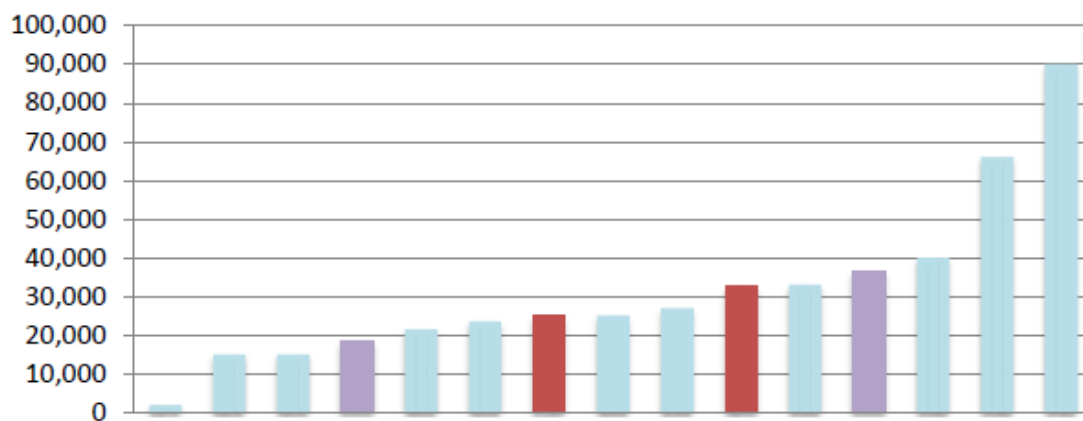


# **WORCESTERSHIRE WASTE CORE STRATEGY BACKGROUND DOCUMENT:**

## **ARISINGS AND CAPACITY**

### **PUBLICATION (REGULATION 27) CONSULTATION**



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Last updated 16th June 2011

This is a revised version of the document produced for the Waste Core Strategy  
Publication Document (Regulation 27) consultation.

It has been revised to make the content clearer but does not change any of the  
data or outcomes of the original document.

The Council is preparing a *Waste Core Strategy*: a plan for how to manage all the waste produced in Worcestershire up to 2027. To help provide a robust evidence base for the Waste Core Strategy the Council has prepared a series of background documents. These outline current thinking and have informed the approach taken in the development of the Waste Core Strategy.

We welcome any comments you would like to make on any of the background documents during the *Publication Document (Regulation 27) Consultation*. The consultation will run from **22<sup>nd</sup> March – 4<sup>th</sup> May 2011**.

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For planning advice and support service see <http://www.rtpi.org.uk/planningaid>.

# Executive Summary

One of the objectives of the Waste Core Strategy (WCS) is to achieve equivalent self-sufficiency in waste management. This means delivering waste management capacity that is equal to waste arisings in the County.

In order to ascertain whether equivalent self-sufficiency is being achieved, and to calculate requirements where it is not, we must have an understanding of the current situation and be able to make projections for the future. This relies on having robust data. This background document sets out the data and assumptions that have been used to inform the WCS.

The calculations of capacity gap and land requirements have been undertaken as the basis for what the Waste Core Strategy will need to address, and are not intended to prevent facilities being developed.

## Waste arisings and waste growth

**Summary table of projected waste arisings**

	2010/1	2015/6	2020/1	2025/6	2030/31	2035/36
C&I (including agricultural waste) arisings projection	601,790.4	644,038.8	692,072.6	746,684	808,773.9	879,366.2
Hazardous (including clinical and radioactive) waste arisings projection	73,571.90	73,621.00	73,670.10	73,719.20	73,768.30	73,807.60
C&D arisings projection	510,555	419,520	419,520	419,520	419,520	419,520
MSW arisings projection (Herefordshire and Worcestershire)	395,993	405,139	421,817	438,496	455,175	471,854

## The capacity gap

The capacity gap figures have been rounded at this stage to the nearest 500 tonnes or cubic metres and land requirements to 0.5 hectares to avoid 'spurious accuracy'.

**Summary table of capacity gap**

		2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
capacity gap	C&I (inc Agricultural waste)	58,000	81,000	107,500	137,500	172,000	210,500

	C&D	127,500	105,000	105,000	105,000	105,000	105,000
	MSW	186,000	195,000	229,000	238,500	259,500	267,000
	Hazardous (inc Clinical and radioactive)	40,000	40,500	40,500	40,500	40,500	40,500
	<b>Total re-use and recycling capacity gap</b>	<b>411,500</b>	<b>421,500</b>	<b>482,000</b>	<b>521,500</b>	<b>577,000</b>	<b>623,000</b>
'Other recovery' capacity gap (tonnes per annum)	C&I (inc Agricultural waste)	120,500	129,000	138,500	149,500	162,000	176,000
	MSW	113,500	118,000	123,000	127,500	132,000	136,000
	Hazardous (inc Clinical and radioactive)	6,500	6,500	6,500	6,500	6,500	6,500
	<b>Total 'other recovery' capacity gap</b>	<b>240,500</b>	<b>253,500</b>	<b>268,000</b>	<b>283,500</b>	<b>300,500</b>	<b>318,500</b>
Sorting and transfer capacity gap (tonnes per annum)	C&I (inc Agricultural waste) and C&D	0	0	0	0	0	0
	MSW	0	0	0	0	0	0
	Hazardous (inc Clinical and radioactive)	0	0	0	0	0	0
	<b>Total sorting and transfer capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Disposal and landfill capacity gap (cubic metres)	C&I (inc Agricultural waste) and C&D	0	0	0	0	290,500	1,776,000
	MSW	0	0	0	0	0	0
	Hazardous (inc Clinical and radioactive)	0	0	0	0	423,000	1,209,500
	<b>Total disposal and landfill capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>713,500</b>	<b>2,985,500</b>

**Summary table of land requirements**

Land requirements (hectares)	Re-use and recycling	18 ha	18 ha	20 ha	22 ha	24 ha	26 ha
	'Other recovery'	8 ha	8 ha	9 ha	9 ha	9.5 ha	10 ha
	Sorting and transfer	0	0	0	0	0	0
	<b>Total land requirements</b>	<b>25.5 ha</b>	<b>26 ha</b>	<b>29 ha</b>	<b>31 ha</b>	<b>34 ha</b>	<b>36 ha</b>

## Waste Water

New, expanded and/or upgraded waste water treatment infrastructure will be required to serve future housing growth. In particular Bromsgrove District is in need of new or expanded sites.

**Overview of Sewage Treatment Works Capacity**

Utility: Waste Water		
Worcestershire	District Councils	Potential Level of Constraint
	Bromsgrove	Extremely High
	Malvern Hills	Low
	Redditch	Medium
	Worcester	Medium
	Wychavon	Medium
	Wyre Forest	Low

Source: MacDonald, M. (2007) *West Midlands Regional Spatial Strategy Infrastructure Review Report, Final Draft*. West Midlands Regional Assembly, Birmingham

No specific capacity gap or land requirement has been identified for waste water treatment. Notional locations for new waste water treatment infrastructure will be identified by the District, City and Borough Councils in their Core Strategies as part of the infrastructure needed for new development. Policies in the Waste Core Strategy will be used to determine applications for planning permission for waste water treatment infrastructure.

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# Section 1. Introduction

- 1.1. One of the objectives of the Waste Core Strategy (WCS) is to achieve equivalent self-sufficiency in waste management. This means delivering waste management capacity that is equal to waste arisings in the County.
- 1.2. In order to ascertain whether equivalent self-sufficiency is being achieved, and to calculate requirements where it is not, we must have an understanding of the current situation and be able to make projections for the future. This relies on having robust data. This background document sets out the data and assumptions that have been used to inform the WCS.
- 1.3. In order to address Worcestershire's waste needs this document is split into the following sections:
  - Introduction to the issues and the scope of this document (section 1-2)
  - Waste arisings and waste growth (section 3): setting out the levels of waste currently produced in Worcestershire and making projections of how this is likely to change in the future;
  - The capacity gap (section 4-7): setting out the county's current waste management capacity and assessing whether it is adequate to deal with the projected levels of waste in the County. This section then sets out what new capacity is likely to be required in terms of 're-use and recycling', 'recovery', 'sorting and transfer'<sup>1</sup> and 'disposal and landfill'; and
  - Land requirement (section 8): how much land will be needed to provide the necessary waste management capacity, as well as estimating the number of facilities which might be required.
- 1.4. Within each part of the document the following waste streams are addressed in turn:
  - Commercial and Industrial waste (C&I), including agricultural waste;
  - Hazardous waste, including clinical and radioactive waste;
  - Construction, Demolition and Excavation waste (C&D);
  - Municipal Solid Waste (MSW).
- 1.5. Although we have considered these as separate waste streams, we acknowledge that in reality waste does not always fall neatly into these categories and some facilities manage or treat, for example, both C&I waste and MSW.

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<sup>1</sup> The policies in the Waste Core Strategy include sorting and transfer facilities under the heading of re-use and recycling as they perform the function of enabling re-use and recycling to take place and have similar locational requirements and impacts. However, for the purpose of calculating the capacity gap in this document it is necessary to consider sorting and transfer separately.

- 1.6. Waste water is managed in a different way from the other waste streams and is therefore considered separately.
- 1.7. The calculations of capacity gap and land requirements have been undertaken as the basis for what the Waste Core Strategy will need to address, but are not intended to prevent facilities being developed.

## Imports and Exports of Waste

- 1.8. The Waste Core Strategy will be based in the concept of *equivalent self-sufficiency*<sup>2</sup> and will seek to enable capacity to be developed to manage the equivalent of all waste arisings in Worcestershire; however we must also consider imports and exports of waste for the county.
- 1.9. The economy takes little account of geographical or local government boundaries; goods and services move freely into, out of and within the county according to supply and demand. Waste materials are the same. The supply of and demand for materials, the need for specialist facilities for some waste streams and commercial pressures and opportunities mean that significant volumes of waste flow in and out of the County. However, data on these movements is limited. The only reliable source appears to be the Environment Agency Waste Data Interrogator (WDI) but it has serious limitations, in particular:
  - that very large volumes of waste are recorded as "not codeable" and are not identified further, and
  - that very large volumes of waste are shown as "Worcestershire". It is not clear if these are genuine imports and exports or movements of materials within the county or include both.
- 1.10. Table 1 shows these movements by region. It should be noted that the West Midlands figures include those wastes arising from within Worcestershire. Table 2 shows movements within the West Midlands.

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<sup>2</sup> "Equivalent self-sufficiency" Equivalent self-sufficiency means Worcestershire's capacity to treat waste that arises in the County; however cross-boundary movements are inevitable as specialised facilities exist, often benefiting from economies of scale. As such, some facilities perform a regional or even national function and the concept of equivalent self-sufficiency allows imports and exports of waste to be taken into account. Some cross boundary movements of waste will occur due to the waste management industry being market driven.

**Table 1: Imports into and Exports from Worcestershire by Region (tonnes) (WDI 2008)**

	<b>Imports into Worcestershire</b>	<b>Exports from Worcestershire</b>	<b>Net movement of waste to Worcestershire</b>
<b>East Midlands</b>	281.32	876.48	- 595.16
<b>East of England</b>	3,850.14	8,211.85	- 4,361.71
<b>London</b>	150.22	4.70	+ 145.52
<b>North East</b>	0.20	7.74	- 7.54
<b>North West</b>	308.65	2,561.94	- 2,253.29
<b>Northern Ireland</b>	-	16.91	- 16.91
<b>Scotland</b>	3.00	-	+ 3.00
<b>South East</b>	337.64	11,475.17	- 11,137.53
<b>South West</b>	63,259.22	20,912.98	+ 42,346.24
<b>Wales</b>	575.78	215.34	+ 360.44
<b>West Midlands</b>	543,645.30	257,845.30	+ 285,800.00
<i>Of which Worcestershire</i>	<i>(527,240.10)</i>	<i>(193,205.00)</i>	<i>(+ 334,035.10)</i>
<b>Yorks and Humber</b>	71.69	20,223.00	- 20,151.31
<b>Not Codeable</b>	365,568.30	159,735.50	+ 205,832.80
<b>Total</b>	<b>978,051.46</b>	<b>482,086.91</b>	<b>+ 495,964.55</b>

**Table 2: Imports and Exports of waste into and out of Worcestershire by WPA in the West Midlands (tonnes) (WDI 2008)**

	<b>Imports into Worcestershire</b>	<b>Exports from Worcestershire</b>	<b>Net movement of waste to Worcestershire</b>
<b>Birmingham</b>	913.88	6,084.66	- 5,170.78
<b>Coventry</b>	1,122.76	0.12	+ 1,122.64
<b>Dudley</b>	402.36	10.86	+ 391.50
<b>Herefordshire</b>	1,017.75	15,394.5	- 14,376.75
<b>Sandwell</b>	477.28	-	+ 477.28
<b>Shropshire</b>	386.26	-	+386.26
<b>Solihull</b>	0.25	-	+ 0.25
<b>Staffordshire</b>	63.53	652.88	- 589.35
<b>Stoke on Trent</b>	24.12	-	+ 24.12
<b>Telford and Wrekin</b>	26.37		+ 26.37
<b>Walsall</b>	10	634.37	- 624.37
<b>Warwickshire</b>	335.27	21,519.45	- 21,184.18
<b>Wolverhampton</b>	4.05	8,777.73	-8,773.68
<b>Worcestershire</b>	527,240.1	193,205	+ 334,035.10
<b>Total</b>	<b>532,023.98</b>	<b>246,279.57</b>	<b>+ 285,744.41</b>

Note: This total differs from that for the West Midlands in Table 1 as some data is only recorded at a regional level.

- 1.11. These figures suggest that a net total of 495,964.55 tonnes of waste was imported into Worcestershire in 2008. We do not believe that this is completely accurate but it is the best data available.

- 1.12. The issue is complicated by the fact that the Waste Data Interrogator does not clearly identify whether any of this waste is MSW. We know that 92,371t of MSW is produced in Herefordshire (2008/9, see **Table 32: Defra's Waste Data** Flow Municipal Waste Statistics) and that most of this is treated or disposed of in Worcestershire through the Integrated Waste Management Contract<sup>3</sup>. Table 2 shows 1,017.75 tonnes shown as being imported from Herefordshire, therefore the MSW material is clearly not included in these figures.
- 1.13. The ambiguities highlight the fact that, at present, imports and exports of all kinds of waste into and out of Worcestershire are difficult to identify in detail.
- 1.14. Nonetheless, the WDI is the best source of information we currently have available. We believe that the Waste Core Strategy needs to recognise that there are significant volumes of both imports and exports of waste into and out of Worcestershire and until these are clarified the best way of dealing with it will be to ensure that there is sufficient waste transfer capacity to make such movements possible.
- 1.15. There is no evidence on how imports and exports of waste into and out of the county should be projected. The ratio between imports and exports is also important as a change in the ratio could mean the capacity gap rises or falls accordingly. Given the poor quality of the data, any projections would be problematic. The Strategy will therefore assume that the ratio of imports and exports will remain static. This will be monitored during the life of the strategy and any significant variations will be assessed to determine whether a revision to the Strategy is necessary. Calculations for MSW are based on arisings of MSW in Herefordshire and Worcestershire.

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<sup>3</sup> Herefordshire and Worcestershire manage their municipal waste jointly, via the Joint Municipal Waste Management Strategy (JMWMS) and the associated Integrated Waste Management Contract. For further information see <http://www.worcestershire.gov.uk/cms/community-and-living/waste-management/waste-strategy.aspx>

## Section 2. Waste water treatment

- 2.1. Waste water arises from both domestic and industrial sources and includes domestic waste water from baths, sinks, toilets, washing machines and rainwater run-off from roads, roofs and gardens and industrial effluents. It is managed in a different way from the other waste streams<sup>4</sup> and therefore is considered separately in this document.
- 2.2. Waste water is mainly transported via underground pipes or sewers, although some waste water will be transported by tanker where access to sewers is unavailable or not permitted. Waste water collected by the sewers usually flows by gravity to treatment plants, "sewage treatment works", or is relayed by pumping stations which exist to lift flows or assist flows where flow by gravity is not possible. This is usually between one piped system and another.
- 2.3. Waste water treatment uses mechanical, biological or chemical methods of treatment to ensure the water effluent is safe to be discharged back into the environment. There are two main ways to deal with waste water; either by the conventional treatment methods such as sewage treatment works or a low energy alternative method such as Wetland Ecosystem Treatment (WET) Systems<sup>5</sup>.
- 2.4. There are three alternative approaches for making provision for extended or new sewage treatment facilities:
- **Identifying specific sites.** Locations for sites could be set out in the Waste Core Strategy for Worcestershire. However, with the exception of Wyre Forest, the District, City and Borough Councils have not yet adopted their Core Strategies and Site Specific Allocation Development Plan Documents (setting out the preferred locations of new development). It is not appropriate, or possible, to designate land for sewage treatment facilities or upgrade sewage treatment works until these strategies are adopted and areas for future growth are known.
  - **Identifying broad locations for sites.** Broad locations for sites could be set out, but this faces the same limitations as identifying specific sites.
  - **Criteria based approach.** A criteria based approach would be to produce a broad set of topic related policies (for example, policies

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<sup>4</sup> See background document "*Waste water treatment infrastructure*" for more information on this waste stream.

<sup>5</sup> WET Systems are constructed wetland systems which function by harnessing the innate ability of natural wetland ecosystems to absorb and transform the organic nutrients found in wastewater, converting these into plant biomass and soil. A WET System is made up of a series of swales - specially designed and constructed earth banks and ponds.



related to landscape or transport issues) against which proposals would be judged. This approach has been taken forward in developing the Waste Core Strategy.

## Capacity Gap

2.5. **Table 3** illustrates the potential level of constraint of waste water treatment works not having sufficient capacity to meet the needs of new development if it were to occur, by district (on a scale of very low, low, medium, high, very high, extremely high). It is clear that development of new, expanded and/or upgraded waste water treatment infrastructure will be required in the future to serve future housing growth. In particular Bromsgrove District is in need of new or expanded sites.

**Table 3: Overview of Sewage Treatment Works Capacity**

Utility: Waste Water		
Worcestershire	District Councils	Potential Level of Constraint
	Bromsgrove	Extremely High
	Malvern Hills	Low
	Redditch	Medium
	Worcester	Medium
	Wychavon	Medium
	Wyre Forest	Low

Source: MacDonald, M. (2007) *West Midlands Regional Spatial Strategy Infrastructure Review Report, Final Draft*. West Midlands Regional Assembly, Birmingham

2.6. To ensure the impacts of new development on waste water treatment infrastructure are minimised, there must be a close liaison between water companies and the County and City, Borough and District Councils to fully understand where there is likely to be a future demand for new waste water treatment infrastructure. This close liaison would also allow for the various site options and locations to be considered as early as possible in the planning process. This should ensure that there are fewer issues arising at a late stage in the planning process. Furthermore, the adoption of water efficiency measures, such as grey-water harvesting and low energy alternative methods of treatment, such as SUDS, should be an integral part of development to lessen the impact of new development on sewage treatment works.

2.7. Due to the difficulty of identifying appropriate locations for waste water treatment in advance of the county's Core Strategies being adopted, no specific capacity gap and land requirement has been identified for waste water treatment. Instead, we consider that:

- The County Council will identify the principles that broadly direct what kind of waste water treatment facilities would be needed to enable new development to be realised;
- Notional locations for new waste water treatment infrastructure will be identified by the District, City and Borough Councils (Bromsgrove, Malvern, Redditch, Worcester City, Wychavon and Wyre Forest) in

their Core Strategies as part of the infrastructure needed for new development;

- The policies in the Waste Core Strategy will be used to determine applications for planning permission for waste water treatment infrastructure; and
- All applications for waste water treatment related development will be determined by the County Council in accordance with the policies set out in the development plan.

## Section 3. Waste arisings and projections

- 3.1. This section sets out the methodology we have adopted to calculate waste arisings and makes projections for waste growth<sup>6</sup> now, up to 2027, and beyond.
- 3.2. There are no set approaches for making estimates about waste arisings or projecting waste growth and several alternative approaches have been considered. This section details all methodologies considered, setting out the strengths and weaknesses of each approach and reasons for selecting our preferred method.

### ***Definitions of capacity***

- 3.3. Data collection for waste management planning is fraught with difficulties. However, government advice in PPS 10 is that "spurious precision should be avoided".
- 3.4. Defining waste management capacity is not easy but following a direct question in the *Refreshed Issues and Options* consultation in September 2008 we consider that the waste management capacity in Worcestershire can be defined in the following two ways:
- **Actual capacity:** This is the throughput of operational facilities with both valid planning permissions and waste management licences, permits or exemptions and refers to the actual quantity of waste which the facility manages.
  - **Notional capacity:** This is the potential throughput which could be achieved if operations were to work to the maximum levels permitted in their planning permission or waste management licence or permit or exemption.
- 3.5. There may well be significant differences between the two. AWM's report "*Waste Treatment Facilities and Capacity Survey*" (Final Report May 2007, AWM SLR) estimates that the facilities they surveyed were working at 59% of their licence maximum. It was thought that "this reduced throughput recorded may reflect optimum operating capacities to account for facility down time, changing demand and other operational issues that prevent operators working to their maximum licence capacities." However, the report also considered that if the demand were there many facilities could process significantly more material (notionally 41% more) than is currently the case.

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<sup>6</sup> The term growth is used to cover all aspects of change in the volume of waste.

# Commercial and Industrial Waste

- 3.6. Commercial and industrial (C&I) waste is the waste produced by businesses and industry, excluding the relatively small proportion of such waste which is collected by local authorities and classed as municipal waste.
- 3.7. C&I waste ranges from packaging wastes such as paper and card, through discarded food from catering or food processing, chemical, mineral and other wastes which are produced as residues from manufacturing, to plant and machinery which has reached the end of its working life and becomes scrap. In general terms, the following classifications are applied:
- Commercial waste: waste arising from wholesalers, catering establishments, retail premises and offices;
  - Industrial waste: waste arising from factories and industrial plants.<sup>7</sup>
- 3.8. Data relating to C&I waste falls into two categories:
- **Waste Arisings:** the waste generated within the county, in essence what we need to manage; and
  - **Waste Managed:** the waste that is currently being managed or disposed of within the County.
- 3.9. Comparisons between the two kinds of figures are useful in revealing what is happening (as waste managed) and what needs to be addressed (as waste arisings).
- 3.10. The Environment Agency (EA) has a duty to assess what C&I waste is produced and collects data from operators' estimates of the waste they manage at their sites. The EA is working with Defra to improve data collection but limitations of existing data are acknowledged. The West Midlands Regional Technical Advisory Body for Waste (WMRTAB) has supplemented this information with research of its own.

## ***C&I waste arisings: alternative methods of estimation***

- 3.11. We have considered several methods for estimating arisings of C&I waste:

### The Environment Agency Strategic Waste Management Assessment (SWMA)

- 3.12. Annex A to the Waste Strategy for England 2007<sup>8</sup> states "The Environment Agency's 2002/3 Commercial and Industrial waste survey

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<sup>7</sup> West Midlands Waste Treatment Facilities Capacity Study "Phase 2: Future Capacity Requirements" (AWM/SLR/18/11/2004 p19)

provides the most comprehensive and current evidence on the sources, quantities and fates of CI&H [commercial, industrial and household] wastes in England."

- 3.13. Strategic Waste Management Assessments ("SWMA") of waste arisings were derived from a (10%) sample survey of businesses undertaken by the EA in:

- 1998
- 2003 and
- 2006 (smaller sample surveyed)

They are regarded as having a precision of +/-1-5% at a 90% confidence level. Users are advised to treat them as the best estimate from a range and should not read too much into small differences between sectors or previous surveys.

- 3.14. The Waste Strategy for England 2007 regards the EA SWMA for 2002/3 as the most reliable source of data on waste arisings. The figure for Worcestershire's C&I waste for that year is 755,000 tonnes.

- 3.15. After the Council commenced work on the Waste Core Strategy the Environment Agency deleted all copies of the SWMA 2002/3 from their website, "as a cost saving exercise". No paper copies have been retained. Two requests for assistance to the EA's national customer contact centre and requests by the Council to the West Midlands Regional Office in Solihull and from the WMRTAB members, including GOWM and DEFRA, failed to unearth copies.

- 3.16. The only source for the figure for Worcestershire's waste arisings which has survived is in the WMRSS Phase 2 revision, table 6. That table was developed by Shropshire County Council as the lead authority and was endorsed by the WMRTAB on several occasions as the Waste chapter of the Phase 2 revision of the RSS was developed. However, the data is now almost a decade old and significant changes have occurred in that time.

- 3.17. Two authoritative sources of data have been produced since this study:

- the "ADAS" study (referred to below) and
- the DEFRA "Commercial and Industrial Waste Survey" 2010.

Both report significantly lower levels of C&I arisings (for Worcestershire in the ADAS study and nationally and regionally for the DEFRA study). The Environment Agency WDI for 2007, 2008 and 2009 all also report much lower levels of arisings. Viewed in this light, we believe that we can no longer assume the SWMA for 2002/3 estimate is a reliable or accurate assessment of current arisings.

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<sup>8</sup> Paragraph 34, page 40 of Annex A to the Waste Strategy for England 2007, available at <http://www.defra.gov.uk/environment/waste/strategy/strategy07/documents/waste07-annex-a.pdf>

## Study into Commercial and Industrial Waste Arisings, ADAS April 2009 ("the ADAS Study")

- 3.18. The findings of the SWMA have been supplemented by a *Study into Commercial and Industrial Waste Arisings* ("the ADAS Study"), which made assessments of waste produced per employee, by size bands of organisational size, by Standard Industrial Classification (SIC) based on 2006 survey data.

The study forecast changes in waste arisings up to 2020 using models developed by Oxford Economics for Greater Manchester and East of England region and applied these to individual regions. This was based on a survey of 981 companies in the North West region in 2006, extrapolated to other English regions. It makes the assumption that companies that are in the same sectors and in the same employee size band produce similar quantities and types of waste. It produces estimates of C&I waste arisings on the basis of the number of companies in each standard industrial classification (SIC) sector for each Region:

- by sector and company size
- Material type by sector

- 3.19. Of note here is the different estimates such a method provides as compared to the usual simplistic growth scenarios that show waste arisings growth of, say, 1%, 2% and so on. The method utilised here accounts for specific sector growth, whereby those sectors with high rates of waste production per employee are in relative decline as compared to those with lower rates. Thus, whilst overall employment is increasing, this will not necessarily mean increases in waste arisings.

- 3.20. On behalf of the WMRTAB, this study was further broken down to provide estimates for each of the authorities in the West Midlands. This estimates Worcestershire's C&I waste for 2006/7 as 568,199 tonnes. These are further broken down by industrial sector (SIC) and type of waste (SOC) in Table 4.

**Table 4: Waste production by Substance Oriented Classification (SOC) tonnes (Worcestershire 2006/7)**

SIC Sector	SOC									Total
	Animal & Vegetable waste	Chemical wastes	Common sludges	Discarded equipment	Health Care	Metallic wastes	Mineral wastes	Mixed (ordinary) wastes	Non-metallic wastes	
Food, drink & tobacco	14,700	1,559	2,659	3	1	545	177	5,431	4,040	<b>29,116</b>
Textiles/wood/paper/publishing	25	968	1,158	8	0	1,755	79	15,527	29,243	<b>48,763</b>
Power & Utilities	0	4,074	104	12	0	113	903	342	69	<b>5,618</b>
Chemical/non-metallic minerals	55	45,820	244	34	11	1,263	11,384	8,529	5,484	<b>72,825</b>
Metal manufacturing	0	12,887	170	413	1	21,456	19,310	5,557	2,428	<b>62,223</b>
Machinery &	636	6,393	131	1,166	1	8,230	82	13,479	14,879	<b>44,998</b>

equipment (other manufacturing)										
Retail & wholesale	16,293	3,819	16	2,375	45	6,493	80	48,369	49,797	<b>127,287</b>
Other services	1,671	13,916	3,346	455	87	1,926	239	79,990	25,895	<b>127,525</b>
Public sector	3,438	21	0	709	6,856	42	1	27,585	11,194	<b>49,845</b>
<b>Total</b>	<b>36,818</b>	<b>89,457</b>	<b>7,828</b>	<b>5,175</b>	<b>7,002</b>	<b>41,824</b>	<b>32,255</b>	<b>204,809</b>	<b>143,030</b>	<b>568,199</b>

Source: WMRTAB analysis of *Study into Commercial and Industrial Waste Arisings* ADAS April 2009 by region and sub region. 20th April 2009

3.21. A weakness in these figures is that they extrapolate employee growth rates from the North West region across every other region and it is not clear if this is reliable. However they are more detailed than other estimates in terms of the types of waste produced and also geographical distribution.

3.22. Because of the way they are calculated, they can be used to give an indication of the pattern of arisings broken down into small units, including Lower Super Output Areas (LSOA)<sup>9</sup>. To that extent they are more useful than other sources of data. We have no other comparable source of the spatial distribution of waste arisings and we intend therefore to use this data to identify the patterns of C&I waste arisings in the county.

3.23. Defra recently published *its 'Survey of Commercial and Industrial Waste Arisings 2010'*<sup>10</sup> which was based on the same methodology using 2009 data and produces data at national and regional levels which are comparable with the ADAS study. This is being used to inform the review of national waste strategy. It can therefore be assumed that at a national level this methodology is considered with some confidence.

