Energy from Waste Incinerator (EFW) including Infrastructure plus that for Combined Heat and Power (CHP), Incinerator Bottom Ash (IBA) Processing Plant with Outside Storage Area, and Air Pollution Control Residue (APCR) Treatment and Disposal Facility, Visitor & Office Accommodation and Landscaping within the Sutton Courtenay Resource Recovery Park

Sutton Courtenay Resource Recovery Park, Oxfordshire.

Waste Recycling Group Limited

Environmental Statement
Chapter 5
Need and Alternatives

RPS

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5. Need and Alternatives

5.1 Introduction

5.1.1 This chapter identifies, describes and evaluates the process and decisions underpinning the choice of location, waste management technology and design, which define the proposal. Need and Alternatives have been considered in detail in the preparation of this Environmental Statement (ES) and the formulation of the proposals.

5.1.2 The proposals will enable the further integration of additional waste management capacity within the Sutton Courtenay Resource Recovery Park with the development of an Energy from Waste incinerator (EfW), together with associated infrastructure plus that for Combined Heat & Power (CHP) and the provision of energy in the form of steam or heated water to neighbouring developments. The EfW incinerator, together with the existing landfill site will provide the means to sustainably manage biodegradable and combustible waste arisings within Oxfordshire. The EfW incinerator will provide the means to meet the requirements of Oxfordshire's municipal waste management contract.

5.1.3 This proposal seeks to only provide a municipal waste management solution for Oxfordshire with the capacity to handle a proportion of the commercial and industrial waste arising within the County.

5.2 Need for the Development

5.2.1 Whilst Planning Policy Statement 23: Planning and Pollution Control, at Annex 1 paragraph 1.54, states:

"applicants do not normally have to prove a need for their proposed development, or discuss the merits of alternative sites," Paragraph 1.54 provides that the nature of polluting or potentially polluting developments and the national or regional need for them, or the location of a proposal in an environmentally designated or sensitive area may make the availability, or lack of availability, of suitable alternative sites material to the planning decision.

5.2.2 Paragraph 1.55 provides:

"Environmental Statements, which must accompany applications where EIA is considered necessary, should identify matters that will be relevant to the determination of the application. Where alternatives are considered, they must include an outline of the main options examined by the applicant and an indication of the most important reasons for the choice, taking into account the respective environmental effects and other relevant matters".

5.2.3 Planning Policy Statement 10: Delivering Sustainable Waste Management, in respect to the demonstration of need states: (paragraph 22), "*Development plans form the framework within which decisions on proposals for development are taken. It is important that plans are kept up to date and properly reflect national policy. When proposals are consistent with an up to date development plan, waste planning authorities should not require applicants for new or enhanced waste management facilities to demonstrate a quantative or market need for their proposal*".

5.3 Waste Strategy

5.3.1 Waste policy in the UK sits within a wider policy and legislative framework agreed with the European Union (EU) and internationally. This collaborative approach will help to deliver global environmental benefits associated with waste, whilst the policy

instruments supporting the EU internal market objectives and recognise the global nature of international trade. Waste Strategy is addressed at a number of levels, Internationally this is through the Waste Framework Directive then nationally through the Waste Strategy for England 2007 (WS2007).

5.3.2 The proposal relates to waste management within Oxfordshire, a county of the South-East region. At a regional level through RSS, the Regional Planning Guidance 9 (RPG9) (revised chapters) Waste and Minerals published in 2006. This regional waste strategy provides guidance on the strategy for waste management within this part of England. At the County level, published by the Oxfordshire Waste Partnership (OWP), The Oxfordshire Joint Municipal Waste Management Strategy – 'No Time to Waste' addresses waste management objectives within the County area.

Waste Framework Directive (75/442/EEC, amended by Directives 91/156, 91/692 and 96/350)

5.3.3 This EU Directive establishes the principle that the essential objective of all provisions relating to waste disposal must be the protection of human health and the environment against harmful effects. It states that the recovery of waste and the re-use of recovered materials should be encouraged in order to conserve natural resources. It also introduces measures designed to implement these principles.

Waste Strategy for England 2007

5.3.4 The National Waste Strategy is part of the implementation for England of the requirements within the Framework Directive on Waste, and associated Directives to produce waste management plans. The European Landfill Directive (Council Directive 1999/31/EC) sets targets for the reduction of biodegradable municipal waste sent to landfill. These targets were incorporated into the National Waste Strategy (Waste Strategy 2000). Since that time the National Waste Strategy has been taken forwards to the Waste Strategy for England 2007 issued in June 2007.

5.3.5 WS2007 highlights: '*There is a particular requirement in the Waste Framework Directive for the waste management plan to identify suitable waste disposal sites or installations. PPS10 (Planning for Sustainable Waste Management) sets out relevant national policies for waste management facilities, including location criteria to inform local planning policy and planning decisions. Local planning authorities in England are reminded of their obligation under the Waste Management Licensing Regulations 1994 (now the Environmental Permitting (England and Wales) Regulations 2007) to produce detailed policies in respect of suitable disposal sites or installations for waste management purposes when producing local development documents, and also their obligation to have regard to national policies in this strategy. PPS10 provides that local planning authorities should, among other things, identify in development plan documents sites and areas suitable for new or enhanced waste management facilities for the waste management needs of their areas, and, in particular, allocated sites to support the pattern of waste management facilities set out in the RSS (in accordance with the broad locations identified in the RSS)'*.

5.3.6 WS2007 sets out the Government's key objectives:

- Decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re use;
- Meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020;
- Increase diversion from landfill of non municipal waste and secure better integration of treatment for municipal and non municipal waste;

- Secure the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste; and,

- Get the most environmental benefit from that investment through increased recycling of resources and energy recovery from residual waste using a mix of technologies.

5.3.7 The WS2007 reinforces the importance of the waste hierarchy whereby landfill is treated as the option of last resort, with an emphasis upon reduction in waste generation followed by reuse and recycling and recovery of value. Despite the hierarchy, the majority of UK waste is still being disposed of through landfill. The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste minimisation strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.

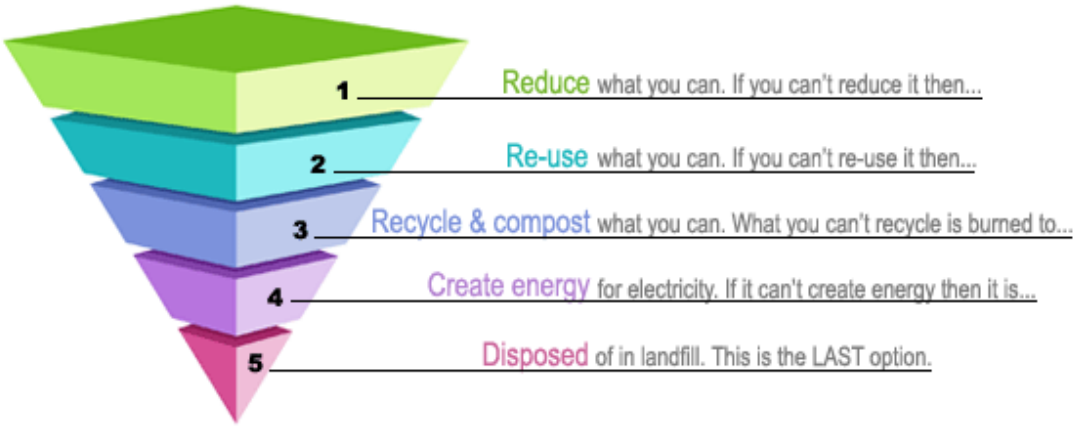


Fig.5.1: Waste Hierarchy

5.3.8 The key landfill targets in WS2007 are:

- To reduce the amount of industrial and commercial waste land filled to 85% of 1998 levels by 2005,

- To reduce the amount of biodegradable municipal waste that is land filled to 75%, 50% and 35% of 1995 levels by 2010, 2013 and 2020 respectively.

5.3.9 A key lever is the Landfill Allowance Trading Scheme (LATS). Introduced as part of the Waste and Emissions Trading Act in 2003, a statutory limit on the amount of Biodegradable Municipal Waste (BMW) that can be sent to landfill by waste authorities in each year between 2005 and 2020 has now been imposed. The Landfill Allowances Trading Scheme (LATS) requires all Waste Disposal Authorities to either reduce the materials sent to landfill, trade permits with other better performing authorities or risk a fine of £150 per tonne for any biodegradable municipal waste sent to landfill over the set limit.

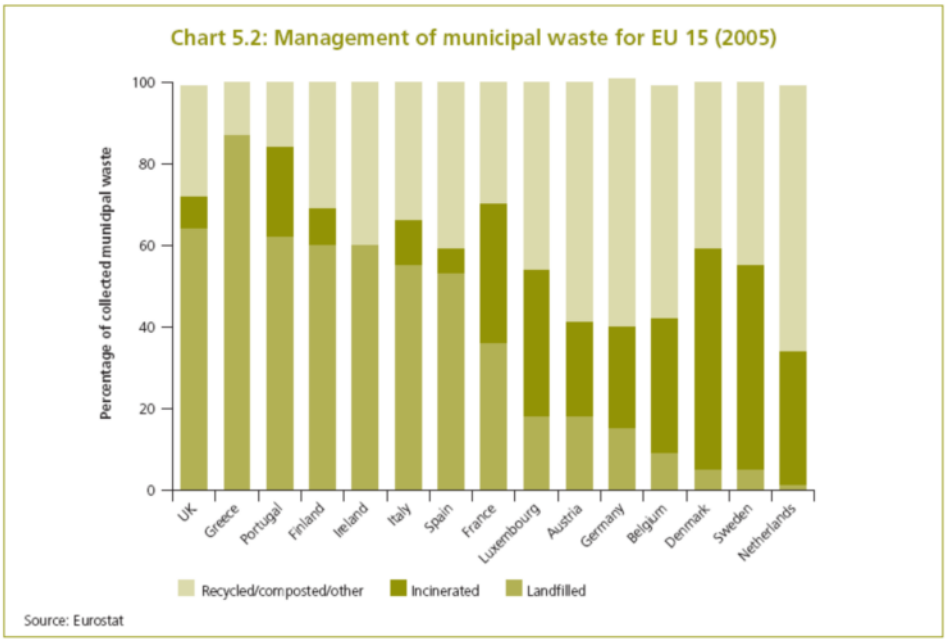
5.3.10 Increased national targets were set in WS2007, compared to that of the Waste Strategy 2000:

- To recover value from 53% of municipal waste by 2010, 67% by 2015, and 75% by 2020;

- To recycle or compost at least 40% of household waste by 2010, 45% by 2015, and 50% by 2020.

