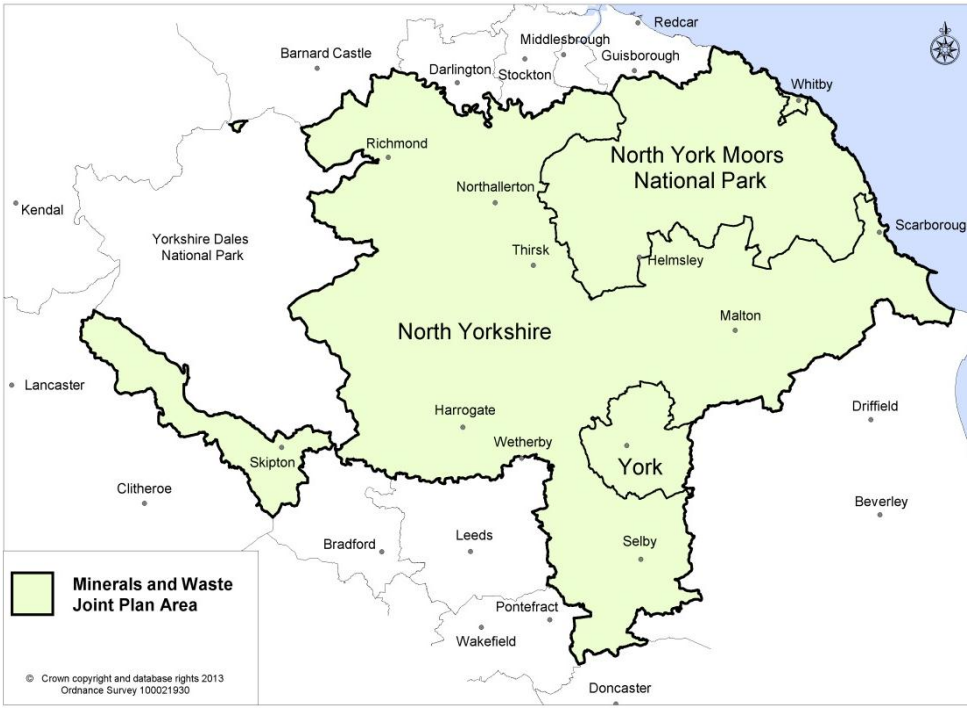
Minerals and Waste Joint Plan

Sustainability Appraisal Update Report

To Accompany Issues and Options Consultation

Volume I

February 2014



City of York Council | North York Moors National Park Authority | North Yorkshire County Council

VOLUME I: Contents

1 Introduction

The extraction and processing of minerals and the management of waste are issues with significant environmental, social and economic impacts. Planning policies can play a fundamental role in considering key questions about future minerals and waste development, such as: *where* should future waste development be directed, *when* should future development take place, *what* sort of development should take place and *how* should it be implemented?

North Yorkshire County Council, the City of York Council and the North York Moors National Park Authority have agreed to work together to prepare a Minerals and Waste Joint Plan (the 'Joint Plan'). This plan, to 2030, will contain the spatial framework for future minerals and waste development across the three authorities and present land use policies and allocations for future minerals and waste development.

The Joint Plan will be prepared under the provisions of the Town and Country Planning (Local Planning) Regulations 2012[1]. These Regulations set out the procedures for producing Local Plans, which include a requirement to undertake Sustainability Appraisal (SA). Sustainability Appraisal is a systematic process of appraisal which can help shape the Joint Plan. It can help deliver sustainable development through the plan by scrutinising options and policies for their sustainability implications. Thus the Government stresses the importance of SA in the National Planning Policy Framework by stating:

'A sustainability appraisal which meets the requirements of the European Directive on strategic environmental assessment should be an integral part of the plan preparation process, and should consider all the likely significant effects on the environment, economic and social factors'.[2]

This Sustainability Appraisal Update Report has been published alongside the Joint Plan Issues and Options Report to set out a considered view of the potential environmental, social and economic issues associated with the draft vision and objectives, and each set of options contained within the Issues and Options Report.

Chapter 2 of this report provides an update of the Sustainability Appraisal process so far and gives a brief description of the Sustainability Appraisal Framework that has been used to assess the vision, objectives and options in the plan. Chapters 3 and 4 show how the vision and objectives of the Joint Plan, and each set of options have been assessed and describes how they perform against the SA objectives. Chapter 5 sets out the next steps for the SA while Chapter 6 describes the arrangements for consultation on this report. An important part of the assessment has involved understanding the effects of minerals and waste developments, and this is discussed in Chapter 2 with details contained in Appendix 2.

[1] These Regulations build upon the broader system for producing plans set out in the 2004 Planning and Compulsory Purchase Act. For instance, the arrangements for Development Plan Documents are amended and those DPDs are renamed as Local Plans.

[2] Department for Communities and Local Government, 2012. National Planning Policy Framework. DCLG, London [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf].

We have published detailed appraisals of each set of options in a separate volume of this report. This can be found at www.northyorks.gov.uk/mwsustainability.

While this report sets out the findings of the assessment team on the sustainability of the Joint Plan, the assessments within the report are only as good as the evidence and professional judgements that have been utilised in the process of assessing the Issues and Options Report. We would therefore invite any interested persons to submit their comments on any aspect of this report. To this end, we have included a series of consultation questions throughout this report. However, you are not obliged to answer the questions and we would be grateful for your views in whichever way you wish to present them to us. Please see Chapter 6 of this report for instructions on how to submit your views, or visit our website for a copy of the consultation questionnaire [www.northyorks.gov.uk/mwsustainability].

2 Sustainability Appraisal of the Joint Plan Issues and Options

2.1 The Joint Plan Issues and Options Consultation

The purpose of the Issues and Options stage of Joint Plan preparation is to ensure that all of the key issues related to drawing up new policies for minerals and waste are presented, along with realistic options for addressing these. These policy options are not draft policies, rather they intend to give an indication of the potential scope and purpose of future policies to deal with issues identified.

The Issues and Options document starts by presenting a series of issues and challenges for minerals, waste and general cross cutting themes based on evidence gathered. These have then been used to articulate a vision for the plan and a series of objectives. The vision and objectives are re-stated in Chapter 3 of this report.

Following on from this a series of options are presented. These are grouped into topic areas as follows:

Minerals Options

- Broad geographical approach to supply of aggregates
- Locational approach to new sources of supply of aggregates
- Calculating sand and gravel provision
- Overall distribution of sand and gravel provision
- Landbanks for sand and gravel
- Safeguarding sand and gravel
- Provision of crushed rock
- Maintenance of landbanks for crushed rock
- Safeguarding crushed rock
- Concreting sand and gravel delivery
- Building sand delivery
- Magnesian Limestone delivery
- Unallocated extensions to existing aggregates quarries
- Supply of alternatives to land won primary aggregates
- Continuity of supply of silica sand
- Silica sand resources safeguarding
- Continuity of supply of clay
- Incidental working of clay in association with other minerals
- Clay resources safeguarding
- Continuity of supply of building stone
- Use of building stone
- Safeguarding building stone
- Overall spatial options for oil and gas
- Co-ordination of gas extraction and processing
- Gas developments (exploration and appraisal)
- Gas developments (production and processing)
- Coal Mine Methane (CMM)

- Coal Bed Methane, Underground Coal Gasification, Shale gas, and Carbon and Gas Storage
- Continuity of supply of deep coal
- Shallow coal
- Safeguarding shallow coal
- Safeguarding deep coal
- Disposal of colliery spoil
- Potash supply
- Safeguarding potash
- Continuity of supply of gypsum
- Gypsum safeguarding
- Safeguarding deep mineral resources
- Supply of vein minerals
- Safeguarding vein minerals
- Borrow pits

Waste Options

- Overall approach to the waste hierarchy
- Strategic role of the Plan area in the management of waste
- Meeting waste management capacity requirements – Local Authority Collected Waste
- Meeting waste management capacity requirements – Commercial and Industrial Waste (including C and I waste)
- Meeting waste management capacity requirements – Construction, Demolition and Excavation waste (including hazardous CD&E waste)
- Managing agricultural waste
- Managing Low Level (Non-Nuclear) Radioactive Waste
- Managing waste water (sewage sludge)
- Managing power station ash
- Overall locational principles for provision of new waste capacity
- Waste site identification principles
- Waste management facility safeguarding

Transport and Other Infrastructure Options

- Transport infrastructure
- Transport infrastructure safeguarding
- Locations for ancillary minerals infrastructure
- Minerals ancillary infrastructure safeguarding

Development Management

- Presumption in favour of sustainable minerals and waste development
- Local amenity and cumulative impacts
- Transport of minerals and waste and associated traffic impacts
- North York Moors National Park and the AONBs
- Minerals and waste development in the Green Belt

- Landscape
- Biodiversity and geodiversity
- Historic environment
- Water environment
- Strategic approach to reclamation and after-use
- Sustainable design, construction and operation of development
- Other key criteria for minerals and waste development
- Developments proposed within Mineral Safeguarding Areas
- Consideration of applications in Mineral Consultation Areas
- Coal mining legacy

Each option is listed in full in the assessment tables in Volume II of this report.

2.2 Work on the Sustainability Appraisal to date

In order to inform the decision making process in taking forward the options we have published this Sustainability Appraisal Update Report. However, this Report is just one step in the SA process. Earlier stages in the process have enabled us to write this report, while later stages will allow further appraisal of the environmental, social and economic effects of the Plan.

Figure 1 shows the steps in the SA process, and those steps that have been carried out by this and preceeding reports have been highlighted.

As can be seen from the diagram, the scoping stage of this Sustainability Appraisal has been consulted upon and a final SA methodology developed. This methodology directs the appraisal results set out in this report. You can view the finalised Sustainability Appraisal Scoping Report at www.northyorks.gov.uk/mwsustainability.

Alongside this report we have also published a separate report on the methodology for identifying and assessing sites and areas for minerals and waste, which incorporates the requirement to subject those sites and areas to Sustainability Appraisal. This will also inform the findings of the final Sustainability Appraisal report.

Two supplementary assessments also inform the Sustainability Appraisal as well as the Joint Plan itself. These are a Habitats Regulations Assessment and a Strategic Flood Risk Assessment.

A Habitats Regulations Assessment Report that presents an initial screening of likely significant effects will be published for consultation on the Joint Plan website as part of the Issues and Options consultation, whilst the Strategic Flood Risk Assessment will be published later in the spring. Please visit the Joint Plan Sustainability Appraisal website at www.northyorks.gov.uk/mwsustainability for further updates on this work.

Figure 1: Stages in this Sustainability Appraisal

Stage A: Setting the objectives and developing the baseline (Scoping)	**Completed?**
A1: Identifying relevant policies, plans and programmes	Yes – Scoping Report
A2: Collecting baseline information	Yes – Scoping Report
A3: Identifying the sustainability issues and the appraisal objectives	Yes – Scoping Report
A4: Considering options and alternatives	Yes – Scoping Report
A5: Consulting on the scope of the Sustainability Appraisal	Yes – Scoping Report
Stage B: Developing and refining options and assessing effects	
B1: Testing the plan objectives against the Sustainability Appraisal objectives	Yes – in this report
B2: Develop and refine the strategic options for the plan	Yes – in this report
B3: Predict and appraise the significant effects of the options, including alternatives	Yes – in this report
B4: Evaluate the effects of the plan, including alternatives	Yes – in this report
B5: Consider ways of mitigating adverse effects and maximising beneficial impacts	Considered in later reports
B6: Propose measures to monitor the significant effects of implementing the plan	Considered in later reports
Stage C: Preparing the Sustainability Appraisal Report	
C1: Preparing the Sustainability Appraisal report	Considered in Draft Sustainability Appraisal Report
Stage D: Publication and Submission of the Plan: Sustainability Appraisal	
D1: Consulting on the draft plan and the Sustainability Appraisal	Considered in Draft Sustainability Appraisal Report
D2: Assessing significant changes and making decisions	Considered in finalised Sustainability Appraisal Report
D3: The Sustainability Appraisal at submission stage	Considered in finalised Sustainability Appraisal Report
Stage E: Examination of the Plan	
E1: Examination and adoption	Documented in Post Adoption Statement
E2: Monitoring of significant effects	Considered in Post Adoption Statement and later monitoring reports
E3: Responding to adverse effects	Considered in Post Adoption Statement and later monitoring reports

2.3 The Sustainability Appraisal Framework and its Application to the Issues and Options Consultation

A key outcome of the SA scoping consultation was the creation of a Sustainability Appraisal Framework. This comprises a list of SA objectives, sub objectives and indicators. These objectives, sub objectives and indicators have been compared to each of the options set out in the Issues and Options document and the extent to which each option contributes to or detracts from each objective has been documented. The SA objectives are listed below, however the full SA Framework is presented at Appendix 1 of this report.

The SA objectives are:

1. Protect and enhance biodiversity and geo-diversity and improve habitat connectivity
2. Enhance or maintain water quality and supply and improve efficiency of water use
3. Reduce transport miles and associated emissions from transport and encourage the use of sustainable modes of transportation
4. Protect and improve air quality
5. Use soil and land efficiently and safeguard or enhance their quality
6. Reduce the causes of climate change
7. Respond and adapt to the effects of climate change
8. Minimise the use of resources and encourage their re-use or safeguarding
9. Minimise waste generation and prioritise management of waste as high up the waste hierarchy as practicable
10. Conserve and enhance the historic environment, heritage assets and their settings
11. Protect and enhance the quality and character of landscapes and townscapes
12. Achieve sustainable economic growth and create and support jobs
13. Maintain and enhance the viability and vitality of local communities
14. Provide opportunities to enable recreation, leisure and learning
15. Protect and improve the wellbeing, health and safety of local communities
16. Minimise flood risk and reduce the impact of flooding
17. Address the needs of a changing population in a sustainable and inclusive manner

In order to be able to assess the options, as well as having an understanding of the baseline situation in the Plan area it is necessary to understand the processes and developments involved in different types of mineral extraction and different types of waste management. Appendix 2 of this report contains a summary of the potential main effects, both positive and negative, from the different types of development that will be covered by the Plan. This focuses on the main effects only and does not consider every possible effect, many of which will be dependent on the specific location of development. Likewise, it is not the case that all of the effects identified would occur at every development of that type, but it is considered possible that they would be issues in most cases. It should also be noted that the table does not take mitigation into account – in many cases many of the effects can be minimised or mitigated through the planning process.

The consultation questions in this box refer to the tables in Appendix 2: The potential main effects of minerals and waste development.

Consultation Question 1: Do you agree with the way in which the potential main effects have been identified and presented?

Consultation Question 2: Have we missed any potential main effects?

Consultation Question 3: Have we included effects which should not be included? If so, why should these not be included?

3 Appraisal of the Vision and Objectives

Assessment of the Plan's objectives is required under stage B1 of the key Sustainability Appraisal tasks[3]. The Plan's vision and objectives will set the overall direction of the Plan and the framework for the policies in the Plan and it is therefore important that these are assessed at the outset of Plan production to ensure that any sustainability effects can be identified and addressed at the strategic level.

3.1 Assessment of the Vision

The vision is a description of how it is envisaged the Joint Plan area will be in 2030 in terms of the supply of minerals, the management of waste and the impacts of associated developments on the Joint Plan area. The draft vision is set out below:

Delivering Sustainable Waste Management

i. *Less waste will be being generated and the Joint Plan area will have moved substantially closer to a zero waste economy, with more waste being used as a resource and disposal of waste arising in the Joint Plan area only taking place as a last resort. National and local targets for recycling and diversion of waste will, as a minimum, have been met and, where practicable, exceeded. Important waste management infrastructure will have been safeguarded for the future and the Joint Plan area will have delivered sufficient waste management capacity to meet needs equivalent to waste arising in North Yorkshire and the City of York, with waste only being exported out of the Joint Plan area where necessary or more sustainable.*

Achieving the Efficient Use of Minerals Resources

ii. *Whilst maximising the use of alternatives to primary minerals, the provision of an adequate and steady supply of minerals will have been maintained, recognising the important role the Joint Plan area has in the supply of a range of minerals and in particular recognising the area's role in aggregates provision in the Yorkshire and Humber area and the adjacent North East region. Provision will have also reflected the importance of using local minerals to help maintain and improve the quality of the area's built environment. Important minerals resources and minerals supply infrastructure will have been safeguarded effectively for the future.*

Optimising the Spatial Distribution of Minerals and Waste Development

iii *Where geological and infrastructure considerations allow, opportunities to ensure a good match between locations of minerals supply and demand will have been taken, and appropriately located mineral workings will also be playing a role as locations for the re-use and/or recycling of construction and demolition and excavation waste.*

iv *For both minerals and waste development, an adequate network of suitably scaled and sustainably located facilities will have been delivered in order to meet requirements identified in the Plan and*

[3] See 'figure 1: Stages in this Sustainability Appriasal' in section 2.2 of this report

the distribution of these will have had regard to the availability of suitable transportation networks, any opportunities for modal shift and the benefits of minimising the overall distance waste and minerals are transported.

v *Waste arising in both urban and rural areas will be being managed as near to where it arises as practicable, appropriate to the waste stream and scale of arisings, in order to provide a network of facilities accessible to local communities and businesses. New waste facilities in both urban and rural locations will, where practicable, have been co-located with complementary industries, businesses and producers or users of waste, in order to maximise the overall efficiency of waste management and the delivery of wider benefits to local businesses and the economy, including from the generation of heat and power through the recovery of waste.*

vi *In identifying appropriate locations for the delivery of both minerals and waste development the distinguished natural, historic and cultural environment and unique and special landscapes of the Joint Plan area will have been protected, with particular protection afforded to the North York Moors National Park, the Areas of Outstanding Natural Beauty and the historic City of York.*

Protecting and enhancing the environment, supporting communities and businesses and mitigating and adapting to climate change

vii *Minerals and waste development will be taking place in accordance with the highest practicable standards of design, operation and mitigation throughout the life of the development in order to ensure that the amenity of local communities, the sustainability of local businesses and the high quality environment of the Joint Plan area are given robust protection. Liaison between developers and local communities, businesses, regulators and landowners will have been key in delivering this.*

viii *Improved efficiency in energy and resource use, including increased use of alternatives to primary minerals and appropriate design and mitigation to address effects on, and from, climate change, including reducing the carbon footprint associated with minerals and waste and reducing flooding will have occurred, and a high standard of reclamation and afteruse of minerals and waste sites will be being delivered, providing a range of benefits for local communities and the environment of the area.*

The vision has been assessed as a whole against the SA framework, taking into account the fact that the vision is high-level and would not be expected to contain the level of detail that may be expected within options or policies. The assessment has been undertaken using the matrix in the Scoping Report as set out below:

Score	Significance
++	There is predicted to be a major positive effect on the baseline and the achievement of the SA objective
+	There is predicted to be a minor positive effect on the baseline and the achievement of the SA objective
0	There will be no effect on the baseline and the achievement of the SA objective
-	There is predicted to be a minor negative effect on the baseline and the achievement of the SA objective

--	There is predicted to be a major negative effect on the baseline and the achievement of the SA objective
?	The effects on the baseline and the achievement of the SA objective are uncertain

The results, shown in Figure 2 below, contain an explanation for the scoring, and includes recommendations where relevant for modifications to the vision or for factors to be taken on board when developing detailed policies.

Figure 2: Sustainability Appraisal of the Draft Vision

SA Objective	Impact[4]	Comments / Mitigation
1. Protect and enhance biodiversity and geodiversity and improve habitat connectivity	+	Whilst lacking specific reference to biodiversity, geodiversity and habitats, paragraph vii does state that *'the environment of the Joint Plan area will be given robust protection'* and paragraph vi states that the natural environment will be protected when identifying appropriate locations for minerals and waste developments. The vision will therefore have a positive impact against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the policies of the Plan should ensure that protection is given to biodiversity and geodiversity and support habitat connectivity.
2. Enhance or maintain water quality and supply and improve efficiency of water use	+	Whilst lacking specific reference to water quality and supply, paragraph vii does state that *'the environment of the Joint Plan area will be given robust protection'* and paragraph vi states that the natural environment will be protected when identifying appropriate locations for minerals and waste developments. The vision will therefore have a positive impact against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the policies of the Plan should ensure that protection is given to water quality and supply.
3. Reduce transport miles and associated emissions from transport and	++	Paragraph iv specifically aims for new minerals and waste development to have regard to '*an adequate network of suitably scaled and sustainably located facilities ……and the distribution of these will have had*

[4] Within this appraisal of the vision, specific direct impacts cannot be identified and so the use of the word impact is intended to communicate that the vision will direct Plan development in a way which positively or negatively contributes to the SA objective.