3.24. Although there are some limitations with the ADAS data, as discussed above, the methodology is now being used in the development of national policy and is felt to represent the best available estimates. The Defra study using 2009 data will not be further broken down to Local Authority level due to lack of funding to do so.

### "Waste a Future Resource for Business: Developing the evidence for a targeted market intervention strategy for the West Midlands" (March 2008) (SLR/AWM)

3.25. This report attempts to break down waste arisings to the local level. It includes a material-specific mapping exercise for Paper and Card, Plastic, Waste Electrical and Electronic Equipment (WEEE) and Hazardous materials.

<sup>9</sup> Lower Super Output Areas (LSOAs) are the divisions used for Census data, covering approximately 1,500 people.

<sup>10</sup> December 2010 -

<http://www.defra.gov.uk/evidence/statistics/environment/waste/documents/stats-release101216.pdf>

3.26. Paper and card and plastic generation figures were estimated based on the Welsh Assembly Government municipal waste composition for municipal arisings and the Strategic Waste Management Assessment (SWMA) 1998/99 Environment Agency figures for the C&I waste stream. The general proportion of the C&I waste stream was further disaggregated based on waste compositions for different commercial activities<sup>11</sup> applied to the business profile of the region. The estimated arisings of WEEE are based on England average generation figures for households and businesses<sup>12</sup> applied to household and business numbers in each respective authority, while the hazardous waste produced is obtained from the Environment Agency Hazardous Waste Interrogator.

3.27. The report depends on outdated base figures and a number of assumptions, but its findings are useful in showing geographical distribution for some of the key waste streams. The figures for Worcestershire are shown in **Table 5**.

**Table 5: Estimates of the Origin of Certain Wastes, by District**

	Estimated arisings – tonnes per annum			
	Paper & Card	Plastics	WEEE	Hazardous
Bromsgrove DC	44,000	8,000	3,000	3,000
Malvern Hills DC	37,000	6,000	3,000	4,000
Redditch BC	48,000	8,000	3,000	18,000
Worcester City DC	59,000	10,000	3,000	13,000
Wychavon DC	66,000	11,000	5,000	6,000
Wyre Forest DC	51,000	9,000	3,000	16,000
<b>Total Worcestershire</b>	<b>305,000</b>	<b>52,000</b>	<b>20,000</b>	<b>60,000</b>

Source: "Waste a Future Resource for Business" Developing the evidence for a targeted market intervention strategy for the West Midlands (March 2008) (SLR) (AWM)

3.28. This assessment is not as recent or detailed as the "ADAS Study" and we do not intend to rely on it.

### Considering Waste Managed (Based on Environment Agency Data)

3.29. Assessments of C&I waste managed are based on returns made to the EA by waste management operators as a requirement of Waste Management Licences. Two sets of figures are available:

#### *The Environment Agency Regional Attached Tonnage System (RATS)*

3.30. We believe that these figures are helpful up to 2007 but less reliable after that date because, as the EA acknowledges, they do not include figures from some waste management sites operating under the

<sup>11</sup> Westminster Waste Analysis (SWAP 2002)

<sup>12</sup> Waste Strategy for England 2007



new Environmental Permitting regime – which includes some of Worcestershire's larger sites. The figure for Worcestershire's arisings for 2007<sup>13</sup> is:

Commercial waste	307,000t
Industrial waste	321,000t
<b>Total</b>	<b>628,000t</b>

### The Environment Agency Waste Data Interrogator

3.31. We believe that this could be a very useful tool to develop options for the Waste Core Strategy and to monitor annual changes. However, there are acknowledged limitations in this data, namely that:

- Data on quantities of waste produced and deposited is incomplete because not all sites that handle waste are subject to the same regulatory regime. Many are not required to make site input returns: this includes incinerators, (most) exempt facilities or waste treatment activities permitted under Pollution Prevention and Control (PPC) regulations.
- Waste management operations with environmental permits are required to provide quarterly or annual returns showing the types and quantities of waste they accepted but some operators legally challenged the new system. This challenge was upheld by the High Court and therefore some operators do not provide information on origin and destination.
- It gives information of waste managed not waste produced.

3.32. In spite of these provisos, the Waste Data Interrogator offers much new information and is thought to be relatively robust. It must be emphasised however that these are estimates of waste managed. The waste managed figures for Worcestershire as per the Waste Data Interrogator are shown in Table 6:

**Table 6: Worcestershire Waste managed as per the Waste Data Interrogator**

Year	Waste managed <sup>14</sup> (tonnes)
2007	599,467
2008	475,878
2009	521,634

Note: This figure is for the Waste Data Interrogator category "HIC" waste, meaning that it is not only commercial and industrial waste but also includes household waste.

3.33. This level of information has not been possible to get until now. It is, however, still flawed, as the "Help" notes to the Waste Data Interrogator point out:

<sup>13</sup> Source: correspondence with EA (Jeremy Swanson) 24th August 2009

<sup>14</sup> Data retrieved from Waste Data Interrogator by running the following query: "Facility location by WPA, include all", "Waste category HIC", "Waste classification include all", "Facility by site category, include all", "Report on waste facility by waste received", "Display data by Facility, site category" and "Table layout, origins by WPA".

- Although waste inputs must now be reported using EWC codes, which provides a level of consistency and detail, the codes are based on physical characteristics and do not differentiate by source. For example, the data shown in **Table 6** is for the category 'HIC waste' which covers household waste (rather than municipal waste) as well as commercial and industrial waste. This makes it difficult to distinguish between the waste streams.
- The advice of the Environment Agency<sup>15</sup> is that a realistic estimate ("a sound methodology") of Worcestershire's C&I waste could be obtained by deducting Defra statements of MSW<sup>16</sup> from the Waste Data Interrogator figure for all household, industrial and commercial (HIC) waste, as per the equations shown in **Box 1** below:

**Box 1: Equation to estimate C&I waste managed from Waste Data Interrogator household, industrial and commercial data**

<b>2007</b>	Waste Data Interrogator 2007: all HIC waste	-	DEFRA statements of MSW 2007	=	Worcestershire Commercial and Industrial Waste 2007
	599,467 tonnes		299,863 tonnes		299,604 tonnes
<b>2008</b>	Waste Data Interrogator 2008: all HIC waste	-	DEFRA statements of MSW 2008	=	Worcestershire Commercial and Industrial Waste 2008
	475,878 tonnes		295,255 tonnes		180,623 tonnes
<b>2009</b>	Waste Data Interrogator 2009: all HIC waste	-	DEFRA statements of MSW 2009	=	Worcestershire Commercial and Industrial Waste 2009
	521,634 tonnes		296,765 tonnes		224,869 tonnes

- "Some operators do not provide information on origin and destination. If you run queries drawing on this data you should use the results with care because of this missing data.
- Our data on quantities of waste produced and deposited is also incomplete because not all sites that handle waste are subject to the same regulatory regime. Many are not required to make site input returns. Exempt facilities and those that are not subject to waste management permitting are not included. This means that a significant proportion of waste that is recovered or re-used does not appear in our records.[...]

<sup>15</sup> Email and telephone conversations with Jeremy Swanson, May-June 2009

<sup>16</sup> This is different from the baseline figure used as the baseline for MSW growth projections due to the fact that, for MSW, Herefordshire's arisings are also taken into account. This is not the case for C&I arisings and therefore the Defra MSW statistics have been used.

- Not all incineration and treatment activities permitted under our Integrated Pollution Prevention and Control (PPC) regime are currently required to make returns of their waste inputs. They do not appear in these records. Some waste recycling and reprocessing activity is also either exempt or falls under a different regulatory regime. This makes it difficult to identify total quantities of waste recycled or recovered with any certainty."

3.34. For these reasons it is not possible to derive Worcestershire's C&I waste arisings figures from the Waste Data Interrogator with any degree of confidence and therefore we do not intend to use them.

### ***C&I Waste Arisings: Preferred Methodology***

3.35. There is no truly robust data regarding waste arisings, and with a recent High Court judgement that waste operators do not have to provide information relating to origin or destination of waste, this situation is unlikely to improve dramatically in the near future. We will however use the best available data to inform our approach in the Waste Core Strategy.

We have considered all five of the above estimates of C&I waste arisings for Worcestershire and have decided to use the ADAS study. This is a change from the approach taken in the First Draft Submission consultation Waste Core Strategy (and in previous versions of this document), which used the SWMA 2002/3 data as the preferred estimate.

#### **Box 2. C&I Arisings: Preferred Methodology**

ADAS study figure for 2006/7: C&I waste arisings in Worcestershire 568,199 tonnes

- 3.36. There are several reasons for choosing the ADAS study as the preferred methodology:
- The SWMA 2002/3 data is now almost a decade old and significant changes have occurred in that time. Viewing it in this light means that we can no longer assume the estimate is a reliable or accurate assessment of current arisings; the estimates provided in the ADAS study suggest a drop of around 13% in the West Midlands from the 2002/03 survey.
  - The SLR/AWM data is even older (1998/9) and not as detailed as the ADAS study;
  - The RATS data is not useful after 2007 as there are no figures available from some sites;
  - The Waste Data Interrogator shows waste managed and cannot be used with confidence to determine waste arisings
  - The estimates from the ADAS study could be used alongside known changes in employment figures for Worcestershire to review the estimated levels of C&I waste arisings in the county to monitor the strategy;
  - The ADAS approach is recent.
  - The ADAS approach produces data at county level

- and the ADAS approach is being used by national government in reviewing the Waste Strategy for England.

We do however continue to appreciate the value of the other methods, and will use these to inform some elements of the WCS.

## ***Risk Assessment***

- 3.37. It must be recognised that the ADAS estimates are different from and less than those in the WM RSS proposed Phase 2 Revision. However, it is government policy that Local Planning Authorities can provide a local interpretation if there is sound evidence that it is justified by local circumstances.
- 3.38. In this case we believe that the manifest inadequacies of the SWMA data of 2002/3 justify the use of more recent data. The advantages of using the ADAS data notably that it identifies the distribution of arisings, further supports its use. Doing so would still be in conformity with the strategy of the proposed revision of the RSS, the only difference would be regarding the scale of the capacity gap identified.
- 3.39. Our approach is supported by the 2009 DEFRA survey which found a 29% fall in C&I waste arisings in the West Midlands since 2002/3. Waste from some sectors fell at a greater rate than the fall in numbers employed in that sector and in some cases even though the numbers significantly increased. The final report into the 2009 survey attributes this to the effects of fiscal and regulatory policy since 2002/3. In practice therefore it seems reasonable to assume that the 2002/3 data has therefore been superceded.
- 3.40. The risk assessment of using the ADAS data is summarised in Table 7.

**Table 7. C&I arisings risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	<p>The ADAS estimates are lower than some of the other figures outlined, although higher than others. They are, however, closer to the Waste Data Interrogator figures for C&amp;I managed in the county than those based on the SWMA 2002/3 figures and they are entirely consistent with the DEFRA survey of 2009.</p> <p>This approach is also being used by national government in reviewing the Waste Strategy for England.</p>
<b>Worst Case Scenarios:</b> The calculations are too high and an overprovision of facilities could occur.	Low	<p>It is important that the Waste Core Strategy allows for adequate capacity and it is unlikely that the market will over provide facilities if the estimates prove to be too high<sup>17</sup>.</p> <p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends. Members of the Environmental Services Association have frequently asserted at the WMRTAB, including at the Examination into the WMRSS Phase 2 revision, that market conditions will not allow this to happen in practice.</p>
<b>Worst Case Scenarios:</b> The calculations underestimate the scale of waste arisings.	Medium	As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy or other identified aims.

<sup>17</sup> Industry representatives at the WMRTAB have consistently argued that market mechanisms mean that this simply could not happen so far as the C&I and C&D streams are concerned.

## ***C&I Waste Growth Projections: Alternative Methods of Estimation***

### **Waste Strategy for England (Defra 2007)**

- 3.41. The Waste Strategy for England is the national policy for waste at the time of writing this document.
- 3.42. The Waste Strategy for England states that "(National) Baseline projections indicate C&I waste arisings increasing from 57.9 million tonnes in 2002/03 to roughly 70.5 million tonnes in 2019/20. These projections are based on a sectoral growth model of the UK economy which integrates a degree of decoupling between economic growth and waste growth based on the difference between modelled and empirical evidence from the 1998/99 and 2002/03 Environment Agency waste surveys."
- 3.43. The strategy was based on Cambridge Econometrics' Regional Economy-Environment Input-Output model and 2002/3 SWMA data. In essence its projections were:
- Essentially zero growth in industrial waste;
  - Average annual growth of 2.6% pa in commercial waste;
- 3.44. The methodology used in the Waste Strategy for England 2007 is to use the EA SWMA 2002/3 projections and apply the following assumptions<sup>18</sup>:
- Industrial Waste = 51% of C&I arisings in 2002/3, increasing at zero growth; and
  - Commercial Waste = 49% of C&I arisings in 2002/3, increasing at 2.6% p.a.
- 3.45. Using the EA SWMA 2002/3 as the base line and applying these assumptions to projections of growth, gives the baseline data for Worcestershire shown in **Table 8** and the growth projections at 5 year intervals shown in **Table 9** below.

**Table 8: Worcestershire C&I Waste Baseline: National Waste Strategy methodology**

<b>Total C&amp;I waste in Worcestershire (EA SWMA 2002/3)</b>	<b>Industrial waste = 51%</b>	<b>Commercial waste = 49%</b>
755,000 tonnes	385,050 tonnes	369,950 tonnes

Source: Base data 2002 EA SWMA C&I Waste (Worcestershire)

**Table 9: C&I Waste (Worcestershire) (National Waste Strategy Methodology)**

	<b>Baseline</b>	<b>2005/6</b>	<b>2010/1</b>	<b>2015/6</b>	<b>2020/1</b>	<b>2025/6</b>	<b>2035/6</b>
Industrial (51%)	385,050 x 0% pa	385,050	385,050	385,050	385,050	385,050	385,050
Commercial Waste	369,950 x 2.6% pa	400,147	456,052	519,768	592,385	675,148	872,715

<sup>18</sup> Waste Strategy for England 2007, Annex A Impact Assessment, Appendix I, p 45-46.

(49%)							
<b>Total</b>	<b>755,000</b>	<b>785,197</b>	<b>841,102</b>	<b>904,818</b>	<b>977,435</b>	<b>1,060,198</b>	<b>1,257,765</b>

## RSS Phase 2 Revision Draft Preferred Options

3.46. The WMRSS Phase 2 Revision draft waste policies took a similar approach but were developed before Waste Strategy 2007 was issued and used the government's assumptions in the draft review of the National Waste Strategy (February 2006).

3.47. This reflected predicted economic growth and changes in the sectoral mix of the UK economy at that time. It was based on base data from the EA SWMA 2002/3 and the projected growth rates set out in **Table 10** below. The assumptions used were different from those used in the final Waste Strategy for England 2007.

**Table 10: Growth rate projections (National Waste Strategy Draft Review February 2006)**

<b>Growth rate (National Waste Strategy Review Feb 2006)</b>	
2006 – 2010	0.31% pa
2011 – 2015	3.13% pa
2016 – 2020	5.57% pa
2021 – 2028	No growth

3.48. Using the EA SWMA 2002/3 as the base line and applying these assumptions to projections of growth, gives the projections for Worcestershire shown in **Table 11** below.

**Table 11: Growth Projections<sup>19</sup> for Worcestershire (National Waste Strategy Draft Review February 2006)**

	<b>Baseline</b>	<b>2005/6</b>	<b>2010/1</b>	<b>2015/6</b>	<b>2020/1</b>	<b>2025/6</b>
Total	755,000	762,043	773,928	902,871	1,183,937	1,183,937

Note: Calculated with an assumption of 0.31% growth from 2002-05

## ***C&I Waste Growth Projections: Preferred Methodology***

3.49. We believe that using the methodology from the Waste Strategy for England is the most convincing approach as it is based on a more up-to-date national policy approach than that which informed the RSS.

3.50. This methodology can be updated using the ADAS<sup>20</sup> baseline figure rather than the SWMA 2002/3 data, as shown in **Table 12**.

**Table 12: Worcestershire C&I Waste Baseline: National Waste Strategy methodology**

<b>ADAS baseline</b>	<b>Industrial waste = 51%</b>	<b>Commercial waste = 49%</b>
568,199 tonnes	289,781.5tonnes	278,417.5 tonnes

<sup>19</sup> Using assumption of 0.31% growth from 2002-2005 and growth rates from **Table 10**.

<sup>20</sup> *Survey of Commercial and Industrial Waste Arisings* 2009 (ADAS, Defra)

3.51. And the following growth projections at 5 year intervals (see **Table 13** below).

**Table 13: C&I Waste (Worcestershire) (National Waste Strategy Methodology)**

	2006/7	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
Industrial x 0% pa	289,781.5	289,781.5	289,781.5	289,781.5	289,781.5	289,781.5	289,781.5
Commercial Waste x 2.6% pa	278,417.5	308,521.9	350,770.3	398,804.1	453,415.5	515,505.4	586,097.7
<b>Total</b>	<b>568,199.0</b>	<b>598,303.4</b>	<b>640,551.8</b>	<b>688,585.6</b>	<b>743,197</b>	<b>805,286.9</b>	<b>875,879.2</b>

**Box 3. C&I Projections: Preferred Methodology**

Use ADAS figures of waste arisings to establish the baseline.

Make projections based on the assumptions in the Waste Strategy for England 2007 that:

- a) C&I waste is split into 51% Industrial and 49% commercial
- b) Industrial waste will grow at 0% per annum
- c) Commercial waste will grow at 2.6% per annum

## ***Risk Assessment***

3.52. The risk assessment for this approach is summarised in **Table 14**.

**Table 14. C&I waste growth projections risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The projections are based on the best available data and use the same methodology as national policy. Monitoring should reveal trends in operations, triggering a review of the Strategy.
<b>Worst Case Scenarios:</b> The calculations are too high and an overprovision of facilities could occur.	Low	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.  Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste management but market corrections should make excessive surplus unprofitable and such overprovision unattractive.



<p><b>Worst Case Scenarios:</b> The calculations underestimate the scale of waste arisings.</p>	<p>Medium</p>	<p>This is considered unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>
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## ***Agricultural wastes***

3.53. Agricultural activities produce some Directive Waste<sup>21</sup>, i.e. non-natural waste from farms, such as plastics, scrap metal, tyres, glass, building waste, paper and cardboard. "Organic Waste" i.e. crop residues and animal manures which have traditionally been composted or re-used on the farm itself are not defined as waste for the purposes of EU legislation and are therefore not considered in the Waste Core Strategy.

3.54. The best estimate we have is from the Waste Scenarios Study (WMRA, 2005). This states that agricultural (Directive Waste) arisings in Worcestershire were 3,487t in 2003<sup>22</sup>.

### **Box 4. Agricultural Waste arisings: Preferred Methodology**

Waste Scenarios Study (WMRA 2005): Directive agricultural waste arisings in Worcestershire 3,487 tonnes per annum

3.55. We intend to project this at the same rate as the Waste Strategy for England 2007 does for industrial waste, which is essentially zero percent growth per year. This is because we believe that the composition of agricultural waste is more like industrial waste than commercial waste. It is difficult to predict agricultural change but we believe there may well be a continued trend towards larger, more efficient farms, at the same time there will be more pressure to reduce the amount of waste produce. We believe therefore that zero percent growth in agricultural waste is the most likely figure.

<sup>21</sup> Directive Waste is defined in the Waste Management Licensing Regulations 1994 (SI 1994 1056) as being any substance or object in the categories set out in Part II of Schedule 4 of the Regulations that the producer or holder discards, intends to discard or is required to discard. The list shown in Part II of Schedule 4 is taken from the Waste Framework Directive (Directive 75/442/EEC).

<sup>22</sup> See background document "Agricultural waste".

- 3.56. These wastes are also most likely to be managed as part of the wider C&I waste stream. A small number of specialist collectors of agricultural plastic have emerged but none is currently based in Worcestershire. We will therefore include the capacity requirement for agricultural wastes under the heading of C&I waste.

**Box 5. Agricultural Waste projections: Preferred Methodology**

Project growth at the same rate as industrial waste: 0%

- 3.57. Including agricultural waste in the C&I waste stream gives the projections of arisings as shown in **Table 15**.

**Table 15: C&I projections including Agricultural Waste (tonnes p.a.)**

	2010/1	2015/6	2020/1	2025/6	2030/31	2035/36
C&I waste projection	598,303.4	640,551.8	688,585.6	743,197	805,286.9	875,879.2
Agricultural waste projection	3,487	3,487	3,487	3,487	3,487	3,487
<b>Total</b>	<b>601,790.4</b>	<b>644,038.8</b>	<b>692,072.6</b>	<b>746,684</b>	<b>808,773.9</b>	<b>879,366.2</b>

## ***Risk Assessment***

- 3.58. The risk assessment for this approach is summarised in **Table 16**.

**Table 16. C&I waste growth projections risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The projections are based on the best available data.
<b>Worst Case Scenarios:</b> The calculations are too high and an overprovision of facilities could occur.	Low	Unlikely to prove serious. The predicted level of agricultural waste arisings is very low and forms a negligible part of the wider C&I waste stream.  Overprovision of facilities is highly unlikely.
<b>Worst Case Scenarios:</b> The calculations underestimate the scale of waste arisings.	Medium	This is considered unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.  As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this

		should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.
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## Hazardous, clinical and radioactive wastes

### *Hazardous waste*

- 3.59. Hazardous wastes include many substances generally recognised as potentially dangerous such as pesticides, asbestos and strong acids. However, a number of wastes that result from everyday activities have also been designated hazardous waste, for example mobile phone batteries and used engine oils, redundant fridges and freezers, scrap cars (End of Life Vehicles) and some waste electrical equipment (WEEE).
- 3.60. Hazardous MSW arises as part of the normal collection services undertaken by District Councils or waste delivered to Household Recycling Centres by the public and this is included in the Hazardous Waste Interrogator figures of arisings. These are often 'ordinary' materials. Details of the makeup of the Household Hazardous Waste collected and disposed of via Worcestershire's County and District Councils are set out in **Table 17**. Arisings in 2008 were 2,975 tonnes. Changes in these arisings are likely to reflect changes in MSW generally over time. No evidence was submitted to the review of the Joint Municipal Waste Management Strategy (JMWMS) to suggest that the collection or disposal of hazardous MSW was a particular problem.

**Table 17: Estimated Annual Tonnage of Worcestershire's Household Hazardous Waste (2008)**<sup>23</sup>

Waste Type*	Tonnes
Asbestos	267
Batteries (car)	281
Batteries (household)	10
Fluorescent Tubes	32
Fridges/Freezers	1069
Mobile Phones	0
Oil (Mineral)	93
Printer Cartridges	1
Televisions & Monitors	1182
Fly Tipped Tyres	36
Hazardous Household Chemicals collected at HWS.	4
<b>Total</b>	<b>2,975</b>

\*All 'hazardous' or similar waste collected by Waste Collection Authorities and at Household Recycling Centres

<sup>23</sup> Information provided by Environmental Services, Worcestershire County Council, 2008

## Hazardous Waste Data Interrogator

- 3.61. The Environment Agency Hazardous Waste Data Interrogator contains accurate and relatively up to date information on hazardous waste arisings. All movements of hazardous waste are tracked until they reach a waste management facility. As a consequence, relatively detailed information about the production, movement and treatment of this waste stream is available from the Environment Agency. The hazardous waste arising in Worcestershire is shown in **Table 18**.

**Table 18: Hazardous waste arising from Worcestershire as shown by the Hazardous Waste Interrogator<sup>24</sup>**

Deposit location	2007 tonnes	2008 tonnes	2009 tonnes
East Midlands	11,273.01	10,233.29	4,914.83
East of England	280.36	118.34	252.45
London	10.58	6.01	31.50
North East	2,206.42	24.30	60.71
North West	3,014.01	5,174.93	4,002.59
South East	267.85	125.66	379.74
South West	15,234.90	5,043.09	2,720.45
Wales	311.58	428.81	500.06
West Midlands	28,585.65	24,666.77	19,869.37
Yorkshire & The Humber	7,218.12	643.15	387.72
<b>Total</b>	<b>68,402.46</b>	<b>46,464.35</b>	<b>33,119.42</b>

- 3.62. Although more recent data is available, 2007 figures will be used as the basis for projecting arisings, as this also ties into projections used in regional studies (see Scott-Wilson Report below).

### Box 6. C&I Projections: Preferred Methodology

Environment Agency Hazardous Waste Data Interrogator (2007): 68,402 tonnes

## Hazardous Waste Growth Projections: Alternative Methods of Estimation

- 3.63. Three options have been considered for projecting hazardous waste arisings:
1. the Waste Strategy for England 2007
  2. the RSS Phase 2 Waste Treatment Capacity Study
  3. the West Midlands Landfill Capacity Study 2009 Update (Scott-Wilson Report).

<sup>24</sup> Data sourced from hazardous waste data interrogator 2007, 2008 and 2009 using the following selections: arose in planning region 'West Midlands' and sub-region 'Worcestershire', all waste types and recovery methods, reporting arisings by region, show disposal or recovery method as columns and show movements for all consignments.

## Waste Strategy for England 2007 (Defra 2007)

- 3.64. The Waste Strategy for England 2007 does not make specific projections for hazardous waste, it includes it with C&I waste as "CI and H waste" and makes projections of 0% per annum growth for industrial waste and a 2.6% per annum growth for commercial waste<sup>25</sup>.
- 3.65. Hazardous waste is more likely to arise from industrial waste than other sources, therefore projections could be made on the basis that 0% growth is likely. Based on 2009 figures this would give projected arisings of 33,119.42 per annum.
- 3.66. It is government policy to reduce hazardous waste arisings and even if the use of hazardous materials increases, the financial cost of dealing with any wastes is likely to encourage waste minimisation. The Hazardous waste data interrogator demonstrates that levels of hazardous waste arisings in Worcestershire have decreased over the last 3 years (see *Table 18: Hazardous waste arising from Worcestershire as shown by the Hazardous Waste Interrogator*).

## WMRA West Midlands Waste Treatment Facilities Capacity Study - Phase 2: Future Capacity Requirements<sup>26</sup>

- 3.67. The Waste Treatment Facilities Capacity Study assumed that:
- The quantity of hazardous waste would increase by 22% in 2005 in response to the re-classification of waste by Hazardous Waste Regulations, followed by a subsequent reduction of 2% per annum until 2010 to reflect minimisation efforts.
  - There would be a 1% per annum increase in arisings for 5 years from 2006 to reflect the need to meet pre-treatment requirements and other Waste Acceptance Criteria.
  - After 2010 the quantity of hazardous waste arisings would remain static.
  - That imports and exports of hazardous waste would remain unchanged from 2002.
- 3.68. The Study estimated that more re-use and recycling capacity would be required to reflect both increased treatment requirements and the increased cost and limited future availability of landfill capacity.
- 3.69. The Study made the following assessment of the additional capacity needed in Worcestershire (see **Table 19**):

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<sup>25</sup> Waste Strategy 2007 Annex A paras 34 to 46. DEFRA 2007

<sup>26</sup> West Midlands Waste Treatment Facilities Capacity Study: Phase 2 Future Capacity Requirements (WMRA: Shropshire CC 18/11/2004) pages 11-12

**Table 19: Capacity required to recycle, treat and dispose of Worcestershire's hazardous waste 2005-2021** <sup>27</sup>

	Existing Capacity 2001	Capacity required by 2005	Capacity required by 2010	Capacity required by 2015	Capacity required by 2021
Indicative Capacity Required to Re-use and Recycle Hazardous Waste	10,000t	59,000t	72,000t	72,000t	72,000t
Cumulative Landfill Capacity Required to Dispose of Hazardous Waste	0t	57,000t	79,000t	82,000t	86,000t

3.70. In practice, when checked against the EA Hazardous Waste Data Interrogator figures, which are generally accepted to be reliable, none of the anticipated increases in hazardous waste production have taken place, either in the region or Worcestershire in particular. Arisings of hazardous waste in the County were less than 46,500t in 2008 and 33,120 in 2009 <sup>28</sup>, well below the Study baseline for 2005 and there is no evidence that this level is likely to increase. The need for additional capacity predicted in the Waste Treatment Facilities Capacity Study has not therefore come about.

### West Midlands Landfill Capacity Study 2009 Update (Scott-Wilson Report)

3.71. This study is an update of a report issued in 2007. The 2009 update is based on the EA Hazardous Waste Data Interrogator for 2007 and makes projections based on a reduction of 2% per annum between 2007 and 2010 and static levels from 2011 onwards, see **Table 20**.

**Table 20: Projection of hazardous waste arisings, tonnes per annum (WMRA: Scott-Wilson Report)**

	2007 Base year	2010/11	2015/16	2020/21	2025/26	2030/31	Cumulative total
Worcestershire	68,402	64,379	64,379	64,379	64,379	64,379	1,553,097
West Midlands total	519,905	489,330	489,330	489,330	489,330	489,330	11,804,668

Source: West Midlands Landfill Capacity Study 2009 Update (Scott-Wilson) Appendix C

3.72. Actual arisings in Worcestershire in 2008 and 2009 (46,464.35 and 33,119.42 tonnes respectively) show that there has been a reduction of much greater than the 2% predicted by the Scott Wilson report.

