Oxfordshire Minerals and Waste Development Framework

Sustainability Appraisal/Strategic Environmental Assessment

Minerals Spatial Strategy Options

May 2010

Revision Schedule

Verification Report
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1 Introduction

1.1 Oxfordshire Minerals and Waste Development Framework

The Council is preparing a Minerals and Waste Core Strategy Development Plan Document (MWDPD) as part of its Minerals and Waste Development Framework (MWDF). This DPD will provide a strategic vision and overall strategy for meeting known and anticipated minerals and waste development requirements in Oxfordshire for the period up to 2026.

With regard to minerals, the Core Strategy DPD will identify a spatial strategy for sand and gravel and crushed rock extraction to meet need as well as maintain land banks for primary aggregates in line with national and regional guidance. To this end, the Council is in the process of identifying draft spatial strategy options for the location of future areas for the extraction of sharp sand and gravel, soft sand and crushed rock.

1.2 Background to Appraisal

Scott Wilson was commissioned by Oxfordshire County Council to undertake an independent Sustainability Appraisal incorporating Strategic Environmental Assessment[1] (hereby referred as SA) of the emerging strategy options for mineral working which will form part of the Core Strategy DPD.

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.

1.3 Appraisal Methodology

SA Framework

The emerging options were appraised against the already established SA framework for the Oxfordshire MWDF. The objectives are 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].

They also reflect regional sustainability objectives as well as feedback from a range of consultees to ensure they capture the key sustainability issues relevant to the County. The table below outlines the SA framework including the underlying sub-objectives and indicators.

[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 the 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 ground and surface water quality	Will the MWDF affect groundwater quality?	Number of permitted 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 negative impacts of waste management facilities and mineral extraction on human health	Will the MWDF have impacts which could have a harmful effect on human health?	Number of permitted applications for mineral or waste development within 250m of sensitive receptors

		(settlements)
9. 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? Will the MWDF provide opportunities for enhancement of local amenity and access to the countryside?	Number of sites for mineral or waste development within 250m of sensitive receptors (settlements) Number of permitted applications with restoration conditions which enhance local amenity and /or improve access to the countryside.
10. 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
11. 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
12. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to its sub-regional 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.
13. To promote efficient use of natural resources and avoid unnecessary sterilisation of mineral resources	Will the MWDF encourage use of secondary and recycled aggregates, and make provision for these sites? Does the MWDF encourage minimising the area of land take per tonne of mineral aggregate produced?	Number of permitted applications for secondary and recycled aggregate developments.
	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
14. To support Oxfordshire's		
	Will the MWDF generate new	Number of direct jobs created

economic growth and reduce disparities across the county.	jobs for the county?	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?	

Approach to Options Appraisal

The appraisal involved assessing each of the draft spatial strategy options for mineral working against the SA objectives taking account of both potential 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 issues/options and also consist of a summary of key issues raised which form the basis of the SA findings.

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. The table below shows the symbols used when completing the matrices.

Table 2.2 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 Sharp Sand and Gravel Options

Based on the current sub-regional apportionment for sand and gravel, the Council has calculated Oxfordshire needs to plan for 1.82 million tonnes per annum over the plan period. This is split between soft sand and sharp sand and gravel based on the historical production figures (over the last three years).

Based on the above split, the Council has identified that it needs to plan for 21.511 million tonnes of sharp sand and gravel (net requirement) to meet the need to 2026.

In order to deliver 21.511 million tonnes of sharp sand and gravel required over the plan period, the Council has drafted three spatial strategy options. The possible options are to concentrate working, disperse it or to phase development.

1. The Concentration Strategy – This option is further broken into the following three options:

   1a) Concentrate working to the north west of Oxford, in the Lower Windrush Valley, Stanton Harcourt, Eynsham and Cassington areas;

   1b) Concentrate working to the south east of Oxford, in Radley, Sutton Courtenay, Culham, Dorchester, Warborough and Benson areas; or

   1c) A combination of options 1a and 1b, concentrating working in both.

