Oxfordshire MWDF

Sustainability Appraisal/Strategic Environmental Assessment

Waste Spatial Strategy Options

August 2011

Revision Schedule

Waste Spatial Strategy Options SA/SEA
August 2011

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	August 2011	Draft	J. Boca	Colin Bush	
02	August	Final	J. Boca	Colin Bush	

URS/Scott Wilson
Scott House
Alencon Link
Basingstoke
Hampshire
RG21 7PP

Tel. 01256 310200
Fax. 01256 310201

www.urs-scottwilson.com

Table of Contents

1 Introduction

1.1 Oxfordshire Minerals and Waste Development Framework

The Council is preparing a Minerals and Waste Development Framework (MWDF) for Oxfordshire. The Minerals and Waste Core Strategy Development Plan Document (MWDPD) will form a key part of the MWDF and will provide a strategic vision and overall strategy for meeting known and anticipated minerals and waste development requirements in Oxfordshire for the period to 2030.

1.2 Waste Spatial Strategy Options

In order to effectively manage the waste produced in Oxfordshire, the Council is preparing a Waste Planning Strategy as part of the Minerals and Waste Core Strategy DPD. This strategy will make planning provision for the facilities that will be required to manage Oxfordshire's waste over the plan period.

The strategy will need to set out how much additional capacity for different types of waste management is required over the plan period and how, where and when it should be provided, including a clear framework for the identification of suitable sites for waste management facilities.

The Council has prepared spatial strategy options for all the key waste streams to aid in the identification of their preferred spatial strategy to be taken forward in the Waste Planning Strategy consultation scheduled for September/October 2011.

1.3 Background to Appraisal

URS/Scott Wilson was commissioned by Oxfordshire County Council to undertake an independent Sustainability Appraisal incorporating Strategic Environmental Assessment[1] (hereby referred to as SA) of the waste spatial strategy options in July 2011. This report relates to the appraisal of these options.

SA seeks to identify the economic, social and environmental impacts of a plan and suggests ways to avoid or minimise negative impacts and maximise positive ones.

1.4 Appraisal Methodology

1.4.1 SA Framework

The waste spatial options were appraised against the already established SA framework for the Oxfordshire MWDF. The SA framework objectives were compiled using the information gathered during the early stages of the Scoping process and cover the full range of environmental impacts stipulated by the SEA Directive and the Regulations, and the broad range of economic and social issues proposed in the current guidance on SA[2].

The table below outlines the SA framework including the underlying sub-objectives and indicators[3].

[1] As required through the Strategic Environmental Assessment Directive (2001/42/EC).
2 ODPM (2005) Sustainability Appraisal of Regional Spatial Strategies and Local Development Documents

Table 1.1 SA Framework

SA Objective	Appraisal Criteria/Sub-objectives	Possible Indicators
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	Will the MWDF protect, maintain and enhance UK BAP Priority Habitats?	Number of permitted applications for minerals and waste development which include a restoration scheme which contributes to the objectives of Oxfordshire Habitats Plans for the creation of calcareous grasslands, lowland acid grassland and reedbeds
		Number of planning applications which have an impact on designated sites or BAP habitats
	Will the MWDF conserve and enhance internationally, nationally and regionally important sites of nature conservation importance?	Number of permitted applications which result in restoration of favourable/favourable recovering condition or buffering of designated areas through appropriate habitat creation.
	Will the MWDF protect, maintain and enhance UK BAP Priority Species?	Number of permitted applications for minerals and waste development which include a restoration scheme which contributes to the objectives of Oxfordshire Species Plans.
	Will it contribute to the aims of the Conservation Target Areas?	Contribution of the MWDF policies to Conservation Target Areas for restoration of minerals and waste management sites.
	Will it protect and conserve geological SSSIs and RIGs?	Number of permitted applications which include conditions for the protection or enhancement of RIGS or geological SSSIs.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	Will the MWDF conserve and enhance Oxfordshire's AONBs & their settings and take into account guidelines associated with specific landscape types?	Number of permitted applications for Minerals and Waste development which include conditions for the protection or restoration of statutory or non-statutory landscape designations.
	Will the MWDF protect and enhance the historic and prehistoric environment of Oxfordshire?	Number of permitted applications for Minerals and Waste development which include conditions for the protection or enhancement of the historic and prehistoric environment in Oxfordshire.
3. To maintain and improve	Will the MWDF affect	Number of permitted

ground and surface water quality	groundwater quality?	applications affecting source protection zones 2 and 3 Number of permitted applications which assess the risk of contamination of groundwater
	Will the MWDF affect surface water quality?	Number of sites within 50m of a watercourse
		Number of permitted applications requiring abstraction licences
4. To improve and maintain air quality to levels which do not damage natural systems	Will the MWDF lead to increased traffic congestion in built up areas?	Number of permitted applications with routeing agreements which avoid AQMAs Survey of trip generation to civic amenity sites
	Will the MWDF lead to increased dust and/or odours?	Number of complaints relating to dust/odours
5. To reduce greenhouse gas emissions to reduce the cause of climate change	Will the MWDF lead to a decrease in production of greenhouse gases such as methane?	Proportion of waste and aggregates transported by rail or water Quantity of biodegradable wastes landfilled
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	Number of sites that are permitted within flood risk zone as identified by PPS25.	Number of permitted sites for minerals and waste development within the flood plain (flood zone 3a/) Number of mineral restoration schemes identified for flood attenuation
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	Will the MWDF reduce distances travelled by road?	Distances travelled by road from new applications to settlements (waste) or markets Number of sites with rail/water access
	Are sites in the MWDF well located in relation to surrounding settlements for waste, or minerals for markets?	Number of sites with suitable access to appropriate roads
	Will the waste facilities or mineral operation serve local needs?	
	Does the MWDF facilitate HGV routeing agreements and developer contributions for infrastructure improvements?	
8. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	Will the MWDF result in loss of amenity through visual impact, noise, dust or vibration for local communities?	Number of sites for mineral or waste development within 250m of sensitive receptors (settlements)
	Will the MWDF provide opportunities for	Number of permitted applications with restoration

	enhancement of local amenity and access to the countryside?	conditions which enhance local amenity and /or improve access to the countryside.
9. To protect, improve and where necessary restore land and soil quality	Will the MWDF affect high grade agricultural land?	Area of high grade agricultural land lost to minerals and waste development
	Will the MWDF lead to soil pollution or contamination?	Incidences of land contamination related to minerals and waste development
10. To contribute towards moving up the waste hierarchy in Oxfordshire.	Will the MWDF policies reduce the amount of waste produced?	Amount of waste arising in Oxfordshire
	Will the MWDF encourage re-use, recycling/composting and recovery?	Amount of waste recycled and recovered
11. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to the appropriate minerals apportionment		Number of permitted applications for waste management to meet targets to achieve net waste self sufficiency. Number of permitted applications which contribute to meeting apportionment.
	Will the MWDF avoid sterilising mineral resources by preventing unnecessary development on or near to mineral resources?	Identification of mineral safeguarding areas in the MWDF
	Will the MWDF promote dialogue between local authorities to ensure valuable mineral resources are not sterilised by non-minerals development?	Evidence of cross-boundary liaison meetings
12. To support Oxfordshire's economic growth and reduce disparities across the county.	Will the MWDF generate new jobs for the county?	Number of direct jobs created in the waste/mineral sector per year
	Will the MWDF support and encourage the growth of small and medium size business?	Number of new mineral and waste permissions
	Will the MWDF encourage the provision of more locally based skills and facilities?	

1.4.2 Approach to Options Appraisal

The appraisal involved assessing each of the waste spatial options against the SA objectives taking account of both potential positive and negative effects. The appraisal also takes into account other impact dimensions, including whether the effects are primary, secondary, direct, indirect, permanent, short-term, medium-term, long-term or cumulative (the term cumulative effects is also used to describe synergistic and secondary effects).

Matrices were used to identify the sustainability effects and these are provided in Appendix 1. The matrices allow for the comparison of options and also consist of a summary of the principle underlying each of the options.

The appraisal was based on a combination of expert judgement and analysis of baseline data gathered in the Scoping Report and other available background information. Due to the strategic nature of SA, it is difficult to make predictions with a high degree of certainty and more detailed information is required in some instances. Where this is the case, detailed assessments are recommended at the site selection and planning application stages in order to further confirm the likelihood of impacts and their magnitude and propose mitigation measures where relevant. The table below shows the symbols used when completing the matrices.