SA Objective	Impact[4]	Comments / Mitigation
encourage the use of sustainable modes of transportation		*regard to the availability of suitable transportation networks, any opportunities for modal shift and the benefits of minimising the overall distance waste and minerals are transported'.*The vision will therefore have a strong, direct positive impact against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective.
4. Protect and improve air quality	+	Whilst lacking specific reference to air quality, paragraph vii does state that the environment of the Joint Plan area will be given *'robust protection'* and paragraph vi states that the natural environment will be protected when identifying appropriate locations for minerals and waste developments. The vision will therefore have a positive impact against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the policies of the Plan should ensure that protection is given to air quality.
5. Use soil and land efficiently and safeguard or enhance their quality	+	Whilst lacking specific reference to protecting soil and land the vision does refer to maximising the use of alternatives to primary minerals, co-location of waste facilities with complementary uses, and safeguarding infrastructure which may all indirectly result in less land take. In addition, references to protecting the environment may also afford protection to the quality of land and soils. The vision will therefore have an indirect positive impact against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the policies of the Plan should ensure that protection is given to the most valuable land and soils.
6. Reduce the causes of climate change	++	Paragraph viii makes specific reference to improving efficiency in energy and resource use and mitigating effects on climate change. Other parts of the vision may have indirect positive effects such as the aim to co-locate developments and minimise the overall distance waste and minerals are transported which would minimise transport emissions. The vision will therefore have direct and indirect positive effects against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the

SA Objective	Impact[4]	Comments / Mitigation
		policies of the Plan should contain further detail about what assets / receptors should be protected and how.
7. Respond and adapt to the effects of climate change	++	Paragraph viii refers to addressing the effects from climate change and therefore has a strong, direct positive effect against this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective.
8. Minimise the use of resources and encourage their re-use and safeguarding	++	Minimisation of use of resources, re-use of resources and safeguarding are all explicitly referred to within the vision. Paragraph i refers to waste being used as a resource and paragraph ii refers to maximising the use of alternatives to primary minerals and safeguarding minerals resources. Paragraph viii refers to efficiency in resource use in design of new development. The vision therefore has a strong direct positive impact on this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective.
9. Minimise waste generation and prioritise management of waste as high up the waste hierarchy as practicable	++	Paragraph i refers to less waste being generated, more waste being used as a resource and disposal of waste only taking place as a last resort, and the vision will therefore have a strong, direct positive effect on this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective.
10. Conserve and enhance the historic environment, heritage assets and their settings	+	Paragraph vi states that the historic environment will be protected when identifying appropriate locations for minerals and waste developments. Whilst lacking specific reference to the historic environment elsewhere, paragraph vii does state that *'the environment of the Joint Plan area will be given robust protection'.* The vision will therefore have positive effects on this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the policies of the Plan should ensure that protection is given to the historic environment.
11. Protect and enhance the quality and character of landscapes and townscapes	+	Paragraph vi states that the natural, historic and cultural environment (which are all components of the landscape and townscapes) and unique and special landscapes will be protected when identifying appropriate locations for

SA Objective	Impact[4]	Comments / Mitigation
		minerals and waste developments. Paragraph vii states that *'the environment of the Joint Plan area will be given robust protection'* which would include landscape. The vision will therefore have direct positive effects on this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective. However, the policies of the Plan should ensure that consideration is given to impacts on all landscapes.
12. Achieve sustainable economic growth and create and support jobs	+	The vision supports the economy of the Plan Area through supporting an adequate and steady supply of minerals, safeguarding minerals for the future and referring to more waste being used as a resource. Paragraph vii also refers to the sustainability of local businesses. **Recommendations:** No changes to the vision are required in relation to this objective. However, job support and creation should specifically be identified in the policies.
13. Maintain and enhance the viability and vitality of local communties	+	Paragraph vii refers to protecting the sustainability of local businesses which will have a positive contribution towards protecting the viability and vitality of local communities. **Recommendations:** No changes to the vision are required in relation to this objective. However, supporting communities and local businesses should specifically be identified in the policies.
14. Provide opportunities to enable recreation, leisure and learning	+	Whilst protection is afforded to some of the key recreation assets in the Plan area (notably the National Park and also the AONBs) the vision does not specifically contain reference to protecting opportunities for recreation, leisure and learning. Protection of local amenity in paragraph vii may however also indirectly help to protect recreation and leisure assets, particularly through liaison with local communities. The vision will therefore have direct and indirect positive impacts on this objective. **Recommendations:** No changes to the vision are required in relation to this objective. However, protection and enhancement/creation of opportunities for recreation, leisure and learning should be identified in the policies.

SA Objective	Impact[4]	Comments / Mitigation
15. Protect and improve wellbeing, health and safety of local communities	+	Paragraph vii refers to new development *'having the highest practicable standards of design, operation and mitigation throughout the life of the development in order to ensure that the amenity of local communities...are given robust protection'*. The vision will therefore have a positive impact on this objective, provided that 'amenity' is considered to include health, safety and wellbeing in this strategic context. **Recommendation:** Whilst the vision performs positively against this objective, it is considered that protection should be given to specifically to the health, safety and wellbeing of local communities through detailed policies covering amenity.
16. Minimise flood risk and reduce the impact of flooding	++	Paragraph viii refers to addressing the effects from climate change, and specifically refers to addressing effects on and from flooding. The vision will therefore have a strong, direct positive impact on this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective.
17. Address the needs of a changing population in a sustainable and inclusive manner	++	The vision refers to providing an adequate and steady supply of minerals as well as protecting the area's important assets. The vision also refers to liaison with local communities in delivering the Plan. The vision will therefore have a strong, direct positive impact on this objective. **Recommendations:** No changes to the vision are recommended in relation to this objective.

To summarise, the vision has been assessed as contributing to beneficial impacts on the environment, economy and communities in the Plan area. Potential positive impacts have been identified in relation to the natural and historic environment, landscape, climate change, the economy and protecting communities and potentially strong positive impacts identified in relation to minimising the use of resources, managing waste more sustainably, mitigating climate change and enabling the supply of minerals to support the needs of the population. No negative impacts have been identified, primarily due to the nature of the vision being an overarching goal for the Plan.

The recommendations identified alongside the assessment against each SA Objective in Figure 2 above will be considered by those producing the Plan when progressing to the Preferred Options stage.

Consultation Question 4: Do you agree with the conclusions of the assessment of the vision?

Consultation Question 5: Do you agree with the recommendations for addressing the potential impacts of the vision?

2.2 Assessment of the Plan's Objectives

The objectives of the Plan, which are a reflection of the vision and set out the aims the Plan should follow to meet the vision, must also be tested against the SA framework in order to ascertain any potential synergies and inconsistencies[5]. This can be helpful in identifying the potential for sutainablity effects as the plan develops.

In order to check the consistency between the Plan's objectives themselves, an initial check of the extent to which the Plan Objectives complement or run counter to one another has been made. This initial check looks purely at the the Plan objectives and does not consider the SA objectives at this stage. This can help to identify areas of tension between Plan objectives which can be addressed through either amending the objectives or through the detail of the Plan's policies. This assessment is contained in Figure 3 below. The assessment has used a simplified version of the scoring matrix (see below) to reflect the fact that the assessment is testing for consistency at a strategic level rather than a detailed assessment of all possible effects.

+	Objectives are compatible
-	Objectives are incompatible
0	No direct relationship
?	Uncertain / potentially incompatible

The Plan's objectives, as contained in the Issues and Options document, are:

- Objective 1 – Encouraging the management of waste further up the waste hierarchy
- Objective 2 – Making adequate provision for the waste management capacity needed to manage waste arising in the sub-region
- Objective 3 – Safeguarding important minerals resources and minerals infrastructure for the future
- Objective 4 – Prioritising the long term conservation of minerals through facilitating provision of sustainable alternatives to primary land won minerals extraction, including increasing the re-use and recycling of minerals and the use of secondary and marine aggregates
- Objective 5 – Planning for the steady and adequate supply of the minerals needed to contribute to local and wider economic growth, development, quality of life, local distinctiveness and energy requirements, within the principles of sustainable development

[5] Further information on testing plan or programme objectives is available in ODPM, 2005. A Practical Guide to the Strategic Environmental Assessment Directive.

- Objective 6 – Identifying suitable locations for the extraction and recycling of minerals, the production of secondary aggregate, key minerals supply and transport infrastructure and the management of waste
- Objective 7 – Seeking a good match between locations for waste management infrastructure and the places where waste arises, and between locations for mineral working and minerals supply infrastructure and the places where minerals and mineral products are used, in order to minimise the overall need for transport
- Objective 8 – Promoting the use of alternatives to road transport and ensuring that new development is served by suitable transport networks
- Objective 9 – Protecting the natural and historic environment, landscapes and tranquil areas of the Joint Plan area
- Objective 10 – Protecting local communities, businesses and visitors from the impacts of minerals and waste development, including transport
- Objective 11 – Addressing the causes and effects of climate change relating to minerals and waste development activity, including using opportunities arising from minerals and waste development and reclamation activity to mitigate and adapt to climate change
- Objective 12 – Delivering benefits for biodiversity, recreation opportunities and climate change adaptation through reclamation of minerals workings

Figure 3: Assessment of Plan Objectives against each other

Plan Objectives	1	2	3	4	5	6	7	8	9	10	11	12
1												
2	+											
3		0										
4		+	+									
5		+	+	+								
6		+	+	+	+							
7		+	+	+	+	+						
8		?	+	+	?	+	+					
9		?	0	+	-	+	+	+				
10		?	0	+	?	+	+	+	+			
11		+	0	+	+	+	+	+	+	+		
12		0	+	0	+	+	0	0	+	+	+	

Whilst most of the objectives have been recorded as being compatible with each other or having no direct relationship, a number have been identified as being uncertain or incompatible. These are discussed below along with recommendations for addressing the issues, taking into account the purpose of the minerals and waste plan:

- Compatibility between objectives 1 and 5 is uncertain as it is likely that more waste would be generated which although may be managed sustainably would not contribute to minimising waste in terms of the waste hierarchy. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty and therefore the potential issues should be addressed through the detailed policies of the Plan.

- Uncertainty has been recorded between objectives 1 and 9 as managing waste further up the hierarchy may require more facilities which could have effects on the environment. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but this potential inconsistency should be considered when developing detailed policies.

- Uncertainty has been recorded between objectives 1 and 10 as managing waste further up the hierarchy may require more facilities which could have effects on communities. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but this potential inconsistency should be considered when developing detailed policies.

- Uncertainty has been recorded between objectives 2 and 8 as, depending upon the modes of transport supported in relation to the provision of waste management facilities these objectives could be either compatible or incompatible. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but the potential transport implications of waste management policies will need to be considered when developing detailed policies.

- Uncertainty has been recorded between objectives 2 and 9 as making adequate provision for waste management capacity may lead to effects on the environment (for insatance where it results in new facilities being constructed). **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but this potential inconsistency should be considered when developing detailed policies.

- Uncertainty has been recorded between objectives 2 and 10 as making adequate provision for waste management capacity may lead to effects on communities. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but this potential inconsistency should be considered when developing detailed policies.

- Uncertainty has been recorded between 5 and 8 as minerals can only be extracted where found which may limit opportunities for using non-road transport in some cases, although this would depend upon the details of actual sites coming forward. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but this potential inconsistency should be considered when developing detailed policies.

- An incompatibility has been recorded between objectives 5 and 9 as it is unlikely that an adequate and steady supply of minerals could be achieved without having any adverse effect on the environment. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the incompatibility but the Plan should acknowledge potential adverse effects on the environment and seek to minimise these.

- Uncertainty has been recorded between objectives 5 and 10 as ensuring an adequate and steady supply of minerals may lead to effects on communities. **Recommendation:** Both objectives are important for the Plan and it is not considered that there are any amendments that could be made which would remove the uncertainty but this potential inconsistency should be considered when developing detailed policies.

Consultation Question 6: Do you agree with the conclusions of the assessment of the Plan objectives against each other?

Consultation Question 7: Do you agree with the recommendations for addressing the effects identified from this?

After assessing the Plan Objectives against themselves, the Plan Objectives have been assessed against the objectives contained in the SA framework. The same scoring matrix has been used and objectives have been assessed as being either compatible, incompatible, having no direct relationship or having uncertain effects. Figure 4 below shows the results of this assessment.

Figure 4: Assessment of Plan Objectives against Sustainability Objectives

	Sustainability Objectives																
Joint Plan Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
1	+	+ ?	+	+	+	+	+	+	+	+	+	+	+	+	+	0	+
2	?	?	+	+ ?	?	?	0	+	+	?	?	+	?	?	?	?	+
3	0	0	0	0	0	0	0	+	+	0	0	+	+	0	0	0	+
4	+	+ ?	?	?	+	+	+	+	+	+	+	+	+	0	+	+	+
5	-	-	?	?	-	-	- +	-	+	?	?	+	?	?	?	- +	+
6	?	?	?	?	?	?	?	0	0	?	?	+	?	?	?	?	+
7	0	0	+	+	0	+	+	0	0	0	0	+	+	0	0	0	0
8	0	0	+	0	0	+	0	0	0	0	0	0	0	0	+	0	0
9	+	+	+	+	+	+	+	+	?	+	+	+ ?	+	+	+	+	?
10	0	+	+	+	0	0	+	+	?	+	+	?	+	+	+	+	?

11	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12	+	0	0	0	0	0	+	0	0	0	0	0	0	+	0	+	0

To summarise, the objectives of the Plan are considered to have a potentially positive relationship on many of the environmental, economic and community Sustainability Appraisal objectives. The Plan Objectives which seek to protect the environment and address climate change (9, 11 and 12) score particularly positively in relation to the SA objectives. A number of uncertainties have been identified, however, in terms of the relationship between Plan and SA objectives, particularly for Plan Objectives 2, 5 and 6 where, on their own, these may ultimately result in a range of potential impacts on the environment and communities in the Plan area, and so exhibit an uncertain relationship with the relevant SA objectives. Plan Objectives 5 and 2 may impact negatively on the achievement of the biodiversity, landscape, the historic environment and community wellbeing SA objectives.

Where Plan Objectives have been identified as having uncertain relationships or being incompatible these are discussed below along with recommendations for addressing the issues, taking into account the purpose of the minerals and waste plan. It should be noted that all objectives will operate in combination with each other and that a positive score has been recorded at least once in relation to each sustainability objective, meaning that the Plan will contribute in some way towards each objective. The recommendations are based upon the principle that it is not appropriate to caveat every Plan Objective, but to read them together.

- Uncertainty has been recorded between Plan Objective 1 and SA Objective 2 as whether or not there are any positive or negative impacts depends upon whether the processes of reusing and recycling materials would use more water than extraction and processing, which cannot be ascertained at this strategic level. **Recommendation:** As Plan Objective 9 refers to protecting the natural environment, which would include water quality and supply, it is not considered necessary to amend Plan Objective 1, but water usage should be considered when considering site allocations and when developing the detailed policies of the Plan.

- Under Plan Objective 2 potential impacts on biodiversity, water quality and supply, air quality, mitigating climate change, historic environment, landscape, recreation and communities are possible, so the relationship with the relevant SA objectives is uncertain as much would depend upon the location and type of development. **Recommendation:** As Plan Objective 9 refers to protecting the natural and historic environment, landscapes and tranquil areas it is not considered necessary to make any amendments to Plan Objective 2.

- Uncertainty has been recorded between Plan Objective 4 and SA objective 2 as whether or not there are any potential effects depends upon whether the processes of reusing and recycling materials would use more water than extraction and processing, which cannot be ascertained at this strategic level.The level of compatibility between these objectives is therefore uncertain. **Recommendation:** As Plan Objective 9 refers to protecting the natural environment, which would include water quality and supply, it is not considered necessary to amend Plan Objective 4, but water usage should be considered when considering site allocations and when developing the detailed policies of the Plan.

- Uncertainty has been recorded between Plan Objective 4 and SA objectives 3 and 4 as potential effects on transport and air quality would depend upon the resultant transportation requirements.The level of compatibility between these objectives is therefore uncertain. **Recommendation:** As Plan Objectives 8 and 9 seek to promote sustainable transportation and protect the natural environment it is not considered necessary to amend Plan Objective 4.

- Under Plan Objective 5 there may be negative or uncertain effects on a number of SA objectives related to protecting the environment and communities, depending on the location of minerals extraction and the level of compatibility between these objectives is therefore uncertain. **Recommendation:** As Plan Objectives 9 and 10 seek to protect the environment and communities it is not considered necessary to amend Plan Objective 5.

- Plan Objective 6 there may lead to negative or uncertain effects on a number of SA objectives related to protecting the environment and communities, depending on the location of minerals extraction. The level of compatibility between these objectives is therefore uncertain. **Recommendation:** As Plan Objectives 9 and 10 seek to protect the environment and communities it is not considered necessary to amend Plan Objective 5.

- Uncertainty has been recorded between Plan Objective 9 and SA Objectives 9, 12 and 17 in relation to the economy, minerals supply and provision of waste management infrastructure should it restrict the amount of minerals extraction and waste management development coming forward.The level of compatibility is therefore uncertain. **Recommendation:** As the Plan contains a number of objectives which support minerals supply and the provision of waste management facilities it is not considered necessary to amend Plan Objective 9.

- Whilst Plan Objective 9 scores positively in relation to SA Objective 1 and they are therefore broadly compatible, it is considered that a more stronger positive could be achieved by amending the Plan Objective to also refer to enhancing the environment. **Recommendation:** Amend Plan Objective 9 to state ‘Protecting and enhancing the natural and historic environment, landscapes and tranquil areas of the Joint Plan area.’

- Uncertainty has been recorded between Plan Objective 10 and SA Objectives 9, 12 and 17 in relation to the economy, minerals supply and provision of waste management infrastructure should it restrict the amount of minerals extraction and waste management development coming forward. **Recommendation:** As the Plan contains a number of objectives which support minerals supply and the provision of waste management facilities it is not considered necessary to amend Plan Objective 10.

Consultation Question 8: Do you agree with the conclusions of the assessment of the Plan objectives?

Consultation Question 9: Do you agree with the recommendations for addressing the effects identified from this?

The recommendations identified in relation to the assessment of the Plan Objectives against each other and the assessment of the Plan Objectives against the SA Objectives will be considered by those producing the Plan when progressing to the Preferred Options stage.

4 Appraisal of Options

4.1 Undertaking the Assessment of Options

As explained in Chapter 2 the purpose of the Issues and Options stage of the Minerals and Waste Joint Plan is to ensure that all of the key issues related to drawing up new policies for minerals and waste are presented, along with realistic options for addressing these.

Appendix 3 of this report presents the results of the appraisal of each of the groups of options, with full details of the assessments provided in Volume 2.

Each individual option has been tested against the 17 SA objectives and, using the sub objectives and indicators as a guide, assessors from the three planning authorities have indicated the extent to which each individual option contributes to each of the SA objectives by predicting the sustainability effects[6] of pursuing the option over the following timescales:

Short term (S) – this equates to 0 to 5 years from plan adoption
Medium term (M) – this equates to 6 to 15 years from plan adoption
Long term (M) – this equates to 16 to 30 years from plan adoption

The assessment draws upon evidence such as the baseline identified in the SA Scoping Report, reports published by third parties, geographical information datasets, the findings of historic planning applications and the professional judgement of the assessors and technical officers within the three local planning authorities. In order to categorise the magnitude of effects a standard scoring mechanism has been used, as set out in the Scoping Report, and reproduced in below.

Score	Significance
++	The option is predicted to have major positive effects on the baseline and the achievement of the SA objective.
+	The option is predicted to have minor positive effects on the baseline and the achievement of the SA objective.
0	The option will have no effect on the baseline and the achievement of the SA objective.
-	The option is predicted to have minor negative effects on the baseline and the achievement of the SA objective.
--	The option is predicted to have major negative effects and the achievement of the SA objective.
?	The impact of the objective on the baseline / SA objective is uncertain.

Secondary, cumulative and synergistic effects are also considered, and are recorded within individual assessments. Any assumptions made by the assessors are recorded and initial recommendations are

[6] The term 'effects' is used in this part of the assessment to adopt consistent language with the SEA Directive which refers to 'likely significant effects'

made. Whether or not an impact is permanent (P), temporary (T), direct (D) or indirect (I) is also noted in the full appraisal matrices.

4.2 Limitations of the Assessment

The appraisal of options gives an indication of which individual options are considered the most sustainable at this stage. However, readers will note that a good deal of uncertainty is recorded in the assessment. This is because the options presented are often very broad strategic steers, and it can be difficult to consider the exact impacts on individual SA objectives, which often rely on being able to predict how features on the ground, such as historic assets or local biodiversity might be affected by the Plan. This more detailed assessment will be possible as the plan evolves, and policies are developed and sites are considered in more detail. A site identification and assessment methodology report is presented alongside this consultation at https://www.northyorks.gov.uk/planning-and-conservation/planning-policy/planning-policy-minerals-and-waste/minerals-and-waste-joint-plan/evidence-base

It is also worth noting that the environmental effects of options often fall into one of two categories. These are: environmental problems which would be expected to be addressed by the planning process, from plan making to development management; and environmental problems that would be expected to be addressed through the pollution control and permitting regimes administered by pollution control authorities.

The National Planning Policy Framework gives guidance on which impacts a Local Plan should focus on. While *'to prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location'* the NPPF also recognises that *'local planning authorities should focus on whether the development itself is an acceptable use of land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively'*[7].