2. The dispersal Option – This option seeks to spread working areas across a number of areas to maximise the proximity of mineral supply to markets: Lower Windrush Valley, Stanton Harcourt, Eynsham, Cassington, Faringdon, Radley, Sutton Courtenay, Culham, Dorchester, Warborough, Benson, Wallingford, Cholsey and Caversham areas.

3. The Phased strategy option – This option seeks to allow short term extensions to existing sites in the Lower Windrush Valley, Eynsham, Cassington, Faringdon, Radley, Sutton Courtenay and Caversham areas as well as long term planning for one or more new strategic sand and gravel working areas in one or more of the following areas:

   - Clanfield – Bampton
   - Culham
   - Dorchester, Warborough, Benson
   - Wallingford - Cholsey

Concentration Strategy - Summary of SA findings

Option 1a) – This option would lead to concentration of working in the north west and west of Oxford. This area already experiences mineral extraction and further working in this broad location would lead to negative cumulative effects with regard to amenity for the local communities. Other cumulative effects include landscape and visual impacts for example in the Lower Windrush Valley where the landscape has already been extensively modified by mineral extraction. Given that most of the sand and

gravel currently worked in this area is transported by road and that the road network is already experiencing congestion a significant increase in working in this area would have negative cumulative effects on the road network (in particular the A40) leading to increased congestion, continued green house gas emissions and air and noise pollution associated with Heavy Goods Vehicle (HGV) movements.

There are also important nature conservation designations in close proximity to area 1. The location of these sites close to potential mineral works would restrict the exact location of working within the broad area. Working in this area would therefore require mitigation measures to be in place to avoid adverse negative effects on the nature conservation sites including creating the creation of buffer zones and other measures.

Some of the area covered by option 1a (e.g. the Lower Windrush Valley) lie within the Conservation Target Areas (CTAs) identified by the Oxfordshire Nature Conservation Forum[3] . The main aim within CTAs is to restore biodiversity at a landscape-scale through maintenance, restoration and creation of BAP priority habitats. Further working in this area would therefore contribute positively to the planned restoration and habitat creation in this area at a large scale which combined with existing restoration plans would have significant beneficial cumulative effects for the local community as well as on nature conservation. However, such benefits would be in the long-term as mineral works are likely to take years before the restoration plans are implemented.

Although the area is generally well located in terms of proximity to markets, some sites may not be close to the markets thereby increasing distances materials are moved. This further contributes to the negative effect of increasing GHG emissions where road transport is used as well as the negative effects associated with HGV movements including noise, air pollution and congestion.

Option 1b) – Option 1b seeks to concentrate working in the south east of oxford. This option would lead to a concentration of impacts on communities living within or in close proximity to the identified resource areas. The broad location is in close proximity to most of the main areas of demand - Oxford, Didcot, Wantage, Grove as well as the centres of employment (apart from Bicester). Although it could lead to some sites not being as close to main areas of demand, the general location is judged to be well located for serving most of the demand areas. Restoration following working would lead to beneficial effects for biodiversity as well as creating recreational opportunities for the local communities. Working resource area 13 could have negative effects on archaeology as significant archaeological remains have been identified here. However, it is expected that mitigation measures would be required prior to planning permission being granted therefore reducing potential adverse impacts. The southern area of this option also lies close to the AONB which would present constraints to mineral working in this part.

Option 1c) – This option divides the sand and gravel requirement equally between the resource areas in option 1a and 1c (with the exception of RAS 9). This division would lead to a distribution of impacts of mineral working on a small number of local communities in both areas as opposed to more communities in one area as options 1a and 1b would lead to. This has the benefit of relieving some communities especially in areas where communities have already experienced mineral working in the past. Compared to options 1a and b, this option performs better in terms of

[3] http://www.oncf.org.uk/biodiversity/cta.html

proximity to markets as it covers a wider area as opposed to the north west/west in option 1a or south east in option 1b.