5.3.11 In respect to investment in infrastructure WS2007 confirms that the Government is [Executive Summary xxiv] '*ensuring that Regional Spatial Strategies and local development plans conform to national planning guidance on waste so that waste infrastructure projects needed to deliver this strategy receive planning approval'*. Also '*using PFI, and, where appropriate, Enhanced Capital Allowances, and/or Renewable Obligation Certificates (ROC's) to encourage a variety of energy recovery technologies (including anaerobic digestion) so that unavoidable residual waste is treated in the way which provides the greatest benefits to energy policy. Recovering energy from waste (EFW), which cannot sensibly be recycled, is an essential component of a well-balanced energy policy. Energy from waste is expected to account for 25% of municipal waste by 2020 compared with 10% today*'.

5.3.12 The Strategy further emphasises:' [Chapter 5 paragraphs 5, 17] '*recovering energy from waste which cannot sensibly be reused or recycled is an essential component of a well balanced energy policy*, and [Chapter 5 paragraph 21]. *'the recovery of energy from waste has been held back by public fears over alleged health effects, and fears that the development of suitable infrastructure would lock in wastes which could otherwise be minimised or recycled'.* It is important that energy recovery does not crowd out recycling and the Government points out [Chapter 5 paragraph 23] '*evidence from neighbouring countries, where very high rates of recycling and energy from waste are able to coexist, demonstrates that a vigorous energy from waste policy is compatible with high recycling rates*'.(see chart below)



5.3.13 WS2007 also highlights trends in waste growth, recycling and composting. '*In April 2007 the government set performance standards on recycling and composting for all local authorities for the year 2007/2008, setting a minimum performance standard of 20% across the country*.'

Regional Planning Guidance (RPG) 9: Waste & Minerals (June 2006)

5.3.14 The revised RPG9 was published in June 2006 by the Government Office for the South East (GOSE), and includes a waste management strategy (the Strategy), which replaced Policy INF3 and its supporting paragraphs. The South East of England Regional Assembly (SEERA) submitted a draft South East Plan in March

2006. When the South East Plan is finally adopted it will be the Regional Spatial Strategy (RSS) for the South East and replace RPG9 in its entirety. Until that time the RPG9 remains the statutory RSS.

5.3.15 The Strategy has been developed to provide a robust framework for the rapid development of new waste management facilities required to recover, recycle and otherwise treat wastes within the South East region. The Strategy aims to set a clear direction and sense of priority for the region in terms of the approach required by the waste hierarchy – aiming to reduce waste generation, increase re-use, recycling, composting and other forms of recovery before final disposal. The Strategy states that *'There is an immediate and acute shortfall in the capacity and the mixture of facilities, and the region's waste planning authorities and other organisations must start addressing the shortfall now. This urgency is compounded by the long lead-time for many facilities and difficulties in obtaining planning permission'.*

5.3.16 The Strategy states at paragraphs 10.105 to 10.106 that *'One of the most significant issues facing the South East is the growing amount of waste produced and how to manage it now and in the future…A new approach is needed. Growth in waste needs to be reduced… Disposal of materials should be the least preferred option after ensuring as much value as possible has been recovered from them."*

5.3.17 At paragraphs 10.107 to 10.110, the Regional Waste Strategy continues "*In 2000-01, the base year for the data in this revision, approximately 28.5 million tonnes of waste was managed in the South East. The South East's waste included 4.1 million tonnes of Municipal Solid Waste (MSW collected by local authorities), of which almost 80% was landfilled and only 19% was recycled; around 8 million tonnes of Commercial and Industrial waste, of which half was landfilled…The total waste managed in the South East is estimated to rise to nearly 35 million tonnes per annum by 2025. If these patterns of waste management continue, the region's landfills will be full within the decade, creating a management problem but also representing a waste potentially valuable resources and the storing up of environmental problems for the future. This is clearly not sustainable".* .

5.3.18 At paragraph 10.110 the Regional Waste Strategy highlights "*European and national policies demand that the proportion of waste from which we recover value is increased, for example through recycling, composting and recovery of energy, and that the proportion of waste sent to landfill is decreased."*

5.3.19 Recycling and composting targets for municipal solid waste are highlighted by the Regional Waste Strategy at paragraph 10.180. with municipal solid waste rising from 30% in 2005 to 60% by 2025, with Commercial and Industrial Waste rising from 40% in 2005 to 65% in 2025.

5.3.20 The provision of Waste Management Capacity is a key component in delivery of the necessary infrastructure to enable the reduction in waste land filled. The Regional Waste Strategy at paragraph 10.181 highlights "*There is an immediate and acute shortfall in capacity required to achieve the ambitious targets for recycling , composting and other forms of recovery, including energy recovery, and the overall diversion of waste from landfill".*

The Oxfordshire Joint Municipal Waste Management Strategy – No Time to Waste

5.3.21 "No time to waste" was published in August 2006 by the Oxfordshire Waste Partnership and sets out how Oxfordshire will improve the way in which its waste is managed over the next 25 years. Its vision for sustainable waste management and resource efficiency is "*We will work in partnership to reduce waste and to maximise reuse, recycling and composting. We will treat residual waste before disposal and recover further value and to minimise the environmental impact of disposal."*

5.3.22 The Oxfordshire Waste Partnership was established in 2003 whose membership comprises the following authorities.

- Cherwell District Council
- Oxford City Council
- Oxfordshire County Council
- South Oxfordshire District Council
- Vale of White Horse District Council
- West Oxfordshire District Council

5.3.23 The joint municipal waste management strategy notes that in 2005/ 2006, Oxfordshire generated approximately 311,000 tonnes of municipal waste, with some 96% (300,000 tonnes from households and the rest arising from other activities such as street sweepings and litter collections and any trade waste that the Waste Collection Authorities collect.

5.3.24 The Strategy notes that in Oxfordshire some 142,000 tonnes of biodegradable waste was sent to landfill (out of a total municipal solid waste stream to landfill of 211,727 tonnes) and that Oxfordshire must reduce the amount of biodegradable waste land filled to:

- 121,700 tonnes by 2009-2010
- 81,000 tonnes by 2012- 2013
- 56,700 tonnes by 2019- 2020

5.3.25 The Strategy confirms that it achieved a 1.8% reduction in municipal waste per person in 2005/2006 compared with an annual growth nationally of 3%. It also confirms that historical waste data for Oxfordshire show that annual waste growth is expected to be 0.34% per household (from 2006 onwards). Projected housing increases are not included therefore a greater increase is expected. The Oxfordshire Waste Partnership seeks to reduce waste growth to 0% per annum by 2012.

5.3.26 The Oxfordshire Waste Partnership through the Joint Waste Management Strategy looks to provide for an integrated system of collection and processing of household waste which will achieve, as a minimum:

By 31st March 2010: recycle or compost at least 40% of household waste;

By 31st March 2015: recycle or compost at least 45% of household waste;

By 31st March 2020; recycle or compost at least 55% of household waste.

5.3.27 The timescales for achieving waste reduction in Oxfordshire are as follows:

- By 2008/2009 Recycle or compost 38% of household waste.

5.4 Planning Policy

5.4.1 The Government's approach to planning and for sustainable waste management is enshrined within Planning Policy Statement 10: Planning for Sustainable Waste Management. Paragraph 1 of the policy statement provides: "*The overall objective of Government policy on waste, as set out in the strategy for sustainable development, is to protect human health and the environment by producing less waste and by using it as a*

resource wherever possible. Through more sustainable waste management, moving the management of waste up the 'waste hierarchy' of reduction , reuse, recycling and composting , using waste as a source of energy and only disposing as a last resort."

5.4.2 Further '*This means a step change in the way waste is handled and significant new investment in waste management facilities. The planning system is pivotal to the adequate and timely provision of the new facilities that will be needed'.*

5.4.3 In addition paragraph 2 of the policy statement provides: *"Positive planning has an important role in delivering sustainable waste management:*

- *through the development of appropriate strategies for growth, regeneration and the prudent use of resources; and ,*

- *by providing sufficient opportunities for new waste management facilities of the right type, in the right place and at the right time"*

5.4.4 The policy statement at paragraph 7 identifies some of the factors which should be taken into account by Regional planning bodies in developing a responsible approach to future waste management. These include the latest Government advice on forecasts of waste arisings and the proportion of waste that can be recycled; waste arisings across the region; municipal waste management strategies, and, opportunities to accommodate new or expanded waste management facilities including for disposal of the residues from treated wastes.

5.4.5 In identifying land for waste management facilities, paragraph 17 of the policy statement identifies that Waste Planning Authorities should identify in development plan documents sites and areas suitable for new or enhanced waste management facilities for waste management needs of their areas by the allocation of sites and areas for new and enhanced waste management facilities. In so doing (paragraph 18) Waste Planning Authorities should be able to demonstrate how capacity equivalent to at least 10 years of the annual rates set out within the RSS could be provided, and identify the type or types of waste management facility that would be appropriately located on the allocated site or in the allocated area.

5.4.6 In identifying suitable sites and areas for new enhanced waste management facilities, waste planning authorities are advised (paragraph 20) to consider:

"opportunities for on-site management of waste where it arises, and, a broad range of locations including industrial sites, looking for opportunities to co locate facilities together and with complementary activities (reflecting the concept of resource recovery parks)."

5.4.7 Under the Planning and Compulsory Purchase Act 2004, local plans are being replaced by local development frameworks. Where in the interim where development plans are not yet updated to reflect policies of the planning policy statement (PPS10).

Regional Planning Policy Context

5.4.8 Issued in June 2006 the Waste and Minerals revision to Regional Planning Guidance 9 sets out policy guidance which has the key aim of moving waste management up the waste hierarchy. The following policy applies.

