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**TRAFFIC IMPACT STATEMENT
PROPOSED METAL RECYCLING FACILITY
191 MILLER ROAD
CHESTER HILL**

Ref: 05-132

SEPTEMBER 2006

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APPENDICES

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1. INTRODUCTION

Thompson Stanbury Associates has been engaged by CMA Corporation to prepare a traffic impact assessment to accompany a Part 3A Major Project submitted to the Department of Planning regarding a proposal for the construction and use of a portion of No. 191 Miller Road, Chester Hill as a materials recycling facility. The purpose of this report is to assess and document likely traffic impacts resulting from the proposal and to recommend, where appropriate, treatments to ameliorate such impacts. In this regard, assessment is made of the following:

- Proposed on-site parking provision as it relates to employee parking demand and Bankstown City Council's (herein referred to as Council) requirements;
- Existing road network conditions within the vicinity of the site including traffic volumes and general traffic safety;
- Identifying traffic likely to be generated by the subject development with particular regard to the movement of heavy vehicles;
- Assess the ability of the surrounding road network to accommodate additional traffic movements projected by the proposal; and
- Proposed access arrangements and internal circulation patterns including ingress / egress to Miller Road, and proposed heavy vehicle flow paths and loading areas.

Reference has been made to the Roads & Traffic Authority's *Guide to Traffic Generating Developments* and the Council's Development Control Plans No. 1 and 10 relating to parking and industrial developments respectively.

This Practice has consulted with the Roads & Traffic Authority's Development Impact Unit in relation to the subject proposal. The Unit has indicated that the development is of sufficient scale and importance that the matter should be referred to the Authority for assessment as part of the application process.

The report should be read in conjunction with site plans prepared by Doerfler Borg submitted accompanying the subject application.

2. SITE DETAILS

2.1 Site Location

The subject site is located on the eastern side of Miller Road approximately 250m south of its intersection with Christina Road, Chester Hill. This location is illustrated within a neighbourhood context by **Figure 1** shown overleaf.

2.2 Site Description

The site is described as Lot 8 within deposited Plan 1039882 and is known as 191 Miller Road, Chester Hill. The site in total is predominantly trapezoidal in shape and has a frontage of 168.27m to Miller Road. The northern boundary runs along the Main Southern Railway line for length of approximately 320m. The total site has an area of 6.543ha of which approximately 2ha will be taken up by the proposed facility. The remainder of the site will be utilised for future employment generating uses subject to separate approvals.

2.3 Existing Use

The site has been utilised in the past for a range of industrial purposes mostly associated with chemical and fertiliser manufacturing. The site comprises developed by underutilised industrial land. Existing improvements within the development zone (forming part of this proposal) include an administration building, parking areas, concrete and bitumen driveways, open storage areas and utility services. These existing improvements will be used as part of the project.

2.4 Surrounding Uses

The following provides a description of the surrounding land-use characteristics:

- The Main Southern Rail Line bounds the site to the north. Further to the north, a range of primarily residential uses in conjunction with a nursing home, fire station, industrial units and a child care centre occupy land;
- Industrial uses such as ‘Aperio Group Packaging’ and ‘Aqua Cool’ refrigeration manufacturing occupy land to the south fronting Orchard Road whilst land further to the south primarily accommodates residential dwellings;
- Other industrial sites, residential and commercial areas bound the site to the east; and
- A transport intermodal / terminal bounds the western side of Miller Street whilst other industrial developments accommodate land further to the west along the Main Southern Railway.

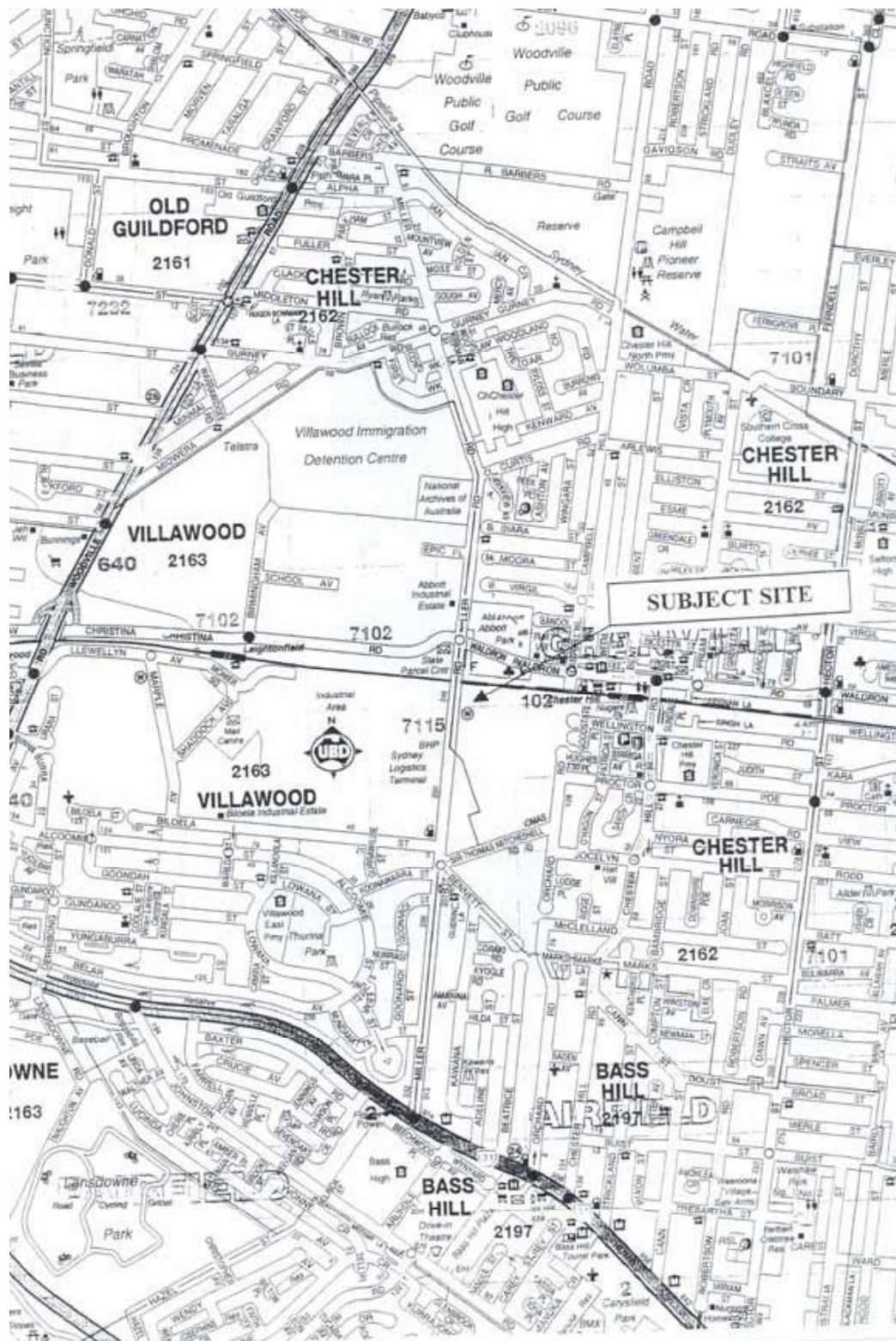


FIGURE 1 – SITE LOCATION WITHIN A NEIGHBOURHOOD CONTEXT

3. PROPOSED DEVELOPMENT

3.1 Site Operations and Built Form

The subject application relates to the construction of the subject portion of No. 191 Miller Road as a materials recycling facility for the processing of ferrous and non-ferrous metal waste. The following provides a description of the development whilst full details are provided within an Environmental Assessment as provided by BBC Consulting Planners:

