

1 TRAFFIC IMPACT ASSESSMENT

This report outlines the high level traffic assessment that was undertaken for the Umdoni Municipality. Detailed Tia's for each development will therefore need to be undertaken when those projects commence to identify local upgrade requirements.

1.1 Proposed Developments

The proposed developments consist of low and middle income housing projects. The expected traffic generation will therefore consist of residential traffic and public transport, and no commercial or industrial traffic is expected.

The current proposals include current projects and future projects. The following table indicates all future household estimates and includes existing development:

TABLE 1: Existing and Future Households

<i>Ward</i>	<i>Existing Household</i>	<i>Future Household</i>
1	2200	4000
2	2500	5000
3	2300	6000
4	3700	4500
5	1500	3500
6	1900	2500
7	2500	7500
8	1100	2600
9	1600	2700
Total	19300	38300

1.2 Development Localities

The major developments are centered on Scottburgh, Umzinto and Pennington. The remaining developments are more rural in nature.

2. TRIP GENERATION

2.1 Methodology

Trip generation is a critical step in the determination of traffic impact from proposed developments. Before any development takes place, a detailed traffic impact study should be conducted in order to determine the road network and upgrades needed to cater for such developments.

For the purposes of this study however, a broad based assessment will be done to determine a rough idea of the road network needed to successfully serve these developments. This study will undertake the traffic impact assessment for the road network.

The most reliable source of data available for trip generation for the residential and industrial developments uses the Department of Transport Guideline for trip generation rates in the Manual *For Traffic Impact Studies*, 1994 and these trip generation rates are summarized in section 2.2.

According to the rates in the manual, for low cost housing a generation rate of 0.5 vehicles per unit is stated and 0.8 generation rate for medium cost housing. In other words, 50% of the sites of the new low cost housing development will have a private vehicle and 80% for the medium cost housing.

2.2 Trip Generation

TABLE 2: Trip generation rates (trips per dwelling unit)

WARD	Residential/ Industrial	AM			PM		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Ward 1	Residential (low income) Per DU	0.175	0.325	0.5	0.325	0.175	0.5
Ward 2	Residential (low income) Per DU	0.175	0.325	0.5	0.325	0.175	0.5
Ward 3	Residential (middle income) Per DU	0.275	0.825	1.1	0.825	0.275	1.1
Ward 4	Residential (middle income) Per DU	0.275	0.825	1.1	0.275	0.825	1.1
Ward 5	Residential (middle income) Per DU	0.275	0.825	1.1	0.275	0.825	1.1
Ward 6	Residential (low income) Per DU	0.175	0.325	0.5	0.325	0.175	0.5
Ward 7	Residential (middle income) Per DU	0.275	0.825	1.1	0.825	0.275	1.1
Ward 8	Residential (low income) Per DU	0.175	0.325	0.5	0.325	0.175	0.5
Ward 9	Residential (low income) Per DU	0.175	0.325	0.5	0.325	0.175	0.5