3.73. However, the Environment Agency and other respondents to consultations on the Waste Core Strategy have expressed concern

<sup>27</sup> WMRA (2004) West Midlands Waste Treatment Facilities Capacity Study – Phase Two: Future Capacity Requirements Table 5.5

<sup>28</sup> Data sourced from Hazardous Waste Data Interrogator 2008 and 2009 using the following selections: arose in planning region 'West Midlands' and sub-region 'Worcestershire', all waste types and recovery methods, reporting arisings by region, show disposal or recovery method as columns and show movements for all consignments.

about the need to address hazardous waste arisings adequately and projecting any greater decrease than this is unlikely to be supported.

### ***Hazardous waste projections: preferred methodology***

- 3.74. In order to ensure that sufficient provision to manage hazardous wastes arising in the county, we intend to adopt the Scott Wilson report projections of Hazardous waste arisings. This gives lower projections than using the *WMRA West Midlands Waste Treatment Facilities Capacity Study - Phase 2: Future Capacity Requirements* but projections that are almost twice as high using a projection of 0% growth (as per the Waste Strategy for England) based on current levels of arisings (2009).

### **Other considerations**

- 3.75. In March 2011 the (Worcestershire) County Council Planning and Regulatory committee resolved that they were minded to grant approval for development of an Energy from Waste (EfW) facility for the combustion of non-hazardous waste and the recovery of energy at Oak Drive Hartlebury Trading Estate, Hartlebury. The application has been referred to the Department for Communities and Local Government, in accordance with the Town and Country Planning (Consultation) (England) Direction 2009, as the proposal is a departure from Green Belt policy. If the Secretary of State does not wish to intervene planning permission will be granted, subject to conditions.
- 3.76. This proposal is for the management of 200,000 tonnes per annum of residual waste. If approved it is anticipated to become operational in summer 2014 and could generate an average of 8,000t of hazardous waste p.a. The application proposes that this material would either be transported to an appropriate disposal facility or used in the stabilisation of acid wastes.<sup>29</sup>
- 3.77. In order not to constrain requirements for hazardous waste management facilities, the projections for Worcestershire's hazardous waste arisings which will be used to calculate the capacity gap to be addressed are therefore:
- a constant of 64,379 tonnes per annum
  - plus the potential for 8,000 tonnes per annum from residual treatment of MSW.

**Table 21: Projection of hazardous waste arisings, tonnes per annum (WMRA: Scott-Wilson Report plus potential for 8,000 tonnes per annum from residual treatment of MSW)**

	<b>2007 Base year</b>	<b>2010/11</b>	<b>2015/16</b>	<b>2020/21</b>	<b>2025/26</b>	<b>2030/31</b>
Scott Wilson Projections	68,402	64,379	64,379	64,379	64,379	64,379

<sup>29</sup> *Proposed Development of an Energy from Waste facility at Hartlebury Trading Estate Hartlebury*. Environmental Statement Vol. 1. Main Report April 2010 paras 5.3.31 and 5.7.6. Mercia EnviRecover

Potential arisings from residual treatment	-	+8,000	+8,000	+8,000	+8,000	+8,000
Total projections	-	72,379	72,379	72,379	72,379	72,379

Source: West Midlands Landfill Capacity Study 2009 Update (Scott-Wilson) Appendix C

3.78. This gives a total of 72,379 tonnes per annum<sup>30</sup> of hazardous waste arisings in Worcestershire throughout the life of the Waste Core Strategy.

#### **Box 7. C&I Projections: Preferred Methodology**

Use Hazardous Waste Data Interrogator 2007 to establish arisings.

Make projections based on:

- a) 2% reduction 2007-2010
- b) 0% change 2011 onwards
- c) Provision for an additional 8,000 tonnes per annum hazardous waste from a residual treatment facility.

### ***Risk Assessment***

3.79. The risk assessment for this approach is summarised in Table 22.

**Table 22. Hazardous waste growth projections risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Medium	<p>The projections are based on the most recent method, However the available data suggests that the assessment is significantly too high.</p> <p>It is possible that arisings may be increased by new industrial or other activities in the area which produce hazardous waste, although there is no evidence that this is likely.</p> <p>It is also possible that arisings may continue to reduce in line with current trends.</p> <p>Monitoring should reveal trends in arisings and possible disparities, triggering a review of the Strategy.</p>

<sup>30</sup> This harmonises extremely well with the RSS Phase 2 Future capacity requirement of 72,000t p.a.



<p><b>Worst Case Scenarios:</b> The calculations are too high and an overprovision of facilities could occur.</p>	Low	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste management. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.</p>
<p><b>Worst Case Scenarios:</b> The calculations underestimate the scale of waste arisings.</p>	Low	<p>This is considered very unlikely. The projection is based on higher figures. Projections are over twice that recorded in the current Hazardous Waste Interrogator (2009).</p> <p>Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>

## ***Clinical and low-level radioactive wastes***

- 3.80. Clinical and radioactive wastes<sup>31</sup> are most likely to be managed as part of the wider hazardous waste stream. We will therefore include the capacity requirement for clinical and radioactive wastes under the heading of hazardous waste.

### **Clinical Waste Arisings**

- 3.81. Information about clinical waste arisings in Worcestershire is difficult to obtain, as figures are recorded across several categories of EWC code and often combined with other waste types. However it is estimated that the clinical waste shown in **Table 23** is produced in the

<sup>31</sup> See background document "Waste Arising from Healthcare and Related Activities: Clinical Wastes and Low Level Radioactive Wastes" for further information and data sources.

county (this does not include any clinical waste that may be produced by veterinary practice, tattoo parlours or private health care providers).

**Table 23. Clinical waste arisings<sup>32</sup> (tonnes per annum)**

Source	Tonnes per annum
Clinical waste arising from Worcestershire Primary Care and Mental Health Partnership Trusts <sup>33</sup>	195
Clinical waste arising from Worcestershire Acute Hospital Trust <sup>34</sup>	994
Clinical waste arising from households in Worcestershire	3.9
<b>Total</b>	<b>1,192.9</b>

3.82. It is possible that these levels of arisings will increase with population growth and increased patient awareness of collection services, although there is little advice on how these projections should be calculated.

3.83. We have applied the same percentage increase in waste as used for MSW, as this follows projected increases in household numbers (see MSW section). This is shown in **Table 24**.

**Table 24. Projected clinical waste arisings (tonnes per annum)**

	2010	2015	2020	2025	2030	2035
% increase applied <sup>1</sup>		4.1%	4.0%	3.8%	3.6%	2.8%
<b>Projected clinical waste arisings</b>	<b>1,192.9</b>	<b>1,242</b>	<b>1,291.1</b>	<b>1,340.2</b>	<b>1,389.3</b>	<b>1,428.6</b>

Note: The projection was calculated on an annual basis but is shown here at 5 year intervals for ease of reference.

## Non-Nuclear Industry Low Level Radioactive Waste Arisings

3.84. The organisations in Worcestershire registered by Environment Agency for the accumulation and disposal of LLW have been contacted for information. Of those who have responded the Acute Hospital Trust is the only organisation to currently undertake such activities.

3.85. The Worcestershire Acute Hospitals Trust is responsible for several properties which are authorised to produce waste under the Radioactive Substances Act. The Trust is licensed to dispose of some liquid LLW to the sewers and there has been a year on year increase in disposal in this way. The trust is also authorised to dispose of solid radioactive waste through approved routes, however where possible the need is avoided

<sup>32</sup> See background document "Waste Arising from Healthcare and Related Activities: Clinical Wastes and Low Level Radioactive Wastes"

<sup>33</sup> April 2007 – March 2008 (Figures received in correspondence from Worcestershire Primary Care Trust and Mental Health Partnership. NB. Figures include 'offensive/hygiene waste')

<sup>34</sup> 2008-2009. From correspondence with the Acute Hospital Trust dated 5<sup>th</sup> June 2009

through on site storage until radioactive decay has allowed for its disposal as normal clinical/non-clinical waste.

3.86. There are three other organisations in the County authorised under the Radioactive Substances Act to accumulate and dispose of radioactive material:

- QinetiQ (Malvern): the authorisation is related to two activities. Firstly the decontamination of the company's land. This activity has now been completed. Secondly, a small collection of reference samples being used as part of some research work, which is both very low in volume and radioactivity level. These samples have now been transferred to other authorised research labs. Any future disposal will take place at the National Low-Level Radioactive Waste Repository near Drigg in Cumbria.
- Oil Analysis Midlands (Hartlebury Trading Estate): Activities involving radioactive material were never commenced and the company no longer have facilities on this site.
- Peasebrook Equine Clinic (Broadway): Did not respond to the request for information. There is no evidence to suggest that arisings from this site are significant.

3.87. The Scoping Report for the Sustainability Appraisal for the Non-Nuclear Industry Radioactive Waste Strategy<sup>35</sup> suggests that the volume of LLW in Worcestershire is less than 10m<sup>3</sup>/year. This is a standard assessment where levels are very low, the real figure may well be lower. As the majority of this is treated as clinical waste and the levels of arisings are so small, a specific projection and capacity gap for NNI LLW will not be calculated.

### Nuclear Industry Radioactive Waste Arisings

3.88. There are currently no nuclear facilities in the West Midlands and none of the nine potential locations proposed for new nuclear reactors in April 2009 are within the region. At present there is no VLLW or LLW produced by the nuclear industry in the County and no evidence that any will be imported into Worcestershire for treatment or disposal.

3.89. Policy for managing Nuclear Industry radioactive wastes is dealt with at a national level.

#### **Box 8. Clinical and Radioactive Waste Projections: Preferred Methodology**

Arisings based:

- a) Clinical waste: WCC research - 1,192 tonnes 2010.
- b) Non-nuclear industry low level radioactive waste: 10m<sup>3</sup>/year or less and not included in projections
- c) Nuclear industry radioactive waste: None

<sup>35</sup> "Sustainability Appraisal of the Non-Nuclear Industry Radioactive Waste Strategy; Scoping Report" January 2009. Produced by Atkins Limited for Defra.

Make projections based on clinical waste increasing at the same rates as projected household growth.

### ***Hazardous waste arisings including clinical and radioactive wastes***

3.90. Including clinical and radioactive waste in the hazardous waste stream gives the projections of arisings as shown in **Table 25**.

**Table 25. Projection of hazardous waste plus clinical waste arisings**

	2010/1	2015/6	2020/1	2025/6	2030/31	2035/36
Hazardous waste projection	72,379	72,379	72,379	72,379	72,379	72,379
Clinical waste projection	1,192.9	1,242	1,291.1	1,340.2	1,389.3	1,428.6
Radioactive waste projection	0	0	0	0	0	0
<b>Total</b>	<b>73,571.90</b>	<b>73,621.00</b>	<b>73,670.10</b>	<b>73,719.20</b>	<b>73,768.30</b>	<b>73,807.60</b>

### ***Risk Assessment***

3.91. The risk assessment for this approach is summarised in Table 26.

**Table 26. Hazardous waste growth projections risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The projections are based on a survey of producers in Worcestershire, with a reasonable response rate from significant producers and the department of health.
<b>Worst Case Scenarios:</b> The calculations are too high and an overprovision of facilities could occur.	Low	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.  Overprovision of facilities is highly unlikely. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.
<b>Worst Case Scenarios:</b> The calculations underestimate the scale	Low	This is considered unlikely as the department of health are currently undertaking initiatives to minimise clinical waste production, through better

of waste arisings.		segregation of waste at source.
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## Construction and Demolition Waste

- 3.92. C&D waste<sup>36</sup> arises from the construction, repair, maintenance and demolition of buildings and structures. It mostly includes brick, concrete, hardcore, subsoil and topsoil, but it can also include quantities of timber, metal, plastics and (occasionally) hazardous waste materials.
- 3.93. Construction and demolition waste was traditionally disposed of at:
- local "exempt facilities" which used C&D waste as a fill material;
  - licensed locations which restored or reclaimed land for beneficial use using C&D waste as engineering or fill material; and
  - landfill sites, often licensed specifically for these materials (known as "inert" landfill).
- 3.94. However, changes in the waste management licensing regulations and the introduction of the Landfill and Aggregates Taxes had a significant impact on this waste stream. An increasing proportion of C&D waste is now treated by screening and crushing plants, often at the site of origin, prior to re-use on-site or for sale as an aggregate or fill. The volumes treated are rarely recorded and there are no mechanisms in the West Midlands to collate any recording which may be undertaken.
- 3.95. While the re-use and recycling which is now undertaken are very much in line with Government policy to reduce unnecessary regulation and reclaim as much material as possible, the changes in waste management have led to considerable difficulty in quantifying the amount of C&D waste generated. There are no reliable assessments of C&D arisings.
- 3.96. There are no set approaches for making estimates about waste arisings or projecting waste growth for C&D waste. Several alternative approaches have been considered.

### ***C&D Waste Arisings and growth projections: Alternative Methods of Estimation***

#### EA Waste Data Interrogator

- 3.97. The EA Waste Data Interrogator records waste managed at licensed sites. The most recent, 2009, data is available classified in 'Substance Oriented Classification' codes. SOC level 2 includes that category 'construction and demolition wastes' as shown in **Table 27** below.

<sup>36</sup> The term construction and demolition (C&D) waste is used to also encompass excavation waste

**Table 27. C&D waste identified in the EA Waste Data Interrogator 2009** <sup>37</sup>

SOC level 1	SOC level 2	SOC level 3	Tonnes
12-Mineral wastes	Construction and demolition wastes	Mixed construction wastes	58,195.55
12-Mineral wastes	Construction and demolition wastes	Concrete, bricks and gypsum waste	44,221.72
<b>Total</b>			<b>102,417.27</b>

3.98. However, these figures only refer to waste managed at licensed sites and therefore exclude C&D waste managed at the point of origin. We believe therefore that the Waste Data Interrogator underestimates the volume of C&D managed in the County and is not therefore a realistic estimate of arising. These figures nonetheless give some indication of the throughput of the existing waste management infrastructure in Worcestershire. Any significant increase in that throughput would suggest increased demand for facilities.

### The Environment Agency Strategic Waste Management Assessments 2002/3 and 2009

3.99. The EA SWMAs provide little information about the generation and management of construction and demolition waste below regional level. Data did exist for Worcestershire in the 2002/3 survey but has subsequently been lost.

### Survey of Arisings and Use of Construction, Demolition and Excavation Waste as Aggregate in England 2003 (ODPM 2004)

3.100. Some data for the West Midlands region is available from research carried out by the Symonds Group on behalf of the Office of the Deputy Prime Minister. Figures for the generation of C&D waste have been derived from regional estimates in Annex 8 of the Survey of Arisings and Use of Construction, Demolition and Excavation Waste as Aggregate in England in 2003 (ODPM October 2004).

3.101. Several options for the disaggregation of the regional estimate given in the Symonds survey are available:

1. **Proportionality:** assumes that the relationship between C&D waste and other waste streams remains consistent with the regional

<sup>37</sup> Data extracted by running the query as follows: Facility location by Worcestershire WPA, Waste category 'inert', waste classification 'SOC', Facility type 'include all', report by 'waste received', show waste type by SOC class levels 1, 2 and 3.

average. Knowing the total quantity of waste in other waste streams allows an estimate of the quantity of C&D waste to be calculated.

2. **Employment:** assumes that the quantity of C&D waste is consistent with the relative levels of employment (including self employment) in construction and demolition businesses in each area.
3. **Population:** assumes that the quantity of C&D waste is consistent with the relative size of the population in each Waste Planning Authority (WPA) area.
4. **Development:** assumes that the quantity of C&D waste reflects the relative levels of housing development (as a proxy for all development), including a weighting for the proportion of development on previously developed land and the level of demolition in each area.

### The RSS Phase 2 Future Capacity Requirements Study (WMRA Shropshire 18/11/2004)

- 3.102. This study uses option 4 of the ODPM report (above). Although it does not measure all development, it provides a proxy and it allows a weighting to be built in to reflect relative levels of demolitions and the proportion of development on previously developed land, both of which have the potential to significantly increase the quantity of C&D waste.
- 3.103. The report estimated the quantity of construction and demolition waste generated in each Waste Planning Authority over the period 2001-2021 using a development index to disaggregate the regional total. This index was based on *RPG11: Regional Planning Guidance for the West Midlands* which identified the distribution and rate of future housing development, demolitions and the use of previously developed land in each WPA area in three phases: the period up to 2007; 2007-2011; and 2011-2021 (RPG11, Tables 1-3, pp.37-39).
- 3.104. The calculations assume that development will initially be concentrated on previously developed (brownfield) land and that such sites will generate considerable volumes of C&D waste but that over time more new development will take place on greenfield sites and the wastes produced from redevelopment will decrease.
- 3.105. The proposed Phase 2 revision of the WMRSS has not been approved by the Secretary of State and it is very possible that core strategies developed by the District Councils in the county will be based on different figures from those proposed. For the present however the estimates prepared for the revision are the best evidence available for both housing proposals and C&D arisings.
- 3.106. The summary calculation for Worcestershire is illustrated in **Table 28**.

**Table 28: Calculation of C&D waste arisings using weighted annual % share of housing development 2001-2021**

	To 2007	2007-2011	2011-2021
Weighted share	10.06%	7%	6%
C&D waste arisings (tonnes per annum)	818,015	510,555	419,520

Source: RSS Phase 2 Future Capacity Study table 4.2

3.107. The Phase 2 study also states that the quantity of C&D waste in the West Midlands has decreased and the proportion recycled has increased from 50% in 2001 to 61% in 2003, the highest performance of any region in England. In the absence of local information about the management of this waste stream, the report assumes that waste currently generated in individual Waste Planning Authority areas, including Worcestershire, follows the regional pattern.

3.108. The study also states that policy drivers and the economics of recycling have led to an increase in the recovery rate from mixed C&D waste. Further growth in recycling will require improvements in on-site separation of recyclable aggregates from soils and other materials.

3.109. Changes to Waste Management Licensing Regulations were proposed when the study was undertaken and the study states that the changes are likely to require all exemptions involving deposits of waste on land to make records available to the EA. Therefore, the information available on this waste stream should improve over time.

### Projections in the West Midlands Landfill Capacity Study 2009 Update (Scott-Wilson Report)

3.110. This projection is based on the WMRSS growth assumptions<sup>38</sup>; however the report states that growth is predicted to be affected in line with economic changes being experienced in commercial and industrial sectors during 2009 – 2011.

3.111. The UK Economic Outlook (PWC, March 2009) presented information in relation to the expected impact on economic growth for the periods 2008 to 2011. Using this information, construction growth was set to mirror the general sector growth changes, namely a 1% decline in 2008, a 4.25% decline in 2009, and 0.4% growth in 2010, after which growth returns back to the WMRSS basis. These give the projection for C&D arisings as shown in **Table 29**.

<sup>38</sup> The status of the Regional Spatial Strategy is currently under question, with the Secretary of State having stated his intention to revoke the documents and their associated growth targets. However the evidence base behind them remains valid and is therefore still credible as the assumption behind this report.



**Table 29: C&D Total Arisings (tonnes) Scott Wilson: Update 2009**

	<b>2007 Base year</b>	<b>2010/11</b>	<b>2015/16</b>	<b>2020/21</b>	<b>2025/26</b>	<b>2030/31</b>
Worcestershire	747,868	711,759	611,767	605,015	598,943	593,482
West Midlands total	9,526,031	9,066,083	8,959,751	8,860,863	8,771,931	8,691,953

Source: Projections in the West Midlands Landfill Capacity Study 2009 Update (Scott-Wilson) Table 4.4.3 and Appendix C

## ***C&D Waste Growth Projections: Preferred Methodology***

3.112. The Phase 2 Future Capacity Study figures apply a national approach (ODPM) to a local level. They have been tested at examination and attempt to identify all C&D waste generated, not just those managed at licensed sites. There is no evidence that better data exists and for this reason this is the approach that will be used for estimating C&D waste arisings in Worcestershire.

3.113. This means that our preferred projection of C&D waste arisings is based on the relative levels of housing development (as a proxy for all development), including a weighting for the proportion of development on previously developed land and the level of demolition in each area.

3.114. This gives a projection for C&D waste arisings as shown in **Table 30**.

**Table 30. Projection of C&D waste arisings**

	<b>2010/1</b>	<b>2015/6</b>	<b>2020/1</b>	<b>2025/6</b>	<b>2030/31</b>	<b>2035/36</b>
<b>Total</b>	<b>510,555</b>	<b>419,520</b>	<b>419,520</b>	<b>419,520</b>	<b>419,520</b>	<b>419,520</b>

### **Box 9. C&D Arisings: Preferred Methodology**

Use RSS Phase 2 Future Capacity Requirements study figures to predict levels of C&D arisings, meaning projections are based on levels of housing development as a proxy for all development, with a weighting for relative levels of demolitions and the proportion of development on previously developed land:

2007-2011: 510,555 tonnes per annum

2011-2021: 419,520 tonnes per annum (assumed to remain at this level after 2021)

## ***Risk Assessment***

3.115. The risk assessment for this approach is summarised in **Table 31**.

**Table 31. C&D waste growth projections risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are	Low	The strategy will not be founded on accurate figures. However the WMRA

wrong.		estimates that there is very little C&D waste which is not already being recycled.
<b>Likelihood</b> of risk occurring	Medium	The figures are based on the most authoritative sources available but these are known to be partial and based on estimates.
<b>Worst Case Scenarios</b> that the calculations are too low and that more capacity will be needed	Low	Limited risk that projection are too low a) In practice, in situ treatment is likely to increase rather than decrease regardless of the Waste Core Strategy because it is both cheaper and easier for developers than any other method. b) The Symonds Report estimates that treatment capacity at licensed sites in the West Midlands is already ample. c) Considerable surplus capacity already exists in Worcestershire at sites with planning permission to manage these materials but which are currently operating well below their capacity.
<b>Worst Case Scenario</b> that the calculations are too high, overestimating the need for specific facilities to treat these wastes	Low	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.  Overprovision of facilities is highly unlikely. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.

## Municipal Solid Waste

3.116. Municipal Solid Waste (MSW) includes all household waste, street litter, waste delivered to council recycling points, household recycling centre waste and some commercial waste from shops and smaller trading estates where local authority waste collection agreements are in place.

3.117. In practice MSW can include hazardous materials but the Hazardous Waste Regulations do not apply to the small amounts of hazardous waste disposed of by householders in their domestic waste and collected as part of the door-to-door mixed municipal waste collection<sup>39</sup>.

<sup>39</sup> Defra, April 2007, "Hazardous Waste Regulations: Guidance on mixing hazardous waste", accessed at <http://www.defra.gov.uk/environment/waste/topics/hazwaste/documents/hwrmixing-guide.pdf>

- 3.118. Local authorities have a duty to provide waste collection facilities for business premises on request and these too are counted as municipal waste arisings. These collections can include industrial and commercial waste and also waste arisings from facilities such as nursing and residential homes for the elderly. In the West Midlands generally, and in Worcestershire in particular, the quantity of business waste collected by local authorities represents only a small percentage of the total quantity of MSW collected.
- 3.119. Worcestershire County Council, as the Waste Disposal Authority, works in partnership with the six Worcestershire City, Borough and District Councils and with Herefordshire Council to manage the two counties' MSW through the Herefordshire and Worcestershire Joint Municipal Waste Management Strategy (JMWMS) and a joint PFI<sup>40</sup> contract (the Integrated Waste Management contract). In assessing how we should manage Worcestershire's MSW arisings, account must therefore also be taken of Herefordshire's MSW arisings.

### ***Data on MSW Arisings***

- 3.120. Municipal waste is one of the few waste streams where current, accurate data is available about the collection, movement and disposal of waste. Trend data is also available, which helps to establish patterns in the recent management of this waste stream<sup>41</sup>.
- 3.121. Local Authorities are required by Defra to submit detailed assessments of the waste they collect and how they manage and dispose of it. This means that these figures are highly reliable. Unfortunately ambiguities in the definitions mean that statistics need very close examination to be useable, for example:
- The category Municipal Solid Waste (MSW) includes all the waste collected by local authorities, including waste from street cleansing, clearance of fly tipping and other sources. This is not the same as *Household Waste*, which is just the waste produced by residents and collected at the kerb-side or through household waste sites.
  - Construction and Demolition (C&D) waste collected at household recycling centres is considered MSW, but cannot be counted towards the Council's recycling targets whilst everything else collected at these sites can be.
- 3.122. The most up to date and reliable publicly available figures are from DEFRA's Waste Data Flow. The figures for Worcestershire and Herefordshire from 2005 to 2009 are shown in Table 32 and Figure 1 below.

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<sup>40</sup> Private Finance Initiative

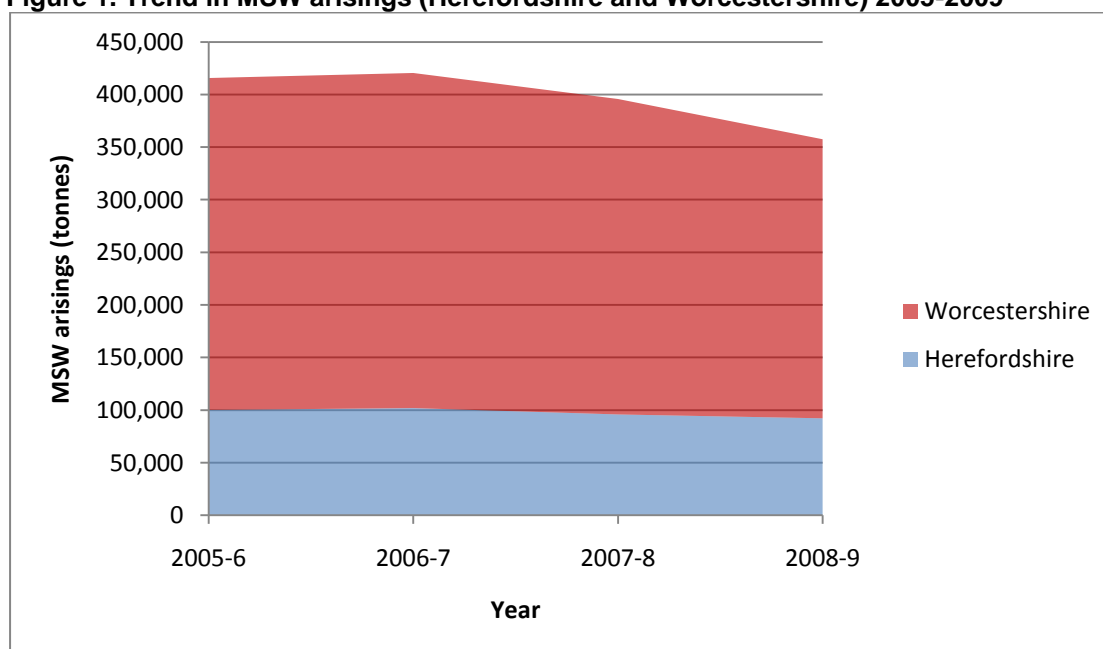
<sup>41</sup> West Midlands Treatment Facilities Capacity Study Phase 2: Future Capacity Requirements (WMRA SLR) (18/11/2004 P9)

**Table 32: Defra's Waste Data Flow Municipal Waste Statistics**

Year	Worcestershire (tonnes)	Herefordshire (tonnes)	Two-counties total (tonnes)
2005-6	315,502	100,317	415,819
2006-7	318,543	102,070	420,613
2007-8	299,863	96,039	395,902
2008-9	265,255	92,371	357,626

Source: Defra Municipal Waste Management Statistics collected via *Waste Dataflow*.  
<http://www.defra.gov.uk/environment/statistics/wastats/index.htm>

**Figure 1. Trend in MSW arisings (Herefordshire and Worcestershire) 2005-2009**



Source: Defra Municipal Waste Management Statistics collected via *Waste Dataflow*.  
<http://www.defra.gov.uk/environment/statistics/wastats/index.htm>

- 3.123. Arisings have reduced over this period. However, the JMWMS is based on a figure of 395,993 tonnes for 2007-8. The difference of 91 tonnes between the Defra Waste Data Flow and the JMWMS is negligible and attributed to a difference between the verified end of year figures (Waste Data Flow) and estimated figures (JMWMS)<sup>42</sup>. In order to ensure consistency between the Waste Core Strategy and Joint Municipal Waste Management Strategy, the JMWMS baseline figure of 395,993 tonnes for 2007-8 will be used as a baseline.

**Box 10. MSW Arisings Baseline: Preferred Methodology**

Use JMWMS baseline (2007-8): 395,993 tonnes

- 3.124. The risk assessment for this approach is summarised in Table 33.

**Table 33. MSW arisings risk analysis**

Issue	Level	Comments
Risk if estimates are	Medium	The strategy will not be founded on

<sup>42</sup> Advice from Worcestershire County Council Waste Data Management officer.

wrong.		accurate figures.
<b>Likelihood</b> of risk occurring	Low	The figures are robust and align with the JMWMS.
<b>Worst Case Scenarios:</b> The calculations are too high,	Medium	Unlikely to prove serious. Although there has been a decrease in arisings over recent years and a 2007/8 baseline has been used, the risk of the figures being significantly too high is limited because of the reliability of the source.  Monitoring of the Waste Core Strategy and the JMWMS are likely to alert the Council to emerging trends.
<b>Worst Case Scenarios either:</b> The calculations are too low	Low	This is considered unlikely. The baseline is from 2007/8 figures and there has been a decrease in arisings over recent years.  Monitoring of the Waste Core Strategy and JMWMS are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.