However, this option is also characterised by some of the effects and constrains identified for options 1a (cumulative effects on some communities, road network and nature conservation constraints) as well as those identified for option 1b (landscape and archaeology constraints). Ultimately, the significance of impact will depend on the exact location of sites within the broad areas and the mitigation measures put in place through the planning application process.

Dispersal Option - Summary of SA findings

This option seeks to disperse mineral extraction close to the main areas of demand in a way that minimises the effects of mineral extraction in any one area of the County. Although it does not eliminate the negative effects associated with mineral extraction, distributing them would have positive effects on communities where extraction has previously taken place as well as minimising the overall negative effects felt by any single community. This option would however lead to more communities being affected by mineral working as more areas would be brought forward for extraction (although the effects are likely to be reduced compared to concentration based options).

Distributing extraction also has the advantage of reducing distances aggregates are moved thereby minimising emissions and mitigating against climate change. Reducing the distances travelled would have the added benefit of minimising other negative impacts associated with HGV movements including impact on air quality and noise. Moving minerals for shorter distances would also lead to positive financial effects on industry through cost savings on transport. However, this option would also have a negative economic effect by requiring new investment in infrastructure on new sites as opposed to taking advantage of existing infrastructure. It would also lead to job losses although new jobs would be created elsewhere in the County.

As with all options, the dispersal option offers opportunities for beneficial restoration although it does not offer the potential to contribute to large scale habitat creation as works would be spread in different parts of the County. Overall, although this option has some beneficial environmental effects (distributing effects and reducing distances travelled), it also has some draw backs in economic and restoration factors (social) and this needs to be balanced against the environmental benefits.

Phasing Option - Summary of SA findings

This option has a balanced effect on most of the SA objectives in that although it reduces mineral working in areas that have historically experienced extraction, it also introduces new areas of working and so transfers the impacts to other communities including some more remote areas and a stretch of the River Thames valley that has not been previously worked.

The phasing approach adopts a long term approach which will allow time for the phasing and introduction of new areas and it also seeks to adopt a master planning approach. This has potential benefits in facilitating a co-ordinated restoration and after-use plan in current areas of working as well as ensuring that potential adverse effects identified in the proposed new areas of working are adequately addressed and mitigation measures put in place to minimise negative effects.

This approach also provides certainty to industry and allows the time necessary for the development of new infrastructure in the new areas of work. New and improved infrastructure however requires further investment which is likely to have a negative financial effect on industry. The long lead times however can help mitigate against adverse financial implications by allowing companies time to wind down and set up new operations.

Some of the new areas are not well located with regard to proximity to the strategic road network and this would also require significant improvements to provide adequate access. As above, the long-term planning approach would help to deliver such infrastructure.

The extension of current works will lead to cumulative effects in already affected areas throughout the plan period. Although this is taken to be 'short-term' it is recommended that detailed assessment of existing sites (and nominations for extensions) is undertaken to assess which areas are best suited to sustainably support further working as some areas may be close to reaching or may have reached their 'environmental' capacity for example in terms of the road network, impact on amenity etc. Assessment on 'environmental' capacity should be required at the planning application stage.

Some areas e.g. RAS 4 are not well located in relation to potential markets and development here will lead to increase in distances travelled which in turn leads to increased GHG emissions and other negative effects associated with road based transport including noise, air pollution and congestion. Significant archaeological effects have also been identified in RAS13 and mitigation measures would be required to minimise potential adverse effects in this area. To off-set some of the negative effects of road transportation, opportunities to use the River Thames to move materials in RAS 4 should be maximised wherever possible.

Overall, the option has both beneficial and some negative effects. However, the negative effects can be mitigated against (apart from the issue relating to the proximity of RAS 4 to markets) through the planning process.

2.2 Soft Sand

The Core Strategy seeks to plan for 0.309 million tonnes per annum (5.562 million tonnes to 2026) of soft sand based on the current sub-regional apportionment. To meet the apportionment, the Council's preferred option is to meet demand from a single soft sand resource area in the south west of the County.

