

## **West Midlands Regional Assembly – Regional Planning Body**

This report has been prepared on behalf of the West Midlands Regional Assembly, the Regional Planning Body, as technical advice to inform the Regional Spatial Strategy Revision process. It is one of a suite of technical reports commissioned to inform the development of spatial policy as part of Phase Two of the Revision of the West Midlands Regional Spatial Strategy.

Every effort has been made to verify and check the contents of this report including all figures and tables. However the West Midlands Regional Assembly can not accept any responsibility for errors or inaccuracies.

Further information and details of the West Midlands Regional Strategy and the Revision process can be found on our web site [www.wmra.gov.uk](http://www.wmra.gov.uk)

# A Study Into Future Landfill Capacity In The West Midlands

**WEST MIDLANDS**  
**REGIONAL ASSEMBLY**

*May 2007*



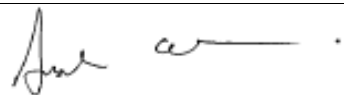
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**WEST MIDLANDS REGIONAL ASSEMBLY**

**A Study Into Future Landfill Capacity In The West Midlands**

May 2007

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## EXECUTIVE SUMMARY

Following the publication of the RPG for the West Midlands in June 2004, the Secretary of State recommended that some issues should be the subject of an early review. The RPB has chosen to undertake the review in a phased manner. As the RPG (which became the RSS in September 2005) focussed primarily on Municipal Waste, one of the topics identified for early review was to ensure that all waste streams are addressed – this forms part of the Phase 2 review.

The modelling work previously undertaken for the establishment of the RSS indicated that, based on different scenarios for diverting municipal, commercial and industrial wastes from landfill, the life of existing landfill sites was limited to some time between 2017 and 2020.

In seeking to establish improved predictions, updated to reflect parallel reviews of housing and employment in the Spatial Options proposals, the West Midlands Regional Assembly commissioned a new study to review future landfill capacity, the aims of which are to :

- Develop a methodology for surveying existing and planned waste landfill capacity, including clarifying definitions of planning status and Environment Agency authorisation covering different types of capacity - inert, non-inert and hazardous;
- Apply the methodology and collate up-to-date data at regional, sub-regional and waste planning authority area levels on landfill capacity and when it might become available; and
- Ensure the methodology can be readily and regularly updated, suggesting a means of enabling the waste planning authorities, WMRTAB and the Regional Assembly to do this, thereby avoiding reliance on future, irregular, surveys.

In undertaking this study, the following activities have been undertaken :

- A register of operational/non-operational landfill sites has been established, which, together with predicted future landfill availability, has been used to establish actual/predicted capacities;
- Detailed predictions of waste arisings across a number of waste streams, derived from separate waste-stream growth assumptions have been converted into annual disposal requirements based on existing diversion/recovery obligations across three options; and
- Progressive consumption of landfill void capacity has been modelled for 4 specific scenarios.

The outcome of these scenario-oriented assessments predicts that, based on the input assumptions concerning waste generation and landfill diversion rates remaining valid, at worst-case landfill capacity will last until 2015/16, and at best case 2022/23.

Sensitivity assessments suggest that increased diversion rates of commercial and industrial waste from landfill have the potential to change these timescales more substantially than municipal and construction and demolition landfill diversions, where existing diversion rates are more demanding.

Future process monitoring proposals are presented. These are focussed on a need to review annually validated data and diversion assumptions, as without the former the true position remains uncertain, while the latter are changing rapidly.

Decisions which inform the RSS need to be underwritten by certainty, and for this reason it is recommended that key decisions be linked to certainty of prediction, even if incoming statute and/or verified data initially delays this process.

## **1. INTRODUCTION**

### **1.1 STUDY BACKGROUND**

Scott Wilson Limited has been engaged by the West Midlands Regional Assembly to undertake a study to assess and predict the future landfill capacity requirements for the West Midlands region.

The Regional Spatial Strategy (RSS) forms part of the statutory development plan and incorporating the Regional Transport Plan. The RSS provides the framework for all Local Development Frameworks and Local Transport Plans. The RSS should also include a concise strategy for the management of waste, formulated in conjunction with other spatial concerns. The strategy for waste management should:

- Look forward for a fifteen to twenty year period; and
- Comprise a distribution of waste tonnage requiring management, a pattern of waste management facilities of national, regional or sub-regional significance, and supporting policies.

Following the publication of the RSS in June 2004, the Secretary of State recommended that some issues be the subject of early review and developed further in a phased revision. As the RSS focussed primarily on Municipal Waste, one of the topics identified for early review was waste, to ensure that all waste streams are addressed.

The Regional Planning Body (RPB) took the decision to undertake the RSS revision in a phased manner:

- Phase one concentrated on the Black Country.
- Phase two will consider housing, employment, transport and waste.
- Phase three will consider a range of other issues including critical rural services, provision for gypsies and travellers, recreational provision, quality of the environment and possibly more.

Modelling work has been completed to support the proposed Phase 2 review of the RSS and has estimated the additional waste management capacity required over different periods at Waste Planning and regional level. The model took account of forecast arisings, existing and planned capacity, and the application and delivery of regional recovery targets. The new model looks at all waste streams and was based on data collected on behalf of the Regional Technical Advisory Body for Waste (WMRTAB).

The modelling work previously undertaken in relation to the revision of the RSS for the West Midlands indicated, that based on different scenarios for diverting municipal, commercial and industrial wastes from landfill, the life of existing sites permitted by the Environment Agency for non-inert and hazardous waste (i.e. excluding inert waste sites) will expire between 2017 and 2020.

To support the earlier modelling work, the Regional Assembly and the WMRTAB are keen to develop an accurate picture for the current landfill capacity, the availability of potential new landfill capacity from mineral sites within the region, together with a consistent categorisation of definitions for different types of waste management for use in future

capacity surveys. The resulting data will be used to update the data referred to in the RSS and as a baseline against which future monitoring can be undertaken.

The identified landfill capacity is predicted to have been fully utilised before the end of the plan period. However, when the capacity is predicted to run out is subject to a number of variables including:

- The rate of waste growth;
- The diversion of waste from landfill;
- Landfill life expectancy - as this is based on a mix of sites with Waste Management Licences and Pollution Prevention Control permits, if sites with WMLs do not receive PPC permits or have their capacity reduced they will not make the anticipated contribution to the region's capacity; and
- Availability of potential new landfill sites from the many mineral sites in the region with planning permission for restoration using imported materials. Some of these sites have a long life expectancy in terms of their future extraction programme and are unsuitable for phased restoration as they are being worked vertically rather than laterally due to the nature of the mineral and geological features. Other sites may be too small to provide viable landfill sites under the new regulatory regime or may not be able to comply with the new requirements with regard to protection of groundwater (RGN 3).

Before considering whether to require Waste Planning Authorities to allocate new landfill capacity in their Waste Development Documents the Regional Planning Body needs to establish the realistic position with regard to additional landfill capacity coming forward from sites which already have planning permission but which do not have a WML or PPC permit.

## **1.2 AIMS OF THE STUDY**

The aims of the study are to:

- Develop a methodology for surveying existing and planned waste landfill capacity, including clarifying definitions of planning status and Environment Agency authorisation covering different types of capacity - inert, non-inert and hazardous;
- Apply the methodology and collate up-to-date data at regional, sub-regional and waste planning authority area levels on waste landfill capacity and when it might become available; and
- Ensure the methodology can be readily and regularly updated, suggesting a means of enabling the waste planning authorities, WMRTAB and the Regional Assembly to do this, thereby avoiding reliance on future, irregular surveys.

The development of the waste scenarios and growth predictions cover the time period from 2005/06 up to 2025/26 and draws primarily from data collated between 2002 and 2005 by the Environment Agency, DEFRA and local authorities using the most up-to-date data available at the time of the study.

The study process has involved consultation with the RTAB, Environment Agency, Mineral and Waste Planning Authorities and Waste/Mineral Operators.

### **1.3 REPORT OUTLINE**

The report is structured as follows:

- Section 2 sets out the legislative and policy context of the study and highlights key pieces of waste legislation.
- Section 3 outlines the background to the project including a summary of the previous capacity reviews.
- Section 4 outlines the main methodology processes used in the study.
- Section 5 summarises the primary data sources used, and definitions employed in relation to waste type and landfill type.
- Section 6 outlines the growth predictions used and provides an overview of the cumulative tonnage produced for each waste type and the corresponding landfill capacity requirements.
- Section 7 outlines the existing criteria for site location/selection, as defined by planning status and Environment Agency requirements, and presents an outline of existing landfill capacity and the forecast capacity requirements.
- Section 8 provides recommendations for ensuring the model remains current with the passage of time.
- Section 9 summarises the findings and conclusions of the study.

Supporting information is included in the Appendices where appropriate.

## **2. LEGISLATIVE AND POLICY DRIVERS**

### **2.1 EUROPEAN DRIVERS IMPACTING ON LANDFILL**

The EU Waste Framework Directive (75/442/EEC), as amended, is the framework document that directs waste management legislation in Europe. Although it does not directly affect waste generation or treatment capacity within the West Midlands region, it provides the basis on which National legislation and strategy is formulated.

In addition to the Waste Framework Directive, the EU has derived a series of thematic strategies, which include:

- Prevention & Recycling and Waste (adopted 21/12/05) – which provides the future direction on waste management including definitions relating to ‘end-of-waste’.
- Sustainable use of Resources (adopted 21/12/05) – closely interlinked with waste strategy.
- Air Pollution (adopted 21/09/05) including Directive on Ambient Air Quality – likely to impact on future emissions and technical/operational standards.
- Urban Environment (adopted 11/01/06) – focus will be on integrated approach to environmental management practices.

These thematic strategies are expected to drive EU policy and legislative changes in the future.

### **2.2 NATIONAL DRIVERS DIRECTLY IMPACTING ON LANDFILL**

#### **2.2.1 The Landfill Directive**

Landfill Directive (99/31/EC) is implemented in England through the Landfill (England and Wales) Regulations 2002 (SI 1559) and aims to improve waste management practices in relation to landfill. This legislation and recent amendments, has had a significant impact on waste management practice, the most significant impacts of which, include:

- Prohibiting the disposal of a number of wastes in landfill including liquids, tyres and flammable, corrosive, explosive, oxidising and infectious wastes.
- Prohibiting the co-disposal of hazardous and non-hazardous wastes in the same landfill cells.
- Introducing the requirement for the pre-treatment of hazardous and non-hazardous wastes prior to disposal in landfill. Although this requirement won't be fully implemented for non-hazardous wastes until the last quarter of 2007, it will increase the cost of disposal and lead to increased requirements for treatment capacity.
- Introducing reduction/diversion targets for all biodegradable waste types going to landfill.
- Introducing the requirement to demonstrate that waste being deposited into landfill meets defined waste acceptance criteria.

### **2.2.2 Waste Strategy 2000**

The Waste Strategy 2000 is the national waste strategy developed to provide strategic direction for the sustainable management of waste. The document was primarily based on waste data collated in 1998/99 and sets out a number of targets and national goals for improvements in waste management in England and Wales. Key targets were set for recycling, recovery and diversion from landfill for municipal, commercial and industrial wastes.

A public consultation on the proposed review of this strategy for England was undertaken in 2006 and once formally adopted will drive forward changes in waste management practice in future years. The review document includes updates with respect to waste data collated since the original strategy, includes more detail on certain waste types (e.g. commercial and industrial wastes) and reviews progress against the initial targets for recycling, recovery and diversion. In addition to the progress update, the Strategy Review also proposes amendments to the targets for future years.

### **2.2.3 The Waste and Emissions Trading Act and Landfill Allowance Trading Scheme**

These Acts introduced the requirements relating to the allocation of landfill allowances in order for the UK to meet its national biodegradable municipal waste (BMW) diversion targets set out in the Landfill Directive. Each WDA has been allocated a maximum allowance of BMW that it is permitted to dispose of each year to landfill. The current allocations have been set for each year between 1<sup>st</sup> April 2005 and 2020 and failure to achieve the maximum diversion rates will lead to punitive financial penalties for the WDA of £150 per tonne BMW in excess of its permitted allowance.

### **2.2.4 Landfill Tax Regulations**

These regulations introduce classification of waste into 'active' and 'inactive' types for the purposes of applying a tax on wastes disposed of at landfill. Currently landfill tax from 1<sup>st</sup> April 2007 will be £24/tonne for active waste and £2/tonne for inactive wastes.

The Landfill Tax has been increasing at £3 per tonne per year since 2002 and was planned to continue to rise until it reached £35 per tonne in 2012. The calculations in the RSS Review Options were undertaken on the basis of the £3 per tonne per year increase.

From 1<sup>st</sup> April 2008, the increase in the tax will change to:

- £2.50/tonne for inactive wastes
- The tax for active waste will escalate annually by a further £8 until at least 2010 at which stage it will have reached a tax rate of £48/tonne.

This financial impetus is aimed at increasing the quantity of waste diverted from landfill to other disposal/treatment facilities. It will have an impact on the amount of waste which goes to landfill but the effect of the increase in the Landfill Tax Escalator has not been taken into account in calculating the anticipated life of landfill sites in the Region.

## **2.3 OTHER DRIVERS IMPACTING ON WASTE MANAGEMENT PRACTICES**

### **2.3.1 The Hazardous Waste Regulations**

These regulations introduced in 2005 set out the new regime for dealing with hazardous waste including the reclassification of hazardous waste using the revised European Waste Catalogue (EWC). The new requirements are influencing the type and quantity of waste being classified as hazardous and the mechanisms of how this waste will be treated and disposed off in future.

### **2.3.2 Producer Responsibility (Packaging Waste) Regulations**

These regulations are aimed at reducing the quantity of packaging materials being sent for disposal by introducing recovery and recycling targets for packaging materials.

### **2.3.3 Waste Electrical and Electronic Equipment (WEEE) Directive**

This Directive is aimed at minimising the impacts of waste from a range of electrical and electronic equipment on the environment. It encourages and sets criteria for the collection, treatment, recycling and recovery of WEEE, thus reducing the need for disposal and makes producers responsible for financing most of these activities.

### **2.3.4 Restrictions of the Use of Certain Hazardous Substances (RoHS) In Electrical and Electronic Equipment**

This directive bans new electrical and electronic equipment being placed on the EU market if they contain defined metals and organic compounds in excess of specified levels. RoHS takes its scope broadly from the WEEE Directive and will assist in reducing the environmental impact of such equipment.

### **2.3.5 End of Life Vehicles Regulations**

These regulations transpose the requirements of the End of Life Vehicles Directive (2005/53/EC) aimed at reducing the amount of waste produced from ELVs and increase the recycling and recovery of waste that does arise. The regulations which contain challenging targets for reuse and recycling of ELV components through approved treatment facilities will assist in reducing the requirements for disposal of these materials in the future.

### **2.3.6 Ozone Depleting Substances Regulations**

These regulations introduced new requirements for the disposal of fridges and freezers including the extraction of CFCs from insulation prior to final disposal or recovery.

### **2.3.7 Aggregates Levy**

The Aggregates Levy was introduced in 2002 to stimulate a reduction in the impact of aggregate extraction on the environment through the introduction of a tax (currently £1.60 per tonne rising to £1.95 per tonne from 1<sup>st</sup> April 2008) on the extraction of primary aggregates. This tax is expected to influence the recycling and reuse of secondary aggregate materials which traditionally may have been sent for disposal.

### **2.3.8 Agricultural Waste**

These regulations came into force in May 2006 and mean that all substances/objects used for agriculture and which are discarded by the holder will be subject to control as waste.

The regulations affect whether an agricultural waste can be burned, buried, stored or used on the farm or will have to be sent elsewhere for treatment or disposal.

### **2.3.9 Animal By-Products Regulations (APBR)**

These regulations impose a number of restrictions on the handling, treatment and disposal of waste that contains or potentially contains animal by-products. Wastes are classified as type 1, 2 or 3 and the regulations define permitted disposal methods including landfill following rendering.

### **2.3.10 Municipal/Household Waste Minimisation, Recovery and Recycling**

The Waste Minimisation Act 1998 and the Household Waste Recycling Act 2003 are the legislative drivers for local authority actions to minimise the quantities of controlled wastes generated and the collection of recyclable materials from households, separate from residual wastes.

In addition, Waste Strategy 2000 and the subsequent reviews contain a number of recycling and recovery targets for municipal and household waste supported by performance targets set for each authority. Such targets are aimed at increasing the quantity of waste diverted from landfill in the future.

### **2.3.11 Planning Policy Statement 10: Planning For Sustainable Waste Management**

This document was published in July 2005 and sets out how sustainable waste management will be delivered through spatial planning.

### **3. BACKGROUND**

#### **3.1 REGIONAL SPATIAL STRATEGY**

The West Midlands Regional Assembly (WMRA) as the Regional Planning Body for the Region has a legal responsibility for preparing a Regional Spatial Strategy (RSS) as the Development Plan for the Region. The RSS provides the framework for all Local Development Frameworks and Local Transport Plans. The RSS should also include a concise strategy for the management of waste, formulated in conjunction with other spatial concerns.

Following the publication of the RSS in June 2004, the Secretary of State recommended that some issues should be the subject of early review and they are being developed further in a phased revision. As the RSS focussed primarily on Municipal Waste, one of the topics identified for early review was waste, to ensure that all waste streams are addressed.