Table 1.2 Appraisal symbols

Symbol	Likely effect on the SA Objective
++	The option is likely to have a **very positive** impact
+	The option is likely to have a **positive** impact
0	**No significant effect** / **no clear link**
?	**Uncertain** or **insufficient information** on which to determine impact
-	The option is likely to have a **negative** impact
- -	The option is likely to have a **very negative** impact

2 Results of the Options Appraisal

2.1 Municipal Waste (MSW)

2.1.1 Recycling of MSW

At present, the Council's Waste Needs Assessment indicates that there is a surplus of MSW recycling provision in the county. However, there is a need to make provision for a new recycling facility to serve Banbury to replace the existing temporary facility at Alkerton. Making provision to meet local need in Banbury will ensure that waste is not transported far for recycling as it is dealt with closer to its source of arising. This has a positive effect on minimising GHG emissions associated with transporting waste by road as well as reducing the potential for other negative transport related impacts like congestion on the county's roads. Provision of recycling capacity also provides opportunities for further carbon savings as reprocessing of recycled material requires less energy than processing of raw materials. Overall, this policy is assessed as being in line with sustainability principles.

2.1.2 Residual waste transfer stations for MSW

This option relates to the need to provide for bulking up and transfer stations of residual MSW waste from southern and western parts of Oxfordshire for efficient transportation to the Ardley energy from waste facility to be built in 2015. Ardley is located in the north of the county. The Council has identified in its Waste Needs Assessment Report that the location of the plant in the north of the county may give rise to the need for up to two additional transfer stations to facilitate the effective delivery of waste to the plant. The proposed locations of the two residual transfer stations are south (Abingdon/Didcot/Wantage and Grove) and west (Witney/Carterton) areas of the county.

Providing for the residual transfer stations in the identified areas would facilitate the efficient transportation of waste to Ardley. This is assessed as having positive impacts on the SA objectives related to transport and climate mitigation as the transfer stations are likely to lead to less waste movement across the county from the south and west to the north, thereby reducing potential negative transport impacts (congestion, noise, vibration and air pollution) as well as minimising greenhouse gases (GHGs) associated with waste transportation.

At a strategic level, the SA has not identified any obvious reasons for not locating the required residual waste transfer stations in the proposed broad areas. However, the potential impacts on the built and natural environment (as well as on amenity) of the proposed facilities should be addressed in detail at the site selection stage to ensure that development does not lead to adverse impacts on sensitive receptors including biodiversity, landscape, local amenity and the historic environment.

2.2 Commercial and Industrial Waste (C&I)

2.2.1 Recycling of C&I waste

The Council estimates that there is a capacity gap of approximately 100,000 tonnes per annum (tpa) by 2030 for recycling C&I waste. This capacity is primarily needed to serve the large towns of Bicester, Abingdon and Didcot and their

surrounding areas and the Council has identified 3 options for provision of this capacity. The appraisal findings for each of the options are provided below.

Option A: This option seeks to concentrate additional provision at or close to Oxford. The Council does not identify the need for additional capacity in this part of the county. While this approach would allow for shorter distances to be travelled for waste originating from Oxford and surrounding areas, waste from further north and south would need to be transported for longer distances resulting in potential negative transport impacts as well as leading to increases in green house gas emissions (GHGs). Other potential impacts on the built and natural environment and on amenity will be site specific and should be addressed in detail during the site selection process to ensure that further provision in this area does not lead to adverse effects on the environment and local communities.

Option B: Option B seeks to make additional provision at or close to the large towns in the north and south of the county. This option would lead to capacity being provided close to the sources of waste arising for the large towns in the north and south of county but with waste from the surrounding areas being transported to these facilities. This has potential for some negative transport impacts (especially on local roads) and lead to increase in GHG emissions. However, these are likely to be minor due to the short distances travelled and it is also assumed that the smaller surrounding areas are likely to produce relatively small quantities of C&I waste compared to the larger areas.

To mitigate against potential adverse effects on the built and natural environment, the detailed assessment of environment and amenity issues including biodiversity, landscape, the historic environment, air, noise and water pollution should be considered when selecting sites and during the planning application process.

Option C: Option C provides for additional capacity to be made at or close to large and smaller towns in the north (Bicester) and south (Abingdon, Didcot, Faringdon, Henley and Thame). From a transport and climate mitigation perspective, this option offers scope to provide for well located facilities across the county that will lead to waste being managed as close as possible to where it arises, reducing impacts on the road network and minimising transport related GHG emissions. The potential impacts on the built and natural environment associated with Option C should be considered during site selection and planning application stages to mitigate against potential adverse effects.

Options **A**, **B** and **C** offer opportunities for moving waste up the waste hierarchy as well as contributing to enabling Oxfordshire to be self-sufficient in the management of C&I waste. They also offer potential for local job creation.

2.2.2 Residual treatment of C&I waste

The Council has identified an estimated gap in required provision for residual treatment of C&I waste of approximately 200,000 tpa by 2015. A consented site is located in northern Oxfordshire (Ardley) and the Council has also resolved to approve a smaller facility at another site in the north of the County (Finmere). The council has therefore identified that any further provision is required in the southern and western parts of the county. The following options have been considered when planning for residual treatment of C&I waste:

Option A: Option A proposes provision of a single large facility in the Abingdon/Didcot/Wantage and Grove area. This option would lead to waste from the western part of the county being transported further for treatment and could therefore have some potential negative effects on the local road network

(congestion, air pollution and noise from HGV traffic). It would also lead to increase in GHG emissions associated with road transportation of waste. This option has potential for job creation and therefore a positive impact on the local economy. In taking this option forward, consideration of potential impacts on the built and natural environment as well as on amenity will be required during the site selection process and planning application stages to ensure that development does not lead to adverse effects on the environment and community.

Option B: This option proposes 2 smaller facilities in the Abingdon/Didcot/Wantage and Grove area; and in the Witney area. This would lead to waste being managed close to where it arises and supports SA objectives related to transport and climate mitigation. It would also have a positive economic impact due to potential for local job creation. At a strategic level, the SA has not identified any obvious reasons for not locating the required facilities in the proposed broad areas. However, the potential impacts on the built and natural environment (as well as on amenity) will need to be considered during site selection and planning application stages to ensure that development does not lead to adverse effects on the environment and community.

Both options are supportive of SA objectives 10 (moving waste up the hierarchy), 11 (supporting self-sufficiency) and 12 (contributing to the local economy).

2.3 Construction, Demolition and Excavation waste (CDE)

2.3.1 Recycling of CD&E waste

The Council estimates that approximately 500,000 tpa by 2030 will be required for recycling of CD&E waste and that this is likely to be needed mostly in Bicester, Didcot, Wantage and Grove, but with some requirement also at Oxford, Banbury, Witney, Carterton, Abingdon and the smaller towns in southern Oxfordshire. The Council has also identified that half of the required additional capacity could be provided at temporary facilities at landfill and quarry sites across the county. Three options have been considered as follows:

Option A: Option A seeks to concentrate additional permanent provision at or close to Bicester, Didcot and Wantage and Grove and temporary facilities at landfill quarry sites across Oxfordshire. This option does not make provision for other parts of the county that may require CDE recycling facilities. This would result in CDE waste from Oxford, Banbury, Witney, Carterton and Abingdon having to be transported further for management although allowing for use of temporary facilities in landfill sites and quarries may reduce the distances travelled where such sites are closer to areas without adequate provision. This option therefore has some potential for negative transport and climate mitigation impacts.

Option B- This option seeks to provide for dispersed additional permanent CD&E recycling capacity at or close to Oxford and large and smaller towns as well as make us of temporary facilities at landfill sites and quarry sites where opportunities arise across the county. This option would ensure that provision is made as close to the sources of waste arising as possible reducing travel distances and GHG emissions associated with transporting waste. Allowing for use of temporary facilities at landfills and quarries further enhances these benefits.

Option C – This option allows for additional permanent provision at or close to Oxford and large and smaller towns in the county. However, it does not allow for the use of temporary facilities at landfill and quarry sites. Although it makes provision for management of waste close to where it arises and is likely to have

reduced transport impacts and GHG emissions, it fails to maximise these benefits (and may actually increase transport impact) by allowing some of the capacity to be met at temporary facilities where opportunities arise.

All the options are supportive of SA objectives 10 (moving waste up the hierarchy), 11 (supporting self-sufficiency) and 12 (contributing to the local economy).

Further analysis of potential impacts on the built and natural environment should be undertaken at the site selection and planning application stages to mitigate against adverse impacts and the environment and local amenity.