This has ramifications for the SA, which is required to review environmental effects. While it will be necessary to identify the nature, significance and cumulative potential of impacts to air, soil and water, the SEA must also recognise that the Plan, while it is able to help avoid significant pollution impacts arising from locational choices, and may also be able to reduce some other pollution pathways through its non-specific requirements for, for example, design, will have less control over the actual permitted levels of pollution that will be allowed from a particular process undertaken at a particular site. Where the SA identifies that such processes and their potential for significant effects are likely to be regulated through pollution control and permitting regimes this is mentioned in the assessments, though the SA recognises that the plan is required to assume that such permitting regimes will operate effectively.

4.3 Findings of the Assessment

The findings of the assessment are set out in detail in Volume 2 of this Sustainability Appraisal Update Report. These show that a range of environmental, social and economic effects would be

[7] CLG, 2012. National Planning Policy Framework [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf]

likely to result if individual options were pursued. A comparison matrix has been produced for each option and a summary of the findings is also presented. These are displayed at Appendix 3. In very broad terms the SA has found that a broad range of options has been presented, and while often minerals and waste development will, by its very nature, display significant environmental effects, very often these effects can be mitigated for by pursuing a certain option and developing it further.

Please refer to appendix 3 of this report and the full sustainability appraisal matrices in Volume 2 when answering the questions below.

Consultation Question 10: Do you agree with the detailed assessments of the options?

Consultation Question 11: Do you agree with the summaries of the options assessments?

Consultation Question 12: Do you agree with the recommendations for the options?

Please identify the sets of options and specific parts of the assessment you are referring to.

5 Taking Forward the Appraisal

This Sustainability Appraisal Update Report contains assessments relating to the vision, objectives and the options contained in the Issues and Options document. In addition to assessing the likely effects of each of these elements of the document against the sustainability objectives in the SA framework, the assessment has made recommendations for addressing these effects in future stages of Plan production. These recommendations are detailed in the relevant chapters, appendices and annexes of this report.

In relation to the vision and objectives, the recommendations do largely not relate to making a specific amendment in the Plan but to considering the conclusions when drawing up detailed policies. In relation to the options, a recommendation as to the most sustainable options has been given at the end of each detailed assessment and in some cases this recommends an approach which would follow a combination of two or more of the options presented.

Following consultation, those producing the Plan will consider the conclusions and recommendations of this Sustainability Appraisal when selecting preferred options and developing draft policies, alongside consultation responses, wider policy and specific pieces of evidence produced to inform the Plan. There is no requirement to take on board the recommendations of the Sustainability Appraisal, and these must be balanced against other considerations.

The Preferred Options document will then itself be subject to Sustainability Appraisal, with reference back to the assessments undertaken at the Issues and Options stage and contained within this report. At this stage, it will be appropriate for the Sustainability Appraisal to begin to identify potential indicators which could be used to monitor the significant sustainability effects of implementing the Plan. There will then be a further round of consultation where comments can be made on the Preferred Options and the accompanying Sustainability Appraisal.

6 Consultation

This Sustainability Appraisal Update Report accompanies the Issues and Options document and is published as part of the Issues and Options Consultation. This report should be read alongside the Issues and Options document. As part of this consultation we welcome any comments on the Sustainabiltiy Appraisal Update Report and a number of questions have been presented at key points within this report. These are repeated below.

Consultation Question 1: Do you agree with the way in which the potential main effects have been identified and presented?

Consultation Question 2: Have we missed any potential main effects?

Consultation Question 3: Have we included effects which should not be included? If so, why should these not be included?

Consultation Question 4: Do you agree with the conclusions of the assessment of the vision?

Consultation Question 5: Do you agree with the recommendations for addressing the effects of the vision?

Consultation Question 6: Do you agree with the conclusions of the assessment of the Plan objectives against each other?

Consultation Question 7: Do you agree with the recommendations for addressing the effects identified from this?

Consultation Question 8: Do you agree with the conclusions of the assessment of the Plan objectives?

Consultation Question 9: Do you agree with the recommendations for addressing the effects identified from this?

Consultation Question 10: Do you agree with the detailed assessments of the options?

Consultation Question 11: Do you agree with the summaries of the options assessments?

Consultation Question 12: Do you agree with the recommendations for the options?

The Issues and Options consultation is running from until 11th April 2014. A Sustainability Appraisal comments form is available at www.northyorks.gov.uk/mwsustainability and details about the consultation can be found at www.northyorks.gov.uk/mwconsult. Please send any comments to the address below by 5pm on 11th April 2014.

Contact details:

Website: www.northyorks.gov.uk/mwsustainability

Email: mwsustainability@northyorks.gov.uk

Address: BUSINESS REPLY SERVICE, License No DL358, Minerals and Waste Joint Plan, Planning Services, North Yorkshire County Council, County Hall, Northallerton, North Yorkshire, DL7 8BR – No stamp is required.

If you would like to contact someone in any of the three authorities, please use the contact details below:

North Yorkshire County Council: Environmental Policy Officers – mwsustainability@northyorks.gov.uk, 01609 536493

North York Moors National Park Authority: Andrea McMillan – a.mcmillan@northyorkmoors.org.uk, 01439 772700

City of York Council: Alison Cooke – integratedstrategy@york.gov.uk, 01904 551467

Appendix 1 – Sustainability Appraisal Framework

Sustainability Appraisal Framework

Sustainability Objectives	Sub objectives	Indicators
1. Protect and enhance biodiversity and geodiversity and improve habitat connectivity	-Protect and enhance designated nature conservation sites and protected species; -To contribute to the suitable protection of trees, woodlands and forests -Avoid damage to designated geological assets and create new areas of geodiversity value; -Seek to contribute to national targets for biodiversity, including for national and local priority species and habitats; -Seek to contribute to local targets for geodiversity; -Preserve the integrity of habitat networks and increase the connectivity between habitats; -Maximise the potential for the creation of new habitats; -Minimise the spread of invasive species; -Provide opportunities for people to access the natural environment; -Protect and manage ancient woodland; -Appropriately manage and enhance PAWS; -Promote improvements for biodiversity at the landscape scale; -Achieve a net gain for biodiversity	1. Percentage of SSSIs in favourable condition (Natural England) 2. Total area of SSSI (Natural England) 3. Total area of UK BAP Priority Habitat (Natural England) 4. Area of ancient and semi natural woodland (Natural England) 5. Area of ancient replanted woodland (PAWS) (Natural England) 6. Area of land in Higher Level Stewardship (Natural England) 7. Area of SINC land (NYCC) 8. Number of alerts for invasive species relevant to North Yorkshire (Defra)[8] 9. Number of alien species on UKTAG List found in North Yorkshire[9]
2. Enhance or maintain water quality and supply and improve efficiency of water use	-Ensure that Water Framework Directive status objectives for surface and groundwater are not compromised by maintaining or improving upon	1. Percentage of water bodies achieving overall good status in River Basin Management Plans (Environment Agency)

[8] Species distribution to be taken from the National Biodiversity Network.
[9] Species distribution to be taken from the National Biodiversity Network.

Sustainability Objectives	Sub objectives	Indicators
	ecological and chemical status; - Prevent unsustainable levels of ground and surface water abstraction; - Avoid wasting water; -Protect groundwater source protection zones	2. Water resource availability at low flows as reported in CAMS (Environment Agency) 3. Groundwater resource availability as reported in CAMS (Environment Agency)
3. Reduce transport miles and associated emissions from transport and encourage the use of sustainable modes of transportation	-Encourage more sustainable transport modes; -Reduce the impact of transporting minerals by road on local communities; -Reduce vehicle emissions due to mineral and waste movements; -Encourage proximity between minerals and waste sites and markets / sources; -Safeguard or deliver valuable infrastructure that may contribute to modal shift; -Promote active travel and sustainable commuting -Improve congestion	1. Motor vehicle traffic (Vehicle miles) by local authority (DfT) 2. Proportion of residents who walk or cycle, at least one per month, for utility purposes (for reasons other than recreation, health, training or competition) by local authority[10] (DfT) 3. Road transport energy consumption at local authority level (DfT/NAEI)
4. Protect and improve air quality	-Reduce all emissions to air from new development; -To reduce the causes and levels of air pollution in Air Quality Management Areas and seek to avoid new designations; -To minimise dust and odour, particularly where communities or other receptors may be affected; -Support cleaner technology for minerals and waste development; -Avoid locating development in areas of existing poor air quality where it could result in negative impacts on the	1. Number of Air Quality Management Areas 2. Number of SAC and SPAs exceeding critical loads for deposition of either N or S (APIS) 3. Mapped distribution of NOX, NO2, PM10 and PM2.5 (Defra LAQM)

[10] Department for Transport/Sport England, 2012. Local Area Walking and Cycling Statistics: England 2010/11 [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/9105/local-area-walking-and-cycling-2010-11.pdf].

Sustainability Objectives	Sub objectives	Indicators
	health of present and future occupants / users; -Seek to avoid adding to pollutant deposition at sensitive habitats.	
5. Use soil and land efficiently and safeguard or enhance their quality	-Reduce the permanent loss of best and most versatile agricultural land; -Conserve and enhance soil resources and quality; -Promote good land management practices on restored land; -Reduce the amount of derelict, contaminated, degraded and vacant / underused land; -Recover nutrient value from biodegradable wastes (e.g. compost, biodigestate) -Minimise land taken up by minerals and waste development -Seek to utilise brownfield land for waste development where possible	1. Number of minerals and waste applications which are located within areas of best and most versatile (BMV) agricultural land (NYCC) 2. Land use change: previous use of land changing to developed use annual average by region[11] (DCLG)
6. Reduce the causes of climate change	-Reduce emissions of greenhouse gases; -Reduce CO2 from minerals and waste development through use of energy efficient and low and zero carbon design and adoption of efficient plant and processes; -Maximise the generation and use of renewable energy in appropriate locations; -Prevent the loss of embodied energy by promoting the use of recycled, recyclable and secondary resources; -Promote carbon storage through appropriate land management	1. Emissions of CO2 per capita by Local Authority (excluding LULUCF[13]) (DECC) 2. Industrial and commercial per capita CO2 emissions by Local Authority (DECC) 3. Road transport CO2 emissions per capita by Local Authority (DECC) 4. Land use change CO2 emissions per capita by Local Authority (DECC)[14]

[11]Derived from the Department for Communities and Local Government 'Live Tables on Land Use Change Statistics' which are collated by Government Office Region [https://www.gov.uk/government/statistical-data-sets/live-tables-on-land-use-change-statistics].

Sustainability Objectives	Sub objectives	Indicators
	-Adhere to the principles of the energy hierarchy[12]	
7. Respond and adapt to the effects of climate change	-To plan and implement adaptation measures for the likely effects of climate change; -Ensure 'sustainable adaptation' is planned for[15]; -Ensure that minerals and waste developments are not susceptible to effects of climate change -Ensure that minerals and waste developments do not hinder adaptation to climate change	1. UKCP climate change scenarios[16](UKCP) 2. Mapped extent of Flood Zones under Climate Change as reported in available Strategic Flood Risk Assessments[17] (NYCC, CYC, NYMNPA) 3. Allocations requiring exception testing in North Yorkshire SFRA (NYCC)
8. Minimise the use of resources and encourage their re-use and safeguarding	-To safeguard and use minerals resources efficiently; -Safeguard infrastructure that may support more sustainable minerals and waste development -To encourage the re-use of primary materials; -To promote the efficient use of resources throughout the lifecycle of a development, including construction, operation and decommissioning of minerals and waste infrastructure; Encourage the utilisation of sustainable construction techniques;	1. Number / type / area of safeguarding areas defined in Plan 2. Reserves of primary land won aggregate and crushed rock (LAA) 3. Sales of secondary aggregate in the North Yorkshire sub region (LAA)

[13] LULUCF relates to emissions from Land Use, Land Use Change and Forestry.
[14] There is a time lag between publication of the DECC carbon statistics at a local authority level and the present year, such that 2010 figures were published in 2012.
[12] The energy hierarchy is analogous to the waste hierarchy in that it shows a sequence of preferred approaches to obtaining energy. Broadly this can be shown as three steps, in order of preference: 'Reduce' the amount of energy required in the first place (for instance through good design); 'Re-use' waste energy such as heat (e.g. through combined heat and power technology); and 'recycling' (which means the provision of energy that has some processing applied – e.g. renewable energy to meet demand or the extracting of energy from waste). CABE, 2011. Thinking Differently – The Energy Hierarchy.
[15] Sustainable Adaptation has been defined by Natural England. According to Natural England 'It is important that any adaptation action is sustainable. This means that any response by society should not actually add to climate change, cause detrimental impacts or limit the ability or other parts of the natural environment society or business to carry out adaptation elsewhere" (Natural England, undated. Sustainable Adaptation [URL: naturalengland.org.uk/ourwork/climateandenergy/climatechange/adaptation/sustainable.aspx] URL is no longer available.
[16] Changes to precipitation and temperature to be recorded in line with latest available data.
[17] As further SFRA work becomes available the spatial extent of increased flood risk from rivers will become clearer.

Sustainability Objectives	Sub objectives	Indicators
	-Promote the use of secondary and recycled minerals resources where they can play a role in reducing the need for more primary minerals extraction	
9. Minimise waste generation and prioritise management of waste as high up the waste hierarchy as practicable	-Use less materials through design and processing; -Re-use materials where possible; -Encourage recycling; -Recover residual resources (e.g. through anaerobic digestion or energy recovery); -Support 'recycling on the go';[18] -Recognise and promote the value of waste streams as alternatives to primary mineral extraction; -Promote economic gain through re-use	1. Total waste received by waste facilities by category ('household, industrial and commercial', 'inert / construction and demolition', 'hazardous', 'unknown') (Environment Agency); 2. Waste management method of household waste arisings in North Yorkshire (NYCC) 3. Anaerobic digestion plants in the plan area[19]
10. Conserve and enhance the historic environment, heritage assets and their settings.	-To protect and enhance those elements, including setting, which contribute to the significance of: ➢ World Heritage Sites ➢ Scheduled Monuments ➢ Archaeological Features ➢ Listed buildings ➢ Historic parks and gardens ➢ Historic battlefields ➢ Conservation Areas; ➢ The city of York -To provide appropriate protection for archaeological features in areas of potential development; -To protect the wider historic environment from the potential impacts of proposed development and the	1. Buildings, scheduled monuments, conservation areas, registered parks and gardens, registered battlefields 'at risk' as defined by the Heritage at Risk Register (English Heritage) 2. Number of visits to historic sites (Yorkshire and the Humber) (English Heritage)

[18] 'Recycling on the go' is promoted by the Government's Waste Policy Review. It represents recycling on the street and in public places.
[19] As shown on the official biogas plant map produced by 'Anaerobic Digestion' [URL: http://www.biogas-info.co.uk/].

Sustainability Objectives	Sub objectives	Indicators
	cumulative impacts; -To improve access to, and enjoyment of, the historic environment where appropriate; -Preserve and enhance local culture -Safeguard those elements which contribute to the special historic character and setting of York. -To ensure a steady supply of building and roofing stone for the repair and construction of buildings and structures -Protect and enhance important non-designated heritage assets	
11. Protect and enhance the quality and character of landscapes and townscapes	-Conserve and enhance the natural beauty and cultural heritage of the North York Moors National Park; - To conserve and enhance the setting of designated landscapes, including those outside of the Plan area; - To protect and enhance the natural beauty of Areas of Outstanding Natural Beauty -To protect and enhance local landscape / townscape character and quality, local distinctiveness and sense of place; -To protect the setting of important townscapes; -To protect the purposes and 'positive use'[20] of the Green Belt; -To protect coastal landscape and seascape character; -To protect and improve tranquillity levels and reduce sources of intrusion, such as light pollution;	1. Number of minerals and waste planning applications in the green belt / designated landscapes / conservation areas (NYCC, CYC, NYMNPA); 2. Number of planning conditions related to visual amenity / noise / lighting for minerals and waste sites (NYCC, CYC, NYMNPA); 3. Ratio of standalone minerals / waste sites to sites located next to existing buildings (NYCC)

[20] The National Planning Policy Framework defined 5 purposes to the Green Belt and also recommends that local planning authorities should 'plan positively to enhance the beneficial use of the Green Belt'.

Sustainability Objectives	Sub objectives	Indicators
	-To co-locate waste facilities with complementary industrial facilities where possible to reduce dispersed visual intrusion; -Preserve, enhance and complement architectural character and complexity	
12. Achieve sustainable economic growth and create and support jobs	-To increase the level and range of employment opportunities, particularly in deprived areas; -To encourage stable economic growth through provision of an adequate, sustainable, low cost and steady supply of minerals; -To promote conditions which enable sustainable local economic activity and regeneration and encourage creativity and innovation; -To capture value from waste streams by creating saleable products from them -Promote a low carbon economy -Support existing employment drivers and create new ones -Support existing businesses and the local economy outside of the minerals and waste sectors	1. Economically Active Rate of 16 to 64 year olds 2 Number of new bank accounts (first current accounts from a small business banking range) (LEP) 3. Unemployment rate (Annualised Population Survey Rate) 4. Gross median weekly earnings of residents and people who work within the area (NYCC) 5. Number of minerals and waste planning applications (NYCC)
13. Maintain and enhance the viability and vitality of local communities	-Provide opportunities to boost tourism -To promote job creation, training and volunteer opportunities -Contribute to the provision of housing through the provision of construction materials -Promote conditions that would maintain the vitality and functionality of the community	1.Ratio of lower quartile house prices to lower quartile earnings (NYCC Stream) 2.Economically Active Rate of 16 to 64 year olds 4.Number of visits to historic sites (Yorkshire and the Humber) (English Heritage)
14. Provide opportunities to enable recreation, leisure and learning	-Provide opportunities to enable the enjoyment and understanding of the special qualities of the National Park;	1. Length of Public Rights of Way Network (NYCC/CYC/NYMNP) 2. People qualified to at least level 4 who are

Sustainability Objectives	Sub objectives	Indicators
	-Promote recreation in the countryside and AONBs, consistent with the wider social, economic and environmental facets; -Provide opportunities for lifelong learning -To contribute to networks of multifunctional green infrastructure -To increase access to the public rights of way network and the wider countryside	economically active (NYCC Stream) 3. Visits to places out of doors (as measured in Natural England's MENE programme) (Natural England)
15. Protect and improve the wellbeing, health and safety of local communities	-To minimise the impact of nuisances associated with minerals and waste development, such as noise pollution, odour and severance; -Reduce traffic accidents -To reduce health inequalities; -To promote healthy living, offer opportunities for more healthy lifestyles and improve life expectancy; -To improve levels of wellbeing -To ensure the safety and security of local people and visitors -To ensure that pollution does not pose unacceptable risks to health	1. Incapacity benefit claimants as percentage of working age population (NYCC Steam) 2. Mortality rate from coronary heart disease (NYCC Stream) 3. Road accident Casualties – Killed and Seriously Injured (NYCC Stream) 4. Life expectancy at birth (ONS) 5. Fly tipping incidents reported by Local Authorities (by waste source) (NYCC Stream) 6. Anti-social behaviour (all categories) number (NYCC Stream) 7. All age respiratory disease mortality (Public Health England)
16. Minimise flood risk and reduce the impact of flooding	-To ensure that the location and design of new development has regard to the potential risk, causes and consequences of flooding; -To promote opportunities for sustainable flood alleviation; -To reduce the number of people and properties at risk of flooding.	1. Allocations requiring exception testing in North Yorkshire SFRA (NYCC) 2. Number of planning conditions relating to SUDS (NYCC, CYC, NYMNPA)
17. Address the needs of a changing population in a	-To enable development and wider activity to meet the needs of the population;	1. Number of consultation responses to Joint Plan and Sustainability Appraisal (NYCC)

Sustainability Objectives	Sub objectives	Indicators
sustainable and inclusive manner	-To support shortened supply chains for building materials; -To enable the community to contribute to and have influence in decision making -To improve public access to facilities enabling sustainable waste management -To support community led waste management schemes -Reduce social exclusion	2. Number of Household Waste Recycling Centres (NYCC, CYC) 3. Indices of Deprivation Average Rank (NYCC Stream)

Appendix 2 – Potential Main Effects of Minerals and Waste Development

Potential main effects of minerals developments

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
Crushed Rock	Associated infrastructure required for quarrying may include access roads, buildings/compounds and paved areas.	Typically extracted from large deep quarries – extraction may involve use of explosives, secondary breaking and vehicle movements.	Processing may involve removal of clays and fines, followed by crushing to produce different grades of aggregate.	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of restoration effects will vary.	While transportation can be undertaken via a range of modes, typically it is undertaken by road.	Waste products may be stored on site in tips or possibly using settlement lagoons.	-Blades et al[22] note possible secondary effects arising from crushed rock dust on historic buildings, including soiling of building exteriors and chemical attack on buildings and artefacts. However, modern practices such as washing vehicle wheels are likely to reduce any impact significantly. -Without mitigation, dewatering, while potentially impacting directly on the water table, may also lead to secondary effects on surface water bodies, either as a result of surface water / groundwater interactions where surface water bodies are groundwater fed or as a result of discharge of water to a surface water body[23] Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an
	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Fumes (from	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Water consumption and waste water	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Groundwater rebound could be an issue depending on restoration	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Vehicle washing (impacts to water)	Potential Negative Effects Include: ➢ Visual impact of piles of overburden / other waste rock ➢ Dust ➢ Run off / sedimentation of	

[21] Whilst some impacts of mineral extraction may occur during construction but be a result of the development, such as loss of historic assets, the construction impacts focus on the effects of the construction process, with the more general effects of the extraction / development being considered in the extraction column.