The new strategy formulated for waste management should aim to:

- Look forward for a fifteen to twenty year period.
- Comprise a distribution of waste tonnage requiring management, a pattern of waste management facilities of national, regional or sub-regional significance, and supporting policies.

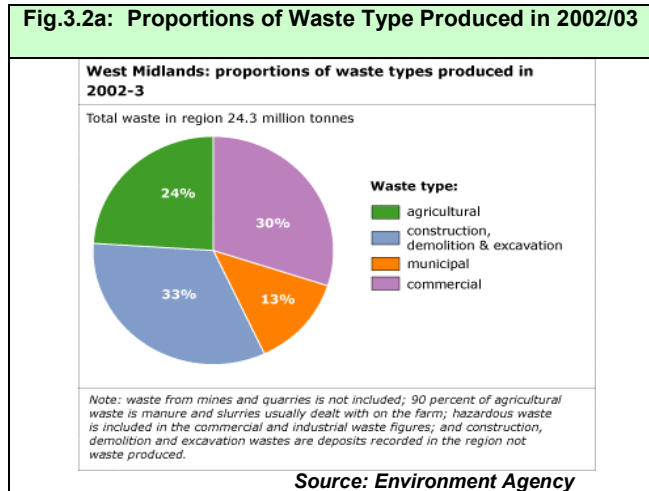
Modelling work has been completed to support the proposed review of the RSS and has estimated the additional waste management capacity required over different periods at Waste Planning and regional level. This modelling took account of forecast arisings and existing and planned capacity, along with application and delivery of regional recovery targets. The new model looks at all waste streams and was based on data collected on behalf of the Regional Technical Advisory Board for Waste (WMRTAB).

To support the Phase Two review of the RSS, West Midlands Regional Assembly issued a revised spatial options document for consultation in January 2007. This consultation document incorporated several proposed priority issues for waste management to support the development of the waste strategy:

1. Planning our future waste management infrastructure.
2. Prevention and improved management of Municipal Solid Wastes.
3. Managing the impacts of Regional and sub-Regional growth.
4. Improving the efficiency of our resource use & reducing commercial & industrial waste.
5. Reduction and management of construction and demolition waste.
6. Prevention and improving management of Hazardous Wastes.
7. Design of new development to facilitate waste recycling and recovery.

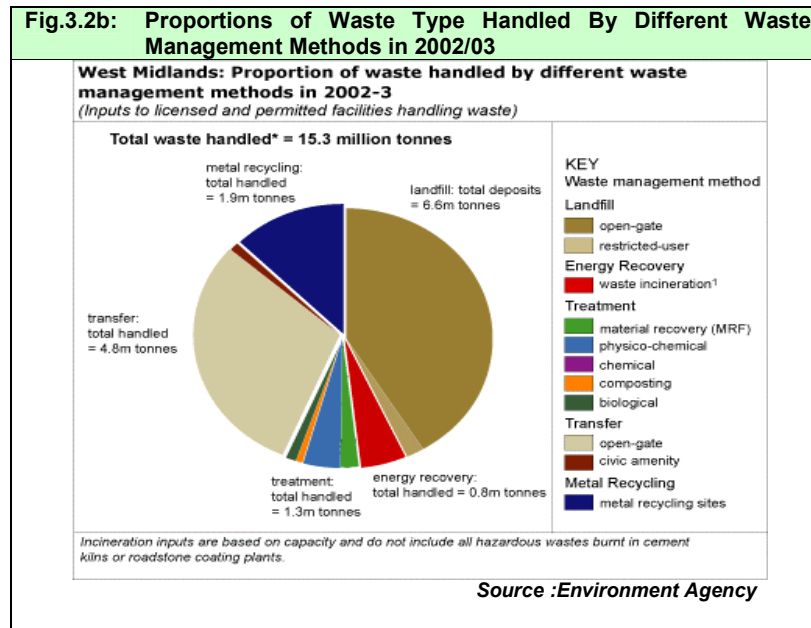
#### **3.2 WASTE ARISING IN THE WEST MIDLANDS**

In 2002/03, the West midlands produced a total of 24.5 million tonnes of waste incorporating 30% from business, 9% hazardous, 13% municipal, 33% from construction and 24% from agriculture.



The Strategic Waste Management Information provided by the Environment Agency has identified that during this period :

- There were more than 1200 licensed waste management facilities operating in the West Midlands handling 15.3 millions tonnes of waste.
- Landfills in the region accepted 6.6 million tonnes of the waste handled (43%) which was a decrease of around 4% on previous years. A third of this was inert/construction and demolition and only 1.5% was special waste.
- Nine authorised incinerators received 0.8 million tonnes of waste, metal recovery took 1.9 million tonnes and waste treatment took 1.3 million tonnes.
- Nearly 4.8 million tonnes went through the West Midlands transfer stations and civic amenity sites.



More up-to-date information on the waste managed at facilities by sub-region has been published by the Environment Agency for the 2004/05 year, based on material managed in the region, but not necessarily arising within the region.

<b>Table 3.2: Waste Managed In The West Midlands By Sub-Region In 2004/05</b>						
Unitary Authority/ Sub-Region	Waste Returns Figures 2004/05 - '000 Tonnes					TOTAL
	Inert/C&D	Special <sup>(1)</sup>	Municipal	Industrial - Commercial	Mun - Ind - Comm	
Herefordshire	19,028	756	84,777	97,999	182,115	201,899
Shropshire & Telford and Wrekin	575,671	15,778	227,427	659,539	886,966	1,476,415
Staffordshire & Stoke-On-Trent	1,326,001	39,679	557,916	1,059,816	1,617,731	2,983,411
Warwickshire	497,360	54,379	1,589,584	1,088,545	2,676,129	3,229,868
West Midlands Met Districts	1,695,268	310,709	385,515	3,138,516	3,524,031	5,530,008
Worcestershire	272,613	53,507	235,921	590,498	826,420	1,152,540
<b>West Midlands Region</b>	<b>4,385,941</b>	<b>310,709</b>	<b>385,515</b>	<b>3,138,516</b>	<b>3,524,031</b>	<b>5,530,008</b>

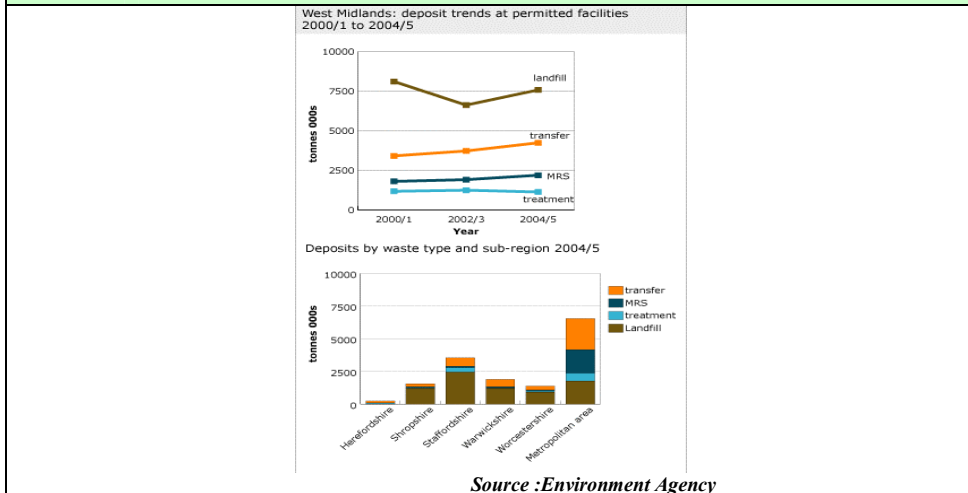
(1) The definition of Special Waste changed in July 2004 and is now called Hazardous Waste  
 Source: Environment Agency

The data needs to be utilised with caution as it may include an element of double counting as some waste will pass through transfer stations, where a degree of sorting and bulking will take place. The same waste may then be recorded as being received at another site in the region where it is recycled or disposed of by composting, landfill or thermal treatment.

A review of the waste management methods employed in this year to deal with the above waste indicated:

- Landfill deposits fell by 7% between 2000/01 and 2004/05 despite an increase after 2002/03.
- Over 25% of the inputs in the metropolitan area went to landfill (1.8 million tonnes) with a similar amount recovered via inputs to metal recycling plants.
- Inputs to transfer and metal recycling facilities increased by over 20% between 2000/01 and 2004/05, while inputs to licensed waste treatment plants remained fairly stable.

**Fig.3.2c: Proportions of Waste Type Handled By Different Waste Management Methods in 2004/05**



### 3.3 CURRENT PREDICTIONS ON LANDFILL CAPACITY IN THE WEST MIDLANDS

In addition to the distribution of facilities to manage waste, the Region needs to make provision for the landfill disposal of residues resulting from the different waste management processes.

The legislation that governs the authorisation of landfill sites has changed in recent years and as such will affect the number of sites and capacity that continue to be authorised.

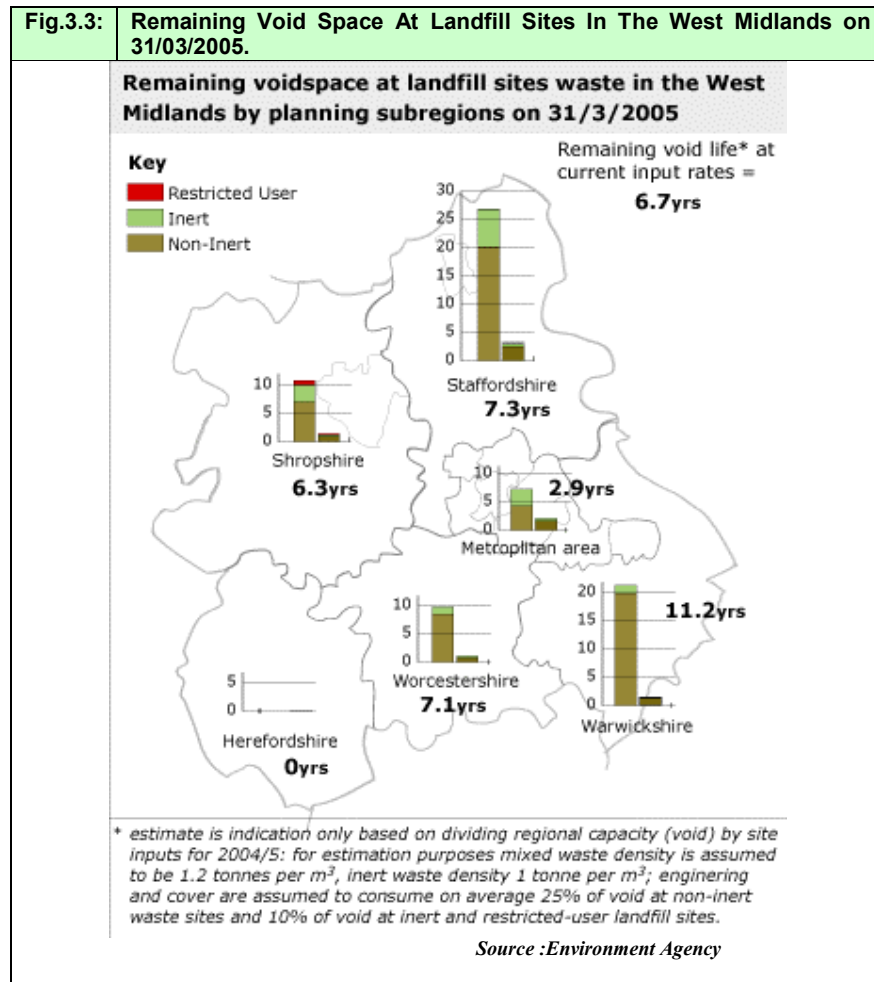
The table below represents, for 2004/05, the then mix of sites that had their capacity set by new Pollution Prevention Control (PPC) authorisation or by the older Waste Management Licences (WML) as identified by the Environment Agency. The capacity indicated may be overstated due to the mix of PPC and WML, and the actual capacity may not be finalised until the PPC permitting process is finished for all sites.

<b>Table 3.3: Landfill Capacity In The West Midlands 2004/05</b>			
<b>Waste Planning Authority</b>	<b>No. of Operational Sites</b>	<b>Non. Of Non-Operational Sites</b>	<b>Void Space (Cubic Metres)</b>
Birmingham City, Coventry & Dudley	3	5	4,703,228
Sandwell	3	4	475,844
Solihull	3	5	530,000
Wolverhampton	0	5	0
Walsall	4	5	3,517,240
Herefordshire	2	0	0
Worcestershire	8	0	9,740,444
Staffordshire	22	61	26,403,856
Stoke-On-Trent	5	11	392,399
Shropshire	4	2	1,808,635
Telford & Wrekin	5	0	9,021,357
Warwickshire	9	6	22,136,002
<b>TOTAL</b>	<b>68</b>	<b>104</b>	<b>78,629,005</b>

*Source: Environment Agency*

The Environment Agency has analysed the above capacity for the region (reference - Waste Data Update 2004) and on the basis that all the capacity available at both operational and non-operational sites is available for use, have drawn the following conclusions:

- On average, the region's landfills have a remaining lifespan of around 7 years at the current rates of disposal (i.e. capacity will expire around 2012/13).
- Staffordshire and Warwickshire have the most remaining voidspace, each with more than 20 million cubic metres; the metropolitan area has over 9 million cubic metres of permitted capacity on existing landfill sites; Herefordshire has effectively no remaining capacity.
- Estimated lifespan varies considerably between the sub-regions, ranging from 2.9 years in the metropolitan areas to more than 11 years in Warwickshire.



However, the modelling work previously undertaken in relation to the revision of the RSS indicated that the existing void capacity at the sites permitted by the Environment Agency for non-inert and hazardous waste (excluding inert waste sites) will expire between 2017 (worse case) and 2020 (best case). The difference in relation to expected landfill lifespan between the two studies is due to the fact that the RSS revision assessed the use of the above indicated landfill void capacity based on the different scenarios for diverting municipal, commercial and industrial wastes from landfill, while the Agency's calculation simply divided the remaining capacity by the base year's tonnage.

To support this earlier work, the Regional Assembly and the WMRTAB are now keen to develop a more accurate picture for the current landfill capacity, together with a consistent categorisation of definitions of different types of waste management for use in future capacity surveys. The resulting models will be used to update the data used in the RSS and as a baseline against which future monitoring can be undertaken.

Historically, the identified landfill capacity is expected to have been fully utilised before the end of the plan period. However, when this historic capacity will run out is subject to a number of variables including:

- The rate of growth of waste generation;
- The rate of diversion from landfill;

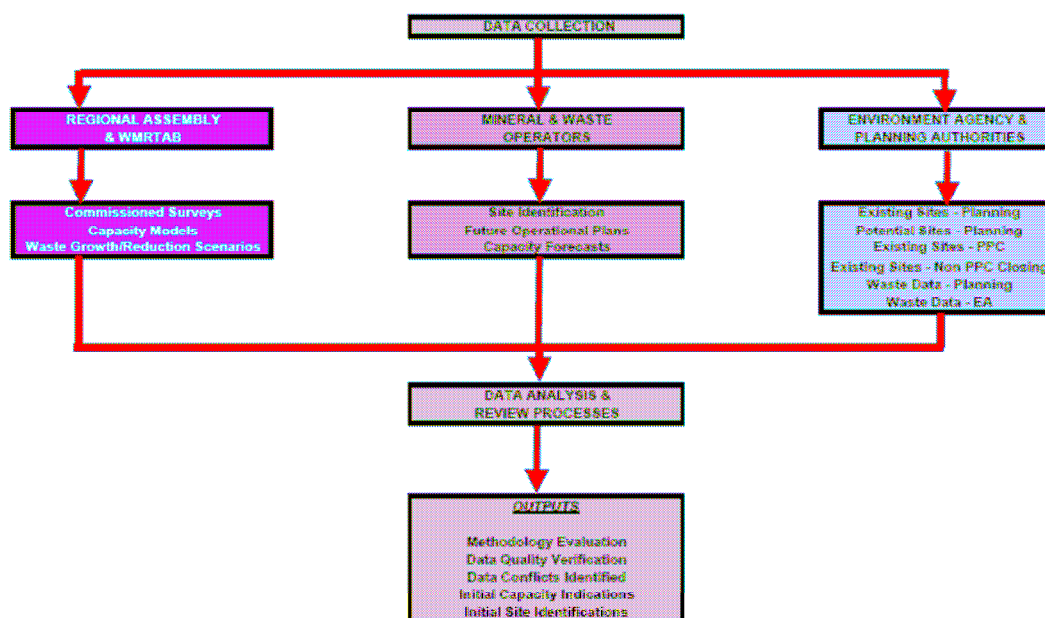
- Landfill life expectancy - as this is based on a mix of sites with Waste Management Licences and Pollution Prevention Control permits, if sites with WMLs do not receive PPC permits or have their capacity reduced they will not make the anticipated contribution to the Region's theoretical availability; and
- The availability of potential new landfill sites from the mineral sites in the Region, particularly those with planning permission for restoration using imported materials. Some of these sites have a long life expectancy in terms of their extraction programme and are unsuitable for phased restoration as they are being worked vertically rather than laterally due to the nature of the mineral and geological features. Other sites may be too small to provide viable landfill sites under the new regulatory regime or may not be able to comply with the new requirements with regard to protection of groundwater (RGN 3).

