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Appendix A - The Regional Vision: Minimum Waste: Maximum Benefit

A Vision for Sustainable Waste Management in the South West

Our vision is:

The South West region will become a minimum waste producer by 2030, with business and households maximising opportunities for reuse and recycling.

This will require radical changes in all our behaviour over the next thirty years if we are to work towards zero waste production. We shall need to:

- ➔ *minimise production of waste*
- ➔ *reuse, recycle and recover value from the maximum practicable amount of waste that is produced*

This will help to prevent degradation of the environment by lessening the need for landfill and should assist business competitiveness and increase job opportunities within the South West.

What are the benefits of adopting a regional waste management approach?

The regional waste strategy can add value by:

- ➔ *Looking at all waste streams together across the region*
- ➔ *Addressing cross-boundary waste issues*
- ➔ *Looking at waste as part of an integrated regional strategy, rather than in isolation*



- ➔ *Identifying solutions where facilities of regional rather than local significance are required*
- ➔ *Identifying where partnership working can be of benefit*
- ➔ *Looking to a longer term timeframe than local authority municipal waste strategies*
- ➔ *Lobbying on behalf of organisations in the region*
- ➔ *Enabling reductions in barriers which limit sustainable waste management for public and private sector organisations*



Why should we change?

Circumstances in the South West mean we cannot continue disposing of waste by traditional means. The population of the region is growing at around twice the national average due to inward migration, and household waste production is also growing at around double the national average of 3%. Although many local authorities in the region have some of the highest recycling rates in the country, we have a very limited market for reprocessing those recyclates in the region. The South West has a high proportion of Small to Medium Sized Enterprises (SMEs)¹ and a high proportion of jobs in tourism – for small companies a lack of economies of scale has often limited the ability and willingness to use waste management options other than landfill. However, with the right strategy in place even the smallest companies will be able to make savings by reducing the waste they create. Due to the high proportion of agriculture, the region produces 23% of the agricultural waste produced in England and Wales. Although much of this falls outside the controlled waste stream, elements of it are shortly to become regulated and changes in other legislation and subsidy regimes will have major impacts upon the way agricultural waste is managed.

We need a sustainable waste management strategy if we want:

- ➔ *Our children to inherit valuable well-managed resources*
- ➔ *Our businesses to operate in a responsible and cost effective way*
- ➔ *The next generation to live and work in a clean, healthy environment*

This means one that will meet the needs of our region, without causing unacceptable environmental, social and economic problems now and in the future.

We cannot continue to throw our rubbish in landfill sites². Landfill, the traditional cheap disposal option, which has normally not covered the real cost to society of disposal, has acted as a disincentive to reduce waste production and to utilise the valuable resource that is lost through disposal. As the availability and acceptability of landfill continues to fall, we must look at other options, although there will continue to be a limited need for landfill.

¹ 96.9% of VAT and PAYE-registered enterprises in the region are SMEs and 15.2% of total jobs in the region are self-employed. (Source: South West Regional Observatory Business Economy Module)

² We currently landfill around 84% of our municipal waste and around 50% of our industrial and commercial waste.



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Our Aspirations:

If we change the way we manage waste we can reap environmental, social and economic benefits. If we don't our environment, our children and our businesses will have to pay the price.

- *We must conserve scarce and non-renewable resources for future generations*
- *We must reduce the impact of our waste on the environment*
- *We must meet national and EU targets on waste reduction or face penalties*
- *We can change unavoidable waste into a resource that offers economic benefit for our businesses*
- *We can generate more local jobs in environmental services by developing innovative solutions and technical skills in waste management*
- *We can take the opportunity to plan waste management in the long term*

Carrying on as before is no longer an option, and we must develop long term solutions. The purpose of this Vision is to provide the terms of reference for the long term strategy. But it is important that the radical changes in the approach are started now.

This Vision has been developed following an extensive period of consultation with interested parties in the region. Further consultation will take place on the strategy that will be developed.

To move towards the Vision set out above, there are certain underlying aspirations. These are that by 2030:

- *Every child will be educated on sustainable waste management and consumers will be made aware of waste minimisation and be encouraged to support local initiatives*

The biggest challenge to overcome in developing sustainable waste management practices will be to increase public understanding and participation. Awareness raising and changing perceptions are a vital part of delivering this Vision. There is already some good work being done in parts of the region in promoting recycling and waste minimisation in schools. These schemes must be expanded to ensure all children are made aware of the issues, to change their own behaviour, and also to help raise awareness of the need to reduce, reuse and recycle in their families and communities. Similarly there are and have been a number of awareness campaigns for the general public in parts of the region. However, these campaigns have too often been short-term or terminated early due to



funding problems. Long-term, adequately funded campaigns are a vital part of delivering this Vision.

- ➔ *Every household will have convenient access to a segregated collection system for recyclables made available to them and use it well*

The fastest growth rates in waste generation are happening in household waste. Effective segregation of waste at source will be essential to ensure it meets standards needed for reuse or recycling. Evidence shows that many people would be willing to use a segregated collection system if

available. Segregation of “reusable resources” must become the norm to help deliver major reductions in waste requiring disposal. The need for segregated collection systems must be taken into account in new developments and refurbishment of older properties.

- ➔ *The region will be at the forefront of developing and delivering sustainable waste management policies and practices. Where possible, local skills will be used to solve local and/or regional waste problems*



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The region currently has some of the best recycling rates in the country, demonstrating innovative collection schemes. It is also at the forefront of developing innovative sustainable waste management practices (eg the Holsworthy biomass plant and the CompactPower pyrolysis plant at Avonmouth). To continue to be at the forefront of sustainable waste management practices and to

make major inroads into the quantity of waste requiring disposal to landfill will require continual improvements in ways of managing waste. By staying at the forefront of developing policies and practices we will also be generating jobs and encouraging sustainable development.

→ *Green procurement will be at the heart of all business in the South West*

Green procurement practices are essential if sustainable waste management is to be achieved. Increases in recycling rates will only continue if there are markets for the materials collected. It is therefore essential that goods are not over-packaged and that they are recyclable and reusable where possible. Public sector organisations in the South West should lead by example and buy recycled goods that are reusable, but it is also important that all businesses fully engage in this philosophy.

→ *Local high value markets will be developed for recyclables in the region*



Alongside positive green procurement policies, the region needs to develop reprocessing facilities for recyclables. Much of the recyclables collected in the South West currently are exported out of the region to elsewhere in the UK and abroad, because there are very few local markets. Generating those markets in the South West will help to generate jobs, will reduce the environmental and cost implications of transportation and will make the collection of recyclables more cost effective. Support will be given to this area through ReMade South West and ReMade Kernow and national organisations such as WRAP will be encouraged to offer greater support to such initiatives in the South West.

➔ *All business will have a waste minimisation and recycling action plan*

Business economics already provides some focus for producers of waste to be responsible for the waste they produce directly. However greater emphasis needs to be placed on waste which is produced by them indirectly and by consumers of goods they produce, such as the packaging of food products. The waste impacts of new developments, both in the construction and operation of facilities, should be assessed at the planning stage. Many businesses can make considerable savings by

introducing waste minimisation and recycling schemes, and as the cost of landfill rises due to increases in landfill tax, these savings will become greater. The options available to some businesses, particularly small businesses might be limited due to a lack of available infrastructure for, for example, collection of recyclables. We must look at ways to make this infrastructure available to these businesses. For example, we must aim to ensure that new business developments have adequate segregation and storage areas, and landlords of all business parks who currently provide waste disposal as part of a contract for services must be encouraged to consider revisions to their service contracts that stimulate waste minimisation and recycling. We must also ensure that there is easy access to high quality training and advice on waste issues for business.

➔ *Waste streams that are hazardous or costly to recycle will be phased out and replaced by new clean materials that can be reused/recycled effectively*

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Hazardous waste is generally the most difficult to treat. Tighter regulations will also make it much more expensive to manage, and the traditional option used of co-disposal in landfills with non-hazardous waste is banned under the Landfill Directive. Where there is no practical reuse option, producers should be encouraged to eliminate the use of substances that will become hazardous waste in their products. Certain other non-hazardous wastes can also be difficult to reuse or recycle (for example some types of plastics). Where this is the case producers should be encouraged to replace such materials with those that can be reused. We will, as a region, lobby for national and European legislation that will require such changes, but we will also encourage businesses to take action without such legislation. Certain types of hazardous waste, such as clinical waste, will continue to be produced that will have no reuse or recycling option. It will be important to minimise the amount produced, for example by ensuring effective segregation at source, and then to dispose of that which is produced by the Best Practicable Environmental Option.

→ *Products will be redesigned to ensure their longevity and that they can be reused or recycled effectively*

Without product redesign to increase longevity and enable products to be reused and recycled we will continue to produce large amounts of waste for which there is no option but disposal by incineration or landfill. We will, as a region, lobby for national and European legislation that will require such changes, but we will also encourage businesses to take action without such legislation.

→ *Infrastructure will be in place to enable all waste handled to be reused, recycled or composted before energy is recovered from the residue*

The lack of appropriate financial and physical infrastructure is a major barrier to increasing recycling rates, whether for household, commercial, industrial, agricultural or other types of waste. Establishing that infrastructure is vital, but requires adequate funding. We will lobby for adequate funding, and also encourage the organisations that can provide and operate that infrastructure to develop it.



Moving from Vision to Strategy

This Vision will require a strongly focused and co-ordinated approach to waste management decision-making and a step change in the way we handle our waste. The Regional Waste Strategy will establish challenging but achievable short, medium and long term targets to enable the aspirations of this Vision to be met.

In developing the Strategy, work will be undertaken to examine long term trends in waste arisings, to examine thoroughly all the waste management options available and to examine the Best Practicable Environmental Options for the different waste streams. The Assembly will work with a wide range of partners in the region to draw up the strategy and engage in further public consultations.



Many thanks to the following for use of their pictures:
Exeter City Council
The Environment Agency
Carymoor Environmental Trust
Perrys Recycling



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Appendix B - Dealing With Waste in the Region: The Current Position

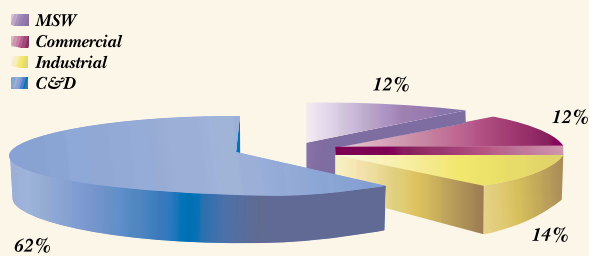
This Appendix sets out the facts and figures about current waste production and management in the South West and the requirements of a Strategy to meet the challenges of targets and legislation set out in the previous section.

