Surrey Local Government Association

Surrey Joint Municipal Waste Management Strategy

Municipal Solid Waste Growth Projections
Supplementary Report SR-1

April 2006

Entec UK Limited

Report for

SLGA c/o Pauline Morrow
Policy Officer SLGA
Woking Borough Council
Civic Offices
Gloucester Square
Woking Surrey
GU21 6YL

Main Contributors

Steve Blackburn
Alison Leavens
Amy Harris

This Report

Is produced on behalf of Department for Environment Food and Rural Affairs Direct Consultancy Support Local Authority Support Unit in partnership with Entec UK Ltd.

Issued by

S Blackburn
Steve Blackburn

Approved by

M. Sellwood
Matthew Sellwood

Entec UK Limited

Atlantic House
Imperial Way
Reading RG2 0TD
England
Tel: +44 (0) 1189 036061
Fax: +44 (0) 1189 036261

h:\projects\wm-220\16000 - 16999\16460 - surrey jmwms\design & technical input\strategy draft\srs\finalised srs\sr-1 waste growth final.doc

Surrey Local Government Association

Surrey Joint Municipal Waste Management Strategy

Municipal Solid Waste Growth Projections
Supplementary Report SR-1

April 2006

Entec UK Limited

Certificate No. EMS 69090 Certificate No. FS 13881

Copyright and Non-Disclosure Notice

Third Party Disclaimer

Document Revisions

No.	Details	Date
1	Working Draft	March 06
2	Entec Submitted Document	April 06

Contents

Entec

1. Purpose of this Report

1.1 Overview

In June 2005, the Surrey Local Government Association (SLGA), which comprises Surrey County Council (SCC) and eleven District and Borough Councils, commissioned Entec to provide technical assistance in the development of its Joint Municipal Waste Management Strategy (JMWMS). To inform the JMWMS development process, Entec UK Ltd. has produced a series of supplementary reports to provide technical waste management information.

This supplementary report presents Entec's professional opinion on the possible future growth rates for municipal solid waste (MSW) in the County of Surrey.

As the projection of waste arisings over long periods is notoriously difficult, a range of growth scenarios illustrating some possible outcomes are presented in this report. The scenarios presented range from zero growth through to a higher growth rate. Due to time constraints we have not conducted a full UK review of current and possible future waste trends. The views expressed in this report are based on our professional experience at the time of writing and could change in light of information on local circumstances, future plans and policies.

Note that this report includes interim data that has not been formally audited, but is useful for the purpose of future growth projections. We recommend that the projected growth rates are monitored annually to see if the underlying assumptions in this paper need updating. It is stressed that waste projections are an inexact art, and there are conceivable circumstances where actual arisings could be lower or higher than stated.

2. Historic Trends

2.1 Borough and District Authorities

As many factors affect waste arisings, generating a realistic arisings profile for future projections is inherently problematic. To develop an outline profile the collection authorities have been assessed on an individual basis. Historic data regarding waste arisings and household/population numbers has been assessed to identify any recent trends.

Many studies use projections for the number of new households/dwellings to inform future waste growth. Lifestyle changes are leading to smaller numbers of people per household, and a high demand for new housing. These extra dwellings may not all be new builds –properties may be converted in to multi-occupancy buildings. Even though the total population may stay the same, this causes the waste to grow, as each new household creates an extra baseline amount of waste (e.g. due to duplication of purchases etc).

In the future the authorities may wish to utilise a projection based on population figures, rather than housing, as this links into a Best Value performance indicator, BVPI 84[1]:

> *"The number of kilograms of household waste collected per head of population in the authority's area and the percentage increase or decrease in this amount compared to the previous financial year"*

The total quantity of waste arising in each Borough/District is presented in Table 2.1, and calculated on a "per household" basis. The number of households within each Borough/District is predicted to increase, therefore even if there were no change in quantity of waste produced per household, the total waste arisings could still increase. The baseline for housing calculations is 2001, when the last national census was conducted; earlier data has more uncertainties. The yearly housing estimates are updated regularly by the Office for National Statistics.

As each year progresses, monthly tonnage data is compiled. This can be used to give an initial indication of ongoing waste growth, and whether older growth projections are coming to fruition. Surrey County Council compiles data about all waste arisings, and has extrapolated the waste arisings data that is available at the time of writing, to estimate the waste arisings generated in the period 2005/06. Such data should be treated with more caution as it is incomplete. It is possible that seasonal events will lead to total yearly arisings being very different from those envisaged. However it is judged better to let these estimates inform future growth projections, particularly if they suggest older estimates are inaccurate.

