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## 15.0 INDEPENDENT TRAFFIC CONSULTANT'S REPORT

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### **INDEPENDENT TRAFFIC CONSULTANT'S REPORT (Prepared for inclusion in the Prospectus)**

10 November 2003

The Board of Directors  
Sunway Infrastructure Berhad; and  
Sistem Lingkaran-Lebuhraya Kajang Sdn Bhd  
Level 16, Menara Sunway  
Jalan Lagoon Timur, Bandar Sunway  
46150 Petaling Jaya  
Selangor

Dear Sirs

### **INDEPENDENT TRAFFIC CONSULTANT'S REPORT OF SISTEM LINGKARAN- LEBUHRAYA KAJANG SDN BHD'S NEW RING ROAD PROJECT**

This report has been prepared for inclusion in the Prospectus of Sunway Infrastructure Berhad ("SIB") in connection with:

- the institutional issue of 40,000,000 new ordinary shares of RM0.50 each at an issue price of RM1.50 per share together with 20,000,000 new warrants to be allotted at no consideration on the basis of one (1) new warrant for every two (2) new ordinary shares of RM0.50 each subscribed; and
- the retail issue of 12,000,000 new ordinary shares of RM0.50 each at an issue price of RM1.50 per share together with 6,000,000 new warrants to be allotted at no consideration on the basis of one (1) new warrant for every two (2) new ordinary shares of RM0.50 each subscribed, in conjunction with the listing of SIB on the Main Board of the Kuala Lumpur Stock Exchange.

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## **1 Introduction**

### **1.1 Introduction**

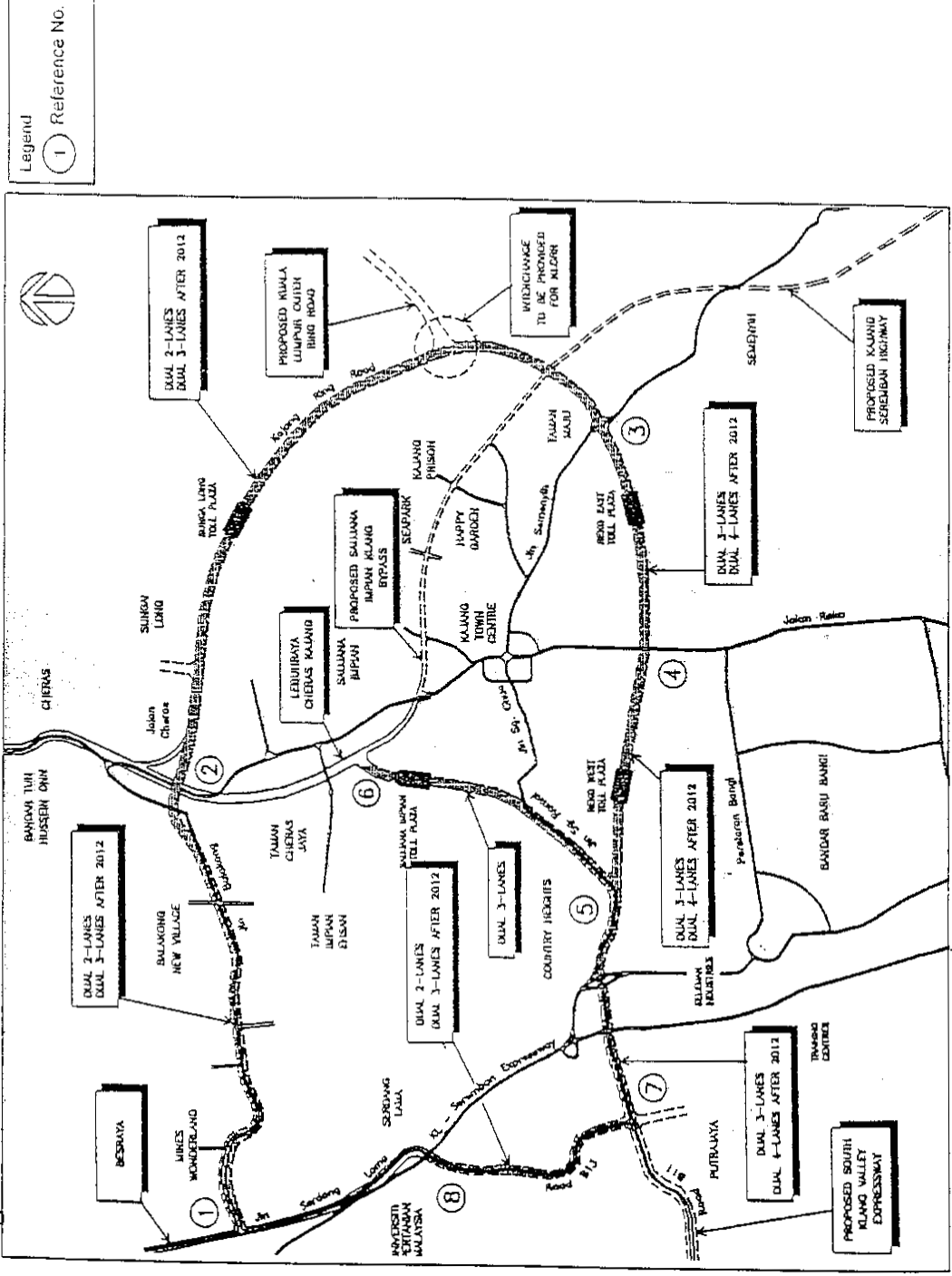
In June 2000 Halcrow Consultants Sdn Bhd (Halcrow) were commissioned by Sistem Lingkaran-Lebuhraya Kajang Sdn Bhd (SILK) to carry out a short review of traffic and revenue forecasts for the Kajang Ring Road (KRR) - scheme produced by MAG Consultants and described in their report of June 2000. Following that initial review, Halcrow were commissioned to carry out a number of further brief reviews of forecast updates produced by MAG, most recently in August 2002 and February 2003.

