



**ANNEXURE 3.      TRAFFIC ENGINEER'S REPORT**

# PROPOSED PRIVATE PLAN CHANGE

**509-513 SANDRINGHAM ROAD**

**SANDRINGHAM**

**TRAFFIC IMPACT ASSESSMENT**

*Prepared By:*  
**Bryce Hall**

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PO Box 60-255, Titirangi, Auckland  
Level 1, 400 Titirangi Road  
cnr Rangiwai Road, Titirangi Village

Tel: (09) 817 2500 Fax: (09) 817 2504  
E-mail: [tpc@trafficplanning.co.nz](mailto:tpc@trafficplanning.co.nz)

DIRECTORS  
John M. Burgess, B.Eng, C.Eng, MICE, MIPENZ  
Jos Vroegop, BE (Civil), ME, MIPENZ

## 1.0 INTRODUCTION

This report examines and describes the traffic engineering effects of a Proposed Private Plan Change on a site located at 509-513 Sandringham Road in Sandringham. The report specifically describes the existing traffic environment, the proposal, District Plan provisions, the traffic effects of the proposal and an assessment against the relevant District Plan criteria.

The site is located on the western side of Sandringham Road almost directly opposite Halesowen Avenue and is currently zoned Residential 6b under the Auckland City District Plan – Isthmus Section. The proposed plan change seeks to change the Residential 6b zone to a Business 2 zone.

By way of a summary of the detail contained within this report, it can be stated that the traffic planning effects of a development contemplated by the proposed plan change can be accommodated on the road network without compromise to its function, capacity or safety.

## 2.0 EXISTING TRANSPORT ENVIRONMENT

### 2.1 The Road Network

The site is located on the western side of Sandringham Road almost directly opposite Halesowen Avenue. It is bounded by residential development to the north and west with commercial development located immediately to the south and by Sandringham Road to the east.

Along the eastern side of the site, Sandringham Road provides a link between Kingsland and Mount Roskill as well as an alternative north-south route for this part of the Auckland Isthmus to the Mount Eden Road and Dominion Road routes located further to the east. Activity on the opposite eastern side of Sandringham Road is a mix of residential and commercial in nature. Sandringham Road is classified as a District Arterial Road in the Auckland City District Plan - Isthmus Section. District Arterial Roads cater for major traffic movement between various areas of the city with a predominant traffic carrying function.

In this location, Sandringham Road has a kerb to kerb carriageway width of some 14 metres which provides for one traffic lane in each direction together with on-street parking and a painted flush median. There are some short lengths of “no stopping at all times” parking restriction marked on Sandringham Road in the general vicinity of the site.

Traffic counts carried out on Sandringham Road in May 2005, north of Edendale School, are summarised in Table 1.

Table 1 - Sandringham Road Traffic Counts

Direction	Weekday	Saturday	Sunday	Weekday		
				AM Peak Hour	Midday Peak Hour	PM Peak Hour
Northbound	10,239	9,957	8,166	1,182	846	682
Southbound	9,540	9,417	7,880	439	732	1,136
TOTAL	19,779	19,374	16,046	1,621	1,578	1,818

## 2.2 Traffic Safety

Information from the Land Transport Safety Authority's "Crash Analysis System" for the five year period, January 2002 to December 2006, indicates that a number of crashes have been reported on Sandringham Road between Coyle Street in the north and Calgary Street to the south.

One crash has been reported at the intersection of Sandringham Road and Calgary Street. It involved a northbound car on Sandringham Road hitting a car that was parking / unparking.

One crash has been reported at the intersection of Sandringham Road and Halesowen Avenue. It involved a northbound car on Sandringham Road hitting a car that was parking / unparking.

Eleven of the crashes were reported at mid-block (non-intersection) locations on Sandringham Road between Coyle Street and Calgary Street including three involving injury. Of the crashes reported, three involved rear end collisions, two involved vehicles being hit while doing u-turns and two involved pedestrians being hit crossing the road.

Overall, it is considered that the crash analysis does not indicate a traffic safety problem in the vicinity of the subject site.

## 2.3 Public Transport Accessibility

The site is located in close proximity to the bus routes that run along both Sandringham Road and Balmoral Road. As such, the site has good accessibility to existing public transport routes.

## 3.0 THE PROPOSAL

### 3.1 Description

The proposal involves the rezoning of two sites with a combined area of 938m<sup>2</sup> to Business 2 from the current residential zone. The Business 2 zone has a range of permitted activities including but not limited to:

- Care centres,

- Community welfare facility,
- Education facility,
- Funeral parlour,
- Healthcare services,
- Offices,
- Retail.