Waste Production

In 2001 the South West region generated an estimated 20.5 million tonnes¹ (Mt) of controlled wastes which consisted of:

- ➔ 2.6 million tonnes from households
- ➔ 2.4 million tonnes from commercial premises
- ➔ 2.9 million tonnes from industrial premises and
- ➔ 12.6 million tonnes from construction and demolition activity

Diagram 2.1: Percentage Controlled Waste Production in South West 2001



Source: BPEO Study

It is worth noting that while municipal or household waste is obviously at the forefront of the public's mind **it only makes up some 12% of the controlled waste stream**. Twice as much is generated by commercial and industrial activities and the vast majority is wastes from construction and demolition. This is due in large part to its weight but also the method of recording².

Controlled Waste Management

Waste management is a commercial activity operated by the private sector, though there are a number of differences in the way household and 'trade' wastes are managed.

1. Household Waste Management

The management of household waste is characterised by the regular collection of household waste from the doorstep and the provision of 'municipal tips' or Household Waste Recycling Centres (HWRC), providing a service to defined areas under a long-term contract. A key feature is the separation of waste collection and disposal responsibilities in two tier areas with the districts responsible for arrangements for household waste collection and the county for disposal. In the unitary authority areas these functions are combined.

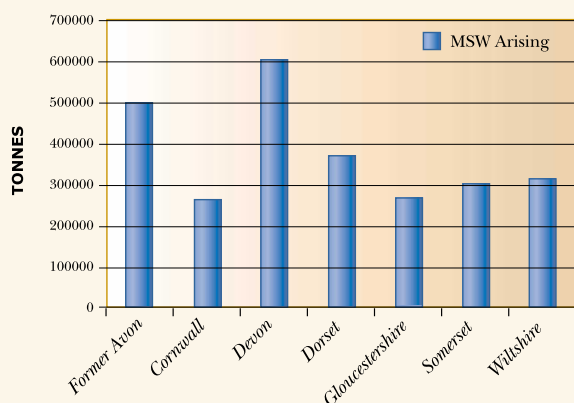
¹ These estimated figures are taken from arisings surveys. Figures elsewhere in the document may be taken from deposits figures or amounts being managed through the waste management system (as opposed for example to "waste" being reused on site). Therefore, there may be some variations on the figures presented

² The data on construction and demolition waste presented here is drawn from a statistical survey carried out by ODPM and is subject to a certain amount of error and while large, the proportion is broadly in line with other English regions at around half the total controlled waste stream



The region produced some 2.6Mt of municipal waste in 2001/02. Diagram 2.2 shows the relative contributions by each main sub-regional area.

Diagram 2.2: Municipal Waste Produced in South West Region 2001/02



Source BPEO Study 2003

The region relies predominantly on one method of treatment and disposal. The South West disposed of over 80% of municipal waste to landfill. The remaining 19% was recycled or composted. While the regional recycling rate is one of the highest in the UK, the region recovers no other residual value from waste prior to disposal.

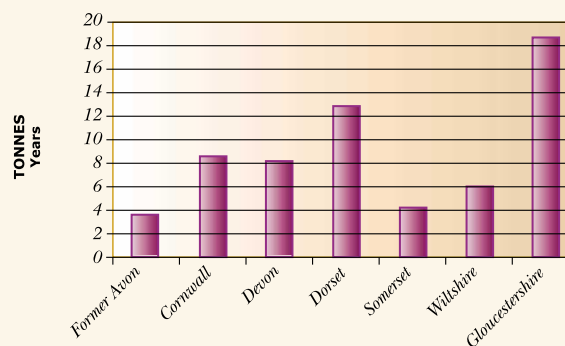
2. Growth in Municipal Waste

The RTAB's technical assessment of current and future waste production for the South West region modelled potential growth in municipal waste to the year 2020 illustrated in Diagram 2.4 overleaf.

3. Landfill Capacity

The region's reliance on landfill is a reflection of our geology, industrial past and economics. Mineral extraction voids have provided convenient, relatively safe and inexpensive capacity across the region in the past. The challenge to reduce our reliance on landfill as the dominant disposal method is made all the more pressing by the predicated life of our existing landfill sites across the region. Diagram 2.3 shows that the predicted capacity of landfill in some areas is as little as three years with an average of about eight years.

Diagram 2.3: Biodegradable Landfill Life Expectancy South West Region in 2001



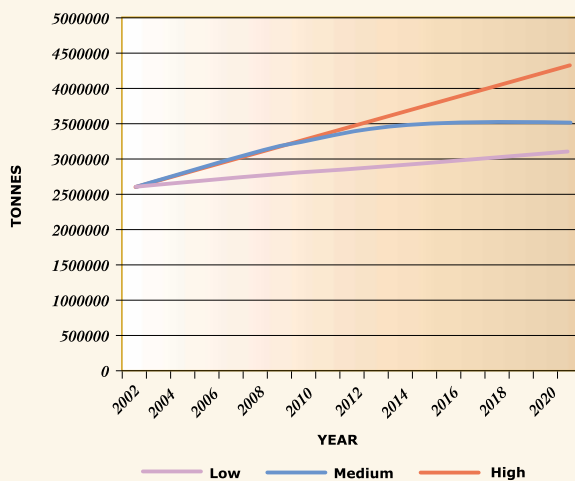
Source: Environment Agency Survey 2001



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The information used to assess the probable life of our existing sites is based on the assumption that the pattern of disposal would remain the same over time. This is not the case as the Government's annual municipal waste survey shows that nationally household waste is growing by around 3% per annum.

Diagram 2.4: Low, Medium and High Growth of Municipal Waste to Year 2020



Source: RTAB Technical Report 2003

In the worst case with waste growing exponentially at 3.5% per annum the amount of municipal waste will have nearly doubled by 2020. Even in a low growth scenario with growth of 1% per annum an extra 0.5Mt of waste would require management and disposal. A medium growth model proposed would see total municipal waste grow to 3.5Mt per annum by 2020.

'Trade' Waste Production

The last survey of waste production by industry and commerce was completed in 1998/99 and estimated that South West companies produced some 5.2Mt waste. Diagram 2.1 shows that this waste stream comprised about a quarter of the total waste produced. When wastes from construction and demolition are included as commercial activity this proportion rises to 88 percent of all waste produced. Everyday economic activity is producing the vast majority of waste in the South West. This section considers the various components of this complete commercial waste stream.

Commercial Waste Management

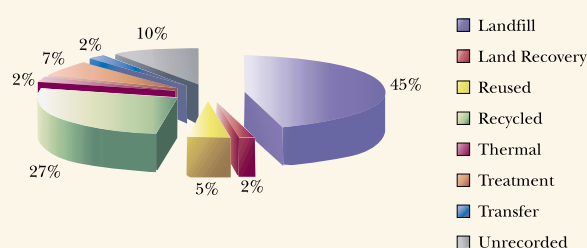
The majority of the waste produced in the South West resulting from the economic activity of industry and commerce is managed in a wholly different manner to household wastes. Collection and disposal arrangements are made by individual companies, invariably on short-term contracts and often by specific waste streams eg paper, metals, hazardous and mixed wastes provided by locally significant operators. The system is almost completely outside the control of local authorities, except where their own contractors are providing the service.

As companies have explicit information on the cost of their waste management, this can have a significant effect on their behaviour in the market. Any increase in disposal cost can be seen and action taken to reduce costs through reducing and recycling waste. Consequently market based policy measures and statutory targets, such as producer responsibility legislation, can have a significant and relatively rapid impact on commercial waste management. However, particularly for small companies, these costs may not be so transparent, as disposal costs might be included in property rental costs.

Capacity for Commercial Waste Treatment and Disposal

The market for commercial waste management results in a significantly different mix of waste management activity as illustrated in Diagram 2.5. Though as with municipal waste landfill is the dominant disposal method at 46% or nearly 2.4Mt in 1998/99. Environment Agency information on waste deposits to the region's landfill sites has shown that this figure has stayed relatively stable at 2.2Mt in 2000/01. Data on commercial waste management is less comprehensive than that collected regularly from local authorities due to operation of the market and concerns about commercial confidentiality.

Diagram 2.5: Percentage Commercial and Industrial Waste Management Methods



Source: Environment Agency SWMA 2000

Within these figures for commercial and industrial wastes is a proportion of hazardous waste. Agency data indicates that the South West produced about 310,000 tonnes of hazardous waste in 2001. This figure is considered about half the total amount that would be produced in the region once the UK fully implements the requirements of the Hazardous Waste Directive. The issue of hazardous waste management is discussed later in this appendix.

Growth in 'Trade' Waste

Comprehensive data on commercial and industrial waste production has only been collected once in 1998, though another survey is currently underway. Consequently it is difficult to offer any supported prediction of changes over time. As previously stated Environment Agency data on deposits to landfill from 1998-01 indicate no significant trend either up or down. The BPEO report suggested



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growth scenarios ranging from 2% per annum to reduction of 1% per annum over the period to 2020. The final modelled scenario assumed a declining growth model giving a compound growth of 1% over the plan period³.

Driving Change

Waste Strategy 2000 set an aspirational target to reduce landfill of commercial and industrial wastes to 85% of 1998 levels. The targets in Policies P7.1-P7.7 of the Strategy are designed to ensure the South West exceeds this national target.

It is likely the true drivers for change in commercial and industrial waste management will be the continuation and introduction of extended

producer responsibility legislation implementing compulsory recycling and recovery targets from specified waste streams, such as metals, paper, plastics and wood, for example the Packaging and Packaging Waste Regulations 1998.

Hazardous Waste

Companies and organisations produced 313,000 tonnes of Special Waste in 2001. About two thirds of this is managed through specialist facilities located in the region.

It is important to note the role landfill plays in the management options available. A third of this waste stream is managed through direct disposal, with the majority in sites located across the region.