2.4 Landfill

2.4.1 Inert Landfill

The Council estimates that an additional 3 million cubic metres of capacity for disposal of inert waste that cannot be recycled will be required from around 2020. To meet this need, the Council proposes to make provision for this amount with priority given to use of inert waste to restore mineral workings. This option is assessed as having positive effects on land restoration (where inert waste is used to restore mineral works). It also supports county self sufficiency and can offer local job opportunities and therefore has positive economic benefits. The proposal however does not support SA objective 10 on moving waste up the hierarchy as landfill does not lead to more waste being recycled or recovered. However, it is acknowledged that adequate provision for landfill should still be provided as some waste that cannot be recycled/treated will require disposal.

The potential transport and climate mitigation impacts of the proposed approach are difficult to assess without knowing the location of sites. This should be addressed during site selection and planning application process to ensure that sites are located close to sources of arisings.

Other potential impacts on the built and natural environment (biodiversity, landscape, historic environment, air, water, noise and soil) should also be assessed in detail during site selection and planning application stages to mitigate against adverse effects.

2.4.2 Hazardous Landfill

Oxfordshire is a net exporter of hazardous waste. The Council acknowledges that the county should be as self-sufficient as is reasonably possible in managing hazardous waste. However, due to the specialist nature of hazardous waste management facilities, they currently tend to serve large catchment areas than a single county. Oxfordshire estimates that additional capacity could be required for approximately 50,000tpa of hazardous waste produced in the county. Two options have been considered for meeting the required provision:

Option A: This option makes no additional provision and would seek to continue to rely on hazardous waste facilities outside Oxfordshire, apart from disposal of non-reactive hazardous waste in existing non-hazardous landfill sites in the county where acceptable.

When assessed against the SA objectives, no significant positive or negative impacts are identified as it is taken to be ‘business as usual’. However, increases in the amount of hazardous waste requiring management outside the county could have some negative transport and climate mitigation impacts although this would be expected to be minor due to quantities of waste transported being relatively

small. Option A does not support SA objective 11 on enabling Oxfordshire be self sufficient in its waste management although this objective is unlikely to be achievable given the specialist nature of hazardous waste management facilities.

Option B- This option proposes changing one of Oxfordshire's existing non-hazardous landfill sites to hazardous landfill. This would have a positive impact on SA objectives related to transport and climate mitigation as it would reduce the distance hazardous waste requiring disposal would be transported. It would also enable the county to move towards self-sufficiency in hazardous disposal capacity. To change the non-hazardous landfill site to hazardous, operators would be required to comply with strict Environment Agency landfilling criteria as well as planning criteria to ensure that such changes do not lead to adverse effects on the environment and the local amenity. Detailed assessment of potential impacts on the environment and amenity would also be required through the planning process to mitigate against adverse impacts.

Overall, option A is assessed as offering a sustainable option for the management of Oxfordshire's hazardous waste due to the specialised nature of facilities that handle this waste stream and the relatively small quantities arising.

Where proposals come forward for conversion of existing non-hazardous sites to hazardous, this can also offer a sustainable option for disposal of hazardous waste if the site is only restricted to accepting hazardous waste for disposal arising in Oxfordshire and its conversion does not lead to adverse environmental and amenity effects.

2.5 Radioactive Waste

2.5.1 Intermediate level radioactive waste storage

There is intermediate level radioactive waste remaining at Harwell and smaller quantities at Culham. The Council estimates that there is a requirement for treatment and storage of an estimated 10,000 cubic metres of intermediate level radioactive waste at these locations. In planning for the management of this waste, three options have been considered:

Option A: Option A seeks to make provision at source – treatment and long-term storage at Harwell (for Harwell waste only) and at Culham (for Culham waste only), pending removal to a national disposal facility. This option is considered sustainable in that it supports management of waste close to where it is produced reducing the need to transport waste further (although the distance between the two facilities is only approximately 7 miles). Key issues that would need to be considered at Harwell include:

- Potential impact on local biodiversity including a SSSI 7 kms to the south east of the site
- The close proximity to the North Wessex Downs AONB as well as potential local visual and landscape impacts
- Potential impacts on Scheduled monuments identified close to the site (within 5kms)
- Potential for ground water and surface water contamination
- Potential for land contamination

- Potential amenity and health impacts associated with management of intermediate level waste

Key issues that should be considered at Culham include:

- Potential impacts on local site biodiversity (there are no designated sites close to or within the site)
- Potential impacts on the AONB
- Potential impacts on the Scheduled Monument site identified 1km east of the site
- Potential impacts on surface and ground water
- Potential amenity and health impacts

Option B – This option provides for treatment and long-term storage of intermediate level nuclear waste (from Harwell and Culham) at Harwell, pending removal to a national disposal facility. Compared to option A, this option would lead to some waste from Culham being transported to Harwell. Although assessed as a negative impact against SA objectives on transport and climate change, this impact is likely to be minor due to the distance travelled (approximately 7miles) and the quantities of waste moved (expected to be small). The key sustainability issues identified above (as in option A) would still need to be addressed at the planning application stage to ensure that development of the proposed facility at Harwell does not lead to adverse environmental impacts.

Option C – This option seeks to provide for the treatment and long-term storage of intermediate level nuclear waste from Oxfordshire (Harwell and Culham) and waste from Dorset (Winfrith) at Harwell, pending removal to a national disposal facility. This option would lead to radioactive waste being transported from Culham, but also from Dorset which lies outside the County. It is not clear at this stage the quantities of waste from Dorset that would require transportation to Harwell but due to the distance involved, this option is judged as having a potential negative impact on SA objectives 5 and 7. However, like option B above, option C would allow for economies of scale due to the additional capacity to manage waste from Winfrith making option C likely to be more deliverable compared to option A based on cost-efficiency. The key sustainability issues identified above for the Harwell site (as in option A) would still need to be addressed at the planning application stage to ensure that development of the proposed facility does not lead to adverse environmental impacts

2.5.2 Low level radioactive waste management

It is estimated that a total of 100,000 cubic metres of low level radioactive waste mainly arising from demolition and clearance of buildings at Harwell and Culham will be required to be managed. The Council has considered four options for the storage and disposal of this waste as follows:

Option A – Temporary storage and disposal in a bespoke facility at Harwell (for Harwell only), and at Culham (for waste from Culham). This option when assessed against the SA objective would lead to the least movement of materials and therefore performs well against SA objectives 5 and 7. The following key issues would need to be considered when assessing the potential development of such facilities at Harwell and Culham:

Harwell:

- Potential impact on local biodiversity including a SSSI 7 kms to the south east of the site
- The close proximity to the North Wessex Downs AONB as well as potential local visual and landscape impacts
- Potential impacts on Scheduled monuments identified close to the site (within 5kms)
- Potential for ground water and surface water contamination
- Potential for land contamination

Culham:

- Potential impacts on local site biodiversity (there are no designated sites close to or within the site)
- Potential impacts on the AONB
- Potential impacts on the Scheduled Monument site identified 1km east of the site
- Potential impacts on surface and ground water
- Potential amenity and health impacts

Option B: Temporary storage of waste at source of waste and disposal of a bespoke facility at Harwell (waste from Harwell and Culham). This option would lead to some movement of materials from Culham. However, although assessed as a potential negative impact in terms of transport and climate mitigation, this impact is likely to be minor due to the distance travelled and the amount of waste requiring transportation being relatively small. The key environmental and amenity issues identified above (as in option A) for Harwell should be addressed at the planning application stage to mitigate against potential adverse effects.

Option C – Temporary storage of waste at source of waste and disposal in a suitable off-site landfill in Oxfordshire. This option would require waste to be stored at Harwell and Culham before being disposed off-site in a landfill in Oxfordshire. It would result in waste being transported from its source of arising for disposal elsewhere in the county. Depending on the location of the landfill site there is potential for increases in negative transport impacts as well as GHG emissions associated with waste transportation (although this are likely to be minor due to the quantities of waste requiring movement). Potential impacts on the built and natural environment as well as on amenity associated with such a disposal facility would need to be considered in detail at the site selection and planning application stages to ensure that such development does not lead to adverse impacts on the environment and local amenity and on human health.

Option D- Temporary storage of waste at source of waste and disposal in a suitable off-site landfill outside Oxfordshire. This option like option C above would require waste to be stored at Harwell and Culham before being disposed off site but to a landfill site outside of Oxfordshire. For the purposes of this assessment, it has been assumed that landfill sites out of county are likely to be further from the sources of waste arising compared to landfill sites within Oxfordshire. This is assessed as having potential for negative transport impacts and associated GHG emissions. This option does not support SA objective 11 on enabling county self-sufficiency as it would require waste to be disposed out of county.