Policy W1: Waste Reduction (part)

5.4.9 "*The Regional Assembly, SEEDA, the Environment Agency and other Regional Partners will work together to reduce growth of all waste to 1% per annum by 2010 and 0.5% per annum by 2020".*

Policy W3 Regional Self Sufficiency (part)

5.4.10 "*Waste Authorities and waste management companies should provide management capacity equivalent to the amount of waste arising and requiring management within the regions boundaries, plus a declining amount of waste from London. Provision of capacity for rapidly increasing recycling, composting and other recovery should be made reflecting the targets and requirement set out within the strategy".*

Policy W5 Targets for Diversion from Landfill

5.4.11 *"A substantial increase in the recovery of waste and a commensurate reduction in landfill is required in the region. Accordingly the following targets for diversion from landfill of all waste need to be achieved in the region*:

Table 5.1 Diversion from Landfill in the South East

South East Regional Diversion from Landfill Targets

Year	MSW		C&I		C&D		All Waste	
	Mt/yr	%	Mt/yr	%	Mt/yr	%	Mt/yr	%
2005	1.7	35%	4.3	54%	9.8	81%	15.8	63%
2010	2.8	52%	5.9	65%	10.1	83%	18.8	71%
2015	4.4	74%	7.5	75%	10.4	86%	22.3	79%
2020	5.4	83%	8.7	81%	10.7	88%	24.8	84%
2025	5.8	84%	9.5	84%	10.9	90%	26.2	86%

Source RPG 9 for South East - Waste and Minerals 2006

Waste planning authorities should ensure that policies and proposals are in place to contribute to the delivery of these targets, and waste management companies should take them into account in their commercial decisions. The optimal management solution will vary according to the individual material resource streams and local circumstances and will usually involve one or more of the following processes:

- *Re-use;*
- *Recycling;*
- *Mechanical and or/ biological processing (to recover materials and produce compost, soil conditioner or inert residue); or*
- *Thermal treatment (to recover energy).*
- *Priority should be given to processes higher up this waste hierarchy.*

Waste planning authorities should continue to provide sufficient landfill capacity for residues and waste that cannot practicably be recovered".

Policy W6: Recycling and Composting Targets

5.4.12 "The following targets for recycling and composting should be achieved in the region:

South East Regional Recycling and Composting Targets

Year	MSW		C&I		C&D		All Waste	
	Mt/yr	%	Mt/yr	%	Mt/yr	%	Mt/yr	%
2005	1.4	30%	3.2	40%	5.5	45%	10	40%
2010	2.2	40%	4.5	50%	6.1	50%	13.3	50%
2015	3	50%	5.5	55%	6.1	50%	15.5	55%
2020	3.6	55%	6.5	60%	7.3	60%	17.6	60%
2025	4.2	60%	7.4	65%	7.3	60%	19.8	65%

Source RPG 9 for South East - Waste and Minerals 2006

Waste authorities should adopt policies and proposals to assist delivery of these targets and waste management companies should take them into account in their commercial decisions".

Policy W7: Waste Management Capacity Requirements (part)

5.4.13 *"Waste planning authorities should provide for an appropriate mix of development opportunities to support the waste management facilities required to achieve the targets set out in this Strategy. The annual average rates of waste to be managed (set out in Table 3) provide benchmarks for the preparation of Development Plan Documents and annual monitoring*.

Annual Average Tonnages to be managed (Thousand Tonnes)

Sub Region	2005- 2009	2010- 2014	2015-2019	2020-2024	2025
Oxfordshire					
MSW	386	432	473	509	532
C&I	600	672	734	783	807

Source RPG 9 for South East - Waste and Minerals 2006

In bringing forward and safeguarding sites for waste management facilities, waste planning authorities should consider type, size and mix of facilities that will be required, taking into account:

- *Activities dealing with mixed materials requiring enclosed industrial premises such as mechanical bio treatment, anaerobic digestion and energy from waste facilities;*

In areas of major new developments considerations should be given to identifying sites for integrated resource recovery facilities and new resource parks accommodating a mix of activities where they meet environmental, technical and operational objectives"

Policy W12; Other Recovery and Diversion Technologies

5.4.14 "*The Regional Assembly, SEEDA, the Environment Agency and other regional partners will promote and encourage the development and demonstration of anaerobic digestion and advanced recovery technologies that will be expected to make a growing contribution towards the delivery of the regional targets for recovery, diversion from landfill, and renewable energy generation over the period of the strategy.*

Waste Development Documents and Municipal Waste Management Strategies should only include energy from waste as part of an integrated approach to management.

All proposed waste facilities should:

- *Operate to the required pollution control standards; and*
- *Include measures to ensure that appropriate materials are recycled, composted and recovered where this has not been carried out elsewhere.*

Proposed thermal facilities should, wherever possible, aim to incorporate combined generation and distribution of heat and power".

Policy W17: Location of Waste Management Facilities (part)

5.4.15 "*Waste Development Documents should, in identifying locations for waste management facilities give priority to safeguarding and expanding suitable sites with an existing waste management use and good transport connections.*

The suitability of existing sites and potential new sites should be assessed on the basis of the following characteristics:

- *Good accessibility from existing urban areas or major new planned development*
- *Good transport connections including, where possible, rail or water;*
- *Compatible land uses;*
- *Be capable of meeting a range of locally based environmental and amenity criteria."*

Local Planning Policy Context

5.4.16 The Oxfordshire Minerals and Waste Local Plan (OMWLP) was adopted in 1996 and covers the period to 2006. This is now due for replacement, which will be in the form of a new-style Minerals and Waste Development Framework. The Minerals and Waste Development Scheme (Second Revision, March 2007), which covers the period to March 2010, states that all policies and proposals from the Oxfordshire Minerals and Waste Local Plan are to be saved as part of the Development Framework.

The Oxfordshire Structure Plan

5.4.17 The Oxfordshire Structure Plan was adopted with modifications on 21 October 2005 and sets out the strategic planning framework for the administrative areas of Cherwell District Council, Oxford City Council, South Oxfordshire District Council, Vale of the White Horse Council and West Oxfordshire Council.

5.4.18 Policy WM1 relates to the provision of waste management and states:

"*Provision will be made for the treatment and/or disposal of a quantity of waste equivalent to the total quantity of waste produced in Oxfordshire, except for that waste which requires management at specialised sub-regional, regional or national facilities. Provision will also be made for the reception and treatment and/or disposal of waste from London, provided it is consistent with regional policy and the waste is transported by rail or water for the principal component of its journey*."

Policy WM2 relates to waste management facilities and states:

"*Permission will be granted for waste management facilities (for re-use, recycling, composting, resource recovery, treatment, transfer, and landfill) to ensure sufficient capacity for the management of that waste which needs to be managed within Oxfordshire, having due regard to the principle of best practicable environmental option, including the waste hierarchy and the proximity principle. Proposals which move waste management up the hierarchy will be encouraged. Permission will only be granted for landfill required for the disposal of waste which remains after reduction, re-use, recycling and recovery policies have been applied*."

Oxfordshire Minerals and Waste Development Framework

5.4.19 The Planning and Compulsory Purchase Act 2004 has brought in a new system of development plans. Oxfordshire County Council will replace its Minerals and Waste Local Plan with a Minerals and Waste Development Framework which is in the course of preparation. A revised Minerals and Waste Development Scheme covering 2007 to 2010 was submitted to the Secretary of State in March 2007.This includes a revised timetable for the Minerals and Waste Development Framework, setting out a three year programme for preparation of the Minerals and Waste Development Documents that will make up the Framework. But because of uncertainties over how to achieve a 'sound' Minerals and Waste Core Strategy, this timetable has slipped.

5.4.20 The Minerals and Waste Development Scheme will be revised again. However, in November 2007 the Government published proposed changes to the local development framework system for consultation. In addition, the County Council confirmed that uncertainties over the Core Strategy are unresolved. In view these factors, on 3 January 2008 the County Council announced a decision to defer preparation on the revision of the Minerals and Waste Development Scheme until the implications of the Government's proposed changes to the local development framework system are clear; and that in the meantime further formal stages of work on the Minerals and Waste Development Framework be deferred. Technical work to build up the evidence base for the Minerals and Waste Development Documents however continues.

5.4.21 In respect to site selection, an *Interim Report on Site Selection for Strategic Waste Management Facilities* has been issued by the County Council. The report identifies Sutton Courtenay as Site 10. The report concludes that:

"This site is considered to offer potential for development of a strategic waste management facility. It is located close to significant sources of waste arisings and is well located within the County to provide strategic capacity. There are potential markets for the recovery of energy generated by waste management facilities and the site benefits from good access and access into the wider road network."

5.4.22 Oxfordshire County Council commissioned ERM to produce an assessment of the planned and existing capacity of waste management infrastructure within the County. The study was designed to follow on from previous consultancy work that had been carried out for the South East England Regional Assembly (SEERA) by ERM in 2006. That report delivered predictions of existing and planned capacity at regional and waste planning authority level. The *Waste Arisings, Capacity and Future Requirements Study* published in January 2008 sets out relevant data and projections for the Oxfordshire County area.

5.4.23 The Study at Table 5.4 draws upon data taken from the draft *Regional Waste Capacity Survey & Establishment of Methodology & Monitoring Procedure for Regional Waste Management Capacity Report 2007*.