Summary of SA findings

When assessed against the SA objectives, although the option will have some negative effects especially with regard to impacts on amenity and the environment, if working is to be carried out based on the current levels of production then these effects (on the natural and built environment) are judged to be neutral as the baseline will remain the same.

However, given that working has been going in this locality for a long time, future working in the same area will have negative cumulative effects on some of the local communities. To mitigate against such cumulative effects becoming adverse, it will be important to ensure future extensions are located away from sensitive receptors e.g

settlements (Hatford and Tubney) as well as being located in close proximity to the strategic road network.

This option has economic benefits as it takes advantage of existing infrastructure as well as providing certainty to industry and meeting local needs for soft sand. Overall, with adequate mitigation measures at the planning stage, this option has potential to continue meeting Oxfordshire's soft sand needs in a sustainable manner.

2.3 Crushed Rock

The amount of crushed rock required over the period of the Core Strategy has been calculated based on the current sub-regional apportionment of 1.0 million tonnes per annum for Oxfordshire. The net requirement for the period up to 2026 taking into account current permitted reserves is 4.98 million tonnes.

The Council's preferred spatial option for meeting the apportionment is to continue with a single option for crushed rock comprising strategic areas in the:

- Witney-Burford area; and
- Chipping Norton - Bicester area

This option will also include continued supply of some crushed rock from the south west of the County in conjunction with soft sand workings and the identification of a small resource area south west of Bicester which recognises the presence of Jurassic limestone in this area.

Summary of SA findings

When assessed against the SA objectives, this option is judged to have neutral effects on impacts against the natural and built environment (assuming future working was to be in line with current production levels and that any new working in the south west Bicester area would be small-scale).

However, in the long term, there will be cumulative effects of continued working on the communities living near the identified areas. These may include cumulative effects on the landscape as well as on local amenity – air, noise, and dust and traffic impacts. Mitigation measures at the planning application stage can help ensure that such effects are adequately addressed before new permissions are granted. There are some economic advantages in retaining working in the identified areas including use of existing infrastructure and meeting Oxfordshire's crushed rock needs in line with regional policy.

Appendix 1 Appraisal Matrices

Sand and Gravel Option 1- Concentration				
Sustainability Appraisal Objectives	**Sub-options**			
	1a NW/W of Oxford	**1b SE of Oxford**	**NW/W and SE of Oxford**	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	+/?	+	+ /?	National and international nature conservation designations in area 1a present a constraint and development in this area would need to demonstrate that mitigation measures would be in place to avoid adverse effects Restoration offers opportunities for biodiversity conservation for all the options.
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	0/?	?/-	?/-	Proximity to the AONB to the south of area 1b and presence of archaeological remains in RAS13 presents a constraint for sites in that area and proposals here would need to include mitigation measures to avoid adverse effects.
3. To maintain and improve ground and surface water quality	?	?	?	It is expected that mitigation measures would be required to protect water resources before planning permission is granted
4. To improve and maintain air quality to levels which do not damage natural systems	-	-	-	Movement of sand and gravel by road has potential for negative impacts on air quality
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-	-	-	The Scoping report notes that present movements of aggregates in Oxfordshire are by road transport. Assuming all options will lead to continued use of road transport, this will contribute to continued GHG emissions associated with moving minerals by road

Sand and Gravel Option 1- Concentration				
Sustainability Appraisal Objectives	**Sub-options**			
	1a NW/W of Oxford	**1b SE of Oxford**	**NW/W and SE of Oxford**	
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	-/?	?	?/-	Option 1a is constrained by some areas lying within flood risk zones. However, the significance of flooding is dependent on the exact location of works and the operations on site, and the mitigation measures put in place
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	--	-	+/?	Depending on the exact location of sites, options a and b could lead to materials being moved further as sites may not be as close to markets compared to option c which would lead to a distribution of sites potentially reducing distances traveled. Significant increase in working within areas covered by Option 1a would lead to adverse effects and cumulative impacts on the road network as currently the road network in the area is experiencing congestion.
8. To minimise negative impacts of waste management facilities and mineral extraction on human health	0	0	0	It is expected that mineral working would not be in close proximity to sensitive human receptors and that mitigation measures would be in place to off set potential negative health effects e.g. from dust.
9. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	-	-	-	Mineral extraction is likely to have some negative impacts on amenity including increase in HGV movements, noise and visual effects. However, option 1c could have reduced effects overall as the impacts would be distributed as opposed to different parts of the County.