The zone rules provide for a maximum height of 12.5 metres and a basic floor area ratio (FAR) of 2 to 1. The rules also suggest a maximum floor area of any activity shall not exceed 999m<sup>2</sup> as a permitted activity. Applications for floor areas in excess of 1,000m<sup>2</sup> would require a Resource Consent.

With the two sites having an area of 938m<sup>2</sup> and a basic FAR of 2 to 1, the maximum floor area able to be achieved on the two sites would be 1,876m<sup>2</sup> as a permitted activity.

Of the activities permitted for the zone, the highest potential traffic generation would occur if developed as a retail activity or healthcare services followed by offices. For the purpose of this assessment, the following assumptions have been made in respect of a potential future development of the site:

- All required parking is provided in a basement parking area,
- Retail activities with a GFA of 938m<sup>2</sup> are located at ground floor level,
- Office activities with a GFA of 938m<sup>2</sup> are located at first and second floor levels.

### 3.2 Traffic Generation

The traffic generation of any development for the site will consist of that associated with the different activities to be established on the site. In this respect, typical traffic generation rates from the Transfund New Zealand Research Reports (TRR) 209 and 210 "Trips and Parking Related to Land Use" and the RTA publication "Guide to Traffic Generating Developments" have been sourced as well as surveys that Traffic Planning Consultants have carried out to provide an appropriate estimate of the traffic likely to be generated by the proposed development.

In relation to the traffic generation of retail activities, it is noted that traffic generation does vary significantly depending on the location and nature of the retail activity. Transfund New Zealand Research Report 209 classifies retail activities into five broad categories. These categories together with their associated traffic generation are shown in Table 2.

Table 2 – Retail Traffic Generation Rates

Retail Classification	Peak Hour Vehicle Trip Rate (per 100m <sup>2</sup> of GFA)	Daily Vehicle Trip Rate (per 100m <sup>2</sup> of GFA)
Suburban supermarket	25	130
Primary road store	41	180
Neighbourhood store	36	150
Service stations	103	865
Drive-in – fast foods	60	370

The proposed retail activities likely to establish in this location would fit within the classification of either a “primary road store” or a “neighbourhood store” with associated pm peak hour traffic generation rates of between 36 and 41 traffic movements per hour per 100m<sup>2</sup> of GFA and a daily traffic generation rate of 150 to 180 traffic movements per day per 100m<sup>2</sup>.

Traffic generation surveys carried out by Traffic Planning Consultants Ltd at other similar retail activities as those already established along this part of Sandringham Road indicates traffic generation rates of 7 to 18 traffic movements per hour per 100m<sup>2</sup> of GFA during the midday peak and 5 to 12 traffic movements per hour per 100m<sup>2</sup> of GFA during the afternoon peak hour. Daily traffic generation rates would be in the range of 50 to 120 traffic movements per 100m<sup>2</sup> of GFA per day. These traffic generation rates are considered to be more representative of the actual traffic generation of the possible retail activities on the site than those indicated in TTR 209 and have therefore been used in this assessment.

In relation to the retail traffic generation rates, these are for vehicle movements at the access point to the site. However, in most cases, the traffic generation at the access point is different from the amount of additional traffic added to the road network. Typically, retail activities attract a portion of their trips from traffic passing the site on the way from one location to another. As a rule, retail traffic generation includes three types of trips:

1. Primary Trips

These are trips made for the specific purpose of visiting the shopping centre. The shopping centre is the primary reason for making the trip. This would be encapsulated within a home to shop to home combination of trips.

2. Pass-By Trips

These are trips made as intermediate stops on the way from an origin to a primary destination. Pass-by trips are attracted from traffic passing the site on an immediately adjacent road that provides direct access to the shopping centre. These trips do not require a diversion from another road.

### 3. Diverted Linked Trips

These are trips attracted from the traffic volume on roadways within the vicinity of the generator but which require a diversion from that road to another road to gain access to the site. These roads would include local roads or arterial roads adjacent to the shopping centre but without direct access to the site.

The results of extensive research into the incidence of “pass-by” and “diverted linked” trips is reported in the Institution of Transport Engineers (ITE) publication “Trip Generation Handbook”, March 2001. For the size of the retail activities, the publication suggests that the incidence of “pass-by” type trips would be in the range of 50% to 70%. Similarly, the RTA, through a report prepared by Christopher Hallam & Associates Ltd in June 1995, suggests an average “pass-by” trip rate of about 40 percent. Thus, a significant proportion of the retail trips attracted to the proposed development will be from vehicles already passing the site on Sandringham Road.