In September 2003, Halcrow were once again commissioned to update their review based on the latest MAG report, dated September 2003.

The proposed Kajang Ring Road is 37 kms long and forms a loop around Kajang town centre. A detailed description of the alignment is given in the MAG report. Figure 1 shows the proposed location.

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Figure 1: Location Plan



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Chapter 2 of this report contains a summary of the MAG forecasts. The basic assumptions made by MAG to produce the forecasts are analysed in Chapter 3. Finally Chapter 4 of the report presents independent low and base case estimates carried out by Halcrow to test the sensitivity of the forecasts for varying base assumptions.

2. The MAG Forecasts

2.1 The Forecasts

The forecast daily tollable traffic by toll plaza (excluding motorcycles) is shown overleaf in Table 1 and graphically in Figure 2. In total (all four toll plazas combined), traffic is expected to grow from 176,600 in 2004 (year of scheme opening) to 346,000 in 2008 and 469,000 in 2012. Thereafter the rate of growth declines but nonetheless by 2030 Kajang Ring Road is forecast to carry an average of 828,000 vehicles per day.

Of the four toll plazas, Sg Long is estimated to reach capacity by 2031, Saujana by 2021, Reko East by 2029 and Reko West by 2032.

Figure 2 : MAG Traffic Demand Forecasts (vehicles/day)

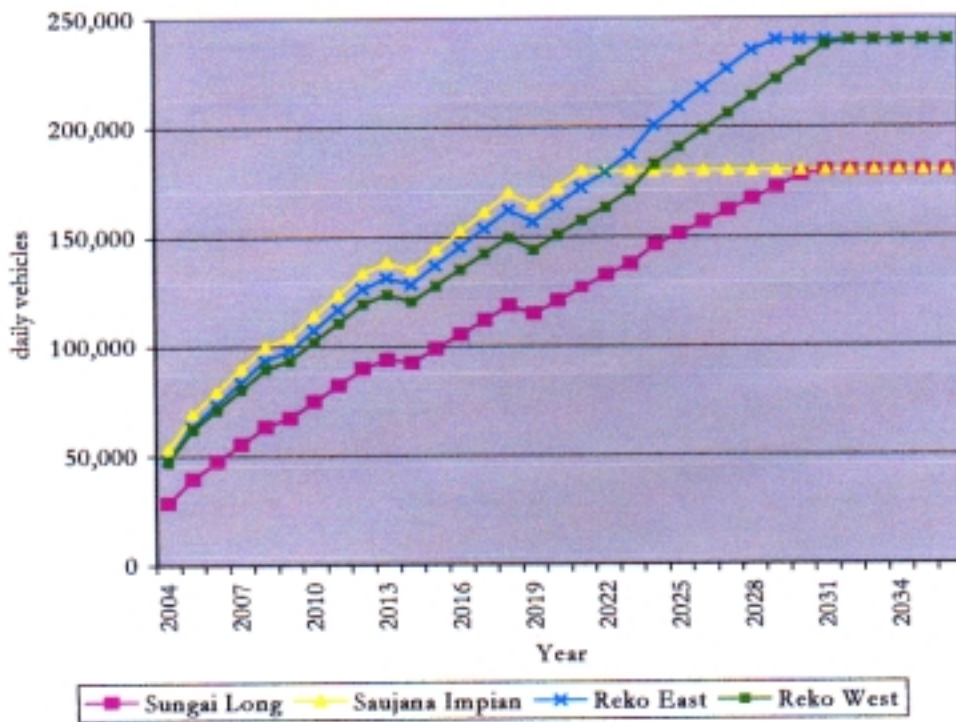


Table 2 shows average annual growth rates for each toll plaza split into five-year periods. Clearly the dominant feature of the forecasts is the extremely high expected growth in the first five years of the Concession. The reasons given by MAG for this high growth are explored further in Chapter 3.

