried some 400 to 500 vehicles per hour (two way).

2.11 The surveys also included a count of traffic flows in Gray Lane. The survey found that Gray Lane (between Gray Avenue and Rocky Point Road) carried less than 5 vehicles per hour (two way) in the peak periods.

Intersection Operation

2.12 The capacity of the road network is generally determined by the capacity of its intersections to cater for peak period traffic flows. The intersections shown on Figures 2 and 3 have been analysed using the SIDRA program.

2.13 The SIDRA program produces a number of measures of intersection operations. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle.

2.14 Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):-

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

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

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

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

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

2.16 The SIDRA analysis found that:

- the intersection of Rocky Point Road and Princes Highway operates with average delays of less than 25 seconds per vehicle during both peak periods. This represents level of service B, a good level of service;

- the intersection of Gray Street and Princes Highway operates with average delays of less than 35 seconds per vehicle during the morning and afternoon peak periods. This represents level of service C, a satisfactory level of service; and

- the intersection of Gray Street and Gray Avenue operates with average delays of less than 20 seconds per vehicle during both peak periods. This represents level of service B, a satisfactory level of service.

Public Transport

2.17 Sydney Buses operates two bus services along Gray Street past the site. These are the 476 and 477 services. They operate at generally 30 minute intervals, seven days a week, with more frequent services in the weekday morning and afternoon peak periods. The 476 service connects Rockdale to San Souci and the 477 service connects Rockdale to Miranda. Both services operate via Kogarah.

2.18 Thus bus services provide public transport connections to the local area and nearby town centres and railway stations.

2.19 In addition the site is located some 900 metres from Kogarah rail station. Kogarah station is located on the Illawarra line that connects Wollongong with the CBD.

3. IMPLICATIONS OF DEVELOPMENT

3.1 The final mix of development is yet to be determined. For traffic assessment purposes the potential development has been based on retail (some 20,450m^2) and commercial (some 8,000m^2). Consistent with the approved development, the eastern section of Gray Lane connecting to Rocky Point Road would be closed. The retail component is anticipated to comprise a DDS (6,000m^2), a supermarket (4,000m^2), mini major (4,950m^2), specialty shops (4,000m^2) and administration (some 1,500m^2). The majority of the commercial is likely to be a medical centre.

3.2 The implications of the potential development are assessed through the following sections: -

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

Public Transport

3.3 The subject site is located close to existing bus services. These services provide links to surrounding areas. Redevelopment of the site will increase densities close to existing public transport services, strengthening the demand for these services and provide employees, customers and patients with a choice of travel to the site. This is consistent with government and Council policies to encourage people to reduce private car trips and increase the use of public transport. It is also consistent with planning principles of:

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

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

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

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

Parking Provision

3.4 Parking requirements for various land uses within Kogarah LGA are set out DCP No. 8. For the proposed development DCP No. 8 recommends the following parking rates:

- retail shops - 1 space per 25m^2 GLFA;
- commercial development - 1 space per 40m^2 GLFA.

3.5 DCP No. 8 does not include a rate for medical centres. A review of peak parking demands at a number of medical centres in Sydney has been undertaken. These medical centres included general practitioners, specialists, day surgery and radiology/pathology services. These are the types of services that would be included within a medical centre at the proposed development. Surveys found an average peak parking demand over the four centres of 2.6 spaces per 100m^2 GFA. This is similar to the DCP No. 8 rate for commercial development.

3.6 The proposed development will provide parking based on DCP No. 8 taking into account complementary components. Bicycle and disabled parking will also be based on Council requirements.

Access, Internal layout and Servicing

3.7 The primary access to the site will be from Gray Avenue (via a roundabout) with secondary access (left in, left out) from Rocky Point Road and/or Princess Highway. The location of these accesses would be subject to traffic and site constraints.

3.8 The section of Gray Lane, parallel to Rocky Point Road, will be widened to improve access to the site. Parking will be provided within basement levels. The car park will be designed to comply with the requirements of AS2890.1-2004.

3.9 Loading docks will be designed to comply with the requirements of AS2890.2-2002 and allow service vehicles to enter and depart the site in a forward direction.