Growth Rates for MSW in Oxfordshire

Year	2006	2010	2013	2016	2020	2022	2025
MSW tpa	346,000	383,000	409,000	423,000	454,000	467,000	490,000

Source: Table 3.1,Waste arisings, Capacity and Future Requirements Study, January ERM 2008

5.5 Current Performance

5.5.1 Section 35 of the Planning and Compulsory Purchase Act 2004 requires every local planning authority to make an Annual Monitoring Report (AMR) to the Secretary of State on its local development framework. Three Annual Monitoring Reports have been prepared by Oxfordshire County Council. In respect to waste management, details on arisings and management of municipal solid waste and commercial and industrial wastes have been reported upon for the years 2004/ 2005; 2005/2006 and 2006/2007 as follows;

Table 5.4

Annual Arisings/ Management of Waste in Oxfordshire (tonnes). AMR 2007

Waste Type	Total Managed	Landfilled	Recycled or Composted	Recovered	Other Treatment
Municipal Solid Waste	322,014	203,659	118,213	0	142
Commercial and Industrial	901,000	422,000	287,000	0	192,000

Data for C&I is for 2002/2003

Annual Arisings/ Management of Waste in Oxfordshire (tonnes). AMR 2006

Waste Type	Total Managed	Landfilled	Recycled or Composted	Recovered	Other Treatment
Municipal Solid Waste	311,152	211,727	99,414	0	0
Commercial and Industrial	901,000	422,000	287,000	0	192,000

Data for C&I is for 2002/2003

Annual Arisings/ Management of Waste in Oxfordshire (tonnes). AMR 2005

Waste Type	Total Managed	Landfilled	Recycled or Composted	Recovered	Other Treatment
Municipal Solid Waste	301,408	210,398	90,866	0	0
Commercial and Industrial	754,950	189,097	252,551	0	0

Data for C&I is for 2000/2001

5.5.2 The AMR shows that Municipal Solid Waste arisings have risen from 2004/ 2005 to 2006/ 2007 starting from a base of 301,408 tonnes rising to 322,014 tonnes. The quantity recycled has grown also, rising from 90,866 tonnes to 118,213 tonnes. Oxfordshire generated approximately 311,000 tonnes of municipal waste in 2005/2006. Some 96% of this waste was from households, with the remaining percentages arising from other activities, i.e.: litter collections, street sweeping. Some 210,000 tonnes of municipal solid waste was sent to landfill of which 142,500 tonnes was biodegradable municipal waste (BMW) (source Oxfordshire CC LDF, Issues and Options paper June 2006).

5.5.3 AMR 2007 states "*Of the total of approximately 2 million tonnes of waste managed in Oxfordshire each year, 42% is construction and demolition waste, 43% is commercial and industrial waste and 15% is municipal waste. Some 32% of commercial and industrial waste is recycled with 47% being disposed of to landfill and a further 21% treated in other ways. At present some 38% of municipal solid waste is recycled and the remainder landfilled.*"

5.5.4 The total capacity of waste management facilities in Oxfordshire has been prepared by ERM consultants acting on behalf of Oxfordshire County Council. There are however uncertainties about the categorisation of some of the facilities and some of the data used. The total waste treatment capacity available stands at 1,575,000 tonnes per annum and MSW and C&I transfer stands at 259,000 tonnes per annum.

5.5.5 There are currently 8 (eight) waste recycling centres across the Oxfordshire region:

- Alkerton, Nr Banbury – recycling, non hazardous landfill
- Ardley Fields, Ardley – recycling, non hazardous landfill, composting

- Dean, Chipping North -- waste transfer station, & recycling facility
- Dix, Stanton Harcourt – recycling, non hazardous landfill
- Redbridge, Oxford – recycling
- Drayton, Nr Abington – recycling, transfer
- Stanford in the Vale, Faringdon – recycling
- Oakley Wood, Nr Wallingford – recycling

5.5.6 Appendix 5.1 illustrates the permissions granted for new, amended or improved waste management facilities in Oxfordshire between 1st April 2006 to 31st March 2007. The only significant additional waste management capacity permitted was:

- 30,000 tonnes per annum temporary capacity for recycled C&D waste at Worton Farm, Yarnton.
- 17,000 tonnes per annum temporary capacity for green waste at Ashgrove Farm, Ardley and Showell Farm, Chipping North.
- 500,000m^3 ash lagoon providing void space for pulverised fuel ash (PFA) from Didcot Power Station.

5.5.7 WRG currently accept C&I waste into Sutton Courtenay from four different sources on single year rolling contracts. The current volumes of C&I waste for 2008 being delivered into Sutton Courtenay for landfill are in excess of 100,000 tonnes per annum.

5.5.8 Municipal Solid Wastes are currently delivered to Sutton Courtenay landfill from a variety of sources and by differing means. Waste is delivered by both road and rail for landfill at Sutton Courtenay. Some 250,000 tonnes of waste which arises in London is delivered by rail which comprises both MSW and pre-shredded green wastes. 350,000 tonnes of MSW and Commercial and Industrial waste is delivered by road for landfill and this is sourced from within Oxfordshire but also from its hinterland and the Berkshire authorities of West Berkshire and Reading to the west. In the future MSW from these sources will significantly reduce when alternative provision for the management of these wastes will become available.

5.6 Waste Management Requirements

5.6.1 The following sub section identifies the projected waste flows associated with the proposal and seeks to highlight the dynamics of commercial and municipal waste generation over the period of 25 years in terms of points of arising, feedstock and management of wastes and requirements. The Waste Strategy for England 2007, the RPG9 and the Oxfordshire Waste Strategy highlight the need for improvement in performance in recycling. National recycling targets have been set for every local authority including Oxfordshire. This section provides analysis of the management of the overall waste stream by reference to the waste hierarchy.

Proposed EfW Capacity

5.6.2 The selection of the EfW size is dependent upon a number of factors which include:

- The identification of the catchment area for the proposed site.

- Identification of the residual waste suitable for incineration.
- Prediction of future waste flows.

The identification of the catchment area for the site.

5.6.3 Municipal Waste Stream

The District and Borough Councils and the County Council have the responsibility for collecting and disposing of the municipal waste stream. It is mainly composed of:

- Waste produced by householders
- Wastes produced by trade premises and collected on behalf of the councils

The waste collected from the district's households will form a portion of the wastes being used as a feedstock for the proposed Energy from Waste facility.

5.6.3 The complete residual MSW waste stream to be managed at the proposed EfW will be generated within the County area and will be sourced from the District Council administrative areas of:

- Cherwell;
- Oxford City
- South Oxfordshire
- Vale of White Horse
- West Oxfordshire

5.6.4 Municipal Solid Wastes will be collected from non-householder sources including school and community premises and street cleansing. Bulky waste items can also be collected directly from school, community and householder premises. Quantities of commercial wastes are also collected from business premises including local authority and associated buildings. Household Waste Recycling Centres are significant recipients of waste generated throughout the County.

5.6.5 Commercial & Industrial mixed waste is similar in composition to Municipal Solid Waste (MSW) and there is an opportunity to process the C&I Mixed waste in a shared waste management facility with MSW. The residual wastes will be drawn from commercial and industrial business premises including shops, offices, factories and other non local authority and household concerns. Residual commercial and industrial wastes to be managed at the proposed EfW will be drawn from within the equivalent Oxfordshire County Area.

Identification of the residual waste suitable for incineration.

5.6.6 Only residual waste suitable for management within an Energy from Waste Incinerator (EfW) is relevant to the selection of plant size. For it to be suitable it must:

- be compatible with the likely requirements of an Environmental Permit;
- be combustible; and,
- of a physical nature to allow handling and feeding into the EfW incinerator.

5.6.7 Table 5.5 shows estimates of suitability of waste feedstock for an EfW of the waste streams generated within the catchment area.

Table 5.5 Suitability of waste streams in Catchment Area

Waste Stream	
Household collected waste	Suitable subject to removal of non combustibles
Civic Amenity residues	Waste deposited in skips is often bulky or inert making it unsuitable for EfW. Further segregation at a Civic Amenity Site could yield wastes suitable for EfW
Street waste	Generally neither suitable or combustible
Bulky waste	Sizes above 1m across or inert items are not suitable.
EfW rejects	Residues likely to be small in size and combustible
Green waste from Civic Amenity	All for composting
Other waste	Mixed municipal waste, commercial and industrial waste or waste with the same characteristics would be permitted by the Environmental Permit for the site. In view of the catchment area this is likely to be a mixture of commercial waste.

Prediction of future waste flows.

5.6.18 The prediction of future waste flows has been based upon published SEERA reporting and studies. Produced on behalf of Oxfordshire County Council in January 2008, the ERM *Final report on Waste Arisings, Capacity and Future Requirements Study* relies upon SEERA Regional waste management data. The Municipal Solid Waste steam projections are based upon agreed arisings from the *Draft Regional Waste Management Capacity Survey & Establishment of Methodology & Monitoring procedure for a Regional Waste Management Capacity Report 2007*. For the Commercial and Industrial waste stream the ERM *Final report on Waste Arisings, Capacity and Future Requirements Study* relies upon data taken from the *South East Regional Waste Management Statement*, Table A1.4, which indicates that 558,530 tonnes of C&I waste was managed in the County in 2000/01.

5.6.19 The ERM study for Commercial and Industrial waste took forwards two scenarios. The first, a low growth assumption assumed no growth at 585,000 tonnes per annum, the second assumed growth rates derived from SEERA reporting with updated waste capacity modelling by ERM in 2005. The rates of growth fell from 2.5% in 2009 to 1% by 2025.

5.6.20 The projected residual waste element of the MSW and C&I waste arisings following the achievement of recycling targets for Oxfordshire is set out in Table 5.7. It is assumed that the residual Oxfordshire MSW waste stream will be managed through the proposed Sutton Courtenay EfW with that part so the residual waste stream not capable of recovery being disposed of to landfill.

Table 5.7 Management of Residual MSW and C&I Waste (tonnes)Oxfordshire 2010/ 2025

Projected Residual Municipal Solid Waste (MSW) and Commercial and Industrial Waste (C&I). Oxfordshire 2010/2034 High C&I growth									
	Arisings MSW Te	Recycling Target %	Recycled Te	Residual MSW Te	Arisings C&I Te	Recycling Target %	Residual C&I Te	Total Residual Te	EfW CapacityTe
2008/09	**372,000**								
2009/10	**383,000**	**40**	153,200	229,200	**645,000**	**50**	**322,500**	551,700	300,000
2014/15	**421,000**	**45**	189,450	231,550	**779,000**	**55**	**428,450**	660,000	300,000
2019/20	**454,000**	**55**	249,000	204,300	**912,000**	**60**	**547,200**	751,500	300,000
2024/25	**489,000**	**55**	268,950	220,050	**1,068,000**	**65**	**694,200**	914,250	300,000

Source: figures in bold taken from:
SEERA Regional WMS Data 2004. Final Report ERM Waste Arisings, Capacity & Future Requirements Study 2008

Projected Residual Municipal Solid Waste (MSW) and Commercial and Industrial Waste (C&I). Oxfordshire 2010/2034 Low C& I growth									
	Arisings MSW Te	Recycling Target %	Recycled Te	Residual MSW Te	Arisings C&I Te	Recycling Target %	Residual C&I Te	Total Residual Te	EfW CapacityTe
2008/09	**372,000**								
2009/10	**383,000**	**40**	153,200	229,200	**585,000**	**50**	**292,500**	521,700	300,000
2014/15	**421,000**	**45**	189,450	231,550	**585,000**	**55**	**321,750**	553,300	300,000
2019/20	**454,000**	**55**	249,000	204,300	**585,000**	**60**	**351,000**	555,300	300,000
2024/25	**489,000**	**55**	268,950	220,050	**585,000**	**65**	**380,250**	600,300	300,000

Source: figures in bold taken from:
SEERA Regional WMS Data 2004. Final Report ERM Waste Arisings, Capacity & Future Requirements Study 2008

5.6.21 The tables show that projected MSW arisings will grow at a reducing rate from 2010 with no growth assumed beyond 2025. Over the period 2009/10 to 2024/25 target recycling rates will grow from 40% to 55%. With a nominated availability of up to 200,000 tonnes within the proposed EfW, the residual tonnages of MSW for treatment are sufficient to ensure that recycling is not crowded out by the availability of the incinerator. In respect to residual commercial and industrial wastes, the tables illustrate a low and high growth option. Waste arising within Oxfordshire is projected to generate at least between 292,500 tonnes of residual waste in 2009/10 and 380,250 tonnes to 820,350 in 2024/25. Not all Commercial and industrial waste arisings from the County will be destined for management within the EfW, with some managed at other facilities within and in counties neighbouring Oxfordshire, however currently the landfill at Sutton Courtenay presently accepts in excess of 100,000 tonnes per annum, and the necessary provisions will be in place to ensure this material is managed at this location in the future.