For offices Table 7.1 in TRR 209 provides summary design trip generation rates. Office activities are separated into three categories with the design traffic generation rates per 100m<sup>2</sup> of GFA as indicated in Table 3.

Table 3 – Office Traffic Generation Rates

Office Classification	Peak Hour Vehicle Trip Rate	Daily Vehicle Trip Rate
Post office (high visitor)	3.7	80
Fringe centre (few visitors)	2.0	15
City centre (few visitors)	1.2	14

Of the three office classifications, the site and the office space located within any proposed development would fall within the “fringe centre” classification with a peak hour trip rate of 2 traffic movements per hour per 100m<sup>2</sup> of GFA and a daily rate of 15 traffic movements per day per 100m<sup>2</sup> of GFA.

The RTA publication indicates peak hour traffic generation rates for offices of 2 traffic movements per hour per 100m<sup>2</sup> of GFA which is consistent with that indicated in the Transfund New Zealand publication although the daily rate is lower at 10 traffic movements per day per 100m<sup>2</sup> of GFA.

Given the above, design peak hour traffic generation rates of 2 traffic movements per hour per 100m<sup>2</sup> have been used. Daily traffic generation rates in the range of 10 to 15 traffic movements per day per 100m<sup>2</sup> of GFA have also been used. During the morning peak hour, 80 percent of traffic movements will be arrivals and 20 percent departures while this pattern will be reversed during the afternoon peak hour.

Based on the above, Table 4 indicates the estimated traffic generation of a potential development fitting within the Business 2 controls for the site as a permitted activity.

Table 4 – Estimated Traffic Generation

Activity	Size	Daily Traffic	AM Peak Hour	PM Peak Hour
Retail	938m <sup>2</sup>	470-1,130	5-11	50-110
Office	938m <sup>2</sup>	94-140	19	19
<b>TOTAL</b>		<b>564-1,270</b>	<b>24-30</b>	<b>69-139</b>

### 3.3 Vehicle Access

Vehicle access to any parking provided on the site would need to occur via an appropriately designed vehicle crossing from Sandringham Road. In considering vehicle access to a site, it is important that:

- adequate sight distance is provided, and
- the access is designed to ensure safe traffic and pedestrian movement.

The appropriate standard for sight distance is the Land Transport Safety Authority publication “Guidelines for Visibility at Driveways”. There are two components to the sight distance measurement. The first being the Sight Distance requirement and the second being the Lines of Clear Sight. The sight distance / lines of clear sight required is dependent upon the traffic generation of the proposal, the 85th percentile speed of vehicles on the frontage road and also the classification of the frontage road.

Table 5 indicates the required and available sight distances from the Sandringham Road vehicle access.

Table 5 – Sandringham Road Vehicle Access Sight Distance

Sight Distance			
Direction	Speed	Required Sight Distance	Available Sight Distance
To the north	60 km/hr	115 metres	>130 metres
To the south	60 km/hr	115 metres	>130 metres
Lines of Clear Sight			
Direction	Speed	Required Sight Distance	Available Sight Distance
To the north	60 km/hr	115 metres	>130 metres
To the south	60 km/hr	115 metres	>130 metres

As can be seen, the available “sight distance” and “lines of clear sight” available in both directions exceeds that recommended and is therefore considered to be acceptable.

Any vehicle access provided to a development on the site would need to be adequately designed to minimise the potential for traffic congestion at the access point and also to minimise any impacts on pedestrian amenity on this part of Sandringham Road.

## 4.0 TRAFFIC IMPACTS OF THE PROPOSAL

The traffic related impacts of the proposal centre on:

- the impacts of the potential additional traffic generated by the proposal,
- the impacts on traffic and pedestrian safety.