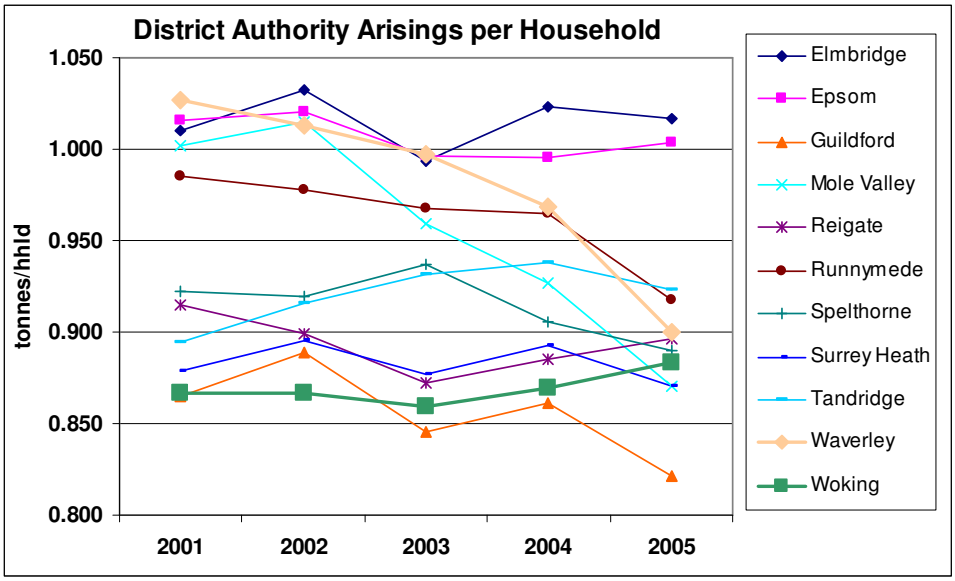
Figure 2.1 provides an indication of the changes in the arisings per household for the individual authorities, which removes the effect of the size of each authority on total arisings.

[1] ODPM, (2005), Best Value Performance Indicators 2005/06: Guidance Document (Amended 01/04/05): http://www.odpm.gov.uk/index.asp?id=1136118

Table 2.1 Analysis of collected household waste arisings per Borough/District Authority

District Authority		2001/02	2002/03	2003/04	2004/05	2005/06 (estimate)
Elmbridge	Tonnes	53,051	54,599	52,845	54,788	*54,741*
	Tonnes/household	1.010	1.033	0.993	1.024	*1.017*
	%change Te/hhld		2.27%	-3.82%	3.06%	*-0.68%*
Epsom	Tonnes	28,421	28,809	28,378	28,593	*29,060*
	Tonnes/household	1.016	1.021	0.997	0.996	*1.003*
	%change Te/hhld		0.48%	-2.35%	-0.11%	*0.77%*
Guildford	Tonnes	46,182	47,623	45,474	46,789	*45,089*
	Tonnes/household	0.865	0.889	0.845	0.861	*0.822*
	%change Te/hhld		2.72%	-4.88%	1.87%	*-4.58%*
Mole Valley	Tonnes	34,550	35,198	33,472	32,529	*30,728*
	Tonnes/household	1.002	1.015	0.959	0.927	*0.870*
	%change Te/hhld		1.27%	-5.47%	-3.39%	*-6.09%*
Reigate	Tonnes	48,246	47,786	46,686	47,783	*48,737*
	Tonnes/household	0.915	0.899	0.872	0.885	*0.896*
	%change Te/hhld		-1.72%	-3.06%	1.57%	*1.22%*
Runnymede	Tonnes	32,101	32,075	31,931	32,055	*30,683*
	Tonnes/household	0.985	0.978	0.967	0.965	*0.918*
	%change Te/hhld		-0.72%	-1.08%	-0.25%	*-4.88%*
Spelthorne	Tonnes	36,171	36,293	37,209	36,197	*35,792*
	Tonnes/household	0.922	0.919	0.937	0.905	*0.890*
	%change Te/hhld		-0.30%	1.88%	-3.33%	*-1.73%*
Surrey Heath	Tonnes	28,786	29,536	29,151	29,895	*29,339*
	Tonnes/household	0.879	0.895	0.877	0.893	*0.870*
	%change Te/hhld		1.84%	-2.03%	1.80%	*-2.57%*
Tandridge	Tonnes	28,942	29,833	30,548	30,979	*30,716*
	Tonnes/household	0.895	0.916	0.931	0.938	*0.923*
	%change Te/hhld		2.35%	1.68%	0.71%	*-1.53%*
Waverley	Tonnes	49,802	49,318	48,747	47,539	*44,344*
	Tonnes/household	1.027	1.013	0.997	0.968	*0.900*
	%change Te/hhld		-1.38%	-1.57%	-2.88%	*-7.11%*
Woking	Tonnes	32,853	33,107	33,125	33,808	*34,604*
	Tonnes/household	0.867	0.866	0.859	0.870	*1.51%*
	%change Te/hhld		-0.08%	-0.79%	1.21%	*0.883*
Surrey Total Collected	Tonnes	419,105	424,177	417,566	420,955	*413,833*
Surrey Average	Tonnes/household	0.943	0.948	0.927	0.928	*0.906*
Surrey	%change Te/hhld		0.52%	-2.23%	0.13%	*-2.35%*