[22] Blades et al, undated. Impacts of Crushed Rocks on Historic Villages and Cultural Landscapes [URL: eprints.ucl.ac.uk/4845/1/4845.pdf - URL is no longer available].

[23] Sustainable Aggregates, undated. Theme 1: Reducing the Environmental Effect: Reducing the Environmental Effect of Aggregate Quarrying on the Water Environment [URL: http://www.sustainableaggregates.com/library/docs/mist/l0084_t1b_water.pdf].

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed during construction	blasting) ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual (but limited built development) ➢ Groundwater (quality and quantity) including dewatering ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Traffic (emissions and safety)	➢ Energy use ➢ Visual (from plant and equipment) and landscape	objectives ➢ Eutrophication of enclosed waterbody[24] ➢ Visual and landscape	➢ Disturbance and displacement effects where vehicles go through important habitats ➢ Highway capacity	watercourses ➢ Smothering of habitats through storage of overburden.	area. Key Sources: Blades et al, undated. Impacts of Crushed Rocks on Historic Villages and Cultural Landscapes [URL: eprints.ucl.ac.uk/4845/1/4845.pdf - URL is no longer available British Geological Survey, 2013. Construction Aggregates: Mineral Planning Factsheet
	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:	

[24] Sustainable Aggregates cite stagnation of water due to stratification of water in isolated water bodies as a common problem in aggregate quarry restorations where mitigation has not been appropriately considered, causing eutrophic algal blooms and potential health risks associated with the formation of blue green algae (Sustainable aggregates, undated).

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
	➢ Employment / local economy	➢ Employment / local economy	➢ Employment / local economy	➢ Employment / local economy ➢ Habitat Creation ➢ Recreation and amenity ➢ Landscape and visual ➢ Food provision (restoration to agriculture) ➢ Waste disposal (where infilling operations are involved) ➢ Geological diversity	➢ Employment / local economy	n/a	
Sand and Gravel	Associated infrastructure required for quarrying may include access roads, buildings/compounds and paved areas.	Usually extracted from shallow quarries with limited overburden. River gravel sites may be below the water table (often close to rivers).	Processing may involve washing and scrubbing, grading and crushing of oversize gravel and blending.	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of restoration effects will vary.	While transportation can be undertaken via a range of modes, typically it is undertaken by road.	Waste products may be stored on site in tips or using settlement lagoons. Impacts can vary.	See secondary effects of crushed rock above. Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: British Geological Survey, 2013. Construction Aggregates: Mineral Planning Factsheet
	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
	➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed during construction	➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land / overburden ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual (but limited built development) ➢ Groundwater (quality and quantity) including dewatering ➢ Impacts on rights of way ➢ Disturbance of surface water drainage regime ➢ Impacts on historic environment ➢ Traffic (emissions	➢ Noise ➢ Water consumption and waste water ➢ Energy use ➢ Dust and other emissions ➢ Vibration ➢ Visual (from plant and equipment) and landscape	➢ Noise (temporary) ➢ Dust (temporary) ➢ Groundwater rebound ➢ Eutrophication of enclosed waterbody ➢ Possible effects on aviation where restoration involves creation of surface waterbodies (birdstrike) ➢ Visual and landscape	➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Disturbance and displacement effects where vehicles go through important habitats ➢ Vehicle washing (impacts to water) ➢ Highway capacity	➢ Visual ➢ Dust ➢ Run off / sedimentation of watercourses	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		and safety)					
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Habitat creation ➢ Recreation and amenity ➢ Landscape ➢ Flood storage ➢ Employment / local economy ➢ Food provision (restoration to agriculture) ➢ Geological diversity	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: n/a	
Onshore Conventional Gas	The initial phase of onshore gas extraction usually involves seismic survey using techniques such as vibroseis[25] (not considered here). This is then followed by the drilling of one	In order to facilitate commercial extraction, the well/s must be 'completed' to allow for the flow of gas to the surface. This process	Processing may be minimal, however, it may include refinement, such as removal of propane liquid and hydrogen	Dependant on the type of restoration effects will vary.	Gas is usually transported via pipeline.	Waste products may include: Well stimulation fluid, waste drilling muds and drill cuttings, waste water or sludges / sediments, and possible fugitive	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: British Geological Survey, 2013. Onshore Oil and Gas: Mineral Planning Factsheet

[25] Vibroseis usually involves vehicle mounted vibration pads, where sound waves are generated and collected via geophones.

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	or more exploration wells. Following commercial appraisal (and permissions sought) production pads may be constructed containing the drilling wells, and associated infrastructure such as gas pipelines (considered in transport) and access will be constructed.	involves well casing and installation of equipment to ensure an efficient flow of gas from the well. Effects arising during the extraction phase are likely to be similar to those arising during the construction phase.	sulphide using controlled processes.			or waste gas emissions[26].	Department of Energy and Climate Change, 2010, Onshore Oil and Gas Licensing: Strategic Environmental Assessment for a 14th and Subsequent Onshore Oil and Gas Licensing Rounds – Environmental Report [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/66721/onshore-er.pdf] Department of Energy and Climate Change, 2013, Strategic Environmental Assessment for Further Onshore Oil and Gas Licensing – Environmental Report [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266330/environmental_report.pdf]
	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Dust ➢ Traffic (emissions and safety) ➢ Visual /setting ➢ Run-off (vehicles and soil etc.) affecting water bodies and habitats	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Dust and other emissions ➢ Traffic (emissions and safety) ➢ Visual / landscape	Potential Negative Effects Include: ➢ On site safety risk (if incorrectly managed) ➢ Air pollution (where flaring occurs) ➢ Visual / landscape	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Visual and landscape	Potential Negative Effects Include: ➢ Habitat loss ➢ Soil loss ➢ Landscape ➢ Archaeology	Potential Negative Effects Include: ➢ Chemical spills and discharges affecting groundwater, surface water and soils; ➢ Atmospheric emissions	

[26] This is not a comprehensive list. See Environment Agency, 2013. Onshore Oil and gas exploratory operations: technical guidance consultation draft. [URL: consult.environment-agency.gov.uk/file/2582905]

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
	➢ Impacts on groundwater (e.g. from spillage of drilling fluids) ➢ Disturbance to wildlife ➢ Land take leading to loss of habitat, damage to or loss of cultural heritage, and loss of agricultural land ➢ Climate change (loss of carbon sequestration and generation of greenhouse gases from direct or indirect combustion of fossil fuels) ➢ Lighting ➢ Environmental footprint of materials consumed during construction	(incl. stacks) ➢ Run-off (from hard surfacing) affecting water bodies and habitats ➢ Impacts on groundwater e.g. contamination from drilling fluids ➢ Disturbance to wildlife ➢ Climate change (fugitive emissions of greenhouse gases) ➢ Lighting	➢ Soil / Agricultural land ➢ Noise ➢ Cultural heritage ➢ Loss of habitat				
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Lower CO_2 emissions	Potential Positive Effects Include: ➢ Employment / local	Potential Positive Effects Include: ➢ Habitat enhancement	Potential Positive Effects Include: n/a	Potential Positive Effects Include: n/a	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		than coal fired power stations ➢ Contribution to energy security ➢ Employment / local economy	economy	/ creation ➢ Recreation and amenity ➢ Heritage assets ➢ Landscape ➢ Employment / local economy			
Unconventional Gas (Shale Gas, Underground Coal Gasification and Coal Bed Methane)	A range of processes may be carried out prior to extraction, from initial seismic survey to test drilling. Typically an access road and well pad will be constructed and vertical drilling will be undertaken with a smaller rig. After this exploratory phase a larger horizontal drilling rig will be set up alongside associated outbuildings prior to the hydraulic fracturing / combustion processes proceeding.	Once infrastructure is in place hydraulic fracturing involves the pumping of fluid and propping agent (e.g. sand) down a wellbore at pressure to create fractures in the deep rock. A well bore is used that allows both vertical and horizontal drilling, and fractures (held open by the propping agent) start at the horizontal stage of the wellbore.	As onshore conventional gas.	As onshore conventional gas.	As onshore conventional gas.	Waste products can include contaminated wastewater containing chemicals used in the fracturing process and natural sub surface contaminants, as well as waste gases (which may be flared or vented).	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value (and economy) of an area. Key Sources: Tyndall Centre for Climate Change Research, 2011. Shale Gas: an updated assessment of environmental and climate change impacts, University of Manchester [URL: tyndall.ac.uk/sites/default/files/coop_shale_gas_report_update_v3.10.pdf] Department of Energy and Climate Change, 2013, Strategic Environmental Assessment for Further Onshore Oil and Gas Licensing – Environmental Report [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266330/onshore_oil_gas_environmental_report.pdf

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		As fluid is pumped back to the surface, the gas then flows through the bore. Fluids continue to return to the surface after the gas has been extracted.					rt.pdf] Environment Agency UCG Factsheet (environment-agency.gov.uk/static/documents/Business/UCG_factsheet_16_Aug10.pdf) www.ucgassociation.org Regulatory Guidance: Coal Bed Methane and Shale Gas (SEPA, 2012)
	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Dust ➢ Traffic (emissions and safety) ➢ Visual ➢ Run-off (vehicles and soil etc.) affecting water bodies and habitats ➢ Impacts on groundwater (e.g. from spillage of drilling fluids) ➢ Damage to or loss of cultural heritage ➢ Disturbance to wildlife	Potential Negative Effects Include: ➢ Fugitive emissions of greenhouse gases (methane) ➢ Contamination of groundwater with solutes of gases or fracturing fluids (sub surface) ➢ Contamination of surface or ground water due to spills of return fluids				Potential Negative Effects Include: ➢ Chemical spills and discharges affecting groundwater, surface water and soils; ➢ Atmospheric emissions / climate change ➢ Burden on existing wastewater treatment infrastructure capacity ➢ Vehicle emissions,	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
	➢ Land take and associated loss of habitat and loss of agricultural land ➢ Lighting ➢ Loss of / damage to archaeological assets (pipeline) ➢ Wider landscape (pipeline) ➢ Climate change (greenhouse gas emissions) ➢ Environmental footprint of materials consumed during construction	and chemicals ➢ Noise ➢ Vibration ➢ Use of water resources ➢ Air quality ➢ Seismic activity ➢ Traffic (emissions and safety) ➢ Dust ➢ Climate change (CO_2 emissions)				noise, vibration, dust and safety issues associated with transportation of waste products	
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ When used for power generation results in lower CO_2 emissions overall than generating power from fossil fuels ➢ Contribution to energy security				Potential Positive Effects Include: n/a	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		➢ Employment / local economy					
Potash	Potash extraction involves the construction of a mine comprising of mine shafts, ventilation buildings, processing buildings and administrative buildings considering the large number of workers required at such sites. Transportation from site is also required via methods such as train or pipeline. Such development is therefore large scale.	Potash is extracted by underground mining methods using remotely controlled continuous mining machines.	Processing may involve crushing, grinding, froth flotation, dewatering, drying and screening.	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of restoration effects will vary.	Transportation of potash off site may be by pipeline or rail.	Waste products include slurry comprising insoluble clay minerals, calcium sulphate and sodium chloride mixed with brine.	Secondary impacts may be associated with visual effects and increased levels of activity – such as impacts on the local recreational or tourist value (and economy) of an area. There may also be secondary effects associated with issues such as housing workers but this would be considered outside of the Minerals and Waste Plan. Key Sources: British Geological Survey, 2011. Potash: Mineral Planning Factsheet Planning Application NYM/2013/0062/MEIA (York Potash Ltd) Cleveland Potash Annual Environmental Statement, May 2013
	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Traffic – workers and haulage (emissions and safety) ➢ Visual (incl. spoil) ➢ Run-off (flood risk and sedimentation)	Potential Negative Effects Include: ➢ Visual (large buildings) ➢ Dust ➢ Noise ➢ Groundwater (quantity and quality) ➢ Loss of habitat	Potential Negative Effects Include: ➢ Noise ➢ Dust ➢ Vibration ➢ Visual (large buildings) ➢ Transportation ➢ Lighting ➢ Traffic -	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Visual and landscape	Potential Negative Effects Include: (Pipeline) ➢ Habitat loss ➢ Soil loss ➢ Landscape ➢ Archaeology (Rail) ➢ Noise ➢ Landscape	Potential Negative Effects Include: ➢ Slurry has in the past been deposited out to sea (leading to deposition of heavy metals) ➢ Vehicle emissions,	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	➢ Dust ➢ Recreation ➢ Tourism ➢ Lighting ➢ Disturbance to wildlife ➢ Loss of or damage to cultural heritage ➢ Land take and associated loss of habitat and loss of agricultural land ➢ Impacts on groundwater (hydrology and hydrogeology) from shaft sinking ➢ Impacts on rights of way ➢ Environmental footprint of materials consumed during construction	➢ Lighting ➢ Traffic (emissions and safety) ➢ Loss of soil / agricultural land ➢ Subsidence (minor)	workers (emissions and safety) ➢ Loss of or damage to cultural heritage ➢ Energy use		➢ Habitat loss	noise, vibration, dust and safety issues associated with transportation of waste products	
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Habitat Creation / enhancement ➢ Recreation and amenity	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: n/a	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
				➢ Landscape ➢ Heritage assets ➢ Food provision (restoration to agriculture) ➢ Employment / local economy			
Building Stone	Associated infrastructure required for quarrying may include access roads, buildings/compounds and paved areas.	Building stone is usually quarried at the surface. The objective is to recover large undamaged rocks from the quarry face. Excavation of sedimentary rocks generally utilises mechanical excavators although 'black powder' blasting techniques are sometimes used.	Softer stones like limestone may be shaped by hand or cut by methods such as mechanical guillotine, while harder stones may require techniques such as use of diamond rotary blades or high pressure water jets. Finishing may involve abrasives or flame jet texturing.	Dependant on the type of restoration effects will vary.	Transportation is usually via road.	Can produce relatively large volumes of stone waste that may sometimes be sold on or processed as aggregate.	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: British Geological Survey, 2007. Building and Roofing Stone: Mineral Planning Factsheet
	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed during construction	➢ Noise ➢ Vibration ➢ Dust ➢ Visual / landscape (limited built development) ➢ Land take resulting in loss of habitat / soils ➢ Disturbance to wildlife ➢ Loss of or damage to cultural heritage ➢ Traffic (emissions and safety) ➢ Disturbance of surface water drainage regime	➢ Use of high pressure water jets for stone working can lead to water consumption and drainage impacts ➢ Noise ➢ Vibration ➢ Dust ➢ Traffic (emissions and safety) ➢ Visual ➢ Energy use	➢ Noise (temporary) ➢ Dust (temporary) ➢ Visual and landscape	➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Disturbance and displacement effects where vehicles go through important habitats ➢ Highway capacity ➢ Vehicle washing (impacts to water)	➢ Storage of waste can be visually intrusive. ➢ Smothering of habitats through storage of overburden.	
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Source of historic building materials	Potential Positive Effects Include: ➢ Employment / local economy ➢ Finished	Potential Positive Effects Include: ➢ Habitat creation / enhancement ➢ Recreation	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Supply of aggregate	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		➢ Employment / local economy	historic building materials ➢ Quality of the built environment	and amenity ➢ Heritage assets ➢ Landscape ➢ Flood storage ➢ Geological diversity ➢ Possible location for storage of inert landfill			
Silica Sand	Associated infrastructure required for quarrying may include access roads, buildings/compounds and paved areas.	Generally surface quarrying is the preferred method of extraction. Usually sandstone deposits are ripped out rather than blasted or drilled, with looser sands removed by techniques such as suction dredging.	Processing varies according to the grade of sand required, but may involve washing, scrubbing, froth flotation, magnetic separation, acid leaching and sorting and blending.	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of restoration effects will vary.	While transportation can be undertaken via a range of modes, typically it is undertaken by road.	Removal of overburden can result in a need to store soils etc.	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: British Geological Survey, 2009. Silica Sand: Mineral Planning Factsheet
	Potential Negative Effects Include: ➢ Noise	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
	➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed during construction	➢ Noise ➢ Vibration ➢ Dust ➢ Loss of soil / agricultural land ➢ Greenhouse gas emissions ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual (but limited built development) ➢ Groundwater (quality and quantity) including dewatering ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage	➢ Storage / handling of chemical leaches (potential for spills) ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Water consumption and waste water ➢ Energy use ➢ Visual (from plant and equipment) and landscape	➢ Noise (temporary) ➢ Dust (temporary) ➢ Groundwater rebound could be an issue depending on restoration objectives ➢ Eutrophication of enclosed waterbody[27] ➢ Visual and landscape	➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Disturbance and displacement effects where vehicles go through important habitats ➢ Vehicle washing (impacts to water) ➢ Highway capacity	➢ Visual impact of piles of overburden / other waste rock ➢ Dust ➢ Run off / sedimentation of watercourses ➢ Smothering of habitats through storage of overburden.	

[27] Sustainable Aggregates cite stagnation of water due to stratification of water in isolated water bodies as a common problem in aggregate quarry restorations where mitigation has not been appropriately considered, causing eutrophic algal blooms and potential health risks associated with the formation of blue green algae (Sustainable aggregates, undated).

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		regime ➢ Traffic (emissions and safety)					
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy ➢ Specialist industrial and commercial applications (economic growth)	Potential Positive Effects Include: ➢ Employment / local economy ➢ Habitat Creation ➢ Recreation and amenity ➢ Landscape ➢ Food provision (restoration to agriculture) ➢ Waste disposal (where infilling operations are involved) ➢ Geological diversity	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: n/a	
Recycled aggregates	n/a	n/a	To meet demanded specifications key waste streams from construction, demolition and	n/a	Transportation is mostly undertaken by road, though there is the possibility of on-site		Key Sources: Sustainable Aggregates Information Gateway, undated. Producing Recycled Aggregate [URL: http://www.sustainableaggregates.com/sourcesofaggregates/recycled/rib_operation.htm]

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
			excavation activities need to be processed, usually via mechanical crushing and then screening to remove any contaminants. For higher quality aggregates washing or use of an air blower may be involved. Mobile plant means recycling can be carried out on site, though more centralised facilities can be used, such as waste processing facilities.		production of recycled aggregates (eliminating the need for transport, other than for crushing facilities etc.)		
			Potential Negative Effects Include: ➢ Dust		Potential Negative Effects Include: ➢ Dust		

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
			➢ Noise (associated with crushing and screening plant) ➢ Water pollution /consumption (e.g. from runoff from storage of material) ➢ Transport (leading to air pollution) ➢ Energy use		➢ Noise ➢ Vibration ➢ Traffic (emissions and safety) ➢ Disturbance and displacement effects where vehicles go through important habitats ➢ Highway capacity		
			Potential Positive Effects Include: ➢ Reclassification of a waste as a product so reducing landfill and its environmental effects ➢ Reduction in demand for primary aggregates		Potential Positive Effects Include: ➢ Employment / local economy		

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
			➢ Lower embodied energy content within aggregate ➢ Employment / local economy				
Secondary Aggregates (e.g. colliery spoil and power station ash)	n/a	n/a	Processing may be required including screening/grading and in some cases excavation form previously deposited ash/spoil	n/a	Transportation is usually via road.	n/a	Key Sources: British Geological Survey, 2013.Construction Aggregates : Mineral Planning Factsheet
			Potential Negative Effects Include: ➢ Dust and other emissions ➢ Noise ➢ Water pollution (e.g. from runoff from storage of		Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Disturbance and displacement effects where		