Traffic Effects

3.10 Estimates of traffic generation of the potential development are based on RTA Guidelines (commercial and retail uses) and surveys of other similar medical centres. RTA guidelines suggest the following rates for retail and commercial development:

- supermarkets and large fruit markets – 14.7 to 15.5 trips per 100m^2 GLFA;
- DDS and mini majors – 1.3 to 5.1 trips per 100m^2 GLFA;
- specialty shops - 4.6 to 10.7 trips per 100m^2 GLFA;
- retail administration – 2.2 trips per 100m^2 GFA; and
- commercial development – 2 trips per 100m^2 GFA.

3.11 Surveys of medical centres have found a generation of 4 trips per 100m^2 GFA during the afternoon peak period. During the Saturday midday peak period the commercial and medical centre components have been assumed to generate 1 trip per 100m^2 GFA.

3.12 Traffic generation of the development (using the above rates) is set out in Table 3.2 below. The medical centre has been based on 75 per cent of the commercial.

Table 3.2 Summary of Peak Hour Traffic Generation

Component	Size	Rate		Traffic Generation	
		Thursday PM	Saturday	Thursday PM	Saturday
Retail					
-DDS	6000m^2	5.1/100m^2	1.3/100m^2	306	78
- supermarket	4000m^2	15.5/100m^2	14.7/100m^2	620	588
- mini major	4950m^2	5.1/100m^2	1.3/100m^2	252	64
- specialty shops	4000m^2	4.6/100m^2	10.7/100m^2	184	428
- administration	1500m^2	2.2/100m^2	2.2/100m^2	33	33
Medical Centre	6000m^2	4/100m^2	1/100m^2	240	60
Commercial	2000m^2	2/100m^2	1/100m^2	40	20
Total				1675	1270

3.13 Examination of Table 3.2 reveals that the development would generate some 1,680 vehicles per hour (two way) in the Thursday afternoon peak period. In the Saturday midday peak period the development would generate some 1270 vehicles per hour (two way).

3.14 A proportion of the traffic will be passing trade or linked trips, which are vehicles that are already in the existing traffic stream passing the development or visiting more than one component of the proposed development. RTA Guidelines suggest that some 25% of retail trips would be passing trade. When passing trade is taken into account the development would generate an additional some 1260 vehicles per hour (two way) in the Thursday afternoon peak period and some 950 vehicles per hour (two way) in the Saturday midday peak period.

3.15 The additional traffic from the development has been assigned to the surrounding road network based on existing traffic patterns. Access has been based on primary access from Gray Avenue and secondary access from Rocky Point Road.

3.16 To cater for development traffic, the following roadworks were given consideration:-

- roundabout at the intersection of Gray Avenue/Gray Lane (site access);
- access from Rocky Point road (left in/left out);
- extension of existing right turn bay on Princes Highway (northbound) at the intersection with Gray Street by 50m;
- no parking in Gray Street/Gray Avenue between Princes Highway and Rocky Point Road to provide two traffic lanes in each direction;
- provision of a 70m left turn lane on Princes Highway (southbound) at the intersection with Gray Street (requires land from site);
- two right turn lanes from Gray Avenue into Rocky Point Road;
- separate left turn lane on Gray Avenue (30m long) into Rocky Point Road (requires land from site); and
- turning movements to/from Gray street into Gray Avenue left in/left out with a median in Gray Avenue.

3.17 With these works, the surrounding intersections were found to be able to cater for the additional development traffic at satisfactory levels of service, based on the potential traffic generation being reduced by some 25 per cent.

3.18 This reduction in traffic generation could be achieved by a combination of:

- encouragement of the use of public transport;
- introduction of a sustainable travel plan to encourage use of travel modes other than private car;
- providing appropriate parking provision;
- changing the mix of the development to reduce the higher traffic generation components.

3.19 A 25 per cent reduced traffic generation of 1,260 and 950 vehicles per hour two way for Thursday and Saturday has been assigned to the road network. The results are summarised in Table 3.3 and displayed in Figures 2 and 3. As for the approved development the eastern section of Gray Lane parallel to Princes Highway and connecting to Rocky Point Road would be closed.