Sand and Gravel Option 1- Concentration				
Sustainability Appraisal Objectives	**Sub-options**			
	1a NW/W of Oxford	**1b SE of Oxford**	**NW/W and SE of Oxford**	
10. To protect, improve and where necessary restore land and soil quality	++	+	+	Minerals working will be accompanied by proposals for restoration and in some cases e.g. in Option 1a restoration would contribute to the creation of large areas for wildlife conservation and improved recreational activities
11. To contribute towards moving up the waste hierarchy in Oxfordshire	0	0	0	
12. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment	++	++	++	
13. To promote efficient use of natural resources and avoid unnecessary sterilisation of mineral resources	++	++	++	

Sand and Gravel Option 1- Concentration				
Sustainability Appraisal Objectives	**Sub-options**			
	1a NW/W of Oxford	**1b SE of Oxford**	**NW/W and SE of Oxford**	
14. To support Oxfordshire's economic growth and reduce disparities across the county	++	++	++	

Summary

Option 1a) – This option would lead to concentration of working in the north west and west of Oxford. This area already experiences mineral extraction and further working in this broad location would lead to negative cumulative effects with regard to amenity for the local communities. Other cumulative effects include landscape and visual impacts for example in the Lower Windrush Valley where the landscape has already been extensively modified by mineral extraction. Given that most of the sand and gravel currently worked in this area is transported by road and that the road network is already experiencing congestion a significant increase in working in this area would have negative cumulative effects on the road network (in particular the A40) leading to increased congestion, continued green house gas emissions and air and noise pollution associated with Heavy Goods Vehicle (HGV) movements.

There are also important nature conservation designations in close proximity to area 1. The location of these sites close to potential mineral works would restrict the exact location of working within the broad area. Working in this area would therefore require mitigation measures to be in place to avoid adverse negative effects on the nature conservation sites including creating the creation of buffer zones and other measures.

Some of the area covered by option 1a (e.g. the Lower Windrush Valley) lie within the Conservation Target Areas (CTAs) identified by the Oxfordshire Nature Conservation Forum[4] . The main aim within CTAs is to restore biodiversity at a landscape-scale through maintenance, restoration and creation of BAP priority habitats. Further working in this area would therefore contribute positively to the planned restoration and habitat creation in this area at a large scale which combined with existing restoration plans would have significant beneficial cumulative effects for the local community as well as on nature conservation. However, such benefits would be in the long-term as mineral works are likely to take years before the restoration plans are implemented.

Although the area is generally well located in terms of proximity to markets, some sites may not be close to the markets thereby increasing distances materials are moved. This further contributes to the negative effect of increasing GHG emissions where road transport is used as well as the negative effects associated with HGV movements including noise, air pollution and congestion.

Option 1b) – Option 1b seeks to concentrate working in the south east of oxford. This option would lead to a concentration of impacts on communities living within or in close proximity to the identified resource areas. The broad location is in close proximity to most of the main areas of demand - Oxford, Didcot, Wantage, Grove as well as the