Potential impacts on the built and natural environment and on amenity should be considered in detail at the site selection and planning stages to ensure that proposals do not lead to adverse impacts on the environment (this responsibility would lie with the local authority where such a site would be located and is outside Oxfordshire County Council's remit but the Council will be consulting potentially affected Waste Planning Authorities on the strategy).

Appendix 1 Matrices

Recycling of MSW		
SA Objectives	**Option - Provision of a new facility to serve Banbury, to replace the existing temporary facility at Alkerton**	**Summary and mitigation measures**
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	Potential impacts on biodiversity, landscape, historic and built heritage, water and air quality will depend on the location of the new facility relative to sensitive receptors. These issues should be addressed during the site selection stage to allow for identification of potential adverse effects and mitigation measures.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	
3. To maintain and improve ground and surface water quality	?	
4. To improve and maintain air quality to levels which do not damage natural systems	?	
5. To reduce greenhouse gas emissions to reduce the cause of climate change	+	Making local provision in Banbury will reduce the likelihood of waste being transported further for recycling therefore reducing transport related greenhouse gas (GHG) emissions.
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Impact on flooding is dependent on the location of the site.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	+	As with SA objective 5, making local provision in Banbury will reduce the likelihood of waste being transported further for recycling therefore reducing the impact of transporting waste
8. To minimise the negative impacts of waste management facilities and mineral extraction on people and local communities		Potential human health and amenity impacts are dependent on the location of the facility relative to sensitive receptors like housing, hospitals and schools. These impacts should be assessed in detail during the site selection process.
10. To protect, improve and where necessary restore land and soil quality	?	
11. To contribute towards moving up the waste hierarchy in Oxfordshire	++	Making provision for recycling has a positive effect on moving waste up the hierarchy as it promotes recycling
12. To support Oxfordshire's economic growth and reduce disparities across the	+	Provision of a local recycling facility can provide local jobs which has a positive economic effect.

county		

Summary –

At present, the Council's Waste Needs Assessment indicates that there is a surplus of MSW recycling provision in the county. However, there is a need to make provision for a new recycling facility to serve Banbury to replace the existing temporary facility at Alkerton. Making provision to meet local need in Banbury will ensure that waste is not transported far for recycling as it is dealt with closer to its source of arising. This has a positive effect reducing GHG emissions associated with transporting waste by road as well as reducing the potential for other negative transport related impacts like congestion on the county's roads. Provision of recycling capacity also provides opportunities for further carbon savings as reprocessing of recycled material requires less energy than processing of raw materials.

Potential impacts related to the built and natural environment (and on amenity) will need to be assessed in detail at the site selection stage so as to ensure that there are no negative effects on sensitive receptors.

Residual Waste Transfer Stations		
SA Objectives	**Option - Two transfer stations to serve Ardley EfW incinerator: one in Abingdon/Didcot/Grove area; and one in Witney/Carterton area.**	**Summary and mitigation measures**
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	Potential impacts on biodiversity, landscape, historic and built heritage, water and air quality will depend on the location of the new facilities relative to sensitive receptors. These issues should be addressed during the site selection stage to allow for identification of potential adverse effects and mitigation measures.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	
3. To maintain and improve ground and surface water quality	?	
4. To improve and maintain air quality to levels which do not damage natural systems	?	
5. To reduce greenhouse gas emissions to reduce the cause of climate change	+	Providing for bulking up and transfer stations to the west and south of the county will allow for efficient transportation of residual waste to the north of the county which has potential to reduce carbon emissions associated with waste transportation.
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Vulnerability to flooding is dependent on the specific location of sites. This will be addressed during site selection to ensure that development does not lead to adverse flooding effects.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	+	Providing for bulking up and transfer stations to the west and south of the county will allow for efficient transportation of residual waste minimising impact of HGV traffic on the road network.
8. To minimise the negative impacts of waste management facilities and mineral extraction on	?	Potential human health and amenity impacts are dependent on the location of the facility relative to sensitive receptors like housing, hospitals and

people and local communities		schools. These impacts should be assessed in detail during the site selection process.
9. To protect, improve and where necessary restore land and soil quality	0	
10. To contribute towards moving up the waste hierarchy in Oxfordshire	+	Transfer stations play an important role in ensuring that waste is bulked up and transferred for processing and therefore contributes to moving waste up the hierarchy
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	+	Making provision for local transfer stations supports SA objective 11 as it contributes to Oxfordshire's self-sufficiency in transfer capacity.
12. To support Oxfordshire's economic growth and reduce disparities across the county	+	Providing for transfer stations in the southern and western parts of the county can provide local employment opportunities.

Summary – This option relates to the need to provide for bulking up and transfer stations of residual municipal waste from southern and western part of Oxfordshire for efficient transportation to the Ardley energy from waste facility to be built in 2015. Ardley is located in the north of the county. The Council has identified in its Waste Needs Assessment Report that the location of the plant in the north of the county may give rise to the need for up to two additional transfer stations to facilitate the effective delivery of waste to the plant. The proposed locations of the two residual transfer stations are south (Abingdon/Didcot/Wantage and Grove) and west (Witney/Carterton) areas of the county.

Providing for the residual transfer stations in the identified areas would facilitate the efficient transportation of waste to Ardley. This is assessed as having positive impacts on the SA objectives related to transport and climate mitigation as the transfer stations are likely to lead to less waste movement across the county from the south and west to the north, thereby reducing potential negative transport impacts (congestion, noise, vibration and air pollution) as well as minimising greenhouse gases (GHGs) associated with waste transportation.

Although the SA does not identify obvious reasons not to locate the proposed development within the identified broad areas, the potential impacts on the built and natural environment of the proposed facilities should be addressed at the site selection stage to ensure that development does not lead to adverse impacts on sensitive receptors including biodiversity, landscape, local amenity, the historic environment etc.

Recycling of Commercial and Industrial (C&I) waste				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional provision at or close to Oxford	**Option 2- Additional provision at or close to large towns – Northern and southern**	**Option 3 – Additional provision at or close to large and smaller towns in northern, southern Oxfordshire**	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	?	?	Impacts will depend on the exact location of sites.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	?	?	Impacts will depend on the exact location of sites.
3. To maintain and improve ground and surface water quality	?	?	?	Impacts will depend on the exact location of sites.
4. To improve and maintain air quality to levels which do not damage natural systems	?	?	?	Impacts will depend on exact location of sites.
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-	-	+	Option A would lead to waste from the north and south of county being moved further for treatment while option B would lead to waste from the smaller surrounding areas to the north and south having to be moved to the facilities in the larger towns in the north or south of county. Option C allows for the waste to be treated as close as possible to where it arises thereby minimising GHG emissions.
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	?	?	Impacts will depend on the exact location of sites.

Recycling of Commercial and Industrial (C&I) waste				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional provision at or close to Oxford	**Option 2- Additional provision at or close to large towns – Northern and southern**	**Option 3 – Additional provision at or close to large and smaller towns in northern, southern Oxfordshire**	
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	-	-	+	Option A would lead to waste from the north and south of county being moved further for treatment while option B would lead to waste from the smaller surrounding areas to the north and south having to be moved to the facilities in the larger towns in the north or south of county. Option C allows for the waste to be treated as close as possible to where it arises thereby minimising overall impact on the county's road network.
8. To minimise the negative impacts of waste management facilities and mineral extraction on people and local communities	?	?	?	Impacts will depend on exact location of sites, relative to sensate receptors.
9. To protect, improve and where necessary restore land and soil quality	0	0	0	
10. To contribute towards moving up the waste hierarchy in Oxfordshire	+	+	+	All options would contribute towards moving up waste the hierarchy as well as contribute to county self-sufficiency and the local economy through potential job-creation.
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	+	+	+	
12. To support Oxfordshire's economic growth and reduce disparities across the county	+	+	+	

Summary:

The Council estimates that there is a capacity gap of approximately 100,000 tonnes per annum (tpa) by 2030 for recycling C&I waste. This capacity is primarily needed to serve the large towns of Bicester, Abingdon and Didcot and their surrounding areas and the Council has identified 3 options for provision of this capacity. The

Recycling of Commercial and Industrial (C&I) waste				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional provision at or close to Oxford	**Option 2- Additional provision at or close to large towns – Northern and southern**	**Option 3 – Additional provision at or close to large and smaller towns in northern, southern Oxfordshire**	

appraisal findings for each of the options are provided below.

Option A: This option seeks to concentrate additional provision at or close to Oxford. The Council does not identify the need for additional capacity in this part of the county. While this approach would allow for shorter distances to be travelled for waste originating from Oxford and surrounding areas, waste from further north and south would need to be transported for longer distances resulting in potential negative transport impacts as well as leading to increases in green house gas emissions (GHGs). Other potential impacts on the built and natural environment and on amenity will be site specific and should be addressed in detail during the site selection process to ensure that further provision in this area does not lead to adverse effects on the environment and local communities.