### ***MSW Growth Projections: Alternative Methods of Estimation***

3.125. We have considered several methods for making growth projections for MSW:

- Waste Strategy for England 2007
- RSS Phase 2 Revision – draft preferred options
- Review of the Joint Municipal Waste Management Strategy for Herefordshire and Worcestershire (JMWMS)

3.126. Each of these is explored in more detail below.

### **Projections in Waste Strategy for England 2007 (Defra 2007)**

3.127. The Waste Strategy 2007 considers four scenarios<sup>43</sup> for possible future arisings in MSW:

- constant MSW growth of 0%,
- constant MSW growth of 0.75%,
- constant MSW growth of 1.5%, and
- constant MSW growth of 2.25% per annum.

<sup>43</sup> In Appendix 1 to Annex A of the Waste Strategy for England, 2007.

- 3.128. These scenarios use per household growth in MSW as a basis for projections of waste arisings and do not consider changes to household numbers. In Worcestershire it is anticipated that there will be both an increase in the number of households in the county and an increase in the kinds of waste collected.

## RSS Phase 2 Revision – Draft Preferred Options (December 2007)

- 3.129. Projections in the RSS Phase 2 Revision are based on "*The West Midlands Waste Treatment Facilities Capacity Study: Phase 2 Future Capacity Requirements Report*" (West Midlands Regional Assembly, Shropshire County Council November 2004) ("The Phase 2 Report"). The report took data from individual Waste Disposal Authorities for the year 2002/3 as its base data.
- 3.130. The Phase 2 Report<sup>44</sup> looked at three alternatives for calculating the future arisings of MSW and selected as its preferred growth option a middle range projection of **continued growth in MSW arisings, with the growth rate matching household growth rates** between 2007-2021.
- 3.131. This assumes that current annual levels of MSW growth will reduce to match the growth of the number of households by 2007. This option takes account of greater emphasis on waste minimisation and the introduction of new waste collection systems which may inflate the quantity of municipal waste collected.
- 3.132. For the period 2004-2007, the annual growth in municipal waste arising for each WPA was therefore assumed to be the household growth rate (2000-2007) plus 1%. For the periods 2007-2011 and 2011-2021, it was assumed that projected rates of household growth will reflect targets and allocations for new dwellings set out in Regional Planning Guidance, adjusted to take account of demolitions and vacancy rates for each WPA area.
- 3.133. This gave the following projected arisings figures for Worcestershire and Herefordshire (Table 34).

**Table 34: RSS Phase 2 Revision Draft Preferred Option: Municipal Waste Arisings (Worcestershire and Herefordshire)<sup>45</sup> (tpa)**

2010	2015	2020	2025
443,000	463,000	483,000	504,000

- 3.134. MSW arising in Worcestershire and Herefordshire have fallen since the 2002/3 baseline. The figures in the Phase 2 report and those

<sup>44</sup> *West Midlands Waste Treatment Facilities Capacity Study: Phase 2 Future Capacity Requirements Report* (West Midlands Regional Assembly, Shropshire County Council November 2004) para 2.7

<sup>45</sup> *WMRSS- Phase 2 Revision. Draft Preferred Option* (December 2007) Table 5 (Worcestershire and Herefordshire.)

developed in Table 5 of the WMRA Phase 2 Revision Preferred Options (December 2007) are therefore higher than current actual arisings.

### Review of the Joint Municipal Waste Management Strategy for Herefordshire and Worcestershire (February 2009)

- 3.135. The Council and its partners developed a range of scenarios for the First Review of the Joint Municipal Waste Management Strategy for Herefordshire and Worcestershire (February 2009) ("the JMWMS Consultation"). These were formally set out in Annex A to that consultation, entitled "Waste Growth".

**Scenario 1** – a top end estimate of the average MSW growth rate for the last 5 years, as quoted in the Waste Strategy for England 2007.

**Scenario 2** – a forecast of MSW growth based on the latest (2007-2008) tonnages for Herefordshire and Worcestershire, with rates of production per household remaining constant but with the number of households growing in line with option 2 from the Regional Spatial Strategy.

**Scenario 3** – a forecast of MSW growth based on the objectives from the Waste Strategy for England 2007 to reduce household waste not re-used, recycled or composted to 225kg/head by 2020. So with a 50% re-use, recycling and composting rate that means total household waste arisings will be 450kg/head. The growth in population associated with option 2 of the Regional Spatial Strategy were applied to the total household waste arisings of 450kg/head. Non-household waste arisings were assumed to remain static.

**Scenario 4** – a forecast of MSW growth based on a profile of the MSW arisings in Herefordshire and Worcestershire from the last five years but with the number of households growing in line with option 2 of the Regional Spatial Strategy.

- 3.136. Scenario 2 was chosen as the preferred option for the reviewed JMWMS:

*"The reason behind this choice is that although we are intending to concentrate our efforts on waste minimisation we are also implementing paid for green waste collections in some local authority areas. Our experience shows that new green waste collections actually generate an increased overall tonnage of MSW, it is our belief that this will balance the waste minimisation efforts and thus waste growth will be due only to the growth in the number of households."*  
(JMWMS First Review, Annex A).

### ***MSW Growth Projections: Preferred Methodology***

- 3.137. The preferred growth projection options of the proposed RSS Phase 2 Revision (option 2) and the JMWMS (scenario 2) both forecast annual MSW growth on the level of arisings per household remaining constant but with the number of households growing in line with option 2

from the proposed revision of the RSS Phase 2 Revision Regional Spatial Strategy.

3.138. There are differences between the RSS and JMWMS projections due to a difference in the baseline data, with the proposed RSS Phase 2 Revision being based on 2002/3 estimates and the JMWMS on 2007/08 DEFRA data.

3.139. In order to use the more up to date data and to maintain consistency with the JMWMS, 2007/08 figures will be used for the baseline in the Waste Core Strategy.

**Box 11. MSW Arisings Projection: Preferred Methodology**

Make projections based on:

- annual MSW arisings per household remaining constant
- growth in number of households growing in line with option 2 from the proposed RSS phase 2 revision.
- 2007-8 baseline: 395,993 tonnes per annum

This uses the preferred method from both the RSS and JMWMS.

3.140. The estimates based on this method are set out in **Table 35**.

**Table 35: MSW Projections; tonnes p.a. (Worcestershire and Herefordshire combined)**

	<b>2007 (baseline)</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2034</b>
MSW arisings per year (tonnes)	395,993	405,139	421,817	438,496	455,175	471,854	485,197
Number of households (based on RSS phase 2 annual average increase)	321,245	329,381	342,941	356,501	370,061	383,621	394,469

Note: These figures are based on a stable level of arisings per household with an annual increase based on the number of households.

Source: Herefordshire and Worcestershire Joint Municipal Waste Strategy Review 2009: Annex A. The figures are for Scenario 2 following the removal of an earlier scenario from the consultation. The text in JMWMS Annex A did not make this clear.

## ***Risk Assessment***

3.141. Following the change of Government in May 2010, the government has stated its intention to revoke the WMRSS along with its stated housing targets. The RSS currently still forms part of the Development Plan and even if the RSS is formally revoked, housing development will still be planned for and still occur. The adopted Wyre Forest Core Strategy is based on the Phase 2 revision housing targets and no other Core Strategies have yet been adopted in the County. As a result the RSS Phase 2 Revision Draft housing figures are the best estimate we have to work with at present.



3.142. Any further decisions at national, regional or local level, either on methodology or housing growth, will be noted in our Annual Monitoring Report (AMR). This will be used, along with continued monitoring of actual MSW arisings, to revise our calculations.

3.143. The risk assessment for this approach is summarised in **Table 36**.

**Table 36. MSW growth projections risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	<p>The figures are founded on the best possible calculations derived from two independent bodies and endorsed by two further independent groups. They are also consistent with the JMWMS.</p> <p>However uncertainty regarding the future status of the RSS and housing figures could impact on these estimates.</p>
<b>Worst Case Scenarios:</b> The calculations are too high and an overprovision of facilities could occur.	Medium	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, the Herefordshire and Worcestershire Joint Municipal Waste Management Strategy, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>It is possible that facilities could manage waste from other (C&amp;I) sources to utilise any surplus capacity which might exist.</p>
<b>Worst Case Scenarios:</b> The calculations underestimate the scale of waste arisings.	Low	This is considered very unlikely. Existing trends show a clear strong reduction in the MSW arisings. National, regional and local policy and considerable financial pressures and incentives all reinforce this trend. Any reversal in these is considered highly unlikely.

## Section 4. Capacity Gap: Re-use and Recycling, and Recovery

- 4.1. This section considers Worcestershire's current capacity for re-use, recycling and recovery of waste, and uses this information to calculate the current and projected capacity gap. Very simply the capacity gap is the difference between the amount of waste arising in Worcestershire and the capacity to manage it.
- 4.2. In practice the amount and types of capacity required depends on a combination of national, regional and local targets, the nature and scale of arisings in the county and estimates of the scale of existing waste management capacity in Worcestershire.
- 4.3. Estimates of the additional waste management capacity needed are subject to constant revision as facilities open and close, expand and contract and to changing assumptions about how, where and when the population and economy of the county will change. This document and the estimates of what waste management capacity we have to provide for are therefore subject to constant change but provide the most accurate estimations possible at the time of writing.

### ***Problems in identifying the capacity gap***

- 4.4. The available waste data is not comprehensive, particularly regarding where wastes come from or go to. There is an element of double counting: operators often treat a material to some extent and forward it to another operator who may also treat it before it is reused, disposed of, or subdivided into elements each of which may themselves be treated differently and despatched to different places.
- 4.5. There is also a significant element of undercounting. A large and increasing range of materials can be managed as 'exemptions'. In practice this means handled without a specific waste management licence or permit. These activities are not generally inspected or monitored by the Environment Agency and there is no reliable information on the volume of material involved from a national or regional level. Officer visits to the waste facilities in the county have been undertaken in order to try and fill this knowledge gap.
- 4.6. It is also widely accepted that whilst waste transfer operators mainly sort and forward waste for further treatment, they do also treat and recycle materials themselves. The problem is that no accurate figures exist to calculate these elements. The AWM report "Waste: A Future for Business"<sup>46</sup> found that 70% of Waste Transfer Stations who responded to their survey were currently performing some kind of pre-treatment which diverted waste from landfill. The range of responses varied from 27% to 100% of waste input, with 60% representing a common

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<sup>46</sup> "Waste a Future Resource for Businesses" (Dec 2007) (SLR/AWM)

performance. For illustrative purposes only, the AWM report estimated that Waste Transfer Stations have the potential to provide between 0.8 and 1.8 million tonnes of diversion (recycling) capacity per year in the West Midlands. None of this material is counted in Environment Agency returns. The data on current activity is therefore not at all clear.

- 4.7. The West Midlands Technical Advisory Body for Waste was asked for advice<sup>47</sup> on whether and how account could be taken of waste transfer stations' diversion capacity. Their recommendation was that there was no sound way of doing so at present and we have not done so. We intend to monitor this concept however and will report any developments in the council's AMR. Meanwhile it must nonetheless be recognized that our estimates of existing capacity undervalue the extent of diversion from landfill which is actually taking place.
- 4.8. This background document assumes that the capacity gap will be filled by new facilities. However, the *West Midlands Regional Assembly Treatment Facilities and Capacity Survey (2007)* found that facilities in the West Midlands utilise only 59% of their theoretical maximum capacity and that intensification and re-organisation of existing facilities may provide some increased capacity. Of the facilities that responded to that study 65% indicated that the facility had potential to expand its throughput with only 35% indicating that they were at their maximum capacity. It is therefore possible that very significant increases in the waste management capacity of the county could be achieved without the need for new planning permissions to be granted if operators simply increased the actual capacity of their existing operations. Some such increases might be achieved simply through the use of more efficient or larger plant, more efficient processing or even simply through working longer hours.
- 4.9. Anecdotal evidence from waste operators in the County suggests that this trend is likely to be true of facilities in Worcestershire; several existing sites have been sub-divided in recent years or are only operating within part of their permitted area. From our initial inspection of these sites it is likely that some of these could expand their operational capacity by re-occupying these areas.
- 4.10. It is therefore possible that significant additional capacity might be provided by the producers of waste themselves. This concept appears to be widely accepted. Cumbria County Council's adopted Waste Core Strategy states that "*half of commercial/industrial waste will be managed in situ, and, therefore, will not need sites to be identified*"<sup>48</sup>. This was accepted by all parties, including the Inspector at the Core Strategy examination. Cumbria County Council have informed us orally that there is no specific evidence for this assertion, it is sufficiently reasonable to be self evident. The Worcestershire Waste Core Strategy does not make any specific estimate of how much new capacity will be created in this way, but it seems compelling that some such provision will be made over the life of the strategy in response to normal market processes. The Council

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<sup>47</sup> At the RTAB meeting of 16<sup>th</sup> July 2010.

<sup>48</sup> Cumbria Minerals and Waste Development Framework: Adopted Core Strategy, para 7.29

will monitor actual capacity during the life of the strategy and revise its estimates of the capacity gap accordingly.

- 4.11. Finally, estimates of what additional waste management capacity is needed are also subject to constant revision as facilities open and close, expand and contract and to changing assumptions about how, where and when the population and economy of the county will change. All of these are also subject to wider changes in the world outside. The economy is now so complex that, for example, the seasonal variations in the distribution of world shipping directly affect the viability of collecting cardboard in Worcestershire<sup>49</sup>. This document and the estimates of what waste management capacity we need to provide are therefore subject to constant change but provide the most accurate estimations possible at the time of writing.

## C&I waste

### ***Existing capacity for re-use, recycling and recovery of C&I waste***

#### Environment Agency Waste Data Interrogator

- 4.12. The Waste Data Interrogator (WDI) provides details of the annual throughputs of licensed sites in Worcestershire in terms of Household, Commercial and Industrial waste, see Table 37. It is not possible to determine what proportion of the HCI waste recorded in the Waste Data Interrogator is MSW or what proportion is C&I waste.

**Table 37. Throughput of C&I waste, EA Waste Data Interrogator<sup>50</sup> (tonnes)**

	2007	2008	2009
Re-use and recycling	106,242.87	112,360.35	130,755.01
Recovery	-	-	-

- 4.13. These figures give details of current throughput but do not give any indication of unused or potential capacity at currently operational sites. In addition they do not consider the throughput of exempt sites in the county.

<sup>49</sup> Reference to world shipping affecting cardboard collection came from a personal communication by an employee at a cardboard recycling plant to N Dean, 9<sup>th</sup> April 2010.

<sup>50</sup> Derived by running the query as follows: Facility location Worcestershire WPA, waste category HIC, classification include all, Facility type by site category include all, report waste received, display data by site category.

## Worcestershire County Council Research: Waste Sites Background Document

- 4.14. In evidence gathering for the Waste Core Strategy, officers visited every known operating waste site in the county. As part of this, each operator was asked to complete a questionnaire detailing:
- annual throughput
  - types of waste managed
  - site area
  - waste source
  - destination of recycle/residues.

Some of these responses were estimates, but the information gathered can be used to supplement data recorded in the Waste Data Interrogator, specifically regarding exempt sites and processes.

### ***Calculating Capacity: Preferred Methodology***

- 4.15. The site throughputs shown in the Waste Data Interrogator vary each year according to how much waste the facilities handled. In order to get the best indication of maximum capacity, the highest figure for each site from either 2008 or 2009 has been used. Where there are gaps in the EA data this is supplemented by the council's research. This gives the re-use, recycling and recovery capacities shown in Table 38.

**Table 38. Worcestershire waste management capacity (WDI supplemented by Waste Sites research<sup>51</sup>)**

Waste hierarchy level	Tonnes per annum
Re-use and recycling	273,057.3
Recovery	0

Note: Re-use and recycling facilities include Metal Recycling Sites, End of Life Vehicle sites, composting and physical treatment facilities.

- 4.16. The main reason for the higher figure for re-use and recycling generated by this approach is the presence of numerous sites in Worcestershire that deal with both exempt and non-exempt waste, and the fact that exempt elements are not recorded on the WDI. Details of the site throughputs behind these figures are set out in the Background Document "*Waste Sites in Worcestershire*".
- 4.17. The waste sites research and the Waste Data Interrogator give figures for throughput rather than permitted capacity at the sites. Whilst this may underestimate the notional capacity available, it is considered that this is preferable to overestimating existing capacity when determining the capacity gap. An overestimate of existing capacity could lead to underestimating the amount of new capacity and land required in the Waste Core Strategy.
- 4.18. In order to ensure that adequate provision of treatment facilities is provided we intend to use the combined Waste Data Interrogator and

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<sup>51</sup> Any facilities specifically for the management of MSW have been excluded from these totals. Some facilities may play a part in managing MSW waste but are considered here to be primarily C&I waste facilities.

waste sites research as the basis for identifying the capacity gap. The Environment Agency Waste Data Interrogator is more robust than the council's waste sites research data, but using the research as a supplement overcomes the disadvantage of the Waste Data Interrogator that it does not recognise the role of exempt sites in the county. However, even the combined data does not include unused capacity in existing facilities and the capacity in sites which are permitted but not operational. We therefore anticipate that monitoring will show significant increases of "actual" capacity over the next few years.

**Box 12. Calculating current C&I capacity: Preferred Methodology**

Current C&I capacity calculated by using the highest figures from either 2008 or 2009 WDI for each site, supplemented by the Council's research.

## ***Risk Assessment***

**Table 39. Method for estimating capacity: Risk Assessment**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The figures are founded on the best available data, with robust EA data supplemented by WCC research where appropriate.
<b>Worst Case Scenarios:</b> The calculations are too high and overestimate current capacity.	Low	Most of the data is from accurate figures of actual throughput which is recorded by operators and submitted to the EA.
<b>Worst Case Scenarios:</b> The calculations are too low and overestimate current capacity.	Medium	Data records current throughput but does not consider maximum notional capacity at each site.  This will be monitored through the AMR and increases recorded. It is likely that market mechanisms will prevent overprovision of facilities.

## ***Capacity Gap***

- 4.19. Table 40 shows the projected capacity gap for C&I waste re-use, recycling and recovery facilities. This shows that more capacity for C&I waste in Worcestershire is required. This is based on projection of C&I waste arisings and estimates of current capacity as outlined elsewhere in this paper.

**Table 40: Capacity Gap for C&I waste**

	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
Projected arisings	601,790.4	644,038.8	692,072.6	746,684	808,773.9	879,366.2
Current Capacity	273,057.3	273,057.3	273,057.3	273,057.3	273,057.3	273,057.3
<b>Capacity Gap</b>	<b>328,733.1</b>	<b>370,981.5</b>	<b>419,015.3</b>	<b>473,626.7</b>	<b>535,716.6</b>	<b>606,308.9</b>

## ***Targets***

- 4.20. In order to calculate the capacity gap at each level of the waste management hierarchy (ie re-use and recycling, recovery and disposal) we need to consider targets for each of these.
- 4.21. There is a very wide range of alternatives we might consider to develop targets from these figures:

### **European Targets**

- 4.22. Article 5 of the Landfill Directive (1999) requires that Member States shall set up a national strategy to implement targets for reductions in biodegradable municipal waste going to landfill:
- Within 5 years: 75% of the 1995 levels
  - Within 8 years: 50% of the 1995 levels
  - Within 15 years: 35% of 1995 levels
- However, these targets do not apply to other waste streams.

### **National Targets**

- 4.23. The Waste Strategy for England 2007 sets progressive targets for reducing C&I arisings and sets a target for a reduction in the percentage of C&I waste landfilled, with a target reduction of at least 20% by 2010 compared to 2004 levels. Neither the Environment Agency, Government Office for the West Midlands or Defra can identify a satisfactory estimate of what C&I waste arisings for Worcestershire were in 2004. In the absence of this data a target cannot be set.
- 4.24. We anticipate that national targets will change as sustainability and climate change issues become more significant and we will consider the need to revise the target through our monitoring processes.
- 4.25. The Waste Strategy for England 2007 does not set specific targets for the recovery of C&I waste, although it does promote the concept generally and includes references to developing targets for C&I recovery. The possibility of specific targets for energy recovery from 1/3 of all wood waste and 60% of packaging waste is referred to but the only specific target for energy recovery is for 25% of MSW by 2020.

## Regional Targets

- 4.26. The WMRTAB commissioned a "Waste Scenarios Study" (WMRA/Enviros) (Final Report July 2005) which assessed 7 scenarios as to how C&I Waste in the Region might be managed in the West Midlands. These are:

- **Scenario 1 – Phase 2 Report Predictions<sup>52</sup>**

The current level of recycling and landfill diversion continues to grow exponentially. Additional treatment capacity is required. The extrapolated scenario is based on a recycling and recovery rate of 75%.

- **Scenario 2 – No Change**

No additional treatment capacity is provided; the predicted capacity shortfall is provided through increased landfill disposal, based on a recycling and recovery rate of 40%. Scenario 2 is one of the least likely to develop as it is heavily reliant on landfill and as such is unsustainable.

- **Scenario 3 – 25% of treatment need provided**

25% of the shortfall in treatment need is provided and all waste not treated is sent to landfill. Recycling and recovery rate of 45%.

- **Scenario 4 – 50% of treatment need provided**

50% of the shortfall in treatment need is provided and all waste not treated is sent to landfill.

- **Scenario 5 – 75% of treatment need provided**

75% of the shortfall in treatment need is provided and all waste not treated is sent to landfill. Recycling and recovery rate of 65%.

- **Scenario 6 – Incineration based provision**

All additional treatment capacity need is provided by incineration. Recycling and recovery rate of 75%. This scenario is unlikely to be supported by local residents and does not support a high recycling approach.

- **Scenario 7 – Exceed Phase 2 Report Predictions**

Recycling and Recovery predictions are exceeded. Treatment need is estimated to be 125% of estimates set out in Scenario 1. Recycling and Recovery rate of 90%. This scenario has the highest sustainability score of 13 and it reduces the need for landfill capacity and involves greater recycling activity. This is an aspirational scenario but one that is unlikely to be supported by the industry until heavier legislative pressure to recycle and reduce waste arisings is imposed.

- **Scenario 8 – Zero Landfill**

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<sup>52</sup> The references to the Phase 2 report in Scenario 1 are to the "West Midlands Waste Treatment Facilities Capacity Study. Phase 2: Future Capacity Requirements" report (WMRA: Shropshire CC 16/11/2004).



No waste is disposed to landfill and all disposal capacity is provided by treatment. This scenario is one of the least likely as it assumes no landfill. This is unlikely to occur in the short term, even if high recycling and treatment activity are achieved.

- 4.27. The Waste Scenarios Study included a Sustainability Assessment which assessed the sustainability of the Scenarios as shown in **Table 41**.

**Table 41. Commercial and Industrial Sustainability Scores**

Scenario	Sustainability Score
<b>Scenario 7: Exceed Recycling Predictions</b>	13
<b>Scenario 8: Zero Landfill</b>	8
<b>Scenario 1: 'Phase 2 Report' Predictions 75% Treatment</b>	7
<b>Scenario 5: Min 65% Treatment, 25% Landfill</b>	7
<b>Scenario 6: All incineration</b>	6
<b>Scenario 4: 50% Treatment, 50% Landfill</b>	-1
<b>Scenario 3: 45% Treatment, 55% Landfill</b>	-11
<b>Scenario 2: 40% treatment 60% Landfill</b>	-18

(Waste Scenarios Study, table 59)

- 4.28. The conclusions made in the scenarios study and subsequently used to develop the proposed Phase 2 Revision of the WM RSS are that scenarios 1 and 5 are reasonable and sustainable and are therefore the most likely to be achievable within the life of the Waste Core Strategy.
- 4.29. Scenario 1 is very similar to Scenario 5, and is based on extrapolating current levels of activity based on predicted future policy and legislative change, its assumptions are clearly set out and reasonable.<sup>53</sup> Scenario 5 is similar but sets a less ambitious target for recycling and recovery (65%) than scenario 1 (75%). The Council does not consider that there is any merit in not aiming at the higher target.
- 4.30. The Waste Scenarios Study developed Scenario 1 on the assumption that additional treatment capacity would be spread across the range of biological, physical and thermal treatment facilities and these could be achieved through a wide range of sizes of facilities. The Sustainability Appraisal of the scenarios considered that scenario 1 had *"the potential to make positive contributions to all the sustainability objectives and in some cases significant contributions... [because]... a range of treatments provides the best opportunity to maximise positive effects and mitigate negative ones"*<sup>54</sup>.
- 4.31. The Phase 2 Revision of the RSS included a table setting out the minimum amount of C&I waste which should be diverted from landfill and the maximum amount which should be landfilled. Table 42 sets out the targets for Worcestershire.

<sup>53</sup> Paragraphs 3.5 to 3.10

<sup>54</sup> "Waste Scenarios Study" (WMRA/Enviros) (Final Report July 2005) para 8.8.1

**Table 42. C&I waste diversion targets for Worcestershire (RSS Phase 2 table 6)**

	<b>2005/6</b>	<b>2010/11</b>	<b>2015/16</b>	<b>2020/21</b>	<b>2025/26</b>
Minimum diversion from landfill	441,000	503,000	627,000	858,000	858,000
Maximum landfill	320,000	271,000	268,000	286,000	286,000

- 4.32. The assumptions behind these projections are for uneven increases on both arisings and recycling/recovery rates over the period<sup>55</sup>. These projections have not been borne out in reality. In essence however the table shows landfill reduced to 25% of the total by 2020.

## Local Targets

- 4.33. In 2003, the Council adopted an "Assessment of the Best Practicable Environmental Options for Municipal Solid Waste, Commercial and Industrial Waste and Construction and Demolition Waste Arisings for Worcestershire and Herefordshire" (June 2003 ERM) ([www.worcestershire.gov.uk/wcs](http://www.worcestershire.gov.uk/wcs)) ("the BPEO"). This remains Council policy (as part of the revised Joint Municipal Waste Management Strategy for MSW) but is no longer part of national policy. We therefore do not intend to give it much weight when developing the Waste Core Strategy.
- 4.34. It is the Council's BPEO policy to recycle at least 73% of C&I waste, this is consistent with Scenario 1 of the Waste Scenarios study. Basing the Waste Core Strategy on scenario 1 and 75% recycling and recovery would therefore represent the continuation, in substance, of a long standing approach to waste management in Worcestershire which has been subject to and supported by several rounds of public consultation.

## Preferred target for the management of C&I waste

Although the RSS is likely to be revoked in the near future, it currently still forms part of the development plan and the evidence base on which it was based is still valid. In the absence of more convincing national or local targets, we believe that Scenario 1 of the Waste Scenarios study is the most realistic alternative and is a realistic policy aspiration. It is expressly *"the position based on extrapolating current levels of activity based on future policy and legislative change"*<sup>56</sup>

- 4.35. In the absence of specific national targets we intend to adopt the approach based on the Phase 2 Capacity study set out above to identify a distribution between recycling and recovery needs.

<sup>55</sup> "West Midlands Waste Treatment Facilities Capacity Study. Phase 2: Future Capacity Requirements" report (WMRA: Shropshire CC 16/11/2004). Para 3.5

<sup>56</sup> West Midlands Waste Treatment Facilities Capacity Study. Phase 2: Future Capacity Requirements" report (WMRA: Shropshire CC 16/11/2004). Para 4.2

4.36. Scenario 1 is to achieve 75% diversion from landfill, through re-use, recycling and recovery. Recycling is higher in the waste hierarchy than recovery but it is clear that at present not all materials can be recycled. The Waste Strategy for England 2007 states that incineration with energy recovery avoids the negative effects of landfilling and saves limited amounts of energy and materials so has a small positive effect overall.

4.37. In order to be realistic, the target for diversion from landfill needs to be further split to reveal separate targets for 're-use and recycling', and 'recovery'. The Waste Scenarios Study (Table 13 of that document) splits the requirement into biological treatment (at 32%), physical treatment (at 40.4%) and thermal treatment (at 27.6%). This distribution of treatment types informed the development of the Phase 2 revision of the WMRSS but was not carried forward to define specific policy requirements<sup>57</sup>.

4.38. These figures have been used to derive the targets for C&I waste in the Waste Core Strategy and set an ambitious but realistic target. For the purposes of establishing a target for the Waste Core Strategy, biological and physical treatments are considered to be re-use and recycling and thermal treatment to be recovery.

Re-use and recycling	Biological treatment	32%	32% of 75% =	24%	54.3%
	Physical treatment	40.4%	40.4% of 75% =	30.3%	
Recovery	Thermal treatment	27.6%	27.6% of 75% =	20.7%	20.7%

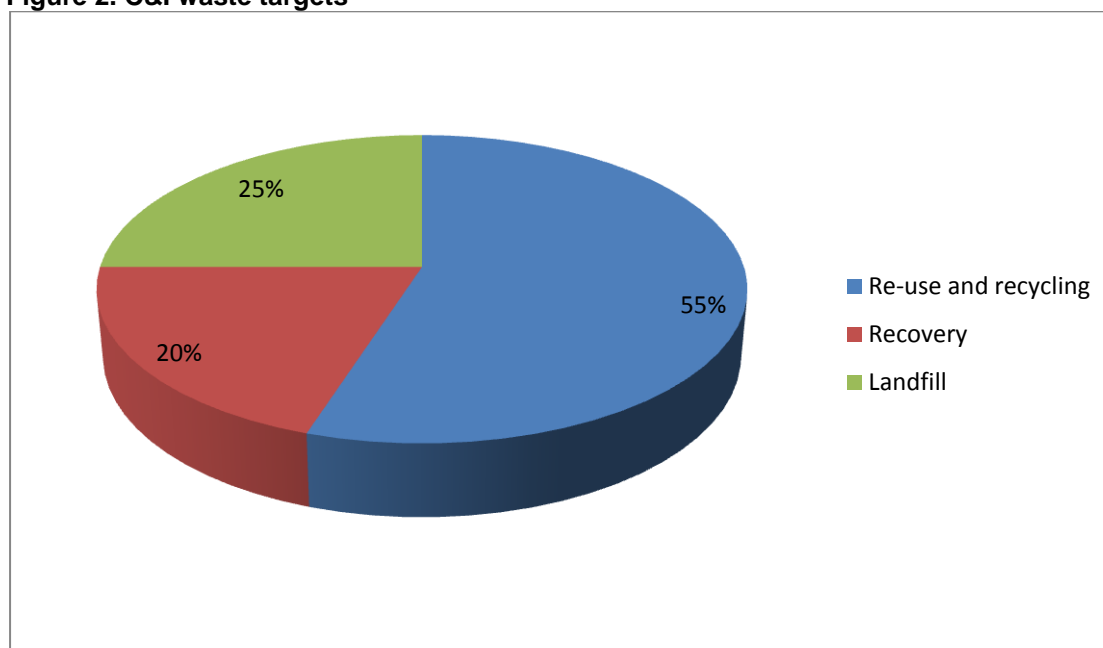
4.39. We have therefore used the target for C&I waste of 75% re-use, recycling and recovery, applied as follows:

- 55% re-use and recycling
- 20% recovery and
- 25% landfill/disposal.