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**Table 1 : Average Daily Tollable Traffic (Vehicles / Day)**

Year	Sungai Long	Saujana Impian	Reko East	Reko West	Total
2004	28,382	52,811	48,101	47,284	176,578
2005	39,425	68,978	63,479	61,765	233,647
2006	47,317	79,280	73,513	70,992	271,102
2007	55,209	89,578	83,546	80,218	308,551
2008	63,101	99,880	93,578	89,445	346,004
2009	67,119	104,170	97,959	93,289	362,537
2010	74,581	113,909	107,445	102,012	397,947
2015	98,651	143,777	136,911	127,711	507,050
2020	120,587	172,078	164,624	150,718	608,007
2030	177,737	180,000	240,000	229,826	827,563
2036	180,000	180,000	240,000	240,000	840,000

**Table 2 : Average Annual Growth Rates**

	2004-09	2010-14	2015-19	2020-24	2025-29	2030-34
Sungai Long	19%	4%	3%	4%	3%	0%
Saujana Impian	15%	3%	3%	1%	0%	0%
Reko East	15%	4%	3%	4%	3%	0%
Reko West	15%	3%	2%	4%	3%	0%
Total	15%	4%	3%	3%	2%	0%

### 3. Analysis of MAG Approach & Assumptions

#### 3.1 MAG Study Approach

The approach adopted by MAG to produce the initial traffic and revenue forecasts as described in the study reports appears to be reasonable and is in line with standard transport planning techniques. To produce the traffic forecast, MAG utilised a standard highway traffic model, updated and calibrated to traffic surveys and other data collected in the study area.

The initial main traffic forecast was presented in the MAG report of January 1996. Since then a series of short reviews have been carried out by MAG have assessed traffic growth, socio-economic trend and other major forecast assumptions.

The approach to carry out regular reviews of the forecasts is sensible. However, the forecasts are still reliant to an extent on the accuracy of data, such as the traffic surveys, carried out in the main study - which is now around 8 years old. This does impact the potential accuracy of the forecasts significantly, though does not bias the forecasts up or down.

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**3.2 The Analysis**

Since Halcrow did not have access to the traffic model itself, the review focuses on the main assumptions that drive the demand and revenue forecasts and the impact that changes in those assumptions would have on the revenue stream, rather than detailed modelling parameters. This chapter attempts to identify these issues.

The key assumptions are:

- (1) the level of existing traffic demand in the highway corridor and the extent to which that would transfer to the Kajang Ring Road;
- (2) forecasted future growth in travel demand;
- (3) the highway capacity constraint and factors applied to the forecasts to convert from the traffic model period to annual figures (annualisation factors);
- (4) the dates of opening and impacts on KRR revenues of other highway projects; and
- (5) toll rates and the impact of toll changes on demand (toll elasticity).

These assumptions and their likely impact are described below:

**3.3 Level of Existing Demand and Diversion to the KRR**

The KRR is predominantly a new alignment and as such there is always going to be uncertainty over how much of the existing traffic will transfer to the new route. In order to identify existing levels of traffic demand, MAG carried out a number of traffic surveys in 1995. In addition MAG collected Government data, local authority planning data and counts from other studies. This data was then input to the traffic model.

However, no new Origin-Destination information was collected. Instead, the travel patterns within the MAG traffic model is based on OD surveys from the mid to late 1980s updated in line with changes on population and employment.

Our opinion is that this is a significant risk but not one that biases the results up or down. Based on such old data however it is unlikely that the forecast of the transfer of existing trips onto the KRR is more accurate than  $\pm 15\%$ .

Using the traffic model, MAG has estimated that, in a hypothetical scenario where the KRR is in place in the year 2000, a total of 80,600 vehicles per day would use pass through the toll plazas.

**3.4 Forecast Growth in Travel Demand****3.4.1 Observed Growth Rates**

It is always a useful exercise to compare the outputs of traffic forecasting studies with actual observed behaviour. The observed behaviour is, by necessity, from a different time period and/or a different location so comparisons need to be treated with care.

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Information that is available and relevant includes traffic growth on roads local to the proposed scheme.

The MAG 2003 report presents data from several highway Planning Unit (HPU) traffic counts in the study area (including a location plan). The average annual growth rates over the period since 1995 are summarised below:

BR001 - 10.9% (95-00)  
BR002 - 18.5% (95-00)  
BR604 - 4.9% (95-00)  
BR606 - 8.4% (95-98)  
BR607 - 10.2% (95-98)

Sites BR001 and BR002 are in the locality of Putrajaya/Cyberjaya. Growth at these sites is high due to the high rate of traffic increase generally in the Putrajaya/Cyberjaya area and the low base level of traffic.

Site BR604 is more local to the Kajang area though traffic growth is relatively low since this is an established route. In the 5-year period between 1986 and 1991 traffic growth at the site was 7.3% and between 1989-1995 was 6.3%.