### 4.1 Impacts of Traffic Generated by the Proposal

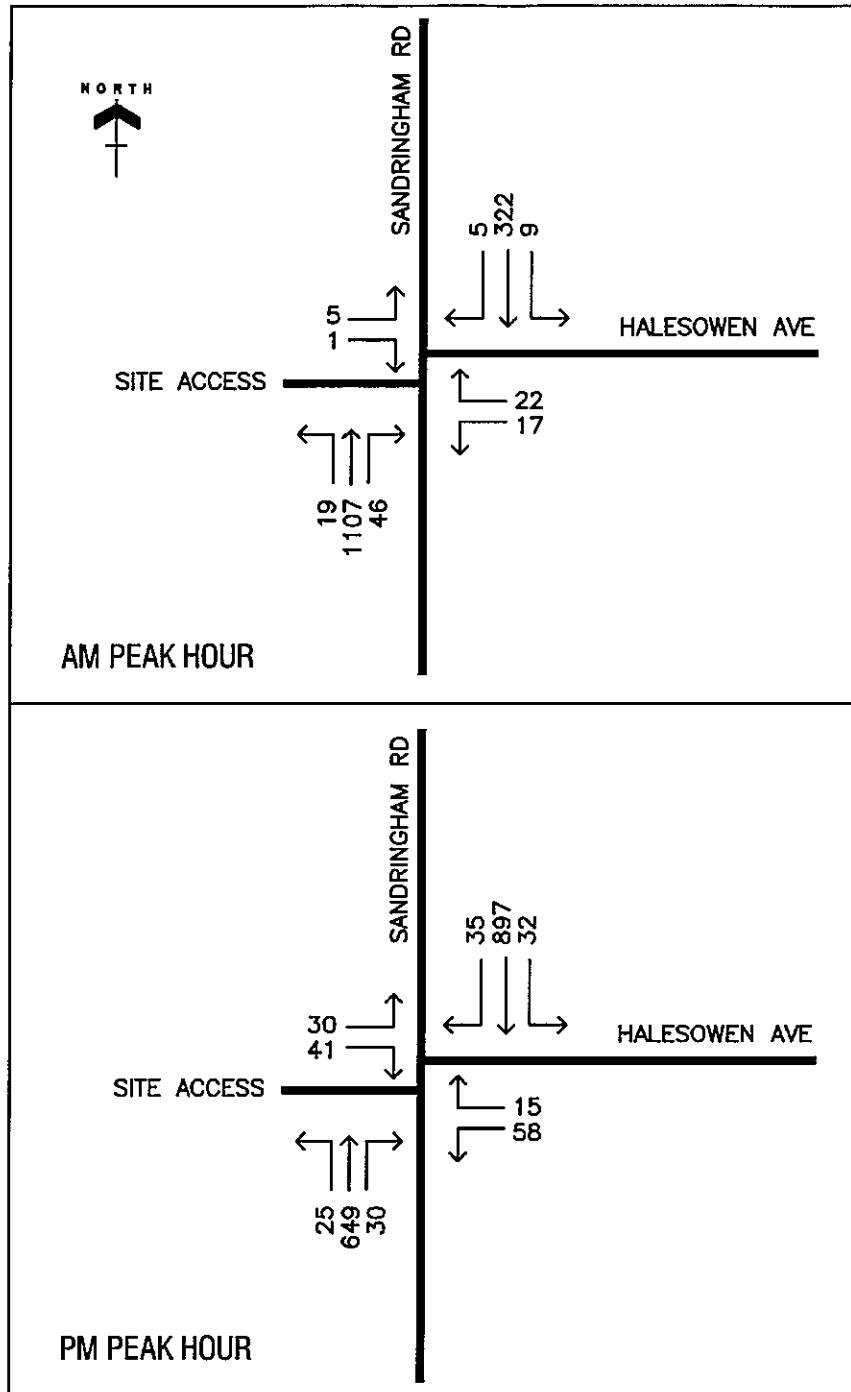
The main effect on the road network associated with a development of the site conforming to the Business 2 zone will be that associated with traffic turning to and from the vehicle crossing and driveway used to access the site. Turning movements to and from the site will be split between entry / exit movements.

On a daily basis, a Business 2 development could be expected to generate in the range of 564 to 1,270 traffic movements per day. Peak hour traffic generation would be in the range of 70 to 140 traffic movements per hour. The greatest effect as a result of the traffic generated by the proposal will be associated with those vehicles turning right into the site from Sandringham Road.

Figure 1 indicates the expected peak hour turning movements at any vehicle access provided to Sandringham Road from the site. Traffic generated by the proposed development has been assigned to and from the road network in the approximate proportion of existing turning movements with some modification according to intersection capacity, existing levels of congestion (particularly along Sandringham Road during the am peak hour), trip type and the locations of major attractions and sources of trip productions.

The traffic assignment has then been based on achieving a “realistic” distribution of trips over the road network, rather than simply assigning traffic to the arterial routes irrespective of existing congestion.

Figure 1 – Estimated Peak Hour Turning Movements



The effects of the operation of a possible Sandringham Road vehicle access with the turning movements indicated in Figure 1 has been determined through analysis with the SIDRA INTERSECTION analysis program. The detailed results of this analysis are summarised in Table 6.