Figure 2.1 Annual percentage change in district arisings per household



In order to analyse this data, the overall "correlation" between the year and waste production per household has been calculated, as presented in Table 2.2. This trend calculation provides the best fit straight line through the available data.

A low correlation ($R^{2\ less}$ than 0.8) indicates that the data is fluctuating too much to indicate whether it is on an upward or downward trend. In these cases subsequent years arisings could change either way, and it may be most prudent to assume zero growth until a more certain method of predicting future arisings is found. Those with a statistically significant correlation have also been highlighted in the table below.

The average growth rate for all available data is also shown, which removes the underlying effect of housing growth. It should be noted that average growth rates should be treated with caution, as there may be no long-term statistical trend in the data, or the trend may change as time goes on, and therefore future waste growth could vary markedly from the average. When the rate of housing growth is added back it can offset any waste minimisation effects.

This analysis suggests that only Mole Valley and Woking have experienced a statistically significant decrease in waste arisings per household over the past 5 years. For the other Councils, the next years arisings could go either way, and it may be most prudent to assume zero growth until a more certain method of predicting future arisings is found. With the successful implementation of minimisation policies such as no-side waste and home composting it may be that other Councils also experience a decrease over the next few years, but it is too soon to predict this with any certainty.

It is noteworthy that until 2003/4 some authorities showed a higher correlation co-efficient, which suggested that we would be able to more accurately predict the arisings for 2004/05. In reality the actual tonnages were markedly lower in some cases, which may be attributable to the dry summer. This illustrates the difficulty in short term planning for the amounts of waste that will be collected.

Table 2.2 Analysis of trends in the tonnage of collected household waste per household

Council	Correlation R^2 * 2001 -2005	Average Growth 2001 -2005**
Elmbridge	0.002	0.21%
Epsom	0.488	-0.30%
Guildford	0.531	-1.22%
Mole Valley	**0.897**	**-3.42%**
Reigate	0.254	-0.50%
Runnymede	0.784	-1.73%
Spelthorne	0.488	-0.87%
Surrey Heath	0.092	-0.24%
Tandridge	0.568	0.80%
Waverley	**0.881**	**-3.24%**
Woking	0.421	0.46%
Surrey Total	**0.818**	**-0.98%**

**The data was analysed in MS Excel to determine the relationship between waste arisings and time (in years). The method utilised was the Pearson product moment correlation coefficient R. The R-squared value can be interpreted as the proportion of the variance in y attributable to the variance in x. Values for R^2 above 0.8 are deemed a significant correlation, and are show in bold text. Values of 1.0 indicate a directly proportional relationship.*

*** The average growth rate does not include the underlying effect of housing growth, which may cause total arisings to rise.*

2.2 Civic Amenity Site Arisings

Although many of the District and Borough Councils have experienced a fall in collected arisings per household, this has been offset by significant increases in total arisings received at the Civic Amenity sites, as show in Table 2.3. This has meant that the total waste generated per household has generally increased year on year.