- The use of the site for the storage and processing of ferrous and non-ferrous metals. Processing will be undertaken with an industrial grade shearer and shearing implements fitted onto excavators. This machinery will cut and sort metal materials to a size suitable for reuse and export;
- The use of an existing two-storey building as an administration headquarters with ancillary staff and visitor car parking within an existing sealed car park;
- The removal of existing soil and concrete stockpiles within the centre of the site and the pouring of concrete in any areas of unsealed surfaces to form a continuous hardstand area for the storage and processing of metals;
- The upgrade of existing stormwater management infrastructure as required;
- The installation of a new electrical substation to service the proposed facility and future development within the site;
- The installation of all necessary physical mitigation measures to preclude deleterious noise, dust and water emissions; and
- The line marking of new truck parking bays within the site at the rear of the existing administration building.

The materials are proposed to be brought to the site by CMA's own vehicles, CMA's contractor's vehicles and by the general public. Materials are proposed to be transported in trucks up to the size of 19m long B-doubles. However, the most frequent truck types are anticipated to be small 1 or 2 tonne trucks. Once processed, the majority of materials will be transported to Port Kembla for export overseas. Some materials however, will be on-sold to metal foundries in Sydney for smelting and re-use. It is anticipated that the site will accommodate an average of approximately 40 – 50 trucks per day.

The proposed operating hours for the facility are 7.00am to 6.00pm Monday to Saturday. The facility will not be operational on Sundays and public holidays.

A maximum of 40 administration and processing staff are proposed to be employed on-site with the administration staff shift comprising 7.00am – 5.30pm and the processing staff shift comprising 7.00am – 6.00pm.

4. SITE ACCESS & INTERNAL CONSIDERATIONS

4.1 Access Arrangements

Access to the subject development is proposed to be maintained via the existing separated ingress and egress driveway servicing Miller Road. The existing access driveway provides a 10m wide ingress driveway and an 8m egress driveways separated by a raised concrete central island.

In order to undertake an assessment of the existing design of the access driveways, reference is made to the Roads & Traffic Authority in its *Guide to Traffic Generating Developments*. This publication outlines recommended driveway characteristics based on provisions set out within the Australian Standards (AS 2890.1 – 2004 and AS 2890.2 –2002). These standards are based on various site characteristics such as the number and classification of vehicles utilising the access driveway and the order of the access road.

Separate ingress / egress driveways of between 8 and 10m each is recommended by AS 2890.1 – 1993 as well as the Roads & Traffic Authority's *Guide to Traffic Generating Developments* where heavy vehicles are to be accommodated on-site. The proposed heavy vehicle access arrangements are therefore considered satisfactory in terms of driveway width.

4.2 Parking Provision

The existing passenger vehicle parking area located adjacent to the existing administration building is proposed to be utilised by the subject operation. This parking area accommodates a total of 74 spaces. In addition to passenger vehicle parking area, a heavy vehicle storage and loading / unloading area is proposed to be provided providing a total of 10 spaces.

Council provides locally sensitive parking requirements within DCP 1 in order to ensure that new developments provide adequate off-street parking. DCP 1 provides the following parking requirements for road transport terminals (the requirements for a road transport terminal have been used because they would be closely related to the actual requirements of this proposed material recycling facility):

Sufficient off-street employee and visitor parking to satisfy demand, plus 1 truck space for each vehicle present at the time of peak vehicle accumulation on the site for both fleet and contract-operator vehicles.

The existing passenger vehicle parking area containing 74 spaces is considered capable of accommodating the proposed staffing requirements in conjunction with any possible instantaneous visitor demand. However, in order to undertake an assessment of the appropriateness of the proposed truck storage and loading / unloading area, the truck operational characteristics of the subject site has to be considered based on an average of 4 – 5 trucks being on-site at any one time (utilising an average of 50 trucks entering the site per day with a likely one hour service time) The proposed heavy vehicle parking area is therefore projected to suitably accommodate the normal operational demand of the proposal whilst also providing

sufficient capacity to accommodate short-term influxes of vehicles associated with increased anticipated demand.

4.3 Internal Circulation

The access driveway off Miller Street is proposed to provide connectivity to an internal roadway which circulates around the existing administration building also providing connectivity to the existing and proposed passenger and heavy vehicle parking areas. In addition, the internal roadway is proposed to provide connectivity to the proposed ferrous and non ferrous material processing and storage yards located within the eastern portion of the site.

Passenger vehicle parking spaces are proposed to be provided with minimum dimensions of 2.5m x 5.5m providing minimum adjacent aisle widths of 6m in accordance with AS 2890.1-2004. The roadway circulation around the passenger vehicle parking area providing connectivity to the heavy vehicle parking and loading / unloading area in conjunction with the materials storage and processing yards is proposed to provide a minimum width of 7m in accordance with the requirements of AS 2890.2-2002.

The heavy vehicle parking spaces are proposed to provide minimum dimensions of 4m x 19m being capable of accommodating vehicles up to and including the size of 19m long B-doubles and semi-trailers. The trucks parking / loading / unloading spaces are proposed to be angled in order to facilitate forward entry and egress movements thereby minimising (if not altogether deleting) the requirement for any reversing manoeuvres on-site.

Once located within the heavy vehicle parking spaces, it is proposed that forklifts will unload / load the vehicles transporting materials between the loading / unloading areas and the storage / processing yards. The application of 19m long semi-trailer turning templates as provided by AS 2890.2-2002 on the site plans indicates that such vehicles will be able to access the site, manoeuvre through the site, access the parking / loading / unloading area prior to manoeuvring again to exit the site. All movements are able to be undertaken in a forward direction with a reasonable level of safety and efficiency.

In addition to the above, the passenger vehicle parking area has been assessed by the overlaying of B85 passenger vehicle turning templates as provided by AS 2890.1-2004 on the site plans. It is concluded that the parking bays and circulation aisles within the site provide adequate manoeuvring room for passenger vehicles. In consideration of this and the above discussion, this Practice concludes that the internal site layout is satisfactory to accommodate the anticipated manoeuvring requirements in a safe and efficient manner.