Table 3.1 : Existing plus Development Two Way Peak Hour Traffic Flows

Location	Thursday Afternoon		Saturday Midday	
	Existing	With Dev	Existing	With Dev
Princes Highway				
- north of Rocky Point Road	4575	+305	4930	+230
- north of Gray Street	3055	+45	3655	+35
- south of Gray Street	3085	+260	3745	+195
Rocky Point Road				
- south of Princes Highway	1465	+230	1555	+170
- north of Gray Avenue	1465	+235	1555	+175
- south of Gray Avenue	1860	+210	1835	+155
Gray Street				
- west of Gray Avenue	545	+605	440	+455
- west of Princes Highway	825	+200	865	+150
- south of Gray Avenue	120	+20	45	+15
Gray Avenue				
- west of Rocky Point Road	470	+235	410	+175
Gray Lane				
- north of Gray Avenue	5	+940	5	+705

3.20 Table 3.3 shows that:

- traffic flows on Princes Highway would increase by some 35 to 305 vehicles per hour (two way) in the peak periods;
- traffic flows on Rocky Point Road would increase by some 155 to 260 vehicles per hour (two way) in the peak periods;
- traffic flows on Gray Street (south of Gray Avenue and west of Princes Highway) would increase by some 20 to 200 vehicles per hour (two way) in the peak periods. In the short section between Princes Highway and Gray Avenue the increase would be some 605 vehicles per hour (two way) in the peak periods;
- traffic flows on Gray Avenue would increase by some 175 to 235 vehicles per hour (two way) in peak periods; and
- traffic flows on Gray Lane would increase by some 705 to 940 vehicles per hour (two way) in the peak periods.

3.21 The surrounding intersections, including the roadworks set down in paragraph 3.16, were reanalysed using SIDRA with the additional development traffic flows shown in Figures 2 and 3. The analysis found that:

- the intersection of Rocky Point Road and Princes Highway would operate with average delays of less than 30 seconds per vehicle during both peak periods. This represents level of service B/C, a good level of service;

- the intersection of Gray Street and Princes Highway would operate with average delays of less than 50 seconds per vehicle during the morning and afternoon peak periods. This represents level of service C, a satisfactory level of service;

- the intersection of Rocky Point Road and Gray Avenue would operate with average delays of less than 20 seconds per vehicle during both peak periods. This represents level of service B, a good level of service;

- the intersection of Gray Street and Gray Avenue would operate with average delays of less than 15 seconds per vehicle during both peak periods. This represents level of service A/B, a satisfactory level of service; and

- the intersection of Gray Avenue and Gray Lane would operate with average delays of less than 20 seconds per vehicle during both peak periods. This represents level of service B, a satisfactory level of service.

3.22 The development would result in a number of benefits to the operation of Princes Highway and Rocky Point Road by the removal of a number of existing driveways that have access onto these roads from the subject site.

3.23 Closure of the eastern section of Gray Lane (connecting to Rocky Point Road) would have minimal impact on traffic flow on the surrounding streets as this section of the lane carries minimal traffic.

Summary

3.24 In summary, the main points relating to the implications of the potential development are:

i) the site has access to bus services operating along Gray Street;

ii) the development would strengthen demand for existing public transport services;

iii) the development will provide parking based on Council code taking into account complementary components;

iv) access arrangements and internal layout will be designed in accordance with the Australian Standards;

v) the southern section of Gray Lane would be widened;

vi) the eastern section of Gray Lane (connecting to Rocky Point Road) would be closed;

vii) to cater for development traffic consideration should be given to provision of the following roadworks:

- roundabout at the intersection of Gray Avenue/Gray Lane (site access);
- access from Rocky Point road (left in/left out);
- extension of existing right turn bay on Princes Highway (northbound) at the intersection with Gray Street by 50m;
- no parking in Gray Street/Gray Avenue between Princes Highway and Rocky Point Road to provide two traffic lanes in each direction;

- provision of a 70m left turn lane on Princes Highway (southbound) at the intersection with Gray Street (requires land from site);
- two right turn lanes from Gray Avenue into Rocky Point Road;
- separate left turn lane on Gray Avenue (30m long) into Rocky Point Road (requires land from site); and
- turning movements to/from Gray street into Gray Avenue left in/left out with a median in Gray Avenue.

viii) the traffic generation of the potential development should be reduced by some 25%;

ix) this reduction in traffic generation could be achieved by a combination of:

- encouragement of the use of public transport;
- introduction of a sustainable travel plan to encourage use of travel modes other than private car;
- providing appropriate parking provision;
- changing the mix of the development to reduce the higher traffic generation components.