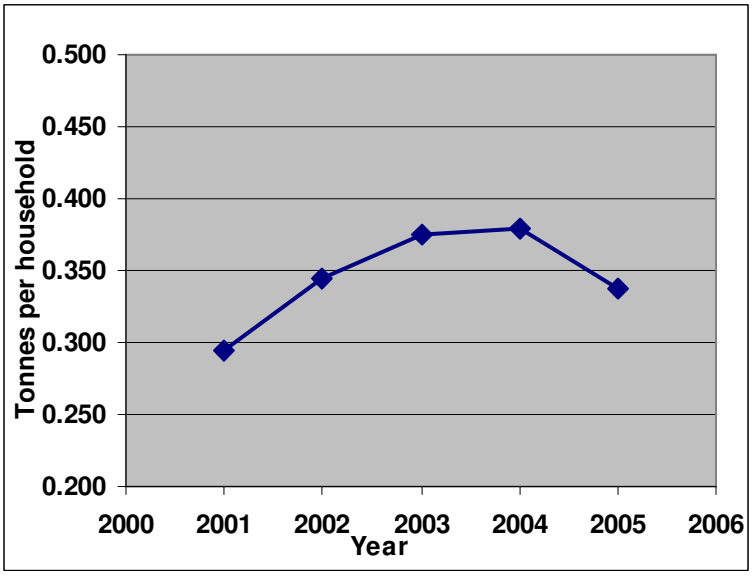
Table 2.3 Analysis of total civic amenity waste arisings

		2001/02	2002/03	2003/04	2004/05	2005/06 estimate
All CA Sites	Tonnes	130,650	154,407	169,198	172,144	*154,167*
	Tonnage/hhld	0.294	0.345	0.376	0.380	*0.338*
	%change Te/hhld		17.37%	8.83%	1.05%	*-11.04%*

It can be seen in Figure 2.2 below that there was a sharp increase in arisings at CA sites from 2001 to 2003, which could now be flattening out. Early indications for 2005/06 are that it has undergone a decline, but it is unclear if this reflects the dry summer or a change in the long-term trend back towards previous waste generation rates. Given the historic fluctuations, it is difficult to assess any longer term pattern. The average from 2001 to 2005 is about 4% growth.

From 2001 to 2003 there was a strong correlation of R^2 =0.98, which suggested the tonnage would rise by 12 to 14% in 2004/05 (depending on whether a linear or curved growth was occurring). In reality it rose by only 1.74%. This highlights the difficulty in making accurate projections in the short term. It is possible that waste arisings will return to the long-term trend line, with 2005/06 being a single anomalous drop in arisings.

Figure 2.2 Civic Amenity waste arisings per dwelling



3. Future Projections

3.1 Borough and District Authorities

A range of waste growth projections have been tested; lower and higher growth rates, and a zero growth rate for comparison.

To develop the "lower growth" waste projection a number of assumptions have been made:

1. Total growth will be related to new dwellings. Increase in household numbers are interim projections from Surrey County Council, which incorporate preliminary local views on the numbers of new dwellings over 5 year periods until 2025. We have used this to calculate the annual increase in household numbers over the period concerned. Current housing growth is about 0.7% per annum, and is projected to fall to about 0.5% from 2006 onwards.

2. The long-term average growth rate per household is adopted for all those authorities where a strong correlation. (R^2>0.8) between the year and tonnes collected per household has been found. This gives a current negative growth per household for Mole Valley and Woking, which is partially offset by the increase in total dwellings.

3. Zero growth per household is assumed for any authority where there is no strong correlation in the pattern of historic collected arisings. This reflects the uncertainty over whether waste growth will continue to grow or will reverse. This means that total arisings grow only in line with new dwellings.

4. All waste streams will reach a point where growth in arisings per household is zero by 2011. This allows 5 years for waste minimisation measures to become successful. Any growth thereafter is then entirely due to new dwellings being built in each council area. It also reflects our views that it is unlikely that arisings in Mole Valley and Woking will continue to decline consistently over 25 years given current data (although there may be changes future in production or consumption which make this more likely).