Option B: Option B seeks to make additional provision at or close to the large towns in the north and south of the county. This option would lead to capacity being provided close to the sources of waste arising for the large towns in the north and south of county but with waste from the surrounding areas being transported to these facilities. This has potential for some negative transport impacts (especially on local roads) and lead to increase in GHG emissions. However, these are likely to be minor due to the short distances travelled and it is also assumed that the smaller surrounding areas are likely to produce relatively small quantities of C&I waste compared to the larger areas.

To mitigate against potential adverse effects on the built and natural environment, the detailed assessment of environment and amenity issues including biodiversity, landscape, the historic environment, air, noise and water pollution should be considered when selecting sites and during the planning application process.

Option C: Option C provides for additional capacity to be made at or close to large and smaller towns in the north (Bicester) and south (Abingdon, Didcot, Faringdon, Henley and Thame). From a transport and climate mitigation perspective, this option offers scope to provide for well located facilities across the county that will lead to waste being managed as close as possible to where it arises, reducing impacts on the road network and minimising transport related GHG emissions. The potential impacts on the built and natural environment associated with Option C should be considered during site selection and planning application stages to mitigate against potential adverse effects.

Options **A**, **B** and **C** offer opportunities for moving waste up the waste hierarchy as well as contributing to enabling Oxfordshire to be self-sufficient in the management of C&I waste. They also offer potential for local job creation.

Residual Treatment of C&I waste			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1- 1 large facility in the Abingdon/Didcot/Wantage and Grove area	**Option 2 – 2 smaller facilities in the Abingdon/Didcot/Wantage and Grove and Witney area**	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	?	Impacts will depend on exact location of sites.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	?	Impacts will depend on exact location of sites.
3. To maintain and improve ground and surface water quality	?	?	Impacts will depend on exact location of sites.
4. To improve and maintain air quality to levels which do not damage natural systems	?	?	Impacts will depend on exact location of sites.
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-	+	Option A provides for one large facility accepting waste from a wide catchment. This would lead to waste from the west of the county being moved further leading to increased emissions. Option C would provide smaller facilities closer to sources of waste arisings in the south and west of county resulting in decreased GHG emissions associated with transport.
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	?	Impacts will depend on exact location of sites.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	-	+	Option A provides for one large facility accepting waste from a wide catchment. This would lead to waste from the west of the county being moved further leading to potential negative transport impacts on the road network. Option C would provide smaller facilities closer to sources of waste arisings in the south and west of county reducing overall transport impacts associated with waste transportation.

Residual Treatment of C&I waste			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1- 1 large facility in the Abingdon/Didcot/Wantage and Grove area	**Option 2 – 2 smaller facilities in the Abingdon/Didcot/Wantage and Grove and Witney area**	
8. To minimise the negative impacts of waste management facilities and mineral extraction on people and local communities	?	?	Impacts will depend on exact location of sites.
9. To protect, improve and where necessary restore land and soil quality	0	0	
10. To contribute towards moving up the waste hierarchy in Oxfordshire	+	+	All options would contribute towards moving up waste the hierarchy as well as contribute to county self-sufficiency and the local economy through potential job-creation. Option A also provides economy of scale to attract investment by the private sector and is therefore likely to be more deliverable compared to smaller facilities supported by Option B
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	+	+	
12. To support Oxfordshire's economic growth and reduce disparities across the county	++	+	

Residual Treatment of C&I waste			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1- 1 large facility in the Abingdon/Didcot/Wantage and Grove area	**Option 2 – 2 smaller facilities in the Abingdon/Didcot/Wantage and Grove and Witney area**	

Summary:

The Council has identified an estimated gap in required provision for residual treatment of C&I waste of approximately 200,000 tpa by 2015. The existing consented sites are both located in northern Oxfordshire (Ardley and Finmere) and the council has identified that further provision is required in the south and western parts of the county and identified the following options.

Option A: Option A proposes provision of a single large facility in the Abingdon/Didcot/Wantage and Grove area. This option would lead to waste from the western part of the county being transported further for treatment and could therefore have some potential negative effects on the local road network (congestion, air pollution and noise from HGV traffic). It would also lead to increase in GHG emissions associated with road transportation of waste. However, due to its large scale, this option offers economy of scale making it more likely to be deliverable by the waste sector. This can have a positive effect on the local economy through bringing significant in-ward investment as well as providing job-opportunities.

Option B: This option proposes 2 smaller facilities in the Abingdon/Didcot/Wantage and Grove area; and in the Witney area. This would lead to waste being managed close to where it arises and supports SA objectives related to transport and climate mitigation. Although judged as having a positive economic impact due to potential for local job opportunities, this option may not be deliverable due to the small-scale nature of the proposed facilities. Facilities of this type are generally attractive to investors when they are of sufficiently large scale to be economical. Therefore this option is unlikely to be deliverable from an economic perspective.

In taking either option forward, the potential impact on the built and natural environment as well as on amenity will need to be considered during site selection to ensure that development does not lead to adverse effects on the environment and community.

Recycling of Construction, Demolition and Excavation Waste (CDE)				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional permanent provision at or close to Bicester, Didcot and Wantage & Grove; and temporary facilities at landfill and quarry sites across Oxfordshire.	**Option 2- Dispersal of additional permanent provision at or close to Oxford and large and smaller towns in:** **Northern Oxfordshire** **Southern Oxfordshire and** **Western Oxfordshire and temporary facilities at landfill and quarry sites where opportunities arise across Oxfordshire**	**Option 3 – Additional permanent provision only at or close to Oxford and towns large and smaller towns in:** **Northern Oxfordshire(** **Southern Oxfordshire and** **Western Oxfordshire**	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	?	?	Impacts will depend on exact location of sites.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	?	?	Impacts will depend on exact location of sites.
3. To maintain and improve ground and surface water quality	?	?	?	Impacts will depend on exact location of sites.
4. To improve and maintain air quality to levels which do not damage natural systems	?	?	?	Impacts will depend on exact location of sites.

Recycling of Construction, Demolition and Excavation Waste (CDE)				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional permanent provision at or close to Bicester, Didcot and Wantage & Grove; and temporary facilities at landfill and quarry sites across Oxfordshire.	**Option 2- Dispersal of additional permanent provision at or close to Oxford and large and smaller towns in:** **Northern Oxfordshire** **Southern Oxfordshire and** **Western Oxfordshire and temporary facilities at landfill and quarry sites where opportunities arise across Oxfordshire**	**Option 3 – Additional permanent provision only at or close to Oxford and towns large and smaller towns in:** **Northern Oxfordshire(** **Southern Oxfordshire and** **Western Oxfordshire**	
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-	+	-	Option A would lead to waste being moved further as it does not make provision for smaller towns in south Oxfordshire as well as the western part of the county although it provides for temporary facilities at landfill quarries. Option B allows for a dispersed pattern of provision as well as allowing temporary facilities at landfill sites and quarries which would reduce GHG emissions from transport. Option C does not provide for use of temporary facilities at landfills and quarries which does not take advantage of potential benefits in reducing transport and could therefore lead to an increase in GHG emissions.
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	?	?	Impacts will depend on exact location of sites.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	-	+	-	Option A and C would lead to more waste movements across the county compared to option B and are therefore likely to have more impact on the road network.

Recycling of Construction, Demolition and Excavation Waste (CDE)				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional permanent provision at or close to Bicester, Didcot and Wantage & Grove; and temporary facilities at landfill and quarry sites across Oxfordshire.	**Option 2- Dispersal of additional permanent provision at or close to Oxford and large and smaller towns in:** **Northern Oxfordshire** **Southern Oxfordshire and** **Western Oxfordshire and temporary facilities at landfill and quarry sites where opportunities arise across Oxfordshire**	**Option 3 – Additional permanent provision only at or close to Oxford and towns large and smaller towns in:** **Northern Oxfordshire(** **Southern Oxfordshire and** **Western Oxfordshire**	
8. To minimise the negative impacts of waste management facilities and mineral extraction on people and local communities	?	?	?	
9. To protect, improve and where necessary restore land and soil quality	0	0	0	
10. To contribute towards moving up the waste hierarchy in Oxfordshire	+	+	+	All options would contribute towards moving up waste the hierarchy as well as contribute to county self-sufficiency and the local economy through potential job-creation.
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	++	+	+	
12. To support Oxfordshire's economic growth and reduce disparities across the county	+	+	+	

Recycling of Construction, Demolition and Excavation Waste (CDE)				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option 1- Concentration of additional permanent provision at or close to Bicester, Didcot and Wantage & Grove; and temporary facilities at landfill and quarry sites across Oxfordshire.	**Option 2- Dispersal of additional permanent provision at or close to Oxford and large and smaller towns in:** **Northern Oxfordshire** **Southern Oxfordshire and** **Western Oxfordshire and temporary facilities at landfill and quarry sites where opportunities arise across Oxfordshire**	**Option 3 – Additional permanent provision only at or close to Oxford and towns large and smaller towns in:** **Northern Oxfordshire(** **Southern Oxfordshire and** **Western Oxfordshire**	

Summary:

The Council estimates that approximately 500,000tpa a year by 2030 will be required for recycling of CD&E waste and that this is likely to be needed mostly in Bicester, Didcot, Wantage and Grove, but with some requirement also at Oxford, Banbury, Witney, Carterton, Abingdon and the smaller towns in southern Oxfordshire. The Council has also identified that half of the required additional capacity could be provided at temporary facilities at landfill and quarry sites across the county. Three options have been considered as follows.