Before considering whether to require Waste Planning Authorities to allocate new landfill capacity in their Waste Development Documents, the Regional Planning Body needs to establish a realistic situation with regard to additional landfill capacity coming forward from sites which already have planning permission (obligation) but which do not have a WML or PPC permit.

## 4. STUDY METHODOLOGY

With the agreement of the Regional Assembly, this project was undertaken in three distinct Phases, as reviewed briefly below.

### 4.1 DATA COLLECTION AND REVIEW



The initial stage of this project involved the collection and review of existing data from a number of different sources including.

#### a. Regional Assembly and WMRTAB Information

Previous WMRTAB and Assembly sponsored surveys were reviewed to evaluate information pertaining to waste facilities and waste growth/reduction in the region. Such information includes:

Surveys	Other Waste Strategy Information
<ul style="list-style-type: none"> <li>Waste Treatment Capacity Survey (August 2004)</li> </ul>	<ul style="list-style-type: none"> <li>Draft Regional Waste Strategy (November 2001)</li> </ul>
<ul style="list-style-type: none"> <li>Waste Treatment – Phase 2 Future Capacity Requirements (Sept 2004)</li> </ul>	
<ul style="list-style-type: none"> <li>Waste Scenarios Survey (July 2005),</li> <li>Waste Residues Report (June 2006)</li> </ul>	<ul style="list-style-type: none"> <li>Waste Planning In The West Midlands – Supplementary Annual Monitoring Statement 2004</li> </ul>

#### b. Information from Operators of Mineral/Waste Sites

Information from the operators/owners of waste and mineral sites was obtained in relation to:

- Existing landfill sites, the materials accepted and the expected life/capacity of the site, and
- Existing and planned mineral extraction sites that will have void capacity available in future years.

**c. Information from Planning Authorities.**

Information from the Mineral and Waste Planning Authorities in the West Midlands region were reviewed in respect of:

- Existing arrangements for data collection, assessment and verification
- Mineral and waste planning strategies and issues critical to the local area
- Current performance against existing strategy and policy, and
- Current and proposed facilities for mineral extraction and landfill

**d. Information from Environment Agency**

As the enforcement body for current waste management legislation, including the permitting of new and existing landfill facilities, the Environment Agency contributed key information relating to:

- Existing landfill capacity within the region for sites permitted, or due to be permitted, under PPC
- Existing landfill capacity projected to be lost from within the region due to closure of existing facilities through failure to meet Landfill Directive requirements or due to prior commitment of available site capacity, and
- Quantification and classification of waste streams within the region, including the provision of current data being supplied by waste producers, waste treatment and waste disposal facilities via routine monitoring returns.

**e. Data Collection**

Data collection was facilitated by:

- Internet search techniques.
- Formal Data Requests.

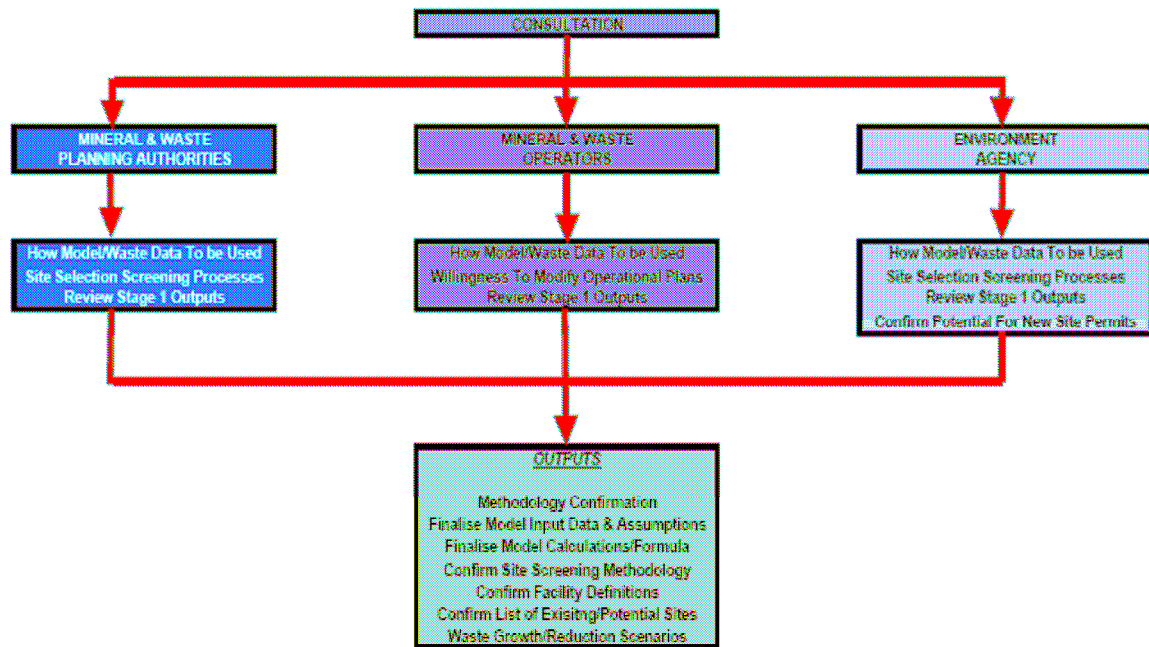
**f. Data Review**

A gap analysis on existing information was completed through:

- **Survey Desk-top Review** - of RSS documents, local plan documents and monitoring returns to evaluate:
  - a. Methodology employed
  - b. Availability of data both at the time of the study and current availability
  - c. Quality of the data with respect to accuracy, variability and assumptions used
  - d. Utilisation of the data in relation to strategy review and development

- **Modelling Desk-top Review** - of the existing modelling spread-sheets and associated methodology to understand the basis of the previous survey results and to verify the quality and accuracy of model outputs.
- **Environment Agency Data Review** - on available data sets (e.g. conditioning plan claims vs. pre-IPPC annual returns; pre-IPPC vs. post-IPPC annual returns) against those supplied from the Mineral and Waste Planning Authorities to identify:
  - a. Main classifications of waste facilities and waste streams
  - b. Areas of common reporting
  - c. Areas of conflicting data/information
  - d. Areas where data collection and management can be improved, and
  - e. Schedule of existing, and planned, facilities in the region
- **Base-level Screening Evaluation** - of each planned/new site, with respect to a nominal environmental impact derived from compliance with the principles of RGN 3, will be completed in order to enable the Environment Agency to confirm its potential to be authorised under IPPC.

## 4.2 CONSULTATION PROCESSES



This portion of the project was completed through a combination of telephone interviews and face-to-face discussions, as appropriate.

### a. Consultation With Mineral and Waste Planning Authorities

Consultation with the Mineral and Waste Planning Authority representatives was undertaken through a series of meetings where the information gathered during the study was presented and review in relation to:

- Data management weaknesses and potential solutions to overcome these
- Current and future data needs
- Effectiveness of the proposed model, including use of preliminary site screening.

**b. Consultation With Environment Agency**

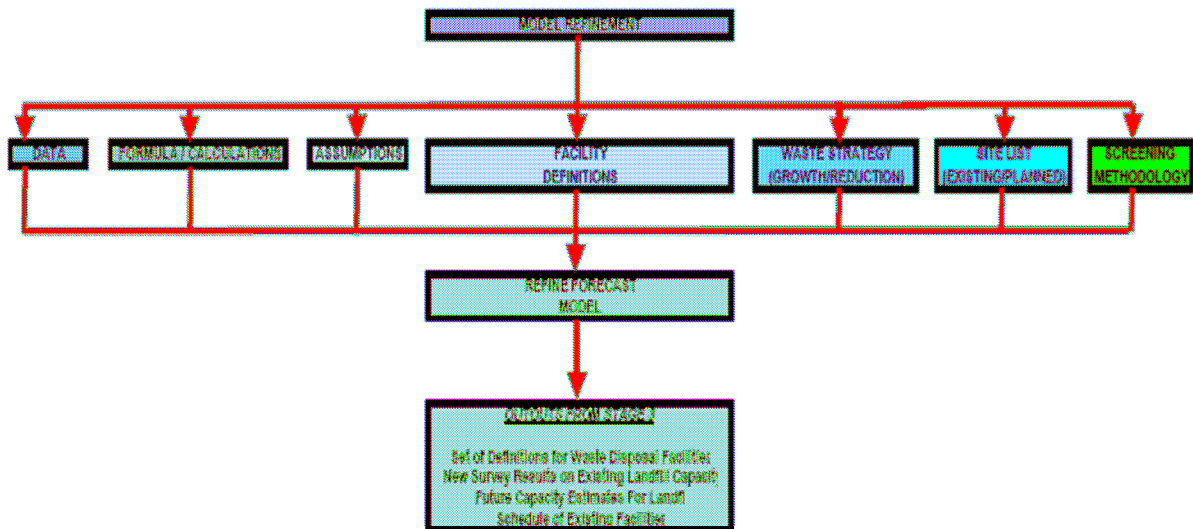
Consultation was facilitated through a meeting and via electronic transfer of information aimed at:

- identifying data management weaknesses and potential solutions
- Current and future data needs
- Effectiveness of the proposed model including, use of preliminary site screening
- Confirming which of those potential future sites may receive an IPPC landfill permit.

**c. Consultation With Operators/Owners of Mineral & Waste Sites**

Consultation with the owners/operators was facilitated through verbal discussion in order to confirm the capacity conclusions

**4.3 Capacity Modelling**



The model was developed in such a manner that included:

- A schedule of permitted/planned landfill facilities;
- A screening facility to enable a consistent, initial assessment of sites that may become available in future, but which are not assessed during this survey;
- A data input area, to be maintained so as to enable future amendments of input criteria, such as predicted growth rates, changes in capacity, changes in landfill diversion and other waste management targets, and
- A calculation section that delivers the model outputs/results.

## 5. STUDY DATA AND DEFINITIONS

This section sets out the key sources of data used in the development of the capacity model and some of the general assumptions that underpin the modelling undertaken. Definitions used herein are presented in Appendix A.

### 5.1 DATA SOURCES

Information on the generation and management of waste at a regional or sub-regional level within the West Midlands, varies by waste stream. The sources of base data used for this study are listed by waste stream in the table below.

<b>Table 5.1: Data Sources</b>			
<b>Parameter</b>	<b>Date</b>	<b>Source</b>	<b>Comment</b>
Municipal Waste	2002/03	Environment Agency Strategic Waste Management Assessment	Although more recent data is available, this has yet to be verified as accurate and has not been used in the current model.
Commercial & Industrial Waste	2002/03	National waste production survey as published in the Strategic Waste Management Assessment (SWMA) for the West Midlands	Data for C&I waste in the SWMA has been modified to exclude hazardous waste for which separate data is available
Construction & Demolition Waste	2002/03	Symonds/ODPM Report	Regional data in the report has been dis-aggregated to provide for data for individual waste planning authorities using a development index based on housing growth.
Hazardous Waste	2004/05	Environment Agency Hazardous Waste Interrogator	The HW Interrogator data is the most recent available. The assumptions adopted in the projections reflect research commissioned by the Hazardous Waste Forum and the EA.

### 5.2 WASTE DEFINITIONS

General waste definitions are provided in the Waste Strategy 2000, part 2, chapter 2 and include:

#### 5.2.1 Municipal Waste

Municipal waste includes all waste under the control of the local authority or agents acting on their behalf. In basic terms this means all household waste, street litter, waste delivered to council recycling points, municipal parks and civic amenity sites, garden wastes, council office waste, waste from schools and some commercial waste from shops and smaller trading estates where local authority waste collection are in place.

Municipal waste including the fractions collected separately is classified in the European Waste Catalogue under Class 20, and is generally considered to be non-hazardous, although some hazardous materials may be present. Only hazardous materials collected separately (e.g. paint, garden chemicals, etc) require consignment and management as a hazardous waste.

### **5.2.2 Commercial and Industrial Waste**

For the purposes of this study, commercial and industrial waste is the waste produced by businesses, excluding:

- Any waste classified as hazardous.
- Any material arising from general construction and demolition activity.
- Any material collected by Local Authorities as municipal.

Business waste materials include:

- Commercial waste - arising from wholesalers, catering establishments, retail businesses and offices; and
- Industrial waste - arising from factories and other industrial plants.

Generally, businesses are expected to make their own arrangements for collection, transport and disposal, although the Waste Planning Authority may collect the material as 'municipal waste'.

In relation to waste classification, a waste is defined by its attribute using the codes in the European Waste Catalogue (EWC) and by its source using the Standard Industrial Classification (SIC) codes. For the purpose of this study the definitions for commercial and industrial waste have been taken from the Environment Agency's SWMA unless otherwise stated.

### **5.2.3 Hazardous Waste**

Hazardous wastes (previously classified as Special Waste) include many substances that are generally recognised as potentially dangerous, such as pesticides, asbestos and strong acids. However, a number of wastes that result from everyday activities (e.g. mobile phone batteries and used engine oils) are also classed as hazardous. From 2002, redundant fridges and freezers have also been classed as hazardous waste, while scrap cars (End of Life Vehicles) and some waste electrical equipment (WEEE) will also shortly be classed as hazardous.

### **5.2.4 Construction and Demolition Waste**

Construction and demolition waste arises from the construction, repair, maintenance and demolition of buildings and structures. It mostly consists of brick, concrete, hardcore, subsoil and topsoil, but it can also include quantities of timber, metal, plastics, plasterboard and occasionally hazardous materials.

### **5.2.5 Agricultural**

Agricultural waste is any waste from a farm or market garden, and includes organic matter, such as manure, slurry, silage effluent and crop residues, together with packaging and films, and animal treatment compounds.

Agricultural waste has recently become a 'controlled waste', and the ability of farmers to dispose of waste on their land, other than the manure, slurry and straw, has been greatly reduced. This waste stream is in essence a commercial waste, and as such while Waste Collection Authorities are not obliged to provide facilities for its collection or management, they may choose to do so. In the absence of any accurate data, for the purpose of this study, this waste stream is not considered further at this time.

### 5.2.6 Other Waste

Other waste types include waste materials from mines and quarries, such as overburden, interburden, and residues left over from initial processing of the extracted material into saleable products. For the purpose of this study, materials from mines and quarries were not considered and such materials were assumed to be managed in-house, where necessary through WML exemptions.

## 5.3 LANDFILL FACILITY DEFINITIONS

Historically, landfill definitions were determined as a result of earlier waste management licensing legislation and 'OPRA for Waste'. The definitions are utilised by the Environment Agency within its REGIS database, and are used in the determination of WML subsistence fees.

Such definitions are broad-ranging, linked to a historically complex method of waste definition and pertain primarily to the facility operational type rather than to any specific waste stream. The historic definitions are identified in the table below, along with a comment on the category in relation to current permitting regimes and waste types.

<b>Table 5.3: Original Landfill Facility Definitions</b>		
<b>Class</b>	<b>Description</b>	<b>Comment</b>
A01	Co-disposal landfill	Take a wide range of waste from all main waste categories (i.e. hazardous, non-hazardous and inert). Changes in legislation mean that such facilities can no longer accept hazardous waste for co-disposal with non-hazardous waste.
A02	Other landfill site taking special waste	These sites will equate to hazardous landfill sites under the current regime.
A04	Household, commercial and industrial landfill	Takes primarily non-hazardous wastes such as municipal and C&I wastes.
A05	Landfill taking non-biodegradable waste	Takes non-hazardous waste limited to non-biodegradable materials, i.e. 'inert'.
A06	Landfill taking other waste	Mainly accepts inert and non-hazardous materials.
A07	Industrial waste landfill (factory curtilage)	Restricted access sites not operated commercially. They are situated within or adjacent to industrial premises and are used for the disposal of a specific waste generated by the industrial operator.

One of the aims of this study was to clarify the above definitions in relation to the planning and authorisation status of landfill facilities, linked to the current categories of waste, namely inert, non-hazardous and hazardous.

In addition, the revised definitions used during the study were based on site availability and on the waste type accepted. The definitions were reviewed and agreed with the WMRA, the sub-regional waste planning authorities and the Environment Agency, and incorporated:

### **Initial Classification - Site Availability**

The initial classification of landfill sites was based on site availability as follows:

- Merchant Sites - Sites operated on a fully commercial basis, available to accept waste from all production sources. Such sites have a valid planning permission and as well a relevant WML or PPC permit.  
  
Capacity available within these sites forms the main basis of the capacity utilisation assessment within this study.
- Restricted Sites - Sites not operated on a commercial basis, but for the purposes of receiving waste produced by their operator alone; previously defined as industrial waste landfills, available to accept waste produced only from the industrial company to whom the landfill permit was issued. Such sites have a valid planning permission and the relevant WML or PPC permit.  
  
Available capacity at these sites are discussed later in the report but are excluded from the assessment of landfill capacity utilisation.
- Planning Obligated Sites - Existing mineral sites that have a planning obligation to restore the site in such a way as can only be achieved by the import of materials. Such imported material may or may not include controlled waste - any site to be used for future landfill capacity will need to go through a PPC permitting process before it can accept waste.  
  
Potential landfill capacity at such sites is discussed later in the report and the implication of such capacity is reviewed in the assessment of landfill capacity utilisation.