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
			material) ➢ Transport (leading to air pollution) ➢ Energy use		vehicles go through important habitats ➢ Highway capacity		
			Potential Positive Effects Include: ➢ Reclassification of a waste as a product so reducing landfill and its environmental effects ➢ Reduction in demand for primary aggregates ➢ Employment / local economy		Potential Positive Effects Include: ➢ Employment / local economy		
Vein Minerals	Associated infrastructure required for extracting vein minerals may include access roads, buildings/compounds, paved areas, mine shafts etc.	Vein minerals can be extracted from both open pit quarries and via underground mines, though the former is	Processing vain minerals can involve techniques such as crushing, washing, heavy media separation,	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of	While transportation can be undertaken via a range of modes, typically it is undertaken by road.	Associated minerals may also be sold on thus avoiding some waste types. However, other wastes may include waste water and	The significance and range of impacts depends on whether extraction is open cast or underground Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		favoured. Vein minerals may be extracted with other minerals (e.g. limestone).	froth flotation.	restoration effects will vary.		overburden.	area. Key Sources: British Geological Survey, 2006. Barytes: Mineral Planning Factsheet British Geological Survey, 2010. Fluorspar: Mineral Planning Factsheet
	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Impacts on groundwater (hydrology and hydrogeology) from shaft sinking ➢ Environmental footprint of materials	Potential Negative Effects Include: ➢ Noise ➢ Dust ➢ Vibration ➢ Visual / landscape ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Loss of or damage to cultural heritage ➢ Traffic (emissions and safety) ➢ Hydrological impacts ➢ Impacts on rights of way	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Water pollution / consumption (e.g. ingress of pollutants to water from plant) and waste water ➢ Energy use ➢ Visual (from plant and equipment) and landscape	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Visual and landscape	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Disturbance and displacement effects where vehicles go through important habitats ➢ Vehicle washing (impacts to water) ➢ Highway capacity	Potential Negative Effects Include: ➢ Pollution of surface water from run off from overburden or mismanaged waste water ➢ Smothering of habitats through storage of overburden ➢ Visual impact of piles of overburden / other waste rock ➢ Dust	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	consumed during construction						
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Habitat Creation / enhancement ➢ Recreation and amenity ➢ Landscape ➢ Heritage assets ➢ Food provision (restoration to agriculture) ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: n/a	
Coal	Access roads and mine shafts along with any other required associated infrastructure (buildings/compounds, paved areas etc.) will need to be constructed prior to coal extraction.	Although coal can be mined using both open cast and underground (deep) mining, in practice in the plan area there is no opencast mining.	Coal often has to be prepared to separate it from interbedded mudstones and other rocks to make a saleable product. Inorganic sulphur may also be	Dependant on the type of restoration effects will vary.	Coal may involve rail or road transportation, or both. For instance at North Yorkshire's active mine coal is sent to nearby power plants by rail, while spoil is	Wastes include Coal Mine Methane / Abandoned Mine Methane and Colliery spoil claystones and siltstones.	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. This list of impacts assumes deep coal mining rather than open cast. Key Sources: British Geological Survey, 2010. Coal: Mineral Planning Factsheet

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
			removed. This is achieved through various techniques including treatment in an oscillating column of water (a washery), suspension of magnetite in water or froth flotation.		sent for disposal by road.		
	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water	Potential Negative Effects Include: ➢ Noise ➢ Dust ➢ Vibration ➢ Visual / landscape ➢ Mine subsidence ➢ Water pollution (e.g. acid mine drainage) and effects on water table ➢ Methane	Potential Negative Effects Include: ➢ Noise ➢ Dust ➢ Visual / landscape ➢ Water pollution /consumption (e.g. ingress of pollutants to water from plant) ➢ Production of colliery spoil (waste which may	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Minewater rebound (may occur at some distance from restoration after mines are decommissioned). This may be an issue if overlying aquifers	Potential Negative Effects Include: ➢ Dust ➢ Noise ➢ Vibration ➢ Safety ➢ Emissions ➢ Highway capacity ➢ Water pollution impacts on surface water bodies from activities such as wheel	Potential Negative Effects Include: ➢ Coal Mine Methane / Abandoned Mine Methane (source of hazard and climate change if unmanaged) ➢ Visual impact of stored waste products	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	drainage regime ➢ Impacts on groundwater (hydrology and hydrogeology) from shaft sinking ➢ Environmental footprint of materials consumed during construction	production ➢ Disturbance to wildlife ➢ Traffic (emissions and safety) ➢ Impacts on rights of way	be used for alternative purposes) ➢ Energy use	become contaminated with polluted water.	washing ➢ Disturbance and displacement effects where vehicles go through important habitats		
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Habitat Creation / enhancement ➢ Recreation and amenity ➢ Landscape ➢ Heritage assets ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Colliery spoil claystones and siltstones may be used as low grade aggregate. ➢ Coal mine methane can be exploited as a source of energy	
Coal Mine Methane	n/a	CMM extraction (not including pre-mining methane extraction) can take place during	n/a	n/a	n/a	Waste gases include carbon dioxide and water vapour.	Generating electricity from CMM produces waste gases that have a significantly lower global warming potential than methane. Key Sources:

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		extraction or after extraction and methods vary according to the phase of extraction. Chiefly either VAM (Ventilation Air Methane) or gob gas (methane from collapsed mine shafts) are utilised to create heat or electricity (e.g. via a lean burn gas turbine systems).					World Coal Association, undated. Coal Mine Methane [URL: worldcoal.org/coal/coal-seam-methane/coal-mine-methane/] The Coal Authority, undated. Coal Mine Methane Activity in the UK [URL: coal.decc.gov.uk/en/coal/cms/publications/mining/methane/methane.aspx]
		Potential Negative Effects Include: ➢ Visual intrusion ➢ Noise ➢ Emissions				Potential Negative Effects Include: n/a	
		Potential Positive Effects Include: ➢ Avoidance of				Potential Positive Effects Include: ➢ Conversion of methane to	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		hazard ➢ Energy or heat generation				more inert gases with a lowered global warming potential ➢ Safety	
Clay	Associated infrastructure required to facilitate clay extraction may include access roads, buildings/compounds and paved areas.	Clay is usually extracted by open pit methods.	Clays generally undergo little processing other than grinding and screening in order to remove any hard or coarse components.	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of restoration effects will vary.	Transportation is usually via road.	Waste products may be stored onsite in tips.	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: British Geological Survey, 2007. Brick Clay: Mineral Planning Factsheet
	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual ➢ Impacts on rights of way ➢ Impacts on historic environment	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual (but limited built	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Energy Use ➢ Visual (from plant and equipment) and landscape	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Groundwater rebound ➢ Eutrophication of enclosed waterbody ➢ Possible effects on aviation where restoration	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Vehicle washing (impacts to water) ➢ Disturbance and displacement effects where	Potential Negative Effects Include: ➢ Visual impact of piles of overburden / other waste rock ➢ Dust ➢ Run off / sedimentation of watercourses ➢ Smothering of habitats through storage of	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed during construction	development) ➢ Groundwater (quality and quantity) ➢ Impacts on rights of way ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime ➢ Traffic (emissions and safety)		involves creation of surface waterbodies (birdstrike) ➢ Visual and landscape	vehicles go through important habitats ➢ Highway capacity	overburden.	
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Habitat creation ➢ Recreation and amenity ➢ Landscape ➢ Flood storage ➢ Employment / local economy ➢ Food provision (restoration to agriculture)	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Aggregate from overburden may be saleable.	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
				➢ Geological diversity			
Gypsum	Access roads and mine shafts along with any other required associated infrastructure (buildings/compounds, paved areas etc.) will need to be constructed prior to mineral extraction.	Gypsum is extracted predominantly by underground mining using pillar and stall mining methods.	Processing generally involves screening to remove fines, followed by crushing and grinding.	Restoration may vary from restoration for wildlife to restoration of agricultural land or for recreation. Dependant on the type of restoration effects will vary.	Transportation is usually via road or rail.	Generally no significant waste is produced.	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: British Geological Survey, 2006. Gypsum: Mineral Planning Factsheet
	Potential Negative Effects Include: ➢ Noise ➢ Traffic – workers and haulage (emissions and safety) ➢ Visual (incl. spoil) ➢ Run-off (flood risk and sedimentation) ➢ Dust ➢ Lighting ➢ Disturbance to wildlife ➢ Loss of or damage to cultural heritage ➢ Land take and	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Visual (buildings) ➢ Groundwater (quantity and quality) ➢ Loss of habitat ➢ Lighting ➢ Traffic (emissions and safety) ➢ Recreation	Potential Negative Effects Include: ➢ Visual (large buildings) ➢ Transportation ➢ Lighting ➢ Traffic - workers (emissions and safety) ➢ Noise ➢ Vibration ➢ Energy use	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Visual and landscape	Potential Negative Effects Include: ➢ Noise ➢ Vibration ➢ Emissions ➢ Safety ➢ Dust ➢ Vehicle washing (impacts to water) ➢ Disturbance and displacement effects where vehicles go through	n/a	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	**Extraction**	**Processing**	**Restoration**	**Mineral Transportation**	**Waste Production**	**Notes (including significant secondary / indirect effects)**
	associated loss of habitat and loss of agricultural land ➢ Impacts on groundwater (hydrology and hydrogeology) from shaft sinking ➢ Environmental footprint of materials consumed during construction	➢ Tourism ➢ Disturbance to wildlife ➢ Impacts on historic environment ➢ Disturbance of surface water drainage regime			important habitats ➢ Highway capacity		
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Habitat creation ➢ Recreation and amenity ➢ Landscape ➢ Heritage assets ➢ Employment / local economy ➢ Food provision (restoration to agriculture)	Potential Positive Effects Include: ➢ Employment / local economy	n/a	
Borrow Pits	n/a	Borrow pits are mineral workings used to supply material solely	n/a	n/a	n/a	n/a	

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		in connection with a specific construction or engineering project. Effects may be broadly similar to other surface quarrying methods however they are generally at a smaller scale.					
		Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Loss of soil / agricultural land ➢ Loss of habitat ➢ Disturbance to wildlife ➢ Visual / impacts on setting ➢ Groundwater (quality and quantity)					

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		➢ Impacts on rights of way ➢ Disturbance of surface water drainage regime					
		Potential Positive Effects Include: ➢ Extraction of materials generally takes place close to where they are required therefore reducing the need for transportation (and its associated effects including emissions, safety, highway capacity, vibration etc.) ➢ Employment / local					

Mineral / Extraction Type	Stage in Extraction Lifecycle						
	Construction[21]	Extraction	Processing	Restoration	Mineral Transportation	Waste Production	Notes (including significant secondary / indirect effects)
		economy					

Potential main effects of waste developments

Recycling Facilities	After temporary storage at a waste transfer station, usually the earlier stages of recycling are undertaken in a Materials Recovery Facility which accepts, sorts and bales waste streams into different categories (e.g. paper, plastics). After this the baled waste may go on to a reprocessing plant for (using the example of aluminium) shredding, decoating, melting and casting. The impacts described below are for the construction of a Materials Recovery Facility.	Vehicles will arrive at a MRF and tip recyclable waste on to a tipping floor before being deposited into a storage pit. The waste is then fed on to conveyors and may be subjected to sorting via techniques such as magnetic separation, eddy current separation, optical separation or air classification. After separation, materials are baled and then transported on for reprocessing. Residual non-recyclable wastes are also separated and baled. All waste treatment facilities are tightly regulated. However, theoretical operational impacts are	n/a	This is usually undertaken by road.	n/a	This section does not consider green waste which may also be taken to a MRF. Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: DEFRA, Draft Materials Recovery Facility (MRF) Regulations for Insertion into Environmental Permitting (England and Wales) (Amendment) Regulations 2013

[28] Reuse has not been specifically covered in this summary of potential effects because as a standalone operation it rarely falls under the remit of the Minerals and Waste Joint Plan although it is recognised that it may take place as a subsidiary operation of another waste management process such as recycling.

[29] It should be noted that multiple processes may take place in one facility however for the purposes of this summary of potential effects we have endeavoured to separate out the potential effects associated with each individual stage.

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
		outlined below.				
	Potential Negative Effects Include: ➢ Noise ➢ Dust ➢ Vibration ➢ Possible loss of habitat / archaeology / soils ➢ Visual impact ➢ Traffic (emissions and safety) ➢ Spillage of fuel (impacts on water / soils) ➢ Run off (flood risk and sedimentation) ➢ Environmental footprint of materials consumed during construction	Potential Negative Effects Include: ➢ Noise ➢ Odour, dust and litter ➢ Visual impact ➢ Run off ➢ Energy use of buildings ➢ Use of water resources ➢ Traffic (emissions and safety)		Potential Negative Effects Include: ➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity		
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Diversion of waste from landfill ➢ Reduction in costs of landfilling waste ➢ Employment / local economy		Potential Positive Effects Include: ➢ Employment / local economy		
Compostin	In vessel composting	IVC involves the delivery		Usually food waste and	n/a	Secondary impacts

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
g – In vessel	(IVC) is a method of composting food and garden waste in a temperature controlled enclosed environment. There are a number of IVC systems (WRAP define 6 types: containers, silos, agitated bays, tunnels, rotating bays and enclosed halls), however, each will require some built infrastructure.	and reception of food and garden waste into an enclosed area, followed by shredding. Micro- organisms then begin to break down the waste at 60 to 70 Celsius as it moves through a series of areas before being left to mature and stabilise. Finally it is screened to ensure it is of product quality. Unmitigated possible impacts are outlined below.		compost is moved by road.		may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: WRAP, 2012. In vessel composting [IVC] [URL: wrap.org.uk /content/vessel-composting-ivc] Public Health England, undated. Bioaerosols – General Information [URL: hpa.org.uk/ Topics/ InfectiousDisea ses/ InfectionsAZ/Bioae rosols/BioaerosolsQan dA/]
	Potential Negative Effects Include: ➢ Noise ➢ Possible habitat / archaeology / soils loss due to land take of buildings and access ➢ Disturbance to wildlife ➢ Visual impact and lighting ➢ Traffic (emissions and safety) ➢ Spillage of fuel (impacts on water /	Potential Negative Effects Include: ➢ Run-off from building roofs and access ➢ Odour ➢ Air quality (bio-aerosols) ➢ Occupational health impacts of bio-aerosols ➢ Energy use ➢ Traffic ➢ Noise	Potential Negative Effects Include: ➢ Run-off (where compost, reject material or leachate not enclosed) ➢ Odour	Potential Negative Effects Include: ➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity		

Waste Management Type[28]	Stage[29]					
	Construction	Operation / Processing	Storage	Transportation	Restoration	Other
	soils) ➢ Run off (flood risk and sedimentation) ➢ Environmental footprint of materials consumed during construction					
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Aerobic composting reduces methane generation compared to anaerobic decomposition in landfill ➢ Transformation of a waste into a useful product ➢ Reduction of need to landfill ➢ Avoidance of landfill tax ➢ Employment / local economy	Potential Positive Effects Include: n/a	Potential Positive Effects Include: ➢ Employment / local economy		
Composting - windrow	Windrow composting is generally used for the composting of garden / plant / farm waste where material is shredded then placed in rows on a	Once constructed, feedstock is shredded and then mixed before being placed into rows. These are regularly turned for a period of about 16 weeks before		Usually food waste and compost is moved by road.	n/a	Impacts on habitats are unknown, though environmental permitting for windrow sites establishes distance thresholds from protected habitats

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
	non-permeable surface. This may be open or covered. Windrows may also be utilised as part of other waste processing facilities, e.g. IVC. Construction impacts are generally associated with access and the creation of a non-permeable surface and sealed drainage.	being screened for contaminants such as plastics.				based on the fact that levels of bio-aerosols reduce significantly with distance. The authors note that some environmental assessments have recognised this issue and taken a precautionary approach in the absence of data (see for example Worcestershire County Council, 2011. HRA Addendum [URL: worcestershire.gov.uk/cms/pdf/APP%208%20HRA%20Addendum%20-%20main%20document.pdf]
	Potential Negative Effects Include: ➢ Dust ➢ Noise ➢ Vibration ➢ Land take (possible impacts on biodiversity, historic environment) ➢ Possible landscape and other impacts if area is covered ➢ Disturbance to wildlife ➢ Disturbance of surface water drainage regime	Potential Negative Effects Include: ➢ Odour ➢ Runoff of leachates (if drainage system fails) / runoff from roads ➢ Transport ➢ Unknown impacts on habitats ➢ Dust and other emissions to air	Potential Negative Effects Include: ➢ Odour ➢ Runoff of leachates (if drainage system fails) / runoff from roads	Potential Negative Effects Include: ➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity		
	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:		

Waste Management Type[28]	Stage[29]					
	Construction	Operation / Processing	Storage	Transportation	Restoration	Other
	➢ Employment / local economy	➢ Aerobic composting reduces methane generation compared to anaerobic decomposition in landfill ➢ Transformation of a waste into a useful product ➢ Reduction of need to landfill ➢ Avoidance of landfill tax ➢ Employment / local economy	n/a	➢ Employment / local economy		
Energy from Waste	Energy from Waste is the process of using waste and deriving usable energy from it. This can include electricity, heat and fuels for transportation or a mixture of these forms of energy. There are a number of techniques for achieving this, though all require built infrastructure, including a reception area to receive the waste and get it ready for combustion, a	A number of treatment processes can be involved in the operation of an energy from waste plant. These can broadly be defined as: -Reception (arrival and unloading) of waste; -Pre-treatment of waste which may be done on site or elsewhere (via processes such as materials recovery (see 'recycling' above), mechanical biological treatment (which may incorporate anaerobic	Incoming waste is likely to only be stored for a short period of time. Storage of, for example, incinerator bottom ash may result in environmental impacts (if poorly managed).	Transport is usually undertaken by road.	n/a	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: Defra, 2013. Energy from Waste: a guide to the debate [URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221042/pb13892-energy-from-waste.pdf]

	thermal treatment area to release energy from the waste, and an area for conversion of energy and an emissions clean up area. These may be contained in a single or multiple buildings. Unmitigated construction impacts are outlined below.	digestion) (see below) or mechanical heat treatment[30]); -Thermal treatment (which may involve incineration of the waste to create heat, or more advanced processes such as gasification where the chemical energy of gases released through combustion is preserved); -Conversion where fuel, heat or gas from thermal treatment is used to drive a turbine or feed a gas engine and or catalysed to create transport or other fuels. Heat may also be captured for distribution; -Emissions clean up where ash or pollution control residues are collected.				
	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:		

[30] For a description of mechanical heat treatment see Defra, 2013. Mechanical Heat Treatment of Municipal Solid Waste {URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221040/pb13891-heat-treatment-waste.pdf]

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
	➢ Land take, including possible impacts on soils, recreation, cultural heritage and biodiversity ➢ Noise ➢ Vibration ➢ Disturbance to wildlife ➢ Disturbance to surface water drainage regime ➢ Traffic (emissions and safety) ➢ Visual impacts (including stack) ➢ Run-off from construction site, stored fuels etc. ➢ Dust ➢ Lighting ➢ Environmental footprint of materials consumed during construction of plant and connecting pipeline / grid connection infrastructure	➢ Continued visual / landscape impact ➢ Air pollution from vehicles and energy conversion (though, because of flue gas clean up technology, emissions from the latter may be relatively low) ➢ Carbon dioxide emissions ➢ Water pollution from runoff from roads, poor housekeeping at reception, pre-treatment or emissions clean up stages ➢ Traffic (noise, safety, dust) ➢ Lighting ➢ Energy use (e.g. to heat treat or burn waste, to operate buildings etc.) ➢ Conversion efficiency and transmission losses (effecting the energy input to output ratio of plant)	➢ Visual impact of storage building ➢ Odour ➢ Contamination through spills / ingress to soil / water (e.g. where loaded to vehicles)	➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity		
	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:	Potential Positive Effects Include:		

Waste Management Type[28]	Stage[29]					
	Construction	Operation / Processing	Storage	Transportation	Restoration	Other
	➢ Employment / local economy	➢ Employment / local economy ➢ Electricity production (offsetting other energy types) ➢ Contribution to security of energy supply ➢ Heat production ➢ Fuel production ➢ Diversion from landfill and avoidance of landfill tax	n/a	➢ Employment / local economy		
Landfill	Landfill is where waste is deposited into or onto land. Modern landfill sites, particularly those that receive biodegradable waste, are often lined with combinations of clay, flexible membranes and plastic liners (and later capped using composites of clay, and geo-membranes and geotextiles). This prevents problems associated with leachate if correctly implemented.	In broad terms, as the landfill is filled, operational impacts can include those outlined below.	n/a	Transport is usually undertaken by road	Dependant on the type of restoration effects will vary.	The effects listed here are assumed for a typical inert landfill site, however many landfill sites also accept hazardous waste and effects (and permitting requirements) may vary accordingly. Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources:

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
	Potential Negative Effects Include: ➢ Land take and associated loss of habitats, soil and agricultural land ➢ Visual impact ➢ Water pollution from oil and fuel spills and release of sediment from wheel washing ➢ Changes to surface drainage from land take and compaction of adjacent land ➢ Disturbance to wildlife	Potential Negative Effects Include: ➢ Impacts on groundwater from leachate if liner fails ➢ Odour ➢ Litter ➢ Air quality (bioaerosols) ➢ Traffic (noise, safety, dust) ➢ Visual impact / impacts on setting ➢ Climate change if organic material is included in waste stream ➢ Vermin ➢ Runoff from access routes ➢ Emissions to air (landfill gas)		Potential Negative Effects Include: ➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity	Potential Negative Effects Include: ➢ Noise (temporary) ➢ Dust (temporary) ➢ Changes to surface water drainage ➢ Possible ongoing impacts from the operational stage (e.g. emission of landfill gas / leachate)	Scottish Natural Heritage, Rivers and their Catchments: Impacts of landfill on water quality – Information and Advisory Note 39 [URL: snh.org.uk/publications/on-line/advisorynotes/39/39.htm] Environment Agency, undated. LFE4 – Earthworks in landfill engineering: Design, construction and quality assurance of earthworks in landfill engineering [URL: cdn.environment-agency.gov.uk/B7B47611-DB92-47A4-9EF7-56412D27F3AC/FinalDownload/DownloadId-D4050FE0695F064451B6EB7FA9F72F92/B7B47611-DB92-47A4-9EF7-56412D27F3AC/geho0211btlr-e-e.pdf]
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy		Potential Positive Effects Include: n/a	Potential Positive Effects Include: ➢ Habitat creation / enhancement ➢ Recreation and amenity ➢ Heritage assets ➢ Landscape ➢ Utilisation of landfill gas	