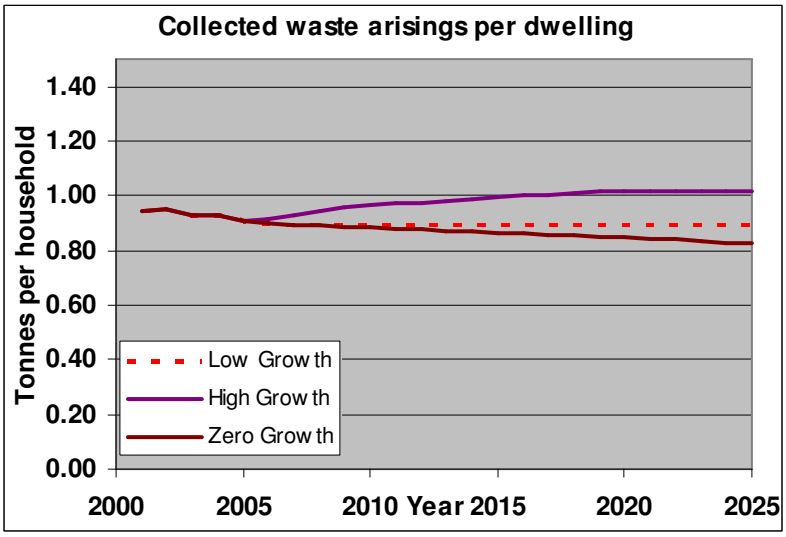
The "higher growth" waste projection is based on the previous Surrey Waste Strategy 2003 figures. This used an average historic growth rate of 3%, but then assumed that waste minimisation will successfully decrease to 2% growth from 2005-2009, and then 1% from 2010-2019. For this study we have extended the growth projection to 2025, and used the regional (RWMS) projection for that period of 0.5%.

We have also tested a "zero growth" projection, whereby the 2005/06 projected arisings are held static. Because the total number of households are increasing this would mean that there is real waste minimisation happening year on year, with less arisings per person/household over the period.

The net effect of these assumptions, in terms of arisings per dwelling, is illustrated in Figure 3.1 below. The average Surrey household produced 0.93 tonnes of collected waste per year over the period 2001-2005. Under the low growth scenario this would decrease by 4% to 0.89 tonnes per household in 2025, and increase by 9% (1.2 tonnes/hhld) with the high growth scenario. The zero growth scenario would result in a decline of 11% to reach 0.83 tonnes per household

by 2025. This decline would equate to an annual waste minimisation rate of about -0.5% (opposite to the underlying growth in households), and could occur if educational and incentive schemes have a significant impact on consumer lifestyles.

Figure 3.1 Total household waste arisings per dwelling for each growth projection



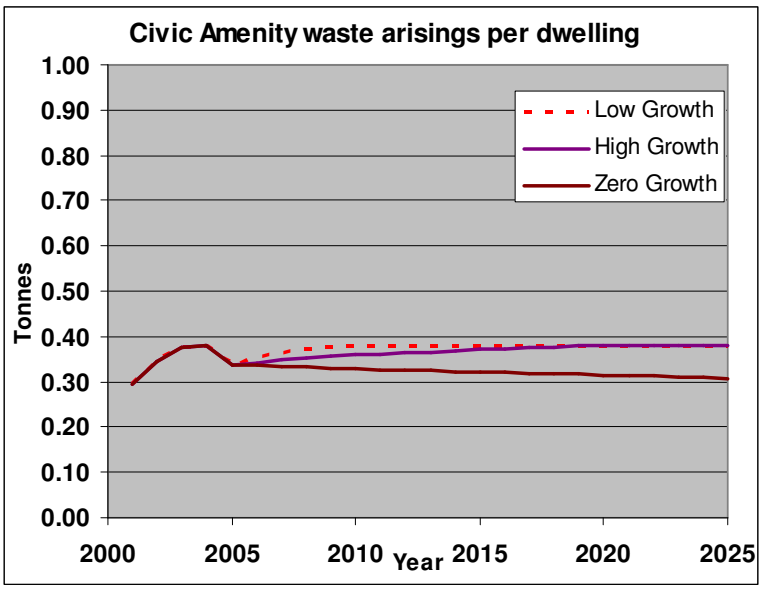
3.2 Civic Amenity Sites

There is currently no clear trend in civic amenity site arisings, although in previous years it was strongly growing. The illicit use of CA sites by commercial traders (waste which should be declared as commercial/industrial rather than municipal) may have accounted for much of the increase, and is possibly related to higher disposal charges at trade waste disposal points. In the future greater enforcement of site usage may be expected to control this contribution to CA site arisings.

For CA site arisings in the lower growth projection an annual growth rate starting at the long-term average of 4% has been used. We would anticipate the growth rate to slow, and have adopted the same assumption as for collected waste, that growth will slow to zero per household by 2011, and thereafter total growth will be proportional to the increase in dwellings from 2011. The higher and zero growth assumptions are as per the local authority assumptions. This results in the higher projection being slower than our lower growth projection, which suggests the regional growth projections were over-optimistic for a civic amenity waste in Surrey.