To provide an accurate evaluation of landfill capacity available for use within the Region, the study focussed primarily on the merchant sites that are available for waste disposal. Such facilities are further classified to reflect the waste materials that can be accepted, and the current operational status of the site at the time of the study.

### **Secondary Classification - Waste Type**

The secondary classification applied to the merchant sites and when reviewing the planning obligated sites, is based on the current PPC classifications relating to waste types, including:

- Hazardous landfill;
- Non-hazardous landfill; and
- Inert landfill.

It should be noted that some of the non-hazardous landfills are permitted to receive a small amount of hazardous waste into a designated cell, designated as stabilised, non-reactive hazardous waste (e.g. asbestos, calcium sulphate/plasterboard waste).

### **Tertiary Classification - Operational Status**

A tertiary classification for merchant sites was applied to reflect the operational status of the facility at the time of the study. This classification included:

- Operational - These fully authorised facilities were operating at the time of the study, and were accepting waste. The capacity at these facilities was assumed to be available *without restriction* for the purpose of this study.
- Non-operational - These facilities were fully authorised (either PPC or WML) at the time of the study, but were deemed to be pre-operational (i.e. the first waste had yet to be received) or non-operational (i.e. they were either temporarily closed or unable to receive waste for other reasons). These sites were not accepting waste and for the purpose of the study the capacity could *not* be deemed to be available without restriction as the decision to bring the capacity on-line will be dependant on commercial, operational or other factors outside the influence of the WMRA.

## **6. WASTE GROWTH PREDICTIONS**

### **6.1 GROWTH SCENARIO DEVELOPMENT**

A description of the growth scenario development for each waste type is described below, and the assumptions used for each growth prediction are summarised in Appendix B.

#### **6.1.1 Municipal Waste**

Municipal waste is one of the few waste streams where current data is available about its collection, movement and disposal, and trend analysis is available to assist in establishing patterns in recent management of this waste stream.

Although data is available up to 2005/06, the modelling undertaken in this study used the previous base year of 2002/03, as this later data has yet to be fully verified.

The scenarios used for the modelling of the landfill capacity utilisation are based on the three scenarios set out in the RSS - Phase Two Revision, Spatial Options document, issued for consultation 8<sup>th</sup> January - 5<sup>th</sup> March 2007.

These scenarios are based on the principle that the generation of municipal waste is closely related to the number of households, and that landfill requirements are based on the quantity of residual waste following recycling, recovery and the landfill diversion requirements set out in the WET Act and LATS which impose stringent financial penalties on Waste Disposal Authorities failing to meet the diversion targets.

#### **6.1.2 Commercial and Industrial Waste**

Data for commercial and industrial waste is limited, and is primarily produced as part of a national survey undertaken by the Environment Agency across the main industrial sectors.

The base year for this study was taken as 2002/03, derived from the WMRA Phase 2 Capacity Study. The growth scenarios were based on the predictions outlined in the (ongoing) review of the Waste Strategy 2000, which factors the changes affecting the balance between manufacturing and service industries.

The three landfill diversion rates used are based on:

- Low diversion – as outlined in Waste Strategy 2000.
- Medium diversion – based on the proposed diversion levels in the draft revision to England's waste strategy.
- High diversion – rates are set at *twice* the medium diversion rates, and are aimed at simulating the impact of increases in landfill tax and producer responsibility obligations.

#### **6.1.3 Hazardous Waste**

Data for hazardous waste for the study was derived from the Environment Agency's Hazardous Waste Interrogator for 2004/05. Data produced in this year will primarily reflect

the original special waste classifications rather than the new EWC code classifications introduced with the change in regulations during 2005.

The impact of the changes in the definition of hazardous waste and the use of newly specified waste acceptance criteria (WAC) on the generation and management of such materials has not yet been fully revealed. This makes it difficult to accurately extrapolate data from historic, special waste, data.

The WMRA does not have to apportion a tonnage of hazardous waste to each WPA within the RSS. However, it is important to consider the implications of this waste type on landfill capacity. For the purpose of this study, scenarios used for predicting the growth in this category of waste have been based on the assumptions utilised in the WMRA Phase 2 - Future Capacity Study.

#### **6.1.4 Construction and Demolition Waste**

Base data pertaining to the generation and management of construction and demolition waste for the Region has been derived from the research carried out by the Symonds Group on behalf of the Office of the Deputy Prime Minister.

The WMRA does not have to apportion a tonnage of construction and demolition waste to each WPA within the RSS. However, it is important to consider the implications of this waste type on landfill capacity.

For the purpose of the study future predictions are based on :

- The dis-aggregation of the Regional estimate given in the Symonds survey, whereby the quantity of C&D waste produced reflects the relative level of housing development. This is a similar approach to the one taken in the WMRA Phase 2 Future Capacity Study. However, the quantity of 'development' apportioned to each WPA area is now based on the three housing options outlined in the Phase 2 Spatial Options document (Jan 2007).
- In the absence of updated data and trends on C&D waste, the growth predictions used in the WMRA Phase 2 Future Capacity Study have been used.

## **6.2 FUTURE WASTE ARISING**

Detailed waste arising predictions for each WPA are given in Appendix C of this report and are summarised below.

### **6.2.1 Municipal Waste**

Municipal waste growth is closely related to the changes observed in housing development for the Region and decisions made about the amount and distribution of houses built across the region will therefore affect the quantity of municipal waste generated.

In addition, waste collected by the local authorities up to 2002 indicated a 3% per annum increase, reducing to 2% per annum since then, except where there have been 'one off' increases when authorities introduced 'green waste' collections.

For the purpose of the study, waste growth has been predicted at 1% per annum from 2006 to 2011, while it is predicted to remain static except for impact of household number changes from 2011 onwards. Targets for recycling and diverting municipal waste from

landfill have also been incorporated into the modelling. The following summary table shows the cumulative amount of municipal waste predicted to arise for each of the three housing options detailed in the Phase 2 Spatial Options document (Jan 2007).

<b>Table 6.2.1: Predicted Cumulative Municipal Waste Arisings 2002/03 - 2025/26, tonnes</b>			
<b>Planning Authority</b>	<b>Housing Option 1</b>	<b>Housing Option 2</b>	<b>Housing Option 3</b>
Birmingham	14,657,272	14,882,235	15,032,208
Coventry	4,471,435	4,563,507	4,918,283
Dudley	3,905,382	3,946,626	3,970,438
Sandwell	4,184,664	4,383,585	4,410,865
Solihull	4,570,595	5,734,268	6,728,196
Walsall	4,181,424	4,251,867	4,279,661
Wolverhampton	4,030,735	4,084,949	4,130,170
<b>Met Area Sub-Total</b>	<b>40,001,506</b>	<b>41,847,038</b>	<b>43,469,822</b>
Shropshire	4,731,853	4,813,139	4,813,139
Telford and Wrekin	2,955,494	3,091,013	3,234,190
Staffordshire	13,176,904	13,490,182	13,683,390
Stoke-On-Trent	3,914,350	4,023,599	4,023,599
Warwickshire	8,234,775	8,480,353	8,763,978
Worcestershire	7,980,648	8,230,147	8,512,774
Herefordshire	2,395,273	2,463,594	2,463,594
<b>Shire Area Sub-Total</b>	<b>43,389,298</b>	<b>44,592,027</b>	<b>45,494,665</b>
<b>West Midlands Total</b>	<b>83,390,803</b>	<b>85,439,065</b>	<b>88,964,487</b>

### 6.2.2 Commercial and Industrial Waste

The combined amount of commercial and industrial waste in the Region has not changed significantly in recent years. However, the decline in manufacturing observed has resulted in a fall in the quantity of industrial waste arising, while the growth in the service sector has conversely increased the quantities of commercial waste being generated.

The (ongoing) review of the Waste Strategy for England provides an estimate of the how the balance of employment in manufacturing and service sectors is expected to change into the future, and translates this expected change into predictions on waste growth for each.

The following summary table shows the cumulative amount of commercial and industrial waste predicted to arise in the region, based on the growth predictions outlined in the (ongoing) Review of England's Waste Strategy.

<b>Table 6.2.2: Predicted Cumulative C &amp; I Waste Arisings 2002/03 - 2025/26, tonnes</b>			
<b>Planning Authority</b>	<b>Commercial</b>	<b>Industrial</b>	<b>Combined Commercial &amp; Industrial</b>
Birmingham	19,22,016	13,235,225	32,437,241
Coventry	6,757,960	4,657,991	11,415,950
Dudley	6,866,942	4,733,121	11,600,063
Sandwell	10,136,939	6,986,998	17,123,937
Solihull	3,088,320	2,128,653	5,216,972
Walsall	6,903,310	4,758,180	11,661,489
Wolverhampton	5,649,810	3,894,185	9,543,995
<b>Met Area Sub-Total</b>	<b>58,605,297</b>	<b>40,394,351</b>	<b>98,999,648</b>
Shropshire	4,192,651	5,957,982	10,150,633
Telford and Wrekin	3,938,922	5,597,488	9,536,409
Staffordshire & Stoke-On-Trent	22,423,390	23,873,304	46,296,694
Warwickshire	13,863,924	6,741,245	20,605,168
Worcestershire	12,336,883	7,461,860	19,798,43
Herefordshire	3,576,490	4,602,643	8,179,133
<b>Shire Area Sub-Total</b>	<b>60,332,259</b>	<b>54,234,522</b>	<b>114,566,781</b>
<b>West Midlands Total</b>	<b>118,937,556</b>	<b>94,628,373</b>	<b>213,566,429</b>

### 6.2.3 Hazardous Waste

In predicting future hazardous waste arisings, consideration needs to be given to 3 key factors likely to have a significant impact:

- The potential for waste minimisation in response to policy drivers and cost increases.
- The change in definition from special waste to hazardous waste.
- The targeting of brownfield redevelopment in the regional planning strategy (RPG11).

The WMRA Phase 2 Future Capacity Study summarised the expected impacts of the key factors, based on work undertaken by the Hazardous Waste Forum, and indicated the net effect of these three factors to the types of hazardous waste generated in the region as:

<b>Table 6.2.3a: Impact of Re-Classification of Hazardous Waste Arisings In The West Midlands</b>				
<b>EWC Code</b>	<b>EWC Chapter</b>	<b>2002 Arisings (Tonnes)</b>	<b>% Change Assumed</b>	<b>Estimated Arisings 2005</b>
01	Mining and Minerals	13	No Change	13
02	Agricultural and Food Production	341	No Change	341
03	Wood and Paper Production	261	No Change	261
04	Leather and Textile Production	6	No Change	6
05	Petrol, Gas and Coal Refining/Treatment	339	No Change	339
06	Inorganic Chemical Processes	26,458	3	27,238
07	Organic Chemical Processes	49,225	10	54,148
08	MFSU Paints, Varnish, Adhesive and Inks	18,631	No Change	18,631
09	Photographic Industry	3,862	No Change	3,862
10	Thermal Process Waste (Inorganic)	37,798	146	93,055
11	Metal Treatment and Coating Processes	28,997	10	31,874
12	Shaping/Treatment of Metals and Plastics	26,843	10	29,490
13	Oil and Oil/Water Mixtures	122,856	No Change	122,856
14	Solvents	2,050	No Change	2,050
15	Packaging, Cloths and Filter Materials	9,337	100	18,673
16	Not Otherwise Specified	39,284	13	44,275
17	C&D Waste and Asbestos	104,235	38	143,934
18	Healthcare	876	No Change	876
19	Waste/Water Treatment and Water Industry	50,918	No Change	50,918
20	Municipal and Similar Commercial Wastes	5,446	No Change	5,446
99	Unclassified	13,800	No Change	13,800
	<b>TOTAL</b>	<b>541,575</b>	<b>22</b>	<b>662,086</b>

Source: WMRA Phase 2 Future Capacity Study

These predicted impacts have been translated into the latest growth prediction, and in the absence of further data to accurately extrapolate future trends, the previous assumptions have been applied to determine a forecast of waste arisings. The following summary table shows the cumulative amount of hazardous waste predicted to arise in the region.

<b>Table 6.2.3b: Predicted Cumulative Hazardous Waste Arisings 2002/3 - 2025/26, tonnes</b>			
<b>Planning Authority</b>	<b>Cumulative Tonnes</b>	<b>Planning Authority</b>	<b>Cumulative Tonnes</b>
Birmingham	1,769,150	Shropshire	581,961
Coventry	992,326	Telford and Wrekin	319,949
Dudley	834,591	Staffordshire	1,948,910
Sandwell	1,103,100	Stoke-On-Trent	720,099
Solihull	231,163	Warwickshire	1,568,314
Walsall	1,809,509	Worcestershire	1,602,295
Wolverhampton	424,364	Herefordshire	221,202
<b>Met Area Sub-Total</b>	<b>7,164,202</b>	<b>Shire Area Sub-Total</b>	<b>6,692,729</b>
<b>West Midlands Total</b>	<b>14,126,931</b>		

### 6.2.4 Construction and Demolition Waste

Data on the generation and management of construction and demolition waste was derived from the Symonds/ODPM 2003 report. The report provided several options for the disaggregation of the regional waste estimates, and as stated in the WMRA Phase 2 Future Capacity Study, the 'development' index used was based on Development Option 4.

For this study, the 'development' index was recalculated to reflect the latest housing options presented in the Phase 2 Spatial Options (Jan 2007) and the updated Annual % Share of Housing Development for each Housing Option is shown in the table below.

<b>Table 6.2.4a: Annual % Share of Housing Development in Region</b>			
<b>Planning Authority</b>	<b>Housing Option 1</b>	<b>Housing Option 2</b>	<b>Housing Option 3</b>
Birmingham	18.6	17.01	16.00
Coventry	5.02	4.97	7.65
Dudley	5.55	4.85	4.42
Sandwell	6.23	7.11	6.33
Solihull	2.92	3.05	3.13
Walsall	4.34	4.28	3.90
Wolverhampton	4.34	4.11	3.91
Shropshire	6.54	5.92	5.66
Telford and Wrekin	6.33	6.11	6.26
Staffordshire	13.48	13.82	13.55
Stoke-On-Trent	3.97	4.28	3.65
Warwickshire	10.26	10.69	11.74
Worcestershire	8.18	9.63	10.83
Herefordshire	4.24	4.17	3.57
<b>West Midlands Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

The assumptions used in the WMRA Phase 2 Future Capacity Study are utilised for this study and the following summary table shows the cumulative amount of construction and demolition waste predicted to arise in the Region for each housing option.

<b>Table 6.2.4b: Predicted Cumulative Construction &amp; Demolition Waste Arisings 2002/03 - 2025/26, tonnes</b>			
<b>Planning Authority</b>	<b>Housing Option 1</b>	<b>Housing Option 2</b>	<b>Housing Option 3</b>
Birmingham	32,566,073	29,798,895	28,013,826
Coventry	8,789,338	8,701,795	13,394,111
Dudley	9,717,296	8,491,691	7,738,820
Sandwell	10,907,884	12,448,644	11,082,970
Solihull	5,112,523	5,340,136	5,480,205
Walsall	7,598,750	7,493,699	6,828,370
Wolverhampton	7,598,750	7,196,052	6,845,879
<b>Met Area Sub-Total</b>	<b>82,290,615</b>	<b>79,470,911</b>	<b>79,384,180</b>
Shropshire	11,450,652	10,365,116	8,859,373
Telford and Wrekin	11,082,970	10,697,780	10,96,410
Staffordshire	23,601,649	24,196,942	23,724,209
Stoke-On-Trent	6,950,931	7,493,699	6,390,654
Warwickshire	17,963,866	18,716,738	20,555,145
Worcestershire	14,322,069	16,860,822	18,961,859
Herefordshire	7,423,664	7,301,103	6,250,585
<b>Shire Area Sub-Total</b>	<b>92,795,800</b>	<b>95,632,200</b>	<b>95,702,234</b>
<b>West Midlands Total</b>	<b>175,086,415</b>	<b>175,103,110</b>	<b>175,086,415</b>

### 6.3 LANDFILL CAPACITY REQUIREMENTS

Detailed predictions of landfill capacity requirements were based on a nominal placed waste density of:

- 1 tonne per cubic metre for non-hazardous waste (i.e. municipal and C&I), including a nominal allowance for daily cover; and
- 1.5 tonne per cubic metre for inert waste (i.e. C&D).

The detailed capacity requirements for each WPA are given in Appendix D of this report and the cumulative requirements for each waste type are summarised below.

#### 6.3.1 Municipal Waste

Landfill capacity requirements for municipal waste assume that all recycling, recovery and diversion targets for municipal waste continue to be fully met during the period of the study. The table below summarises the cumulative landfill requirement for disposal of residual waste in each WPA area for each of the Housing Options identified in WMRA Phase 2 Spatial Options document (Jan 2007).