5. EXISTING TRAFFIC CONDITIONS

5.1 Traffic Functions and Conditions

Miller Road with Barbers Road provides north-south connectivity between Woodville Road in the north (albeit restricted access) and Hume Highway in the south. Between Hume Highway and Christina Road / Waldron Road, Miller Road is classified as a regional road under Council's road hierarchy whilst it only provides a local function further to the north. Miller Road generally provides one through lane in each direction however widening is provided to accommodate exclusive turning lanes on approach to major junctions.

Adjacent to the site, Miller Road provides a standard 13m wide carriageway allowing for one through lane in each direction whilst on-street parking is also allowed on both sides of the road. To the north of the site, the Miller Road pavement narrows to an approximately 8m wide separated carriageway in the vicinity of the railway overbridge. Miller Road widens again to the north of the overbridge to 13m to accommodate four trafficable lanes on approach to its intersection with Christina Road and Waldron Road, which operates under two-lane circulating roundabout control.

Miller Road to the south of the site forms a roundabout junction with Sir Thomas Mitchell Road and Bennett Street, whilst further south it forms a signalised T-junction with Hume Highway. The section of Miller Road between Christina Road / Waldron Road and the BHP development to the south-west of the subject site is a Roads & Traffic Authority approved B-double route. Christina Road, an east-west regional road providing access between Auburn Road and The Horsley Drive (with other roads), provides an extension of the B-double route between the site and Woodville Road. Waldron Road extends to the east to provide connectivity to Carlingford Street and Park Road. Heavy vehicular traffic flow is however restricted along Waldron Road via the provision of a sign posted 3 tonne load limit.

5.2 Traffic Volumes

5.2.1 Roads & Traffic Authority AADT – Miller Road

Annual Average Daily Traffic (AADT) volumes have been compiled by the Roads & Traffic Authority and published in their *Traffic Volume Data for Sydney Region* (1999). AADT indicates average daily traffic calculated over an entire year, and in this regard, accounts for any seasonal variations that may exist. The relevant counting station is 43.232 – Miller Road at Regents Park Railway Line. AADT volumes for the available years are shown overleaf in **Table 1**.

	1993	1998	1999	2002	2006*
AADT	10,828	11,993	11,832	10,629	9,332

* The 2006 AADT has been extrapolated utilising the average rate of decline experienced between 1998 and 2002

5.2.2 Automatic Survey – Miller Road

Further to the above Roads & Traffic Authority AADT volumes, reference is made to seven-day automatic counts undertaken on behalf of this Practice in association with a separate matter during 16 – 23 September, 2003. **Table 2** summarises volumes recorded by the automatic surveys whilst a more detailed summary is provided within as **Appendix 1**.

	Northbound	Southbound	Total
5-day AADT	5,541	5,768	11,309
7-day AADT	4,781	5,035	9,816
AM Peak Hour	500	507	1,007
PM Peak Hour	514	538	1,052

Tables 1 & 2 indicate that between 9,000 - 10,000 vehicles utilise Miller Road daily in the vicinity of the subject site. It is noted that there is no significant north / south directional volume split during peak periods. Further, peak volumes shown above occurred both during and outside of usual peak periods, that is, between 7am – 9am and 4pm – 6pm. This indicates that traffic volumes along the subject route are generally fairly consistent throughout the day averaging around 300 vehicles per hour in each direction (see **Appendix 1**).

5.2.3 Intersection of Miller Road and Christina Road – Peak Hour

In order to obtain an indication of the level of service of the surrounding road network during peak times, reference is made to manual traffic surveys undertaken on behalf of this Practice at the intersection of Miller Road and Christina Road in association with a separate matter. Surveys at the intersection were undertaken during the morning and afternoon peak periods (between 7.00am – 9.00pm and 4.00pm - 6.00pm) on 19 August 2003. Whilst it is noted that these surveys are now approximately 3 years old, recent check surveys have indicated that, if anything, existing traffic demands are less than that surveyed in 2003.

Figure 2 overleaf provides a graphical representation of the afternoon movement profile obtained from the above manual traffic surveys whilst **Appendix 2** contains full details.

FIGURE 2
AUGUST 2003 PEAK HOUR TRAFFIC MOVEMENTS
INTERSECTION OF MILLER ROAD AND CHRISTINA ROAD

Legend: AM/PM

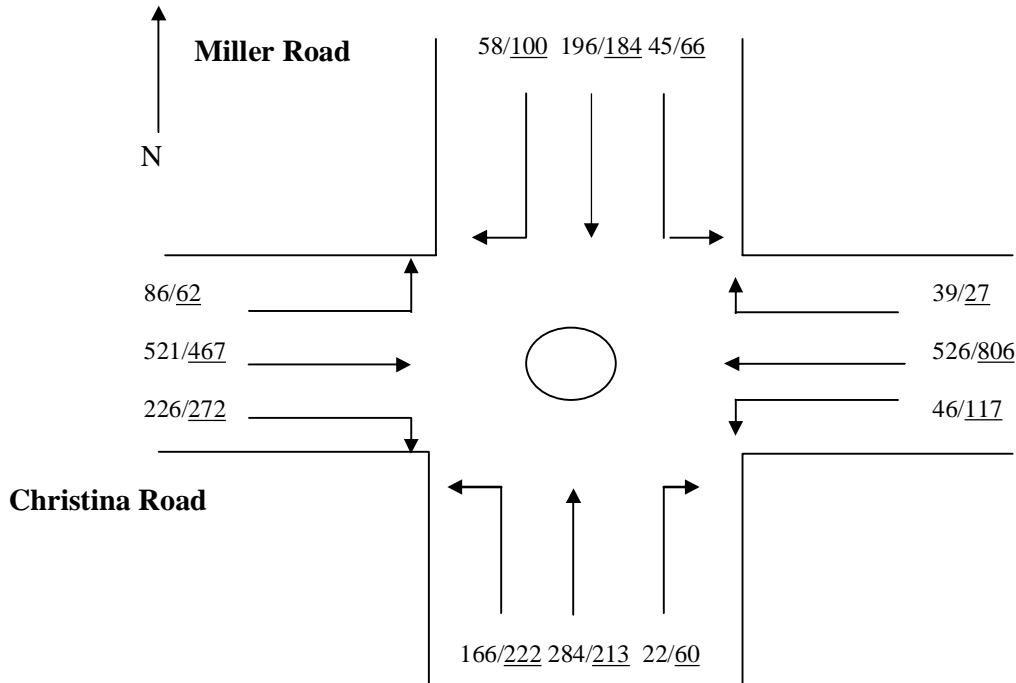


Figure 2 indicates that whilst Miller Road north and south approaches accommodate significant peak hour traffic volumes, Christina Road through movements generally dominate the movement profile. Whilst significant traffic volumes are accommodated at the above intersection and the surrounding road network adjoining the subject site during peak and non-peak times, our observations have indicated that vehicles generally are able to manoeuvre with little impedance and with a reasonable level of service.