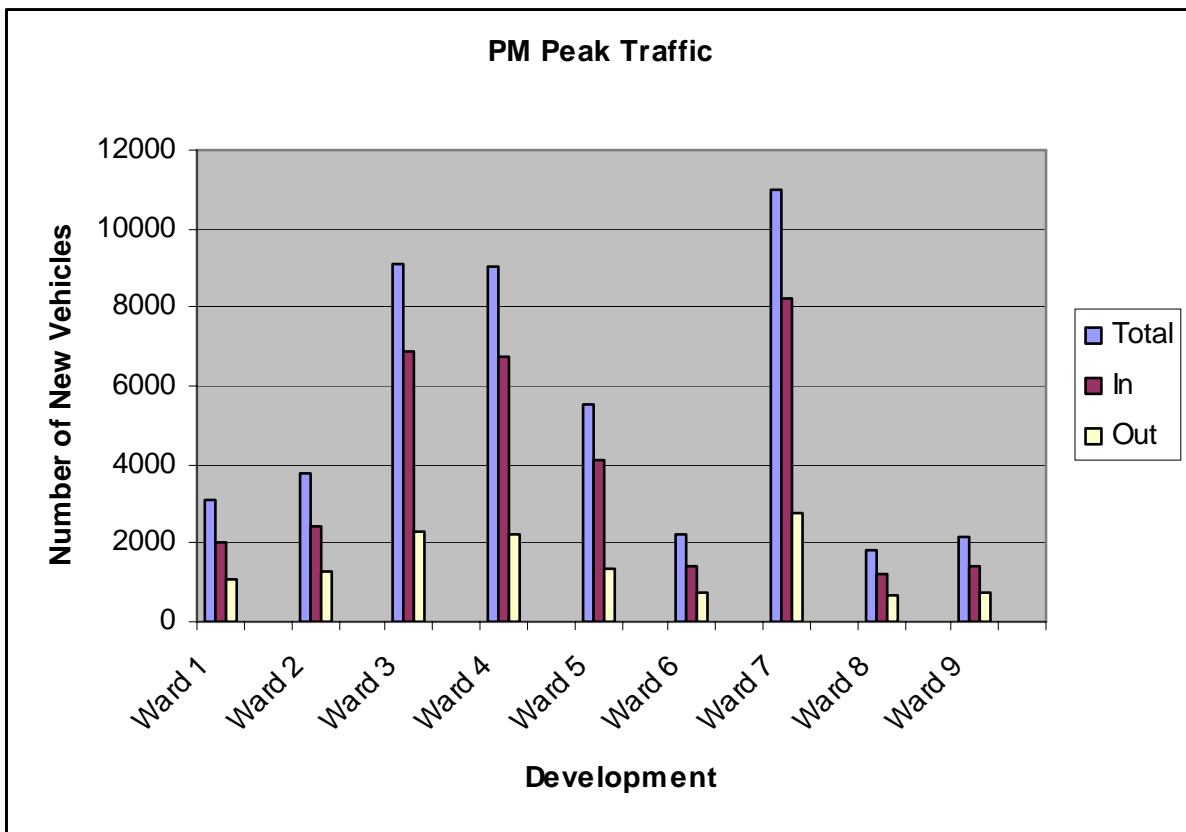
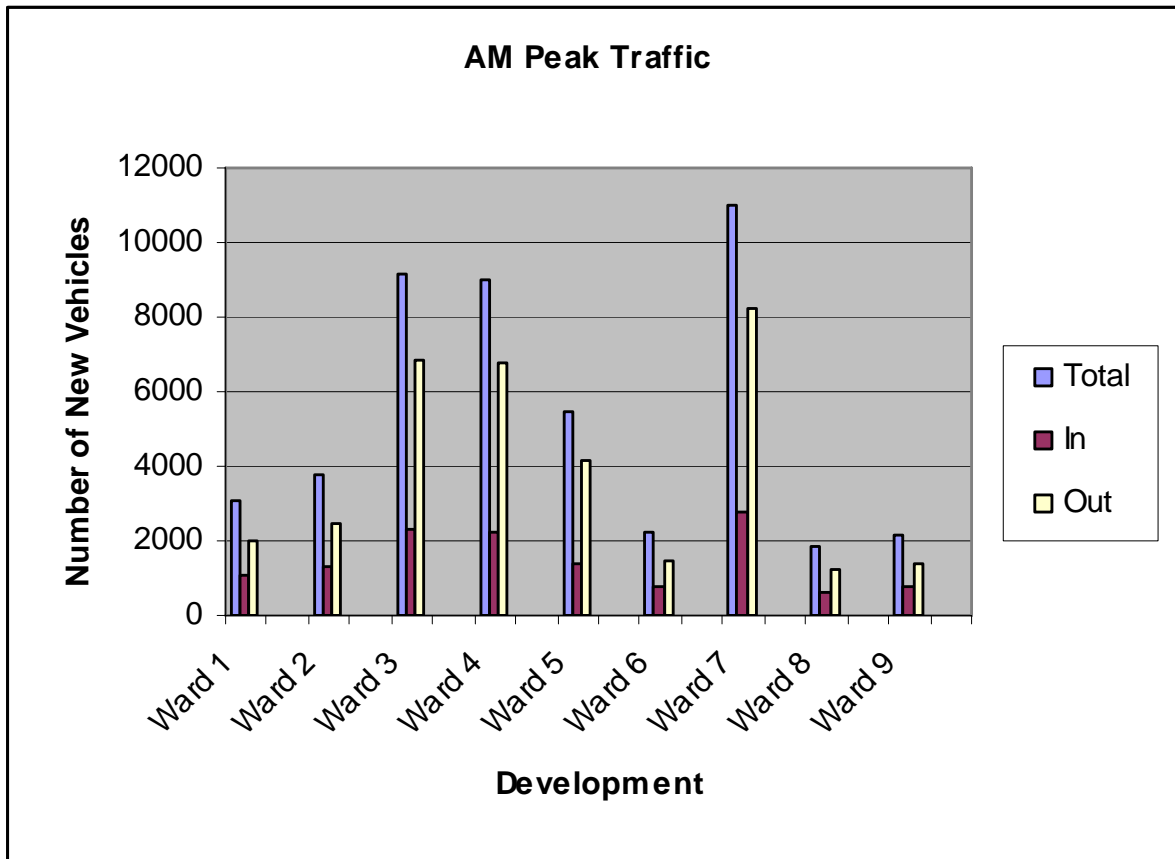
TABLE 3: Number of New Trips Peak Hour