<b>Table 6.3.1: Predicted Cumulative Landfill Needs for Municipal Waste 2005 – 2026, tonnes</b>			
<b>Planning Authority</b>	<b>Housing Option 1</b>	<b>Housing Option 2</b>	<b>Housing Option 3</b>
Birmingham	6,595,261	6,660,897	6,704,659
Coventry	2,013,440	2,040,277	2,142,733
Dudley	1,668,525	1,680,556	1,687,503
Sandwell	1,967,017	2,025,058	2,033,020
Solihull	1,786,597	2,128,483	2,420,503
Walsall	1,960,683	1,981,221	1,989,325
Wolverhampton	1,797,475	1,813,271	1,826,449
<b>Met Area Sub-Total</b>	<b>17,788,997</b>	<b>18,329,763</b>	<b>18,805,190</b>
Shropshire	2,286,934	2,310,587	2,310,587
Telford and Wrekin	1,370,013	1,409,580	1,451,396
Staffordshire	6,112,340	6,203,591	6,259,879
Stoke-On-Trent	1,681,847	1,713,680	1,713,680
Warwickshire	3,882,615	3,954,204	4,036,908
Worcestershire	3,881,522	3,954,070	4,036,396
Herefordshire	1,165,839	1,185,734	1,185,734
<b>Shire Area Sub-Total</b>	<b>20,381,110</b>	<b>20,731,446</b>	<b>20,994,581</b>
<b>West Midlands Total</b>	<b>38,170,107</b>	<b>39,061,210</b>	<b>39,799,771</b>

#### 6.3.2 Commercial and Industrial Waste

Landfill capacity requirements for commercial and industrial waste have been determined from a calculation of the residual C&I waste based on each of the three landfill diversion options. The table below summarises the cumulative landfill requirement for disposal of residual C&I waste in each WPA area for each of the Diversion Options identified in WMRA Phase 2 Spatial Options document (Jan 2007).

<b>Table 6.3.2: Predicted Cumulative Landfill Needs for C&amp;I Waste 2005 – 2026, tonnes</b>			
<b>Planning Authority</b>	<b>Low Diversion</b>	<b>Medium Diversion</b>	<b>High Diversion</b>
Birmingham	13,095,722	12,138,386	10,505,377
Coventry	4,608,903	4,271,979	3,697,258
Dudley	4,683,234	4,340,876	3,756,886
Sandwell	6,913,360	6,407,972	5,545,891
Solihull	2,106,222	1,952,250	1,689,609
Walsall	4,708,034	4,363,862	3,776,780
Wolverhampton	3,853,148	3,571,471	3,090,992
<b>Met Area Sub-Total</b>	<b>39,968,623</b>	<b>37,046,796</b>	<b>32,062,794</b>
Shropshire	4,105,915	3,815,483	3,331,293
Telford and Wrekin	3,857,462	3,584,605	3,129,714
Staffordshire & Stoke-on-Trent	18,712,668	17,371,393	15,114,259
Warwickshire	8,311,617	7,695,093	6,633,141
Worcestershire	7,990,581	7,403,144	6,397,296
Herefordshire	3,307,589	3,072,569	2,679,493
<b>Shire Area Sub-Total</b>	<b>46,285,832</b>	<b>42,942,288</b>	<b>37,285,197</b>
<b>West Midlands Total</b>	<b>86,254,456</b>	<b>79,989,085</b>	<b>69,247,991</b>

### 6.3.3 Hazardous Waste

Landfill capacity requirements for hazardous waste assumes that initial predicted increases in landfill requirements reflect the need to accommodate increases needed to address the changes brought about by legislation. In future years, a decrease in the quantity of waste produced will reflect minimisation efforts and the decrease in landfill requirements will reflect changes in availability of landfill.

The table below summarises the cumulative landfill requirement for disposal of residual hazardous waste in each WPA area.

<b>Table 6.3.3: Predicted Cumulative Landfill Needs for Hazardous Waste 2005 - 2026, tonnes</b>	
<b>Planning Authority</b>	<b>Cumulative Landfill Capacity</b>
Birmingham	55,238
Coventry	77,331
Dudley	1,03,961
Sandwell	183,624
Solihull	18,170
Walsall	216,461
Wolverhampton	33,063
<b>Met Area Sub-Total</b>	<b>1,587,848</b>
Shropshire	1,692
Telford and Wrekin	90,472
Staffordshire	606,579
Stoke-On-Trent	57,592
Warwickshire	3,179,453
Worcestershire	37,867
Herefordshire	17,671
<b>Shire Area Sub-Total</b>	<b>3,991,327</b>
<b>West Midlands Total</b>	<b>5,579,175</b>

### 6.3.4 Construction and Demolition Waste

Landfill capacity requirements for construction and demolition waste assumes that landfill capacity requirements remain at the 2003 rates (i.e. approximately 9% of arisings). The table below summarises the cumulative landfill requirement for disposal of residual C&D

waste in each WPA area for each of the Housing Options identified in WMRA Phase 2 Spatial Options document (Jan 2007).

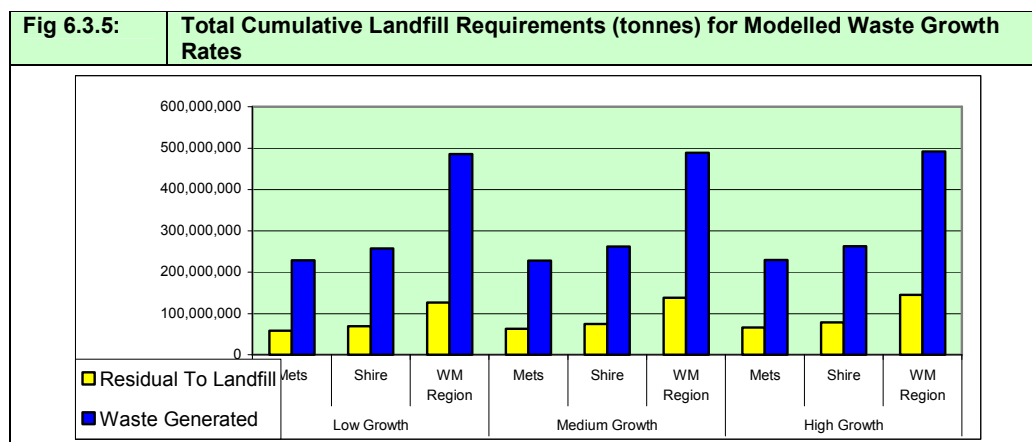
<b>Table 6.3.4: Predicted Cumulative Landfill Needs for C&amp;D Waste 2005 – 2026, tonnes</b>			
<b>Planning Authority</b>	<b>Housing Option 1</b>	<b>Housing Option 2</b>	<b>Housing Option 3</b>
Birmingham	2,531,574	2,316,527	2,177,698
Coventry	683,253	676,448	1,041,212
Dudley	755,389	660,115	601,589
Sandwell	847,941	967,715	861,552
Solihull	397,430	415,124	426,012
Walsall	590,701	582,534	430,814
Wolverhampton	590,701	559,396	532,175
<b>Met Area Sub-Total</b>	<b>6,396,989</b>	<b>6,177,858</b>	<b>6,171,053</b>
Shropshire	890,134	805,748	688,697
Telford and Wrekin	861,552	831,609	852,025
Staffordshire	1,834,711	1,880,987	1,844,238
Stoke-On-Trent	540,341	582,534	496,787
Warwickshire	1,396,449	1,454,975	1,597,886
Worcestershire	1,113,348	1,310,702	1,474,030
Herefordshire	577,090	567,563	485,899
<b>Shire Area Sub-Total</b>	<b>7,213,626</b>	<b>7,434,118</b>	<b>7,439,562</b>
<b>West Midlands Total</b>	<b>13,610,615</b>	<b>13,611,976</b>	<b>13,610,615</b>

### 6.3.5 Predicted Total Landfill Requirements for Residual Waste

Based on a low, medium and high waste generation rates from the above growth predictions, the cumulative requirements for landfill of residual wastes can be summarised as:

<b>Table 6.3.5: Total Cumulative Landfill Requirements 2005 - 2026, tonnes</b>			
	<b>Met Area</b>	<b>Shire Area</b>	<b>West Midlands</b>
<b>Low Cumulative Waste Growth</b>			
Waste Generated	228,455,971	257,444,608	485,890,579
Residual To Landfill	57,836,628	68,871,260	126,707,888
<b>Medium Cumulative Waste Growth</b>			
Waste Generated	227,481,799	261,483,737	488,965,536
Residual To Landfill	63,142,265	75,099,179	138,241,444
<b>High Cumulative Waste Growth</b>			
Waste Generated	229,017,852	262,456,409	491,474,261
Residual To Landfill	66,532,714	78,711,302	145,244,016

This can be represented graphically as:

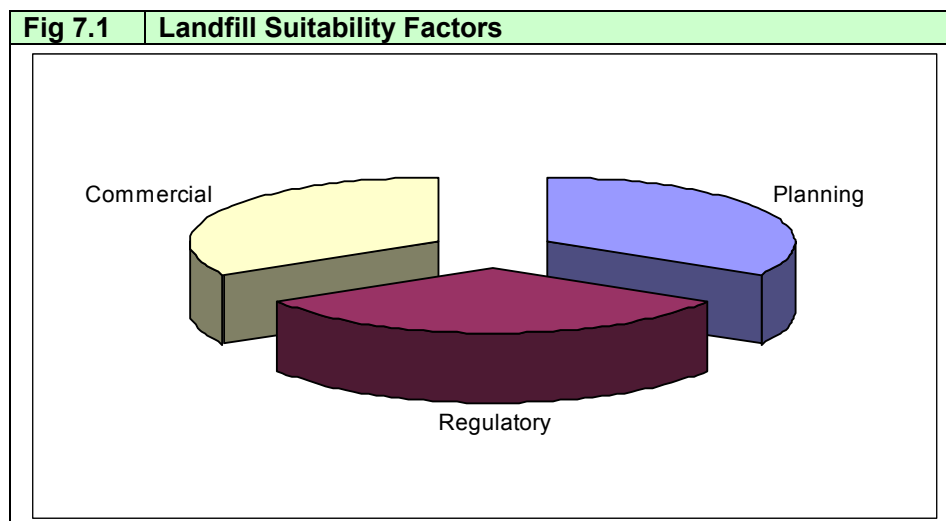


Overall, the proportion of predicted cumulative residual waste needing to go to landfill is between 26 - 29.6% of that arising, dependant on the growth rate assumed.

## 7. LANDFILL CAPACITY ASSESSMENT

### 7.1 FACTORS AFFECTING SUITABILITY OF A SITE AS A FUTURE LANDFILL

Assessing the suitability of a new landfill development or expansion of an existing landfill will be affected by issues in relation to planning, regulatory and commercial aspects.



#### 7.1.1 Planning

Planning Policy Statement 10 (PPS10) governs the factors that primarily affect the suitability of a site for landfill development in the context of land use planning. This document sets out the key planning objectives for Regional Planning Bodies (RPBs) and planning authorities with respect to preparing and delivering planning strategies for 'sustainable waste management'.

Embedded within PPS10 are requirements relating to site selection in terms of a waste management development, on the basis of:

- a. The allocation of sites by the RPBs and planning authorities within the local development framework in terms of:
  - i. Suitability for development against each of the following criteria:
    - The extent to which they support policies in PPS10.
    - Physical/environmental constraints on the development, including existing and proposed neighbouring land uses.
    - The cumulative effect of previous waste disposal facilities on the well-being of the local community, including significant adverse impacts on environmental quality, social cohesion and inclusion of economic potential.
    - The capacity of existing and potential transport infrastructure to support the sustainable movement of waste and products arising from resource recovery, seeking when practicable and beneficial to use modes other than road transport.

- ii. Giving priority to the re-use of previously developed land, redundant agricultural and forestry buildings and their curtilages.
- b. Assessing planning applications for sites that have not been identified or are not located in an area identified in a development plan document as suitable for new or enhanced waste management facilities. Such applications should be considered favourably when their development is consistent with:
  - PPS10 policies and criteria.
  - The waste planning authority's core strategy.

In the case of waste disposal facilities, applications should demonstrate that the development site would not undermine the waste planning strategy through prejudicing the movement of materials up the waste hierarchy

### **7.1.2 Regulatory**

The requirements specified within the PPC Regulations and associated guidance are key determining factors affecting suitability of a site for landfill development in a regulatory context.

These regulations require applications for proposed new landfill sites, or for extensions to existing landfills, to be submitted to the Environment Agency. During the determination of the application process, the Environment Agency review the predicted impact of the proposed development on:

- Ground and surface water sources.
- Air quality.
- Land quality.
- Habitats, species and protected areas.
- Human health and wellbeing.

Applications will be reviewed against current legislative and industry standards (e.g. RGN 3, BAT, etc) and a proposed development will only be successfully permitted if the application demonstrates the relevant standards for operation and management can be met.

The implications of the assessment against the Environment Agency standards, particularly RGN 3, mean that all future landfill developments are likely to be restricted to areas of the region with clay as the primary geological strata.

### **7.1.3 Commercial**

Operators or landowners will undertake any assessment of the feasibility of developing a new landfill site, or extending an existing operation. This feasibility assessment its likely to be undertaken on the basis of a number of criteria including:

- Financial implications and risk, such as capital/revenue expenditure and profitability.
- Environmental risk management, particularly with respect to any long-term liabilities.
- Planning and permitting feasibility.
- Existing planning and permitting requirements.
- Operational restrictions, including impact on core business activity.
- Stakeholder management.

Many potential landfills theoretically capable of being developed from existing mineral voids may not be taken forward by an operator due to lack of financial, regulatory or operational impetus or commitment.

## **7.2 SITE SELECTION CRITERIA**

Within the context of this study, an initial assessment as to the potential suitability of existing mineral voids to be converted into actual landfill capacity in future was undertaken.

An initial review of existing mineral developments was undertaken with the Mineral Planning Authorities and Mineral Operators to identify sites that have a planning permission that requires it to be restored through the import of materials. The likely suitability of such sites was determined against current planning and regulatory criteria.

In instances where a site was determined to be potentially suitable as a future landfill, the operator was asked to provide an indication of predicted void capacity and the timeframe for this becoming available.

### **7.2.1 Planning Criteria**

The planning criteria used for suitability assessment were:

- Having a planning permission requiring restoration to original or similar levels.
- Planning permission specifying the restoration materials to be used.
- Compliance with the local plan.
- Proximity to residential property now or shown as a future commitment in the Development Plan.
- Availability of appropriate access and transport infrastructure.

### **7.2.2 Environment Agency Criteria**

The regulatory criteria used for suitability assessment were based on the :

- Likelihood of the proposed development meeting the criteria set out in RGN 3 in relation to the protection of groundwater.
- Likelihood of compliance with the requirements set out in the Landfill Directive.

## **7.3 LANDFILL CAPACITY AS AT JANUARY 2007**

During the study, the landfill capacity available at 01 January 2007 was determined from information provided by the Environment Agency, the Planning Authorities and operators. This information included details on:

- Existing landfill sites with valid planning permission and authorisation (either WML or PPC).
- Mineral sites with planning permissions requiring restoration through the import of materials.
- Capacity and phasing indications from the operators on current and potential sites.

### 7.3.1 Operational Landfill Capacity

Operational landfill capacity for the Region is located at landfill sites that are fully authorised (i.e. either WML or PPC) and were operational and accepting waste at the time of the study, as summarised below.

<b>Table 7.3.1: Operational Capacity At 01/01/07</b>		
Type	Total No Sites	Total Capacity (m <sup>3</sup> )
Inert	12	6,710,000
Non-Hazardous	18	34,474,900
Hazardous	1	500,000
<b>TOTAL</b>	<b>31</b>	<b>41,684,900</b>

### 7.3.2 Non-Operational Landfill Capacity

Non-operational landfill capacity for the Region is located at landfill sites that are fully authorised (i.e. either WML or PPC) but which were not accepting waste at the time of the study, for example for reasons of progressive or phased release. The availability of this capacity for use is dependant on commercial, operational or other factors outside the influence of the WMRA, and is summarised below.

<b>Table 7.3.2: Non-Operational Capacity At 01/01/07</b>		
Type	Total No Sites	Total Capacity (m <sup>3</sup> )
Inert	4	5,235,000
Non-Hazardous	8	25,000,000
Hazardous	0	0
<b>TOTAL</b>	<b>11</b>	<b>30,235,000</b>

### 7.3.3 Planning Obligated - Potential Landfill Capacity

This potential capacity within the region is located at existing mineral sites that have a planning obligation to restore the site in such a way as can only be achieved by the import of materials. Imported materials may include waste, thus potentially providing a further 11 new landfills for the region at a future date. It should be noted, however that any site to be used for future landfill capacity will need to go through a PPC permitting process before it can accept waste. This capacity is summarised below.

<b>Table 7.3.3: Potential Capacity Due To Planning Obligations At 01/01/07</b>		
Type	Total No Sites	Total Capacity (m <sup>3</sup> )
Inert	4	3,000,000
Non-Hazardous	1	4,000,000
Non-Hazardous/SNRH	6	13,600,000
Non-Hazardous/SNRH/Haz	1	5,000,000
<b>TOTAL</b>	<b>12</b>	<b>26,600,000</b>

### 7.3.4 Restricted Landfill Capacity

Restricted landfill capacity is located at non-commercial sites previously defined as industrial waste landfills (A07). Such landfills are typically situated on or adjacent to land used for an industrial process, where the Industrial Operator has successfully obtained planning permission and a permit (i.e. WML/PPC) for a landfill to manage the disposal of specific process related waste. Such sites are not currently available to accept other wastes on a commercial basis.