5.2.4 Junction of Hume Highway and Miller Road – Peak Hour

In addition to the previously undertaken peak hour intersection surveys, this Practice has recently undertaken traffic surveys at the junction of Hume Highway and Miller Road. Surveys were undertaken between 7.00am – 9.00am and 4.00pm – 6.00pm on 23 August 2006. **Figure 3** overleaf provides a summary of the results of the survey whilst full details are contained within **Appendix 2** for reference.

FIGURE 3
AUGUST 2006 PEAK HOUR TRAFFIC MOVEMENTS
INTERSECTION OF HUME HIGHWAY & MILLER ROAD

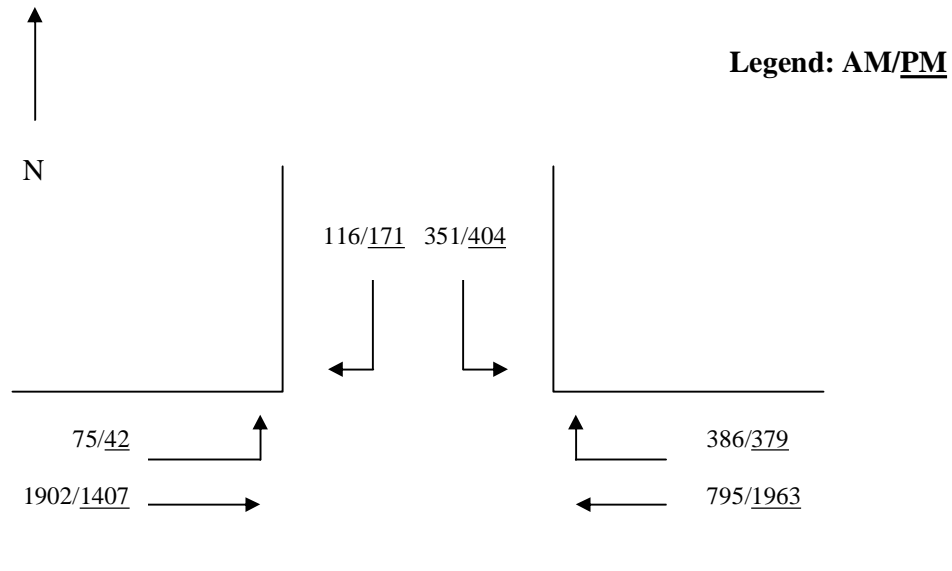


Figure 3 indicates that despite notable turning movements associated with Miller Road access movements, through Hume Highway traffic flows significantly dominate the movement profile. In this regard, the Highway through traffic is somewhat tidal during peak periods with eastbound flow dominating during the morning peak and westbound flow dominating during the evening peak.

5.3 Vehicle Classification

The automatic tube counting surveys undertaken of Miller Road were able to distinguish between vehicle classifications at the count location approximately adjoining the site. These counts were therefore able to provide us with an accurate indication of the number of heavy vehicles utilising Miller Road in the vicinity of the subject site. The mechanical counts segregate all vehicle types into 12 classes. Classes 1 – 2 are passenger vehicles whilst classes 3 – 12 represent different types of heavy vehicles. Vehicles within classes 3 – 5 are rigid vehicles containing 2 – 4 axles, classes 6 – 9 represent articulated heavy vehicles containing 3 – 6 axles, whereas classes 10 – 12 represent B-double type vehicles or road trains. A full summary of the AUSTRROADS 1994 Class Scheme is contained within **Appendix 1**.

Table 3 overleaf provides a summary of the number and classifications of vehicles utilising the Miller Road in the vicinity of the subject site whilst full details are contained within **Appendix 1**.

Vehicle Class	Northbound	Southbound	TOTAL
3 – 5	3,368	3,502	6,870
6 – 9	919	1,044	1,963
10 –13	135	155	290

Table 3 above indicates that the Miller Road currently carries a relatively high volume of heavy vehicles. Heavy vehicles constitute approximately 15 - 16% of the total traffic flow. It is noted that, on average, approximately 155 articulated vehicles and 290 B-doubles travel along Miller Road during each week in both directions in the vicinity of the site.

5.4 Vehicle Speeds

In addition to the above volumetric and classification data, the automatic tube counter provided vehicle speed data. The 85th percentile vehicle speeds past the survey site were measured to be 60km/hr and 58km/hr in the north and southbound directions respectively being commensurate with the existing sign posted speed limit.

5.5 Intersection Modelling

In order to estimate the existing efficiency of the surrounding road network, a SIDRA analysis of the intersection of Christina Road and Miller Road and the junction Hume Highway and Miller Road has been undertaken. SIDRA is an intersection analysis software package developed by the Australian Road Research Board (Akcelik, 1989). It is an advanced analytical tool for evaluation of alternative intersection designs in terms of capacity, level of service, a wide range of performance measures including delay, queue length, and number of stops. Key indicators of SIDRA include level of service which is a summary indicator ranging from A to F with A representing optimum intersection performance, and degree of saturation which represents a ratio of the demand of an approach to its capacity.

SIDRA uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by SIDRA are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation, known as the X-value, is the ratio of the arrival rate of vehicles to the capacity of the approach. The X-value is a useful and professionally accepted measure of intersection performance. A value of 0.75 permits the intersection to operate in a generally satisfactory manner and provides tolerance for minor disturbances and fluctuations in the traffic conditions.

For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1.0. For intersections controlled by a roundabout or give way or stop signs, a degree of saturation of 0.8 or less indicates satisfactory intersection operation. SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 4** overleaf (adapted from the Roads & Traffic Authority's *Guide to Traffic Generating Developments*).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	Less than 14	Good Operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Table 5 overleaf provides a summary of the SIDRA output data whilst **Appendix 3** contains full details.

	AM Peak	PM Peak
Cristina Road / Miller Road		
Average Vehicle Delay (sec/veh)	10.9	12.5
Degree of Saturation	0.44	0.60
Level of Service	B	B
Hume Highway / Miller Road		
Average Vehicle Delay (sec/veh)	54.6	32.6
Degree of Saturation	0.97	0.87
Level of Service	D	C

Table 4 indicates the following:

- The intersection of Miller Road and Christina Road currently operates with a good level of service and with spare capacity during commuter peak periods; and
- The junction of Hume Highway and Miller Road operates near capacity during peak periods.

6. PROJECTED TRAFFIC CONDITIONS

6.1 Traffic Generation

The traffic generation of the proposed development is essentially projected to be a function of the proposed employment levels in conjunction with the level of service vehicle traffic generated by the proposed metal recycling facility. Section 3.2 of this report presented that the proposed use is anticipated to generate a maximum of 40 staff.