5.6.22 Having regard to the target recycling rates and actual tonnages that can be recovered from the waste stream, the remaining combustible fraction of the waste stream is available for treatment through EfW. When taking account of the overall arisings of MSW and C&I, a plant of a 300,000 tonnes annual throughput is adequately sized without crowding out the needs of the recyclable part of the waste stream.

5.6.23 In 1994/1995 approximately 465,000 tonnes of municipal solid waste were disposed of at landfill in Oxfordshire (OMWLP Figure 7). Of this some 68% or 316,200 is likely to have comprised biodegradable waste. WS2007 targets highlighted in paragraph 5.3.8 seek to reduce the amount of biodegradable waste that is landfilled to 75% of that landfilled in 1995. With the achievement of recycling targets and the management of residuals through incinerator by 2010, as described in Table 5.7 above then disposal by landfill will fall to less than 7% of that disposed of in 1995.

5.6.24 In the year 1998/99, 462,000 tonnes of commercial and industrial waste were disposed of at landfill in Oxfordshire (Environment Agency, SWMA 2000, Table 2.5).

With the achievement of recycling rates and the management through the incinerator of a proportion of residuals arising within Oxfordshire County as described in Table 5.7 above, then disposal of commercial and industrial wastes could be expected to fall to at least 222,000 tonnes if not more by 2010 which is approximately 48% of the tonnage disposed by landfill in 1998/1999. The proposal will therefore make a positive contribution to exceeding targets for landfill diversion within Oxfordshire as set out within WS2007.

5.7 Landfill Allowance Trading Scheme (LATS)

5.7.1 The Landfill Allowance Trading Scheme (LATS) was introduced on 1st April 2005. LATS introduces significant and innovative changes in waste policy and practice for the diversion of biodegradable municipal waste from landfill. It is intended to provide a cost effective way of enabling England to meet its targets for reducing the landfilling of biodegradable municipal waste under Article 5(2) of the EC Landfill Directive. Allowances were allocated to each waste disposal authority at a level that will enable England to meet its targets as a contribution to the UK targets in accordance with the Landfill Directive. The allowance is in the form of the total tonnes of Biodegradable Municipal Waste (BMW) that would be allowed to go to landfill during each year (April to April).

5.7.2 Oxfordshire County Council, as a disposal authority was given a LATS allocation. The proposal would reduce the potential liability of Oxfordshire Council under Landfill Avoidance Trading Scheme (LATS) penalties by approximately £ 250 million over the 25 year term of the contract. This is based on a £150 fine for every tonne of BMW land filled above the LATS target. Additionally, the incinerator could manage a further 100,000 tonnes of biodegradable commercial and industrial residual wastes which would other wise be disposed of at landfill, reducing further valuable landfill capacity within the County.

5.7.3 The LATS allocation for each authority reduces year on year. For Oxfordshire the allocation is 140,000 tonnes in 2008 and reduces to 60,000 tonnes by the year 2019. The County needs to divert approximately 155,000 tonnes of BMW from landfill by 2012/13, 202,000 tonnes by 2019/20 and potentially 246,000 tonnes by 2035/36. These tonnages are based on waste growth forecasts, and are subject to vary depending on unpredictable future changes in waste growth.

5.7.4 Thermal treatment using EfW will deliver the achievement of LATS targets. In Oxfordshire, for every 1000 tonnes of residual waste sent to EfW, there will be a reduction of 1,000 tonnes going to landfill. The ash from an EfW incinerator is not biodegradable and so can be landfilled without affecting the LATS target.

5.8 Waste Hierarchy

5.8.1 The proposal forms part of a larger network of waste management installations which will collectively manage the target waste arisings within Oxfordshire. The proposed EfW will manage those residual combustible wastes that are not recycled following kerbside collection or management within the mix of civic amenity sites and household waste recycling centres located within the catchment area.

5.8.2 Taken in isolation, EfW with energy recovery in the context of the waste hierarchy is more favourable than disposal, but less favourable than recycling and composting. The option of doing nothing is very reliant on management of the residual biodegradable waste by landfill, which in terms of the waste hierarchy is the least favoured option. In practice, this option is becoming more constrained by the fast diminishing available permitted landfill capacity within the County as highlighted by RPG 9 – *Waste and Minerals June 2006*.

5.8.3 The proposal is an essential component of the overall strategy to move the management of waste up the waste hierarchy and should not be viewed in isolation.

The proposed EfW will form part of a network of waste management sites which include those which will receive and manage recyclate, civic amenity sites, composting facilities and landfill. It will form part of a network of other facilities within the County and those located within and forming part of the Resource Recovery Park. The proposal therefore sits in combination with those existing permitted uses at a higher level with reference to the waste hierarchy.

5.9 Alternatives

5.9.1 The requirement to consider alternatives stems primarily from requirements under the EIA Regulations. The Regulations identify the information for inclusion within the Environmental Statement. Part 1(2) and 2(4) include:

"An outline of the main alternatives studied and an indication of the main reasons for this choice taking into account the environmental effects".

5.9.2 Paragraph 83 of Circular 2/99 which accompanies the Regulations note that:

"Although the Directive and the Regulations do not expressly required the developer to study alternatives the nature of certain developments and their location may make the consideration of alternatives a material consideration…

5.9.3 The following sections addresses the consideration of alternative sites, alternative technology and alternative designs.

Alternative Sites

5.9.4 Although not mandatory, the consideration of alternative sites is advisable. An Alternative Site appraisal has been undertaken and this is set out within Appendix 5.2. The following section, based upon the reporting sets out the methodology and conclusions of the assessment of alternative sites.

Site Selection Criteria

5.9.5 RPS Planning and Development alternative site assessments methodology, has been applied for similar proposed developments undertaken across the UK for a range of clients in the waste industry. This methodology reflects recent national planning guidance on site identification contained within Planning Policy Statement 10 (PPS10) and its Companion Guide.

5.9.6 An initial site identification process was undertaken to provide a list of sites which form the basis for an alternative site appraisal. Those sites were identified from a review of a variety of sources, including, adopted and emerging development plan documents, local authority publications and supplementary planning documents, Ordnance Survey mapping and personal knowledge.

5.9.7 The alternative site study aims to identify all potential development sites within a search area which is based upon districts within the administrative area of Oxfordshire County. The districts within Oxfordshire in which the study is based upon are Cherwell, West Oxfordshire, South Oxfordshire, Vale of White Horse and Oxford City.

5.9.8 In identifying the proposal site, the factors taken into account by the applicant achieve the best balance between;

Acceptability in planning, environment, local impact and traffic terms.

Availability; and,

Deliverability.

5.9.9 Following WRG's choice of site, a further study (set out within Appendix 5.2) has now been undertaken to provide an up to date comparative analysis of option sites within Oxfordshire. The report focuses on the suitability of the site for development as an Energy from Waste Incinerator within a Resource Recovery Park.

5.9.10 The analysis has been undertaken in three stages.

- **Stage 1** desk based analysis of sites by filtering out those which do not meet locational, site size / shape requirements, and employment/previously developed land requirements. Existing waste management sites, such as licensed landfill sites, and power stations are included in the long list.
- **Stage 2** desk based analysis of retained sites by filtering out those, which did not meet criteria relating to: availability through development, compatibility with objectives of the adopted development plan and other material considerations; neighbouring land uses and access.
- **Stage 3** provides a comparative analysis based on key planning considerations of the final list of retained sites by carrying out site visits.

Stage 1

5.9.11 Stage 1 of the analysis identified a potential 229 sites within the five districts of Oxfordshire. Of the 229 sites identified, 137 were discounted from the next stage of the process on the basis of size, shape of the site, and the site location.

Stage 2

5.9.12 Of the 92 short listed sites, a further 81 were discounted on the basis of their relative merits having regards to: Availability, Allocations and objectives of the Development Plan, Existing and Proposed Neighbouring Land Uses and Accessibility.

Stage 3

5.9.13 The remaining 11 sites were subject to a more detailed appraisal which involved a site visit. The appraisal used a non numeric system of scoring based upon: Potential positive impact/consideration (✓), Neutral (=), Potential negative impact/consideration (x) and Unknown/uncertain (?), having regard to Planning vision, Sensitive human receptors, Landscape and Visual consideration, potential impacts on natural environment, potential Impact on historic environment and built heritage, road access, rail and water transport, energy utilisation, flood risk and ground water vulnerability, Aerodrome Safeguarding Zones, Air Quality management Areas and Green Belt.

5.9.14 The assessment using the non numeric system of scoring showed that the Sutton Courtenay site proved to have more positive attributes when compared with those located elsewhere. Overall, on balance the alternative site report considers that no other site identified is better than Sutton Courtenay for the proposed development.

5.10 Alternative Technology

5.10.1 The scoping response of Oxfordshire County Council (Appendix 1) requires the consideration of Alternative technology.