<sup>57</sup> Physical treatment is assumed to cover materials recycling/sorting activities that might occur at an MRF or transfer facility as well as other forms of physical treatment. It also includes physiochemical and chemical treatment for the purposes of this study as the capacity in the region is very limited. Biological treatment includes primarily the treatment of organic waste in an enclosed system such as in-vessel or anaerobic digestion facilities. Some capacity will be made up of windrow facilities. These estimates of the proportions of different treatment methods needed are derived from analysis of the SWMA 2000 of the composition of specific waste streams, supplemented by work undertaken on behalf of the Welsh Assembly. For example, food and kitchen waste were assumed to be treated via biological treatment. Paper, card, glass and other recyclables were assumed to follow a physical treatment route and other waste types were assumed to be treated via thermal treatment. West Midlands Waste Treatment Facilities Capacity Study. Phase 2: Future Capacity Requirements" report (WMRA: Shropshire CC 16/11/2004). Para 4.2.1

This is shown in Figure 2.

**Figure 2. C&I waste targets**



4.40. We anticipate that future EC and national policies are likely to further promote resource recovery and recycling technologies and we will revise these targets during the life of the strategy if more ambitious targets are set.

**Box 13. C&I target led capacity gap: Preferred Methodology**

Capacity requirements will be calculated on the basis of:

- 55% re-use and recycling
- 20% recovery
- 25% landfill/disposal

This is broadly in accordance with the RSS proposed phase 2 revision.

4.41. Applying these targets to the identified C&I capacity gap gives the capacity requirements for re-use and recycling and recovery shown in **Table 43**.

**Table 43. C&I waste (including agricultural waste) re-use & recycling, and recovery capacity requirements (tonnes per annum)**

Year	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
Projected arisings	601,790.4	644,038.8	692,072.6	746,684	808,773.9	879,366.2
Re-use and recycling requirement (55%)	330,984.72	354,221.34	380,639.93	410,676.2	444,825.65	483,651.41

Current re-use and recycling capacity	273,057.3	273,057.3	273,057.3	273,057.3	273,057.3	273,057.3
<b>Re-use and recycling capacity gap</b>	<b>57,927.42</b>	<b>81,164.04</b>	<b>107,582.63</b>	<b>137,618.90</b>	<b>171,768.35</b>	<b>210,594.11</b>
Recovery requirement (20%)	<b>120,358.08</b>	<b>128,807.76</b>	<b>138,414.52</b>	<b>149,336.8</b>	<b>161,754.78</b>	<b>175,873.24</b>
Current recovery capacity	0	0	0	0	0	0
<b>Recovery capacity gap</b>	<b>120,358.08</b>	<b>128,807.76</b>	<b>138,414.52</b>	<b>149,336.8</b>	<b>161,754.78</b>	<b>175,873.24</b>

## ***Risk Assessment***

4.42. There are difficulties in trying to anticipate the market but given the wide ranging nature of Worcestershire's economy and the kinds of waste produced, it is clear that different kinds of waste treatment facility will be necessary. The percentage targets are in general accordance with the evidence base for the WMRSS Phase 2 revision<sup>58</sup>.

4.43. The risk assessment for this approach is summarised in Table 44.

<sup>58</sup> i.e. the West Midlands *Waste Treatment Facilities Capacity Study "Phase 2: Future Capacity Requirements"* (AWM/SLR/18/11/2004) paragraph 3.10 assumed 50% recycling and 25% recovery.

**Table 44. C&I Re-use and recycling and recovery capacity gap risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Medium	<p>The estimates of current capacity are based on the most reliable source of information available and supplemented with additional local research.</p> <p>The targets are the most likely to be achieved and sustained over the life of the strategy.</p>
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Medium	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste management. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.</p>
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	<p>This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>

# Hazardous, clinical and radioactive waste

## ***Existing capacity for re-use, recycling and recovery of hazardous, clinical and radioactive waste***

- 4.44. The amount of hazardous waste managed in the county is recorded in the Environment Agency's Hazardous Waste Data Interrogator. Figures for 2008 and 2009 are shown in Table 45. Whilst this does not give a total for the total permitted capacity for handling hazardous waste in the county, it does show the actual amount handled.

**Table 45. Hazardous waste capacity (tonnes)**

Disposal or recovery method	2008	2009
Re-use and Recycling	219.36	239.02
<i>Recycling / reuse</i>	<i>168.54</i>	<i>199.11</i>
<i>Treatment</i>	<i>50.72</i>	<i>39.91</i>
Transfer (total)	66,701.35	51,896.79
<i>Transfer (D)</i>	<i>2,767.25</i>	<i>2,852.69</i>
<i>Transfer (R)</i>	<i>63,934.10</i>	<i>49,044.10</i>
Incineration without energy recovery	7,968.40	8,163.68
<b>Total</b>	<b>74,889.01</b>	<b>60,299.50</b>

- 4.45. The most significant aspect of hazardous waste management capacity is transfer (transfer capacity will be addressed later in Section 5).
- 4.46. The figure shown as 'Incineration without energy recovery' is known to be the capacity at the clinical waste incinerator in Redditch. This facility recovers heat which is used at the Alexandra Hospital. It is therefore considered to be recovery capacity at 8,163.68 tonnes in 2009, although it has a licensed throughput of 10,000 tonnes per annum. The facility is also authorised to manage radioactive waste
- 4.47. It is possible that future technologies may emerge in the county which significantly alter the levels of arisings. It is also very difficult to generalise about hazardous waste capacity since processing requirements and capacity are specific to the characteristics and relative concentration of the material being handled.

## ***Re-use, recycling and recovery capacity gap and targets***

- 4.48. There are currently no specific targets for the management of hazardous waste.

4.49. In order to align with the other major waste streams, of which hazardous waste is a component, we will set a target of 75% re-use, recycling and recovery and 25% landfill/disposal, applied as follows:

- 55% re-use and recycling
- 20% recovery and
- 25% landfill/disposal.

This recognises current trends and the pollution control requirements for certain forms of hazardous waste to be disposed of or landfilled.

4.50. Applying these targets to the identified Hazardous Waste arisings gives the capacity requirements for re-use and recycling and recovery shown in Table 46 (landfill and disposal requirements are considered in Section 6).

**Table 46. Hazardous, clinical and radioactive waste capacity gap**

	2010	2015	2020	2025	2030	2035
Projected arisings	73,571.90	73,621.00	73,670.10	73,719.20	73,768.30	73,807.60
Re-use and recycling requirement (55% of total)	40,464.55	40,491.55	40,518.56	40,545.56	40,572.57	40,594.18
Current re-use and recycling capacity	239.02	239.02	239.02	239.02	239.02	239.02
<b>Re-use and recycling capacity gap</b>	<b>40,225.53</b>	<b>40,252.53</b>	<b>40,279.54</b>	<b>40,306.54</b>	<b>40,333.55</b>	<b>40,355.16</b>
Recovery requirement 20% of total)	14,714.38	14,724.20	14,734.02	14,743.84	14,753.66	14,761.52
Current recovery capacity	8,163.68	8,163.68	8,163.68	8,163.68	8,163.68	8,163.68
<b>Recovery capacity gap</b>	<b>6,550.70</b>	<b>6,560.52</b>	<b>6,570.34</b>	<b>6,580.16</b>	<b>6,589.98</b>	<b>6,597.84</b>

## ***Risk Assessment***

4.51. The risk assessment for this approach is summarised in Table 47.



**Table 47. Hazardous waste re-use, recycling and recovery capacity gap risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Medium	<p>The estimates of current capacity are based on the most reliable source of information available.</p> <p>The targets are the most likely to be achieved and sustained over the life of the strategy.</p>
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Medium	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste management. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.</p>
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	<p>This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>

## **C&D waste**

### ***Existing capacity for re-use, recycling and recovery of C&D waste***

- 4.52. C&D waste recycling primarily involves crushing and screening activities and is largely carried out by static or mobile plant. Mobile plant

is able to follow the treatment capacity need, and this need will vary over time depending on where regeneration or construction activity is taking place (WMRA, Waste Scenarios Study, 2005).

4.53. There is a disparity between the volume of C&D waste identified in the Waste Data Interrogator and the various calculations of arisings. It is widely accepted that large volumes of C&D waste are treated and crushed on site by mobile plant as part of other development activity. There are no records of the volumes treated in this manner, but this activity clearly enables the re-use and recycling of considerable volumes of material. The current capacity for C&D waste is therefore very difficult to calculate, as is the capacity gap.

4.54. There are a number of possible ways to calculate the existing capacity for the re-use and recycling of C&D waste arisings:

### EA Waste Data Interrogator C&D throughput figures

**Table 48. Calculating C&D treatment capacity gap <sup>59</sup> (tonnes per annum)**

	2010	2015	2020	2025	2030	2035
Projected C&D arisings	510,555	419,520	419,520	419,520	419,520	419,520
Current capacity (Waste Data Interrogator 2009)	102,417.27	102,417.27	102,417.27	102,417.27	102,417.27	102,417.27
Capacity gap (Arisings minus current capacity)	408,137.73	317,102.73	317,102.73	317,102.73	317,102.73	317,102.73

4.55. There are limitations in this approach. Deducting known capacity at existing waste management facilities from the total arisings predicted ignores the facts that:

- this is based on actual capacity identified in the WDI (2007) but substantial additional capacity already exists at those sites;
- mobile plant are now commonplace and much C&D waste is treated on site during re-development; This capacity is not included;
- the capacity shown on the Waste Data Interrogator is all from Waste Transfer Stations: the line between transfer and treatment of C&D waste is difficult to distinguish. Many waste transfer stations actually crush and sell C&D waste as ancillary activities to their main planning permissions, meaning that in practice further capacity could be achieved at existing sites if operators simply introduced larger or more efficient plant.

### Worcestershire County Council Research: Waste Sites Background Paper

<sup>59</sup> Current capacity derived from Waste Data Interrogator 2007 by running the query for WPA Worcestershire, by waste category 'inert', by site category 'all', reporting waste received and showing facility by site category.

4.56. In evidence gathering for the Waste Core Strategy, officers visited every known operating waste site in the county. As part of this, each operator was asked to complete a questionnaire detailing:

- annual throughput
- types of waste managed
- site area
- waste source
- destination of recycle/residues

Some of these responses were estimates, but the information gathered can be used to supplement data recorded in the Waste Data Interrogator, specifically regarding exempt sites and processes.

4.57. Only one facility (Stanford highways depot) was identified as a C&D treatment facility for the reprocessing of road planings. Several other sites also undertook crushing a screening of soils and aggregates, however all of these facilities are classed as sorting and transfer facilities and their throughput has therefore have not been included in Table 49.

**Table 49. Worcestershire C&D waste management capacity (Waste Sites research)**

<b>Waste hierarchy level</b>	<b>Tonnes per annum</b>
Re-use and recycling	20,000

4.58. As this approach does not take into account the current capacity for the management of C&D waste at transfer stations or mobile plant, it is likely that it underestimates current treatment capacity and cannot realistically be used as the estimate of C&D treatment capacity.

### WMRA 'Waste Scenarios Study'

4.59. The 'Waste Scenarios Study' (WMRA/Enviros July 2005) developed four scenarios for additional capacity to recycle C&D waste in the West Midlands:

- **Scenario 1. No change**

No new recycling provision, shortfall in capacity is made up by additional landfill

- **Scenario2. Large scale provision**

Recycling capacity shortfall is provided for by large scale facilities (static plant)

- **Scenario 3. Small scale provision**

Recycling capacity provided by small scale facilities (mobile crushing plant)

- **Scenario 4. Hybrid provision**

Additional capacity is provided by a mixture of static and mobile plant

4.60. The study suggests that the most plausible of these options is Scenario 4, which assumes that the West Midlands conurbation and

Staffordshire would be serviced by static plant and the other sub-regions, including Worcestershire, by mobile plant.

- 4.61. Short transport distances are important for C&D waste as it is not cost-effective to transport long distances. The Waste Scenarios Study considered that:
- additional re-use and recycling capacity could be met by providing additional mobile plant, rather than static plant,
  - mobile plant throughput will vary depending on the size of a demolition job
  - throughput can be increased by operating a number of crushing plant on a site at one time
  - capacity can also be increased by increasing the hours of operation.
- 4.62. The study is based on a worst-case scenario in terms of existing capacity and concludes that therefore there may already be sufficient capacity in the region to recycle C&D waste<sup>60</sup>.

## ***Targets***

- 4.63. The issue of how we should manage C&D waste is complicated therefore by the absence of clear national targets for how much C&D waste should be recycled, as well as by the lack of robust data on the levels of C&D waste arisings and the scale of current capacity.
- 4.64. The revised Waste Framework Directive places a duty on member states to ensure that 70% of non-hazardous construction and demolition waste (excluding soil and stones) re-use and recycling by mid 2020 is used as a target.
- 4.65. We would like to set a more challenging target of re-using and recycling 75% of C&D waste and landfilling a maximum of 25%, This is an ambitious targets but will align with the targets for C&I waste and take account of the fact that soil and stones will inevitably form part of C&D waste and cannot easily be differentiated in the data.
- 4.66. It is not currently possible to monitor progress towards this target due to the lack of data on C&D waste arisings and amounts managed on-site. We anticipate that Defra will improve the data for C&D treatment in order to be able to demonstrate that the UK is meeting this target and will revise our monitoring accordingly.

## ***Calculating Capacity Gap – Preferred Option***

- 4.67. The Waste Scenarios Study appears to be the most reliable basis for planning for C&D waste re-use and recycling capacity. On this basis, these factors mean that Worcestershire's capacity gap could be met by additional mobile plant. This means that it may not be necessary to

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<sup>60</sup> 'Waste Scenarios Study' (WMRA/Enviros) July 2005 para 6.2.

identify a specific capacity gap to inform land requirements. This approach is strengthened by evidence from the SLR/AWM report "Waste – a future resource for business" (2008, p20) that Waste Transfer Stations commonly contribute 60% of their throughput to recycling capacity.

- 4.68. However, in order not to stifle development opportunities we will plan for re-use and recycling of a quarter of C&D waste arisings at static plant, as shown in Table 50. This will enable the market to establish such facilities should demand or regulatory practices regarding mobile plant change. It is not realistic to set a target for C&D waste recovery due to the nature of the waste.

**Table 50. Capacity gap for re-use and recycling of C&D waste (tonnes per annum)**

	<b>2010/11</b>	<b>2015/16</b>	<b>2020/21</b>	<b>2025/26</b>	<b>2030/31</b>	<b>2035/36</b>
Projected C&D arisings	510,555	419,520	419,520	419,520	419,520	419,520
<b>Capacity gap (25% of total arisings)</b>	<b>127,638.75</b>	<b>104,880</b>	<b>104,880</b>	<b>104,880</b>	<b>104,880</b>	<b>104,880</b>

**Box 14. Calculating C&D capacity gap: Preferred Methodology**

Assume that 25% of C&D waste arisings will be treated for re-use and recycling at static plant.

## ***Risk Assessment***

- 4.69. The risk assessment for this approach is summarised in **Table 51**.

**Table 51. C&D Re-use and recycling capacity gap risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	High	The estimates of arisings and current capacity are based on the best information available, although the flaws in the data are acknowledged.
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Medium	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste management. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.</p>
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	<p>This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>

## **MSW**

### ***Existing capacity for re-use, recycling and recovery of MSW***

- 4.70. EU and national policy prescribe that MSW can be divided into general and biodegradable MSW. However, as the Waste Core Strategy is not technology specific, these will not be considered separately.

- 4.71. All projections of MSW arisings and growth include figures for both Herefordshire and Worcestershire due to the joint nature of the municipal waste management contract. Waste management capacity for MSW in both counties has therefore been considered.
- 4.72. Although the background calculations on which the JMWMS is based split MSW arisings into portions which will be composted, recycled, landfilled, disposed of and managed by 'residual treatment' in order to meet national and local targets, the JMWMS itself does not prescribe that those volumes must be managed in any particular way. It is government policy that the Waste Core Strategy should not be technology specific and in order to remain flexible it will not prescribe the processes which must be undertaken to manage MSW.

### Re-use and Recycling Capacity

- 4.73. As MSW is managed by the councils in Herefordshire and Worcestershire, rather than by the private sector, much more reliable detail is available to the council about MSW facilities than facilities managing other waste streams. It is therefore not necessary to establish alternative means of estimating capacity for MSW.
- 4.74. There is currently only one facility in Worcestershire for the re-use and recycling of MSW. This is the open-windrow composting facility at Hill and Moor landfill site, near Pershore, which has a capacity of 25,000 tpa.
- 4.75. A municipal waste composting site has been permitted in Herefordshire, at Morton-on-Lugg, as part of the integrated waste management contract. It has a capacity of 12,000 tpa and is only permitted to take waste from household recycling centres. The site is likely to be operating at capacity by 2028.
- 4.76. The combined capacity for both Hill and Moor and Morton-on-Lugg composting sites is 37,000tpa.
- 4.77. At current landfill rates it is likely that the Hill and Moor landfill site will close during the life of the Waste Core Strategy and that the composting facility will close when the Hill and Moor Landfill site ceases operation. Due to the phasing of the landfill operations it is also possible that composting on the site may cease before the landfill operations are completed. It is currently estimated that the composting area may therefore be rendered in-operable during the life of the strategy, possibly sometime between 2019 and 2023.
- 4.78. This has been taken into account when estimating capacity over the life of the Strategy. Current composting capacity at Hill and Moor has not included in calculations of capacity from 2020 onwards (see Table 52).

**Table 52: Estimate of MSW capacity (Herefordshire and Worcestershire) (tpa)**

	2010	2015	2020	2025	2030	2034
Existing capacity for re-use, recycling and recovery	37,000	37,000	12,000	12,000	12,000	12,000

## Recovery Capacity

- 4.79. Neither Worcestershire nor Herefordshire currently have facilities for recovery of MSW.

## ***Targets***

- 4.80. There are several sets of targets relating to the management of these arisings. Although many of the targets set relate to household waste, for the purpose of work on the capacity gap they will be taken to apply to MSW.

## European Targets:

- 4.81. The EU Landfill Directive means that the UK is obligated to reduce the amount of Biodegradable MSW sent to landfill from 1995 levels to 75% by 2010, to 50% by 2013 and to 35% by 2020.
- 4.82. To enable England to meet its share of the UK target, waste disposal authorities in England were given individual targets and the Landfill Allowance Trading Scheme (LATS) was introduced. The LATS targets have been taken into account in the JMWMS targets.

## National Targets:

- 4.83. National targets are set out in the Waste Strategy for England 2007:
- Household waste recycling:**
- 2010: 40%
- 2015: 45%
- 2020: 50%
- Municipal waste recovery (including recycling target):**
- 2010: 53%
- 2015: 67%
- 2020: 75%

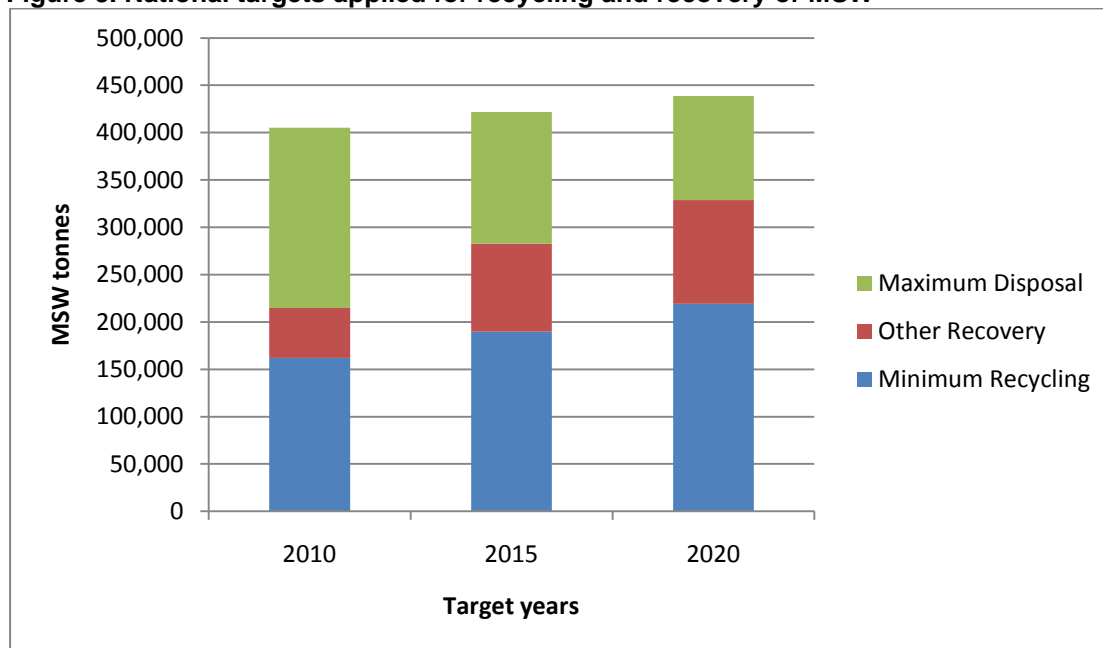
- 4.84. Applying these targets to projections of MSW arisings in Herefordshire and Worcestershire means that the tonnages shown in **Table 53** and **Figure 3** must be recycled or recovered.



**Table 53. National MSW recycling and recovery targets applied to MSW arisings in Herefordshire and Worcestershire**

	2010	2015	2020
Projected MSW arisings	405,139	421,817	438,496
Minimum Recycling	162,056	189,818	219,248
Other Recovery	52,668	92,800	109,624
Maximum Disposal	190,415	139,200	109,624

**Figure 3. National targets applied for recycling and recovery of MSW**



## Regional Targets

- 4.85. Regional targets exist in West Midlands RSS (Phase 1) Policy WD1 as follows:
- To recover value from at least 40% of municipal waste by 2005, 45% by 2010 and 67% by 2015.
  - To recycle or compost at least 25% of household waste by 2005, 30% by 2010 and 33% by 2015.
- 4.86. These targets have been superseded by National targets. More recent targets for minimum diversion from landfill and maximum landfill were set out in the RSS Phase 2 revision Draft Preferred Options, as shown in **Table 54**, and these are based on LATS targets. Minimum diversion from landfill is equivalent to re-use, recycling and recovery.

**Table 54. MSW, minimum diversion and maximum landfill, Worcestershire and Herefordshire (tonnes per annum)**

Municipal waste management		Worcestershire	Herefordshire	Two-counties' total
2005/06	Min diversion from landfill	78,000	24,000	<b>102,000</b>
	Max landfill	234,000	68,000	<b>302,000</b>
2010/11	Min diversion from landfill	160,000	43,000	<b>203,000</b>
	Max landfill	181,000	59,000	<b>240,000</b>
2015/16	Min diversion from landfill	212,000	60,000	<b>272,000</b>
	Max landfill	143,000	48,000	<b>191,000</b>
2020/21	Min diversion from landfill	242,000	69,000	<b>311,000</b>
	Max landfill	127,000	45,000	<b>172,000</b>
2025/26	Min diversion from landfill	254,000	74,000	<b>328,000</b>
	Max landfill	130,000	46,000	<b>176,000</b>

Source: RSS Phase 2 Revisions Draft Preferred Option Table 5: Municipal Waste Minimum Diversion by Waste Planning Authority (extract for Worcestershire and Herefordshire).

## Local Targets

- 4.87. The Joint Municipal Waste Management Strategy (JMWMS) sets targets which will comply with national policy and the Council has adopted these in its roles as both Waste Disposal and Waste Planning Authority. Full details of these targets are set out in the JMWMS, but those targets which need to be considered here in relation to the capacity gap are targets 3, 5 and 6:

**JMWMS Target 3:** To achieve national recycling/composting levels of household waste of:

- 40% by 31<sup>st</sup> March 2010 as a minimum and work towards
- 45% by 31<sup>st</sup> March 2015 and
- 50% by 31<sup>st</sup> March 2020.

- 4.88. The aim of the target is to achieve the minimum recycling and composting levels that the Government has set in Waste Strategy for England 2007.

- 4.89. The Partnership has set a target of 43% recycling/composting before 31<sup>st</sup> March 2014. As new collection and treatment methods are introduced, the Partnership will review its ability to exceed this target in line with the 2015 national target of 45%.

**JMWMS Target 5:** By 2015 or earlier, if practicable, to recover value from a minimum of 78% of municipal waste.

- 4.90. The aim of this target is to achieve the Best Practicable Environmental Option (BPEO) for Herefordshire and Worcestershire that was identified in July 2003 through a portfolio of treatment options, i.e.:  
a minimum of 33% of waste to be recycled and/or composted,  
a maximum of 22% landfilled  
the remaining 23% for energy recovery.

- 4.91. We recognise that the BPEO is no longer part of planning guidance. After several stages of public consultation we have decided not to rely on it to finalise the Waste Core Strategy but it remains an adopted policy within Herefordshire and Worcestershire and has informed the development of the JMWMS.

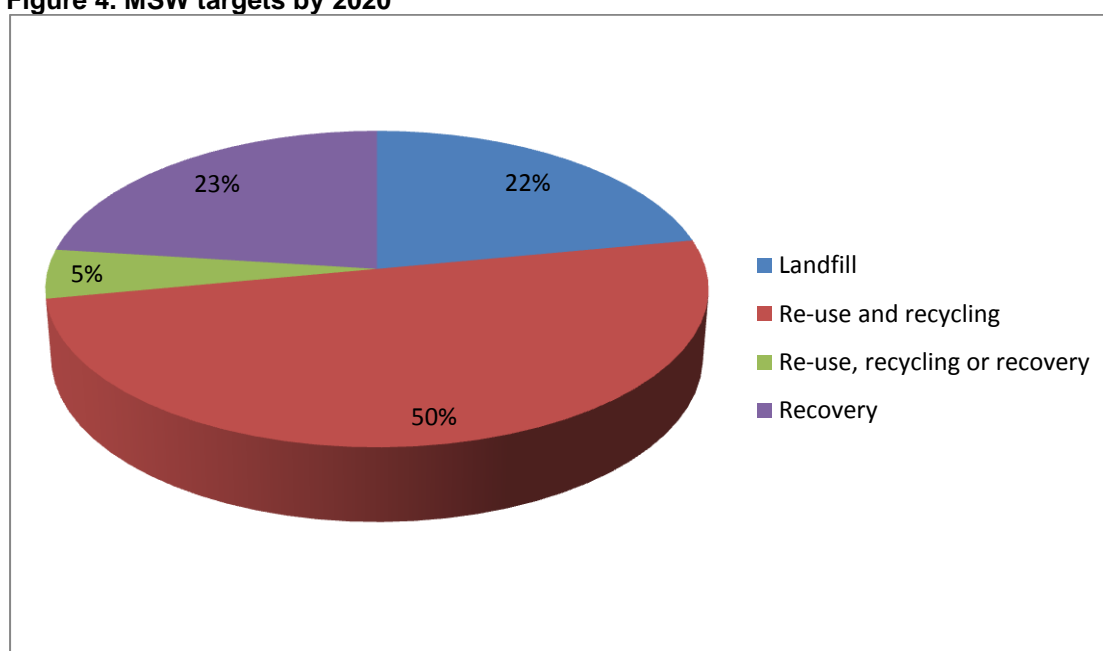
**JMWMS Target 6:** The Partnership will work together to reduce the amount of biodegradable municipal waste landfilled in order to meet the yearly allowances set by Government under the Landfill Allowance Trading Scheme (LATS) as shown in Table 55.

**Table 55. LATS Targets for Worcestershire, maximum Biodegradable MSW permitted to be landfilled (tonnes)**

LATS target years	Worcestershire	Herefordshire	Two counties total
2009/10	118,656	35,508	<b>154,164</b>
2012/13	79,033	23,651	<b>102,684</b>
2019/20	55,302	16,549	<b>71,851</b>

- 4.92. The aim of the target is to ensure that the authorities meet the requirements of the Landfill Directive.
- 4.93. These targets have been applied in the background work to the reviewed JMWMS to give annual targets for recycling, composting, and maximum landfill. An amount is designated as residual tonnes available for treatment. The relative percentages vary at the start of the JMWMS period due to the various target dates, but Figure 4 shows the proportions of MSW which will be managed by re-use and recycling, recovery and the maximum to be landfilled by 2020.