Assuming a worst case scenario that each employee drives themselves to and from the subject site at the start and finish of their shifts, a total of 40 inbound vehicle trips and 40 outbound vehicle trips could be expected during the morning and afternoon peak period. The Environmental Assessment Report prepared by BBC Consulting Planners indicates that, on average, the site is expected to accommodate 40 – 50 trucks during a normal day. BBC Consulting Planners however also indicate that the site could potentially accommodate up to a maximum of 100 trucks per day.

Based on each of the above trucks constituting an ingress and an egress movement, it is anticipated that the subject development will generate an absolute maximum of 200 truck movements per day. Assuming these movements occur randomly over the 11 hour operational period, this represents an hourly heavy vehicle traffic generation of approximately 9 heavy vehicles (or 18 movements) per hour.

The peak hourly traffic generation of the subject development is therefore projected as summarised within **Table 6**.

TABLE 6 PROJECTED MORNING AND AFTERNOON PEAK PERIOD TRAFFIC GENERATION				
	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
Passenger Vehicles	40	0	0	40
Heavy Vehicles	9	9	9	9
TOTAL	49	9	9	49

Table 6 represents an absolute worst case scenario for the following reasons:

- Staff journey to and from work trips are most likely to occur outside or on the shoulder of normal peak road network operational periods based on the shift start and finish times presented within Section 3.1 of this report; and
- The heavy vehicle traffic generation represents the capacity of the site whilst the actual operation of the site is anticipated to be approximately half that provided within **Table 6**.

Further to the above, whilst the subject site is not currently operational, it is understood that the site previously generated a significant volume of traffic demand (including heavy vehicular movements) associated with its previous uses. The extent

of the additional traffic discussed above is considered to be commensurate with the previous operating characteristics of the site.

6.2 Trip Assignment

Consultation with the applicant has indicated that whilst inbound materials are anticipated to originate from numerous locations throughout the Sydney metropolitan area, a majority of outgoing product will be transported to Port Kembla. Incoming trips are therefore most likely travel via Wallgrove Road, Christina Road and Miller Road or Hume Highway and thence Miller Road whereas a significant majority of exiting traffic will travel south to the Highway via Miller Road.

Notwithstanding the above, B-double movements to and from the site (anticipated to only comprise a very small component of the total heavy vehicle traffic) will be required to access the site via the previously presented B-double route (Section 5.1 of this report) comprising Woodville Road, Christina Road and Miller Road. Based on this and the above discussion, the following trip assignment is projected in relation to heavy vehicle movements:

- 25% of inbound vehicles will access the site from the north via Christina Road and Miller Road;
- 25% of inbound vehicles will access the site from the north via Gurney Road and Miller Road;
- The remaining 50% of inbound vehicles will access the site from the south via Miller Road;
- 70% of outbound vehicles will travel to the south via Miller Road and thence Hume Highway; and
- The remaining 30% of outbound vehicles will travel to the north via Miller Road and Christina Road.

Staff and visitor passenger vehicle trips are anticipated to be evenly distributed to the north and south via Miller Road.

Table 7 overleaf provides a summary of the passenger and heavy vehicle trip assignment as described above.

TABLE 7 PROJECTED PEAK HOUR TRIP ASSIGNMENT						
	AM Peak Hour			PM Peak Hour		
	Passenger Vehicles	Heavy Vehicles	TOTAL	Passenger Vehicles	Heavy Vehicles	TOTAL
Left Turn In	20	5	25	0	5	5
Right Turn In	20	4	24	0	4	4
Left Turn Out	0	6	6	20	6	26
Right Turn Out	0	3	3	20	3	23
TOTAL	40	18	58	40	18	58

6.3 Traffic Impact & Safety

6.3.1 Site Access

In order to undertake an assessment of the projected operational performance of the subject site access driveway with the adjoining Miller Road traffic flow, a capacity analysis has been undertaken in accordance with the Roads & Traffic Authority's *Road Design Guide*. This publication states that the capacity of traffic flow along two-lane two-way roads is dependent upon the percent of time delayed, average speed, and sight distance. The same publication provides guidelines associated with the crossing and turning capacity of roads, stating that capacity figures for uninterrupted flow at intersections carrying a light crossing are dependant upon critical gap acceptance (T) and follow up headway (T₀).

Table 8 (adopted from the Road Design Guide, table 4.4.1) provides suitable values of these parameters, according to the subject situation.

TABLE 8 CRITICAL ACCEPTANCE GAPS AND FOLLOW UP HEADWAYS RELEVANT TO THE SUBJECT SITE		
	Critical Acceptance Gap T(sec)	Follow-up Headway T₀(sec)
Left Turn In	*	*
Right Turn In	4	2
Left Turn Out	14	2
Right Turn Out	14	3

* Left turn ingress movements are not required to give-way to other movements and therefore the capacity of such a movement can not be calculated utilising this method.

The Roads & Traffic Authority provide the following formula (overleaf) based on the existing directional traffic volumes and the gap acceptance criteria provided within **Table 8** to calculate the ability of a roadway to accommodate additional turning movements:

$$C = \frac{Qe^{(Q \cdot T)}}{1 - e^{(Q \cdot T_0)}}$$

Where: C = Turning Capacity
 Q = Major Route Through Flow (veh/sec)
 T = Critical Gap Acceptance (sec)
 T₀ = Follow-up Headway (sec).

Utilising the above presented formula, the following capacities have been calculated associated with left and right turn movements to and from the site based on the Miller Road peak hour through traffic volumes as presented within **Table 2**:

- The capacity of the right turn ingress movement is 1,145 vehicles per hour;
- The capacity of the left turn egress movement is 257 vehicles per hour; and
- The capacity of the right turn egress movement is 30 vehicles per hour.

The above analysis indicates that the existing Miller Road through volumes have more than enough capacity to accommodate the projected traffic generated by the subject development as detailed within **Table 7**.

6.3.2 Greater Road Network

The SIDRA modelling presented within **Table 5** indicates that the intersection of Christina Road and Miller Road operates with a level of service A / B providing spare capacity thereby being capable of accommodating the additional traffic generated by the subject development.

Table 5 also indicates that the junction of Hume Highway and Miller Road operates near capacity during peak periods. **Table 7** however indicates that the subject development is only likely to generate a maximum hourly traffic generation of 30 vehicular movements at the junction of the Highway and Miller Road. Such an additional level of traffic represents less than 1% of the total traffic currently accommodated by the junction and is therefore unlikely to have an unreasonable impact on its operating performance.

The above discussion indicates that it is unlikely that there will be any significant impacts resulting from the number of additional passenger and heavy vehicles on the surrounding road network generated by the subject application. In this regard, the existing road network is considered to operate at a reasonable level of efficiency and is capable of accommodating the additional traffic movements anticipated to be generated by the subject application.