Within the West Midlands region, this study has identified 3 operational and 1 non-operational landfill associated with the power generation and cement manufacturing industries. Due to permitting determinations currently taking place, it was not possible to identify the potential available capacity at these sites during this study.

### 7.3.5 Hazardous Landfill Capacity

In relation to hazardous landfill, this study has identified that there is currently only one authorised and operational hazardous landfill in the region, currently accepting predominantly one type of hazardous waste material.

In addition, 7 operational non-hazardous landfills and 2 non-operational non-hazardous landfills are authorised to accept small quantities of hazardous waste that is classified as 'stable, non-reactive, hazardous waste'. The amount of this material currently being deposited in the landfills is believed to be a small proportion of the overall material being deposited, and for economic reasons it is by no means certain that such capacities will be maintained into the future.

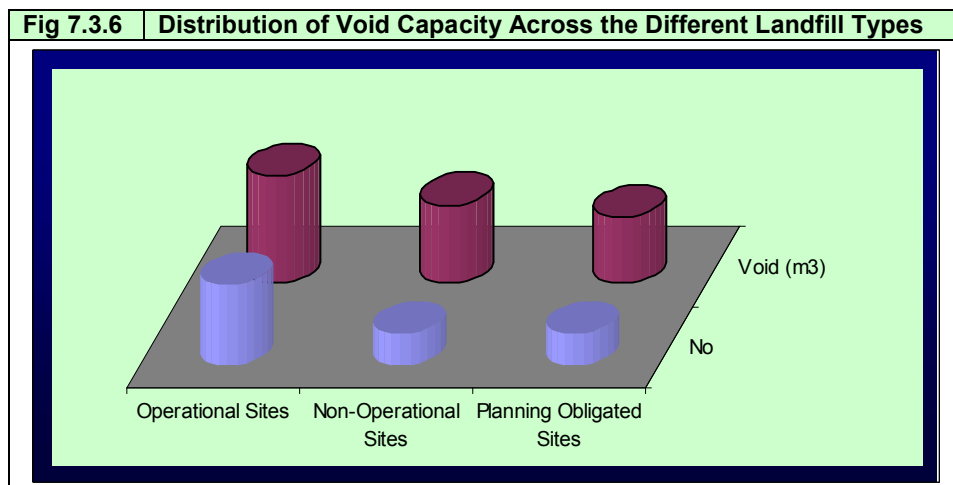
For the purpose of this study, it has been assumed that the status quo is maintained within the region in respect of landfill capacity for hazardous waste materials.

### 7.3.6 Total Landfill Capacity

Landfill Capacity for the region is summarised in the table below.

<b>Table 7.3.6: Landfill Capacity In The West Midlands</b>		
	<b>Environment Agency</b>	<b>WMRA Landfill Capacity Study</b>
Capacity At:	31 Mar 2005	01 Jan 2007
<b>Authorised Capacity</b>		
No. of Operational Sites	68	31
No. of Non-Operational Sites	104	12
Void Space (cubic metres)	78,629,005	71,919,900
<b>Potential Capacity At Planning Obligated Sites</b>		
No. of Sites Planning Obligations To Restore By Material Import	Not Quantified	12
Potential Void Space (cubic metres)	Not Quantified	25,600,000

The distribution of the above void capacity available for landfill capacity during the study period can be shown as:



## 7.4 FUTURE LANDFILL CAPACITY UTILISATION

### 7.4.1 Scenarios Used For Assessing Landfill Capacity Utilisation

In the original RSS modelling, the scenarios used for assessing landfill capacity were based on the different predictions used for municipal, commercial and industrial waste arisings to determine a best, medium and worse case for depletion of available void space. These scenarios are summarised below.

<b>Table 7.4.1a : Scenarios Used For Assessing Use of Landfill Capacity In Original Capacity Studies</b>		
<b>Scenario Case</b>	<b>Housing Option (Municipal)</b>	<b>Diversion Option C&amp;I Waste</b>
Best	One - lowest growth	High - most quantity of material diverted from landfill
Medium	Two - medium growth	Medium - median quantity of material diverted from landfill
Worse	Three - highest growth	Low - least quantity of material diverted from landfill

Based on the information evaluated during this study, the above scenarios were felt to be too simplistic in relation to landfill operational status and also do not account for residual construction and demolition wastes that are required to be deposited in landfill.

Four new scenarios were developed to take account of:

- Waste growth predictions for municipal, commercial & industrial, and construction & demolition wastes.
- The availability of the void space at non-operational authorised landfills.
- Potential void space becoming available at mineral sites with a planning obligation for restoration by material import.

The new scenarios are summarised in the table below.

<b>Table 7.4.1b : Scenarios Used for Assessing Use of Landfill Capacity</b>					
<b>Case</b>	<b>Housing Option (Municipal/C&amp;D Waste)</b>	<b>Diversion Option C&amp;I Waste</b>	<b>Site Availability</b>		
			<b>Operational</b>	<b>Non-Operational</b>	<b>Planning Obligated</b>
Best	One	High	From 2007	From 2007	Phased In
Median 1	Two	Medium	From 2007	From 2007	Not included
Median 2	Two	Medium	From 2007	Phased In	Phased In
Worse	Three	Low	From 2007	Phased In	Not included

**NOTE:**

- In the 'best case' and 'Median 1' scenarios, non-operational capacity has been assumed to be available for use without restriction from 2007.
- In reality, operators have indicated that non-operational capacity is likely to become available for use at different stages and at different rates. This phasing of non-operational capacity includes a proportion not expected to be available during the study timeframe - it has been simulated in the 'worse case' and 'Median 2' scenarios based on operator information.
- Operators have also indicated that potential capacity may become available from planning obligated sites during the study period - this has been simulated in the 'best case' and 'Median 2' scenarios.

**7.4.2 Comparison of Current Total Capacity Utilisation With Previous Predictions**

A review of landfill capacity utilisation using the same basis as that previously used by the Environment Agency and for the RSS development has shown:

<b>Table 7.4.2: Comparison of Landfill Capacity Utilisation on Same Basis as Historical Surveys</b>			
	<b>Environment Agency (Waste Data 2004)</b>	<b>WMRA - Phase 2 Future Capacity Study 2004</b>	<b>WMRA Landfill Capacity Study 2007</b>
Landfill Capacity Expiry	2012 - 2013 (i.e. average 7 yrs)	2017 - 2020	2021 - 2024

As explained above, this review of capacity use does not include construction and demolition landfill requirements or the phasing of the availability of landfill capacity. As such, without consideration of these issues, any conclusions drawn about landfill capacity may represent an under-estimate of demand.

The change in the Landfill Tax Escalator, effective from April 2008 and announced in the March 2007 Budget statement, has not been factored in to the above assessment scenarios, but they is undoubtedly designed to reduce the quantity of waste from all sources going to landfill.

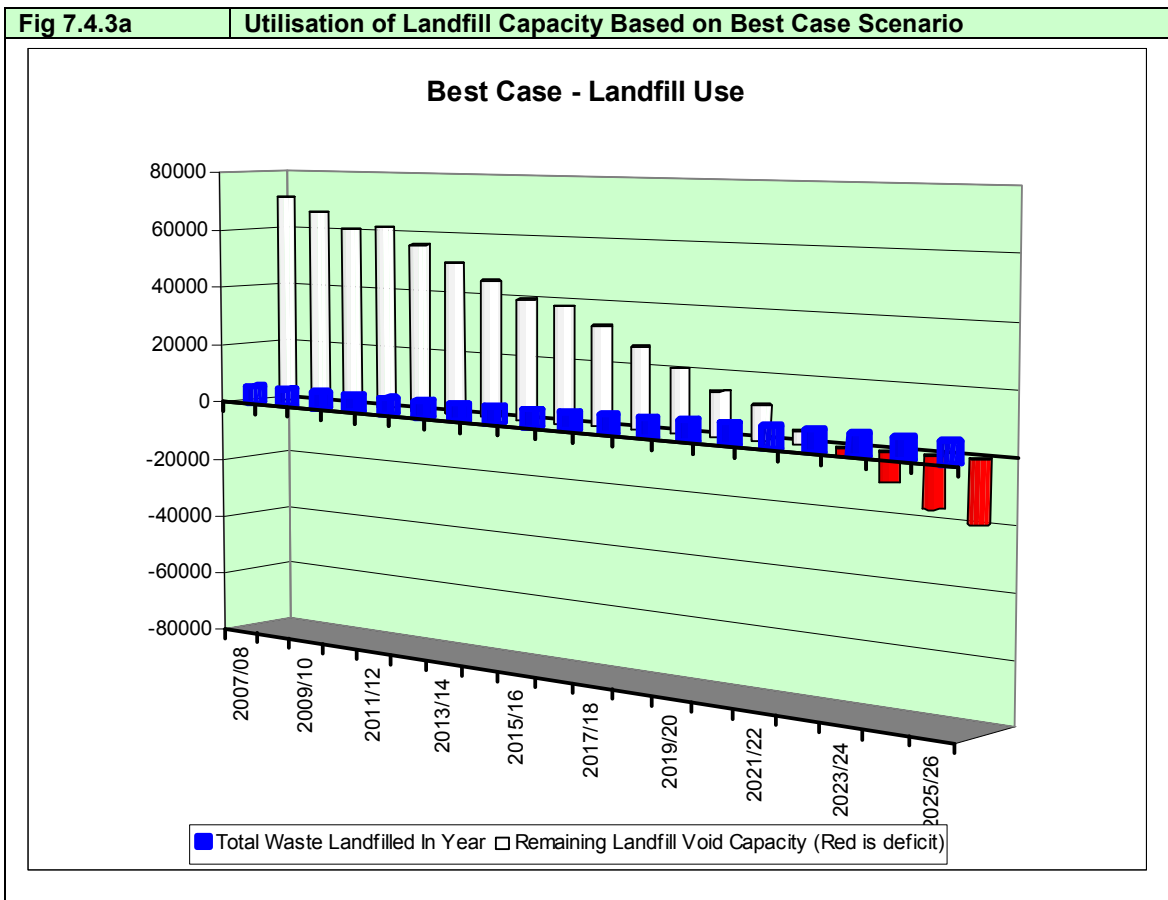
### 7.4.3 Capacity Utilisation for Merchant and Planning Obligated Landfill Scenarios

#### Scenario One - Best Case

In this scenario, it has been assumed that:

- Waste growth for municipal and C&D wastes are at the lowest option.
- Diversion rates for C&I waste are at the highest level.
- Authorised capacity is fully available for operational and non-operational landfills from 2007 and waste can be accepted at all sites.
- Potential capacity identified at mineral sites with a planning obligation to restore through import of materials has been released for use as landfill in line with the phasing indicated by operators.

The combination of these predictions has indicated that useable landfill capacity is likely to expire during 2022/23 as shown below.



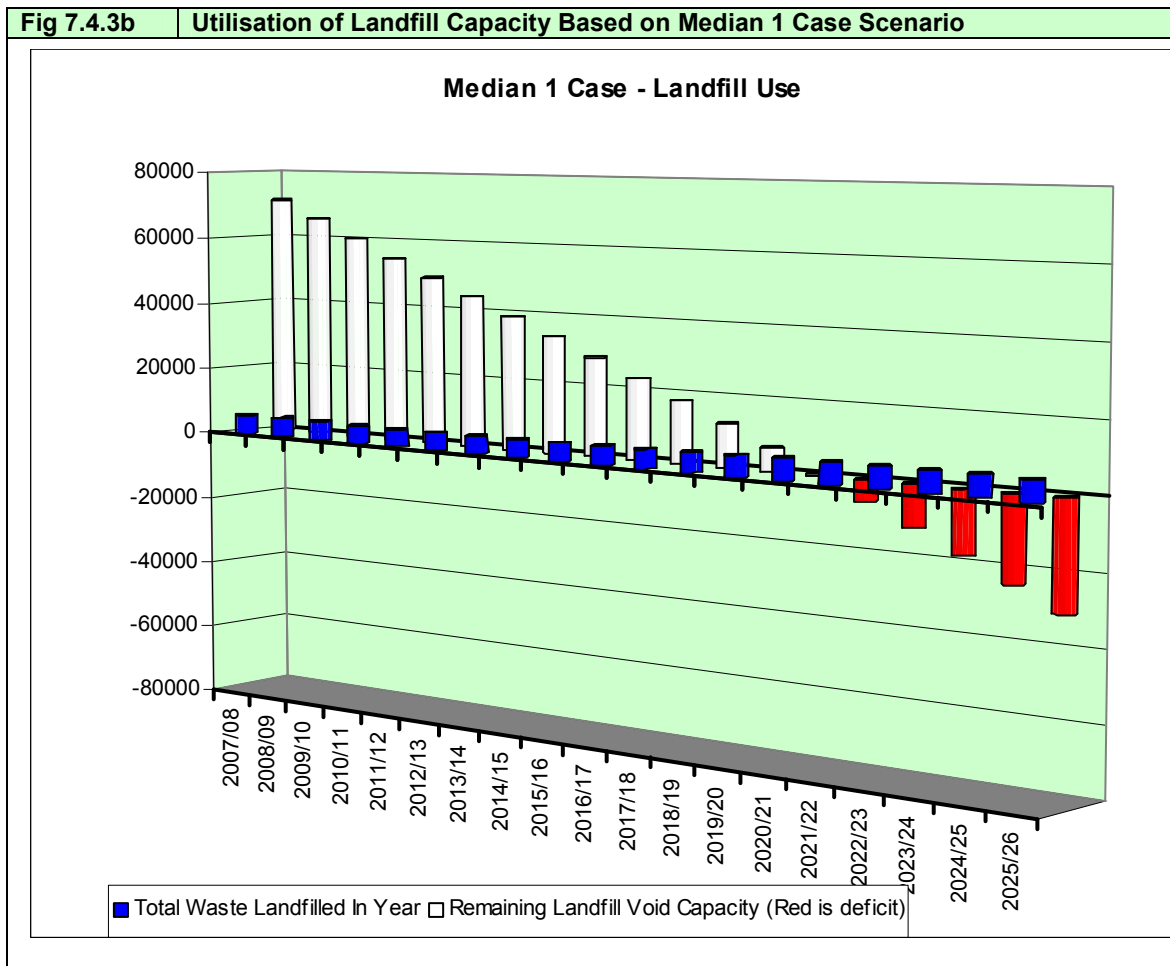
A review of other potential capacity from planning obligated mineral sites has indicated a further potential capacity equating to approximately 8,000,000m<sup>3</sup> exists. Even if this capacity could be released, it is unlikely that it would be sufficient to extend landfill availability beyond 2024/25.

**Scenario Two - Median 1 Case**

In this scenario, it has been assumed that:

- Waste growth for municipal and C&D wastes are at the median option.
- Diversion rates for C&I waste are at the median level.
- Authorised capacity is fully available for operational and non-operational landfills from 2007 and waste can be accepted at all sites.
- Potential capacity identified at mineral sites with a planning obligation to restore through import of materials is not available within the timeframe of the study.

The combination of these predictions has indicated that useable landfill capacity is likely to expire during 2021/22 as shown below.

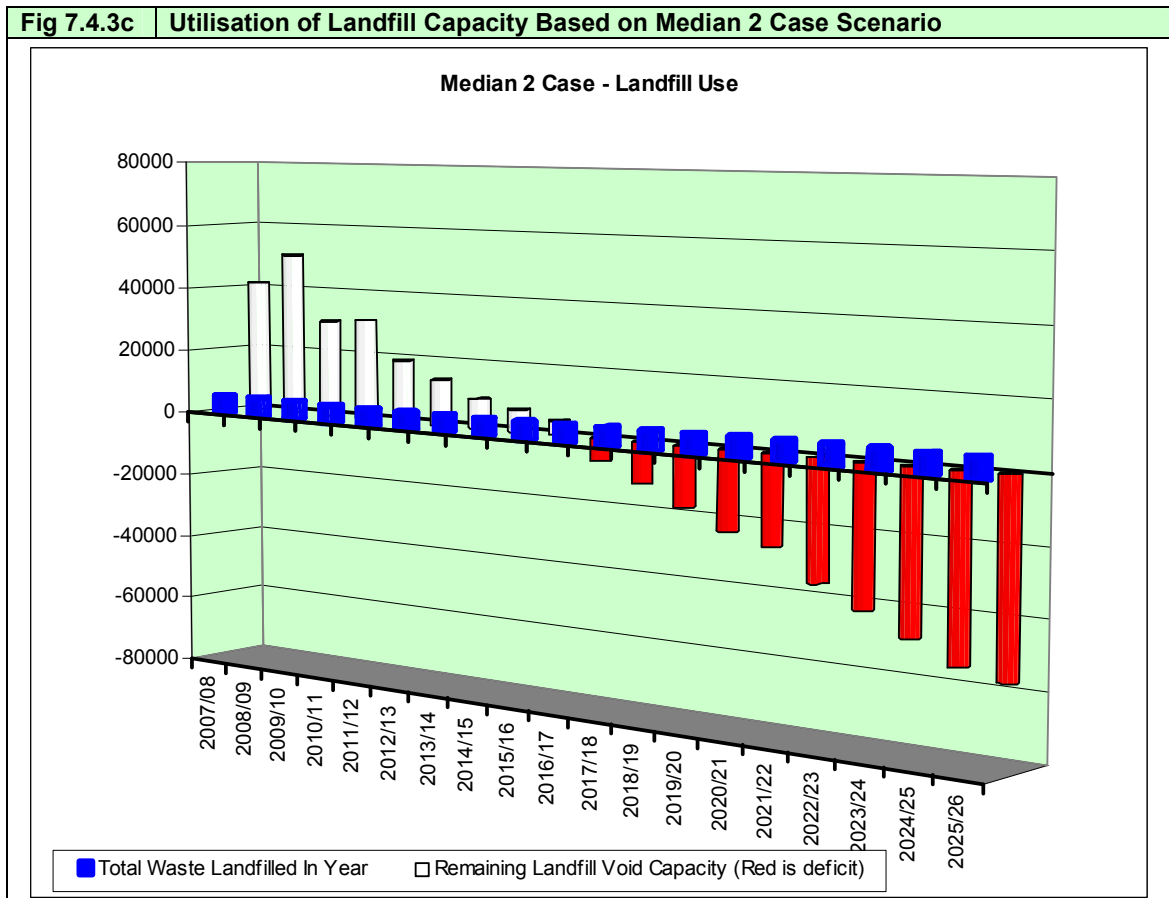


### Scenario Three - Median 2 Case

In this scenario, it has been assumed that:

- Waste growth for municipal and C&D wastes are at the median growth option.
- Diversion rates for C&I waste are at the median level.
- Authorised capacity is fully available for operational sites only from 2007 and operational sites are available to take waste.
- Authorised capacity at non-operational landfills is released in the phasing currently indicated by operators. This means that waste can only be accepted at the sites when the operator releases the capacity for use.
- Potential capacity identified at mineral sites with a planning obligation to restore through import of materials has been released for use as landfill in line with the phasing indicated by operators.