Option A: Option A seeks to concentrate additional permanent provision at of closer to Bicester, Didcot and Wantage and Grove and temporary facilities at landfill quarry sites across Oxfordshire. This option does not make provision for other parts of the county that may require CDE recycling facilities. This would result in CDE waste from Oxford, Banbury, Witney etc having to be transported further for management although allowing for use of temporary facilities in landfill sites and quarries may reduce the distances travelled where such sites are closer to areas without adequate provision. This option therefore has some potential for negative transport and climate mitigation impacts.

Option B- This option seeks to provide for dispersed additional permanent CDE recycling capacity at or close to Oxford and large and smaller towns as well as make us of temporary facilities at landfill sites and quarry sites where opportunities arise across the county. This option would ensure that provision is made as close to the sources of waste arising as possible reducing travel distances and GHG emissions associated with transporting waste. Allowing for use of temporary facilities at landfills and quarries further enhances these benefits.

Option C – This option allows for additional permanent provision at or close to Oxford and large and smaller towns in the county. However, it does not allow for the use of temporary facilities at landfill and quarry sites. Although it makes provision for management of waste close to where it arises and is likely to have reduced transport impacts and GHG emissions, it fails to maximise these benefits by allowing some of the capacity to be met at temporary facilities where opportunities arise.

All the options are supportive of SA objectives 10, 11 and 12. Further analysis of potential impacts on the built and natural environment should be undertaken at the site selection stage to mitigate against adverse impacts.

Landfill		
SA Objectives	**Option**	**Summary and mitigation measure**
	Provision of approximately 3million cubic metres of capacity for disposal of inert waste that cannot be recycled, with priority given to use of inert waste to restore minerals workings	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	Impacts will depend on exact location of sites.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	Impacts will depend on exact location of sites.
3. To maintain and improve ground and surface water quality	?	Impacts will depend on exact location of sites.
4. To improve and maintain air quality to levels which do not damage natural systems	?	Impacts will depend on exact location of sites.
5. To reduce greenhouse gas emissions to reduce the cause of climate change	?	Impacts will depend on exact location of sites relative to sources of waste arising
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Impacts will depend on exact location of sites.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	0	Impacts will depend on exact location of sites relative to sources of waste arising
8. To minimise the negative impacts of waste management facilities and mineral extraction on people and local communities	?	Impacts will depend on exact location of sites relative to sources of waste arising
9. To protect, improve and where necessary restore land and soil quality	+	Provision for additional landfill capacity for inert waste where used to restore sites has a positive effect on SA objective 9
10. To contribute towards moving up the waste hierarchy in Oxfordshire	-	Landfilling is the option of last resort and it does not contribute towards moving waste up the hierarchy. However, it is recognised that it should be adequately provided for.
11. To enable Oxfordshire to be self-sufficient in its	+	Making local provision allows for county self-sufficiency. It

waste management and to make a sustainable contribution to its sub-regional minerals apportionment.		also offers potential for local job-opportunities.
12. To support Oxfordshire's economic growth and reduce disparities across the county	+	

Summary –

The Council estimates that an additional 3 million cubic metres of capacity for disposal of inert waste that cannot be recycled will be required from around 2020. To meet this need, the Council proposes to make provision for this amount with priority given to use of inert waste to restore mineral workings. This option is assessed as having positive effects on land restoration (where inert waste is used to restore mineral works). It also supports county self sufficiency and can offer local job opportunities and therefore have positive economic benefits. The proposal however does not support SA objective 10 on moving waste up the hierarchy as landfill does not lead to more waste being recycled or recovered. However, it is acknowledged that adequate provision for landfill should still be provided as some waste that cannot be recycled/treated will require disposal.

The potential transport and climate mitigation impacts of the proposed approach are difficult to assess without knowing the location of sites. This should be addressed during site selection to ensure that sites are located close to sources of arisings. Other potential impacts on the built and natural environment should also be assessed in detail during site selection to mitigate against adverse effects.

Hazardous Waste - Landfill			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1-No additional provision: continue to rely on hazardous waste landfill facilities outside Oxfordshire, apart from disposal of non-reactive hazardous waste	**Option 2 – Existing landfill- change one of Oxfordshire's existing non-hazardous landfills to hazardous landfill**	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	0	0/?	Proposals for hazardous landfilling would need to be assessed against strict Environmental agency landfilling criteria as well as planning criteria to ensure no adverse environmental impacts
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	0	0/?	

Hazardous Waste - Landfill			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1-No additional provision: continue to rely on hazardous waste landfill facilities outside Oxfordshire, apart from disposal of non-reactive hazardous waste	**Option 2 – Existing landfill- change one of Oxfordshire's existing non-hazardous landfills to hazardous landfill**	
3. To maintain and improve ground and surface water quality	0	0/?	
4. To improve and maintain air quality to levels which do not damage natural systems	0	0/?	Proposals for hazardous landfilling would need to be assessed against strict Environmental agency landfilling criteria as well as planning criteria to ensure no adverse environmental impacts
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-/0	+	Option A will continue to rely on some of Oxfordshire's hazardous waste being managed elsewhere. If quantities remain the same, this is unlikely to increase GHG emissions associated with these movements, also, the quantities of hazardous waste requiring management are generally not significant. Option B would lead to some local provision in Oxfordshire which would have a positive effect due to reduced travel distances for hazardous waste
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	0	0/?	Proposals for hazardous landfilling would need to be assessed against strict Environmental agency landfilling criteria as well as planning criteria to ensure no adverse environmental impacts

Hazardous Waste - Landfill			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1-No additional provision: continue to rely on hazardous waste landfill facilities outside Oxfordshire, apart from disposal of non-reactive hazardous waste	**Option 2 – Existing landfill- change one of Oxfordshire's existing non-hazardous landfills to hazardous landfill**	
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	0	+	Option A will continue to rely on some of Oxfordshire's hazardous waste being managed elsewhere. If quantities remain the same, this is unlikely to increase transport impact associated with these movements, also, the quantities of hazardous waste requiring management are generally not significant. Option B would lead to some local provision in Oxfordshire which would have a positive effect due to reduced travel distances for hazardous waste
8. To minimise the negative impacts of waste management facilities and mineral extraction on people and local communities	0	0/?	Proposals for hazardous landfilling would need to be assessed against strict Environmental agency landfilling criteria as well as planning criteria to ensure no adverse environmental impacts including on the local community
9. To protect, improve and where necessary restore land and soil quality	0	0/?	Proposals for hazardous landfilling would need to be assessed against strict Environmental agency landfilling criteria as well as planning criteria to ensure no adverse environmental impacts
10. To contribute towards moving up the waste hierarchy in Oxfordshire	0/?	-	Option A – impact is dependent on the management route applied to the hazardous waste (treatment or disposal). Option D does not support SA objective 10 as disposal does not lead to moving waste up the waste hierarchy.