WARD	LANDUSE	AM			PM		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Ward 1	Residential (low income)	1085	2015	3100	2015	1085	3100
Ward 2	Residential (low income)	1313	2438	3751	2438	1313	3751
Ward 3	Residential (middle income)	2283	6848	9131	6848	2283	9131
Ward 4	Residential (middle income)	2255	6765	9020	6765	2255	9020
Ward 5	Residential (middle income)	1375	4125	5500	4125	1375	5500
Ward 6	Residential (low income)	770	1430	2200	1430	770	2200
Ward 7	Residential (middle income)	2750	8250	11000	8250	2750	11000
Ward 8	Residential (low income)	648	1203	1851	1203	648	1851
Ward 9	Residential (low income)	753	1398	2150	1398	753	2150
	TOTAL	13232	34472	47703	34472	13232	47703

2.3 Comments on Trip Generation Results

From table 3, the traffic can now be distributed onto the road network, as per the ratio splits, i.e. in is the traffic approaching the development and out is the traffic moving away from the development. These figures can then be superimposed onto the respective lanes

The new trip generation figures are graphically indicated in the following charts.



The traffic volumes that will be added to the network are tabulated below (morning peak).

WARD	NUMBER OF VEHICLES (Per lane/per leg)	COMMENTS
Ward 1	3016	Upgrading required
Ward 2	501	No upgrading required
Ward 3	1712	No upgrading required
Ward 4	1211	No upgrading required
Ward 5	2157	Upgrading required
Ward 6	3393	Upgrading required
Ward 7	1032	No upgrading required
Ward 8	1669	No upgrading required
Ward 9	466	No upgrading required

Table 4: Traffic Volumes added to the Road Network

3. TRAFFIC IMPLICATIONS

3.1 Basis of impact

Since this is a high-level traffic impact analysis, the following broad assumptions have been made:

- A signalised intersection can clear approximately 1 000 vehicles per hour per lane, provided that equal priority is given to all directions.
- A priority-controlled intersection can clear approximately 700 vehicles per hour per lane.
- A single traffic lane, on a link (i.e. along a straight of road), can carry approximately 1 800 vehicles per hour per lane.

3.2 Available Capacity

For the most part the existing Provincial Road Networks have sufficient capacity for the current and future anticipated traffic in all of the wards of Umdoni Municipality.

However the Provincial Roads in Ward1, Ward5 and Ward 6 will need to be doubled up to be able to carry the estimated traffic generated by the future development.