Table 1: Hazardous Waste Produced or Managed in South West 2001

Sub Region	Waste Management Method (tonnes per annum)							
	Transfer	Storage	Recycling	Treatment	EFW	Incineration	Landfill	Sub Total
Former Avon	4240	11	8343	30848	43	6473	24700	74658
Cornwall	3055	0	20064	5073	25	1	2865	31082
Devon	8553	55	3600	26405	819	64	16454	55951
Dorset	7528	1398	1896	19166	35	35	8468	38526
Gloucestershire	4423	0	2036	9167	17	25	6247	21915
Somerset	2995	39	1767	14608	10	16	3651	23086
Wiltshire	3666	104	2014	13608	44	249	14874	34560
Regional Totals	34459	1607	39720	118876	993	6864	77259	279778
Exported	10241	1607	20176	61743	18	6801	19781	120367
Managed in SW	24218	0	19544	57133	975	63	57478	159411

Source: Environment Agency

³ This is based on a combined growth rate of 1.9% for commercial waste and -0.9% for industrial waste. However, for the purpose of developing sub-regional allocations in annex C a range of 0-1% has been assumed as the combined growth rate, due to uncertainties over data



The requirements of the Landfill Directive to classify sites purely for hazardous wastes will have a significant impact on this disposal route, particularly in the South West. The Environment Agency is reviewing landfill site operators' intentions for compliance with the Directive and currently expects only one site in the region to accept hazardous waste, and this will be limited to asbestos only.

With the impact of impending hazardous waste legislation in late 2004 there will be a significant increase in wastes classified as hazardous across the region at a time when disposal capacity is contracting. This could place serious demands on the region's existing transfer and treatment capacity.

When considering these two key facts the region is likely to need a minimum of 100,000 tonnes of additional transfer and treatment capacity by 2005 - this is equivalent to the amount currently accepted at the region's landfill sites. The need for an urgent review of capacity requirements for hazardous waste is included in Policy P9.2 and Actions A9.1 – 9.2.



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The Waste Development Policy Framework

Diagram 2.6: Waste Development Policy Framework

Diagram 2.6 gives a simplified diagrammatic illustration of policy responsibilities relating to waste management.

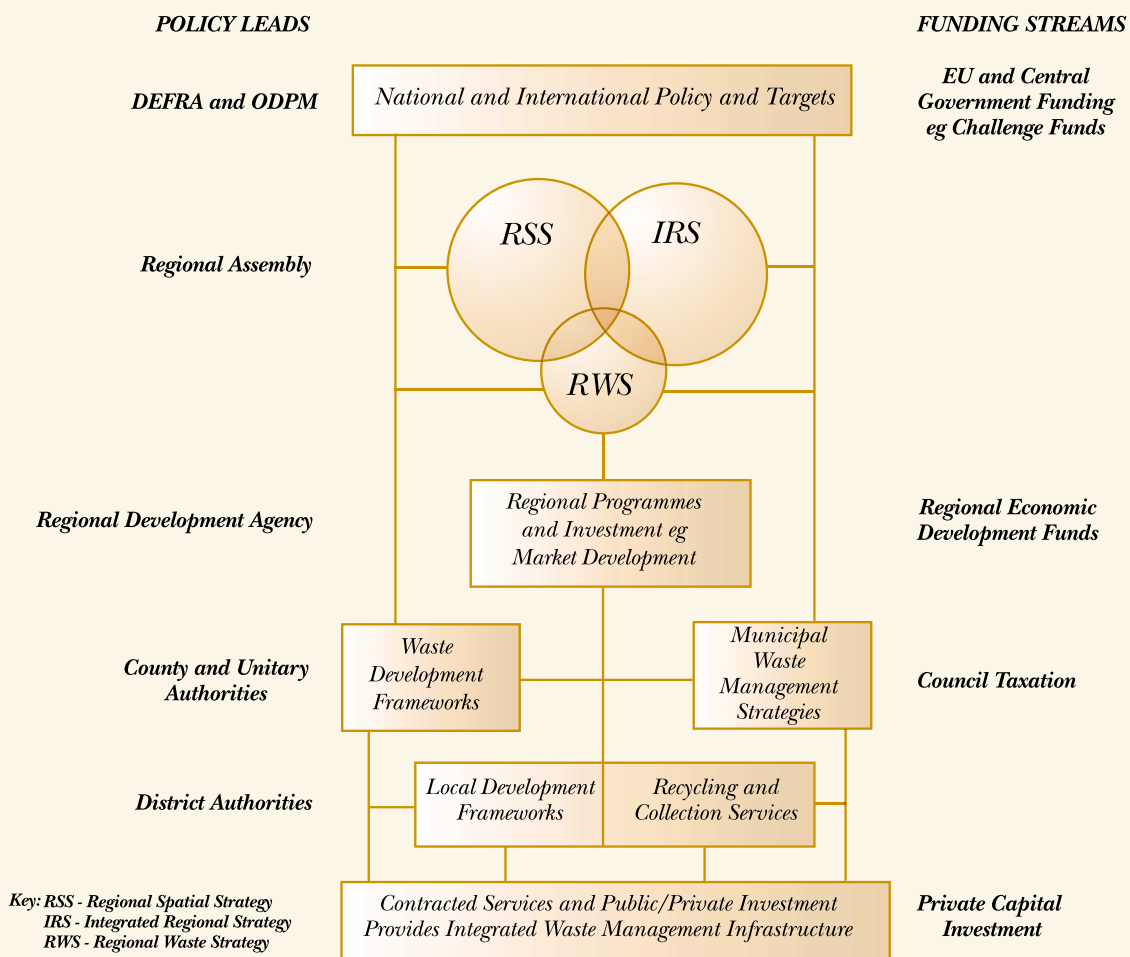
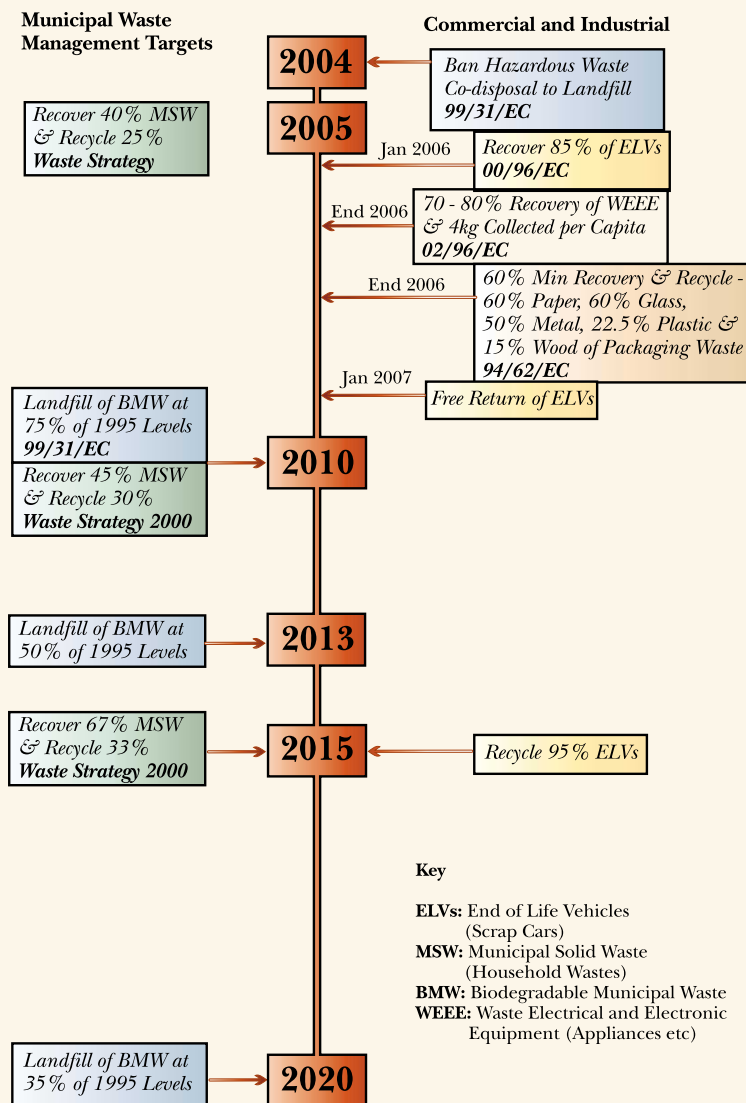


Diagram A1: Key Targets and EU Directives Timeline



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APPENDIX C - Sub-Regional Indicative Allocations

This appendix provides indicative capacity allocations for the main waste streams for each sub-region for the years 2010, 2013, and 2020.

These figures are based on an assumption that each sub-region will be self sufficient in waste management facilities to manage the waste produced in that sub-region.

Municipal Waste - Table 1: Indicative Annual Municipal Waste Management Capacities for the Landfill Directive Target Years

Target Year	Sub-Region	Minimum Source Separated ¹ (000s t/annum)	Maximum Secondary Treatment ² (000s t/annum)	Maximum Landfill ³ (000s t/annum)
2010	Former Avon	230	150	300
	Cornwall	120	80	150
	Devon	310	210	410
	Dorset	210	140	270
	Gloucestershire	130	80	160
	Somerset	140	90	180
	Wiltshire	180	120	240
	Totals		1320	870
2013	Former Avon	280	220	240
	Cornwall	140	110	120
	Devon	380	300	310
	Dorset	250	200	210
	Gloucestershire	150	120	130
	Somerset	170	130	140
	Wiltshire	220	180	190
	Totals		1590	1260
2020 ⁴	Former Avon	310	370	120
	Cornwall	150	190	60
	Devon	410	500	150
	Dorset	270	330	100
	Gloucestershire	170	200	60
	Somerset	180	220	70
	Wiltshire	240	290	90
	Totals		1730	2100

1: Source separated waste includes all municipal and household waste collected and segregated by material at source such as kerbside collection, bring banks and Household Waste Recycling Centres. It also includes separated organic materials sent direct to composting and anaerobic digestion systems.

2: Secondary treatment is indicative of the types of technologies known and near market to treat the mixed residual waste streams from households. It necessarily includes mechanical and biological treatment methods, MBT and thermal treatment systems from conventional incineration to potential gasification and pyrolysis plants.