Thermal Treatment Technology

5.10.2 Whilst the proposal includes the provision of a moving grate facility, which is the preferred technology option, there are a number of alternative thermal treatment technologies, which include:

Fluidised Bed;

Gasification; and,

Pyrolysis.

5.10.3 A detailed description of the selected moving grate system has been provided in Chapter 4. This section provides an outline of the key features of the alternatives and assesses their relative performance against moving grate technology. These options can also be considered against the current practice of landfill, which achieves lower levels of energy recovery and emissions control and is therefore lower down the waste hierarchy. The alternatives are all considered in the light of the county's waste recycling targets, to deal with the residual fraction, after recycling targets have been achieved.

Thermal Treatment Technologies

5.10.4 Conventional thermal treatment technologies are based upon the complete combustion of the residual waste feedstock, which will require a facility to comply with the Waste Incineration Directive (WID). Fundamental requirements of the WID include the requirement to achieve a combustion temperature of >850°C with a residence time of at least 2 seconds after the last injection of combustion air. A number of variations exist based on the type of combustion plant, including moving grate and fluidised bed systems.

5.10.5 Conventional thermal treatment processes offer a proven technique, able to operate flexibly, to cater for a wide range of waste inputs and in many cases, such as with moving grate systems, with little pre-treatment.

Moving Grate

5.10.6 Moving grate technologies are the most widely adopted system for MSW applications and are well proven and reliable. The moving grate system is capable of burning MSW as received, thereby avoiding the need for upfront pre-treatment. A variety of designs are available, but typically the grate system will include a mechanism for distributing the waste feed across the grate and for transporting the waste forward, providing mixing as it traverses the length of the grate.

5.10.7 The waste is burned with an excess of air that is frequently drawn from above the waste bunker, providing a source of odour control. Primary air is normally fed through the grate with a secondary air supply above the grate to create turbulence.

5.10.8 Moving grate systems will produce two waste streams, bottom ash and Air Pollution Control (APC) residues (including flyash).

Fluidised Bed Furnace

5.10.9 Fluidised Bed (FB) technology operates by feeding waste onto a bed of 'fluidised' sand particles where combustion is more efficient than traditional technologies such as moving grate. However, fluidised bed technology requires a homogenous feedstock with high calorific value. For MSW applications the feedstock will require full pre-treatment (sorting,

crushing, shredding) prior to combustion taking place. These pre-treatment stages are resource intensive and typically outweigh the combustion thermal efficiency advantages. If a lower calorific fuel is used then the feedstock may have to be mixed with another fuel (e.g. oil, gas, RDF) within the fluidised bed or make use of pre-heating of air to reach the required operating temperatures (both of which are energy intensive). Failure of the pre-treatment processes can cause operational problems and increase maintenance costs.

5.10.10 Fluid Bed technology is capable of achieving lower NO_x concentrations in the raw gas through the lower bed temperatures (which reduce thermal NO_x formation), than is typically achievable in moving grate systems. However, additional abatement using either SCR or SNCR is still required to guarantee WID compliance.

5.10.11 Additional raw materials are required in the form of sand within the fluidised bed system.

5.10.12 Solid waste streams from the process typically include bottom ash, cyclone ash (usually mixed with the bottom ash), and APC residues (including fly ash). Due to the addition of sand for fluidisation waste residues are generally higher for FB systems.

Advanced Thermal Treatment

5.10.13 Gasification and pyrolysis treatment processes have a history of application to fossil fuels and certain homogeneous waste streams (although these were not historically governed by the requirements of the Waste Incineration Directive), but their application to MSW is relatively new in the UK.

Gasification

5.10.14 Gasification is the partial thermal degradation of a substance in the presence of oxygen but with insufficient oxygen to oxidise the fuel completely.

5.10.15 This process produces gaseous fractions known as ‘synthesis gas’ or ‘syngas’, primarily a combination of carbon monoxide, hydrogen and methane. The syngas offers the potential to be utilised in a number of ways, subject to market constraints and technical feasibility, including combustion in engines, steam raising boilers or other energy conversion processes, although this is subject to gas quality and legislative requirements. In applications where the syngas is not used as a fuel in a combustion process, it is uncertain that this would be subject to WID.

5.10.16 The beneficial use of syngas depends upon the availability of a market for its utilisation. There is no identified market for syngas at the current time and given that this application seeks to generate energy from the waste within the site, for the comparison of alternatives it is reasonable to assume that the syngas would need to be combusted on site. Where syngas is combusted in a steam raising boiler to generate electricity, slight efficiency improvements might be obtained owing to a potentially higher temperature of steam generation.

5.10.17 To obtain consistent gas quality a less heterogeneous incoming waste stream is required and some pre-treatment of MSW is therefore necessary. Typical temperatures for gasification would be above 750°C.

5.10.18 Ash and char are also produced from the gasification process.

Pyrolysis

5.10.19 Pyrolysis is the thermal degradation of a substance in the absence of added oxygen. Pyrolysis also offers the potential option of more innovative use of the pyrolysis syngas other than immediate combustion to produce heat. Unlike gasification or traditional combustion technologies, however, pyrolysis requires energy input from a combination of

waste heat from the process and supplementary combustion, likely to be using either natural gas or low sulphur oil, to achieve the temperature required for thermal treatment.

5.10.20 Typical temperatures for pyrolysis are between 300-800°C.

5.10.21 As for gasification, pyrolysis also produces fuel which can be sold as a product. However, for the reasons detailed previously this comparison assumes combustion on-site to generate energy.

Assessment of Technology Options

5.10.22 The discussion above provides an overview of the moving grate, fluidised bed, pyrolysis and gasification systems. Table 5.8 below summarises the relative performance of each option with respect to key environmental considerations, reliability and costs.

Table 5.8: Comparison of Alternatives versus Moving Grate

Criteria	Moving Grate	Fluidised Bed	Gasification	Pyrolysis
Emissions	Abated emissions meet WID, lower levels are achieved at many plant.	Lower NO_x levels than moving grate are achievable, but abatement will still be required to guarantee WID.	Lower emissions of metals as these are transferred to solid residues (see below). Emissions performance is still reported as limited(1), although it is reported that lower emissions are achievable(2).	Lower emissions of metals as these are transferred to solid residues (see below). Emissions performance is still reported as limited(1), although it is reported that lower emissions are achievable(2).
Global Warming Potential (GWP)(5)	GWP arises as a result of carbon within the waste combusting to release CO_2 and release of nitrous oxides associated with the NO_x abatement (although this is not directly	Higher due to pre-treatment of incoming wastes.	Higher due to pre-treatment of incoming wastes.	Higher due to pre-treatment of incoming wastes and additional burning of support fuel to maintain process temperatures.

Criteria	Moving Grate	Fluidised Bed	Gasification	Pyrolysis
Net electrical efficiency	associated with the main technology) . 22%.	21%[4].	Lower (14-20%)[3].	Lower (14-20%)[3].
Residue Generation	Produces bottom ash (<3% carbon) and APC residues.	Produces larger volumes of residues for disposal.	Similar to MG, although residues contain higher levels of metals.	Similar to MG, although residues contain higher levels of metals.
Odour	Odour management typically avoids nuisance.	Pre-treatment can cause additional odours.	Pre-treatment can cause additional odours.	Pre-treatment can cause additional odours.
Raw Materials	In addition to the incoming wastes there is a requirement for flue gas treatment reagents, boiler water treatment chemicals and maintenance and lubricating oils and greases.	Higher due to fluidisation sand requirements.	Variable, depends on flue gas treatment selected	Variable, depends on flue gas treatment selected
Noise	With appropriate abatement noise can be successfully be controlled.	Similar to MG, although pre-treatment plant may cause additional noise requiring abatement.	Similar to MG, although pre-treatment plant may cause additional noise requiring abatement.	Similar to MG, although pre-treatment plant may cause additional noise requiring abatement.
Accidents	The potential for accidents can be minimised through design considerati	Similar to MG, although some plants have experienced problems with waste pre-treatment stages.	Fuel-gas handling present additional risks.	Fuel-gas handling and spillages from liquid fuel present additional risks.

Criteria	Moving Grate	Fluidised Bed	Gasification	Pyrolysis
	ons and operational manageme nt			
Visual Impact	Exhaust gases are emitted through a stack the height of which is largely independen t of the selected technology. Typical building structures in the order of 40 m are required, determined primarily by the boiler height	Similar, although the main building will need to be larger (in foot print) if waste pretreatment is included onsite.	Similar, although if gas engines are used for combustion of the syngas then the building height can be lower (around 15m high) and could therefore have a slight reduction in the required stack height.	Similar, although if gas engines are used for combustion of the syngas then the building height can be lower (around 15m high) and could therefore have a slight reduction in the required stack height.
Construction	Constructio n impacts can be managed to avoid significant impacts	Similar to Moving Grate	Similar to Moving Grate	Similar to Moving Grate
Costs	Lowest cost per tonne.	Capital significantly higher as requires pre-treatment plant and additional residue collection (typically cyclone and bagfilters).	Widely variable, but generally higher(1).	Widely variable, but generally higher(1).
Other	Proven technology with a large number of operational facilities.	Some operational experience, with mixed performance.	No large scale UK operational plants. Largest capacity plant treating MSW is 80,000 tpa (Sweden).	No large scale UK operational plants. Large commercial scale plant operational in Europe, Japan and North

Criteria	Moving Grate	Fluidised Bed	Gasification	Pyrolysis
				America – up to 150,000tpa.

(1) Review of BAT for New Incineration Issues; Part 1 Waste Pyrolysis and Gasification Activities. P4-100/TR, Environment Agency, 2001.
(2) Advanced Thermal Treatment of Municipal Solid Waste, DEFRA, 2005.
(3) The Viability of Advanced Thermal Treatment of MSW in the UK, Fichtner Consulting Engineers Limited, 2004.
(4) Based on performance at WRG's Allington Facility
(5) Comparison assumes all facilities operate to WID and any intermediate fuels generated are combusted onsite.

5.10.23 The various options for thermal treatment of MSW have relative benefits and disadvantages. All four options are capable, subject to appropriate abatement measures being taken, of performing within WID emissions limits (albeit limited emissions performance data are reported in respect of gasification and pyrolysis). Whilst moving grate systems generate higher raw gas pollutant concentrations, the application of abatement, which is still required for all options, enables compliance with WID limits and in many instances performance well below these levels.