Hazardous Waste - Landfill			
Sustainability Appraisal Objectives	**Options**		**Summary and mitigation measures**
	Option 1-No additional provision: continue to rely on hazardous waste landfill facilities outside Oxfordshire, apart from disposal of non-reactive hazardous waste	**Option 2 – Existing landfill- change one of Oxfordshire's existing non-hazardous landfills to hazardous landfill**	
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	-	+	Option A does not allow for self sufficiency. However, it is accepted that due to the specialist nature of facilities required to manage hazardous waste, it is not practical to provide all capacity locally. Option B can contribute towards achieving self sufficiency in disposal of hazardous waste.
12. To support Oxfordshire's economic growth and reduce disparities across the county	0	0	

Summary

Oxfordshire is a net exporter of hazardous waste. The Council acknowledges that the county should be as self-sufficient as is reasonably possible in managing hazardous waste. However, due to the specialist nature of hazardous waste management facilities, they currently tend to serve large catchment areas than a single county. Oxfordshire estimates that additional capacity could be required for approximately 50,000 tpa of hazardous waste produced in the county. Two options have been proposed for meeting the required provision:

Option A*:* This option makes no additional provision and would seek to continue to rely on hazardous waste facilities outside Oxfordshire, apart from disposal of non-reactive hazardous waste in existing non-hazardous landfill sites in Oxfordshire where acceptable. When assessed against the SA objectives, no significant positive or negative impacts are identified as it is taken to be 'business as usual'. However, increases in the amount of hazardous waste requiring management outside the county could have some negative transport and climate mitigation impacts although this would be expected to be minor due to quantities of waste transported being relatively small. Option A does not support SA objective 11 on enabling Oxfordshire be self sufficient in its waste management although this is unlikely to be achievable given the specialist nature of hazardous waste management facilities.

Option B- This option proposes changing one of Oxfordshire's existing non-hazardous landfill sites to hazardous landfill. This would have a positive impact on SA objectives related to transport and climate mitigation as it would reduce the distance hazardous waste requiring disposal would be transported. It would also enable the county to move towards self-sufficiency in hazardous disposal capacity. To change the non-hazardous landfill site to hazardous, operators would be required to comply with strict Environment Agency landfilling criteria as well as planning criteria to ensure that such changes do not lead to adverse effects on the environment and the local amenity.

Intermediate Level Radioactive Waste Storage				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option A- Storage at source of waste(Harwell and Culham)	**Option B- Treatment and long term storage at Harwell pending transfer to a national disposal facility**	**Option C– Treatment and long term storage for waste from Oxon and storage for waste from Dorset pending removal to a national facility**	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	?	?	There are no specific designated sites within the Harwell site; however there is a SSSI 7km to the south east of the site. There are no designated nature conservation sites within the Culham site or close to the site. For both sites, detailed potential impacts on local biodiversity should be undertaken at the planning application stage to ensure no adverse effects on local wildlife and habitats.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	?	?	The Harwell site borders the North Wessex Downs AONB. Development here should be designed to fit into the surrounding landscape without causing negative impacts on the AONB as well as the local landscape. There are also 17 Scheduled Monuments within 5kms of the site. Potential impacts on these should be assessed at the planning application stage. The Culham site is 2.5 km from the North Wessex Downs AONB and is in the Greenbelt. There is a Scheduled Monument site 1km east of the site. Proposals should demonstrate that development of a storage facility would not have adverse impacts on the landscape and the Scheduled Monument.

Intermediate Level Radioactive Waste Storage				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option A- Storage at source of waste(Harwell and Culham)	**Option B- Treatment and long term storage at Harwell pending transfer to a national disposal facility**	**Option C– Treatment and long term storage for waste from Oxon and storage for waste from Dorset pending removal to a national facility**	
3. To maintain and improve ground and surface water quality	?	?	?	The River Thames is close to both the Harwell Culham sites. For both sites, the ecological quality of the river (near the sites) is considered poor and the chemical status good. Ground water contamination is present at Harwell and remediation work continues. Development proposals for treatment and storage should demonstrate that development would not lead to a deterioration of the surface water quality (as well as ground water quality).
4. To improve and maintain air quality to levels which do not damage natural systems	?	?	?	Development at the Harwell and/or Culham sites should ensure that air quality levels which do not damage natural systems are maintained.
5. To reduce greenhouse gas emissions to reduce the cause of climate change		-	-	Option 1 would lead to waste being treated where it arises reducing the need for transportation. Options B and C would lead to radioactive waste being transported with option C having the furthest travel distances and therefore associated with higher GHG emissions (although there is scope for use of rail).
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	0	0	0	Both sites are not within high flood risk areas.

Intermediate Level Radioactive Waste Storage				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option A- Storage at source of waste(Harwell and Culham)	**Option B- Treatment and long term storage at Harwell pending transfer to a national disposal facility**	**Option C– Treatment and long term storage for waste from Oxon and storage for waste from Dorset pending removal to a national facility**	
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	+	-	-	Option 1 would lead to waste being treated where it arises reducing the need for transportation. Options B and C would lead to radioactive waste being transported with option C having the furthest travel distances although there is scope for use of rail.
8. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	?	?	?	Both sites area associated with some radioactive discharges to the environment and this are monitored to ensure they do not exceed permitted limits. Development of treatment and/or storage facilities would be required to demonstrate that these discharge limits would not be exceeded.
9. To protect, improve and where necessary restore land and soil quality	?	?	?	There is a degree of land contamination at Harwell. Development on this site should demonstrate that it would not lead to adverse impacts on land quality. There is no contaminated land identified at Culham. However, development proposals would be required to demonstrate that they would not lead to contamination of land.
10. To contribute towards moving up the waste hierarchy in Oxfordshire	+/0	+/0	+/0	All options include the treatment of intermediate level radioactive waste – however, in the longer term; this waste will be removed for disposal.

Intermediate Level Radioactive Waste Storage				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option A- Storage at source of waste(Harwell and Culham)	**Option B- Treatment and long term storage at Harwell pending transfer to a national disposal facility**	**Option C– Treatment and long term storage for waste from Oxon and storage for waste from Dorset pending removal to a national facility**	
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	+	+	+	All the options would allow Oxfordshire to be self-sufficient in meeting its intermediate low level radioactive waste needs with option C providing additional capacity for importation
13. To support Oxfordshire's economic growth and reduce disparities across the county	+	+	+	

Summary

Intermediate low level radioactive waste is produced at Harwell and smaller quantities at Culham. There is a requirement for treatment and storage of an estimated 10,000 cubic metres of intermediate level radioactive waste and three proposals have been considered for dealing with this waste:

Option A: Option A seeks to make provision at source – treatment and long-term storage at Harwell (for Harwell waste only) and at Culham (for Culham waste only), pending removal to a national disposal facility. This option is considered sustainable in that it supports management of waste close to where it is produced reducing the need to transport waste further (although the distance between the two facilities is only approximately 7 miles). Key issues that would need to be considered at Harwell include:

- Potential impact on local biodiversity including a SSSI 7 kms to the south east of the site
- The close proximity to the North Wessex Downs AONB as well as potential local visual and landscape impacts
- Potential impacts on Scheduled monuments identified close to the site (within 5kms)
- Potential for ground water and surface water contamination
- Potential for land contamination

  Potential amenity and health impacts associated with management of intermediate

Key issues that should be considered at Culham include:

Intermediate Level Radioactive Waste Storage				
Sustainability Appraisal Objectives	**Options**			**Summary and mitigation measures**
	Option A- Storage at source of waste(Harwell and Culham)	**Option B- Treatment and long term storage at Harwell pending transfer to a national disposal facility**	**Option C– Treatment and long term storage for waste from Oxon and storage for waste from Dorset pending removal to a national facility**	

- Potential impacts on local site biodiversity (there are no designated sites close to or within the site)
- Potential impacts on the AONB
- Potential impacts on the Scheduled Monument site identified 1km east of the site
- Potential impacts on surface and ground water
- Potential amenity and health impacts

Option B – This option provides for treatment and long-term storage of intermediate level nuclear waste (from Harwell and Culham) at Harwell, pending removal to a national disposal facility. Compared to option A, this option would lead to some waste from Culham being transported to Harwell. Although assessed as a negative impact against SA objectives on transport and climate change, this impact is likely to be minor due to the distance travelled (approximately 7miles) and the quantities of waste moved (expected to be small). The key sustainability issues identified above would still need to be addressed at the planning application stage to ensure that development of the proposed facility at Harwell does not lead to adverse environmental impacts.

Option C – This option seeks to provide for the treatment and long-term storage of intermediate level nuclear waste from Oxfordshire (Harwell and Culham) and waste from Dorset (Winfrith) at Harwell, pending removal to a national disposal facility. This option like option B above would lead to radioactive waste being transported from Culham but also from Dorset which lies outside the County. It is not clear at this stage the quantities of waste from Winfrith that would require transportation to Harwell but due to the distance involved, this option is judged as having a potential negative impact on SA objectives 5 and 7. The key sustainability issues identified above for the Harwell site would still need to be addressed at the planning application stage to ensure that development of the proposed facility does not lead to adverse environmental impacts.