3: Landfill figures are maximum assuming primary recycling and secondary treatment divert sufficient quantities of the biodegradable fraction of municipal waste from landfill to meet the requirements of the Landfill Directive as implemented by The Waste and Emission Trading Act and the draft Local Authority Trading Scheme Regulations.

4: Figures to 2020 are included for reference. The extended length of the plan period means these figures will be revised and reviewed particularly when the impact of further proposed waste policy measures such as Extended Producer Responsibility become known.

The indicative capacity figures developed for this table are based on the Environment Agency survey completed in 1999 of commercial and industrial waste management (See Agency South West SWMA 2000 page 13). The regional Strategy adopts this survey approach for assessing waste management capacity because it can capture all waste arising in the region. This is particularly important when a strategy seeks to integrate increased reprocessing capacity and ensure improved regional self-sufficiency.

Commercial and Industrial Waste - Table 2: Indicative Annual Commercial and Industrial Waste management Capacities for Target Years

Year	Sub-Region	Recycling/ reuse (000s t/annum) ¹	Recovery (000s t/annum) ²	Landfilled (000s t/annum)
2010	Former Avon ³	420-460	220-240	470-515
	Cornwall	160-170	80-90	175-195
	Devon	420-460	220-240	460-505
	Dorset ⁴	240-260	120-140	260-290
	Gloucestershire ⁵	260-280	150-180	285-315
	Somerset	240-260	120-140	260-290
	Wiltshire	260-290	140-150	290-320
	Totals	2000-2180	1050-1180	2200-2430
2013	Former Avon	440-490	280-310	390-430
	Cornwall	170-190	100-120	150-160
	Devon	440-490	270-300	380-420
	Dorset	250-280	160-170	220-240
	Gloucestershire	270-300	170-190	240-260
	Somerset	250-280	160-170	220-240
	Wiltshire	280-300	170-180	240-270
	Totals	2100-2330	1310-1440	1840-2020
2020	Former Avon	490-530	430-470	190-200
	Cornwall	180-200	160-180	70-80
	Devon	480-520	430-460	190-200
	Dorset	280-300	240-260	110-120
	Gloucestershire	300-320	260-290	110-120
	Somerset	270-300	240-260	110-120
	Wiltshire	300-330	270-290	120-130
	Totals	2300-2500	2030-2110	900-970

1: This category includes all materials that are source separated eg paper, metals and potentially organic materials. The Total figures necessarily include a proportion of material sent direct to reprocessors outside the region.

2: This category is broad and includes all materials and waste sent treatment and waste transfer facilities. Again this includes materials sent to specialist eg hazardous waste incineration, facilities outside the region. A detailed analysis of baseline data is available in the Environment Agency's SWMA South West Region 2000.

3: Recent work commissioned and accepted by the combined authorities has considered that there will be a reduction of two percent per annum in waste growth that exceeds that currently modelled in this Strategy document.

4: Dorset County Council Plan figures have grouped construction and demolition wastes in the commercial sector and hence figures will differ.

5: Gloucestershire County Council has followed a 'managed' waste model for this waste stream. Figures presented in their Waste Local Plan are significantly lower because they do not necessarily capture waste managed outside the region or directly recycled and reused.



The figures in this table have been derived from an annual snap shot of the recorded material passing through the South West's licensed waste management sites in the year 2000/01.

Environment Agency figures for the previous two years indicate that there is not a significant variation in the pattern of management of this waste stream.

Inert and Construction and Demolition Waste Waste - Table 2: Indicative Inert and Construction and Demolition Waste Management Capacities for Target Years

Year	Sub-Region	Treatment ¹ (000s t/annum)	Transfer ² (000s t/annum)	Landfill (000s t/annum)
2010 ³	Former Avon		220	380
	Cornwall	40	50	230
	Devon		120	910
	Dorset	5	140	290
	Gloucestershire	70	110	210
	Somerset		150	180
	Wiltshire	20	110	190
	Totals		135	900
2013	Former Avon		220	380
	Cornwall	40	50	230
	Devon		120	910
	Dorset	5	140	290
	Gloucestershire	70	110	210
	Somerset		150	180
	Wiltshire	20	110	190
	Totals		135	900
2020	Former Avon		220	380
	Cornwall	40	50	230
	Devon		120	910
	Dorset	5	140	290
	Gloucestershire	70	110	210
	Somerset		150	180
	Wiltshire	20	110	190
	Totals		135	900

1: Treatment is patchy across the region and relates only to licensed crushing and screening facilities

2: Transfer capacity also captures a degree of on-site screening and sorting for recycling of aggregates

3: The Regional Waste Strategy estimates that there will be no growth in this waste stream. Our ambition to see increased recycling of all wastes would indicate a need to increase our treatment and transfer capacity to increase the sorting of this waste stream into reusable aggregate products.



General Comments

Symonds Consultancy completed a survey of inert construction and demolition waste management that sought to identify that proportion of this relatively benign waste stream that was managed through our system of exemptions. The survey results indicate that between three and twelve million tonnes (estimate of six million tonnes) of this type of material was utilised in construction projects from golf courses to small farm tracks without passing through licensed facilities ie it is taken direct from the point of arising to its reuse. Due to the high degree of error associated with this survey the region has adopted a managed approach to assessing capacity requirements over the plan period.



D

Appendix D - Explanation of Technologies Included in the Regional Waste Strategy

Materials Recovery/Recycling Facility (MRF)

There are two main categories:

- **Clean MRF:** Processes clean dry co-mingled recyclables (paper, card, plastic and glass), source separated by the householder or businesses
- **Dirty MRF:** Processes mixed household and business waste with no source separation of potential contaminants such as food and garden wastes

A typical facility will comprise waste reception, storing, sorting and bulking areas incorporating various combinations of plant including conveyors, shredders, crushers, separators, screens and balers. The usual mobile plant of forklifts and front-end loaders are required to move materials.

Clean MRFs are generally smaller in the range 5-50ktpa due to the dry and pre-sorted input waste from kerbside and 'bring' recycling systems. Dirty MRFs are generally far larger up to 200ktpa due to the increased processing requirements to remove and dispose of contaminants and higher quantities of residual waste. Developments are contained in standard industrial buildings with no special requirements.

Mechanical and Biological Treatment (MBT)

MBT is a generic term for a range of processes operated and linked at one facility. At its simplest MBT is a bio-stabilisation and screening process that reduces the volume and biological activity of a mixed waste stream. Adaptations to this basic process include anaerobic and/or composting of organic fractions or the manufacture of a Refuse Derived Fuel (RDF). MBT processes offer a secondary material recovery stage after source segregation thereby maximising potential recovery/recycling rates.

Facility size can be scaled from 35-300ktpa most interest in the UK is for scale solutions in the 60-100ktpa range. Modular MBT plants typically comprise:

- **Biological Drying:** Mixed delivered waste is shredded and dried by air flow extraction for around twelve days. Reducing the moisture and weight by around 25%
- **Material Separation:** Screens and magnets separate inorganic fines (glass, stones and grit) and ferrous metals for recycling
- **Resource Use:** Post drying and separation of the residual material can be prepared for further use, principally as a Refuse Derived Fuel



MBT is considered to have excellent potential when combined with MRFs and Energy from Waste systems to realise high levels of recycling and recovery. The additional treatment of the biodegradable fraction of municipal waste has further potential to help meet the requirements of Article 5 Landfill Directive.

Mass Burn Incineration

Incinerators treat unsorted municipal waste by combustion in air under controlled conditions to significantly reducing the volume and weight of the

input material. Incineration is an old and established treatment method for waste materials across the world. Plant size can vary from several hundred to around hundred thousand tonnes per annum. Few commercial run plants in the UK are below the hundred thousand tonne mark.

Facilities typically comprise of waste reception and storage, burner grate, boilers, chimney stack and pollution abatement plant. Plants are characterised by a chimney stack up to 90m and associated buildings up to 50m high.



D

Few, if any, incineration plant built today does not include a component of energy recovery through combined heat and power. The combustion process releases the calorific value of the input material for a net increase in energy. This can be used to generate electricity and provide heating.

Incineration technologies have an excellent potential to meet the requirements of Article 5 Landfill Directive. The combustion process removes all biological activity from waste and produces a relatively stable ash residue.

Advanced Thermal Treatment (ATT)

Involves the limited conversion of waste into intermediate materials by the application of heat in the absence of oxygen. Typical processes involve pyrolysis and gasification.

These technologies have not been proven at beyond pilot scale in the UK so it is difficult to give a definitive description.

The interest in these systems stems from the potential scalability and flexibility compared with traditional thermal treatment by incineration. Pilot systems have the potential to recover some energy from the treatment process and produce a bio-stabilised residue suitable for potential further processing or landfill. ATT is often considered as a final module of

an MBT process since these anaerobic combustion techniques require a consistent feedstock eg RDF.

Visually these plants are smaller than traditional incinerators but still require a chimney stack, up to 30m and associated industrial buildings.

Anaerobic Digestion

Aerobic (composting) and anaerobic digestion rely on natural biological processes to breakdown the organic fraction of sorted municipal waste streams. Anaerobic digestion breaks down organic wastes in the absence of oxygen in a sealed container or tank. The process generates a usable biogas (methane) for secondary energy generation.

The technology is proven in the treatment of sewage sludges, but has yet to be used at commercial scale for municipal waste management the UK. The digestion process would require a relatively homogenous waste stream to produce a potential useful digestate for further recycling. The process has significant potential to reduce the bioactivity of the input material allowing for final disposal to landfill.

Composting

See above, the controlled aerobic natural degradation of organic material to produce a stabilised material directly suitable for agricultural applications. Most



usually seen as the back garden compost heap. At the commercial scale sorted green waste is shredded and stacked in long piles (windrows) in the open air or in agricultural style buildings. After turning and further screening a potential usable compost or soil conditioner is produced.

The technology particularly when applied to green waste is proven at the commercial scale across the UK. Developing 'in-vessel' systems have the potential to expand the use of composting to a wider range of organic waste materials and offer a

higher degree of control of the degradation process and the final product.

Composting techniques have a key role to play in the diversion of biodegradable household waste from landfill, particularly in the early years of landfill directive.