Table 6 – Sandringham Road Vehicle Access SIDRA Analysis Results

Approach	Lane	AM Peak Hour			PM Peak Hour		
		Deg. Satn.	Ave. Delay	Queue Length	Deg. Satn.	Ave. Delay	Queue Length
Sandringham Rd (northbound)	LT	0.013	6.4	0.1	0.018	6.5	0.1
	TH	0.568	0	0	0.337	0	0
Sandringham Rd (southbound)	TH	0.165	0	0	0.460	0	0
	RT	0.020	20.0	0.1	0.087	10.6	0.2
Site Access	LT / RT	0.024	19.0	0.1	0.334	26.1	1.5
Intersection			0.2			1.4	

The following provides a key to the items shown in the table:

- |                                  |  |
|----------------------------------|--|
| LT – Left Turn Traffic Movement  | Deg. Satn. – Movement Degree of Saturation           |
| TH – Through Traffic Movement    | Ave. Delay – Average Delay (in seconds) per vehicle  |
| RT – Right Turn Traffic Movement | Queue Length – 95 percent queue length (in vehicles) |

The results of the analysis for the Sandringham Road vehicle crossing indicate that it operates at an acceptable level. While vehicles turning right onto Sandringham Road do experience some delay, this is within that experienced by many motorists turning right onto the arterial road network.

Furthermore, vehicles exiting the site have adequate good sight distance available which makes it easier to select appropriate gaps in the traffic stream.

Overall, the SIDRA analysis indicates that the turning movements generated by the proposal can be accommodated by the proposed vehicle crossing.

#### 4.2 Impacts on Traffic and Pedestrian Safety

Analysis of the crash records does not indicate a traffic safety problem in the vicinity of the site. The greatest potential impact on traffic and pedestrian safety associated with the proposal will occur at the vehicle access to the site on Sandringham Road when vehicles are entering and exiting the subject site.

In respect of the impact on traffic and pedestrian safety associated with the vehicle access, the following is noted:

- Vehicles exiting the site have adequate sight distance available which makes it easier to select appropriate gaps in the traffic stream.
- The vehicle access to the site will need to ensure good levels of inter-visibility are provided between vehicles entering and exiting the site and pedestrians using the footpath along the site frontage.
- Separate pedestrian access will need to be provided to the development from Sandringham Road.

These aspects combine to ensure that the overall effect of the proposal on traffic and pedestrian safety in the area will be no more than minor.

## 5.0 DISTRICT PLAN ASSESSMENT CRITERIA

The Auckland City District Plan set out a number of traffic related assessment criteria for resource consent applications. These are:

- *Accessibility of the site.*

The site adjoins Sandringham Road which is an Arterial Road and provides good accessibility to the subject site.

- *Current traffic problems in the area eg high accident location.*

Analysis of the crash records kept by the Land Transport Safety Authority does not indicate a traffic safety problem in the area of the site that would be exacerbated by the proposed café activity.

- *Existing and probable future traffic volumes on adjacent roads.*

Traffic flows on Sandringham Road will increase over time as a result of development in the area as well as further afield. This may necessitate changes to the on-street traffic management on Sandringham Road.

- *Ability of the adjacent existing or planned roading systems to handle increased traffic and the feasibility of improving the roading system to handle the increased traffic volume.*

The estimated traffic generated by the proposal is in the range of 560 to 1,270 traffic movements per day with peak hour traffic flows of up to 140 traffic movements per hour.

The existing traffic flows on Sandringham Road are in the order of 20,000 vehicles per day. The increase in traffic associated with the proposed development is small in comparison and will be barely noticeable to other road users on Sandringham Road.

- *Traffic congestion and pedestrian/vehicle conflict likely to be caused by the proposal.*

The incidence of traffic congestion and pedestrian/vehicle conflict as a result of the proposal will be minimal given the ability to design any vehicle access to an appropriate standard.

- *Vehicle access to and from the site must:*
  - *ensure adequate sight distances and prevent congestion caused by ingress and egress of vehicles.*
  - *be sufficiently separated from pedestrian access to ensure the safety of pedestrians.*

Vehicle access from Sandringham Road can be provided with good sight distance and designed to be sufficiently separated from the main pedestrian access to any development to ensure that pedestrian safety is not compromised.

Overall, the proposal is considered to be consistent with these assessment criteria.

## 6.0 CONCLUSIONS

Based on the analyses described in this report, the following conclusions can be made in respect of the proposed private plan change at 509-513 Sandringham Road in Sandringham:

- The estimated traffic generation of the proposal is in the range of 560 to 1,270 traffic movements per day with peak hour traffic generation of up to 140 traffic movements per hour.
- Vehicle access to the site can be provided to an appropriate standard.
- The traffic generated by the proposal can be accommodated on the road network with little or no effect.

Overall, it is considered that the traffic and parking effects of the proposal can be accommodated on the road network without compromising its function, capacity or safety. Therefore the overall traffic engineering effects of the proposed development are considered to be de minimis.



Bryce Hall