Location Plan

Colston Budd Hunt & Kafes Pty Ltd

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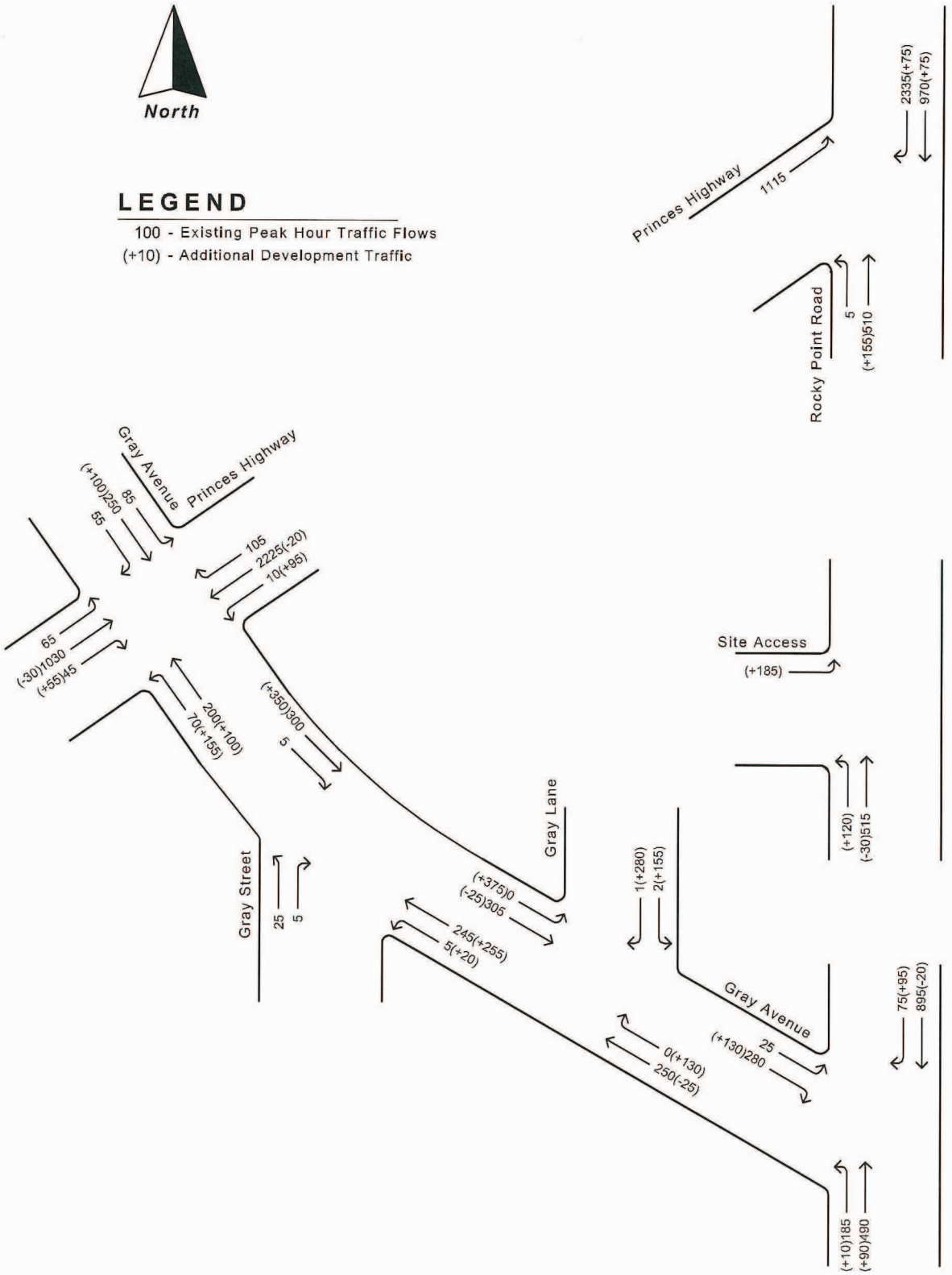
Figure 1