General

The size of different facilities will vary considerably but typical capacities and other key planning considerations are indicated in the table below:

Key Planning Criteria Matrix						
Technology	Waste Type	Capacity (t per annum)	Key Planning Considerations			Potential Land-Use Classes
			Building Size & Height	Stack Height	Vehicle Movements	
Composting (open)	Green Garden	25,000	2-3ha 3-4m	None	10-20	Rural & existing sites
Composting (closed)	Green & Food	25,000	1-2ha 3-7m	None	10-20	Rural, urban B1/B2 & existing sites
AD	Food	40,000	1ha 7m	None	20	Rural, urban B1/B2 & existing sites
MRF	Mixed	50,000	1-2ha 12m	None	20-30	Urban/commercial B1/B2
MBT	Mixed	50,000	1-2ha 15-25m	None	20-30	Industrial/commercial B1/B2
Incineration (small)	Sorted	50,000	1-2ha 15-25m	40-70	20	Industrial/commercial B1/B2
Incineration (large)	Mixed & RDF	250,000	2-5ha 25-30m	60-80	40-50	Intensive industrial B1/B2
Advanced Thermal	Sorted (RDF)	50,000	1-2ha 15-25m	40-70	20	Urban/commercial B1/B2



E

Appendix E – Glossary of Terms

Anaerobic Digestion – a process where biodegradable material is broken down by bacteria in the absence of oxygen. Material is placed into an enclosed vessel and in controlled conditions the waste breaks down into *digestate* and *biogas*.

Best Practicable Environmental Option (BPEO) – a BPEO is the outcome of a systematic and consultative decision-making procedure which emphasises the protection and conservation of the environment across land, air and water. The BPEO procedure establishes, for a given set of objectives, the option that provides the most benefits or the least damage to the environment as a whole, at acceptable cost, in the long-term as well as in the short-term.

Best Value – the duty on local authorities to deliver services (including waste collection and waste disposal management) to clear standards – covering both cost and quality – by the most effective, economic and efficient means available.

Biogas – methane gas evolved during the anaerobic decomposition of organic materials.

Bring Site – a localised collection point for recyclates, eg glass, paper and cans.

Bulky Waste – waste which exceeds 25kg or any article that does not fit into a receptacle provided for householders or if no receptacle is provided a

cylindrical container of 750mm in diameter and 1 metre high.

Central Composting – large-scale schemes which handle kitchen and garden waste from households and which may also accept suitable waste from parks and gardens.

Civic Amenity Waste – a sub-group of household waste, normally delivered by the public direct to sites provided by the local authority.

Clinical Waste – waste arising from medical, nursing, dental, veterinary, pharmaceutical or similar practices, which may present risks of infection.

Combined Heat and Power – a fuel efficient technology which produces electricity and heat from thermal combustion.

Commercial Waste – waste arising from premises which are used wholly or mainly for trade, business, sport, recreation or entertainment, excluding municipal and industrial waste.

Community Sector – including charities, campaign organisations and not-for-profit organisations.

Composting – an aerobic, biological process in which organic wastes, such as garden and kitchen waste are converted into a stable granular material which can be applied to land to improve soil structure and enrich the nutrient content.



Construction and Demolition Waste – arises from the construction, repair, maintenance and demolition of buildings and structures.

Controlled Waste – household, industrial, commercial and clinical waste which require a waste management licence for treatment, transfer or disposal.

Decoupling – removal of the linkage between economic growth and environmental damage.

DEFRA – Department for the Environment, Food and Rural Affairs.

Digestate – the solid material remaining at the end of a controlled biodegradation process.

DTI – Department of Trade and Industry.

Duty of Care – applies to anyone who imports, produces, carries, keeps, treats or disposes of waste. Everyone subject to the duty of care has a legal obligation to comply with it and there are severe penalties for failing to do so. The Duty of Care does not apply to waste collection from households 176.

EC Directive – a European Community legal instruction, which is binding on all Member States, but must be implemented through the legislation of national governments within a prescribed timescale.

Eco-design – the process of producing more goods using fewer resources and causing less pollution, both in manufacturing and disposal.

ELV – End of Life Vehicle: a vehicle which is waste within the meaning of Article 1 of the Waste Framework Directive.

Energy from Waste (EfW) – utilising the embodied energy of waste materials to generate electricity and heat through direct combustion or indirect combustion of *biogas*.

Environment Agency (EA) – established in April 1996, combining the functions of former local waste regulation authorities, the National Rivers Authority and Her Majesty's Inspectorate of Pollution. Intended to promote a more integrated approach to waste management and consistency in waste regulation. The Agency also conducts national surveys of waste arisings and waste facilities.

Flytipping – the illegal dumping of waste materials on public and private land.

Gasification – the conversion of solid organic feedstock into gaseous products at high temperature and pressure in the presence of oxygen and steam.

Green Waste – vegetation and plant matter from household gardens, local authority parks and gardens and commercial landscaped gardens.

Hazardous Waste – waste materials of a particularly toxic or harmful nature as defined by the Hazardous Waste Directive (see also *Special Waste*).



Home Composting – compost made at home using a traditional compost heap, a purpose designed container, or a wormery.

Household Waste – all waste materials originating from residential properties and requiring collection and disposal by *WCAs* and *WDAs*.

Incineration – the controlled burning of waste, to reduce its volume and potential toxicity. Usually combined with power generation in associated Energy from Waste plant. Ash residues still require final disposal to landfill.

Industrial Waste – waste from any factory and from any premises occupied by an industry (excluding mines and quarries).

Inert Waste – waste which does not undergo any significant physical, chemical or biological transformations and which complies with the criteria of Annex III of the EC Directive on the Landfill of Waste.

Integrated Waste Management – involves a number of key elements, including: recognising each step in the waste management process as part of a whole; involving all key players in the decision-making process; and utilising a mixture of waste management options within the locally determined sustainable waste management system.

Integrated Planning Pollution and Control (IPPC)

– is designed to prevent or, where that is not possible, to reduce pollution from a range of industrial and other installations, including some waste management facilities, by means of *best available* techniques.

In-vessel (Composting) – the controlled biological decomposition and stabilisation of organic material in vessels that are usually enclosed affording an enhanced level of process and emission control.

Kerbside Collection – regular collection of recyclables from premises, including collections from commercial or industrial premises as well as from households.

Land Use Planning – the Town and Country Planning System, which regulates the development and use of land in the public interest.

Landfill Sites – are areas of land in or on which waste is deposited permanently.

Landspreading – the spreading of certain types of waste onto agricultural land for soil improvement. Sewage sludge and wastes from the food, brewery and paper pulp industries are typical.

LAs – local authorities.

Licensed Site – a waste disposal or treatment facility which is licensed under the Environmental Protection Act for that function.



Life Cycle Assessment – can provide a basis for making strategic decisions on the ways in which particular wastes in a given set of circumstances can be most effectively managed, in line with the principles of Best Practicable Environmental Option, the waste hierarchy and the proximity principle.

Local Planning Authority – a unitary authority or, in 2 tier areas, district authorities which have responsibility for most planning decisions other than for mineral and waste facilities.

Minimisation – see reduction.

Mineral Voids – spaces available through mining or quarrying activities.

Municipal Waste – household waste and all other wastes collected by a Waste Collection Authority, or its agents, including municipal parks and gardens, beach cleansing, commercial or industrial wastes.

ODPM – Office of the Deputy Prime Minister.

Open Windrow (composting) – the open air biodegradation of green waste in piles or rows to facilitate turning.

Planning Policy Guidance Notes (PPGs) and Mineral Planning Guidance Notes (MPGs) – Government Policy Statements on a variety of planning issues, including waste planning issues, to be taken as material considerations, where

relevant, in deciding planning applications. These are being replaced by Planning Policy Statements (PPSs) and Minerals Policy Statements (MPSs).

Producer Responsibility – producers and others involved in the distribution and sale of goods taking greater responsibility for those goods at the end of the products life.

Proximity Principle – suggests that waste should generally be disposed of as near to its place of production as possible.

Putrescible – readily biodegradable material such as food waste.

Pyrolysis – process in which organic waste is heated in the absence of oxygen to produce a mixture of gaseous and liquid fuels and a solid inert residue.

Recovery – the recovery of value from waste by for example utilising its inherent calorific value as a fuel in heat and power production.

Recycling – the reprocessing of wastes, either into the same product or a different one.

Reduction – reducing the production of waste at source.





Refuse Derived Fuel – the processing of the combustible fractions of mixed waste streams to create a consistent fuel stock for thermal processes, such as heat and power generation.

Regional Technical Advisory Body on Waste (RTAB) – the Regional Assembly’s officer support group, which provides advice to the Assembly on matters of waste policy. It includes representatives of the waste planning disposal and collection authorities, the waste industry, the community sector, industry support groups and regional bodies.

Renewables Obligation – the market in tradable renewable energy certificates for which each supplier of electricity must demonstrate compliance with increasing Government targets for renewable electricity generation.

Reuse – using waste materials or products for the same purpose without the need for complete reprocessing.

Self-sufficiency – dealing with wastes within the region or country where they arise.

Separate Collection – kerbside schemes where materials for recycling are collected either by a different vehicle or at a different time to the ordinary household waste collection.

Source Separated – recyclable/compostable waste collected by *separate collection*.

SME – a small to medium enterprise.

Special Waste – is defined by the Special Waste Regulations 1996 see also *hazardous waste*.

Sub-region – for the purpose of this Strategy the sub-regions are defined as the seven former county areas: Cornwall (including Isles of Scilly); Devon (including Torbay and Plymouth); Dorset, Poole and Bournemouth; Somerset; Wiltshire (including Swindon); Bristol, South Gloucestershire, North Somerset and Bath and North East Somerset; and Gloucestershire. This is a different definition of sub-region to that which is used in other parts of the Regional Spatial Strategy.

Sustainable Waste Management – means using material resources efficiently. And where waste is generated, dealing with it in a way that actively contributes to the economic, social and environmental goals of sustainable development.

The Assembly – South West Regional Assembly.

Treatment – the chemical or biological processing of certain types of waste for the purposes of rendering them harmless, reducing volumes before landfilling, or recycling.

Unitary Authority – a local authority which has the responsibilities of both Waste Collection and Waste Disposal Authorities.

Waste – legally defined in the Waste Framework Directive as any material the holder discards or is required to discard.



Waste Arisings – the amount of waste generated in a given locality over a given period of time.

Waste Collection Authority (WCA) – a local authority charged with the collection of waste from each household in its area on a regular basis. Can also collect, if requested, commercial and industrial wastes from the private sector.