Low Level Radioactive Waste Management					
	Option A- Storage Temporary storage (if required) and disposal in a bespoke facility at Harwell; and at Culham	**Option B- Temporary storage (if required) of waste at source of waste and disposal in a bespoke facility at Harwell.**	**Option C – temporary storage (if required) of waste at source of waste disposal in a suitable off –site landfill in Oxfordshire.**	**Option D – Temporary storage (if required0 of waste at source of waste and disposal in a suitable off-site landfill site outside Oxfordshire.**	**Summary and Mitigation measures**
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	?	?	?	?	There are no specific designated sites within the Harwell site; however there is a SSSI 7km to the south east of the site. There are no designated nature conservation sites within the Culham site or close to the site. For both sites, detailed potential impacts on local biodiversity should be undertaken at the planning application stage to ensure no adverse effects on local wildlife and habitats. This would also apply to the landfill sites considered.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	?	?	?	The Harwell site borders the North Wessex Downs AONB. Development here should be designed to fit into the surrounding landscape without causing negative impacts on the AONB as well as the local landscape. There are also 17 Scheduled Monuments within 5kms of the site. Potential impacts on these should be assessed at the planning application stage. The Culham site is 2.5 km from the North Wessex Downs AONB and is in the Greenbelt. There is a Scheduled Monument site 1km east of the site. Proposals should demonstrate that development of a storage facility would not have adverse impacts on the landscape and the Scheduled Monument. Potential impacts related to options C and D are dependent on the location of the landfill sites and these should be addressed at the site selection and planning stage.

Low Level Radioactive Waste Management					
	Option A- Storage Temporary storage (if required) and disposal in a bespoke facility at Harwell; and at Culham	**Option B- Temporary storage (if required) of waste at source of waste and disposal in a bespoke facility at Harwell.**	**Option C – temporary storage (if required) of waste at source of waste disposal in a suitable off –site landfill in Oxfordshire.**	**Option D – Temporary storage (if required0 of waste at source of waste and disposal in a suitable off-site landfill site outside Oxfordshire.**	**Summary and Mitigation measures**
3. To maintain and improve ground and surface water quality	?	?	?	?	The River Thames is close to both the Harwell Culham sites. For both sites, the ecological quality of the river (near the sites) is considered poor and the chemical status good. Ground water contamination is present at Harwell and remediation work continues. Potential impacts for Options C and D will depend on the location of the landfill sites. Development proposals for storage and disposal should demonstrate that development would not lead to a deterioration of the surface water quality (as well as ground water quality) for whichever option is taken forward.
4. To improve and maintain air quality to levels which do not damage natural systems	?	?	?	?	Development at the Harwell and/or Culham sites should ensure that air quality levels which do not damage natural systems are maintained. For landfill sites, the potential air quality impacts will need to be addressed at the site selection and planning stages to mitigate against adverse effects.
5. To reduce greenhouse gas emissions to reduce the cause of climate change	+	-	-	--	Option A would lead to the least transportation of waste while B, C would lead to relatively low movements compared to option D. The assessment of option D assumes the landfill site outside the county will be situated further from the sources of arisings compared to in-county sites.
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	0	0	?	?	Both sites are Harwell and Culham not within high flood risk areas. Flooding impacts related to the landfill sites will depend on the location of sites and should be considered when selecting potential sites.

Low Level Radioactive Waste Management					
	Option A- Storage Temporary storage (if required) and disposal in a bespoke facility at Harwell; and at Culham	**Option B- Temporary storage (if required) of waste at source of waste and disposal in a bespoke facility at Harwell.**	**Option C – temporary storage (if required) of waste at source of waste disposal in a suitable off –site landfill in Oxfordshire.**	**Option D – Temporary storage (if required0 of waste at source of waste and disposal in a suitable off-site landfill site outside Oxfordshire.**	**Summary and Mitigation measures**
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	+	-	-	--	Option A would lead to the least transportation of waste while B, C would lead to relatively low movements compared to option D. The assessment of option D assumes the landfill sites outside the county will be situated further from the sources of arisings compared to in-county sites.
8. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	?	?	?	?	Harwell and Culham sites area associated with some radioactive discharges to the environment and this are monitored to ensure they do not exceed permitted limits. Development of storage and disposal facilities would be required to demonstrate that these discharge limits would not be exceeded. This should apply to the landfill sites.
9 To protect, improve and where necessary restore land and soil quality	?	?	+	+	There is a degree of land contamination at Harwell. Development of a disposal facility on this site should demonstrate that it would not lead to adverse impacts on land quality. Taking waste off-site has potential to reduce future land contamination. There is no contaminated land identified at Culham. However, development proposals for a disposal facility would be required to demonstrate that they would not lead to contamination of land. Potential impacts on land and soil should be addressed at the site selection and planning stages for the landfill sites to mitigate against adverse effects.
10. To contribute towards moving up the waste hierarchy in Oxfordshire	-	-	-	-	All options relate to disposal of low level radioactive waste and do not lead to the treatment of waste up the hierarchy.

Low Level Radioactive Waste Management					
	Option A- Storage Temporary storage (if required) and disposal in a bespoke facility at Harwell; and at Culham	**Option B- Temporary storage (if required) of waste at source of waste and disposal in a bespoke facility at Harwell.**	**Option C – temporary storage (if required) of waste at source of waste disposal in a suitable off –site landfill in Oxfordshire.**	**Option D – Temporary storage (if required0 of waste at source of waste and disposal in a suitable off-site landfill site outside Oxfordshire.**	**Summary and Mitigation measures**
11. To enable Oxfordshire to be self-sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment.	+	+	+	-	Options A, B and C support county self-sufficiency while option D is not supportive of this aim.
12. To support Oxfordshire's economic growth and reduce disparities across the county	+	+	+	-	Options A, B and C have potential to contribute to the local economy through job creation while option D would not contribute to creation of local jobs.

Summary:

It is estimated that a total of 100,000 cubic metres of low level radioactive waste mainly arising from demolition and clearance of buildings at Harwell and Culham will be required. The Council has considered four options for the storage and disposal of this waste as follows:

Option A – Temporary storage and disposal in a bespoke facility at Harwell (for Harwell only), and at Culham (for waste from Culham). This option when assessed against the SA objective would lead to the least movement of materials and therefore performs well against SA objectives 5 and 7. The following key issues would need to be considered when assessing the potential development of such facilities at Harwell and Culham:

Harwell:

- Potential impact on local biodiversity including a SSSI 7 kms to the south east of the site
- The close proximity to the North Wessex Downs AONB as well as potential local visual and landscape impacts
- Potential impacts on Scheduled monuments identified close to the site (within 5kms)
- Potential for ground water and surface water contamination
- Potential for land contamination

Culham:

- Potential impacts on local site biodiversity (there are no designated sites close to or within the site)
- Potential impacts on the Greenbelt and AONB
- Potential impacts on the Scheduled Monument site identified 1km east of the site
- Potential impacts on surface and ground water
- Potential amenity and health impacts

Option B: Temporary storage of waste at source of waste and disposal of a bespoke facility at Harwell (waste from Harwell and Culham). This option would lead to some movement of materials from Culham. However, although assessed as a potential negative impact in terms of transport and climate mitigation, this impact is likely to be minor due to the distance travelled and the amount of waste requiring transportation being relatively small. The key environmental and amenity issues identified above (Option A) for Harwell should be addressed at the planning application stage to mitigate against potential adverse effects.

Option C – Temporary storage of waste at source of waste and disposal in a suitable off-site landfill in Oxfordshire. This option would see waste stored at Harwell and Culham before being disposed off-site in a landfill in Oxfordshire. It would result in waste being transported from its source of arising for disposal elsewhere in the county. Depending on the location of the landfill site there is potential for increases in negative transport impacts as well as GHG emissions associated with waste transportation. Potential impacts on the built and natural environment as well as on amenity associated with such a disposal facility would need to be considered in detail at the site selection and planning application stages to ensure that such development does not lead to adverse impacts on the environment and local amenity as well as human health.

Option D- Temporary storage of waste at source of waste and disposal in a suitable off-site landfill outside Oxfordshire. This option like option C above would see waste stored at Harwell and Culham before being disposed off site but to a landfill site outside of Oxfordshire. For the purposes of this assessment, it has been assumed that landfill sites out of county are likely to be further from the sources of waste arising than landfill sites within Oxfordshire. This is assessed as having potential for negative transport impacts and associated GHG emissions and it also does not support SA objective 11 on enabling county self-sufficiency. Potential impacts on the built and natural environment and amenity of such a facility should be considered in detail at the site selection and planning stages to ensure that proposals do not lead to adverse impacts on the environment (this responsibility would lie with the local authority where such a site would be located and is outside Oxfordshire County Council's remit but the Council will be consulting potentially affected Waste Planning Authorities).