Existing Thursday afternoon peak hour traffic flows plus development traffic

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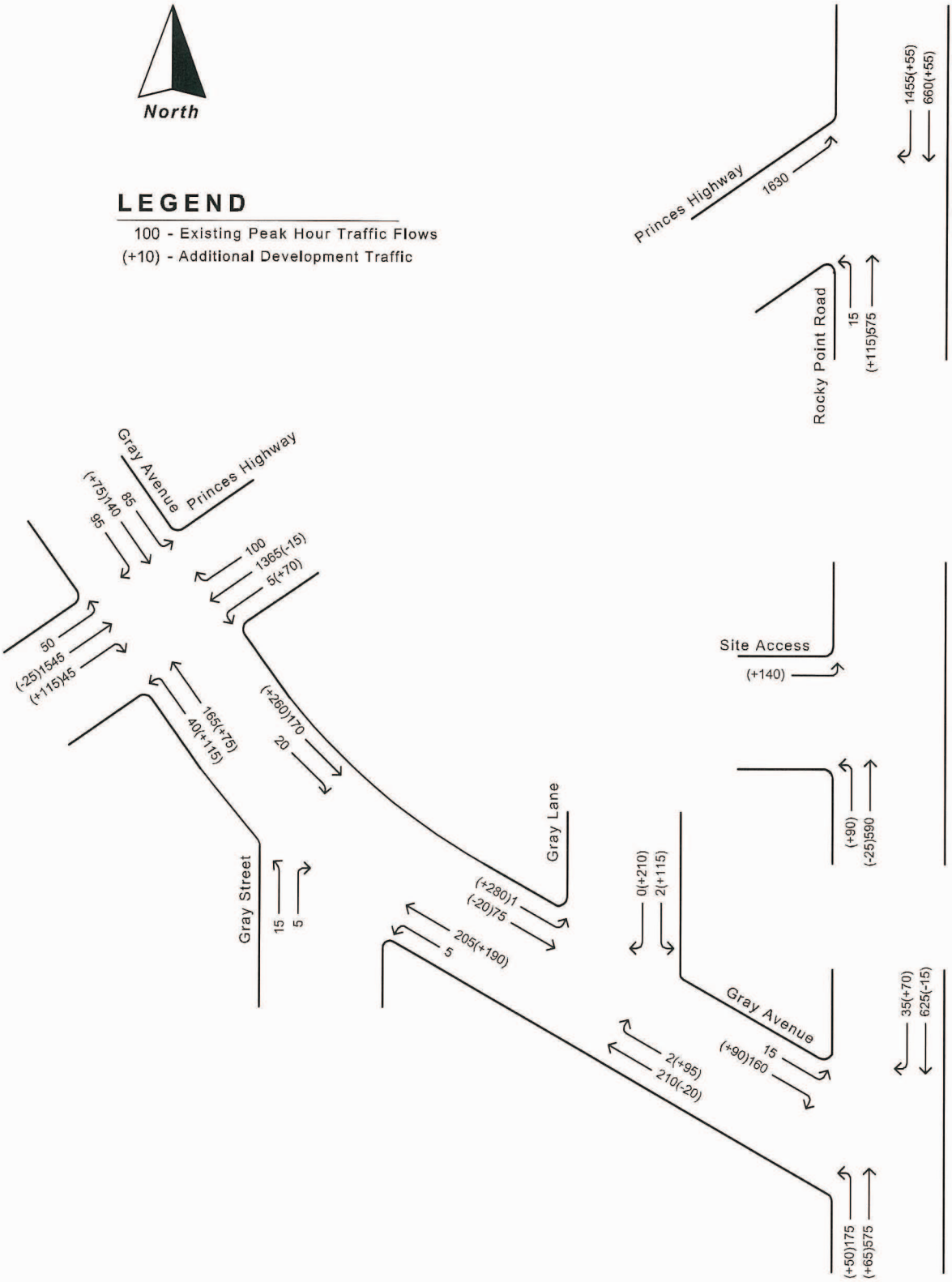
Figure 2



Existing Saturday midday peak hour traffic flows plus development traffic

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Figure 3