Waste Disposal Authority (WDA) – a local authority charged with developing the municipal waste management strategy, providing disposal sites to which it directs the Waste Collection Authorities for the disposal of their controlled waste, and with providing civic amenity facilities.

Waste Planning Authority (WPA) – a local authority charged with developing the waste development plan, and the provision of potential development sites for waste management facilities under the land use planning system.

Waste Hierarchy – the principal of sustainable waste management that requires a hierarchy of options to be considered for any waste in the following priority: reduction, reuse, recycling, recovery, disposal.

Waste Management Industry – the businesses (and not-for-profit organisations) involved in the collection, management and disposal of waste.

Waste Management Licensing – regulatory system for waste management facilities that ensures waste management operations do not harm human health or the environment.

Waste Streams – waste generated from different sources.

Waste Strategy 2000 – Government vision of sustainable waste management in England and Wales until 2020 (Wales has subsequently produced its own strategy).

Waste Transfer Station – a site to which waste is delivered for sorting prior to transfer to another place for recycling, treatment or disposal.

WEEE – Waste Electrical and Electronic Equipment.

WRAP – Waste and Resources Action Programme.



F

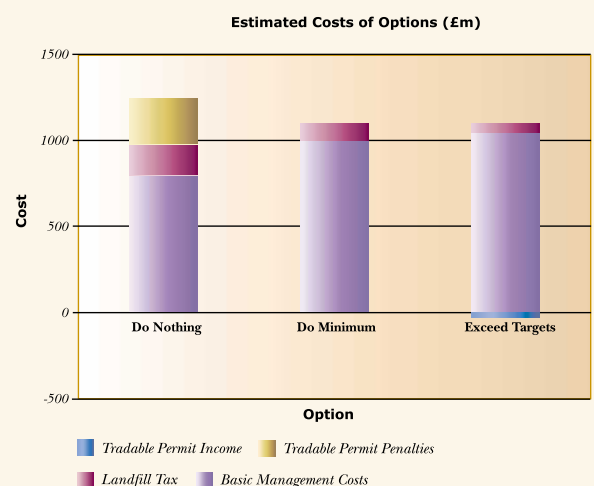
Appendix F – Estimates of Costs of Delivering the Strategy

The BPEO study took account of twenty three different indicators in order to establish the BPEO. One of the indicators considered was the cost of the collection management and disposal of waste. There are clearly considerable uncertainties about what such costs will be by 2020, but based on current costs, it is estimated that if we control the growth in arisings, but continue to manage waste as currently, the annual cost will be in the region of £800m. If we do the minimum necessary to meet the statutory and Landfill Directive targets, the cost would be in the region of £1 billion. The cost of the options adopted in this Strategy are in the range of £950-£1,150m. However, the costs above do not include the costs of landfill tax or the penalties local authorities will face if they miss their landfill diversion targets. The cost of landfill tax alone could increase the cost of the “do nothing” option by £150-£200m. The purchase of tradable permits or other penalties could potentially cost authorities a further £250-£350m under the “do nothing” option.

Under the “do minimum” option landfill tax costs would be in the region of £100m pa, and there would be no tradable permit costs as the requirements would be met.

Under the options in this Strategy, there would be landfill tax costs of no more than £50m. As the landfill directive targets would be exceeded, there would be income from the tradable permits scheme of around £12-£36m⁴.

Therefore, the total costs of these options can be seen in the table below which indicates that the overall annual costs of exceeding targets, may be less than the costs of doing nothing or the costs of meeting targets. However, as mentioned above, there are considerable uncertainties about the assumed costs used, the costs will be significantly higher than current costs and considerable investment will be required over the period to 2020.



⁴ Assumes permits would be valued in a range of £50-£150



Appendix G – South West Authorities Recycling Performance and Statutory Targets (Percentages)



Authority	Recycling/Composting Rates				Recycling/Composting Targets	
	98-99	00-01	01-02	02-03	03-04	05-06
Bath & North East Somerset Council	17	21.3	23.3	26.1	33	36
Bournemouth Borough Council	24	28	20.9	24.5	33	40
Bristol City Council	9	11.1	12.1	13.8	18	27
Council of the Isles of Scilly	8				16	24
North Somerset Council	7	11.8	13.4	13.8	14	21
Plymouth City Council	8	21.1	12	13.7	16	24
Poole Borough Council	22	25	15.9	18.8	33	40
South Gloucestershire Council	7	7.8	11.4	14	14	21
Swindon Borough Council	15	13.6	12.9	14.4	30	36
Torbay Council	10	0	20.8	20.1	20	30
Cornwall County Council	6	9.5	12	17.7	12	18
Caradon District Council	2	5.9	11.4	15.7	10	18
Carrick District Council	7	13	14.6	15.3	14	21
Kerrier District Council	6	8.4	13.7	16.32	12	18
North Cornwall District Council	7	1.4	2	10.9	14	21
Penwith District Council	3	3.7	4.5	8.2	10	18
Restormel Borough Council	8	11.4	13.6	14.8	16	24
Devon County Council	17	19.8	20.5	22.2	33	36
Torridge District Council	11	10.4	12.4	21.3	22	33
East Devon District Council	9	15.9	15.1	15.3	18	27
Exeter City Council	10	10.9	11.8	14.4	20	30
Mid Devon District Council	11	12.2	14	15.5	22	33
North Devon District Council	10	11	14.5	19.8	20	30
South Hams District Council	14	24.9	16.7	17.8	28	36
Teignbridge District Council	12	13.3	14.4	13.6	24	36
West Devon Borough Council	15	14.2	17.2	21.5	30	36





Authority	Recycling/Composting Rates				Recycling/Composting Targets	
	98-99	00-01	01-02	02-03	03-04	05-06
Dorset County Council	31	27	26.5	27.1	33	40
Christchurch Borough Council	11	12	12	13	22	33
East Dorset District Council	19	15.8	15.5	16	33	40
North Dorset District Council	18	16.5	16.1	17	33	36
Purbeck District Council	16	13	12	13	33	36
West Dorset District Council	9	11.4	12	12.6	18	27
Weymouth & Portland Borough Council	15	13.5	12.6	13.2	30	36
Gloucestershire County Council	12	13.4	13.8	16.7	24	36
Cheltenham Borough Council	8	8.5	9.5	12.9	16	24
Costwold District Council	19	16.9	16.8	16.5	33	40
Forest of Dean District Council	11	9.3	9.4	11.7	22	33
Gloucester City Council	6	6.7	6.6	8	12	18
Stroud District Council	13	16.8	16.7	20.5	26	36
Tewkesbury Borough Council	7	7.1	7.8	8.7	14	21
Somerset County Council	14	14.8	15.6	20.2	28	36
Mendip District Council	8	6.9	6.6	8.7	16	24
Sedgemoor District Council	6	9	6.2	8.9	12	18
South Somerset District Council	11	10	10.3	10.8	22	33
Taunton Deane Borough Council	12	12.2	12.6	13.3	24	36
West Somerset District Council	8	10.5	10.7	11.7	16	24
Wiltshire County Council	10	3.9	16	19.4	20	30
Kennet District Council	13	24.5	20.3	17.2	26	36
North Wiltshire District Council	5	13.6	15	9.9	10	18
Salisbury District Council	16	19	20.7	16.1	33	36
West Wiltshire District Council	7	13.4	0	7.5	14	21



Appendix H - European and Regional Municipal Waste Management Comparisons



Region ⁵	Population	Landfill		Incineration & Refuse Derived Fuel		Recycling & Composting		Other		Total	
	Thousands	ooo tonnes	%	ooo tonnes	%	ooo tonnes	%	ooo tonnes	%	ooo tonnes	%
All England	49,183	22,317	77	2,551	9	3,886	13	48	0	28,802	100
South West	4,934	2,276	81	3	0	529	19	0	0	2,808	100
South East	8,006	3,507	79	84	2	858	19	0	0	4,449	100
East Midlands	4,175	1,848	77	156	7	371	16	16	1	2,391	100
West Midlands	5,267	1,695	57	944	32	331	11	20	1	2,990	100
East	5,934	2,400	80	42	1	540	18	1	0	2,983	100
London	7,188	3,228	73	868	19	346	8	0	0	4,442	100
North East	2,516	1,214	78	243	16	108	7	0	0	1,565	100
North West	6,731	3,612	87	94	2	464	11	0	0	4,270	100
Yorks/Humber	4,967	2,536	85	116	4	340	11	10	0	3,002	100

Source: DEFRA Municipal Waste Statistics

Examples of Selected European Municipal Waste Management Methods ⁶			
Country	% Recycled	% EFW	% Landfilled
Austria	44	18	32
Denmark	30	58	12
France	14	27	58
Germany	21	36	43
Netherlands	37	41	22
Sweden	32	35	33
Switzerland	39	47	14
All UK	15	9	78
South West 2001	19	0	81
South West 2020 (forecast)	45	35	20

Source: DEFRA Municipal Waste Statistics; SITA

⁵ Figure from 2001/02

⁶ Definitions of municipal waste vary slightly between different countries so care should be taken in making direct comparisons



I

Appendix I - European Directives

UK Governments are required to implement directives, regulations and decisions passed by the European Parliament. Waste and resource management has drawn considerable attention from the EU recently with directives and regulations that seek to increase reuse, recycling and recovery and implement the policy objectives of the Waste Framework Directive. Figure A1 shows the key target dates for the main directives.

Waste Framework Directive

The principal directive relating to waste that sets out the foundation of sustainable waste management and the requirement to protect human health and the environment. The directive defines waste and the principals of waste hierarchy, proximity and self-sufficiency.

Hazardous Waste Directive

The Hazardous Waste Directive defines a list of materials that because of their properties are particularly hazardous to the environment and human health and singles them out for an increased level of control and management. Recent amendments to the waste catalogue have extended the range of hazardous materials beyond the current scope of our domestic special waste legislation. New materials and products, such as, cathode ray tubes (computer monitors etc) and

fluorescent tubes, will need specialist treatment prior to disposal. This could double the amount of hazardous waste requiring management in the UK.