BR606 and BR607 are also very close to the SILK corridor and are good measures of east-west growth. Both sites recorded relatively high growth subsequent to 1995, an average of 8.4% and 10.2% respectively between 1995-1998 – in a period of potentially low traffic growth due to the economic downturn.

### 3.4.2 MAG Assumed Traffic Growth Rates

The MAG methodology as described in their report appears reasonable and relies upon a number of factors including economic growth, congestion on the rest of the network and expected changes in the amount and distribution of population and employment.

MAG supplied study area growth rates are defined below. These are:

<i>Period</i>	<i>Study Area Growth</i>
2000 – 2005	3.0%
2005 – 2010	6.0%
2010 – 2020	4.5%

The above rates seem reasonable and, in fact are conservative in nature, particularly for the period 2000 - 2005.

However, growth on the KRR specifically, is estimated by MAG to increase at a much greater rate than the study area rates presented particularly for the period between 2004 and 2010, as was shown by Table 2.

### 3.4.3 Observations on Traffic Growth Assumptions

The MAG assumed growth rates on the KRR are significantly higher than the assumed general traffic growth in the study area and also than historical traffic growth on key local roads.

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According to MAG, the reasons for the higher traffic growth on the KRR are:

- (1) Some induced traffic introduced due to the existing suppressed network conditions in and around Kajang.
- (2) Additional traffic generated by the new developments coming on-stream within Kajang and the Kajang – Seminyih corridor.
- (3) The KRR provides an alternative route to the increasingly congested roads within and around Kajang.

The above effects are all likely, though there is uncertainty and risk in the estimation of their extent. In this study the main element of risk appears to be in the estimation of the scale of future development.

The MAG forecasts assume that the population of Putrajaya, Cyberjaya and Cyber Village grows to 940,000 by 2020. This is in line with Government targets, yet is nevertheless a huge growth and obviously has implications for the rest of the Klang Valley and indeed Malaysia as a whole.

In addition, MAG have assumed that a number of other large developments will be implemented within the scheme corridor. It is understood that these assumptions are consistent with local authority development plans. Unfortunately, no detailed review of the progress in land development since the original forecast has been undertaken.

It is clear that a large proportion of traffic growth is due to assumed development traffic. Our view is that it is not possible for all the planned developments in Selangor, including Putrajaya and Cyberjaya, to succeed in the next 20 years. For Putrajaya and Cyberjaya to succeed they will do so, at least in part, at the expense of developments elsewhere. There is therefore a degree of uncertainty and risk inherent in such assumptions.

### **3.5 The Capacity Constraint and Annualisation Factor**

Traffic that is predicted by the model to use the KRR is adjusted to take account of:

- the capacity constraints imposed by the infrastructure; and
- the relationship between the modelled time periods and a year's worth of traffic (the annualisation factor).

The capacity constraints used by MAG seem sensible and appropriate – 180,000 for dual-3 highway. The forecasts do however assume that sufficient toll plazas are provided to accommodate the forecast traffic and they do not model the junctions in detail (i.e. again these are assumed to have sufficient capacity to accommodate the forecast flows).

In terms of the annualisation factor MAG have modelled three time periods (morning peak, evening peak and off-peak). This reduces uncertainty. The modelled periods are then translated to a whole weekday and this to an annual figure by factoring by between 340 and 350. The values used look sensible.

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**3.6 The Dates of Opening of Other Highway Projects and their Impact on KRR Revenues**

There are at least four significant highway projects included in the MAG forecasts. These are:

- The Kajang Seremban Highway (KSH) which is assumed to open in 2005;
- The South Klang Valley Expressway (SKVE) which is assumed to be complete to Westport by 2005;
- The Kuala Lumpur Outer Ring Road (KLORR) which is assumed to be built by year 2020; and
- The Kajang Bypass which is included in the 2005 model.

KLORR is assumed to have no net impact and is a long way ahead. The other three are potentially important.

KSH links with KRR just east of the Jalan Semenyih junction. Construction has started on parts of KSH but Halcrow understand that financing has not yet been arranged for the project as a whole. Completion by 2005 looks unlikely.

Most of the traffic bypassing Kajang will be coming to / from the south with the existing Jalan Semenyih and the future KSH becoming the main routes.

The SKVE north of Cyberjaya has been constructed, however there is no current progress on the link to West Port, Klang. This project looks unlikely to commence in the short-term and completion by 2005 will not now happen. MAG estimate that delays to SKVE would reduce KRR demand by 3% in 2009.

The Kajang Bypass is included in the forecasts as a dual-2 standard highway with at grade junctions. Therefore the road has a low operating capacity and carries flows in the order of 10,000 – 25,000 vehicles per day in the MAG forecasts.

The other assumption implicit in the forecasts is that no other roads are constructed that compete with KRR. The forecasts assume that over time traffic rises and hence congestion increases but no other road construction takes place. This is likely to be a valid assumption for the first ten years but not thereafter if growth continues.