7. CONCLUSION AND RECOMMENDATIONS

This traffic impact assessment details our assessment of the traffic generation, access and safety considerations associated with the proposed metal recycling facility located at 191 Miller Road, Chester Hill. Having regard to the contents of this report the following conclusions are made:

- The on-site parking provisions are adequate to accommodate for projected demand given the likely number of employees on-site at any one time;
- The proposed access arrangements and internal circulation proposed will provide for safe and efficient vehicular and pedestrian movements during peak times;
- The surrounding road operates with a reasonable level of service and is more than capable of accommodating the additional heavy and passenger vehicular traffic projected to be generated by the proposal; and
- Adequate B-double access to the site is provided via Woodville Road, Christina Road and Miller Road.

Having regard to the conclusions abovementioned, this Practice is satisfied that the proposed development is worthy of support in relation to the traffic issues discussed.

Count Number 6262 Ref : TS
 Street MILLER ROAD, CHESTER HILL : Between BILOELA STREET & GURNEY ROAD (bidirectional)
 Location Adjacent Property No. 226, ELP FA 01190

Directory Ref : UBD 250 Q-2

Carriageway

Start Date 16-SEP-03
 Start Time 1200
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 49
 Weekly 85th Percentile Speed 59
 Five Day AADT 11309
 Seven Day AADT 9817

TOTAL COUNT MATRIX

	MON 22ND	TUE 16TH / 23RD	WED 17TH	THU 18TH	FRI 19TH	SAT 20TH	SUN 21ST	5 Day		7 Day	
								Total	Average	Total	Average
Midnight - 1am	51	65	74	69	78	86	100	337	67	523	75
1am - 2am	43	35	40	36	46	74	48	200	40	322	46
2am - 3am	27	44	27	41	47	40	52	186	37	278	40
3am - 4am	43	42	43	34	36	29	24	198	40	251	36
4am - 5am	77	78	68	83	77	39	28	383	77	450	64
5am - 6am	248	246	244	256	267	113	63	1261	252	1437	205
6am - 7am	588	648	609	599	613	210	76	3067	613	3353	479
7am - 8am	802	809	766	807	807	309	108	3991	798	4408	630
8am - 9am	954	945	880	976	952	385	182	4707	941	5274	753
9am - 10am	688	656	629	673	675	462	304	3321	664	4087	584
10am - 11am	583	624	609	616	624	535	351	3066	613	3952	565
11am - Midday	625	245	559	621	632	537	359	2682	536	3578	511
Midday - 1pm	545	600	606	634	687	517	440	3140	628	4097	585
1pm - 2pm	582	656	627	669	701	543	346	3235	647	4124	589
2pm - 3pm	729	718	713	766	716	467	311	3642	728	4420	631
3pm - 4pm	879	888	894	1004	953	481	363	4618	924	5462	780
4pm - 5pm	945	966	918	996	895	424	315	4720	944	5459	780
5pm - 6pm	919	891	977	892	969	445	344	4648	930	5437	777
6pm - 7pm	587	628	637	608	616	451	340	3076	615	3867	552
7pm - 8pm	360	385	391	405	468	312	262	2007	401	2581	369
8pm - 9pm	273	240	278	319	308	209	208	1418	284	1835	262
9pm - 10pm	198	191	216	265	217	175	177	1087	217	1439	206
10pm - 11pm	166	172	165	206	213	151	124	922	184	1197	171
11pm - Midnight	129	113	118	116	155	163	92	631	126	886	127
Total	11061	10893	11148	11691	11750	7157	5017	56543	11308	68717	9816

Count Number 6262 Ref : TS
 Street MILLER ROAD, CHESTER HILL : From BILOELA STREET to GURNEY ROAD : NORTH BOUND
 Location Adjacent Property No. 226, ELP FA 01190
 Directory Ref : UBD 250 Q-2
 Carriageway

Weekly 50th Percentile Speed 50
 Weekly 85th Percentile Speed 60
 Five Day AADT 5541
 Seven Day AADT 4781

Start Date 16-SEP-03
 Start Time 1200
 Duration 7 DAYS
 Interval 1 HOUR

TOTAL COUNT MATRIX

	MON 22ND	TUE 16TH / 23RD	WED 17TH	THU 18TH	FRI 19TH	SAT 20TH	SUN 21ST	5 Day Total	5 Day Average	Total	7 Day Average
Midnight - 1am	25	32	39	27	35	46	56	158	32	260	37
1am - 2am	24	19	22	16	27	36	28	108	22	172	25
2am - 3am	16	19	14	19	22	20	32	90	18	142	20
3am - 4am	22	21	20	10	15	10	14	89	18	113	16
4am - 5am	38	36	36	45	42	18	10	197	39	225	32
5am - 6am	119	114	113	117	127	63	30	589	118	683	98
6am - 7am	264	284	297	268	278	104	34	1361	272	1499	214
7am - 8am	422	410	390	413	392	137	48	2027	405	2212	316
8am - 9am	500	485	448	469	476	186	74	2378	476	2618	374
9am - 10am	325	335	282	298	306	221	148	1546	309	1915	274
10am - 11am	284	293	286	311	301	239	168	1475	295	1882	269
11am - Midday	307	101	269	296	303	241	162	1276	255	1679	240
Midday - 1pm	250	302	329	313	364	247	193	1567	313	2007	287
1pm - 2pm	284	326	301	338	333	287	166	1582	316	2015	288
2pm - 3pm	352	339	346	367	366	241	141	1770	354	2152	307
3pm - 4pm	450	461	466	491	457	242	163	2325	465	2730	390
4pm - 5pm	458	514	481	468	444	191	141	2365	473	2697	385
5pm - 6pm	431	432	439	422	468	211	171	2192	438	2574	368
6pm - 7pm	296	312	319	305	322	205	165	1554	311	1924	275
7pm - 8pm	169	188	185	199	233	151	136	974	195	1261	180
8pm - 9pm	141	115	142	151	154	102	91	703	141	896	128
9pm - 10pm	104	90	121	137	106	90	78	558	112	726	104
10pm - 11pm	84	92	82	111	104	75	57	473	95	605	86
11pm - Midnight	65	64	69	67	80	83	55	345	69	483	69
Total	5439	5384	5466	5658	5756	3406	2361	27703	5540	33470	4781