Landfill Directive

The Landfill Directive is particularly pertinent, as the UK is currently heavily reliant on landfill for disposal of a wide range of unsorted and untreated wastes. Nationally, some eighty percent of waste currently goes to landfill. The Directive sets standards for landfill management and construction, this will have a significant impact on the way we manage hazardous wastes. UK disposal standards allow for the 'co-disposal' of hazardous waste with 'normal' biodegradable waste. This practise will have to cease from July 2004 and hazardous wastes will have to be pre-treated and disposed of in separate sites.

The Directive also aims to reduce the global warming impact of landfill by progressively reducing the amount of Biodegradable Municipal Waste (BMW) disposed of and thereby reducing methane emissions. The Directive sets the following binding targets for reducing BMW sent to landfill:

75% of 1995 levels by 2010

50% of 1995 levels by 2013

35% of 1995 levels by 2020





Producer Responsibility Directives

The EU identified priority waste streams for further action because of their political or environmental impacts. The legislative framework adopted to tackle these waste streams recognises the need to tackle waste at source and recognises the environmental impacts along the whole supply chain from production, distribution, use and final disposal. Producer responsibility places the onus on the manufacturers and suppliers of products to meet statutory recycling and recovery targets. Specific Directives have been adopted for:

- *Packaging*
- *End of Life Vehicles (ELV); and*
- *Waste Electrical and Electronic Equipment (WEEE)*

The Packaging Directive sets targets for the recycling and recovery of packaging materials like paper, metal and glass at the national level. The ELV and WEEE Directives set national targets for the recycling and recovery of specific products, cars, televisions, etc, respectively. These Directives will have a significant impact on the waste management infrastructure of the UK, since they require considerably increased amounts of recycling and reprocessing of traditionally landfilled materials and objects.

Incineration Directive

The Directive sets absolute standards for the permissible emissions from all types and sizes of thermal combustion processes using waste materials. The aim of the Directive is to prevent or limit, as far as practicable, the potential negative impacts of waste combustion processes. The Directive not only controls emission to air but water and landfills as well, through a combination of minimum operational, technical and emissions standards.

Industrial and commercial processes meeting the requirements of the Directive do not present a significant risk to human health or the environment.



J

Appendix J - Developing a Regional Waste Management Strategy for the South West Regional Assembly: BPEO Study Executive Summary

Introduction

In January 2003 SLR Consulting and Land Use Consultants were commissioned by the South West Regional Assembly to prepare a technical report that will assist in the development of a Regional Waste Management Strategy for the South West.

The aim of the study was, firstly, to predict the likely scale of the regional problem to be managed by the year 2020. The second aim was to consider a range of options to meet the demands of its aspirational and statutory diversion, recycling and recovery targets. Thirdly, to appraise these options against an appropriate range of sustainability criteria, including those normally included in a 'Best Practicable Environmental Option' (BPEO) assessment.

Consultation was a critical part of the appraisal process. Two consultation seminars were held with key stakeholders in the region, including local authority waste managers and elected representatives, representatives of the waste management industry, and waste related community organisations. The consultation events helped to develop consensus about the baseline data, to define the objectives against which the options should be appraised, and relative 'weights' that should be attached to objectives and indicators.

Background to the Region

The following sub-regional areas, based broadly on the former counties, were used to identify current and forecasted waste arisings.

- ➔ *Former Avon Area (including Bath and North East Somerset, Bristol, North Somerset South Gloucestershire)*
- ➔ *Cornwall*
- ➔ *Devon (including Plymouth and Torbay)*
- ➔ *Dorset (including Bournemouth and Poole)*
- ➔ *Gloucestershire*
- ➔ *Somerset*
- ➔ *Wiltshire (including Swindon)*

Allocation of waste treatment and disposal infrastructure by these sub-regional groupings have been made for a range of waste management options for the year 2020, the assessment year.





Current and Projected Waste Arisings

A summary of waste arisings in 2001 and predicted arisings for 2020 is shown in Table ES1. Total controlled waste arisings, based on published data, have been estimated at 20.6 million tonnes in 2001. Inclusion of all other agricultural waste gives estimated total waste arisings in excess of 35.6 million tonnes. There is continuing debate concerning the robustness of published waste data at a regional and sub-regional level and this is an issue which the Regional Assembly might wish to consider in the future.

Assumed growth rates were applied to each of the waste streams. Based on the assumed growth rates, it is predicted that controlled waste will rise by 2.5 million tonnes to 23.1 million tonnes in 2020. Inclusion of all other agricultural waste gives estimated total waste arisings in excess of 41.2 million tonnes in 2020.

In waste management terms, it is the 23.1 million tonnes of controlled wastes that is of most significance as it is this waste stream that will require treatment and disposal provision through new and existing facilities throughout the region by the year 2020.

The key assumptions used in projecting growth rates are summarised in Table ES2. These waste growth forecasts are based on available data, professional judgement and industry experience.

Year	MSW	Commercial (inc special waste)	Industrial (inc special waste)	C&D	Agricultural (potentially controlled waste)	Total Controlled Waste	Agricultural (non-controlled waste)	Total
2001	2,536,849	2,398,473	2,942,251	12,620,000	53,113	20,550,686	15,025,881	35,576,567
2020	3,499,911	3,328,834	3,588,346	12,620,000	64,135	23,101,226	18,144,006	41,245,232

Table ES1: Summary of Current and Forecast Waste Arisings (in tonnes) in South West Region





Waste Stream	Assumption
Municipal Solid Waste (MSW)	1.9% pa compounded to 2020
Commercial (C)	1.9% pa compounded to 2020
Industrial (I)	-0.9% pa compounded to 2020
Construction and Demolition (C&D)	No growth compounded to 2020
Agricultural (potentially controlled)	-0.9% pa compounded to 2020
Agricultural (non-controlled)	-0.9% pa compounded to 2020

Table ES2: Principal Waste Growth Forecasts Adopted for the South West Region Options Assessment.

There is inherent uncertainty about the robustness of future waste projections, particularly as far ahead as the year 2020. For the purposes of this assessment, however, they were considered sufficient to enable a range of options to be assessed against each other and to allow conclusions to be made. Due to this uncertainty the report also presents a possible range for total waste arisings, of between 19.2-26.9 million tonnes. However, a medium growth scenario of 23.1 million tonnes was used for the assessment. The Regional Assembly should keep the actual rate of growth of arisings under regular review.

The Technical Report apportions these regional forecasts of waste arisings at a sub-regional level on the basis of current known (or estimated where necessary) waste arisings. Notwithstanding the robustness of this approach, Waste Planning Authorities may wish to attempt a more sophisticated type of analysis in the preparation of

their Waste Local Plans and Municipal Waste Strategies which may lead to some variations between figures presented in this report and other published reports.

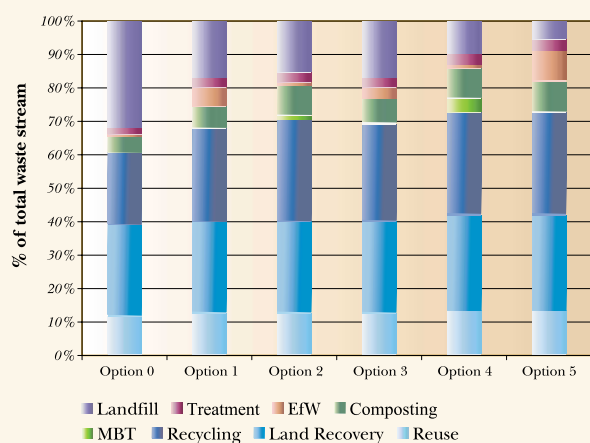
The Options

Six options were considered to represent a suitable range of different approaches at a regional level. The options take account of statutory and non-statutory targets for each principal waste stream for the year 2020, the assessment year. This approach therefore, exceeds the 'do minimum' option of meeting statutory targets only relating to Municipal Solid Waste. A range of new and existing waste management technologies have been incorporated (in varying amounts) within the six options, which are presented graphically in Figure ES1. These technologies are considered likely to represent the principal forms of waste treatment into the year 2020. Again, the Regional Assembly will need to review technological



advancement in the coming years to ensure that this assumption remains acceptable in light of what is a rapidly developing industry.

Figure ES1: Characterisation of Waste Management Options (% Diversion by Waste Treatment Type)



The options have been developed for the year 2020 and essentially fall into three broad categories including 'No Change' (Option 0), 'Meet Targets' (Options 1, 2 and 3) and 'Exceed Targets' (Options 4 and 5). A more detailed description of these options is given below.

Option 0: The 'No Change' Option. Effectively this is a continuation of the current performance levels. Although this fails to meet statutory targets, it provides a useful benchmark for considering the other options.

Option 1: 'Meet 2020 Landfill Directive targets' (integrated treatment/disposal option) by achieving roughly the 2015 'Waste Strategy 2000' levels for source segregated recycling/composting (ie, of say ~33% of MSW). The remaining diversion required to achieve the 2020 Landfill Directive target would be achieved through energy from waste. Residual waste would be sent to landfill.

Option 2: 'Meet 2020 Landfill Directive targets' (principally recycling/composting led with some Mechanical Biological Treatment [MBT] and landfill – a no MSW energy from waste option) by achieving the 2015 'Waste Strategy 2000' recovery levels through source segregation of recycling/composting alone (ie of 67% of MSW). The remaining diversion required to achieve the 2020 Landfill Directive target would be achieved through Mechanical Biological Treatment (MBT). Residual waste would be sent to landfill.

Option 3: 'Meet 2020 Landfill Directive targets' (intermediate option between options 1 and 2) through intermediate levels of source segregated recycling and composting (of say 50% of MSW), together with some energy from waste. Residual waste would be sent to landfill. This option is essentially somewhere between options 1 and 2.



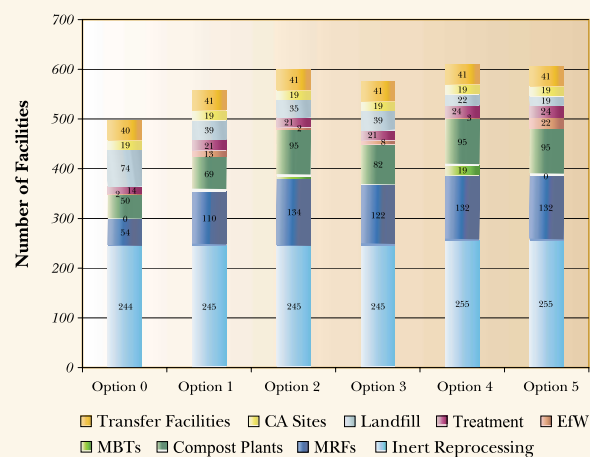
Option 4: 'Exceeding 2020 Landfill Directive targets' (principally recycling/composting and MBT led) by achieving the recently proposed 2015 target (Waste Not Want Not. A strategy for tackling the waste problem in England – Strategy Unit Report December 2002) levels of source segregated recycling and composting (ie say ~45% of MSW). A further analysis of treatment of residual waste (options 4a, 4b, 4c) indicating that the 2020 Landfill Directive targets would be achieved and in fact exceeded. The difference between Options 4a, 4b and 4c are the relative proportions of waste being composted (highest in 4a), landfilled (highest in 4b) and treated through energy from waste (highest in 4c).