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## 3.7 Toll Rates &amp; The Toll Elasticity of Demand

The following toll rates have been assumed by MAG:

**Table 4: Kajang Road Road Toll Charges**

Year	Class 0 (motorcycle)	Class 1 (car)	Class 2 (light lorries with 2 axles)	Class 3 (medium and heavy lorries with more than 2 axles)	Class 4 (taxi, hired car)	Class 5 (bus)
2004 – 2008	0	RM1.00	RM2.00	RM3.00	RM0.50	RM1.00
2009 – 2013	0	RM1.30	RM2.60	RM3.90	RM0.60	RM1.30
2014 – 2018	0	RM1.80	RM3.60	RM5.40	RM0.90	RM1.80
2019 - 2036	0	RM2.40	RM4.80	RM7.20	RM1.20	RM2.40

MAG have assumed a toll elasticity of  $-0.3$  in the “early years” declining to  $-0.2$  over time (elasticity of  $0.3$  implies that a toll increase of  $10\%$  results in a traffic decrease of  $3\%$ ). This seems a reasonable assumption, conservative if anything. As the tolls are declining in real terms (and certainly relative to real incomes) it is unlikely that traffic will be very sensitive to the expected increases.

There are some issues with the tolls:

- (1) *Variations over time* – the timing of the increases and the level of the increases are not comparable with those on other adjoining and competing toll roads. This may lead to short term fluctuations in revenues as the relative attractiveness of the alternative routes could vary significantly.
- (2) *The open toll system* – there is also an issue with the open toll system which always makes revenues slightly more difficult to forecast than for closed toll systems. This is because the location of the toll plazas can change routing patterns. For example from Cheras to Country Heights the obvious route would be via the Saujana Impian toll plaza but there is a toll free alternative via the Mines and the B13.

From a revenue maximising perspective the interchange between KRR and Lebuhraya Cheras Kajang (LCK) should make movements between the western part of KRR (Jalan Balakong) and LCK as difficult as is reasonably possible. That would minimise leakage of revenues.

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**3.8 Conclusions**

The MAG forecasts appear to have been produced in a competent and professional manner and the underlying assumptions made are generally reasonable, however the forecast is now largely based on planning and traffic data dating back to the mid-90's and even earlier. The forecasts also assume high levels of growth initially, with an average growth rate of 15% per annum estimated between 2004 and 2009.

From observed data it would appear that 8-9% per annum would be a reasonable base background growth rate to assume subject to capacity constraints. That was the average during the 1990's prior to the economic downturn. Growth rates significantly higher or lower than that would need strong justification as to why KRR was expected to change from past trends.

The key reason given as to why the MAG forecasts exceed this level of growth is the assumption of high levels of future land development in the road corridor. Though these assumptions are in line with Government plans this does represent a significant element of risk.

**4. Halcrow Forecasts**

In the timescale available it has not been possible to produce any sort of rigorous risk analysis. We have attempted however to produce two alternative scenarios, the Low Case and the Base Case. The underlying assumptions and results are described below. In addition, results are compared to the MAG forecasts to demonstrate the potential level of sensitivity and risk within these forecasts.

**4.1 Test Case Assumptions**
*Low Case*

The low case assumes that the development in Putrajaya and Cyberjaya will continue in line with Government plans for the next 10 years. To take account of this 50% has been added to the background growth rate to give total traffic growth rates for the period 2002 – 2010. The background traffic growth has been assumed in line with the analysis of historical data, described in Chapter 4. Other assumptions are in line with those in the MAG forecasts. The assumptions are defined below:

**(1) Annual traffic growth rates of**

- 8.5% from 2000 – 2009
- 8% from 2010 – 2015
- 4% from 2015 – 2020
- 3% from 2020 onwards

50% additional growth to account for CJ/PJ and other major land developments in the corridor from 2000 – 2010

(Impact for 2000 / 2001 reduced to 20%)

**(2) A 14% trip generation factor in 2004 and 10% in 2005 for the opening of KRR (to reflect the initial trip inducing effect of the road scheme itself).**

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- (3) A 2% factor to represent the impact of KSH (in accordance with information from MAG).
- (4) Levels of Demand Elasticity in line with MAG forecasts: -0.3 initially, elasticity reduces to -0.2 over time.

**Base Case**

The assumptions of the Base Case are similar to those of the Low Case, with the exceptions as outlined below. Slightly higher growth rates have been assumed. In addition, lower toll elasticities have been assumed:

- (1) Annual growth rates of
  - 9% from 2000 – 2009
  - 10% from 2010 – 2015
  - 9% from 2015 – 2020
  - 4.5% from 2020 onwards

50% additional growth to account for CJ/PJ from 2000 – 2010  
(As Low Case)

(Impact for 2000/2001 reduced to 20%)
- (2) Levels of Demand Elasticity: -0.25 initially, elasticity reduces to -0.10 over time.