Waste Management Type[28]	Stage[29]					
	Construction	Operation / Processing	Storage	Transportation	Restoration	Other
					➢ Employment / local economy	
Anaerobic Digestion	Anaerobic digestion is a method of breaking down bio-degradable material in anaerobic (without oxygen) conditions utilising microorganisms called methanogens. It can be used to treat a range of wastes such as wastewater, farm wastes and food waste. Built infrastructure may include reception buildings for receiving waste, buildings housing primary and secondary digesters, storage tanks and energy generation infrastructure such as gas engines, and possible gas pipeline connections or connections to the electricity generation grid.	Operation of plant will generally involve feedstock (organic waste) arriving at a reception unit where it will be mixed. This is then fed into one or more digesters from where digestate is derived (after methanogens break down waste) and fed to a storage tank. Biogas is also fed through an energy conversion technology such as a gas engine for electricity or used as part of a combined heat and power system. Anaerobic digestion may be combined with other waste management treatments (e.g. materials recovery).	Most storage is enclosed in silos.	Transport is usually by road.	n/a	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: The National Non Food Crops Centre, 2011. Anaerobic digestion – Renewable Fuels and Energy Factsheet. WRAP, undated. Anaerobic Digestion [URL: wrap.org.uk /content/anaerobic-digestion-1] WRAP, undated, ETF Project – GWE Biogas Ltd [URL: wrap.org.uk /content/etf-project-gwe-biogas-ltd]
	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:	Potential Negative Effects Include:		

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
	➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Land take resulting in loss of habitats, soil and agricultural land ➢ Disturbance to wildlife ➢ Water pollution (e.g. from sedimentation, vehicle washdown); ➢ Visual impacts / impacts on setting ➢ Impacts on rights of way ➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed during construction	➢ Visual / landscape ➢ Poorly managed leachate affecting groundwater ➢ Odour ➢ Air quality (bio-aerosols) ➢ Traffic (noise, safety, dust) ➢ Runoff from access routes	➢ Visual ➢ Land take resulting in loss of habitats, soil and agricultural land	➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity		
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Production of biogas for energy ➢ Production of digestate for use as	Potential Positive Effects Include: n/a	Potential Positive Effects Include: ➢ Employment / local economy		

Waste Management Type[28]	Stage[29]					
	Construction	Operation / Processing	Storage	Transportation	Restoration	Other
		soil fertiliser ➢ Diversion of organic waste from landfill ➢ Reduction in greenhouse gas emissions by using a renewable carbon neutral energy source / preventing release of fugitive methane from landfill ➢ Employment / local economy				
Waste Transfer	Waste Transfer Stations are local delivery points for waste collection vehicles. Their purpose is primarily to free up time for waste collection rather than having individual waste collection vehicles travel longer distances. However, they may be combined with other facilities such as Material Recovery Facilities. Usually they comprise an open hall, into which waste is delivered and stored,	The day to day operation of Waste Transfer stations will typically involve waste collection vehicles arriving at a site, travelling over a weighbridge and tipping their recyclable or non-recyclable contents into the main hall building (often into segregated bays). They are then loaded into articulated vehicles (often with a mobile grab). Vehicles may also be parked overnight in ancillary depot type facilities.	Storage is only short term and housed in buildings.	Transport is usually by road.	n/a	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value of an area. Key Sources: Veolia Environmental Services, 2006. Waste and Recyclables Transfer Station and Depot, Freshfields Road, Pebsham [URL: veoliaenvironmentalservices.co.uk/Documents/Publications/South%20Downs/MRF%20WTS/Pebsham_Supporting_Statem

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
	as well as access and may include depot parking facilities for vehicles.					ent.pdf]
	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Land take resulting in loss of habitats, soil, agricultural land and impacts on recreation ➢ Disturbance to wildlife ➢ Traffic (emissions and safety) ➢ Water pollution (e.g. from sedimentation, vehicle washdown); ➢ Visual impacts / impacts on setting ➢ Impacts on rights of way ➢ Disturbance of surface water drainage regime ➢ Environmental footprint of materials consumed	Potential Negative Effects Include: ➢ Visual / landscape (buildings) ➢ Noise ➢ Dust ➢ Traffic (emissions and safety) ➢ Run-off from roof and foul water from ground level surfaces ➢ Odour ➢ Lighting ➢ Litter ➢ Energy use	Potential Negative Effects Include: ➢ Visual impact of building ➢ Odour	Potential Negative Effects Include: ➢ Noise ➢ Emissions ➢ Safety ➢ Dust ➢ Vibration ➢ Highway capacity		

Waste Management Type[28]	Stage[29]					
	Construction	**Operation / Processing**	**Storage**	**Transportation**	**Restoration**	**Other**
	during construction					
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include:	Potential Positive Effects Include: ➢ Employment / local economy		
Waste Water Treatment Plants	Waste water treatment plants use various methods to remove waste matter from the water enabling it to be returned to the environment. Development is not usually large scale and many elements can be located underground.	Operationally waste water treatment plants generate little activity as waste water is piped to the sites and piped away. Occasional tankers are required to remove sludge.	n/a	n/a	n/a	Secondary impacts may be associated with visual impact – such as impacts on the local recreational or tourist value in the immediate local area. Key sources: Waste Water Treatment and Recycling factsheet [URL: water.org.uk /home/news/press-releases/wastewater-pamphlet/wastewater-web--2-.pdf] and relevant planning applications.
	Potential Negative Effects Include: ➢ Noise ➢ Dust and other emissions ➢ Vibration ➢ Land take resulting in loss of habitats, soil, agricultural land and impacts on recreation ➢ Disturbance to wildlife ➢ Traffic (emissions and safety) ➢ Water pollution (e.g.	Potential Negative Effects Include: ➢ Energy use ➢ Noise ➢ Odour ➢ Traffic (minor) ➢ Run-off from hard surfacing				

Waste Management Type[28]	Stage[29]					
	Construction	Operation / Processing	Storage	Transportation	Restoration	Other
	from sedimentation, vehicle washdown); ➢ Visual impacts / impacts on setting ➢ Impacts on rights of way ➢ Disturbance of surface water drainage regime Environmental footprint of materials consumed during construction					
	Potential Positive Effects Include: ➢ Employment / local economy	Potential Positive Effects Include: ➢ Positive effects for the water environment through treating waste water				

Appendix 3 – Summary of Sustainability Appraisal Matrices

Appendix 3 Contents

The Sustainability Appraisal Matrices in Volume 2 (which offer an explanation of the sustainability impacts of each option) have been summarised in this appendix.

For each group of options the sustainability findings are presented side by side. This allows for a direct comparison of the performance of each option in a group against each of the 17 Sustainability Appraisal objectives to be made. The predicted effects of each option over the short (S), medium (M) and long term (L) are indicated using the system summarised in the table below.

Score	Significance
++	The option is predicted to have major positive effects on the baseline and the achievement of the SA objective.
+	The option is predicted to have minor positive effects on the baseline and the achievement of the SA objective.
0	The option will have no effect on the baseline and the achievement of the SA objective.
-	The option is predicted to have minor negative effects on the baseline and the achievement of the SA objective.
--	The option is predicted to have major negative effects and the achievement of the SA objective.
?	The impact of the objective on the baseline / SA objective is uncertain.

Minerals

Broad Geographical Approach to Supply of Aggregates (id01)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	++	++	?	?	?
	-	-	-			+
2	-	-	-	?	?	?
3	+	+	+	+	+	+
4	+	+	+	+	+	+
5	-	-	-	?	?	?
6	+	+	+	+	+	+
7	+	+	++	-	-	-
	-	-	-			
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	-	-	-	-	-	-
	+	+	+			+
11	+	++	++	-	-	-
				+	+	+
12	+	+	+	+	+	+
13	+	+	+	+	+	+
14	++	++	++	-	-	-
	-	-	-	+	+	+
15	?	?	?	-	-	-
16	-	-	++	-	-	+
17	+	+	+	+	++	++

Summary of assessment

Option 1 would have clear benefits for the landscape and natural and historic environment whilst enabling supply of aggregates to be maintained. In particular significant positive effects would be evident in the AONBs which currently contain aggregates quarries. Option 2 would potentially have negative effects on the environment of the City of York but would potentially displace such effects from elsewhere in the Plan area and enable aggregates required within York to be sourced locally.

Recommendations
It is recommended that a combination of option 1 and option 2 be progressed, whereby the policy is clear that extraction should take place outside of the National Park and the AONBs but within the rest of the NYCC area and the City of York area.

Locational Approach to New Sources of Supply of Aggregates (id02)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	+	+	+	+	+	+	?	?	?
2	?	?	?	-	-	-	?	?	?
3	+	+	++	+	+	+	-	-	-
4	+	+	+	+	+	+	+	+	+
							-	-	-
5	-	-	-	-	-	-	?	?	?
							-	-	-
6	+	+	++	+	+	+	-	-	-
7	0	0	+	0	0	+	?	?	?
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	?	?	0	0	0	0	0	0	0
			?						
11	0	-	-	0	0	-	?	?	?
12	+	+	++	+	+	+	+	++	++
13	+	+	+	+	+	+	?	?	?
	-	-	-				+	+	+
14	-	-	+	-	-	+	-	-	+
			-			-			-
15	-	-	+	+	+	++	?	?	?
			-						
16	0	0	+	0	0	+	?	?	?

17	+	+	++	+	+	+	?	?	?

Summary of assessment

While all options display a mixture of positive, negative and uncertain effects, Options 1 and 2 exhibit more positive effects than Option 3. Negative effects are associated with land and soils and recreation to some degree under all three options. In broad terms, while Option 1 and 2 are considered to reduce journey lengths, there remains a risk that those journeys will run close to communities under Option 1. Another key issue is how options may restrict the distribution of sites – with Option 1 more likely to attract sites to areas that may be visible from protected landscapes, and Option 2 drawing sites closer to the best quality agricultural land. All options carry some degree of economic benefit.

The assessment of Option 3 is more uncertain as it is not known what the resultant overall spatial distribution of aggregate sites will be.

Recommendations

A key conclusion of this assessment is that there is merit in adopting an approach that includes aspects of both options 1 and the links to the A1 explored in 2. This would potentially balance the negative aspects of each option with the positive aspects of the other. So such an option would include the principle of proximity to markets, but would also favour proximity to the A1 (or other access to the rail / canal / strategic road network where possible).

Calculating Sand and Gravel Provision (id03)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4			Option 5			Option 6		
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
1	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			-			
2	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			+			
3	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			-			
4	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			-			
5	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			+			

6	-	-	-	-	-	--	-	-	--	-	-	-	-	-	-	-	-	-
												--						
7	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
8	-	-	-	--	--	--	-	--	--	-	-	-	-	-	-	+	+	+
										--	--	--	-	-	-	?	?	?
9	-	-	-	--	--	--	-	--	--	-	-	-	-	-	-	+	+	+
											--	--				?	?	?
10	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			+			
11	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-			-	-			+			
12	+	+	+	+	+	++	+	+	++	+	?	?	+	+	+	?	?	?
		?	?								+	++		?	?	-	-	-
13	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-	0	0	0			
14	0	0	0	0	0	0	0	0	0	0	0	0	?	?	?	0	0	0
15	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	+	+	+
				-	-	-	-	-	-		-	-			+			
16	+	+	+	+	+	++	+	+	++	+	+	+	+	+	+	+	+	+
											++	++						
17	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
																?	?	?

Summary of assessment

There is a significant amount of uncertainty in relation to all of these options due to uncertainty over where provision would be made. However, generally there are likely to be negative effects on climate change, resource minimisation and waste, which range in severity depending on the amount extratcted varying from Option 2 (which performs least well) to Option 6 (which performs the best).

Negative effects are also observed in other areas for individual options, with Options 2, 3 and 4 exhibiting the most certain negative environmental effects. Option 5 also has the potential to lead to negative effects on marine environments. Most options also have some positive effects, particularly in relation to economic growth, flood risk and changing population. This is because it is important to match supply of aggregate with demand to support the economy, and because new sand and gravel sites may open up opportunities to contribute to a range of SA objectives, including flood storage and to meet the development needs of local communities and businesses. The exception to this is Option 6, which shows uncertain to negative economic and population effects as shortfalls in provision may result. Option 6 would be likely to have positive environmental effects due to a lower level of land take.

Recommendations

Option 6 performs the most positively in terms of the sustainability appraisal. However, this option does present some uncertainty in terms of meeting demand for sand and gravel. This might be addressed by allowing greater flexibility to increase supply in a similar way to option 4.

Overall Distribution of Sand and Gravel Provision (id04)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	?	?	+	?	?	?	?	?	?	?	?	?
	-	-	-	-	-	-	-	-	-	-	-	-
2	?	?	?	?	?	?	?	?	?	+	+	+
	-	-	-	-	-	-	-	-	-	?	?	?
3	+	++	++	-	-	-	?	?	?	-	--	--
				?	?	?	-	-	-	?	?	?
4	+	+	+	-	-	-	?	?	?	-	--	--
				?	?	?	-	-	-	?	?	?
5	?	?	?	?	?	?	?	?	?	-	-	-
	-	-	-	-	-	-	-	-	-	?	?	?
6	+	++	++	0	-	-	0	-	-	-	--	--
				?	?	?				?	?	?
7	0	0	0	0	0	0	0	0	0	0	0	0

8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	?	?	?	?	?	?	?	?	?	+	+	+
	-	-	-	-	-	-	-	-	-	?	?	?
11	?	?	?	?	?	?	-	-	-	+	+	+
	-	-	-	-	-	-	+	+	+			
			+	+	+	+	?	?	?	?	?	?
12	+	++	++	?	?	?	?	?	?	?	?	?
										+	+	+
13	0	-	-	0	-	-	0	0	0	?	?	?
		+	+		+	+						
14	?	?	?	?	?	?	?	?	?	?	?	?
	-	-	+	-	-	+	-	-	+			
15	+	+	+	?	?	?	?	?	?	?	?	?
	-	-	-	-	-	-	+	+	+			
	?	?	?									
16	0	0	+	0	0	+	0	0	++	0	0	+
17	0	+	+	?	?	?	?	?	?	?	?	?

Summary of assessment

All options display a mixture of uncertain, negative and positive effects. However, Option 1 displays the strongest positive effects largely because it matches well with current market demand, so effects on transport, air pollution and climate change as well as economic growth are all positive.

There are also a number of areas where positive effects are either balanced by uncertainty or are confined to a particular period.
Other options tend to perform less well, and effects vary depending on the ratio of northern to southern division. For instance, landscape effects are both positive and negative under all options though some uncertainty is noted. Similarly, the transport related benefits become negative under Options 2 and 3, or uncertain to negative for option 4.

The final Option (4) displays significant uncertainty across most of the SA objectives as it is not clear where sand and gravel extraction will occur under this objective.

Recommendations
Option 1 is associated with a clear economic, and a number of outright environmental, benefits and is seen to perform best in relation to the SA Framework.

Landbanks for Sand and Gravel (id05)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0 -	-	0	0 -	-	0	+ ?	+ ?
2	0	0 -	-	0	0 -	-	0	+	+
3	0	0 -	0	0	0 -	- ?	0	0	0
4	0	0 -	0	0	0 -	- ?	0	0	0
5	0	0 -	--	0	0 -	--	0	+ ?	+ ?
6	0	-	0	0	0 -	-	0	+	+
7	0	0	0	0	0	+	0	0	0
8	--	--	--	--	--	--	0	+	+
9	--	--	--	--	--	--	0	0 +	0 +
10	0	-	-	0	0 -	-	0	+ ?	+ ?
11	0	0	-	0	0	-	+	+	+

		-			-				
12	++	++	++	++	++	+	0	0	0
						?		-	-
13	0	0	+	0	+	+	+	+	+
		-	-		-	-	-	-	-
14	0	0	-	0	0	0	0	+	+
		-			-	-		?	?
15	0	0	0	0	0	0	+	+	+
		-			-	-	-	-	-
16	0	0	0	0	0	0	0	-	-
17	0	+	+	0	?	?	0	0	0

Summary of assessment

Options 1 and 2 have relatively similar effects, although Option 2 allows more flexibility, which may result in lesser environmental effects. However Option 2 is assessed as having worse effects in relation to transport, air quality and climate change. Both options have major negative effects on soils in the long term as the potential for increased activity could impact on best and most versatile agricultural land. Option 3, which would act in combination with Option 1 or 2, displays a number of sustainability benefits as site extensions have a number of inherent sustainability benefits due to their reduced land take and lesser resource consumption requirements.

Recommendations

The SA considers that option 3 combined with one of the first two options would be the most sustainable option.

Safeguarding Sand and Gravel (id06)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4			Option 5		
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?			
2	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0

	?	?	?	?	?	?	?	?	?	?	?	?			
3	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?			
4	0	0	0	0	?	?	0	0	0	0	0	-	0	0	0
	?	?	?	?			?	?	?	?	?	?			
5	0	+	+	0	+	+	0	+	+	0	+	0	0	+	+
	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?						
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?						
8	++	++	++	++	++	++	++	++	++	+	+	+	++	++	++
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
	?	?	?	?	?	?	?	?	?	?	?				
11	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
	?	?	?	?	?	?	?	?	?	?	?				
12	+	++	++	+	+	+	+	++	++	+	+	+	+	++	++
					-	-									
13	0	0	0	0	?	?	0	0	0	0	0	-	0	0	0
	?	?	?	?			?	?	?	?	?	?			
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?						
15	0	0	0	0	?	?	0	0	0	0	0	-	0	0	0
	?	?	?	?			?	?	?	?	?	?			
16	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
	?	?	?	?	?	?	?	?	?						

17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?						

Summary of assessment

As safeguarding does not infer any sand and gravel development will take place there is generally no predicted effect. Were development to take place it would need to accord with other policies in the Plan.

Most of the options perform strongly in terms of minimising the use of resources as well as the economic growth objective as future sterilisation is avoided, thus conserving resources for future economic benefit. Option 1 performs better than Options 2 and 3 in relation to the economy, whilst all of Options 1, 2 and 3 perform strongly in relation to resource efficiency. There are indirect negative effects associated with the reduced buffer size under Option 2 as problems such as proximity of receptors to noise and dust may limit the extent of area which could be worked.

Option 4 may be subject to the cumulative effects of more concentrated areas of development if smaller sand and gravel resource areas are sterilised through lack of safeguarding and thus possible future development. Option 5 would strengthen the performance of other options in relation to the economy and resource efficiency where used together with them.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied. This will need to be considered when assessing policies at the Preferred Options stage.

Recommendations

The SA does not show a strong preference for one particular option, though options 2 and 4 are considered less sustainable than options 1, and 3 . Option 5 can add some beneficial effects to other options when used itogether with them.

Provision of Crushed Rock (id07)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	0	-	-	- +	-	-	- +
2	0	0	0	-	-	-	-	-	-
3	0	0	0	-	-	-	-	-	-
4	0	0	0	-	-	-	-	-	-

5	0	0	0	-	-	-	-	-	-
6	0	0	0	-	-	-	-	-	-
7	0	0	0	0	0	+	0	0	+
8	-	-	-	--	--	--	+	+	+
9	-	-	-	-	-	-	+	+	+
10	0	0	0	-	-	-	-	-	-
11	0	0	0	-	-	-	-	-	-
12	0	0	0	+	+	+	+	+	+
13	0	0	0	+	+	+	+	+	+
				-	-	-	-	-	-
14	0	0	0	-	-	-	-	-	-
						+			+
15	0	0	0	-	-	-	-	-	-
16	0	0	0	0	0	+	0	0	+
17	++	++	++	++	++	++	++	++	++

Summary of assessment

The assessment has revealed that Option 2 is likely to result in negative effects on the environment, including biodiversity / geodiversity, water and air quality, the historic environment and landscape, but would act particularly positively in relation to ensuring sufficient minerals are available. Under Option 3 there are likely to be positive effects on environmental objectives, although overall these may be slight as the option represents only a small decrease in crushed rock provision. Option 1 has limited effects as further provision of crushed rock would not be required.

Recommendations

It is recommended that Option 3 be pursued as this would enable sufficient provision of Magnesian limestone whilst limiting negative effects and encouraging of use of secondary and recycled aggregates.

Maintenance of Landbanks for Crushed Rock (id08)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	0	-	- +	-	-	- +	+	++	++	+	++	?
2	0	-	-	-	-	-	-	-	--	-	-	?
3	0	-	-	-	-	-	+	+	+	+	+	?
4	0	-	-	-	-	-	+	+	+	+	+	?
5	0	-	--	-	-	--	-	--	--	-	--	?
6	0	-	-	-	-	-	+	+	+	+	+	?
7	0	0	+	0	0	+	0	0	-	0	0	? -
8	--	--	--	--	--	--	0	0	0	0	0	0
9	--	--	--	--	--	--	0	0	0	0	0	0
10	0	-	-	-	-	--	+	+	+	+	+	?
11	0	-	--	-	-	--	++	++	++	++	++	?
12	++	++	++	++	++	++	+	+	+	+	+	?
13	0 0	+ -	+ -	+ -	+ -	+ -	+	+	+	+	+	?
14	0	-	- +	-	-	- +	++	++	++	++	++	?
15	0	-	--	-	-	--	+	+	+	+	+	?
16	0	0	+	0	0	+	0	0	-	0	0	? -
17	+	+ -	+ -	++	++	++	+	+	+	+	+	?