[4] http://www.oncf.org.uk/biodiversity/cta.html

Sand and Gravel Option 1- Concentration				
Sustainability Appraisal Objectives	**Sub-options**			
	1a NW/W of Oxford	**1b SE of Oxford**	**NW/W and SE of Oxford**	
centres of employment (apart from Bicester). Although it could lead to some sites not being as close to main areas of demand, the general location is judged to be well located for serving most of the demand areas. Restoration following working would lead to beneficial effects for biodiversity as well as creating recreational opportunities for the local communities. Working resource area 13 could have negative effects on archaeology as significant archaeological remains have been identified here. However, it is expected that mitigation measures would be required prior to planning permission being granted therefore reducing potential adverse impacts. The southern area of this option also lies close to the AONB which would present constraints to mineral working in this part. **Option 1c)** – This option divides the sand and gravel requirement equally between the resource areas in option 1a and 1c (with the exception of RAS 9). This division would lead to a distribution of impacts of mineral working on a small number of local communities in both areas as opposed to more communities in one area as options 1a and 1b would lead to. This has the benefit of relieving some communities especially in areas where communities have already experienced mineral working in the past. Compared to options 1a and b, this option performs better in terms of proximity to markets as it covers a wider area as opposed to the north west/west in option 1a or south east in option 1b. However, this option is also characterised by some of the effects and constrains identified for options 1a (cumulative effects on some communities, road network and nature conservation constraints) as well as those identified for option 1b (landscape and archaeology constraints). Ultimately, the significance of impact will depend on the exact location of sites within the broad areas and the mitigation measures put in place through the planning application process.				

Sharp Sand and Gravel Strategy Option 2 - Dispersal		
SA Objectives		Comments
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	+	Restoration would lead to creation of new habitats although dispersed working may not take full advantage of the potential to contribute to large scale habitat creation
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	-/+	Moving minerals by road will have some negative air quality effects. However, the dispersal option may lead to reduced distances travelled and so reduced emissions
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-/+	As above – minerals will still be moved by road and therefore there will be some GHG emissions although these may be reduced
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Impact on flooding is dependent on the exact location of sites.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	+/-	As with objectives 4 and 5, moving aggregates by road will still have some negative effects on the road network and amenity although a reduction in distances moved may reduce the effects
8. To minimise negative impacts of waste management facilities and mineral extraction on human health	?/0	It is expected that sites would not be close to sensitive human receptors and that mitigation measures would be required to be in place through the planning process
9. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	+/-	This option will distribute the impacts of mineral working therefore reducing the impact on any one area of Oxfordshire. However, there would still be effects felt in the parts of the County where extraction will take place.
10. To protect, improve and where necessary restore land and soil quality	+	Restoration is likely to have a positive effect on land and soil quality
11. To contribute towards moving up the waste hierarchy in Oxfordshire	0	
12. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals	++	

apportionment		
13. To promote efficient use of natural resources and avoid unnecessary sterilisation of mineral resources	++	
14. To support Oxfordshire's economic growth and reduce disparities across the county	++	

Summary - This option seeks to disperse mineral extraction close to the main areas of demand and in a way that minimises the effects of mineral extraction in any one area of the County. Although this option does not eliminate the negative effects associated with mineral extraction, distributing them has a beneficial effect in ensuring communities do not suffer adversely especially where mineral extraction has occurred in the past. This option would however lead to more communities being affected by mineral working as more areas would be brought forward for extraction. Distributing extraction also has the advantage of reducing distances aggregates are moved thereby reducing emissions and mitigating against climate change. Reducing the distances travelled has also got positive effects on minimising other negative effects of HGV movements including noise and air quality impacts. It also has economic benefits for industry in terms of saving on transport costs. However, this option could also have a negative economic effect by requiring new investment in infrastructure on new sites as opposed to taking advantage of existing infrastructure. As with all options, this option offers opportunities for beneficial restoration although it does not offer the potential to contribute to large scale habitat creation as works would be dispersed. Overall, although this option has some beneficial environmental effects (distributing effects and reducing distances travelled), it also has some draw backs in economic and restoration factors (social) and this needs to be balanced against the environmental benefits.