5.10.24 Both moving grate and fluidized bed systems require flue gas treatment to control NO_x emissions, which may give rise to emissions of nitrous oxide, a powerful global warming agent, as a by-product of the SNCR reaction. The nitrous oxide emissions are less a function of the thermal treatment option itself, than the selected abatement for NO_x. A separate assessment of the selected NO_x abatement is provided later in this section and includes consideration of the global warming impacts associated with the available abatement techniques.

5.10.25 The performance of the various options in terms of carbon dioxide releases is fundamentally dependant on the carbon within the fuel and is not a direct function of the thermal treatment technology. For the waste stream to be accepted at the facility carbon dioxide releases from the facility associated with treatment of the waste will therefore be limited by the plant capacity, but these will be lower than the alternative carbon dioxide equivalent from landfill option, because methane emitted from biodegradable MSW is a more powerful greenhouse gas than carbon dioxide.

5.10.26 Table 5.8 above indicates that, compared with the other options considered, moving grate systems have similar or improved performance in all areas, including emissions performance, global warming potential, electrical efficiency, residue generation, odour, raw material consumption, noise and potential for accidents. Where gasification or pyrolysis using gas engines is proposed, there would be some reduction in the visual impacts of the facility through a lower building height and potentially some reduction in stack height, as a result.

5.10.27 In this context and alongside, in particular, the fact that its reliability at a commercial scale is proven and that it provides a cost effective option, meeting all the requirements of the WID, and helping to achieve landfill diversion targets, taking account of increased recycling, moving grate technology forms the basis for the proposed facility. The above discussions are also the basis for demonstrating that the selected technology is the Best Available Technique (BAT) for this proposal.

5.11 Alternative Layout and Design

5.11.1 A number of alternative layouts for the proposal were considered at an early stage in the design process. These principally related to positioning and orientation of the proposed Energy from Waste Incinerator and positioning.

5.11.2 Early consideration was given to the positioning of the incinerator including a possible location with the existing permitted waste disposal void located to the immediate south of the proposal area. This option was discounted since it would result in the loss of permitted waste disposal capacity.

5.11.3 In response to key design criteria, a zoning strategy was developed for the site and series of functional zones were established running from east to west The north south orientation for the incinerator was chosen since this presented the best landscape aspect. The proposed incinerator is located within land to the south of Portway within the Resource Recovery Park. A number of basic layouts were then explored to consider building mass and the interrelationships of process and traffic. Options for orientation and positioning also closely correspond to associated infrastructure including the Incinerator Bottom Ash (IBA) plant, weighbridge and visitor centre. In determining the position and orientation of the proposed incinerator the IBA is located to the west with vehicle circulation and visitors centre located to the east.

5.11.4 In reviewing the functionality of the outline site layout detail studies were undertaken to review alternative access layouts and traffic flows and segregation within the site.

Figure 5.9 Access options

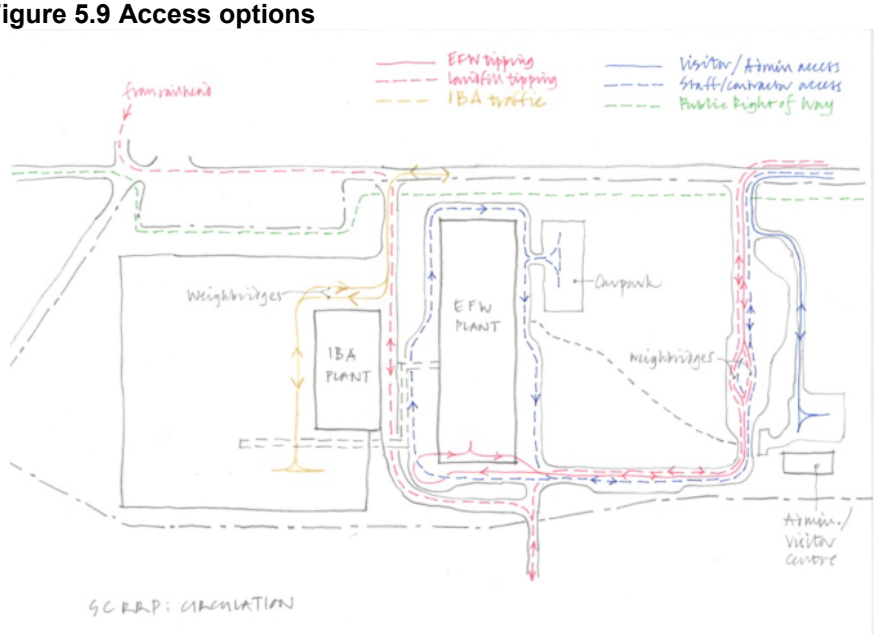
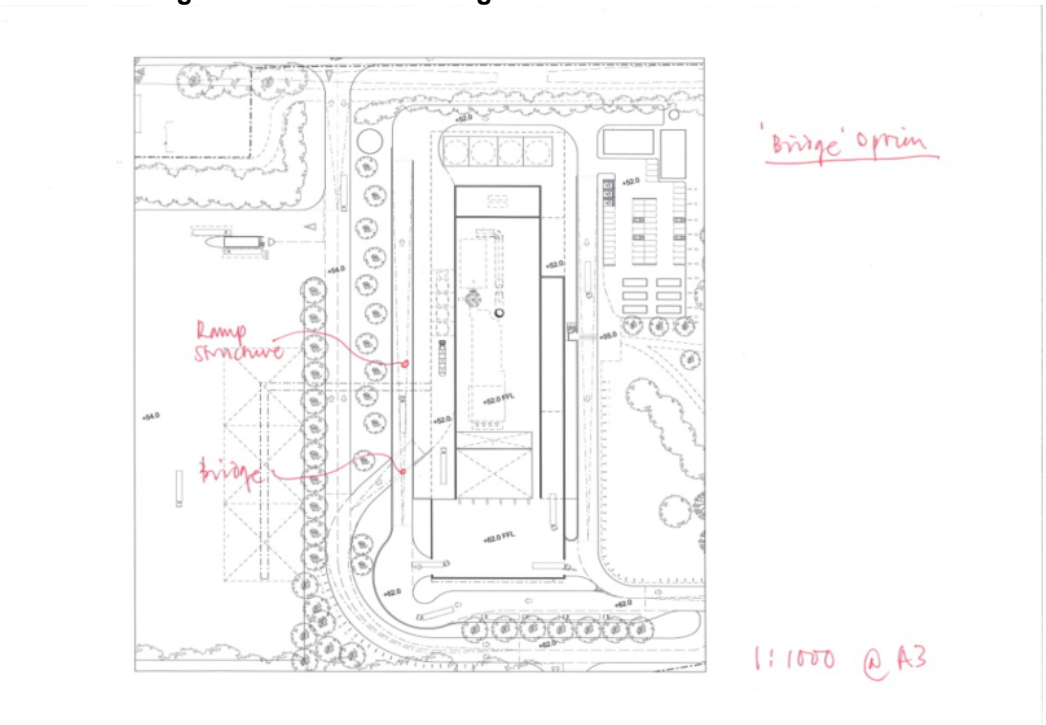


Fig 5.10 – EfW access diagram



5.11.5 The main focus of the architectural design has been the EfW Incinerator, IBA plant, the administration / visitors centre and the weighbridge office. The form of the EfW Incinerator has been developed was developed iteratively from basic spatial requirements to house the process within. This resulted in a series of blocks

Figure 5.11 EfW Incinerator Design components

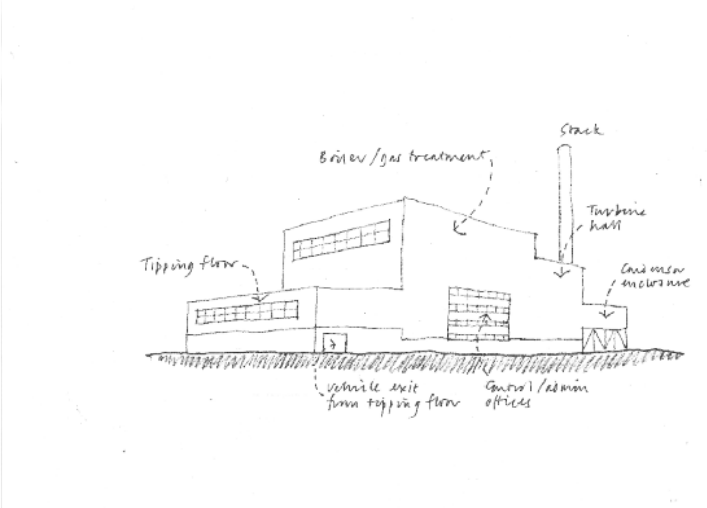


Figure 5.12 EfW Incinerator Design components

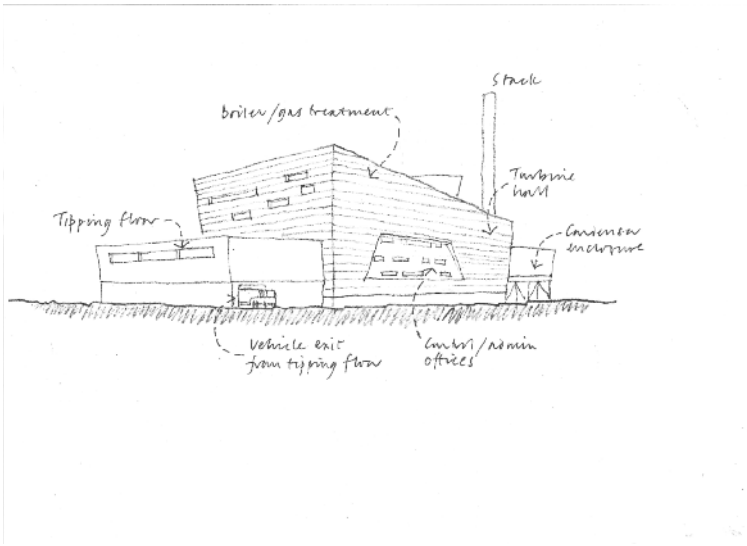
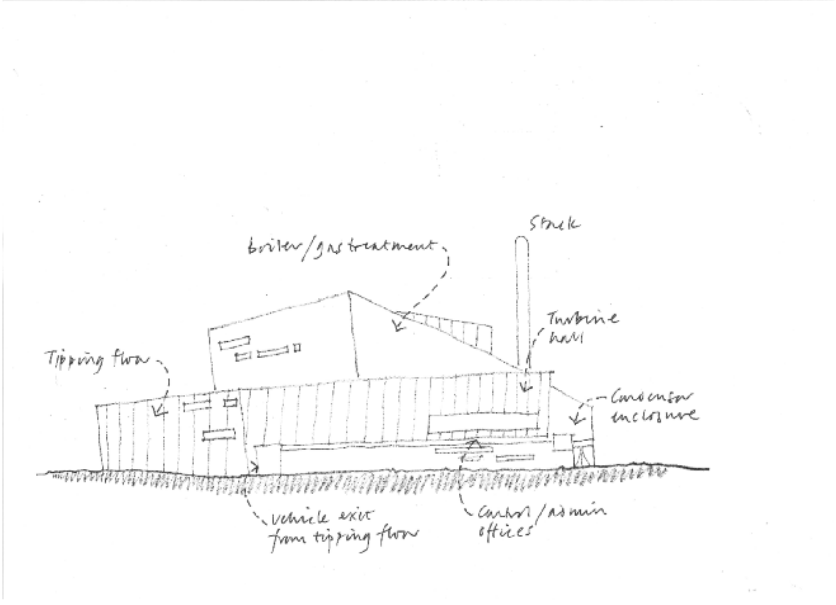