Summary of assessment

The assessment has revealed that both Options 1 and 2 could have negative effects on the environment, including biodiversity / geodiversity, air and water quality, landscape and the historic environment, and communities of the Plan area should these result in the need to release more land for

extraction than is currently permitted. They would however, enable a level of minerals supply to meet demand for development.
Option 3 would provide protection for the National Park and the AONBs to a greater extent than Option 4 where there would be a level of uncertainty over potential protection for these areas, particularly in the longer term.

Recommendations
It is recommended that, provided sufficient safeguards exist in the Development Management policies, no further mitigation would be necessary under options 1 and 2. Option 3 should be followed to avoid any uncertainty presented by option 4.

Safeguarding Crushed Rock (id09)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	+ ?	?	?	?
2	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
3	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
4	0	0	0	0	0	0	0	0	0	0	0	0
	?	+	+	?	+	+	?	+	+	?	+	+
		?	?		?	?		?	?		?	?
5	0	+	+	0	+	+	0	+	+	0	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
6	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
7	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?

8	++	++	++	++	++	++	++ -	++ -	++ --	++	++	++
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	+ ?	?	?	?
11	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	+ ?	?	?	?
12	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
13	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
14	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	+ ?	?	?	?
15	+	+	++	+	+	+	+ -	+ -	+ -	0 ?	0 ?	0 ?
	?	?	?	?	?	?	?	?	?			
16	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
17	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?

Summary of assessment

Overall, minerals safeguarding areas are unlikely to have a great effect on sustainability objectives as their presence does not create a presumption, or add any weight, towards minerals extraction. The options would all have significant positive effects on safeguarding minerals resources, although Option 3 would be slightly less positive as these effects would not be felt in the National Park or AONBs. The positive effects under Option 1 are likely to be greater than those resulting from Option 2 due to the presence of a larger buffer. Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations
It is recommended that Option 1 be pursued due to the greater level of sustainability benefits along with Option 4 which would bring additional slight positive benefits.

Concreting Sand and Gravel Delivery (id10)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	++	++	++	+	+	+	-	-	-
2	++	++	++	+	+	+	-	-	-
3	+	+	+	+	+	+	-	-	-
4	++	++	++	+	+	+	-	-	-
5	+	+	+	+	+	+	--	--	--
6	++	++	++	+	+	+	-	-	-
7	+	+	++	+	+	+	-	-	-
8	--	--	--	--	--	--	--	--	--
9	0	-	-	0	-	-	0	-	--
10	++	++	++	+	+	+	-	-	-
11	++	++	++	+	+	+	-	-	-
12	+	+	?	+	+	+	++	++	++
13	++	++	++	+	+	+	-	-	-

14	++	++	++	+	+	+	-	-	-
15	++	++	++	+	+	+	-	-	-
16	++	++	++	+	+	+	-	-	-
17	+	0	0	+	0	0	-	0	0

Summary of assessment

Options 1 and 2 both perform well against most sustainability appraisal objectives (other than in relation to minimising the use of resources). This is because allocating sites helps to plan for constraints and opportunities in advance so the most sustainable sites are utilised. Of the two options, however, Option 1 performs the best as this seeks to alleviate uncertainty through allocating the most sites.

Option 3 performs more negatively as only areas of search are utilised, and these have only considered the most major environmental constraints in their definition, leaving localised effects to be addressed through mitigation at the planning application stage. However, there are economic benefits with this approach through allowing flexibility in site selection for developers.

Recommendations

Option 1 is considered the most sustainable option.

Building Sand Delivery (id11)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	++	++	++	+	+	+
2	++	++	++	+	+	+
3	+	+	+	0	0	0
				+	+	+
4	++	++	++	0	0	0
				?	?	?
5	+	+	+	0	0	0
				?	?	?
6	++	++	++	0	0	0

				?	?	?
7	0	0	++	0	0	0
8	0	-	-	--	--	--
9	0	0 -	-	0	-	-
10	++	++	++	+	+	+
11	++	++	++	+	+	+
12	+	+	+	+	+	+
13	++	++	++	+	+	+
				?	?	?
14	++	++	++	+	+	+
				?	?	?
15	++	++	++	+	+	+
				?	?	?
16	++	++	++	+	+	+
				?	?	?
17	+	0	0	+	0	0

Summary of assessment

Option 1, when compared to the sustainability appraisal objectives, performs very well. It includes strong positive effects for all or part of the short to long term time period considered for biodiversity and geodiversity, water quality and supply, air quality, climate change, climate adaptation, heritage, landscapes and town and cityscapes, community vitality, recreation and leisure, health and wellbeing and flooding. This is because, through allocating sites and considering criteria, the most sustainable locations can be chosen.

Option 2 also reports a number of (albeit less strong) positive effects as strategic sustainability issues can be considered when deciding upon areas of search and preferred areas. However, there is greater uncertainty as specific locations are unknown.

Both options report negative effects for the resource efficiency objective as these options will inevitably, if applications are approved under them, lead to significant non-renewable resource consumption.

Recommendations

Option 1 performs significantly more strongly against the sustainability appraisal objectives.

Magnesian Limestone Delivery (id12)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	++	++	++	+	+	+
2	++	++	++	+	+	+
3	+	+	+	0	0	0
				+	+	+
4	++	++	++	0	0	0
				?	?	?
5	+	+	+	0	0	0
				?	?	?
6	++	++	++	0	0	0
				?	?	?
7	+	+	++	0	0	0
8	0	-	-	- -	- -	- -
9	0	0	-	0	-	-
		-				
10	++	++	++	+	+	+
11	++	++	++	+	+	+
12	+	+	+	+	+	+
13	++	++	++	+	+	+
				?	?	?
14	++	++	++	+	+	+
				?	?	?
15	++	++	++	+	+	+
				?	?	?
16	++	++	++	+	+	+
				?	?	?

17	+	0	0	+	0	0

Summary of assessment

Option 1 is likely to result in positive effects for biodiversity and geodiversity, water quality and supply, air quality, climate change, climate adaptation, heritage, landscapes and townscapes, community vitality, recreation and leisure, health and wellbeing and flooding. This is because, through allocating sites and considering criteria, the most sustainable locations can be chosen.

Option 2 also reports a number of (albeit less strong) positive effects as strategic sustainability issues can be considered when deciding upon areas of search and preferred areas. However, there is greater uncertainty as specific locations are unknown.

Both options report negative effects for the resource efficiency objective as these options will inevitably, if applications are approved under them, lead to significant non-renewable resource consumption.

Recommendations

Option 1 performs significantly more strongly against the sustainability appraisal objectives.

Unallocated Extensions to Existing Aggregates Quarries (id13)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	?	?	?	?	?	?	+	+	+
	+	+	+	+	+	+			?
		-	-		-	-			
2	?	?	?	?	?	?	+	+	?
	+	+	+	+	+	+			
3	-	-	-	0	0	0	0	0	0
4	?	?	?	?	?	?	+	+	+
	+	+	+	+	+	+			
5	-	-	-	0	0	0	+	+	+
									?
6	-	-	-	0	0	0	0	0	0

7	0	-	-	0	-	-	0	0	0
8	-	-	-	-	-	-	+	+	++
9	0	0	0	0	0	0	0	0	0
10	?	?	?	?	?	?	+	+	+ ?
11	+	+	+	+	+	+	+	+	+ ?
12	+	+	+	+	+	+	-	--	--
13	+	+	+	+	+	+	-	--	--
14	?	? -	? -	?	? -	? -	+	+	+ ?
15	-	-	-	-	-	-	+	+	+
16	0	-	-	0	-	-	+	+	+
17	+	+	+	+	+	+	?	?	?

Summary of assessment

The assessment revealed that Option 3 would provide greater protection for the environment and communities than Options 1 or 2 yet would raise questions over the deliverability of minerals, although this would depend on whether or not there was a sufficient landbank maintained at other permitted sites throughout the plan period.

Recommendations

It is recommended that either Option 2 or 3 would be the most sustainable to follow, although Option 3 is possibly a little inflexible and could lead to negative effects during the latter part of the plan period or beyond should insufficient landbanks be maintained. The chosen option should be combined with the element of Option 1 which requires consideration to be given to implications for increasing the contribution that secondary and recycled aggregates make to aggregates supply.

Supply of Alternatives to Land Won Primary Aggregates (id14)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	+	++	++
		++	++	?	?	?
2	+	+	+	+	+	+
3	+	+	+	+	+	+
	?	?	?	?	?	?
4	?	?	?	?	?	?
5	+	+	+	+	+	+
		++	?			
6	+	++	+	+	++	++
			?			
7	0	0	0	0	0	0
8	++	++	+	++	++	++
9	++	++	+	++	++	++
			?			
10	?	+	?	+	+	+
		?		?	?	?
11	+	+	?	+	+	+
				?	?	?
12	0	0	0	0	0	0
				+	+	+
13	0	0	0	0	0	0
				+	+	+
14	0	0	0	0	0	0
15	-	-	?	-	-	-
				+	+	+
16	0	0	?	?	?	?

	?	?				
17	0	0	0	+	+	+

Summary of assessment
Both of these options will result in largely positive effects, with particularly strong positive effects associated with sustainability objectives relating to biodiversity, soil / land, climate change, resource use and minimising waste generation.
Minor areas of uncertainty occur for a number of SA objectives, and minor negative effects occur under the health and wellbeing SA objective under both options due to the potential for local transport or amenity impacts around secondary or recycled aggregates facilities.

Recommendations
The SA recommends that both options are pursued.

Continuity of Supply of Silica Sand (id15)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	?	?	?	-	-	-	+	+	+
	--	--	--				?	?	?
2	?	?	?	?	?	?	+	+	+
	-	-	-	-	-	-	?	?	?
3	-	-	-	-	-	-	+	+	+
							?	?	?
4	-	-	-	0	0	0	+	+	+
					-	-	?	?	?
5	0	0	0	-	-	0	-	-	+
	-	-					?	?	?
6	0	0	-	0	0	0	+	+	+

	-	-				-	?	?	?
7	0	0	0	?	?	? +	0	0	0
8	-	-	-	-	-	-	0	0	0
9	0 -	-	0 ?	0	-	0 ?	0	0	0
10	0	0 -	0 -	0	0	0	+ ?	+ ?	+ ?
11	? -	? --	? -	?	?	?	-	--	--
12	+	+	+	+	+	+	0	0	0
13	0 -	0 -	0 -	0 -	0 -	0 -	0	0	0
14	-	-	0 -	0 ?	0 ?	0 ?	+ ?	+ ?	+ ?
15	0 ?	0 ?	0 ?	0 ?	0 ?	0 ?	+ ?	+ ?	+ ?
16	0	0	0	0	0	0	+ ?	+ ?	+ ?
17	0	0	0	0	0	0	0	0	0

Summary of assessment

These three options exhibit contrasting sustainability effects. Option 1 is associated with the most negative effects. This is largely because there are some key environmental receptors (such as an internationally important nature conservation site) around the Blubberhouses site in particular. The Burythorpe site was considered to have fewer constraints affecting it.

Option 2 reports similar sustainability effects to Option 1, though these are less significant as Option 2 considers only the possibility of extensions at Burythorpe, where environmental receptors which may be affected tend to be of a lower order.

Option 3 is considered the most sustainable as no assumptions are made on which of these sites will be developed, and criteria allow the

opportunity to consider environmental effects prior to any approval. However, there are negative effects on the economic growth objective under this option.

There is considerable uncertainty in the assessment of all three options and further tests, through the site allocations and Habitats Regulations assessment processes may be necessary to give a more certain assessment of sustainability.

Recommendations

While objective 3 performs comparatively better than other options, the SA considers that the effects of options 1 and 2 are largely the results of potential and uncertain effects on local receptors. Because of the major negative economic effects of option 3 consideration should be also given to more fully exploring the potential for mitigating the local effects of options 1 and 2 through the allocations process so that if one or more sites proves sustainable a criteria based approach could potentially support one or more allocations.

Safeguarding Silica Sand (id16)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	+	+	+	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
2	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
3	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
4	0	0	+	0	0	0	0	0	0	0	0	0
			?									?
5	0	0	+	0	0	+	0	+	?	0	?	+
			?	?	?	?	?	?		?		?
6	0	+	+	0	0	+	0	+	+	0	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
7	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?

8	++	++	++	++	++	++	+	+	+	++	++	++
				+	+	+	?	?	?	?	?	?
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
11	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
12	+	+	+	+	+	+	+	+	+	+	+	+
							?	?	?	?	?	?
13	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
14	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
15	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
16	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
17	0	0	0	0	0	0	0	0	0	0	0	0

Summary of assessment

As safeguarding does not infer any silica sand development will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the plan.

Safeguarding contributes positively, however, to the SA objective 'to minimise the use of resources and encourage their re-use and safeguarding'. In a number of other ways positive indirect effects are noted for all options, though these vary in significance according to factors such as whether or not a buffer is used and whether sites are allowed within protected landscapes or international sites.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations

While sustainability benefits are possible for all options there is a good deal of uncertainty associated with all options, which can only be resolved when a detailed development management policy is put forward. However, on the basis of the information currently available options 1 and 4 perform most strongly in sustainability terms.

Continuity of Supply of Clay (id17)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	?	?	?	?	?	?	?	?	?
	-	-	-	-	-	-	-	-	-
2	0	0	0	?	?	?	?	?	?
				-	-	-			
3	+	+	+	+	+	+	-	-	-
				?	?	?	?	?	?
4	0	0	0	?	?	?	?	?	?
				-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-
	?	?	?	?	?	?	?	?	?
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	+	+	+	+	+	+	+	+	+
	-	-	-				?	?	?
9	0	0	0	0	0	0	0	0	0
10	+	+	+	?	?	?	?	?	?
	?	?	?						
11	-	-	-	-	-	-	-	-	-
	+	+	+				?	?	?
12	+	+	+	+	++	++	+	+	+
13	+	+	+	+	+	+	?	?	?
14	?	?	?	?	?	?	?	?	?
15	?	?	?	?	?	?	?	?	?
	-	-	-						
16	?	?	?	?	?	?	?	?	?

									-
17	+	+	+	+	+	+	?	?	?

Summary of assessment

All of the options are likely to have environmental impacts in relation to biodiversity, land take and landscape given the nature of clay working, particularly where they work in combination. However, Option 1 is likely to have fewer significant impacts by predominantly locating additional capacity near to existing extraction or processing locations thus reducing transport implications (minimising the number and length of trips) as well as impacts on new locations elsewhere.

The effects of Options 2 and 3 have a number of uncertainties. However, Option 2 offers more flexibility to maximise the use of clay in other locations where it could be viable and help to maximise economic benefits from extraction.

Option 3 would support the wider economy given that the extraction of clay would be for other uses not currently identified within the Plan area. However, adverse effects in relation to exportation and transportation outside of the Plan area, as well as cumulative environmental impacts as result of further extraction, are identified.

Recommendations

Assuming that any proposals would also be subject to alternative policies within the plan, it is considered that option 1 in relation to supporting existing production should be pursued and that option 2 in relation to flexibility of future sites should be also pursued.

Incidental Working of Clay in Association with Other Minerals (id18)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	0	0	0	0	0	0
	?	?	?			
2	0	0	0	0	0	0
	?	?	?			
3	-	-	-	0	0	0
	?	?	?			
4	0	0	0	0	0	0
	?	?	?			
5	+	+	+	0	0	0
6	0	0	0	0	0	0

	?	?	?			
7	0	0	0	0	0	0
8	++	++	++	-	-	-
9	++	++	++	-	-	-
10	0	0	0	0	0	0
	?	?	?			
11	0	0	0	0	0	0
	?	?	?			
12	+	+	+	-	-	-
				?	?	?
13	0	0	0	0	0	0
	?	?	?			
14	0	0	0	0	0	0
	?	?	?			
15	0	0	0	0	0	0
	?	?	?			
16	0	0	0	0	0	0
	?	?	?			
17	++	++	++	-	-	-

Summary of assessment

The effects arising from Option 1 are predominantly neutral to uncertain. The option would support incidental clay extraction where overall sustainability and environmental / amenity impacts from the extraction of the primary mineral are not prejudiced. However, there is some uncertainty as to the scope of impacts that will be considered.

This option is likely to maximise opportunities for productivity from mineral extraction, minimising the generation of clay waste and providing positive benefits for the economy. In comparison to Option 1, Option 2 is likely to have predominantly neutral effects as it would be reliant on proposals coming forward to be assessed against other policies within the Plan. The impacts on the economy are considered to be mixed given that there is uncertainty in relation to missed opportunities and reliance on the market to determine incidental working of clay. Negative effects may be experienced in relation to effective management of site waste and the efficient use of resources.

Recommendation

It is considered that option 1 should be pursued.

Safeguarding Clay (id19)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
2	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
3	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
4	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
5	0	+	+	0	+	+	0	+	+	0	?	?
	?	?	?	?	?	?	?	?	?	?		
6	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
7	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
8	++	++	++	++	++	++	++	++	++	++	++	++
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	+	+	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
11	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
12	+	++	++	+	++	++	+	++	++	+	++	++
13	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
14	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
15	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
16	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?

17	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?

Summary of assessment

As safeguarding does not infer clay extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the Plan.

Safeguarding contributes positively, however, to the SA objective 'to minimise the use of resources and encourage their re-use and safeguarding'. In other ways positive indirect effects are noted in relation to the soil / land, and economic objectives through maintaining optimum sites for extraction. Given that Option 4 would increase the amount of clay safeguarded, this is likely to increase economic benefits over the plan period. Option 3 may result in minor positives for the National Park, AONBs and York should less harmful development sterilise the clay resource, but the likelihood of this is questionable.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations

The SA indicates that option 3 and option 4 should be pursued.

Continuity of Supply of Building Stone (id20)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	-	-	-	-	-	-- +	-	-	- +
2	-	-	-	-	-	--	-	-	-
3	-	-	-	-	-	--	+	+	+
4	-	-	-	-	-	--	-	-	-
5	+	+	+	-	-	--	-	-	-
6	-	-	-	-	-	--	-	-	-
7	-	-	-	0	0	+	0	0	+

8	++	++	++	--	--	--	+	+	+
9	+	+	++	--	--	--	+	+	+
10	+	+	+	-	-	--	-	-	-
	--	--	--	++	++	++	+	+	+
11	+	+	+	-	-	--	-	-	-
	-	-	-	+	+	+			
12	-	-	-	+	+	+	+	+	+
13	+	+	+	+	+	+	+	+	+
				-	-	-	-	-	-
14	-	-	-	-	-	--	-	-	-
						+			+
15	-	-	-	-	-	--	-	-	-
16	-	-	-	0	0	+	0	0	+
17	?	?	?	++	++	++	++	++	++

Summary of assessment

The assessment has revealed that all options are likely to result in negative effects on the environment to some degree although Option 2 could in particular have significant negative effects on landscape, biodiversity, recreation, the historic environment, water, soil, air and amenity. Whilst Option 1 would have the least effects on the environment, it could also fail to deliver a sufficient supply of the right types of building stone to support development consistent with landscape / townscape character and the historic environment.

Recommendations

It is recommended that Option 3 would enable a sufficient quantity and quality of building stone to be supplied whilst having minimal detrimental effects on the environment.

Use of Building Stone (id21)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	+	+	+	+	+	+	0	0	0	-	-	-
2	-	-	-	+	+	+	0	0	0	-	-	-
3	+	+	+	+	+	++	0	0	0	++	++	++
4	+ / -	+ / -	+ / -	+	+	+	0	0	0	-	-	-
5	-	-	-	+	+	+	0	0	0	-	-	-
6	+	+	+	+	+	++	0	0	0	++	++	++
7	0	0	-	0	0	-	0	0	0	0	0	0
8	+	+	+	++	++	++	0	0	0	-	-	-
9	+	+	+	+	+	+	0	0	0	-	-	-
10	?	?	?	+	+	+	0	0	0	+	+	+
11	++	++	++	++	++	++	0	0	0	+	+	+
12	? / +	? / +	? / +	-	-	-	0	0	0	0	0	0
13	? / +	? / +	? / +	? / +	? / +	? / +	0	0	0	0 / -	0 / -	0 / -
14	+	+	+	+	+	+	0	0	0	-	-	-
15	+ / ?	+ / ?	+ / ?	+	+	+	0	0	0	-	-	-
16	0	0	-	0	0	-	0	0	0	0	0	0
17	-	-	-	-	-	-	0	0	0	++	++	++

Summary of assessment
The assessment has revealed that Options 1 and 2 would be beneficial in terms of protecting the environment. However, Option 2 may result in negative effects on the local economy should there be less extraction across the area (though this is uncertain).
Option 3 would result in no additional effects from building stone extraction.
Option 4 is likely to have positive effects in terms of supply of building stone and reducing the effects of transportation, and any negative effects are likely to be minor and very temporary.