**Figure 4. MSW targets by 2020**



## ***Preferred target for the management of MSW***

- 4.94. The JMWMS targets incorporate the European and National targets, are very similar to the target in the WMRA Waste Scenarios Report of 75% treatment and 25% landfill and are based on more up to date baseline figures than the RSS targets. For these reasons and to maintain consistency with the JMWMS, we will base MSW targets on the targets in the JMWMS.
- 4.95. In order to make provision for the reviewed JMWMS requirements, we will use the targets which are stated for the end of the period in the JMWMS background work to apply throughout the Waste Core Strategy. This will allow for more flexibility in the approach and allow facilities to come forward earlier than using the varying JMWMS targets. Our targets will be to recover value from 78% of MSW, made up of:
- A minimum 50% re-use and recycling (including composting)
  - A minimum 23% recovery
  - 22% landfill/disposal (maximum).
- 4.96. However, this means the remaining 5% could be managed by re-use, recycling or recovery. Therefore, to ensure all possible scenarios are enabled, in calculating capacity requirements, we will make provision for the additional 5% to be managed by either re-use and recycling or recovery, calculating:
- the re-use and recycling capacity requirement at 55% and
  - the recovery requirement at 28%.
- 4.97. **Table 56** sets out the MSW capacity gap and **Figure 5** compares this level of provision with the requirements set out in the JMWMS background work, which sets different targets for different years, but the same targets by the end of the strategy.

### **Box 15. Calculating MSW Capacity Gap: Preferred Methodology**

Calculate MSW capacity gap based on:

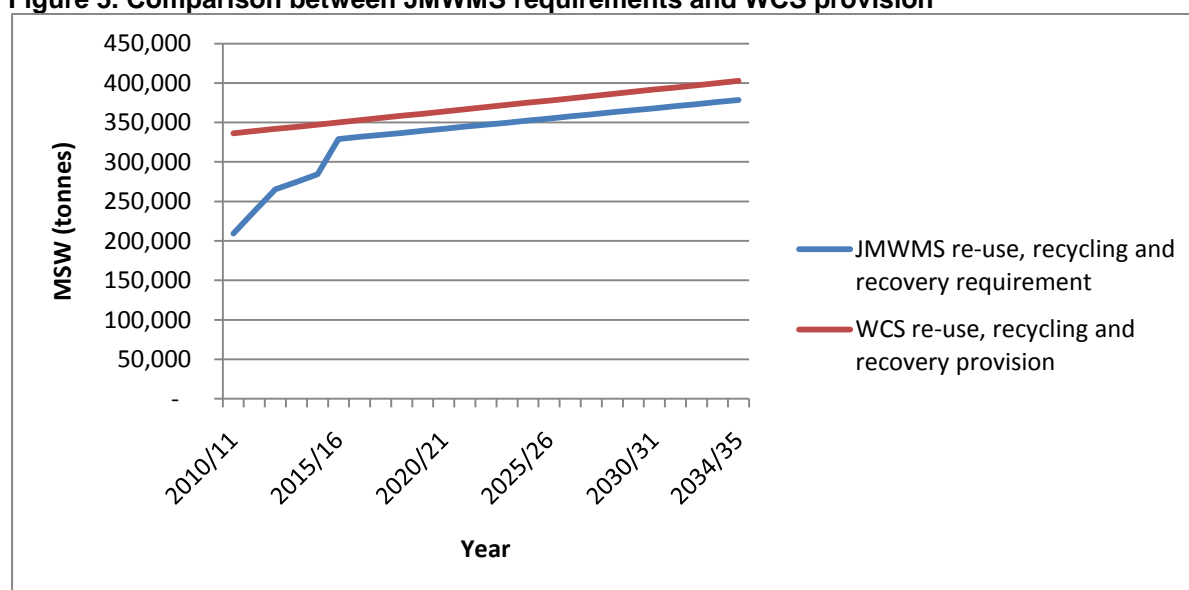
- Re-use and recycling 55% of arisings
- Recovery capacity 28% of arisings
- Landfill/disposal requirement 22% of arisings (maximum)

- 4.98. We will revise these targets during the life of the strategy if more ambitious targets are set.

**Table 56. MSW waste re-use & recycling, and recovery capacity requirements (Herefordshire and Worcestershire) (tonnes per annum)**

Year	2010/11	2015/16	2020/21	2025/26	2030/31	2034/35
Projected MSW arisings	405,139	421,817	438,496	455,175	471,854	485,197
Re-use and recycling requirement (55%)	222,826.25	231,999.59	241,172.93	250,346.27	259,519.61	266,858.28
Current re-use and recycling capacity	37,000	37,000	12,000	12,000	12,000	12,000
Re-use and recycling capacity gap	185,826.25	194,999.59	229,172.93	238,346.27	247,519.61	254,858.28
Recovery requirement (28%)	113,438.82	118,108.88	122,778.94	127,449.01	132,119.07	135,855.12
Current recovery capacity	0	0	0	0	0	0
Recovery capacity gap	113,438.82	118,108.88	122,778.94	127,449.01	132,119.07	135,855.12

**Figure 5. Comparison between JMWMS requirements and WCS provision**



## ***Risk Assessment***

4.99. The risk assessment for this approach is summarised in **Table 57**.

**Table 57. MSW re-use and recycling capacity gap risk analysis**

<b>Issue</b>	<b>Level</b>	<b>Comments</b>
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The estimates of arisings and targets used are based on the best information available, and align with those being used to implement the Joint Municipal Waste Management Strategy.
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Low	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, the Herefordshire and Worcestershire Joint Municipal Waste Management Strategy, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends. It is possible that facilities could manage waste from other (C&I) sources to utilise any surplus capacity which might exist.
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	This is considered very unlikely. Existing trends show a clear strong reduction in the MSW arisings. National, regional and local policy and considerable financial pressures and incentives all reinforce this trend. Any reversal in these is considered highly unlikely.

## Section 5. Capacity gap: Sorting and transfer

- 5.1. The Waste Core Strategy must make provision for waste transfer stations (including materials reclamation facilities, or MRFs, and Household Recycling Centres). However no national, regional or local targets currently exist for waste transfer capacity. The Council has therefore developed a methodology for determining how much waste transfer capacity is likely to be required during the life of the strategy.
- 5.2. As no target exists for any waste stream, this section is structured differently to the previous sections and addresses 'developing a target' for all waste streams before moving on to consider current capacity and the capacity gap for individual waste streams.

### Developing targets

- 5.3. In the West Midlands as a whole waste transfer capacity is about one-third (4.7 million tonnes) of the total 14.5 million tonnes managed in the region. It must however be noted that these figures may include an element of double counting, with some wastes managed by more than one facility.
- 5.4. In line with the regional position we think that the Waste Core Strategy should make provision for WTS capacity to manage at least 30% of all waste arisings in Worcestershire.
- 5.5. An alternative would be to maintain the current 'Worcestershire mix' of facilities, with transfer capacity (860,000 tonnes, as shown in the following sections) for over half of Worcestershire's waste arisings (1,590,000 tonnes (2010)). In Worcestershire transfer facilities are much more prevalent than transfer facilities with a ratio of approximately 1.5 tonnes of transfer capacity for every 1 tonne of treatment capacity (based on Worcestershire Waste sites survey).
- 5.6. As such transfer capacity forms a much greater share of the total capacity than elsewhere in the region. However, we believe this is misleading as the majority of Worcestershire's waste management facilities are currently classed as Waste Transfer but most undertaken some kind of treatment role and it would not be appropriate to maintain this ratio as more treatment facilities are developed. We believe that using this approach would overestimate the capacity which is actually required.
- 5.7. **Table 58** shows the sorting and transfer capacity required for 30% of C&I, Hazardous, C&D, and MSW wastes.

**Table 58. Waste sorting and transfer capacity requirements**

	2010/1	2015/6	2020/1	2025/6	2030/31	2035
Projected C&I arisings (including agricultural waste)	601,790.4	644,038.8	692,072.6	746,684	808,773.9	879,366.2
Requirement for sorting and transfer of 30% of C&I waste	180,537.12	193,211.64	207,621.78	224,005.2	242,632.17	263,809.86
Projected Hazardous waste arisings (including clinical and radioactive)	73,571.90	73,621.00	73,670.10	73,719.20	73,768.30	73,807.60
Requirement for sorting and transfer of 30% of Hazardous waste	22,071.57	22,086.30	22,101.03	22,115.76	22,130.49	22,142.28
Projected C&D arisings	510,555	419,520	419,520	419,520	419,520	419,520
Requirement for sorting and transfer of 30% of C&D waste	153,166.5	125,856	125,856	125,856	125,856	125,856
Projected MSW arisings (Herefordshire and Worcestershire)	405,139	421,817	438,496	455,175	471,854	485,197
Requirement for sorting and transfer of 30% of MSW	121,541.7	126,545.1	131,548.8	136,552.5	141,556.2	145,559.1

## C&I and C&D current capacity

5.8. Sorting and transfer facilities for C&I (including agricultural waste) and C&D waste often treat elements of both waste streams and as such it is not practicable to distinguish the current transfer capacity for each stream separately.

### Waste Data Interrogator

5.9. The EA Waste Data Interrogator shows that the following throughputs of waste were handled at sorting and transfer facilities in Worcestershire between 2007 and 2009 (all waste streams)<sup>61</sup>:

<sup>61</sup> Derived by running the query as follows: facility location 'Worcestershire WPA', Waste category 'all', facility type 'by site category', report on 'waste received', display 'site category'.



2007	358,237.73 tonnes
2008	337,041.59 tonnes
2009	378,503.27 tonnes

- 5.10. These figures give details of throughput but do not give any indication of unused or potential capacity at currently operational sites. In addition they do not consider the throughput of exempt sites in the county.

### Worcestershire County Council Research: Waste Sites Background Paper

- 5.11. In evidence gathering for the Waste Core Strategy, officers visited every known operating waste site in the county. As part of this, each operator was asked to complete a questionnaire detailing:

- annual throughput
- types of waste managed
- site area
- waste source
- destination of recycle/residues

Some of these responses were estimates, but the information gathered can be used to supplement data recorded in the Waste Data Interrogator, specifically regarding exempt sites and processes.

### ***C&I and C&D Transfer capacity gap: Preferred Methodology***

- 5.12. The site throughputs shown in the Waste Data Interrogator vary each year according to how much waste the facilities handled. In order to get the best indication of maximum capacity, the highest figure for each site from either 2008 or 2009 has been used. Where there are gaps in the EA data this is supplemented by the council's research.

- 5.13. In order to ensure an adequate provision of facilities, we intend to use the combined Waste Data Interrogator and waste sites research as the basis for identifying the capacity gap. The Environment Agency Waste Data Interrogator is more robust than the waste sites research data, but using the research as a supplement overcomes the disadvantage of the Waste Data Interrogator that it does not recognise the role of exempt sites in the County. However, even the combined data does not include unused capacity in existing facilities and the capacity in sites which are permitted but not operational. We therefore anticipate that monitoring will show significant increases of "actual" capacity over the next few years.

#### **Box 16. Calculating C&I and C&D Transfer Capacity: Preferred Methodology**

Calculate transfer capacity based on:

- Waste Data Interrogator Capacity (highest annual throughput per site

2008/2009)

- Supplemented by data from WCC research.

5.14. The waste sites research and the Waste Data Interrogator give figures for throughput rather than permitted capacity at the sites. For example one particular facility in the county only commenced operation for part of 2009 so had a recorded throughput of 29,499 tonnes, whereas its permitted capacity is 250,000 tonnes per annum.

5.15. Whilst this approach may underestimate the notional capacity available, we consider that this is preferable to overestimating existing capacity when determining the capacity gap. An overestimate of existing capacity could lead to underestimating the amount of new capacity and land required in the Waste Core Strategy.

5.16. Using the highest figures from 2008 and 2009 WDI supplemented by the Council's research shows the existing sorting and transfer capacity for C&I and C&D waste as 415,891 tonnes per annum. This means that there is not expected to be a capacity gap for C&I and C&D waste sorting and transfer during the life of the strategy and beyond (see Table 59).

**Table 59. Capacity gap for C&I and C&D waste sorting and transfer**

	2010/11	2015/16	2020/21	2025/26	2030/31	2035
Capacity required for 30% of C&I arisings	180,537.12	193,211.64	207,621.78	224,005.2	242,632.17	263,809.86
Capacity required for 30% of C&D arisings	153,166.5	125,856	125,856	125,856	125,856	125,856
Combined capacity requirement for 30% of C&I and C&D arisings	333,703.62	319,067.64	333,477.78	349,861.20	368,488.17	389,665.86
Current capacity	415,891	415,891	415,891	415,891	415,891	415,891
<b>Capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## ***Risk Assessment***

5.17. The risk assessment for this approach is summarised in Table 60.

**Table 60. C&I and C&D sorting and transfer capacity gap risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.

<b>Likelihood</b> of risk occurring	Medium	The estimates of requirement reflect the standard across the West Midlands region. The estimates of existing capacity are based on the most reliable source of information available and supplemented with additional local research.
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Low	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.  Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste management. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.  As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.

## Hazardous, clinical and radioactive waste

5.18. The Hazardous Waste Data Interrogator provides reliable information about the annual throughput of sites managing hazardous waste. Using the highest figures from 2008 and 2009 Hazardous Waste Data Interrogator shows the sorting and transfer capacity for hazardous waste as 66,701.35 tonnes per annum<sup>62</sup>.

5.19. The Hazardous Waste Data Interrogator gives figures for throughput rather than permitted capacity at the sites. Whilst this approach may underestimate the notional capacity available, we consider that this is preferable to overestimating existing capacity when

<sup>62</sup> Highest figure is from 2008. Data derived by running the query as follows: Arose in All, Deposited in Worcestershire WPA, Waste type All, Disposal or recovery method Transfer (D) and Transfer (R), Report arisings and deposits by Don't Show.

determining the capacity gap. An overestimate of existing capacity could lead to underestimating the amount of new capacity and land required in the Waste Core Strategy.

- 5.20. Using this approach means that there is no expected capacity gap for hazardous waste sorting and transfer during the life of the strategy and beyond (as shown in **Table 61**).

**Table 61. Capacity gap for hazardous waste sorting and transfer**

	2010	2015	2020	2025	2030	2035
Capacity required for 30% of hazardous waste arisings	22,071.57	22,086.30	22,101.03	22,115.76	22,130.49	22,142.28
Current transfer capacity	66,701.35	66,701.35	66,701.35	66,701.35	66,701.35	66,701.35
<b>Capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

- 5.21. There is no evidence of a need to identify transfer capacity separately for clinical or radioactive wastes. One waste transfer station in Worcester is permitted to handle clinical waste but does not usually do so<sup>63</sup>.

## **Risk Assessment**

- 5.22. The risk assessment for this approach is summarised in Table 62.

**Table 62. Hazardous waste sorting and transfer capacity gap risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The estimates of requirement reflect the standard across the West Midlands region. The estimates of existing capacity are based on the most reliable source of information available.
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Low	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends. Overprovision of facilities is highly unlikely; costs to waste producers would fall, encouraging further, higher levels of waste

<sup>63</sup> See background document "Waste Arising from Healthcare and Related Activities: Clinical Wastes and Low Level Radioactive Wastes".

		management. In practice market corrections should make excessive surplus unprofitable and such overprovision unattractive.
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	<p>This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>

## MSW

5.23. Existing MRF/WTS sites dealing with MSW in Herefordshire and Worcestershire have a combined capacity of 376,450 tpa<sup>64</sup>:

- Bromsgrove bulking bay 13,000 tpa
- Kidderminster bulking bay 10,000 tpa
- Redditch bulking bay 8,700 tpa
- Redditch transfer station 49,000 tpa
- EnviroSort MRF 105,000 tpa
- Hill and Moor WTS 95,000 tpa
- Leominster WTS 39,050 tpa
- Rotherwas WTS and MRF 56,700 tpa

5.24. The identified requirement and capacity gap for sorting and transfer of 30% of MSW arisings is shown in **Table 63**.

**Table 63. Capacity gap for MSW sorting and transfer**

	2010/1	2015/6	2020/1	2025/6	2030/31	2035
Capacity required for 30% of MSW arisings	121,541.7	126,545.1	131,548.8	136,552.5	141,556.2	145,559.1
Existing capacity	376,450	376,450	376,450	376,450	376,450	376,450
<b>Capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<sup>64</sup> Information from planning permissions and from Worcestershire County Council Waste Management team

## Household Recycling Centres (formerly known as "Household Waste Sites")

5.25. Household Recycling Centres are a special form of waste transfer station for MSW. They currently exist in the following locations across Worcestershire and Herefordshire:

- Worcester - Bilford Road (Worcester East)
- Worcester - Hallow Road (Worcester West)
- Bromsgrove
- Droitwich Spa
- Kidderminster
- Malvern
- Pershore
- Redditch
- Stourport
- Tenbury Wells
- Upton-upon-Severn
- Bromyard
- Hereford
- Ledbury
- Leominster
- Ross-on-Wye.

5.26. The reviewed JMWMS Action Plan (Annex I) identifies that the Household Recycling Centre at Tenbury Wells requires redevelopment. This may or may not be at its current location. However, the replacement of the existing site would, in practice, mean that the notional capacity remains the same and this is therefore not considered when calculating the capacity gap.

## ***Risk Assessment***

5.27. The risk assessment for this approach is summarised in Table 64.

**Table 64. Sorting and transfer capacity gap risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Medium	The estimates of requirement reflect the standard across the West Midlands region. The estimates of existing capacity are based on the most reliable source of information.
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision	Low	Unlikely to prove serious. Monitoring of the the Waste Core Strategy through the AMR and JMWMS are likely to alert the Council to emerging trends.

of facilities could occur.		
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	<p>This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and JMWMS are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>As the Waste Core Strategy will not allocate specific sites and will enable development in appropriate locations, this should not compromise the purpose and objectives of the strategy. The Waste Core Strategy will not cap provision of facilities where they contribute to the local green economy.</p>

## Transfer capacity as treatment

- 5.28. A further source of waste treatment capacity is that provided by waste transfer stations as an ancillary, but profitable, element of their primary function.
- 5.29. The "Waste Treatment Facilities and Capacity Study" (Final Report May 2007) (AWM SLR) found that 70% of Waste Transfer Stations who responded to their survey were currently performing some kind of pre-treatment which diverted waste from landfill. The range of responses varied from 27% to 100% of waste input, with 60% representing a common performance. For illustrative purposes only, the AWM report estimated that Waste Transfer Stations have the potential to provide between 0.8 and 1.8 million tonnes of diversion (recycling) capacity per year in the West Midlands.
- 5.30. There is no clear guidance on how to assess what the capacity is in any particular sub region.
- 5.31. Our discussions with all of the transfer station operators in the county revealed that approximately 90% of the WTSs and MRFs in Worcestershire undertake some form of waste treatment process, such as sorting, screening and crushing waste. We consulted the members of the WMRTAB individually on how we should assess this capacity, the responses were very mixed and there was no uniformity across the public or private sector.
- 5.32. The value of including some estimate for this capacity was specifically mentioned by the Axis consultancy in the *Refreshed Issues and Options* consultation (see our "Summary of Responses to the Refreshed Issues and Options Consultation" for a summary of these responses.) We are in no doubt that we will fairly significantly underestimate our treatment capacity unless we make some allowance

for waste transfer sites' treatment role. However, without further credible evidence to support this approach, we will not take this potential treatment capacity into account in our calculations as it could constrain the capacity we plan for and potentially affect our ability to realise the Strategy.



## Section 6. Capacity gap: Disposal and landfill

- 6.1. The Waste Core Strategy must recognise that, even after maximising re-use, recycling and recovery, some waste will still require disposal or landfill. The principal driver behind reducing the amount sent to landfill will be landfill tax making other means of recycling, recovery and disposal a viable and competitive option. The AWM report "Waste a Future Resource for Business" estimates that by 2015 it should be more economic to treat almost all waste streams in the West Midlands rather than to landfill.
- 6.2. Another form of disposal could be incineration without energy recovery. This may be the only option in some instances, for example there is currently disposal capacity at an individual pet and equine cremation facility in Wyre Forest. This is a small facility which deals with 5-8 horses and 25-35 smaller pets per month. The facility has throughput of 36 tonnes per year, the process leaves a 4% residue. The ashes are returned to the owner in a scatter pouch. Due to the small volume of waste, heat or energy recovery would not be practicable.
- 6.3. There may be other technologies and instances where disposal is necessary, however the Waste Core Strategy will encourage waste to be managed at the highest appropriate level of the waste hierarchy, thereby minimising disposal and landfill. Without any clear evidence of requirements for other types of disposal, this section will concentrate on whether Worcestershire's remaining landfill capacity is sufficient or whether a capacity gap exists.

### Current landfill capacity

- 6.4. The best available data on current operational landfill capacity is provided by the Environment Agency in its Waste Information Data Tables<sup>65</sup>. This is based on information provided by operators as part of the environmental report required by their permit and provides a clear picture of remaining void capacity at the end of the calendar year.
- 6.5. The latest available information is for 2009. Worcestershire's remaining void capacity is shown in Table 65. Worcestershire's landfill void capacity 2009.

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<sup>65</sup> <http://www.environment-agency.gov.uk/research/library/data/> and go to 'Waste Data', follow the links to the appropriate year and then the link to 'Data tables'.

**Table 65. Worcestershire's landfill void capacity 2009**

Landfill type	Landfill capacity 2009
Non-hazardous, non-inert waste	5,729,139m <sup>3</sup>
Non-hazardous with SNRHW cell	1,100,000m <sup>3</sup>
Inert waste	2,949,000 m <sup>3</sup>

## C&I and MSW

### C&I

6.6. Using the targets set out in the re-use, recycling and recovery section above, we have a target for C&I waste of 75% re-use, recycling and recovery, applied as follows:

- 55% re-use and recycling
- 20% recovery and
- 25% landfill/disposal.

6.7. The maximum amount of C&I waste being landfilled to meet these targets is shown in **Table 66**.

**Table 66. Maximum C&I waste to landfill**

Year	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
Projected C&I arisings (tonnes per annum)	601,790.4	644,038.8	692,072.6	746,684	808,773.9	879,366.2
Maximum landfill / disposal requirement (25% of total) (tonnes per annum)	150,447.6	161,009.7	173,018.2	186,671.0	202,193.5	219,841.6
<b>Cumulative total (tonnes)</b>	<b>150,447.6</b>	<b>933,829.8</b>	<b>1,774,287.3</b>	<b>2,679,635.9</b>	<b>3,658,761.7</b>	<b>4,721,767.6</b>

Note: Cumulative total of all years, not 5 year intervals

### MSW

6.8. The background work to the reviewed JMWMS gives annual targets for maximum MSW landfill. The relative percentages vary at the start of the strategy period due to the various target dates, therefore in order to maintain consistency with the reviewed JMWMS, we will use the figures for maximum landfill each year set out in the JMWMS background work rather than a fixed percentage throughout. This is shown in **Table 67**.

**Table 67. Maximum MSW to landfill**

	2010/11	2015/16	2020/21	2025/26	2030/31	2034/35
Projected MSW arisings, (tonnes per annum)	405,139	421,817	438,496	455,175	471,854	485,197
Maximum landfill requirement as per JMWMS (tonnes per annum)	195,719	92,800	96,469	100,139	103,808	106,743
<b>Cumulative total (tonnes)</b>	<b>195,719</b>	<b>880,921</b>	<b>1,355,928</b>	<b>1,849,282</b>	<b>2,360,983</b>	<b>2,783,553</b>

Note: Cumulative total of all years, not 5 year intervals

### ***C&I waste and MSW landfill requirement and capacity gap***

6.9. In order to determine whether there is a capacity gap, the tonnage must be converted into a volume, as landfill capacity is calculated in cubic metres (m<sup>3</sup>). Three alternative methods have been considered for the conversion ratio:

- 0.85 tonnes of municipal or commercial/industrial waste per cubic metre – PPS10 companion guide<sup>66</sup>
- 1.8 tonnes per cubic metre – 'local standard'<sup>67</sup>
- 1 tonne per cubic metre for non hazardous waste (i.e. MSW and C&I), including a nominal allowance for daily cover – WMRA/Scott Wilson<sup>68</sup>.

6.10. The 'local standard' is a single example and therefore cannot be deemed a reliable basis. The PPS10 companion guide estimate does not include 'daily cover' and is, in practice, very similar to the WMRA/Scott Wilson estimates. Therefore we will use the WMRA standard of 1 tonne/m<sup>3</sup> to calculate the volume of landfill required for MSW and C&I waste. See below for a worked example of this conversion for 2025:

$$4,528,917.9 \text{ tonnes} \times 1 \text{ tonne/m}^3 = 4,528,917.9 \text{ m}^3.$$

6.11. The Environment Agency's Waste Information 2009 Data Tables show that the county's void space for non-hazardous, non-inert waste is 5,729,139m<sup>3</sup>. This means that there is no landfill capacity gap for C&I and MSW waste until approximately 2029, as shown in **Table 68** and **Figure 6**.

<sup>66</sup> "Planning for Sustainable Waste Management: A Companion Guide to Planning Policy Statement 10"

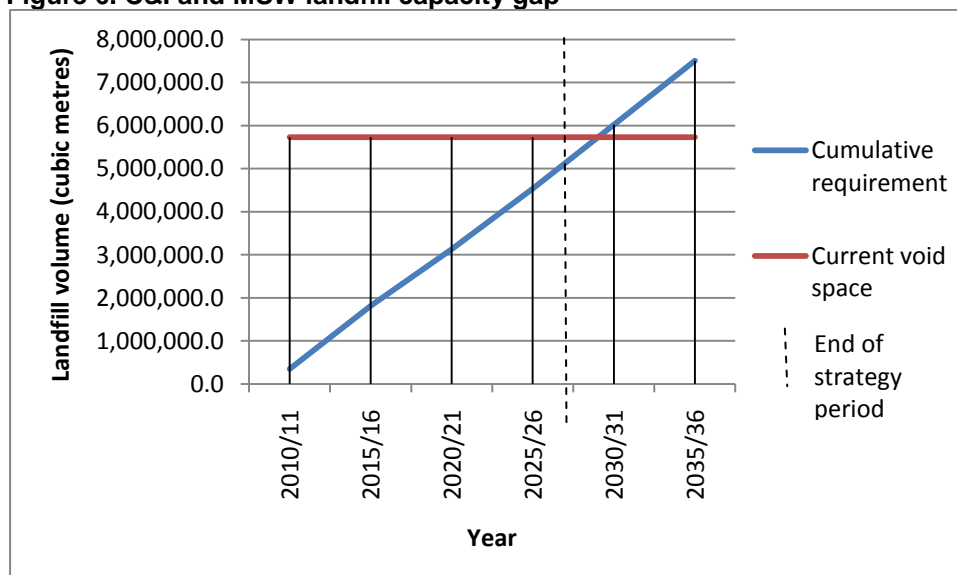
<sup>67</sup> Local Standard: we only have one local estimate from Enviroarm Ltd, agents of Chadwich Quarry/Landfill.

<sup>68</sup> "Study into Future Landfill Capacity in the West Midlands", WMRA: Scott Wilson. First report May 2007

**Table 68. C&I and MSW landfill capacity gap (m<sup>3</sup>)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2034/35
C&I cumulative requirement	150,447.6	933,829.8	1,774,287.3	2,679,635.9	3,658,761.7	4,721,767.6
MSW cumulative requirement	195,719	880,921	1,355,928	1,849,282	2,360,983	2,783,553
Total C&I and MSW cumulative requirement	346,166.6	1,814,750.8	3,130,215.3	4,528,917.9	6,019,744.7	7,505,320.6
Current void capacity	5,729,139	5,729,139	5,729,139	5,729,139	5,729,139	5,729,139
<b>Capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>290,605.7</b>	<b>1,776,181.6</b>

Note: Cumulative total of all years, not 5 year intervals

**Figure 6. C&I and MSW landfill capacity gap**

## Risk Assessment

- 6.12. We can see from the EA Waste Data Interrogator and Defra municipal waste statistics the amount of C&I and MSW waste actually being landfilled from 2007-2009 (see Table 69), Although both have fallen considerably in this period, the amount of C&I waste landfilled was much lower in 2009 than the amount planned for above in 2010. Our estimates therefore represent a worst-case scenario and our remaining landfill void capacity is likely to last well beyond the period of the Waste Core Strategy.

**Table 69. C&I and MSW waste landfilled 2007-2009<sup>69</sup>**

	2007	2008	2009
Defra municipal waste statistics waste landfilled (Herefordshire & Worcestershire)	220,199.57	201,510.62	186,835.515
C&I waste landfilled <sup>70</sup>	254,361.42	161,439.63	83,465.425

6.13. The risk assessment for this approach is summarised in Table 70.

**Table 70. C&I and MSW landfill capacity gap risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The conversion rate from tonnes to cubic metres is based on the best available data.  The estimates of current void capacity are based on the most reliable source of information available.
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Medium	Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.  Overprovision of facilities is unlikely; no capacity gap is identified during the life of the strategy and the policies will not encourage the development of disposal or landfill facilities.
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Low	This is considered very unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.  The projected requirement for 2010 is already much higher than the amount of

<sup>69</sup> Calculated by finding the total waste landfilled in Worcestershire by running the query in the Waste Data Interrogator by WPA Worcestershire, Waste category "all", by site category "landfill", report on waste received, display data by "site category". From this total the amount of MSW landfilled as shown in the Defra Municipal Waste Statistics for Herefordshire and Worcestershire was subtracted, and the amount of C&D waste landfilled (as shown by waste category "inert" in the Waste Data Interrogator) was subtracted.