The Levels of Service that can be expected on the road networks for the traffic volumes is indicated on the following page in Table 1.5(b) of the TRH17 manual.

Macro Study

It is stressed that this is a high-level analysis, and that a more detailed analysis is required in order to confirm the above numbers. This aspect is confirmed in the next report titled: Detailed Traffic Study (Micro Report). It must also be stressed that the above development would bring the degrees of saturation of the existing road network to 90%, which may, at varying times, result in levels of congestion not previously experienced in this area.

Table 1.5(b)
ESTIMATED MAXIMUM AVERAGE DAILY TRAFFIC FOR SELECTED LEVELS OF SERVICE AND K
FACTORS FOR FLAT, ROLLING AND MOUNTAINOUS TERRAIN FOR TWO-LANE TWO-WAY
ROADS

K FACTOR	LEVEL OF SERVICES				
	A	B	C	D	E
Flat terrain					
0,10	2 200	4 900	8 800	14 500	24 600
0,11	2 000	4 500	8 000	13 200	22 300
0,12	1 800	4 100	7 400	12 100	20 500
0,13	1 700	3 800	6 800	11 100	18 900
0,14	1 600	3 500	6 300	10 300	17 500
0,15	1 500	3 300	5 900	9 700	16 400
0,20	1 100	2 500	4 400	7 300	12 300
0,25	900	2 000	3 500	5 800	9 800
Rolling terrain					
0,10	1 500	3 500	6 400	10 600	18 200
0,11	1 300	3 100	5 800	9 600	16 600
0,12	1 200	2 900	5 300	8 800	15 200
0,13	1 100	2 700	4 900	8 100	14 000
0,14	1 000	2 500	4 600	7 500	13 000
0,15	1 000	2 300	4 300	7 000	12 100
0,20	800	1 800	3 200	5 300	9 100
0,25	600	1 400	2 600	4 200	7 300
Mountainous terrain					
0,10	800	2 000	3 800	6 500	11 200
0,11	700	1 800	3 500	5 900	10 200
0,12	700	1 700	3 200	5 400	9 400
0,13	600	1 600	2 900	5 000	8 700
0,14	600	1 400	2 700	4 700	8000
0,15	500	1 300	2 500	4 300	7 500
0,20	400	1 000	1 900	3 300	5 600
0,25	300	800	1 500	2 600	4 500

Flat terrain: $E_t = 1,5$, no-passing zones 20%
 Rolling terrain: $E_t = 4,0$, no-passing zones 40%
 Mountainous terrain: $E_t = 10,0$, no-passing 60%
 For all cases a 60:40 directional split and 15% trucks assumed.
 K = Proportion of average daily traffic (ADT) in the design hour
 E_t = Truck equivalency factor

Table 5: Levels of Service for different scenarios

4. CONCLUSIONS AND RECOMMENDATIONS

To determine the required upgrades to the road network, two issues need to be addressed:

1. Capacity – can the road carry the number of new vehicles?
2. Safety – can the number of new vehicles be safely accommodated?

From the number of new vehicles added to the network, the total volumes fall below the 1800 vehicles per lane per hour. The lane capacity for the roads is therefore adequate.

From a safety point of view, it is recommended that a right turning lane be provided for busy links joining the through roads, to minimise the chances of an accident happening.

Public transport facilities such as bus and taxi laybys must also be provided to allow access and pickup points for commuters dependant on public transport.

The recommended actions and upgrading of the road network is as follows:

- Upgrading for the provincial Roads at Ward 1 (North - South Linkage).
- Upgrading for the provincial Roads at Ward 5 (R 102).
- Upgrading for the provincial Roads at Ward 6 (North – South Linkage).

5. REFERENCES

1. Department of Community Development, Guidelines for the provision of engineering services in residential townships, 1994.
2. Manual for Traffic Impact Studies, Department of Transport, August 1995.
3. Guidelines for the geometric design of rural roads, TRH17, 1988