**4.2 Results of Test Case Analysis**

The results of the analyses for the Low and Base Cases are contained in Tables 5 and 6. Table 5 presents the forecast traffic levels, by year and toll plaza, for each of the tests. Table 6 summarises the calculated annual revenues for each of the tests, again by year and toll plaza. In addition, Figure 4 graphically compares the predicted traffic growths with those forecast by MAG.

The results of the Low Case scenario can be summarised as follows:

- in 2004 the Low Case is 8% lower than MAG;
- over the next 18 years the gap between the forecasts increases due to the higher trip growth rates assumed by MAG. By 2022, 27% less traffic would pass through the toll plazas under the Low Case scenario; and
- after 2030 the forecasts become closer due to road capacity constraining the MAG forecasts.

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**Table 5 - Forecast Average Daily Traffic**

Year	Low Case					Base Case					% of MAG
	Sungai Long	Saujana Implan	Reko East	Reko West	Total	Sungai Long	Saujana Implan	Reko East	Reko West	Total	
2004	34,343	42,626	43,232	42,424	162,625	34,691	43,057	43,669	42,853	164,270	93%
2005	42,594	52,867	53,619	52,616	201,696	43,311	53,757	54,521	53,502	205,091	88%
2006	48,025	59,608	60,455	59,325	227,413	49,158	61,014	61,882	60,725	232,779	86%
2007	54,148	67,208	68,163	66,889	256,408	55,795	69,251	70,236	68,923	264,205	86%
2008	61,052	75,776	76,854	75,417	289,099	63,327	78,600	79,718	78,228	299,873	87%
2009	62,631	77,736	78,841	77,388	296,576	66,477	82,509	83,682	82,118	314,786	87%
2010	67,641	83,955	85,148	83,557	320,301	72,460	89,935	91,214	89,509	343,118	86%
2011	73,053	90,671	91,960	90,241	345,925	78,981	98,029	99,423	97,565	373,998	86%
2012	78,897	97,925	99,317	97,461	373,600	86,089	106,852	108,371	106,345	407,657	87%
2013	82,053	101,842	103,290	101,359	388,544	93,837	116,469	118,124	115,917	444,347	91%
2014	81,410	101,044	102,481	100,565	385,500	94,360	117,118	118,783	116,563	446,824	94%
2015	84,666	105,086	106,580	104,588	400,920	98,607	122,388	124,128	121,808	466,931	92%
2016	88,053	109,289	110,843	108,771	416,956	103,044	127,896	129,714	127,289	487,943	91%
2017	91,575	113,661	115,277	113,122	433,635	107,681	133,651	135,551	133,018	509,901	90%
2018	95,238	118,207	119,888	117,647	450,980	112,526	139,665	141,651	139,003	532,845	89%
2019	92,083	114,291	115,916	113,750	436,040	113,653	141,063	143,069	140,395	538,180	93%
2020	94,846	117,720	119,394	117,162	449,122	117,631	146,000	148,076	145,308	557,015	92%
2021	97,691	121,252	122,976	120,677	462,596	121,748	151,110	153,259	150,394	576,511	91%
2022	100,622	124,889	126,665	124,297	476,473	126,009	156,399	158,623	155,658	596,589	91%
2023	103,640	128,636	130,465	128,026	490,767	130,419	161,873	164,175	161,106	617,573	91%
2024	106,749	132,495	134,379	131,867	505,490	134,984	167,539	169,921	166,745	639,189	90%
2025	109,952	136,470	138,410	135,823	520,655	139,708	173,403	175,868	172,581	661,560	90%
2026	113,251	140,564	142,562	139,898	536,275	144,598	179,472	182,023	178,621	684,714	91%
2027	116,648	144,781	146,839	144,095	552,363	149,659	180,000	188,394	184,873	702,926	91%
2028	120,147	149,124	151,244	148,417	568,932	154,897	180,000	194,988	191,343	721,228	91%
2029	123,752	153,598	155,782	152,870	586,002	160,318	180,000	201,813	198,040	740,171	91%
2030	127,464	158,206	160,455	157,456	603,581	165,930	180,000	208,876	204,972	759,778	92%
2031	131,288	162,952	165,269	162,180	621,689	171,737	180,000	216,187	212,146	780,070	93%
2032	135,227	167,841	170,227	167,045	640,340	177,748	180,000	223,753	219,571	801,072	95%
2033	139,284	172,876	175,334	172,056	659,550	180,000	180,000	231,585	227,256	818,841	97%
2034	143,462	178,062	180,594	177,218	679,336	180,000	180,000	239,690	235,210	834,900	99%
2035	147,766	180,000	186,012	182,535	696,313	180,000	180,000	240,000	240,000	840,000	100%
2036	152,199	180,000	191,592	188,011	711,802	180,000	180,000	240,000	240,000	840,000	100%