Option 5: 'Exceeding 2020 Landfill Directive targets' (principally recycling/composting and energy from waste option) by achieving the recently proposed 2015 target levels of source segregated recycling and composting (ie say ~45% of MSW). All remaining residual waste would be sent to energy from waste and therefore the 2020 Landfill Directive targets would be achieved and in fact exceeded.

Option Characterisation

To simplify the assessment, the forecasted waste arisings for the year 2020 were divided into two principal categories: inert and non-inert wastes. This describes better the broad nature of the waste to be managed, rather than the source of the waste. An assessment of infrastructure requirements for each sub-region was then made, based on assumptions about the size of facilities. These requirements are intended to illustrate a scale of magnitude of infrastructure requirements associated with each of the six options to be assessed. A summary of the facility requirements for all options is presented in Figure ES2. However, it is recognised that local authorities may wish to undertake a more sophisticated analysis in the preparation of their Waste Local Plans and Municipal Waste Strategies to ensure a local rather than regional perspective is achieved.

Figure ES2: Characterisation of Waste Management Options (Total Number of Facility Types)



Primary Screening - Option Appraisal Process

A three stage screening process (primary, secondary and tertiary) was undertaken, as outlined below.

The primary screening assessed all options and identified:

- ➔ *The performance of the options against environmental, socio-economic and operational the indicators*
- ➔ *The 'valued performance' of the options, whereby performance is represented on a common scale (of 0 to 1) to facilitate understanding*
- ➔ *The 'valued and weighted performance' of options. The weights derived from the stakeholders were applied to the valued performance to generate the 'valued and weighted performance'*

The three highest scoring options from the primary screening were Options 5, 1 and 4[c], in descending order. Options 5 and 4[c] exceed the 2020 Landfill Directive targets, whereas Option 1 meets the 2020 Landfill Directive targets. Option 5 exceeds the targets principally through intermediate levels of recycling/composting and some MSW energy from waste treatment. Option 1 meets, but does not exceed, the targets through an integrated treatment and disposal, including lower recycling/composting levels and some energy from waste treatment. Option 4 exceeds the targets principally through intermediate levels of recycling/composting and some Mechanical Biological Treatment (including an element of energy from waste of residual MSW).

Secondary Screening - Option Appraisal Process

The secondary screening evaluated the three highest scoring waste management options (ie, Options 5, 1 and 4[c] - identified through the primary screening) by considering facility size. For example, a larger MRF was modelled with a capacity of 25Ktpa and a smaller MRF with a capacity of 5Ktpa). A range of different assumptions about the key characteristics of 'larger' or 'smaller' facilities were made and used in the

secondary screening assessment process. The primary screening assumed 'larger' facility sizes, which gives rise to a requirement for a relatively small number of facilities. The secondary screening, on the other hand, assumes 'smaller' facility sizes, which gives rise to a requirement for a relatively large number of facilities. Table ES3 summarises the variation in facility numbers for all forecasted waste arisings for Options 5, 1 and 4[c] when larger and smaller facility sizes are considered.

Option	Larger facilities	Smaller facilities
Option 1	555	2,777
Option 4	610	3,217
Option 5	600	3,165

Table ES3: Estimated Total (Existing and New) Infrastructure Requirements for Options 1, 4[c], and 5

The overall conclusion of the secondary screening was that the larger facilities options tend to score higher than the corresponding smaller facilities options. There are two principal reasons for this. First, the 'performance ratings' of smaller facilities, based on generic data and professional judgement, are not proportionately lower than for larger facilities. For example, the assumed landtake for a 25,000 tonne MRF is 0.8ha, while the landtake for a 5,000 tonne MRF is 0.4.

Second, performance against many of the indicators is strongly influenced by the overall number of facilities, as it is assumed that, however well-managed, there is an overall risk of each particular impact (eg noise, dust, water pollution) associated with each individual facility. Consequently, the strongest performing options involve fewer, larger facilities.

The robustness of Option 5 (larger facilities) as the highest scoring option is demonstrated by the fact that it performs well when considered against the weightings of each of the stakeholder groups, as well as the aggregated weightings for all stakeholders.

The inference to be drawn from this secondary screening assessment is that the scores are likely to improve further if a smaller number of even larger facilities were developed across the region, which may be a consideration for local authorities when developing their Waste Local Plans and Municipal Waste Strategies. The limit on facility size must however include consideration of the waste hierarchy, the proximity principal, sub-regional partnership arrangements as well other site-specific considerations. Whatever the number of facilities finally adopted the tonnage allocations for each option remain constant and provide a sound basis for waste management planning purposes.



Proponents of community level waste management initiatives often advocate this 'large number of smaller facilities' approach. Whilst the results summarised overleaf indicate a preference for larger facilities, it is clear from examples within the region that the role of smaller facilities can and do ensure effective waste management, not least due to the educational benefits of community schemes. Therefore, smaller facilities will continue to have an important role in future waste management options within the region. This analysis reveals that whatever option is considered the total number of facilities required is likely to be significant. It should however be noted that the facility sizes used in this report are merely indicative and serve to characterise the options as part of the assessment process.

Tertiary Screening – Option Appraisal Process

The tertiary screening provided further refinement by applying two additional levels of assessment to the highest scoring option from the secondary screening process (ie, Option 5). This analysis, however, is equally valid for the 'cluster' of high scoring options (Options 5, 4 or 1) and includes:

- ➔ **The allocation of waste management capacity/facilities according to urban clusters across the region.** *This spatial distribution exercise was applied to the highest scoring option identified at the secondary screening stage (ie, Option 5 larger facilities). It assessed the relative performance of Option 5 from the secondary screening stage, but assumed facilities were located according to the variation in population distribution rather than an equal spacing within each sub-region as per the primary and secondary screening*
- ➔ **Application of the agreed waste minimisation model.** *The core objective in undertaking this exercise is to reflect the potential reduction in waste arisings and the impact this may have on infrastructure/capacity requirements within the region. This exercise provides a quantification of the benefits of a successful waste minimisation campaign*



Tertiary Screening - Urban Cluster Assessment

The overall conclusion of the 'urban cluster' assessment was that it scored higher than the 'even distribution' assessment undertaken at the secondary screening stage. This would indicate that a spatial distribution of facilities in close proximity to the urban clusters achieves a higher sustainability score than if facilities were to be evenly distributed throughout the region.

The urban cluster model undertaken for Option 5 showed that the largest facilities allocations are associated with (in descending order) Bristol, Plymouth, Bournemouth, Swindon and Poole. It should be noted that although a pro-rata allocation of the larger infrastructure requirements for Option 5 according to urban clusters was made, a similar exercise would equally apply to other high scoring options (ie, Options 1 and 4[c]). Clearly, there are a number of implications of a spatial distribution pattern of this type and strongly suggests that, at a local level, joint working between the sub-regions will be required in these key geographic areas.

Tertiary Screening - Waste Minimisation Model

On the basis of current practice and likely future performance, it was concluded that waste minimisation initiatives could have the following impacts on waste management in 2020:

- *An 11% reduction in the combined municipal/non-inert C and I/agricultural waste arisings*
- *A 6% reduction in inert C and I/C and D arisings*

A full sustainability assessment of this option was not undertaken because the implications are clear, namely:

- *Implementation of a successful waste minimisation campaign across the region has the potential to reduce significantly total waste arisings for 2020*
- *The infrastructure requirement is much reduced (dropping by approximately 11% in terms of total numbers of facilities required)*





Clearly there are benefits of implementing an effective waste minimisation campaign across the region. There are a number of successful waste minimisation schemes described within this report, both within and outwith the region. The Regional Strategy will, however, need to address how an effective waste minimisation campaign can be successfully implemented across such a diverse region and at what cost.





Overall Conclusions

This technical report is not a Regional Waste Strategy but provides technical guidance on the key issues that a Regional Strategy will need to consider.

A regional perspective was applied to the assessment undertaken, although allocations at the sub-regional levels were made to illustrate a scale of magnitude rather than any absolute facilities requirement at a local level. Notwithstanding the robustness of this approach, local authorities may wish to undertake a more sophisticated analysis, guided by the Regional Waste Strategy, in the preparation of their Waste Local Plans and Municipal Waste Strategies.

A forecast of predicted waste arisings for 2020 (with the inherent uncertainties and assumptions) suggests that, at the regional level, controlled and agricultural waste arisings will grow to 41 million tonnes in 2020. In order to provide a sense of scale, these forecasts are distributed at a sub-regional level.

The overall conclusion of the technical assessment is that, at a regional level, Option 5 is the highest scoring option. This exceeds targets for the year 2020. It may however be more productive to consider a 'cluster' of high scoring options, Options 5, 1 and 4 as best performing. All of these options contain an energy from waste component.

The secondary screening suggests that, at the regional level, a 'smaller number of larger facilities' performs better than a 'larger number of smaller facilities'. This conclusion should be seen in light of meeting the waste management needs for the region as a whole in the year 2020, and that there will continue to be a role for smaller scale facilities where efficiency and effectiveness can be clearly demonstrated (as is already the case for many initiatives within the region).

The tertiary screening suggests that it would be preferable to concentrate waste management facilities in proximity to the region's urban clusters. This conclusion has particular implications for joint working across the sub-regions.

The tertiary screening exercise also demonstrates the benefits of implementing an effective waste minimisation campaign across the region. The benefits of reduced waste arisings would serve to reduce the infrastructure requirements and therefore would assist in the delivery of whatever strategy is developed for the region.

***SLR Consulting Ltd and Land Use
Consultants 9th June 2003***







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