Sharp Sand and Gravel Strategy Option 3 - Phasing approach		
SA Objectives		Comments
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	+	Restoration would lead to creation of new habitats – the master plan approach would maximise opportunities for habitat creation
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?/-	Although impacts on landscape and built heritage would be assessed at the planning application stage and mitigated against, there are likely to be negative effects on archaeology in RAS 13.
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	-	Moving minerals by road will have some negative air quality effects. However, some of the identified resource areas are close to the areas proposed for housing development and employment centres which may lead to reduced distances travelled and so reduced emissions
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-/+	As above – minerals will still be moved by road and therefore there will be some GHG emissions although these may be reduced
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Impact on flooding is dependent on the exact location of sites.
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	+/-	As with objectives 4 and 5, moving aggregates by road will still have some negative effects on the road network and amenity although a reduction in distances moved may reduce the effects
8. To minimise negative impacts of waste management facilities and mineral extraction on human health	?/0	It is expected that sites would not be close to sensitive human receptors and that mitigation measures would be required to be in place through the planning process
9. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	+/-	This option would lead to relief to the areas that have historically experienced working but it will at the same time introduce mineral extraction to other areas including some remote rural parts and an undisturbed stretch of the Thames
10. To protect, improve and where necessary restore land and soil quality	+	Restoration is likely to have a positive effect on land and soil quality
11. To contribute towards moving up the waste hierarchy in Oxfordshire	0	
12. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals	++	

apportionment		
13. To promote efficient use of natural resources and avoid unnecessary sterilisation of mineral resources	++	
14. To support Oxfordshire's economic growth and reduce disparities across the county	++	

Summary – This option has a balanced effect on most of the SA objectives in that although it reduces mineral working in areas that have historically experienced extraction, it also introduces new areas of working and so transfers the impacts to other communities. Although there is the benefit of removing negative cumulative effects experienced where mineral works currently occur, there is potential for adverse effects in new areas of working especially in the more remote areas including the stretch of the River Thames that has not been previously worked.

The phasing approach however adopts a long term approach which will allow time for the phasing and introduction of new areas and it also seeks to adopt a master planning approach. This has potential benefits in facilitating a co-ordinated restoration and after-use plan in current areas of working as well as ensuring that potential adverse effects identified in the proposed new areas of working are adequately addressed and mitigation measures put in place to minimise negative effects.

This approach also provides certainty to industry and allows the time necessary for the development of new infrastructure in the new areas of work. New and improved infrastructure however requires further investment from industry which has a negative financial effect but the long lead times can help mitigate against adverse financial implications by allowing companies to wind down and set up new operations. Some of the new areas are not well located with regard to proximity to the strategic road network and this would also require significant improvements to provide adequate access. The long-term planning approach would help to deliver such infrastructure.

The extension of current works will lead to cumulative effects in already affected areas throughout the plan period. Although this is taken to be 'short-term' it is considered that detailed assessment of existing sites (and nominations for extensions) is undertaken to assess which areas are best suited to sustainably support further working as some areas may not be able to support further working as they may be reaching 'environmental' capacity for example in terms of the road network, proximity to sensitive receptors etc. This assessment on 'environmental' capacity should be required at the planning application stage.

Some areas e.g. RAS 4 are not well located in relation to potential markets and development here will lead to increase in distances travelled which in turn leads to increased GHG emissions and other negative effects associated with road based transport (HGV movements) including noise, air pollution and congestion. Significant archaeological effects have also been identified in RAS13 and mitigation measures would be required to minimise potential adverse effects in this area.

Overall, the option has both beneficial and some negative effects. However, the negative effects can be mitigated against (apart from the issue relating to the proximity of RAS 4 to markets) through the planning process.