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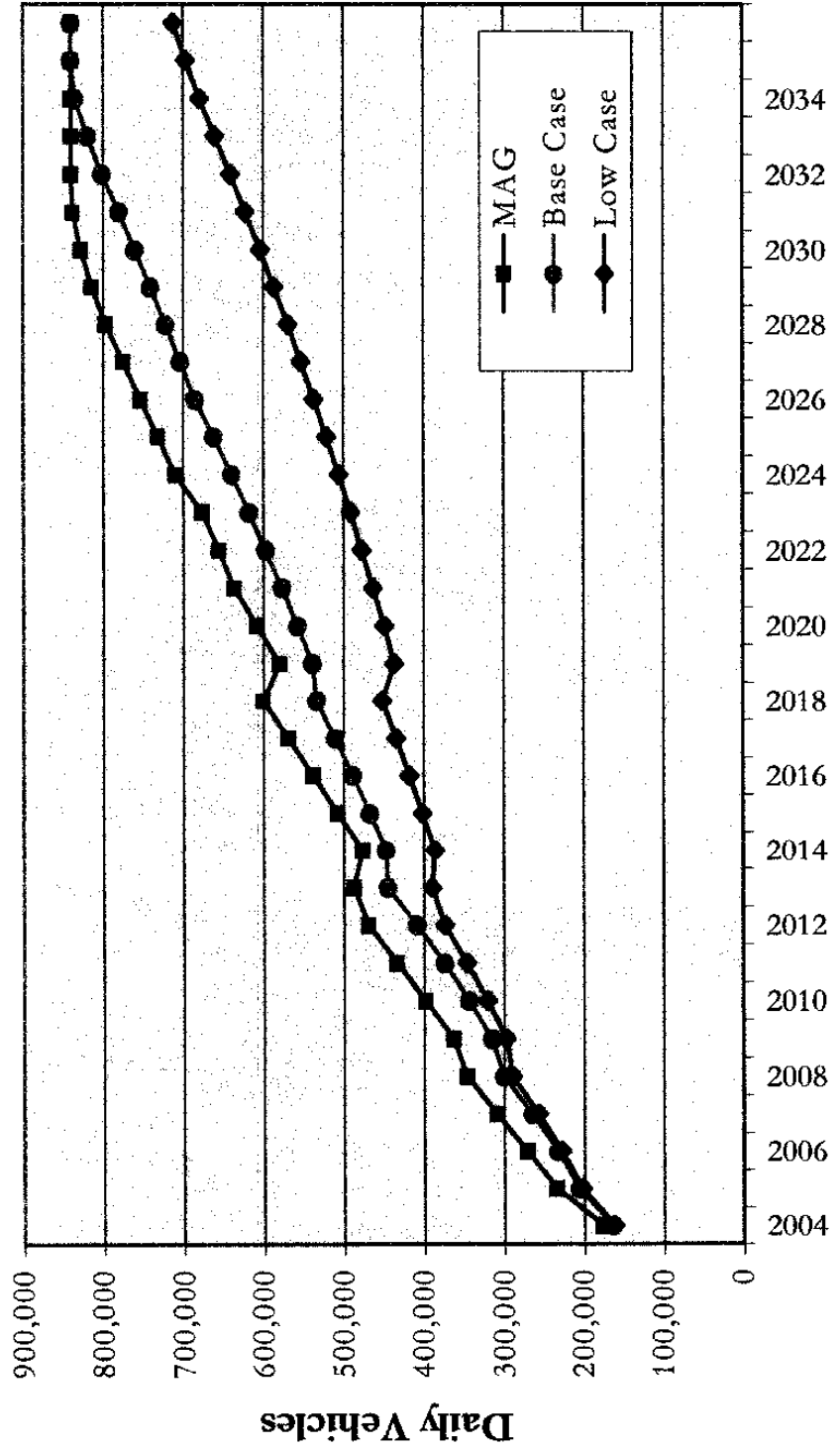
**Table 6 - Annual Revenue (RM '000s)**