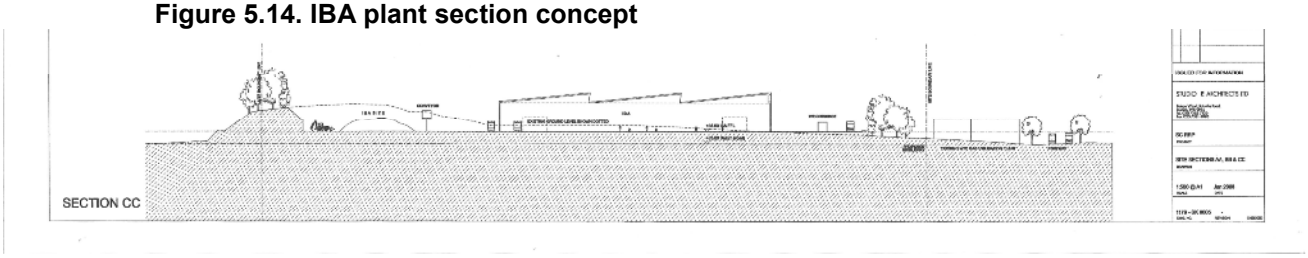
Figure 5.13 EfW Incinerator Design components



5.11.6 The IBA facility is an IBA separation plant, within an enclosure intended to limit dust arising from the separation process within. Ease of circulation for vehicles & minimising the transfer distance of the IBA from the EfW incinerator were key design considerations. The plant has been located close to the EfW incinerator to limit the

length of the ash conveyor, and on the south side of the IBA yard to allow vehicle movement, the location of accessible ash piles, and screening by natural ground levels. The intention was to create a 'family likeness' among the main buildings on the site.

Figure 5.14. IBA plant section concept



5.11.7 The visitor centre includes office space for site staff. The main design requirements were i) a need to have clear views of both the main entrance weighbridges and across the whole development; ii) adequate accommodation for visiting parties (eg school trips) and iii) clear separation between staff and visitor accommodation traffic and pedestrian routes. Some initial work on the section, layout and elevational treatment is shown in Figures 5.15 and 5.16 below.

Figure 5.15. Administration/ visitor centre concept

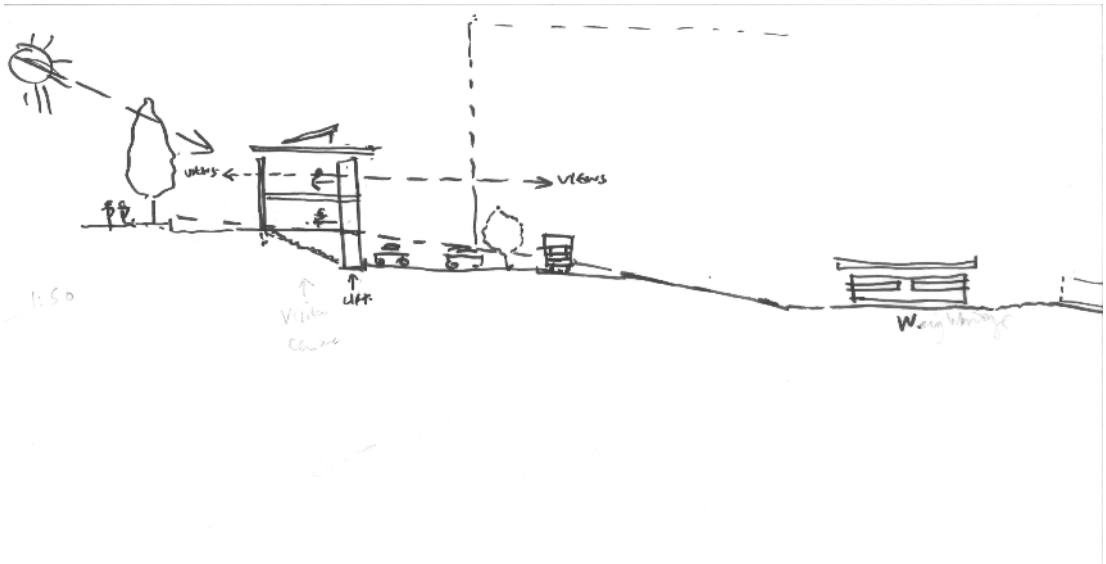
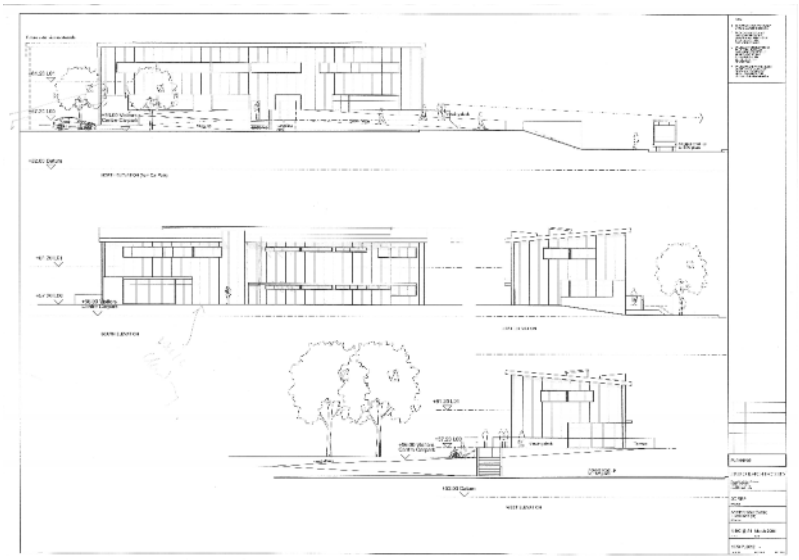


Figure 5.16 Administration/Visitor centre: preliminary layout



5.12 Summary & Conclusions

5.12.1 The review of need objectives is based upon the broad principles of sustainable waste management outlined in government guidance and policies set out within those documents which comprise the Development Plan.

5.12.2 The review demonstrates that with respect to need, the proposal conforms to Government Policy, Waste Strategy for England 2007 and the Development Plan.

5.12.3 The proposal would make a positive contribution to sustainability objectives in that it forms part of an integrated network of proposals as promoted by Regional planning Guidance and identified within the adopted Joint Oxfordshire Municipal Waste Management Strategy. The size of the facility has been designed so as to meet those objectives but also to manage the residual combustible wastes generated within the Oxfordshire County administrative area.

5.12.4 The Municipal Solid Waste (MSW) arisings are predicted to increase from 372,000 tonnes in 2010 to 489,000 tonnes in 2025 with recycling rates increasing from at least 40% to 55% over that period. Commercial & Industrial (C&I) waste is anticipated to grow from 585,000 tonnes in 2005 to between 585,000 and 1,068,000 tonnes in 2025 with recycling rates increasing from at least 50% to 65% over that period. The total waste in the South East is estimated to rise to nearly 35 million tonnes per annum by 2025.

5.12.5 The only sustainable and viable option is to find alternative technologies and resources to manage the County's waste arisings. The proposed Energy from Waste (EfW) incinerator located within the Sutton Courtenay Resource Recovery Park will have sufficient annual throughput to adequately manage Oxfordshire's waste stream in a manner higher up the waste hierarchy in accordance with the Government's philosophy for sustainable waste management.

5.12.6 The assessment of alternative sites has shown that a staged sequential approach was adopted in analysing the potential site for sitting of the Resource recovery Facility. The alternatives appraisal was undertaken to check that since the Sutton Courtenay site was identified, no better sites have emerged.

5.12.7 The alternative site appraisal has considered 229 sites from which and taking account of national, County and Local Plan policy. It is concluded that no other site is better placed to serve the Oxfordshire area than the Sutton Courtenay Resource recovery Park.

5.12.8 The options appraisal provides a high-level comparison of different generic waste management solutions. It illustrates the variability in the performance of different options against different sustainability objectives. The alternative technology review has highlighted other technologies and their relative merits when compared with Energy from Waste.

5.12.9 This chapter has shown that the proposal is sustainable in terms of the waste streams involved and for the site itself, in that:

- It treats the residual waste stream at the appropriate level in the waste hierarchy;
- The proposed EfW incinerator will enable significant diversion of Bio-degradable Municipal Waste away from landfill. This will enable the County Council to meet its responsibilities in terms of minimising the need for biodegradable waste disposal as a means of waste management.
- The proposal complies with the principles of regional self-sufficiency as well as being of the right size and capacity for the catchment area it is intended to serve.
- The proposal provides capacity for the management of a proportion of the County's commercial and industrial waste arisings without crowding out opportunities for recycling.

5.12.10 This proposal for an EfW within the Resource Recovery Park will become an essential component in being able to achieve, and sustain, government targets for reducing waste to landfill within Oxfordshire.

5.13 References

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