<sup>70</sup> C&I waste landfilled was calculated from WDI total landfill, minus "Inert" and minus the amount shown by the Defra municipal waste website.

		waste actually landfilled in 2009, this trend is likely to continue. The Waste Core Strategy will contain policies to consider the development of landfill or disposal facilities where a need is proven.
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## Hazardous, clinical and radioactive waste

6.14. Using the targets set out in the re-use, recycling and recovery section above and in order to align with the other major waste streams, of which hazardous waste is a component, we have a target for hazardous waste of 75% re-use, recycling and recovery and 25% landfill/disposal, applied as follows:

- 55% re-use and recycling
- 20% recovery and
- 25% landfill/disposal.

6.15. The maximum amount of hazardous waste being disposed of or landfilled to meet these targets is shown in **Table 71**.

**Table 71. Maximum hazardous waste to landfill (tonnes per annum)**

	2010	2015	2020	2025	2030	2035
Projected arisings	73,571.90	73,621.00	73,670.10	73,719.20	73,768.30	73,807.60
Maximum landfill / disposal requirement (25% of total)	18,392.98	18,405.25	18,417.53	18,429.80	18,442.08	18,451.90
<b>Cumulative total</b>	<b>18,392.98</b>	<b>110,394.68</b>	<b>202,457.78</b>	<b>294,582.26</b>	<b>386,768.12</b>	<b>460,561.02</b>

Note: Cumulative total of all years, not 5 year intervals

6.16. In order to determine whether there is a capacity gap, this tonnage must be converted into a volume, as landfill capacity is calculated in cubic metres (m<sup>3</sup>). The same method will be applied as for C&I and MSW of 1 tonne per cubic metre to calculate the cumulative volume of landfill required by 2025 for hazardous waste:

$$294,582.26 \text{ tonnes} \times 1 \text{ tonne per cubic metre} = 294,582.26 \text{m}^3.$$

6.17. Hazardous waste must be disposed of at landfill sites, or cells within non-hazardous landfill sites, specifically constructed for materials defined as hazardous. This space has to be engineered and monitored to the highest standards and is too valuable to be used for the deposit of other materials.

6.18. There are no dedicated hazardous landfill sites in Worcestershire. However, there is one landfill site which has an environmental permit allowing it to receive 37,250 tonnes per annum of Stable Non Reactive

Hazardous Wastes (SNRHW) in the form of asbestos & construction material containing asbestos<sup>71</sup>. The Environment Agency's Waste Information 2009 Data Tables show that the county's void space for "non-hazardous with SNRHW (Stable Non Reactive Hazardous Wastes) cell" is 1,100,000m<sup>3</sup>. This capacity is for general landfill at sites permitted to receive hazardous waste as well as hazardous landfill at those sites, We therefore cannot assume that the full 1,100,000 m<sup>3</sup> will be available for hazardous waste.

- 6.19. **Table 72** shows that on an annual basis, comparing the hazardous landfill requirement with the annual permitted amount, there is no capacity gap for landfilling hazardous waste, based on achieving equivalent self-sufficiency.

**Table 72. Hazardous waste landfill capacity gap, annual (tonnes per annum)**

	2010	2015	2020	2025	2030	2035
Projected arisings	73,571.90	73,621.00	73,670.10	73,719.20	73,768.30	73,807.60
Maximum annual landfill / disposal requirement (25% of total)	18,392.98	18,405.25	18,417.53	18,429.80	18,442.08	18,451.90
Annual permitted capacity	37,250	37,250	37,250	37,250	37,250	37,250
<b>Annual capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

- 6.20. However, as the landfill site which has the permit to receive SNRHW is not a dedicated hazardous landfill, it will receive some non-hazardous waste and we therefore cannot assume that the full 1,100,000 m<sup>3</sup> will be available for hazardous waste. If we assume that half of this capacity will be available for hazardous waste, there will still not be a capacity gap for hazardous waste, as shown in **Table 73** and **Figure 7**.

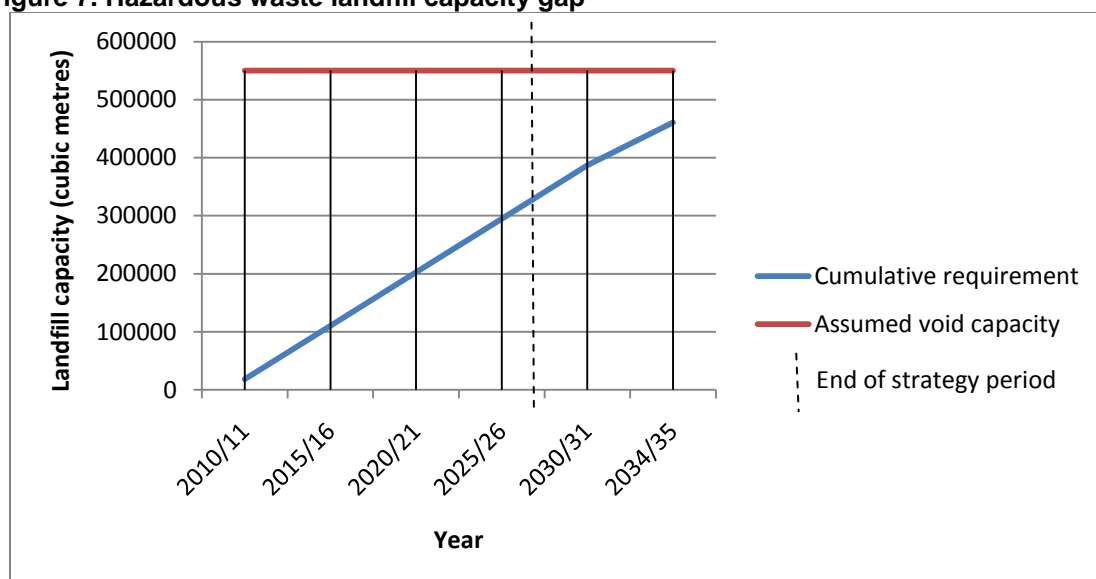
**Table 73. Hazardous waste landfill capacity gap, cumulative (m<sup>3</sup>)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2034/35
Cumulative hazardous waste landfill / disposal requirement (m <sup>3</sup> )	18,392.98	110,394.68	202,457.78	294,582.26	386,768.12	460,561.02
Assumed void capacity	550,000	550,000	550,000	550,000	550,000	550,000
<b>Capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Note: Cumulative total of all years, not 5 year intervals

<sup>71</sup> Information from the Environment Agency by email, 04/02/2011.

**Figure 7. Hazardous waste landfill capacity gap**



## Risk Assessment

6.21. The risk assessment for this approach is summarised in **Table 74**.

**Table 74. Hazardous waste landfill capacity gap risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	High	<p>The conversion rate from tonnes to cubic metres is based on the best available data.</p> <p>The estimates of current void capacity are based on the most reliable source of information available. The assumption that half the void capacity will be available for hazardous waste may not be accurate as it will be a commercial decision for the landfill operator as to whether hazardous cells are constructed, depending on commercial viability.</p>
<b>Worst Case Scenarios:</b> The calculated capacity gap is overestimated and an overprovision of facilities could occur.	Low	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Overprovision of facilities is unlikely; no capacity gap is identified during the life of the strategy. The policies in the Waste Core Strategy will not encourage the</p>



		development of disposal or landfill facilities unless there is a proven need.
<b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.	Medium	<p>This is possible if hazardous cells are not constructed and therefore no hazardous landfill capacity is available. This will be a commercial decision of the operator based on market conditions.</p> <p>Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>The Waste Core Strategy will contain policies to consider the development of landfill or disposal facilities where a need is proven.</p>

## C&D waste

- 6.22. Using a target of landfilling a maximum of 25% of C&D waste, as set out in the re-use, recycling and recovery section, gives the maximum requirement for landfill of C&D waste as shown in **Table 75**.

**Table 75. C&D waste landfill capacity requirements**

	2010	2015	2020	2025	2030	2035
Projected arisings	510,555	419,520	419,520	419,520	419,520	419,520
Maximum landfill requirement (25% of total) (tonnes per annum)	127,638.75	104,880	104,880	104,880	104,880	104,880
<b>Cumulative total (tonnes)</b>	<b>127,638.75</b>	<b>674,797.5</b>	<b>1,199,198</b>	<b>1,723,598</b>	<b>2,247,998</b>	<b>2,772,398</b>

Note: Cumulative total of all years, not 5 year intervals

- 6.23. This shows that the landfill requirement for C&D waste by 2025 is 1,723,598 tonnes.
- 6.24. In order to determine whether there is a capacity gap, this tonnage must be converted into a volume, as landfill capacity is calculated in cubic metres (m<sup>3</sup>). The WMRA/ Scott Wilson "*Study into Future Landfill Capacity in the West Midlands*" (May 2007) used a conversion rate of 1.5 tonnes per cubic metre for inert waste. This is the best evidence we have for inert waste conversion.
- 6.25. This can be used to calculate the cumulative volume of landfill required by 2025/26 for C&D waste:

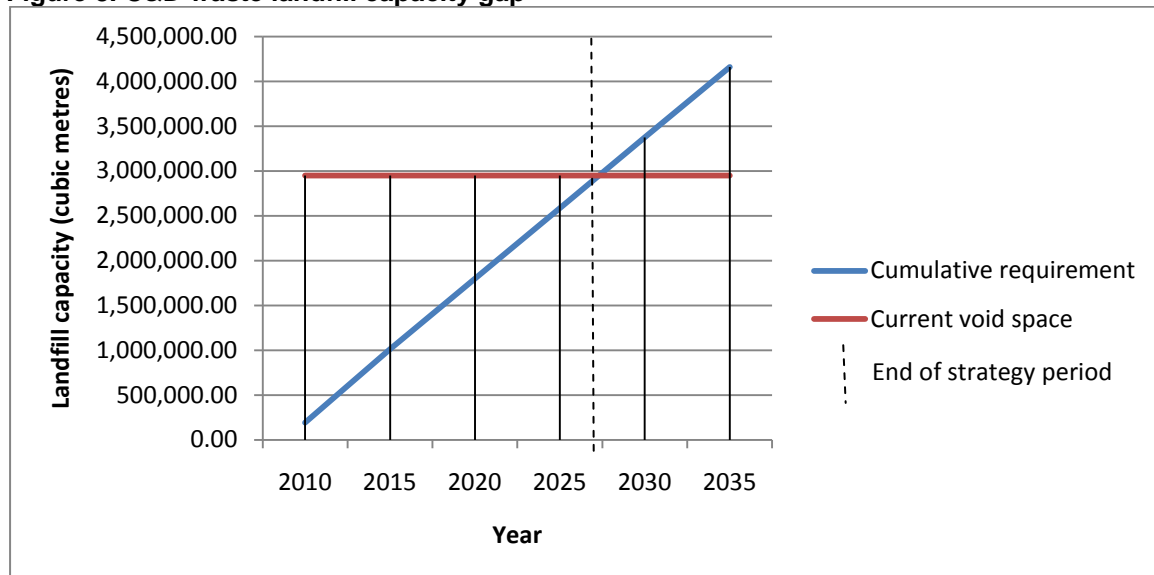
$$1,723,598 \text{ tonnes} \times 1.5 \text{ tonnes per cubic metre} = 2,585,396 \text{ m}^3$$

6.26. The Environment Agency's Waste Information 2009 Data Tables show that the county's void space for inert waste is 2,949,000 m<sup>3</sup>. **Table 76** and **Figure 8** show that this means there is no capacity gap for C&D landfill until approximately 2028.

**Table 76. C&D waste landfill capacity gap (m<sup>3</sup>)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2034/35
Cumulative C&D requirement	191,458.1 25	1,012,196. 25	1,798,796. 25	2,585,396. 25	3,371,996. 25	4,158,596. 25
Current void capacity	2,949,000	2,949,000	2,949,000	2,949,000	2,949,000	2,949,000
<b>Capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>422,996.2 5</b>	<b>1,209,596. 25</b>

**Figure 8. C&D waste landfill capacity gap**



## Risk Assessment

6.27. The risk assessment for this approach is summarised in **Table 77**.

**Table 77. C&D waste landfill capacity gap risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	High	The strategy will not be founded on accurate figures.
<b>Likelihood</b> of risk occurring	Low	The conversion rate from tonnes to cubic metres is based on the best available data.  The estimates of current void capacity are based on the most reliable source of information available.
<b>Worst Case Scenarios:</b>	Medium	Unlikely to prove serious. Monitoring of the

<p>The calculated capacity gap is overestimated and an overprovision of facilities could occur.</p>		<p>Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Overprovision of facilities is unlikely; no capacity gap is identified during the life of the strategy and the policies will not encourage the development of disposal or landfill facilities.</p>
<p><b>Worst Case Scenarios:</b> The calculated capacity gap is underestimated.</p>	<p>Low</p>	<p>This is considered unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>The Waste Core Strategy will contain policies to consider the development of landfill or disposal facilities where a need is proven.</p>

## Section 7. Capacity gap summary

7.1. Drawing together the capacity gaps for re-use and recycling, other recovery, sorting and transfer and disposal and landfill from the sections above allows us to see the scale of the capacity gap across all waste streams, as shown in **Table 78** to **Table 81**.

7.2. The figures have been rounded at this stage to the nearest 500 tonnes or cubic metres to avoid 'spurious accuracy'.

**Table 78. Re-use and recycling capacity gap summary (tonnes per annum)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
C&I (inc Agricultural waste)	58,000	81,000	107,500	137,500	172,000	210,500
C&D	127,500	105,000	105,000	105,000	105,000	105,000
MSW	186,000	195,000	229,000	238,500	247,500	255,000
Hazardous (inc Clinical and radioactive)	40,000	40,500	40,500	40,500	40,500	40,500
<b>Total re-use and recycling capacity gap</b>	<b>411,500</b>	<b>421,500</b>	<b>482,000</b>	<b>521,500</b>	<b>565,000</b>	<b>611,000</b>

**Table 79. Other recovery capacity gap summary (tonnes per annum)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
C&I (inc Agricultural waste)	120,500	129,000	138,500	149,500	162,000	176,000
MSW	113,500	118,000	123,000	127,500	132,000	136,000
Hazardous (inc Clinical and radioactive)	6,500	6,500	6,500	6,500	6,500	6,500
<b>Other recovery capacity gap</b>	<b>240,500</b>	<b>253,500</b>	<b>268,000</b>	<b>283,500</b>	<b>300,500</b>	<b>318,500</b>

**Table 80. Sorting and transfer capacity gap summary (tonnes per annum)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
C&I (inc Agricultural waste) and C&D	0	0	0	0	0	0
MSW	0	0	0	0	0	0
Hazardous (inc Clinical and radioactive)	0	0	0	0	0	0
<b>Sorting and transfer capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Table 81. Disposal and landfill capacity gap summary (m<sup>3</sup>, cumulative)**

	2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
C&I (inc Agricultural waste) and MSW	0	0	0	0	290,500	1,776,000
Hazardous (inc Clinical and radioactive)	0	0	0	0	0	0
C&D	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	423,000	1,209,500
<b>Disposal and landfill capacity gap</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>713,500</b>	<b>2,985,500</b>

## Section 8. Determining how much land we will need

8.1. During the development of the Waste Core Strategy, one of the key issues has been how to calculate the amount of land that will be required to realise the strategy (i.e. deliver facilities to fill the capacity gap).

8.2. Uncertainties exist in relation to:

- how much capacity will be delivered from new facilities and how much from extensions or intensifications of existing sites,
- the impacts of fiscal incentives and fiscal and supply constraints on the market; and
- competing technologies and future innovation;

all of which will ultimately influence the investment choices of the industry.

8.3. A number of alternative options have been considered, consulted on and developed to reach the final approach.

### Alternative methods considered

#### ***Refreshed Issues and Options stage***

8.4. The *Refreshed Issues and Options* consultation asked whether the following ratios should be pursued as the basis of land allocations;

- Open Windrow: 10,000tpa/2.5 ha
- Transfer Stations: 50,000tpa/0.5-1ha
- All other waste management types: 50,000tpa/ha
- Landfill: No set relationship because each proposals and site will differ.

These figures were based on early evidence for the Phase 2 revision of the RSS.

8.5. This approach received some support in the *Refreshed Issues and Options* consultation (57% agreed) and was developed for the *Emerging Preferred Options* consultation.

#### ***Emerging Preferred Options stage***

8.6. The *Emerging Preferred Options* consultation set out the following assumptions:

*"Every waste management facility is different and operators will all have different preferences as to how much land they need for their particular proposal. It is however possible to generalise that, on average modern waste management facilities need about 1HA to process about 50,000t of waste per year<sup>[72]</sup>. On the basis of this ratio, our initial estimate is that we*

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<sup>72</sup> WMRSS Phase 2 Revision, Waste Background Paper (January 2007) page 26.

*anticipate needing to make about the following areas of land necessary during the life of the Strategy:*

- 14HA to manage C and I waste,
- 7.5 HA to manage MSW
- 2 HA to manage biodegradable waste
- 6HA for waste transfer stations
- Additional land to manage C and D waste (area cannot be specified at present)

*Total needed, about 30HA (minimum) over the period 2007-2027*

*It must be stressed however that:*

- Many of the existing waste facilities in Worcestershire process waste on much smaller sites than this ratio of 1HA/50,000tpa and that,
- Permission has already been granted but not yet commenced, for proposals which would manage about 700,000t of waste p.a., i.e. equivalent to about 14HA of land (at this ratio).

*It is possible that not all of these will commence. It is very likely however that we may well only have to identify something like half of the land area suggested above. We may therefore be looking to find about 1 HA, or less, per year of land for new waste management facilities over the life of the Strategy.*

*We intend to develop a range of Options for how much land we might need, based roughly on a ratio of 1HA/50,000t of waste pa."*

- 8.7. This approach did not take account of the waste management hierarchy or the different land take of different facilities.
- 8.8. Three broad approaches were considered to identify what types of facility would be appropriately located on a site. These were to categorise sites by:
- Size;
  - Broad kind; or
  - Specific type.
- 8.9. The option based on size, set out to distinguish between strategic large and local small scale waste management facilities<sup>73</sup>. It defined
- Strategic large facilities: 50,000t or more
  - Local/small sites: less than 50,000t.
- 8.10. The other options did not take account of capacity or land requirements.
- 8.11. A difficulty with both these methods is that some kind of basis is needed to define the difference between the scales. A number of consultees referred to this and a robust method was not found.

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<sup>73</sup> 'Waste Scenarios Study' (WMRA/Enviros) July 2005 para 9.1 "It is understood from anecdotal evidence that larger waste companies are unlikely to build plants of less than 50,000t.p.a." and WMRSS Phase 2 Revision, Waste Background Paper (January 2007) page 26

## ERM large and small scale facilities scenarios

8.12. A further set of three scenarios was examined in the "*Industrial Estates Study*" background document<sup>74, 75</sup>, based on developing:

**a. only small-scale waste management facilities**

**- 18 sites required**

These facilities are assumed to have a capacity of 10,000 to 50,000tpa and require a site of 1 to 2 hectares. Within Worcestershire, there are a number of waste management facilities operating on sites of around 1 hectare in size.

**b. only large-scale waste management facilities**

**- 4 sites required**

These facilities are assumed to have a capacity of 120,000 to 250,000tpa and require a site of 5 hectares.

**c. both small-scale and large-scale waste management facilities**

**- 1 large and 13 small sites required, or**

**- 2 large and 8 small sites required**

This scenario assumes the total required capacity is split between large and small scale facilities.

8.13. The report's short-listing process identified 48 sites which were potentially suitable for accommodating small scale waste facilities and 15 locations at which larger scale facilities could be developed, with seven of these considered particularly suitable for a facility of strategic importance. It also stated that a mix of facility type and size would be deliverable and would bring benefits in terms of greater flexibility to the industry, economies and efficiencies of scale where relevant and enable communities to take responsibility for their waste arisings.

8.14. The scenarios were not intended to identify how waste management capacity should be delivered in Worcestershire. Calculations were made in order to determine whether the likely range of waste management facilities that will be required can be delivered in the county's existing industrial estates.

8.15. A scale based approach received the most support (40.8%) in the Emerging Preferred Options consultation, However approaches based on defining size, kind or specific type run the risk of being over-prescriptive or stifling innovation and it is not possible to determine in advance that a particular number of large or small facilities will be needed, or that any such distribution will not change over time.

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<sup>74</sup> ERM, 2009. "*Industrial Estates Study*" background document to the Waste Core Strategy, available at [www.worcestershire.gov.uk/wcs](http://www.worcestershire.gov.uk/wcs).

<sup>75</sup> Small = 10-50,000 tonnes per annum; medium = 50,000-120,000; large = 120,000-250,000



## ***First Draft Submission stage***

8.16. In response to the consultation comments received on the Emerging Preferred Options consultation, it was noted that calculations relating to land requirements would need to be derived from on a more robust evidence base.

8.17. In evidence gathering for the Waste Core Strategy, officers visited every known operating waste site in the county. As part of this, each operator was asked to complete a questionnaire detailing:

- annual throughput
- types of waste managed
- site area
- waste source
- destination of recycle/residues

Some of these responses were estimates, but the information gathered can be used to supplement data recorded in the Waste Data Interrogator, specifically regarding exempt sites and processes. This research formed the basis of the alternatives which were used to inform the *First Draft Submission* consultation.

8.18. The approach used considered the typical throughput per hectare of different facilities in Worcestershire. One set of alternatives considered was based on this data alone. The other supplemented this with figures from regional or national studies where relevant.

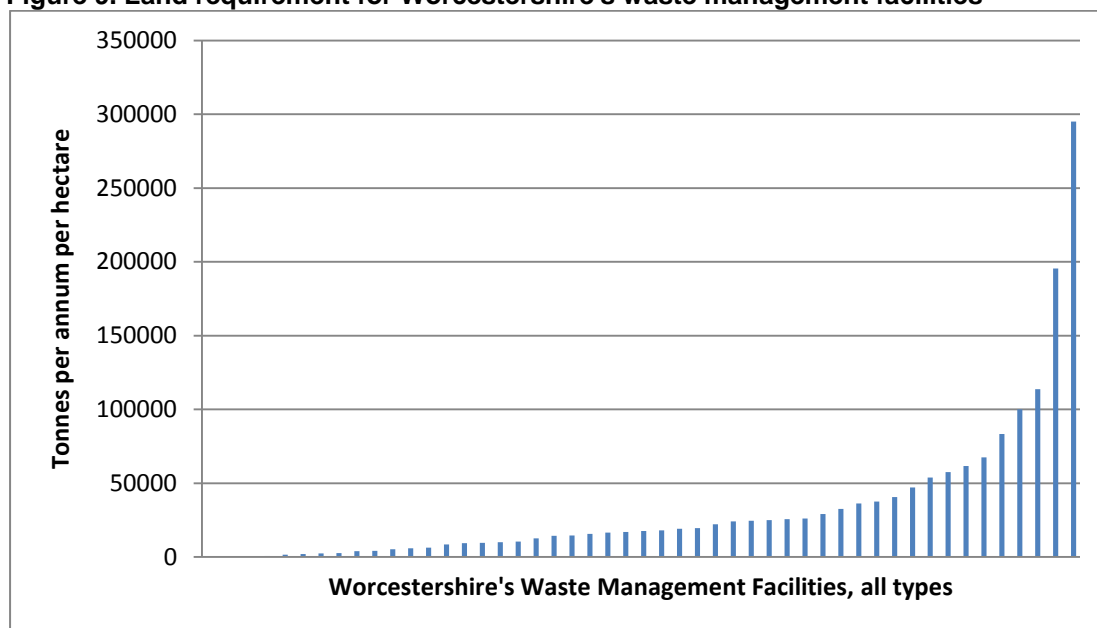
## **Options based on Worcestershire data**

8.19. Analysis of this data gave an indication of the likely quantities of waste which are dealt with per hectare, depending on the nature of the facility. This is set out in **Table 82** and shown in **Figure 9**.

**Table 82. Worcestershire average capacity/land take (tonnes p.a. / ha) for waste management facilities**

Facility Type	Average tonnes per annum/ hectare	
	Information source	tpa/ha
Waste Transfer Station/ MRF	Worcestershire average	23,500
Household Recycling Sites	Worcestershire average	21,500
Metal Recycling Sites	Worcestershire average	15,000
End of life vehicle sites	Worcestershire average	2,000
Physical treatment	Worcestershire average	27,000

**Figure 9. Land requirement for Worcestershire's waste management facilities<sup>76</sup>**



- 8.20. From the data gathered, the two alternative methods were considered for identifying a useful range of land takes:
- Identifying a land requirement range based on the upper and lower quartiles
  - Identifying a land requirement range based on the median and mean averages

These are shown in **Table 83** and **Table 84**.

**Table 83. Identifying a land requirement range using Worcestershire data using Quartiles**

Alternative 1 - Quartiles	Tpa/ha
Lower quartile	6,250
Upper quartile	36,250
Inter-quartile range	30,000

Note: Rounded to nearest 250 tpa/ha

**Table 84. Identifying a land requirement range using Worcestershire data using Averages<sup>77</sup>**

Alternative 2 – Averages	Tpa/ha
Median	17,500
Mean	33,500
Inter-average range	16,000

Note: Rounded to nearest 250 tpa/ha

<sup>76</sup> Each line on this graph represents one of Worcestershire's waste management facilities.

<sup>77</sup> The median average is the numeric value separating the higher half of a sample (in this case the average tonnes per hectare at different waste facility types) from the lower half. The median can be found by arranging the sample in order from lowest value to highest value and picking the middle one. If there is an even number of observations, then there is no single middle value; the median is then defined to be the mean of the two middle values. The mean average can be calculated by adding all the values and dividing by the number of values.

- 8.21. These alternatives provided a useful indication of waste management in Worcestershire. However, there are few large sites in the county and none of certain treatment types.
- 8.22. It was decided that using either of these alternatives could reinforce past trends and not take account of technologies which do not currently exist in the county.

### Options based on supplementing the Worcestershire data

- 8.23. An alternative range was developed by supplementing the Worcestershire sites information with information from regional or national studies as indicated in **Table 85** and **Figure 10**.

**Table 85. Land requirements (tonnes p.a. / hectare) for waste management facilities<sup>78</sup>**

	Average tonnes per annum/ hectare	
	Information source	tpa/ha
Waste Transfer Station/ MRF	Worcestershire average	23,500
Household Recycling Sites	Worcestershire average	21,500
Metal Recycling Sites	Worcestershire average	15,000
End of life vehicle sites	Worcestershire average	2,000
Composting: Open windrow	AWM	15,000
Composting: In-vessel	AWM	25,000
Anaerobic digestion (Small scale)	ODPM	33,000
Anaerobic digestion (Large scale)	ODPM	66,000
Physical treatment	Worcestershire average	27,000
Thermal treatment (Small scale)	ODPM	40,000
Thermal treatment (Large scale)	ODPM	90,000

<sup>78</sup> Sources for Table 85:

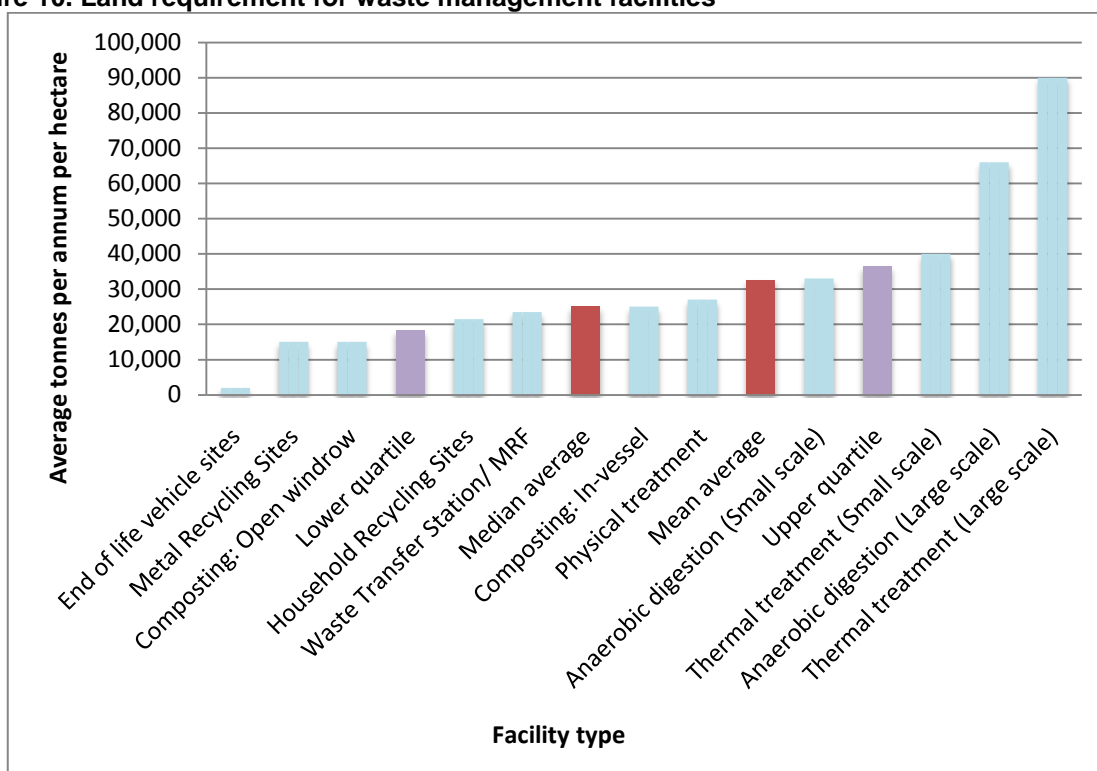
**AWM** (2008) *"Waste – a Future Resource for Businesses: Developing the evidence base for a targeted market intervention strategy for the West Midlands"* – Table 2.12

**Worcestershire Average** *"Worcestershire Waste Core Strategy Background Document: Waste Sites in Worcestershire"*

**Defra** (2007) *"Economies of Scale - Waste Management Optimisation Study by AEA Technology Final Report"*

**ODPM** (2004) *"Planning for Waste Management Facilities, A Research Study"* – where a range is given we have calculated an average.