Year	Low Case					Base Case				
	Sungai Long	Saujana Impian	Reko East	Reko West	Total	Sungai Long	Saujana Impian	Reko East	Reko West	Total
2004	13,755	17,237	17,504	17,113	65,609	13,894	17,412	17,681	17,286	66,273
2005	17,117	21,444	21,776	21,287	81,624	17,405	21,805	22,143	21,645	82,998
2006	19,344	24,233	24,607	24,054	92,238	19,801	24,805	25,188	24,622	94,416
2007	21,845	27,371	27,791	27,167	104,174	22,509	28,203	28,636	27,993	107,341
2008	24,661	30,903	31,376	30,672	117,612	25,580	32,055	32,545	31,815	121,995
2009	32,901	41,234	41,866	40,923	156,924	34,922	43,766	44,437	43,436	166,561
2010	35,561	44,576	45,254	44,237	169,628	38,094	47,751	48,478	47,388	181,711
2011	38,429	48,180	48,911	47,812	183,332	41,547	52,089	52,880	51,692	198,208
2012	41,524	52,069	52,857	51,672	198,122	45,309	56,816	57,675	56,382	216,182
2013	43,240	54,214	55,051	53,801	206,306	49,450	62,001	62,958	61,528	235,937
2014	59,516	74,616	75,787	74,049	283,968	68,983	86,486	87,843	85,829	329,141
2015	62,011	77,731	78,990	77,139	295,871	72,220	90,530	91,995	89,840	344,585
2016	64,596	80,961	82,307	80,344	308,208	75,593	94,744	96,319	94,023	360,879
2017	67,274	84,311	85,744	83,669	320,988	79,106	99,139	100,824	98,384	377,453
2018	70,053	87,786	89,309	87,118	334,266	82,770	103,722	105,521	102,932	394,945
2019	90,412	113,292	115,290	112,432	431,426	111,591	139,829	142,296	138,769	532,485
2020	93,220	116,803	118,897	115,918	444,838	115,614	144,863	147,460	143,766	551,703
2021	96,104	120,413	122,601	119,503	458,621	119,769	150,065	152,792	148,932	571,558
2022	99,075	124,125	126,404	123,190	472,794	124,072	155,443	158,297	154,272	592,084
2023	102,164	127,978	130,390	127,051	487,583	128,562	161,046	164,080	159,878	613,566
2024	105,340	131,935	134,484	131,017	502,776	133,202	166,831	170,054	165,670	635,757
2025	108,608	136,007	138,692	135,095	518,402	138,001	172,814	176,226	171,656	658,697
2026	111,967	140,196	143,016	139,288	534,467	142,960	179,002	182,603	177,842	682,407
2027	115,425	144,502	147,462	143,599	550,988	148,090	179,653	189,193	184,237	701,173
2028	118,983	148,935	152,035	148,034	567,987	153,395	179,772	196,007	190,849	720,023
2029	122,644	153,496	156,738	152,597	585,475	158,883	179,881	203,051	197,686	739,501
2030	126,412	158,192	161,576	157,291	603,471	164,560	179,984	210,336	204,757	759,637
2031	130,289	163,025	166,556	162,122	621,992	170,430	180,081	217,870	212,070	780,451
2032	134,281	167,998	171,680	167,094	641,053	176,505	180,169	225,663	219,635	801,972
2033	138,392	173,120	176,953	172,213	660,678	178,848	180,254	233,724	227,462	820,288
2034	142,628	178,392	182,380	177,475	680,875	178,953	180,334	242,061	235,551	836,899
2035	146,990	180,413	187,969	182,898	698,270	179,054	180,413	242,526	240,478	842,471
2036	151,480	180,483	193,723	188,478	714,164	179,149	180,483	242,669	240,596	842,897

15.0 INDEPENDENT TRAFFIC CONSULTANT'S REPORT (Cont'd)

Sistem Lingkar-Lebuhraya Kajang Sdn Bhd  
Independent Traffic Consultant's Report

**Figure 4: Comparison of Low Case and Base Case Tests with MAG Forecasts**



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15.0 INDEPENDENT TRAFFIC CONSULTANT'S REPORT (*Cont'd*)

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The results of the Base Case can be summarised as follows:

- in 2004 the Base Case is 7% lower than MAG;
- for the next couple of years the Base Case forecast falls further behind the MAG forecast due to lower predictions of initial traffic growth – in 2006 the Base Case traffic levels are 14% lower than the MAG forecasts.
- Over the 25-year period to 2030 the Base forecasts remain within 15% of the MAG forecasts. After 2030 the Base Case becomes closer to the MAG forecast since the MAG traffic growth is constrained by highway capacity. By 2035 traffic levels under both scenarios have reached the assumed capacity.

5. Conclusions

The main conclusions are:

- (1) From the information that we have seen the technical approach adopted by MAG and the logic behind their conclusions are reasonable. The analysis seems to have been produced in a competent and professional manner. However the original forecast (though the subject of regular review) is based on old OD and traffic survey data.
- (2) The forecasts assume very substantial growth in demand especially over the period from 2000-09. There are risks associated with growth of this magnitude which this report has attempted to identify, albeit briefly and reliant on input from MAG's traffic forecast as presented in the report "Kajang Traffic Dispersal Ring Road" dated July 2002.
- (3) The main risk is the extent of future development and land use changes. MAG assume that all the planned development takes place according to schedule. Even under the Halcrow presented low case scenario it has been assumed that development of Putrajaya and Cyberjaya takes place within the Government's revised forecast timetable.
- (4) The more development and other positive factors are included the greater the level of risk associated with the forecasts. The extent to which the investors are prepared to take those risks will depend on their view of future development in the Kajang and surrounding area (Putrajaya and Cyberjaya). That is the market served by KRR and it is by its' nature a road serving a predominantly local market.

Yours faithfully

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