The combination of these predictions has indicated that useable landfill capacity is likely to expire during 2016/17 as shown below.



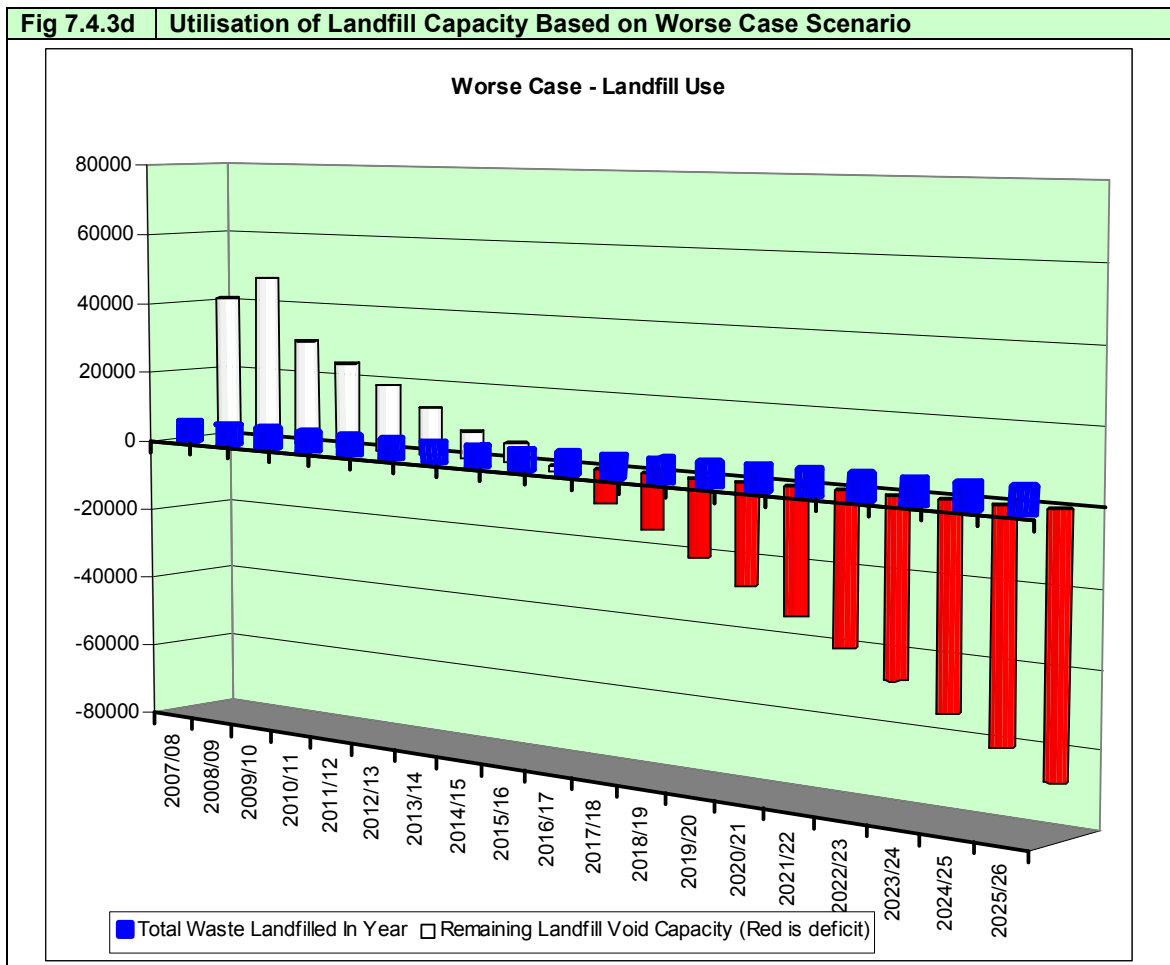
It can be seen from the chart that the impact of capacity from non-operational sites being restricted and available in phases dictated by the operator, means that useable landfill capacity will expire in a significantly shorter time period.

**Scenario Four - Worse Case**

In this scenario, it has been assumed that:

- Waste growth for municipal and C&D wastes are at the highest growth option.
- Diversion rates for C&I waste are at the lowest level.
- Authorised capacity is fully available for operational sites only from 2007 and operational sites are available to take waste.
- Authorised capacity at non-operational landfills is released in the phasing currently indicated by operators. This means that waste can only be accepted at the sites when the operator releases the capacity for use.
- Potential capacity identified at mineral sites with a planning obligation to restore through import of materials is not available during the period of this study.

The combination of these predictions has indicated that useable landfill capacity is likely to expire during 2015/16 as shown below.



#### **7.4.4 Capacity Utilisation At Hazardous Landfills**

As explained above, the Region has a single authorised hazardous waste landfill accepting waste primarily from a single source. Assuming that this arrangement remains in place, then at current deposit rates the landfill has an approximate lifespan of 10 years.

If the region were to be self-sufficient with respect to requirements for hazardous waste landfill, then a site or sites would need to be selected and then developed in line with planning and regulatory requirements. Such a development is unlikely to be available until after 2010 at the earliest, due to delays involved in site selection, planning and permitting processes.

#### **7.4.5 Capacity Utilisation At Restricted Landfills**

It has been assumed that the restricted user operators will continue to provide landfill capacity sufficient for their operational needs into the future and that such capacity will not be made available for commercial use.

#### **7.4.6 Commentary on Landfill Capacity**

In developing the capacity utilisation model, it was evident that the potential scenarios for landfill in the region were numerous, and dependant on the mix of individual waste growth predictions used.

Following a detailed review of the predictions, it was possible to conclude that:

- a. The development of any site as a future landfill is dependant upon the site meeting criteria specified by the Planning Authorities, the Environment Agency and the site operators.
- b. The influence of the criteria specified by the Environment Agency, particularly in relation to the potential impact on ground water (i.e. RGN 3) will be a key determining factor on the suitability of a site for landfill development. As such, future new landfill void capacity is most likely to be restricted to areas within the Region with clay/clay-rich materials as the main underlying geological strata.
- c. Operator (mineral and landfill) influence on the ultimate availability of void capacity is critical and any potential site will have to meet operator-defined criteria relating to financial feasibility, liability/risk management, operational restrictions and stakeholder management. This means that future landfill void capacity will not be released by any mineral operator if doing so compromises its future operations.

It can be seen from the charts above that restricting the release of landfill void capacity from non-operational sites in line with phases dictated by the operator, means that useable landfill capacity will expire in a significantly shorter time period.

The WMRA must therefore maintain an effective dialogue with both mineral and waste operators to optimise the amount of void capacity released for use as landfill in the future.

- d. Previous landfill capacity utilisation was modelled by the WMRA on the basis of municipal and C&I waste growth only. This is an over simplification of landfill demand, although replication of these scenarios indicates that landfill availability had increased from the previously predicted 2017 to 2020 to a period spanning 2020 - 2024.

- e. The level of permitted landfill capacity in the region remains in excess of 72 million cubic metres, with a further potential 24 million cubic metres becoming available from mineral sites with a planning obligation to restore by material import. Available capacity is spread across a significantly lower number of sites than previously indicated by the Environment Agency.

## **8. RECOMMENDATIONS FOR FUTURE LANDFILL CAPACITY MONITORING**

In order to ensure that this model remains a valid tool for assessing the utilisation of landfill capacity, it is recommended that the WMRA needs to implement a review process on an annual basis. This review should consider data issues, scenario predictions and capacity information, and the model should always be re-run when updated information and validated data becomes available.

### **8.1 Data Inputs**

Accurate and up-to-date data is essential for ensuring that the predictions made using the capacity utilisation model are valid. During this study, data from 2002/03 was the year on which predictions were based. This was due to the fact that at the time of the study, more recent data was either not collated or had been collated but was not yet fully validated.

The WMRA should endeavour to input actual historic data (i.e. pre-2007) as soon as possible and to re-run the model to ensure accuracy of future predictions on which strategy decisions will be made.

Future updating should be undertaken annually where possible. Data availability will continue to be varied across the different waste streams, particularly where regulatory reporting is weakest. Data updating for the model should be available as follows:

- WDA/WPA waste management activity for municipal wastes should be available annually through the WasteDataFlow system operated by DEFRA. This data should be capable of being validated relatively rapidly as it is the foundation of reporting requirements against statutory performance targets and is used to demonstrate LATS compliance.
- C&I and C&D waste data are less likely to be readily available on an annual basis, as current data collation is primarily undertaken via stand-alone surveys. This is unlikely to change in the near future until recommendations outlined in the DEFRA's Waste Data Strategy (April 2006) can be effectively implemented.
- Hazardous waste data can only currently be sourced from the Environment Agency - validation of recent data for public release has only been completed to end of 2004, although there recent indications that 2005 data release is imminent and that the validation of 2006 data has recently commenced.
- The Environment Agency is the main source of validated data and this is likely to continue into the future. Data collation is primarily through the routine regulatory reporting and published data is only released after a quality assurance assessment.

### **8.2 Scenario Changes**

Scenarios used for the model are derived on the latest available information from other studies and regional/national strategies. It is therefore important that changes to the underlying assumptions are captured and translated into the model.

Within this area, there are two immediate potential strategy changes that may impact on the ongoing validity of assumptions made in this study:

- The issue of Review of the Waste Strategy 2000 is anticipated in May 2007 and is expected to contain significant changes to waste management targets, particularly with respect to recycling and recovery. The anticipated increases in these targets are expected to significantly alter the requirements for landfill of residual waste.
- Following the recent consultation on spatial options for housing, employment, transportation and waste, the issue of the final Phase 2 issues/options for the West Midlands region is expected before the end of 2007. Changes within the options presented here will affect the ongoing validity of the model, as these spatial options were the basis of the scenarios for municipal, C&D and C&I waste streams.

Other considerations for scenario updates are expected to be linked to the release of more recent hazardous waste data which will enable the updating of the growth and management trends following legislative changes in 2005.

### **8.3 Capacity Information**

Information pertaining to capacity has historically been poor, with the main indications of capacity being provided via the Environment Agency through the permitting process, via operator surveys or a non-statutory element of its waste returns.

To ensure the capacity utilisation model remains valid, it is recommended that the following updates be produced:

- WPAs to produce a summary list to WMRA of any new landfill planning permissions or alterations to mineral permissions to facilitate landfill development for restoration purposes.
- MPAs to produce a summary list to the WMRA of any new mineral planning permission that includes a requirement to restore by material import. (All planning authorities in the region are now maintaining an electronic planning register of new permissions and as such it may now be possible to provide this information more easily than in the past.)
- Environment Agency should produce an updated list of newly permitted and existing landfill facilities. Updates should include waste types, capacity, waste inputs and site availability (i.e. operational, non-operational, closed). (This information should be available via the REGIS system.)
- WMRA should also consider asking WPAs to request operators to provide updated capacity information at least every five years. (This will provide a reality check on the information held and allow the model to be fully updated.)

In the longer term, recommendations from the DEFRA Waste Data Strategy (April 2006) relating to information collation on waste management infrastructure will assist this process, although the changes needed to improve the current situation will take some time to implement.

## **9. CONCLUSIONS**

### **9.1 DATA**

This study was undertaken using the most current validated data available at the time of writing. However, it would be beneficial to update the model with respect additional data in a number of key areas:

- Municipal waste production data is only available via DEFRA up to 2005, but to date has not been fully validated. In an un-validated form, the 2005 data suggests the actual arisings were lower than predictions using the 2002/03 data have indicated. Once the 2005 data has been validated, the WMRA should re-run the model prior to publishing strategic decisions pertaining to landfill, as it is anticipated that the future landfill capacity requirements will reduce.
- Hazardous waste data for 2005/06 should be available within the second quarter of 2007, while early indications for 2006/07 data may be available shortly thereafter. The WMRA should review the model in light of the later data, particularly with respect to waste management and generation trends. Initial indications from the Agency suggest that the previous predicted increase in waste growth rates due to legislative changes have not occurred, and that the overall trend in the disposal of hazardous waste to landfill is reducing.
- 2004/05 data for C&I and C&D waste for the region have been now released by the Environment Agency. This data will not provide detailed sub-regional data to the levels provided in earlier data releases but will assist in the verification of trends for the capacity model.
- Information pertaining to agricultural waste remains extremely limited and is unlikely to be available in a useable format for trend analysis until recent legislative changes become established. Once data relating to the ongoing management of this waste stream is released, WMRA should evaluate the landfill capacity requirements.

### **9.2 WASTE GENERATION PREDICTIONS**

Predictions for future waste production in all waste types were based on the most current trend data and assumptions available at the time of the study. Looking at each waste type:

- a. Municipal waste arising has been identified as being closely linked to changes in household numbers. The predictions within this study were based on the assumptions and housing options set out in the recent Phase 2 Spatial Options document. This document was recently presented for public consultation and depending on feedback received, the scenarios used might be subject to change. Any such changes need to be transferred into the capacity model.
- b. Commercial and Industrial waste arisings have been identified as being closely linked to changes in manufacturing and service industries. The predictions used for this survey were those presented in the Phase 2 Spatial Options document originally derived from the growth assumptions presented in the Review of England's Waste Strategy. Both the Spatial Options document and the Waste Strategy review are subject to change within the immediate future and thus such changes will have to be translated into the capacity model in order to maintain its validity.

- c. Construction and demolition waste predictions have been determined on the same basis as previous capacity surveys, and updated in light of the above Spatial Options report. This information should be reviewed in light of any changes introduced from the Spatial Options consultation and the model updated.
- d. Hazardous waste arisings predictions were based on assumptions from the earlier WMRA Phase 2 Capacity Study that included anticipated impact on growth from recent legislative changes. Early indications of post-2004 data from the Environment Agency suggest that the anticipated increases were not manifest in actual performance, and that trends for hazardous waste arising and disposal are in fact slowly reducing. Such changes need to be considered further before the WMRA determines strategic objectives for self-sufficiency in relation to the disposal of hazardous waste to landfill.
- e. The changes in the Landfill Tax Escalator, effective from April 2008, and announced in the March 2007 Budget statement have not been factored in but they are designed to reduce the quantity of waste going to landfill from all sources.

### 9.3 CAPACITY SCENARIOS

In developing the capacity utilisation model, it was evident that the potential scenarios for landfill in the region were numerous, dependant on the mix of individual waste growth predictions used. Following a detailed review of the predictions, it was possible to conclude that:

- a. Development of a site as a future landfill void is dependant upon the identified site meeting criteria specified by the Planning Authorities, the Environment Agency and the site operators.
- b. The influence of the criteria specified by the Environment Agency, particularly in relation to the potential impact on ground water (i.e. RGN 3) will be key determining factor on the suitability of a site for landfill development. As such future new landfill void capacity is most likely to be restricted to areas within the region with clay/clay-rich materials as the main geological strata.
- c. Operator influence on the availability of void capacity is also critical and any potential site will have to meet operator-defined criteria relating to financial feasibility, liability/risk management, operational restrictions and stakeholder management. This means that future landfill void capacity will not be released by any mineral operator if doing so compromises its future operations.
- d. Previous landfill capacity utilisation was modelled by the WMRA on the basis of municipal and C&I waste growth only. This is an over simplification of landfill requirements for the region, although the replication of these scenarios indicated that landfill availability had increased from the previously predicted 2017 to 2020 to a period spanning 2020 - 2024.
- e. The main scenarios for landfill utilisation included municipal, C&I and C&D wastes and considered operational status and availability of the capacity.
- f. The different growth scenarios for municipal and C&D waste streams, based as they were on individual housing options, had little impact on the overall landfill requirement over the period considered. Differences across the three growth options were a maximum +/-2.2% for municipal and +/-<1% for C&D waste streams.