Count Number 6262

Ref : TS

Street MILLER ROAD, CHESTER HILL : From BILOELA STREET to GURNEY ROAD : NORTH BOUND

Location Carriageway

Start Date 16-SEP-03

Start Time 1200

Duration 7 DAYS

Interval 1 HOUR

Weekly 50th Percentile Speed 50

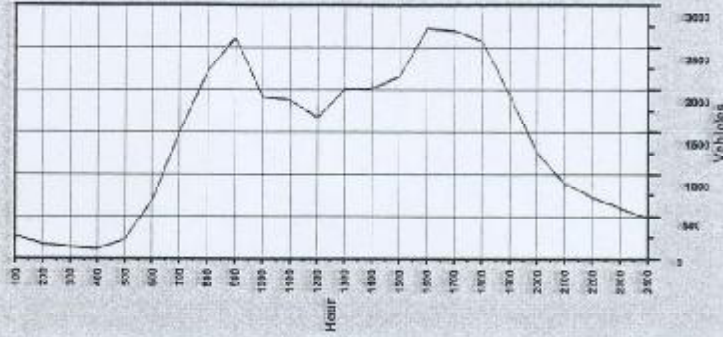
Weekly 85th Percentile Speed 60

Five Day AADT 5541

Seven Day AADT 4781

THE BODY OF THIS REPORT SHOWS : SEVEN DAY TRAFFIC

Time	00	01	02	03	04	05	06	07	08	09	10	11	12	13	Total	Avg
Midnight - 1am	0	224	0	13	6	2	1	1	0	10	0	0	0	3	266	37
1am - 2am	0	143	0	2	14	0	0	1	2	8	0	0	0	2	172	25
2am - 3am	0	108	1	6	7	3	0	1	0	13	0	0	0	3	142	20
3am - 4am	0	74	0	17	3	1	0	1	0	13	0	0	0	4	113	16
4am - 5am	0	177	0	11	10	4	0	4	0	15	2	0	0	2	225	32
5am - 6am	0	568	0	42	19	2	0	2	3	29	11	1	0	6	683	98
6am - 7am	0	1252	7	96	45	11	3	3	2	42	6	1	2	29	1499	214
7am - 8am	0	1842	12	163	63	5	6	26	8	40	6	2	0	39	2212	315
8am - 9am	0	2181	17	203	58	14	5	21	9	39	3	0	4	64	2618	374
9am - 10am	0	1576	11	147	65	12	7	10	7	30	2	0	0	48	1915	274
10am - 11am	0	1506	10	188	69	16	3	11	8	33	10	1	0	29	1862	269
11am - Midday	0	1373	12	119	57	14	4	13	8	40	5	0	1	33	1679	240
Midday - 1pm	0	1534	9	160	73	20	3	13	5	43	8	1	2	35	2007	287
1pm - 2pm	0	1560	12	164	63	9	4	9	5	42	4	0	3	40	2015	288
2pm - 3pm	0	1813	18	142	63	14	3	10	5	37	6	1	1	39	2152	307
3pm - 4pm	0	2339	19	163	71	11	11	14	8	34	3	0	0	57	2730	390
4pm - 5pm	0	2295	13	181	77	9	5	19	2	36	2	0	1	57	2697	385
5pm - 6pm	0	2283	10	138	60	7	2	3	1	24	2	1	0	43	2574	368
6pm - 7pm	0	1695	11	112	35	6	0	5	2	18	8	2	2	28	1924	275
7pm - 8pm	0	1122	1	59	28	4	1	3	4	14	8	1	0	16	1261	180
8pm - 9pm	0	798	0	49	22	1	0	3	0	8	6	1	0	8	896	128
9pm - 10pm	0	657	1	33	12	2	0	1	0	9	8	0	0	3	726	104
10pm - 11pm	0	538	1	28	11	1	0	1	1	17	4	0	0	3	605	86
11pm - Midnight	0	426	0	24	9	0	0	0	1	13	3	0	0	7	483	69
Total	0	28284	165	2260	940	188	58	175	79	607	107	12	18	599	33470	4781
% of Total		85		7	3	1		1		2				2		



Count Number 6262 Ref: TS

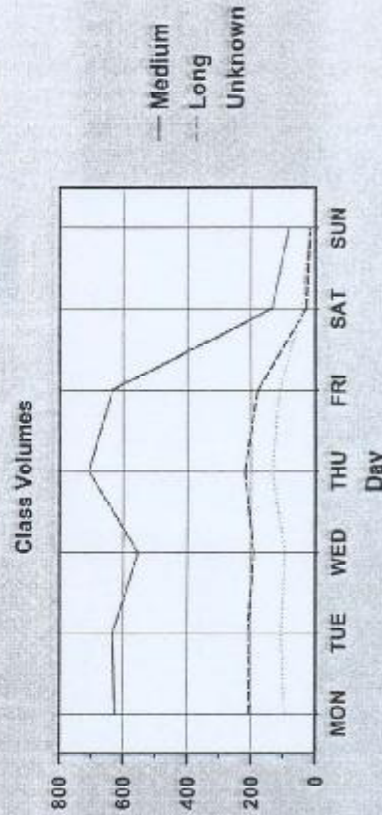
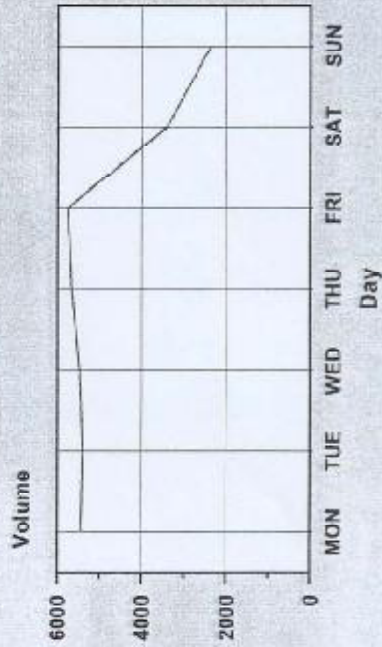
Street MILLER ROAD, CHESTER HILL : From BILOELA STREET to GURNEY ROAD : NORTH BOUND
 Location Adjacent Property No. 226, ELP FA 01190 Carrigeway

Start Date 16-SEP-03
 Start Time 1200
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 50
 Weekly 85th Percentile Speed 60
 Five Day AADT 5541
 Seven Day AADT 4781

THE BODY OF THIS REPORT
 SHOWS:
 TRAFFIC SEVENTYDAY

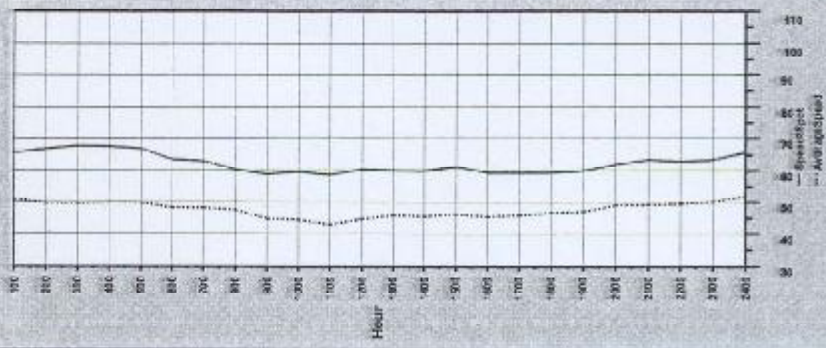
Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
MONDAY	0	4483	30	426	164	34	12	21	16	125	23	3	6	96	5439
TUESDAY	0	4402	31	411	181	41	10	33	16	123	24	3	2	107	5364
WEDNESDAY	0	4598	29	366	167	20	10	32	15	103	21	1	4	94	5466
THURSDAY	0	4572	23	487	187	34	13	36	14	134	20	1	3	134	5658
FRIDAY	0	4814	18	438	164	32	7	44	12	93	14	3	1	111	5756
SATURDAY	0	3187	17	76	52	6	4	6	5	10	3	0	0	40	3406
SUNDAY	0	2228	17	56	25	1	2	3	1	8	2	1	0	17	2361
5 Day Total	0	22869	131	2128	863	161	52	166	73	589	102	11	16	542	27703
5 Day Pct		83		8	3	1		1		2				2	
7 Day Total	0	26284	165	2260	940	168	58	175	79	637	107	12	16	599	33470
7 Day Pct		85		7	3	1		1		2				2	