The net effect of these assumptions in terms of arisings per dwelling is illustrated in the Figure 3.2 below. The average Surrey household produced 0.35 tonnes of civic amenity waste per year over the period 2001-2005. Under the low growth scenario this would increase by 10% to 0.38 tonnes per household in 2025, and increase by 9% (0.38 tonnes/hhld) with the high growth scenario. The zero growth scenario would result in a decline of 11% to reach 0.31 tonnes per household by 2025.

Figure 3.2 Total household waste arisings per dwelling for each growth projection



3.2.1 Other Wastes

The total municipal waste tonnage also includes trade waste collected by the district councils from local businesses, some of which is delivered outside the current contract. It is difficult to analyse growth for this fraction as it is related to the number of businesses who request a collection service from their local council.

In the absence of any specific trend data we have increased these trade waste tonnages in line with the projected growth per household for the collected household waste fraction. This correlation could occur if the majority of trade waste is from activities related to sales to the general public (corner shops etc.). This means that there is no growth after 2011.

There has also been some extra arisings of trade waste outside the main contract (about 16,000 tonnes in 2005/06), which masks some of the decreased in household wastes.

There is uncertainty over the patterns of schools waste arisings and it is not included within these current projections.

3.3 Total Municipal Waste Growth Arisings Projection

The net result of these growth scenarios in terms of total municipal waste is presented in Table 3.1, and Figure 3.3. This suggests that there could be between 611,000 and 753,000 tonnes of municipal waste requiring management in the year 2025. This represents a difference of some 140,000 tonnes, and highlights the need for continual updates to these projections.

It is noteworthy that the low projection lies at almost the mid-point of the high and zero waste growth scenarios, and so represents the average position of two quite different possible outcomes. We would therefore suggest it gives a prudent basis for future planning.

Table 3.1 Total municipal arisings for each growth projection (tonnes)

YEAR	ZERO GROWTH*	LOWER GROWTH*	HIGHER GROWTH*
2001	562,000	562,000	562,000
2002	594,000	594,000	594,000
2003	600,000	600,000	600,000
2004	624,000	624,000	624,000
2005	611,000	611,000	611,000
2006	611,000	618,000	623,000
2007	611,000	625,000	636,000
2008	611,000	630,000	649,000
2009	611,000	635,000	662,000
2010	611,000	639,000	668,000
2011	611,000	642,000	675,000
2012	611,000	645,000	682,000
2013	611,000	647,000	688,000
2014	611,000	649,000	695,000
2015	611,000	651,000	702,000
2016	611,000	654,000	709,000
2017	611,000	657,000	716,000
2018	611,000	660,000	724,000
2019	611,000	663,000	731,000
2020	611,000	666,000	734,000
2021	611,000	669,000	738,000
2022	611,000	672,000	742,000
2023	611,000	675,000	746,000
2024	611,000	678,000	749,000
2025	611,000	681,000	753,000
Total growth 2005-2025	**100%**	**111%**	**123%**

**Figures rounded to nearest 1000 tonnes*

It is anticipated that factors such as changes in packaging, national waste awareness initiatives and waste minimisation schemes will together begin to temper the increase in consumption per household. The objective is that waste arisings per household will be stabilised in the medium term.

There will be fluctuations within the actual growth rate, and we recommend that for ease of calculation a rounded growth rate of **0.5% per year** is used for modelling and monitoring purposes (for 2025 it gives total arisings within 99% of the lower projection described above). This compares to a higher average growth of 2.1% from 2000 to 2005, but down to 1% in recent years. In the medium to long term the total waste growth is anticipated to only be influenced by the construction of new houses in the area.

The growth rates within the modelling for the Joint Municipal Waste Management Strategy have therefore been set at an average of **0.5%** growth per year. This growth rate provides an optimistic projection that the historic trend will be slowed by waste minimisation measures, but will require intensive effort.

This growth target exceeds the policy in the draft Regional Planning Guidance (RPG9) that states *"The Regional Assembly, SEEDA, the Environment Agency and other regional partners will work together to reduce growth of all waste to 1% per annum by 2010 and 0.5% per annum by 2020."* [RPG9 Policy W1 on Waste Reduction].

We recommend that the projected growth rates are monitored annually to see if these assumptions need updating. It is stressed that waste projections are an inexact art, and there are conceivable circumstances where actual arisings could be lower or higher than stated.

Figure 3.3 Total municipal arisings for each growth projection