- g. Variation across the different diversion options considered for C&I waste were more significant, due to the higher volumes of waste being/predicted to be produced.
- h. Diversion, recycling and recovery targets for municipal and C&I waste streams were based on national strategy targets, and will be subject to change following the review of England's Waste Strategy and the changes to the Landfill Tax Escalator. Changes are expected to be significant, especially for C&I waste streams, and will affect the predicted landfill requirements once introduced. The WMRA must ensure that the model is re-run when any new national targets are finalised, so as to provide the most accurate indication of landfill requirements for the Region.
- i. The level of permitted landfill capacity in the Region remains in excess of 71 million cubic metres, with a further potential 26 million cubic metres becoming available from mineral sites with a planning obligation to restore by material import. Available capacity is spread across a significantly lower number of sites than previously indicated by the Environment Agency.
- j. The availability of landfill capacity was found to be a significant determining factor for future waste strategy development. Previous surveys did not consider the issue of authorised non-operational landfill capacity only becoming available on the basis of commercial and operational decisions yet to be made by operators. Discussions during this survey indicated that such non-operational capacity will only be released in phases. On this basis, the predicted landfill lifespan for the Region decreased from 2021/22 to around 2015/16. It should be noted that non-operational capacity will only become available at the discretion of the operator and that such availability is by no means guaranteed.
- k. The availability of additional landfill capacity released from existing mineral sites with planning obligations to restore by material import was also considered during this study. This capacity is also likely to be released in phases, and would benefit the Region with approximately 2 years additional lifespan *only* if it is all released. It should be noted, however, that before this capacity could come on-line, the permitting process for landfills will need to be implemented and that this potential time delay should also be considered in future studies.

#### 9.4 CAPACITY DISTRIBUTION

Landfill capacity distribution (see below) is by no means evenly spread through out the Region, governed as it is by geology and historic mineral extraction activities.

<b>Table 9.4a: Landfill Capacity In The West Midlands</b>		
	<b>Environment Agency</b>	<b>WMRA Landfill Capacity Study</b>
Capacity At:	31 Mar 2005	01 Jan 2007
<b>Authorised Capacity</b>		
No. of Operational Sites	68	31
No. of Non-Operational Sites	104	12
Void Space (cubic metres)	78,629,005	71,919,900
<b>Potential Capacity At Planning Obligated Sites</b>		
No. of Sites with Planning Obligations to Restore by Import	Not Quantified	12
Potential Void Space (cu.m.)	Not Quantified	25,600,000

Excluding the one hazardous waste landfill site in Staffordshire, the availability of current operational and non-operational capacity is skewed towards to the non-Metropolitan areas, although significant capacity remains within the Metropolitan boundaries. This has implications for the cost-effective delivery of waste to operational or soon-to-be operational sites for the short-term.

<b>Table 9.4b: Landfill Distribution in The West Midlands 2007/08</b>		
Site Classification	Metropolitan Area	Non-Metropolitan Area
<b>Inert</b>		
Operational Sites	3	9
Non-Operational Sites	0	4
Planning Obligated Sites	1	3
<b>Non-Hazardous (incl. SNRHW)</b>		
Operational Sites	4	14
Non-operational Sites	1	7
Planning Obligated Sites	4	4

In the longer term, the triple impacts of RGN3, the Landfill Directive and general land-use policies which are aimed at improving the urban environment will inevitably further skew this distribution. By the end of the period covered by this study, it is expected that the majority of landfill activity will be concentrated in clay-based strata. For the West Midlands Region this is likely to mean that future landfill activities are concentrated to the north, east and south-west of the Metropolitan 'centre'

The map in Figure 9.4 below shows the distribution of the void capacity in 2007/08.



## 9.5 CAPACITY UTILISATION MODELS

In relation to the modelling of landfill utilisation, four main scenarios were modelled:

<b>Table 9.5 : Scenarios Used for Assessing Use of Landfill Capacity</b>					
Case	Housing Option (Municipal/C&D Waste)	Diversion Option C&I Waste	Site Availability		
			Operational	Non-Operational	Planning Obligated
Best	One	High	From 2007	From 2007	Phased In
Median 1	Two	Medium	From 2007	From 2007	Not included
Median 2	Two	Medium	From 2007	Phased In	Phased In
Worse	Three	Low	From 2007	Phased In	Not included

**NOTE:**

- In the 'best case' and 'Median 1' scenarios, non-operational capacity has been assumed to be available for use without restriction from 2007.
- In reality, operators have indicated that non-operational capacity is likely to become available for use at different stages and at different rates. This phasing of non-operational capacity includes a proportion not expected to be available during the study timeframe - it has been simulated in the 'worse case' and 'Median 2' scenarios based on operator information.
- Operators have also indicated that potential capacity may become available from planning obligated sites during the study period - this has been simulated in the 'best case' and 'Median 2' scenarios.

On the basis of these scenarios, landfill lifespan for the region has been identified as 2015/16 for the worse case, rising to 2022/23 for the best case.

Consideration was also given to having total availability of all non-operational and planning obligated capacity in the period of the study, purely as a sensitivity assessment. Even on this basis, landfill capacity lifespan at best was extended to 2024/25, which still represents a shortfall of around two years on the period of the RSS.

In terms of restricted landfill capacity, it was assumed that this was only available to specified industrial operators for a specific process-related waste. As permitting determinations were in process for these sites, it was assumed that the operators would continue to provide landfill capacity sufficient for their needs into the future. Never-the-less, the WMRA should note that:

- If the permit application processes are unsuccessful, then these industrial operators will need to divert their waste to a suitable alternative commercial facility, thereby reducing predicted operational lifespans; whereas
- If the permitting is successful, it is theoretically possible that future consideration could be given to making the landfill capacity commercially available, subject to operator agreement and dependant on regulatory and planning requirements being met.

With respect to hazardous landfill capacity, the survey confirmed that the region currently has a single authorised operational site that is currently accepting waste from a single source. This is expected to continue into the future, and at current disposal rates, capacity is available for this waste stream for approximately 10 years.

Other hazardous waste landfill requirements for the Region continue solely to be met through the use cells for the deposit of stable, non-reactive hazardous waste, with the landfill disposal of hazardous waste proper being provided through export to other regions. In the event that the WMRA determines strategically that the Region should be self-

sufficient in hazardous landfill capacity, then additional site(s) need to be located and planning/permitting applications made. It is unlikely, that such new hazardous landfill capacity could be introduced before 2010.

## APPENDIX A GLOSSARY

Biodegradable waste	Waste that is capable of decomposing through the action of bacteria or other microbes. This includes material such as paper, food waste and green garden waste.
Construction & Demolition Waste	Waste arising from the construction, repair, maintenance and demolition of buildings and structures, including roads. It consists mostly of brick, concrete, hardcore, sub-soil and topsoil, but can also contain quantities of timber, metal, plastics and occasionally hazardous waste materials.
ELV	End of Life Vehicle - scrap cars and other vehicles.
EU Directive	A European Union legal instruction that is binding on all Member States and is translated through the implementation of national legislation on a prescribed time-scale.
Environment Agency (EA)	The principal environmental regulatory body in England and Wales. Responsible for promoting improvements in waste management, permitting waste management facilities including landfills and ensuring consistency in regulation across England and Wales.
Hazardous Waste	Broadly any waste on the European Hazardous Waste list that has one or more of fourteen hazardous properties.
Landfill	This is a waste management facility incorporating the engineered deposit of waste into or onto (land raise) land.
Local Development Framework (LDF)	LDF is the term used to describe a group of documents produced by the Local Planning Authority detailing: <ul style="list-style-type: none"><li>• Development plan documents</li><li>• Supplementary planning documents</li><li>• Statement of community involvement</li><li>• Local development scheme</li><li>• Annual monitoring reports</li></ul>
Merchant Landfill	A landfill run as a commercial operation that receives waste from many producers.
Municipal Waste	Household and other wastes collected by a waste collection authority or its nominated contractor.
Operational Landfill	These fully authorised facilities were operational at the time of the study and were accepting waste. The capacity at these facilities was assumed to be available without restriction for the purpose of this study.
Non-operational Landfill	These facilities were fully authorised (either PPC or WML) at the time of the study but were deemed to be pre-operational or non-operational. These sites were not accepting waste and for the purpose of the study the capacity could not be deemed to be available without restriction as the decision to bring the capacity on-line will be dependant on commercial, operational or other factors outside the control of the WMRA.

Planning Obligated Site	Existing mineral sites that have a planning obligation to restore the site by the import of materials. Such imported material used at a future date, may or may not include waste - any site to be used for future landfill capacity will need to go through a PPC permitting process before it can accept waste.
Planning Policy Statement (PPS)	A new system of Government planning advice replacing earlier Government planning guidance on specific topics (eg. PPS 10 Planning For Sustainable Waste Management).
Pollution Prevention and Control (PPC)	This is the new regulatory system for the permitting of specified waste management activities including landfills. These regulations supersede the earlier WML Regulations for many waste management activities and continue to be regulated by the Environment Agency.
Regional Spatial Strategy (RSS)	The strategy for the region over a 15 - 20 year time prepared by the Regional Planning Body. The RSS identifies scale and distribution of new housing, regeneration areas, along with priorities for environment, transport, infrastructure, economic development, minerals, waste management and agriculture.
Regional Technical Advisory Body (RTAB)	Provides specialist advice on waste to the Regional Planning Body in relation to the issues, options and strategies for managing waste produced within the region.
Restricted Landfill	A landfill that is used only by the site operator for specific waste streams associated with a particular industrial process.
SWMA	Strategic Waste Management Assessment published by the Environment Agency.
Unitary Authority	A single local authority that has the responsibilities of waste planning, collection and disposal.
WEEE	Waste Electrical and Electronic Equipment as defined by the EU Directive.
Waste Collection Authority (WCA)	A local authority (i.e. district, borough or unitary) responsible for the collection of household waste within its area.
Waste Disposal Authority (WDA)	A local authority (i.e. a county or unitary) responsible for the management of the waste collected and delivered to its constituent collection authorities. The processing and /or final disposal of the waste is normally contracted to the private sector waste management industry.
Waste Management Industry	Private sectors businesses involved in the collection, treatment, and final disposal of waste.
Waste Management Licensing (WML)	This is the system of licensing used to regulate waste management activities, ensuring that operations are carried out in such a way to protect the environment and human health. This system is regulated by the Environment Agency. Many waste treatment and disposal activities originally permitted under this system are now regulated under the newer Pollution Prevention and Control Regulations.

## APPENDIX B

### ASSUMPTIONS

#### 1. Municipal Waste Assumptions:

In preparing projections of the future generation and management of MSW, the following assumptions have been made:

##### Waste Quantity:

- The number of new dwellings which are expected to be built using the latest RSS projections (Option 1: “Business as Usual” and Option 2: “Managed Growth” & Option 3: “Growth at any cost”) have been converted to numbers of new households for each Strategic Planning Authority for each of the 3 current growth options by making an allowance for demolitions and unoccupied dwellings;
- The average number of new households over the forecast period (2001 – 2025) is then converted into an average annual household growth rate (by WPA and growth option) by dividing average annual growth into the number of households in 2003 (taken from 2006 Government projections);
- Since the generation of municipal waste is closely related to the number of households, these average annual household growth rates are taken as a proxy of the rate of growth of municipal solid waste (MSW). The growth rates are therefore applied to the latest household waste data (2002-3) in order to generate annual projections of the quantity of MSW;
- Since the quantity of MSW is currently growing faster than the number of households, it has been assumed that MSW will grow at the annual household growth rate in each area (& for each option), plus 1% for the period until 2010/11.
- From 2011, waste growth is assumed to fall to a level consistent with the household growth rate;
- The projections assume 68% of municipal waste is biodegradable (for consistency with the Waste and Emissions Trading Act);

##### Waste Management:

- Waste composted is based on actual data for the latest year available (2002/03), followed by incremental increases to 50% of recycling targets by 2010. Composted waste is assumed to be 100% biodegradable;
- Waste recycled is based on actual data where available, increased to reach 50% of recycling targets by 2010. Recycled waste is assumed to be 50% biodegradable;
- The projections assume that the targets for recycling set out in “Waste Strategy 2000” and that Best Value performance standards, along with any ‘stretch targets’ that apply following a Public Service Agreement between individual local authorities and central Government will be met; The projections do not apply national recovery targets, but assume that Landfill Directive targets for biodegradable municipal waste (taken from provisional LATS allowances prepared by DEFRA in July 2004) will be met;

- The level of municipal waste requiring diversion away from landfill has been calculated from the combined requirements of national recycling targets and LATS allowances for biodegradable municipal waste;
- The capacity required to attain these standards is based on an assumption that the quantity of waste diverted represents 80% of throughput for recycling and 70% of throughput for other forms of waste treatment;
- The quantity of residual waste which will require further management or disposal to landfill has been calculated by deducting the quantity requiring diversion from the total arising for that year;

## 2. Industrial & Commercial Waste Assumptions

In preparing projections of the future generation and management of Industrial & Commercial waste, the following assumptions have been made:

### Waste Quantity:

- The 2002 base quantities for each Strategic authority area are derived from the WMRA Phase 2 Capacity Study (excluding 'Special waste' arising) and not from EA survey data for 2002/03 because this was not available broken down into individual WPA areas. There is a 0.3mt difference between the two sources for the region as a whole for this year (the EA survey data is higher, but this may reflect the fact that they were measuring how waste was managed in these areas, rather than where it was generated).
- The quantities of waste indicated in the table for the years from 2002 have been calculated using the assumptions adopted by the Government in the National Waste Strategy Review (Feb 2006), which reflect predicted economic growth and changes in the sectoral mix of the UK economy. The quantity of waste has not been included as a variable and therefore remains constant for all three performance based options;
- The projections assume that 1998-99 imports and exports as shown in the Environment Agency's 'Strategic Waste Management Assessment' remain unchanged, with a reduction to allow for Special Waste movements in 1998;

### Waste Management:

- The level of municipal waste requiring diversion away from landfill for each of the three performance options has been calculated using the performance standards shown in the table below:

<b>Diversion from Landfill as a % of total commercial and Industrial waste</b>	<b>Existing Performance 2002*</b>	<b>2010 %</b>	<b>2015 %</b>	<b>2020 %</b>	<b>2025 %</b>
Low	58	59	60	61	61
Medium	58	63	64	65	65
High	58	65	70	75	75

\* Existing Performance measured using average quantity of I&C waste landfilled in the region (EA SWMA Update 2002-03) as a proportion of the projected quantity of I&C waste arising in the region (Phase 2 Capacity Report)

- The capacity required to attain these standards is based on an assumption that the quantity of waste diverted represents 80% of throughput for recycling and 70% of throughput for other forms of waste treatment;

- The quantity of residual waste which will require further management or disposal to landfill has been calculated by deducting the quantity requiring diversion from the total arising for that year;

### 3. Cumulative Requirement for Municipal Commercial & Industrial (MCI) Waste: Assumptions

- The cumulative quantity of landfill required for each strategic authority area for the period 2004 – 2026 has been calculated by combining the quantities of residual Municipal and Industrial and Commercial waste;
- The 'Best Case' combines 'Business as Usual' for Municipal waste and 'High Diversion' for Industrial & Commercial waste; The 'Middle Case' combines 'Managed Growth for Municipal waste and 'Medium Diversion' for Industrial & Commercial waste; The 'Worst Case' combines 'Growth at all Costs' for Municipal waste and 'Low Diversion' for Industrial & Commercial waste.

### 4. Hazardous Waste Assumptions

In preparing the growth prediction for hazardous waste, the following assumptions have been made:

- **Projected future generation** is determined using the 2004/05 data from the Hazardous Waste Interrogator database. Projections of waste arising assume that the quantity of hazardous waste will increase by 22% in 2005 in response to the re-classification of waste by the Hazardous Waste Regulations. This is followed by a subsequent reduction of 2% per annum to reflect waste minimisation efforts, and static after 2010. Imports and exports to the Region are assumed to be static. Assumptions have been applied pro-rata to individual sub-regional authorities.
- **Landfill Disposal** projections assume that hazardous disposal capacity requirements will increase in 2005 to reflect the need to accommodate increased quantities of hazardous waste generated as a result of the changes to waste classification brought about by the implementation of the Hazardous Waste Regulations. The projections assume that landfill disposal rates will decrease to reflect changes in the availability of landfill capacity, the impact of waste minimisation and additional recycling, recovery and treatment facilities.

### 5. Commercial and Demolition Waste Assumptions

In preparing the growth prediction for construction and demolition waste, the following assumptions have been made:

- **Projected Future Arisings** has been derived from the Symonds/ODPM 2003 report using a dis-aggregation index based on RSS Phase 2 Spatial Options on predicted housing development rates. The quantity of C& D waste is assumed to change in line with the levels of housing development based on 8% reduction 2000 - 2007, 4% reduction 2007 - 2011 and static from 2011 - 2021.
- **Landfill Disposal** as taken from the Symonds/ODPM 2003 report, is assumed to be land disposal + 90% of unrecorded waste + a proportion of waste transferred consistent with the overall proportion disposed/recovered. The projection maintains landfill at 2003 rates (approximately 9% of arisings) and material sent to landfill is assumed to require capacity at inert landfills.