Count Number **6262** Ref : **TS**
 Street **MILLER ROAD, CHESTER HILL : From BILOELA STREET to GURNEY ROAD : NORTH BOUND**
 Location **Carriageway**
 Adjacent Property No. **226. ELP FA 01190**

Start Date **16-SEP-03** Weekly Mean Speed **47**
 Start Time **12:00** Weekly 85th Percentile Speed **60**
 Duration **7 DAYS** Five Day AADT **5541**
 Interval **1 HOUR** Seven Day AADT **4781**

Time	0-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	Total	Mean	85pct
Midnight - 1am	40	53	96	56	11	3	0	1	0	0	0	0	260	51.1	65.7
1am - 2am	38	31	50	40	7	5	1	0	0	0	0	0	172	49.7	66.8
2am - 3am	32	34	36	24	11	2	0	1	2	0	0	0	142	49.6	67.8
3am - 4am	25	21	28	29	8	2	0	0	0	0	0	0	113	49.9	67.6
4am - 5am	49	40	72	44	13	2	5	0	0	0	0	0	225	49.9	66.9
5am - 6am	151	114	259	122	24	2	0	0	0	1	0	0	683	48.3	63.8
6am - 7am	317	296	576	261	35	8	3	2	1	0	0	0	1499	48.2	63.3
7am - 8am	433	531	903	296	38	5	4	1	1	0	0	0	2212	47.6	60.4
8am - 9am	641	737	945	252	28	9	0	3	3	0	0	0	2818	45.0	59.0
9am - 10am	523	482	637	222	36	11	1	1	0	1	0	0	1914	44.7	56.8
10am - 11am	541	563	572	172	26	5	2	0	1	0	0	0	1882	43.3	58.7
11am - Midday	440	472	505	218	33	5	1	2	1	0	0	0	1677	44.9	60.4
Midday - 1pm	479	536	689	240	42	12	4	2	3	0	0	0	2007	46.0	60.1
1pm - 2pm	494	529	693	244	42	6	5	0	0	0	1	0	2014	45.6	59.9
2pm - 3pm	501	561	729	288	61	6	3	2	1	0	0	0	2152	46.4	61.3
3pm - 4pm	650	746	982	303	28	8	7	1	3	0	0	0	2728	45.5	58.4
4pm - 5pm	596	801	948	295	40	5	5	3	1	1	1	0	2695	45.9	58.4
5pm - 6pm	510	746	908	282	34	11	2	1	0	0	0	0	2574	46.7	58.4
6pm - 7pm	383	541	715	235	37	8	1	1	1	0	1	0	1923	47.1	58.9
7pm - 8pm	207	334	495	179	35	4	5	1	1	0	0	0	1261	48.9	62.0
8pm - 9pm	156	224	324	157	27	4	1	2	0	0	0	0	895	49.0	63.6
9pm - 10pm	118	177	287	114	23	7	0	0	0	0	0	0	726	49.4	63.1
10pm - 11pm	89	148	245	92	25	5	1	0	0	0	0	0	605	50.1	63.5
11pm - Midnight	57	124	178	90	27	6	0	0	0	0	1	0	483	51.8	65.7
Total	7170	8841	11962	4255	691	141	51	24	19	3	4	0	33461		
% of Total	22	26	36	13	2										



Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

Daily Speed Summary

Count Number 6262

Ref : TS

Street MILLER ROAD, CHESTER HILL : From BILOELA STREET to GURNEY ROAD : NORTH BOUND

Location Adjacent Property No. 226, ELP FA 01190

Carriageway

Start Date 16-SEP-03

Start Time 1200

Duration 7 DAYS

Interval 1 HOUR

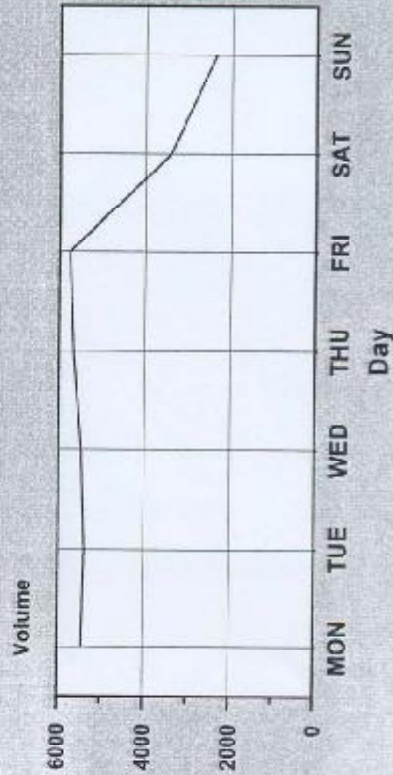
Weekly Mean Speed 47

Weekly 85th Percentile Speed 60

Five Day AADT 5541

Seven Day AADT 4781

Day	0-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130	130-140	140-150	Total	Mean	85pct
MONDAY	1372	1561	1838	539	87	25	4	4	1	2	1	0	5434	44.9	59.2
TUESDAY	1398	1435	1840	585	88	18	5	3	4	0	0	0	5382	44.9	59.4
WEDNESDAY	1109	1509	1994	706	114	20	9	3	2	0	0	0	5465	47.1	60.5
THURSDAY	1442	1657	1896	634	95	13	8	7	3	1	2	0	5658	45.0	59.5
FRIDAY	1267	1527	2072	732	111	28	9	5	3	0	1	0	5755	48.6	60.4
SATURDAY	554	750	1342	612	113	21	9	1	4	0	0	0	3406	49.9	61.1
SUNDAY	328	503	974	447	83	16	7	1	2	0	0	0	2361	51.0	64.5
5 Day Total	6588	7588	9646	3196	495	104	35	22	13	3	4	0	27694		
5 Day Percentage	24	27	35	12	2										
7 Day Total	7470	8841	11962	4255	691	141	51	24	19	3	4	0	33461		
7 Day Percentage	22	26	35	13	2										



Eighty Fifth & Fiftyth Percentile Speed