**Figure 10. Land requirement for waste management facilities**



8.24. Again, two alternative methods were considered for identifying a useful range of land takes from this data:

- Identifying a land requirement range based on the upper and lower quartiles
- Identifying a land requirement range based on the median and mean averages

These are shown in **Table 86** and **Table 87**.

**Table 86. Identifying a land requirement range using supplemented data using Quartiles**

Alternative 1 - Quartiles	Tpa/ha
Lower quartile	18,250
Upper quartile	36,500
Inter-quartile range	18,250

Note: Rounded to nearest 250 tpa/ha

**Table 87. Identifying a land requirement range using supplemented data using Averages**

Alternative 2 - Averages	Tpa/ha
Median	25,000
Mean	32,500
Inter-average range	7,500

Note: Rounded to nearest 250 tpa/ha

8.25. The averages were considered to be the more useful alternative than the quartiles for the following reasons:

- the inter-average range was large enough to indicate a possible range in the land requirement

- the land requirement range provided by the using quartiles was too large to be meaningful.
- 8.26. The land area requirement range based on supplemented data averages was consulted on at *First Draft Submission* stage. 51.9% of respondents agreed with the figures relating to arisings and capacity gap and only one specific comment was made raising concern about the basis for calculation tonnes per hectare.
- 8.27. The main limitation with this approach was that it made assumptions about the technology types/mix that would be used.

## ***Publication Document stage***

- 8.28. The *Publication Document (Regulation 27)* made the waste management hierarchy central to the strategy and as such the capacity gap was structured around levels of the waste management hierarchy. This was significantly different to other consultation stages. To reflect this, methods of estimating land requirements were revised so that they were based around the hierarchy.
- 8.29. The *Publication Document (Regulation 27)* stage returned to using Worcestershire's specific circumstances to calculate land requirements, rather than using the supplemented data. This approach was decided on because emerging Government policy is moving towards a more local view and using local circumstances would provide the most realistic basis for how facilities would actually be developed by market forces throughout the lifetime of the strategy. The following sections give details of the information used in the calculations.
- 8.30. One reason that previously prevented the use of this data was overcome by a move away from average requirements for different facility types towards an approach based on different levels of the waste hierarchy.
- 8.31. In order to make the data for specific sites meaningful in terms of the waste management hierarchy, the following approach was taken:
- Re-use and recycling: Biological, physical and chemical treatment facilities
  - Recovery: Thermal treatment with energy recovery
  - Transfer: MRF and waste transfer stations<sup>79</sup>
  - Disposal: Landfill
- 8.32. Although the approach was no longer technology specific there were still some shortcomings in the Worcestershire data which need to be overcome. Namely that there are some common types of facilities which are not currently operational in the County.

**Composting facilities:** When the *First Draft Submission* consultation was developed there were no operational composting facilities, however by the

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<sup>79</sup> For these calculations this category does not include Household Recycling Centres

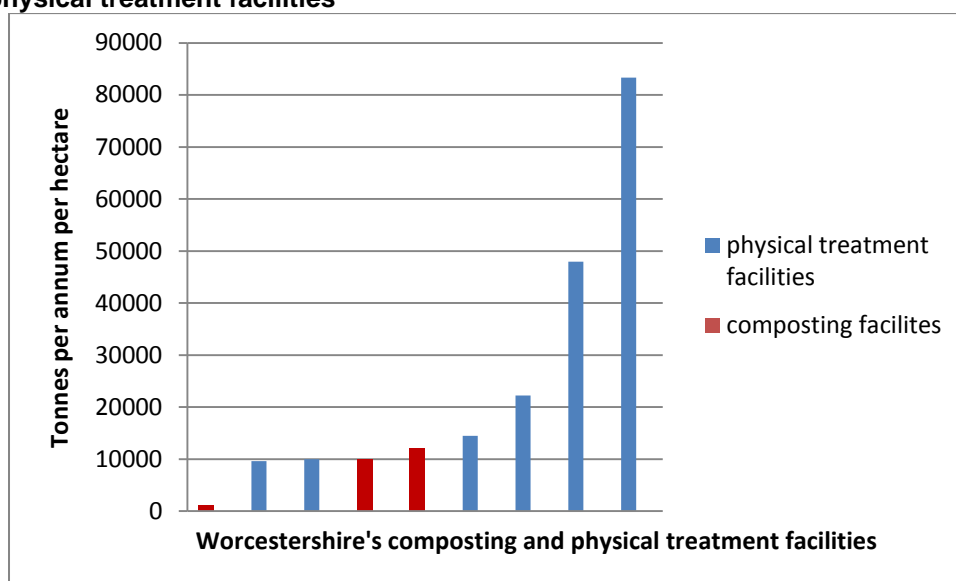
time the Publication Document was developed there were three operational composting facilities in the County. These facilities were considered in re-use and recycling figures.

**Thermal treatment facilities with energy recovery:** There are currently no operational facilities in Worcestershire, however four applications have been made for thermal treatment facilities in Worcestershire since 2000. The throughput and land area of these applications have been used to give a realistic indication of the capacity and throughput that the private sector feels would be deliverable in Worcestershire.

## How much land is needed to meet the re-use and recycling capacity gap?

- 8.33. Land requirements for re-use and recycling of all waste streams have been calculated based on the 9 operational or permitted composting and physical treatment facilities in the county for which we know both the throughput and site area<sup>80</sup>, as shown in **Figure 11**.

**Figure 11. Range of throughputs per hectare at Worcestershire's composting and physical treatment facilities**



- 8.34. These give an average throughput per hectare of 23,500 tonnes per annum. Based on this average, the land requirements for re-use and recycling are shown in **Table 88**.

- 8.35. All land requirements in this section are rounded to the nearest 0.5 hectares.

<sup>80</sup> Hill and Moor composting facility is not included as we do not know the size of the composting area.

**Table 88. Land requirement for re-use and recycling (at 23,500 tpa/ha)**

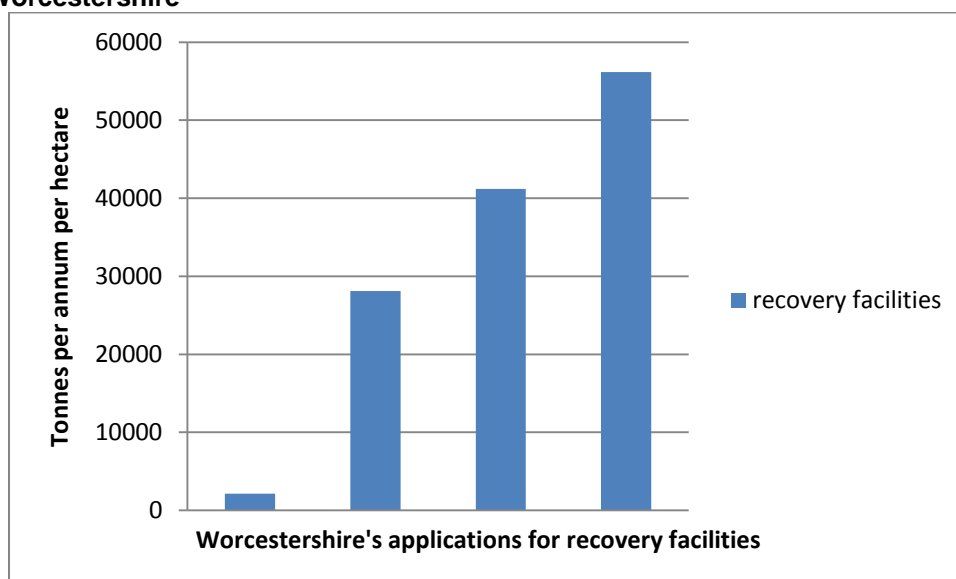
		2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
C&I waste	Capacity gap for re-use and recycling (tonnes per annum)	58,000	81,000	107,500	137,500	172,000	210,500
	<b>Land requirement (hectares)</b>	<b>2.5</b>	<b>3.5</b>	<b>4.5</b>	<b>6</b>	<b>7.5</b>	<b>9</b>
Hazardous waste	Capacity gap for re-use and recycling (tonnes per annum)	40,000	40,500	40,500	40,500	40,500	40,500
	<b>Land requirement (hectares)</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>	<b>1.5</b>
C&D waste	Capacity gap for re-use and recycling (tonnes per annum)	127,500	105,000	105,000	105,000	105,000	105,000
	<b>Land requirement (hectares)</b>	<b>5.5</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>
MSW	Capacity gap for re-use and recycling (tonnes per annum)	186,000	195,000	229,000	238,500	247,500	255,000
	<b>Land requirement (hectares)</b>	<b>8</b>	<b>8.5</b>	<b>9.5</b>	<b>10</b>	<b>10.5</b>	<b>11</b>
<b>Total land requirement for re-use and recycling (hectares)</b>		<b>17.5</b>	<b>18</b>	<b>20</b>	<b>22</b>	<b>24</b>	<b>26</b>

## How much land is needed to meet the recovery capacity gap?

8.36. Land requirements for recovery of all waste streams<sup>81</sup> have been calculated based on all applications for 'other recovery' facilities in Worcestershire between 2000 and 2010. There are currently no operational recovery facilities and this approach gives a realistic estimate of the typical throughput that the industry considers achievable in Worcestershire, as shown in **Figure 12**.

<sup>81</sup> Excluding C&D waste.

**Figure 12. Range of throughputs per hectare at recovery facilities applied for in Worcestershire**



8.37. These give an average throughput per hectare of 32,000 tonnes per annum. Based on this average, the land requirements for re-use and recycling are shown in **Table 89**.

**Table 89. Land requirements for 'other recovery' (at 32,000 tpa/ha)**

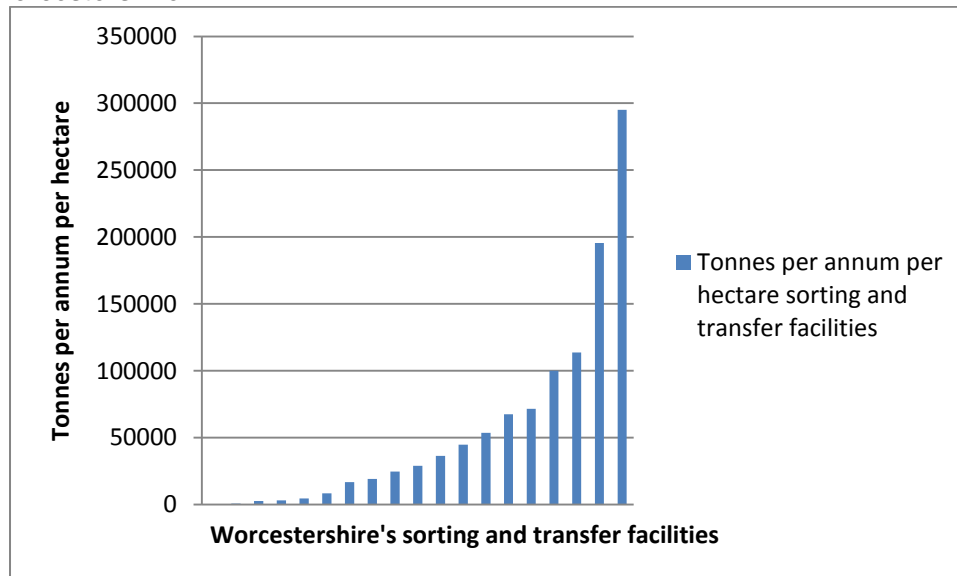
		2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
C&I waste	Capacity gap for recovery (tonnes per annum)	120,500	129,000	138,500	149,500	162,000	176,000
	<b>Land requirement (hectares)</b>	<b>4</b>	<b>4</b>	<b>4.5</b>	<b>4.5</b>	<b>5</b>	<b>5.5</b>
Hazardous waste	Capacity gap for recovery (tonnes per annum)	6,500	6,500	6,500	6,500	6,500	6,500
	<b>Land requirement (hectares)</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>
MSW	Capacity gap for recovery (tonnes per annum)	113,500	118,000	123,000	127,500	132,000	136,000
	<b>Land requirement (hectares)</b>	<b>3.5</b>	<b>3.5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
<b>Total land requirement for recovery (hectares)</b>		<b>8</b>	<b>8</b>	<b>9</b>	<b>9</b>	<b>9.5</b>	<b>10</b>



## How much land is needed to meet the sorting and transfer capacity gap?

- 8.38. Land requirements for sorting and transfer of all waste streams is based on 19 operational or permitted sorting and transfer facilities in the county for which we know both the throughput and site area, as shown in **Figure 13**.

**Figure 13. Range of throughputs per hectare at sorting and transfer facilities in Worcestershire**



- 8.39. These give an average throughput per hectare of 57,000 tonnes per annum. However there is no identified capacity gap for transfer facilities and therefore no land requirement.

## How much land is needed to meet the landfill capacity gap?

- 8.40. It is not possible to determine the land requirement in hectares for landfill as each landfill site will be based both on area and depth. However there is no identified capacity gap for landfill and therefore no land requirement needs to be calculated.

## Land requirement summary and number of facilities

- 8.41. The land requirements for each level of the waste hierarchy as detailed above are drawn together and summarised in **Table 90** below.

**Table 90. Summary of land requirements**

		2010/11	2015/16	2020/21	2025/26	2030/31	2035/36
Re-use and recycling	Total capacity gap (tpa)	411,500	421,500	482,000	521,500	565,000	611,000
	Total land requirement (ha)	17.5	18	20	22	24	26
'Other recovery'	Total capacity gap (tpa)	240,500	253,500	268,000	283,500	300,500	318,500
	Total land requirement (ha)	8	8	9	9	9.5	10
Sorting and transfer	Total capacity gap (tpa)	0	0	0	0	0	0
	Total land requirement (ha)	0	0	0	0	0	0
<b>Total capacity gap (tpa) (excluding landfill)</b>		<b>652,000</b>	<b>675,000</b>	<b>750,000</b>	<b>805,000</b>	<b>865,500</b>	<b>929,500</b>
<b>Total land requirement (ha)</b>		<b>25.5</b>	<b>26</b>	<b>29</b>	<b>31</b>	<b>33.5</b>	<b>36</b>

### ***Number, type and size of facilities***

8.42. Likely land requirements have been established and although estimating the numbers, types and size of facilities that will provide for the identified capacity gap is difficult, some estimate must be undertaken. In line with the method for estimating land requirements, consideration was given to Worcestershire's specific circumstances and the average size of facilities in the county. This was based on average throughputs for the facilities, rather than average land take, as this relates directly to the capacity gap figures:

- Re-use and recycling: 14,000 tpa (at all facilities) to 19,000 tpa (at urban facilities);
- Other recovery: 130,000 tpa (at all facilities applied for);
- Sorting and transfer: 17,000 tpa (at urban facilities) to 25,000 tpa (at all facilities).

These give the number of facilities likely to be developed as shown in **Table 91**.

**Table 91. Estimate of the number of facilities likely to be developed during the life of the Waste Core Strategy**

	2010/11	2015/16	2020/21	2025/26
Re-use and recycling	21-29	22-30	25-35	27-37
Other recovery	2	2	2	2
Sorting and transfer	0	0	0	0
Landfill and disposal	0	0	0	0
<b>Total number of facilities</b>	<b>23-31</b>	<b>24-32</b>	<b>27-37</b>	<b>29-39</b>

- 8.43. These figures accord with the "Waste Scenarios Study"<sup>82</sup> which stated that for C&I waste:
- the need for small operators is likely to be greatest in the shire regions, including Worcestershire;
  - physical treatment plants are more likely to be a range of sizes, with smaller plant or a network of transfer stations across the shire regions, including Worcestershire, feeding into large plant located in the Metropolitan sub-region;
  - larger to medium sized thermal treatment facilities of between 200-400,000 tonnes are more likely than a network of small facilities, equating to approximately 2-3 facilities in the West Midlands region;
  - Regardless of the treatment type there will be a need for new capacity in each sub region;
  - If the assumption that waste is treated as close to its point of arising as possible is followed, then the sub-regions requiring the most new facilities are Staffordshire, Worcestershire and the Metropolitan areas of the West Midlands.
- 8.44. Waste management sites in Worcestershire and the shire counties are smaller than the regional average but it is possible that as the waste industry matures, new facilities will be both larger in scale and have higher throughputs in line with modern facilities elsewhere in the region.
- 8.45. The RSS Phase Two revision evidence base<sup>83</sup> used a much higher average site throughput of 50,000 tpa which would amount to around 18 facilities by 2025/26. The estimates of the number of new facilities that might be needed in Worcestershire therefore represent the worst case scenario for the number of facilities.
- 8.46. Even if this entire capacity were to be provided by new facilities rather than the intensification of existing sites, the number is nonetheless modest and achievable at an average of just over two new facilities each year.

## ***Risk Assessment***

- 8.47. The risk assessment for this approach is summarised in **Table 92**.

**Table 92. Land requirements risk analysis**

Issue	Level	Comments
<b>Risk</b> if estimates are wrong	Medium	The strategy will not be founded on accurate figures. However land requirements will be used to indicate the deliverability of the strategy rather than to determine specific allocation requirements.

<sup>82</sup> 'Waste Scenarios Study' (WMRA/Enviros) July 2005 para 9.1 page 99

<sup>83</sup> West Midland Regional Assembly (2004) *West Midlands Waste Capacity Study. Phase 2: Future Capacity Requirements*.

<b>Likelihood</b> of risk occurring	Low	The best available data has been used to determine the amount of land required by waste management facilities in Worcestershire.
<b>Worst Case Scenarios:</b> The calculated land requirement is overestimated.	Low	<p>Unlikely to prove serious. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends.</p> <p>Land requirements will be used to indicate the deliverability of the strategy rather than to determine specific allocation requirements.</p>
<b>Worst Case Scenarios:</b> The calculated land requirement is underestimated.	Low	<p>This is considered unlikely. Monitoring of the Waste Core Strategy through the AMR, and other monitoring by Defra and the RTAB are likely to alert the Council to emerging trends and will trigger a review of the strategy if projections prove to be very inaccurate.</p> <p>Land requirements will be used to indicate the deliverability of the strategy rather than to determine specific allocation requirements. Waste management facilities will therefore be able to be brought forward on any suitable land and will not be restricted by this calculation.</p>

# Appendix A. Worcestershire Waste Core Strategy Background Documents

To help provide a robust evidence base for the Waste Core Strategy the Council has prepared a series of background documents. These outline current thinking and have informed the approach taken to date in the development of the waste core strategy. All of these background documents are *living document* and are in a state of development and comments are invited on all available documents during the consultation period.

## Key Themes

- *Towards a Vision Statement:* sets out the vision which is driving the Waste Core Strategy and details how it has evolved through consultation process.
- *Spatial Portrait:* provides additional detail to the spatial portrait set out in this consultation. It includes a description of the County and the local factors that need to be taken into account in developing the Waste Core Strategy.
- *Spatial Strategy:* Set out how the Spatial Strategy for the WCS has been developed
- *Arisings and capacity gap:* considers waste arisings in Worcestershire and makes projections about future arisings, treatment capacity and the need for facilities.
- *Monitoring Baseline:* Establishes the baseline for indicators set out in the WCS monitoring schedule and makes recommendations for those indicators that are not currently monitored
- *Identifying 'areas of search':* sets out the approach to identifying locations suitable for waste management development, termed 'areas of search' and details all of the alternatives methods considered. It lists all potential locations assessed and details why they were, or were not, considered suitable for waste management development. This document has been informed by *ERM Industrial Estate Report*.
- *Climate Change:* is intended to form a basis for addressing climate change issues in the Waste Core Strategy. It considers mitigation through the reduction of greenhouse gas emissions, energy demands and the adaptation of waste management facilities to climate change.
- *Links with Districts & Neighbouring Local Authorities Plans and Strategies:* identifies the aspects of the guidance 'Creating Strong, Safe and Prosperous

Communities' which are relevant to the production of the Waste Core Strategy. As a result of the guidance, this paper goes on to examine the links to waste in Worcestershire's Districts and neighbouring Local Authorities plans and strategies. It also evaluates what these links mean for the Waste Core Strategy.

- *Waste Sites in Worcestershire*: details existing waste management operations in Worcestershire and analysis of the relationship between size and throughput. In order to gain this information, the majority of known waste sites in the County were visited between September 2008 and July 2009. During these visits operators were asked about any issues currently faced, any future changes anticipated, these meetings are summarised in the report.
- *Inland Waterways*: The document was developed in response to consultation comments received on behalf of British Waterways regarding the Worcestershire County Council Waste Core Strategy: Refreshed Issues & Options Consultation. It sets out the policy context relating to Inland Waterways in Worcestershire.
- *Waste Freight by Rail*: considers the potential for movements of waste by rail in Worcestershire.

## Waste Streams

- *Municipal Waste*: sets out the national and local policy context. It also includes details of the waste arisings and available capacity for treatment of municipal waste within the County.
- *Commercial and Industrial Waste*: sets out the national and local policy context. It also includes details of the waste arisings and available capacity for treatment of municipal waste within the County.
- *Construction and Demolition Waste*: sets out the national and local policy context. It also includes details of the waste arisings and available capacity for treatment of municipal waste within the County.
- *Agricultural Waste*: considers waste arising from agricultural activities in Worcestershire. It examines what agricultural waste is, how it is treated and explores the planning permitted development rights. and identifies the potential options for making provision through the Waste Core Strategy.
- *Hazardous Waste*: The document considers hazardous waste arising in Worcestershire. It includes information relating to hazardous waste in a national and regional policy context and includes details of the demand and available capacity for the treatment of hazardous waste within the County.
- *Waste Arisings from Healthcare and Related Activities - Clinical Waste and Low Level Radioactive Waste*: considers waste arising from health care and

related activities, focusing on Clinical waste; and Non-nuclear low level radioactive waste. It includes information relating to clinical waste and non-nuclear low level radioactive waste in a policy context. It also includes details of the demand and available capacity for treatment of clinical and non-nuclear low level radioactive waste within the County.

Annex I considers low level radioactive waste from the nuclear industry in more detail, however it is not felt to be a significant issue in the County and is, therefore, not considered in the main body of the report.

## Management Facilities

- *Types of Facilities:* is intended to be a simple guide that gives an overview of the processes that tend to happen at a range of different facilities and lists the things that might need to be thought about when deciding where a facility would be best situated. It also sets out some of the possible impacts and benefits of each type of facility.
- *Landfill* includes background data and considers issues around types of landfill and the policy context. It also details of the demand and available capacity for landfill within the County, based on EA data and the Council's own research.
- *Metal Recycling Sites:* considers all sites in Worcestershire involved in the recycling of metal, this includes sites which sort, bulk and/or process metal and any other sites that form part of the chain of processes of recycling waste metal into a material which can be re-used. It sets out the context and background data relating to metal recycling, detailing the demand and available capacity for metal recycling within the County.
- *Waste Transfer Stations:* considers Waste transfer stations, looking at the current need and capacity in Worcestershire and wider policy context.
- *Resource Recovery from Biodegradable Waste - Composting and Anaerobic Digestion* The document considers composting and anaerobic digestion. These treatment options are considered in the same document as they both offer the opportunity to recover resources from biodegradable waste. It sets out the context and background data relating to composting and anaerobic digestion.
- *Recovering Energy from Waste - Biological and Thermal Treatment Technologies:* sets out the context and background data relating to biological and thermal technologies for recovering energy from waste including anaerobic digestion, incineration and refuse derived fuels. There is some overlap with the Worcestershire Waste Core Strategy Background Document: Resource Recovery from Biodegradable Waste: Composting and Anaerobic Digestion.
- *Waste Water Treatment Infrastructure:* examines the need for waste water treatment infrastructure in Worcestershire. It includes information relating to waste water treatment policy context. It also proposes a possible way forward

for the potential issues regarding who is responsible for what aspects of managing waste water treatment and related development.



## Appendix B. Mineral Waste

Mineral workings generate waste materials, such as naturally occurring strata, overburden, processing by products and more conventional materials such as discarded machinery. Some of these materials are being reclassified as Directive Waste.

In Worcestershire naturally occurring mineral wastes, such as subsoils and unsalable strata or by products are invariably used as part of the restoration of sites. The volumes of the other materials produced are insignificant.

A survey on behalf of the Environment Agency (Atkins 2002) was unable to assemble sufficient data to quantify the types and management methods for non-mineral wastes produced by the UK mineral industry. It concluded that the majority of non-mineral wastes are already dealt with off-site via contract arrangements with the waste management industry, suggesting that the re-classification of these wastes will have little impact. In the context of the quantities of other industrial and commercial waste, the quantities of non-mineral mine and quarry wastes in Worcestershire are very small. There is no evidence that there will be any significant growth in this waste stream in Worcestershire. We will monitor these arisings but we do not anticipate that they will generate issues which need special consideration.

**Table 4: Waste production by Substance Oriented Classification (SOC) tonnes (Worcestershire 2006/7)** shows that this waste stream has been included in calculations of C&I waste arisings as part of the ADAS study.

## Appendix C. JMWMS background assumptions table

A	B	C	D	E	F	G	H	I
YEAR	MSW arising from JMWMS for the partnership	recycling and composting to comply with JMWMS Target 3 (HHW)		non HHW recycled or composted	Max LF of MSW	Residual tonnes available for treatment	All recycling and composting (Columns C+D+E)	Cumulative maximum landfill from 2010/11
		recycling	composting					
2007 - 2008	395,993				284,121			
2008 - 2009	399,200				255,081			
2009 - 2010	401,803				220,234			
2010 - 2011	405,139	102,095	43,755	21,000	195,719	238,289	166,850	195,719
2011 - 2012	408,474	102,936	44,115	21,173	171,206	240,251	168,224	366,924
2012 - 2013	411,810	103,776	44,475	21,346	146,691	242,213	169,597	513,616
2013 - 2014	415,146	112,463	48,198	21,519	140,399	232,966	182,180	654,014
2014 - 2015	418,482	113,367	48,586	21,692	134,107	234,838	183,644	788,121
2015 - 2016	421,817	114,270	48,973	21,865	92,800	236,710	185,108	880,921
2016 - 2017	425,153	120,531	51,656	22,037	93,534	230,929	194,224	974,455
2017 - 2018	428,489	121,477	52,061	22,210	94,268	232,741	195,748	1,068,723
2018 - 2019	431,825	122,422	52,467	22,383	95,001	234,552	197,272	1,163,724
2019 - 2020	435,160	123,368	52,872	22,556	95,735	236,364	198,796	1,259,459
2020 - 2021	438,496	138,126	59,197	22,729	96,469	218,444	220,052	1,355,928
2021 - 2022	441,832	139,177	59,647	22,902	97,203	220,106	221,726	1,453,131
2022 - 2023	445,168	140,228	60,098	23,075	97,937	221,767	223,400	1,551,068
2023 - 2024	448,504	141,279	60,548	23,248	98,671	223,429	225,074	1,649,739
2024 - 2025	451,839	142,329	60,998	23,421	99,405	225,091	226,748	1,749,144
2025 - 2026	455,175	143,380	61,449	23,594	100,139	226,753	228,422	1,849,282
2026 - 2027	458,511	144,431	61,899	23,766	100,872	228,414	230,096	1,950,155
2027 - 2028	461,847	145,482	62,349	23,939	101,606	230,076	231,770	2,051,761

2028 - 2029	465,182	146,532	62,800	24,112	102,340	231,738	233,444	2,154,101
2029 - 2030	468,518	147,583	63,250	24,285	103,074	233,400	235,118	2,257,175
2030 - 2031	471,854	148,634	63,700	24,458	103,808	235,061	236,792	2,360,983
2031 - 2032	475,190	149,685	64,151	24,631	104,542	236,723	238,466	2,465,525
2032 - 2033	478,525	150,735	64,601	24,804	105,276	238,385	240,140	2,570,800
2033 - 2034	481,861	151,786	65,051	24,977	106,009	240,047	241,814	2,676,810
2034 - 2035	485,197	152,837	65,502	25,150	106,743	241,709	243,488	2,783,553

Assumptions:

MSW tonnages from JMWMS

HHW recycling and composting split 70% - 30% based on tonnages used to meet Target 3 of the JMWMS, 40% to 2012/13, 43% to 2015/16, 45% to 2019/20 and 50% thereafter

Growth in non HHW recycling and composting reflects MSW growth

Maximum landfill tonnages allow us to meet BPEO and LATS targets, whichever is more stringent in each year.

LATS runs until 2020

Waste growth is based on household growth only.

Figures for Herefordshire and Worcestershire combined