Soft Sand – Meet demand from one resource area in the south west of County		
SA Objectives	Comments	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	+	Restoration of sites provides opportunities for creation of new habitats
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	Impact on landscape and the built environment will depend on the exact location of extensions
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	-/0	Continued working here at the same rates is unlikely to increase impacts on air quality although there will still be some impacts associated with transport of material
5. To reduce greenhouse gas emissions to reduce the cause of climate change	-/0	As above, working at the current rates will not increase GHG emissions and is likely to maintan emissions at existing levels
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Impact on flooding will depend on the exact location of new sites/extensions and mitigation measures put in place
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	-/0	As objective 4 and 5
8. To minimise negative impacts of waste management facilities and mineral extraction on human health	0/-	Continuing working in this area will lead to increased cumulative effect on the nearby communities although this can be reduced through mitigation measures at planning application stage
9. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	0/-	As above
10. To protect, improve and where necessary restore land and soil quality	+	Restoration of sites is likely to lead to improved land and soil quality
11. To contribute towards moving up the waste hierarchy in Oxfordshire	0	
12. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals apportionment	++	

13. To promote efficient use of natural resources and avoid unnecessary sterilisation of mineral resources	++	
14. To support Oxfordshire's economic growth and reduce disparities across the county	++	

Summary – This option seeks to retain soft sand extraction in one resource area in the south west of the county. When assessed against the SA objectives, although there will be some negative effects especially with regard to impacts on amenity and the environment, if working is to be carried out based on the current levels of production then the effect of the policy is judged as being neutral against some of the SA objectives as the baseline will remain the same. However, given that working has been going in this locality for a long time, future working in the same locality will have negative cumulative effects on some of the local communities. These may include cumulative effects on the landscape as well as on local amenity – air, noise, and dust and traffic impacts. To mitigate against such cumulative effects being adverse, it will be important to ensure future extensions are located away from sensitive receptors e.g settlements (Hatford and Tubney) as well as being located well located for the strategic road network. This option has economic advantages as it takes advantage of existing infrastructure as well as providing certainty to industry and meeting local needs for soft sand.

Crushed Rock		
SA Objectives	Comments	
1. To protect, maintain and enhance Oxfordshire's biodiversity and geodiversity including natural habitats and protected species	+	Restoration has potential to create opportunities for biodiversity
2. Protect and enhance landscape character, local distinctiveness and historic and built heritage	?	Impacts will depend on the specific location of sites and mitigation measures put on place
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	0/-	If working continues at the current level, impacts on air quality will remain as current although identification of a new resource areas south west of Bicester may increase emissions in this area
5. To reduce greenhouse gas emissions to reduce the cause of climate change	0/-	As above
6. To mitigate Oxfordshire's vulnerability to flooding, taking account of climate change	?	Impacts dependent on the exact location of sites
7. To minimise the impact of transportation of aggregates and waste products on the local and strategic road network	0/-	If working continues at the current level, transport impacts will remain as current although identification of a new resource areas south west of Bicester may increase negative effects in this area (minor)
8. To minimise negative impacts of waste management facilities and mineral extraction on human health	-	Continued working in the existing areas will result in cumulative effects over time on the local communities although mitigation measures at the planning application stage can help reduce such impacts
9. To minimise the negative impacts of waste management facilities and mineral extraction on local amenity	-	Continued working in the existing areas will result in cumulative effects over time on the local communities although mitigation measures at the planning application stage can help reduce such impacts s
10. To protect, improve and where necessary restore land and soil quality	+	Restoration is likely to result in improved land and soil quality where appropriate
11. To contribute towards moving up the waste hierarchy in Oxfordshire	0	
12. To enable Oxfordshire to be self sufficient in its waste management and to make a sustainable contribution to its sub-regional minerals	++	

apportionment		
13. To promote efficient use of natural resources and avoid unnecessary sterilisation of mineral resources	++	
14. To support Oxfordshire's economic growth and reduce disparities across the county	++	

Summary – When assessed against the SA objectives, this option is judged to have neutral effects on impacts against the natural and built environment assuming future working was to be in line with current production levels and that any new working in the south west Bicester area would be small-scale. However, in the long term, there will be cumulative effects of continued working on the communities living near the identified areas. Mitigation measures at the planning application stage can help ensure that such effects are adequately addressed before new permissions are granted. There are some economic advantages in retaining working in the identified areas including use of existing infrastructure and meeting Oxfordshire's crushed rock needs in line with regional policy.