Recommendations
It is recommended that a combination of Options 1 and 4 would be the most sustainable approach.

Safeguarding Building Stone (id22)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
2	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
3	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
4	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
5	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
6	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
7	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?

8	++	++	++	++	++	++	++	++	++	++	++	++
9	0	0	0	0	0	0	0	0	0	0	0	0
10	++	++	++	++	++	++	++	++	++	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
11	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
12	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
13	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
14	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
15	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
16	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
17	++	++	++	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?

Summary of assessment

As safeguarding does not infer building stone extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the Plan.

All options would contribute positively to safeguarding minerals and providing minerals to meet the needs of the population, although Option 1 would perform better than Option 2 in this respect. In other ways positive indirect effects are noted, such as in terms of contributing to the future supply of building stone for new build and for the repair of historic assets or buildings which contribute to landscape character.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations
A combination of Option 1 and Option 4 is likely to be most beneficial in sustainability terms as the greatest area of building stone resource would be safeguarded.

Overall Spatial Options for Oil and Gas (id23)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	+	+	++	-	-	-	+	+	+
2	-	-	-	?	?	?	?	?	?
3	+	+	+	-	-	-	+	+	+
4	0	0	0	0	0	0	0	0	0
5	-	-	-	+	+	+	+	+	+
							-	-	-
6	+	+	+	-	-	-	+	+	+
7	0	0	0	0	0	0	0	0	0
8	-	-	-	-	-	-	-	-	-
9	0	0	0	0	0	0	0	0	0
10	+	+	+	+	+	+	?	?	?
				?	?	?			
11	++	++	++	-	-	-	-	-	-
12	+	+	+	+	+	+	+	+	+
13	+	+	+	+	+	+	+	+	+
				-	-	-	-	-	-
14	+	+	++	-	-	-	-	-	-
15	?	?	?	?	?	?	?	?	?
16	0	0	0	0	0	0	0	0	0

17	0	-	-	++	++	++	+	+	+

Summary of assessment

The assessment has revealed that Option 1 is likely to provide the most benefits in terms of both protecting the natural environment and landscapes and also supporting local economies, although this option could direct gas developments to areas of highest agricultural land quality and areas where water sources are protected as well as having negative effects in terms of meeting the energy needs of the population. Under Options 2 and 3 there may be negative effects on the landscape and on recreation, with Option 2 also predicted to have negative effects on biodiversity but positive effects for the historic environment.

Recommendations

It is acknowledged that whilst Option 1 performs best overall, Options 2 and 3 would provide a better framework for ensuing sufficient gas developments can come forward. A combination of options whereby license holders, whose license(s) cover land both within and outside National Parks and AONBs, must investigate possibilities outside of these areas first and all operators must aim to locate processing facilities outside of these areas and apply particularly high standards of siting, design and mitigation within these areas is recommended.

Co-ordination of Gas Extraction and Processing (id24)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	?	?	?
2	+	+	+	?	?	?
3	0	+	+	?	?	?
			?			
4	+	+	+	?	?	?
5	-	-	-	-	-	-
				?	?	?
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	-	-	-	-	-	-
9	0	0	0	0	0	0
10	0	0	?	?	?	?
11	+	+	?	?	?	?

12	+	+	+	+	+	+
				-	-	-
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	0	0	0	0	0
16	0	0	0	?	?	?
17	0	0	0	0	0	0

Summary of assessment

The approach outlined in Option 1 is likely to have more positive effects than Option 2 in relation to making use of existing infrastructure and supporting shared infrastructure where environmental impacts can be minimised. This is likely to reduce the need for additional land, reduce disturbance to wildlife and any additional impacts on the landscape/historic environment as well as reduce the cumulative impacts of processing across the plan area. The majority of effects from Option 2 are uncertain given that they would predominantly rely on other policies in the Plan as well as developers to co-ordinate gas processing. In terms of the economy, both options have mixed effects given that Option 1 is likely to reduce costs through use of existing or shared facilities but may reduce the flexibility of processing in certain areas or proximity to markets; whilst Option 2 is likely to allow more flexibility but may require new facilities which may affect viability.

Recommendations

Supporting a co-ordinated approach such as option 1 is more likely to positively contribute to sustainable development and the consideration of of cumulative effects as opposed to relying on other policies in the plan to make decisions on gas extraction and processing.

Gas Developments (Exploration and Appraisal) (id25)

Sustainability Objective	Option 1		
	S	M	L
1	+	+	+
2	+	+	+
3	0	0	0
4	+	+	+
5	-	-	-
	+	+	+
6	-	-	-

7	0	0	0
8	--	--	--
9	0	0	0
10	+	+	+
11	+	+	+
	-	-	-
12	0	+	+
		?	?
13	0	0	0
14	?	?	?
15	-	-	-
	?	?	?
16	+	+	+
17	0	0	0

Summary of assessment

This option requires the consideration of environmental, amenity and transport effects in relation to gas exploration and appraisal. This, when considered alongside the regulatory regime, is likely to have predominantly positive effects in ensuring that any adverse impacts as result of this are minimised and locations are chosen which are not significantly affected, though some residual effects may remain. However, due to the nature of exploration, development may be proposed in locations which conflict with landscape or other designations. This would need to be balanced against the potential economic benefits from exploration as well as other social and environmental effects.

Recommendations

Option 1 should be pursued but needs to include more detail as to social factors to be considered, such as effects on safety and local economy.

Gas Developments (Production and Processing) (id26)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	+	+	+
2	?	?	?	?	?	?
3	+	+	+	?	?	?

4	+	+	+	+	+	+
5	++	++	++	--	--	--
6	+	+	+	-	-	-
7	+	+	+	-	-	-
8	++	++	++	--	--	--
9	0	0	0	0	0	0
10	+	+	+	+	+	+
11	+	+	+	+	+	+
12	+	+	+	+	+	+
13	+	+	+	+	+	+
	?	?	?	?	?	?
14	?	?	?	-	-	-
15	+	+	+	+	+	+
16	+	+	+	-	-	-
17	+	+	+	0	0	0

Summary of assessment

The assessment reveals that Option 1 would score more positively than Option 2 in a range of areas due to the preference for use of brownfield land over greenfield land. In particular, Option 2 would lead to the loss of soils and, potentially, high quality agricultural land. It may also exacerbate rainwater run-off through loss of permeable land and, in some circumstances, the loss of the areas of habitat that provide a climate regulation function. Some uncertainties, but no negative effects, are identified under Option 1.

Recommendations

It is recommended that Option 1 be pursued.

Coal Mine Methane (id27)

Sustainability	Option 1	Option 2

Objective	S	M	L	S	M	L
1	0	0	0	0	0	0
	-	-	-	-	-	-
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	+	+	+	+	++	++
5	0	0	0	+	+	+
		?	?			
6	++	++	++	+	++	++
7	0	0	0	0	0	0
8	+	+	+	+	++	++
9	+	+	+	+	++	++
10	0	0	0	0	0	0
	-	-	-	-	-	-
11	0	0	0	0	0	0
	-	-	-	-	-	-
12	+	+	+	+	+	+
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	+	+	+	+	++	++
16	0	0	0	0	0	0
17	0	0	0	0	0	0

Summary of assessment

Both Option 1 and Option 2 exhibit broadly positive effects on the sustainability objectives, though there remains some potential for minor negative effects on biodiversity / geodiversity, historic environment, landscape / townscape for both options. Some limited uncertainty with effects on land / soil is observed under Option 1 as it is not clear whether the option would result in a preference for brownfield land.

However, notwithstanding these issues, both options, and especially Option 2, will result in benefits for air quality, climate change, resource use, waste minimisation, jobs and safety.

Recommendations
Due to the magnitude of positive effects, the SA notes a preference for Option 2. However, whichever option is pursued that planning authority should consider clarifying the scope of the definition of coal mine methane to be clear on whether it includes methane extraction prior to mining where different technologies may be used.
In addition, the preference for 'brownfield, industrial or employment land' under option 2 might usefully be extended to option1. Should either option be chosen, it will be helpful for any policy developed to make strong links to other environmental and amenity development management policies.

Coal Bed Methane, Underground Coal Gasification, Shale Gas and Carbon and Gas Storage (id28)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	-	-	-	-	?	?	+	+	+
2	-	-	-	-	?	?	+	+	+
3	+ / -	+ / -	+ / -	-	?	?	0	0	0
4	-	-	-	-	?	?	0	0	0
5	-	-	-	-	?	?	0	0	0
6	++ / -	++ / -	++ / -	+ / -	? / ?	?	0	0	0
7	0	0	0	0	0	0	0	0	0
8	--	--	--	-	?	?	+	+	+
9	-	-	-	-	?	?	+	+	+
10	+ / -	+ / -	+ / -	-	?	?	++	++	++
11	+ / -	+ / -	+ / -	-	?	?	+	+	+
12	++	++	++	+	?	?	-	-	-

	-	-	-				+	+	+
13	+	+	+	-	?	?	+	+	+
	-	-	-	+	?		-	-	-
14	-	-	-	-	?	?	+	+	+
15	-	-	-	-	?	?	++	++	++
16	0	0	0	0	0	0	0	0	0
17	++	++	++	+	?	?	-	--	--

Summary of assessment

The assessment has revealed that under Option 1 there is more potential for negative effects on the environment, and communities of the Joint Plan area yet more potential for wider gains including reduced CO_2 emissions. Option 2 would create greater uncertainties in the medium and long term as the approach would largely be controlled by national policy rather than a local approach. In combination with Option 1, Option 3 would lead to positive effects on the environment and communities but may have negative effects in relation to the provision of minerals to meet the needs of the population.

Recommendations

It is recommended that Option 1 would provide a more certain approach for the Joint Plan area provided that the precautionary approach underlies the support in principle. Option 3 would also provide safeguards for environments and communities and should therefore be pursued, provided this is done so in a way which would be consistent with wider policy for delivering these forms of development.

Continuity of Supply of Deep Coal (id29)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	0	0	?	0	0	0
			-			?
2	0	0	?	0	0	0
	?	?	-			?
3	0	?	?	0	?	?

	?				+	+
4	0	0	0 -	0	0	0
5	0	0	-	0	0	?
6	-	-	--	-	-	-- ?
7	0	0	0	0	0	0
8	--	--	--	--	--	- ?
9	-- -	-- -	-- -	--	--	-
10	0	0	0 ?	?	?	?
11	-	-	-	0 -	0 -	0 -
12	+ ++	+ ++	+ ++	+	+ ?	-- ?
13	+	+	+	+	+ ?	-- ?
14	0	0	0	0	0	0
15	0	-	-	0	+ ?	+ ?
16	0	0	0	0	0	0
17	+	+	+	+	?	- ?

Summary of assessment

Both options show a range of environmental, social and economic effects, with negative effects being observed for Options 1 and 2 for a wide range of environmental objectives including climate change, resource use and waste generation, with the latter option showing some falling off of effects if levels of coal mining decline in the longer term. Other negative effects associated with Option 2 include a longer term negative effects on the economy and community viability.
Option 1 shows very positive economic effects and positive effects on community vitality. There are also positive effects on the population SA objective, which has a sub objective on reducing social exclusion. Option 2 also reports lower level positive effects for the economy and community vitality in the short and medium term.
Several other objectives under both options report minor negative effects, though Option 2 reports less negative effects as a whole.

Recommendations
Several recommendations to improve both objectives are made, including expanding the range of criteria considered to include water pollution impacts, considering the potential for a secondary use for spoil and considering the utilisation of coal mine methane (which may also be considered under other options, if chosen).
Broadly, the SA reports mixed effects for these options with option 2 favoured for environmental performance, and option 1 favoured for economic and social performance.

Shallow Coal (id30)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	- ?	- ?	- ?	-	-	0
2	- ?	- ?	- ?	-	-	-
3	0 -	0 -	-	+	+	+
4	- ?	- ?	- ?	-	-	-
5	-	-	-	-	-	-

	?	?	?	--	--	0
6	-	-	-	--	--	--
	?	?	?			
7	0	0	0	0	0	0
8	-	-	-	--	--	--
	?	?	?			
9	0	0	0	0	0	--
10	-	-	-	-	-	-
	?	?	?			
11	-	-	-	-	-	-
	?	?	?	--	--	--
12	-	-	-	+	+	+
13	?	?	?	?	?	?
14	-	-	-	-	-	-
	?	?	?			
15	0	0	0	-	-	-
	-	-	-			
16	0	0	0	0	0	0
17	0	0	0	0	0	0

Summary of assessment

Both options are associated with a number of negative effects, and Option 1 records a significant amount of uncertainty in relation to several environmental and social factors – though effects would be dependent upon the scale and location of extraction. Potential effects on the North York Moors are unlikely under Option 1 as it is unlikely that other development of a sufficient scale would be permitted in the area of shallow coal resource. There is, however, greater certainty that Option 2 would at least create a more supportive policy environment for shallow coal extraction. This, if development occurs, could potentially cause significant sustainability effects, such as landscape and amenity effects, the nature and magnitude of which would depend on the development management policies chosen, and could have heightened effects if such development takes place in or close to protected landscapes.

There are a limited number of positive effects, mainly associated with Option 2, including benefits accruing for possible restoration, reduction in transport miles, and increased employment.

Recommendations

The sustainability appraisal has shown the potential for significant sustainability effects associated with option 2. From a sustainability perspective option 1 is preferable. Consideration of the implications for these options should be considered when selecting / drafting development management policies.

Safeguarding Shallow Coal (id31)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
2	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
3	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
4	0	0	+	0	0	+	0	0	+
	?	?	?	?	?	?	?	?	?
5	0	0	++	0	0	+	0	0	+
	?	?	?	?	?	?	?	?	?
6	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
7	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
8	++	++	++	++	++	++	++	++	++
	?	?	?	+	+	?	+	+	?

9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
11	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
12	++	++	++	+	+	+	+	+	+
13	0	0	0	0	0	0	+	+	+
	?	?	?	?	?	?	?	?	?
14	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
15	0	0	+	0	0	0	0	0	+
	?	?	?	?	?	?	?	?	?
16	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
17	0	0	0	0	0	0	+	+	+
	?	?	?	?	?	?	?	?	?

Summary of assessment

As safeguarding does not infer shallow coal extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the plan.

Safeguarding contributes positively, however, to the SA objective 'to minimise the use of resources and encourage their re-use and safeguarding'. In other ways positive indirect effects are noted for all options, such as benefits for the economy.

Option 1, as it safeguards land with a buffer zone, shows additional positive effects through avoiding proximal sterilisation of the resource.

Option 3 shows some additional indirect positive effects as it prevents land with little prospect of development being safeguarded. This is likely to positively contribute to the needs of the population and community vitality sub objectives.

Under the options which support safeguarding, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations

The SA shows a mild preference for option 3, though it should be noted that this preference is based on an assumption that development is less likely outside of safeguarded areas. Option 1's 'buffer zones' some limited benefit when contrasted with option 2. Generally, however, sustainability effects of all three options are fairly weak.

Safeguarding Deep Coal (id32)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4			Option 5		
	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				?	?	?	?	?	?				?	?	?
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				?	?	?	?	?	?				?	?	?
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				-	-	-	?	?	-						
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				-	-	-	?	?	-						
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				?	?	?	?	?	?						
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				-	-	-	?	?	-						
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				?	?	?	?	?	?						
8	--	--	--	++	++	++	+	+	+	+	+	+	++	++	++
			?			?			?			?			
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
										?	?	?			
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

				?	?	?	?	?	?			+	?	?	?
11	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0
				?	?	?	?	?	?			+	?	?	?
12	--	--	--	++	++	++	+	+	+	0	0	+	++	++	++
13	0	?	?	0	0	+	0	0	+	0	0	+	0	0	++
				?	?	?	?	?	?						
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				?	?	?	?	?	?						
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				?	?	?	?	?	?						
17	0	0	0	+	+	+	+	+	+	+	+	+	+	+	+

Summary of assessment

As safeguarding does not infer deep coal extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the plan.

Safeguarding contributes positively, however, to the SA objective 'to minimise the use of resources and encourage their re-use and safeguarding'. This positive effect occurs with options 2, 3, 4 and 5, with option 2 performing the best in this respect.

Option 5, as it safeguards land with a buffer zone, shows additional positive effects when used in conjunction with other options through avoiding proximal sterilisation of the resource.

In other ways indirect effects are noted for options, in particular benefits for the economy (e.g. Options 2, 3, 4 and 5). Some of the options also note negative effects (Option 1), or neutral to positive effects on the economy.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied. This will need to considered when assessing policies at the Preferred Options stage.

Recommendations

Option 5 is the most compatible with the SA Framework though there are a range of benefits and dis-benefits associated with all options, with option 1 being the least favoured option.

Disposal of Colliery Spoil (id33)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	?	?	-	-	-
		+	+	?	?	?
2	-	-	-	?	?	?
	?	?	?			
3	0	0	0	?	?	?
	?	?	?	+	+	+
4	0	0	0	-	-	-
	?	?	?	?	?	?
5	-	-	-	-	-	-
	?	?	?	--	--	--
6	0	0	0	?	?	?
	?	?	?	+	+	+
7	+	+	+	?	?	?
	?	?	?			
8	-	-	-	?	?	?
	?	?	?			
9	+	+	+	--	--	--
	?	?	?	?	?	?
10	0	0	0	?	?	?
	?	?	?	-	-	-
11	?	?	?	-	-	-
				?	?	?
12	?	?	?	+	+	+
				?	?	?

13	?	?	?	-	-	-
				?	?	?
14	0	0	0	-	-	-
	?	?	?	?	?	?
15	-	-	-	-	-	-
	?	?	?	--	--	--
16	+	+	+	?	?	?
	?	?	?			
17	0	0	0	0	0	0
	?	?	?	?	?	?

Summary of assessment

There is significant uncertainty around both options. Overall the most major negative effects are reported under Option 2 where a new site in particular may affect biodiversity, soil and land, waste generation, heritage, landscape, recreation and leisure and health and wellbeing; though negative effects are recorded under both options.

Positive effects are generally minor, however, utilisation of available capacity under both options may, to a degree, incentivise the extraction of secondary aggregate from these sites.

Recommendations

Option 1 performs better than option 2. However, it should be noted that there is significant uncertainty around this assessment as the outcome of a major planning application at the Womersley site is still to be determined. There is some potential to mitigate negative effects for option 2, particularly if a new facility is developed to encourage the utilisation of secondary aggregates.

Potash Supply (id34)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	+	+	?	--	--	--	++	++	++	++	++	++

							-	-	-	-	-	-
2	+	+	?	--	--	--	-	-	-	-	-	-
3	+	+	-	--	--	--	+	+	+	+	+	+
4	+	+	-	-	-	-	+	+	+	+	+	+
							-	-	-	-	-	-
5	+	+	?	--	--	--	--	--	--	--	--	--
6	+	+	-	--	--	--	+	+	+	+	+	+
7	+	+	?	-	-	-	+	+	+	+	+	+
8	+	+	+	--	--	--	-	-	-	-	-	-
9	+	+	?	-	-	-	-	-	-	-	-	-
10	+	+	?	-	-	-	+	+	+	+	+	+
							?	?	?	?	?	?
11	+	+	--	--	--	--	++	++	++	++	++	++
12	-	-	+	++	++	++	+	+	+	++	++	++
13	-	-	+	++	++	++	+	+	+	++	++	++
	+	+	-	-	-	-						
14	+	+	--	--	--	--	++	++	++	++	++	++
15	+	+	-	--	--	--	+	+	+	+	+	+
							-	-	-	-	-	-
16	+	+	?	-	-	-	+	+	+	+	+	+
17	-	-	+	++	++	++	+	+	+	++	++	++

Summary of assessment

Option 1 would enable the economic and minerals supply benefits associated with having a potash mine in the Plan area to be maintained, whilst limiting the environmental effects. However, the scale of potential negative environmental, community and recreational effects in the longer term may vary depending on whether the option would lead to the development of a new mine. The environmental effects include effects on landscape, biodiversity / geodiversity, the historic environment, water and air quality. Of all the options, Option 2 would have the most significant negative effects on the environment and communities however could provide overall gains for the economy. Options 3 and 4 would provide the least harm, through protecting the environment and recreational assets of the National Park, although of these Option 4 would have greater positive effects on

the economy and minerals supply.

Recommendations
It is recommended that option 1 or option 4 be pursued, possibly through a combination of the two.

Safeguarding Potash (id35)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
2	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
3	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
4	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
5	+	+	+	0	0	0
	?	?	?	?	?	?
6	0	0	0	0	0	0
	?	?	?	?	?	?
7	0	0	0	0	0	0
	?	?	?	?	?	?
8	-	-	-	++	++	++

9	0	0	0	0	0	0
10	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
11	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
12	-	-	-	?	?	?
	?	?	?			
13	-	-	-	?	?	?
	?	?	?			
14	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
15	+	+	+	+	+	+
	?	?	?	0	0	0
				?	?	?
16	+	+	+	0	0	0
	?	?	?	?	?	?
17	-	--	--	+	++	++
	?	?	?	?	?	?

Summary of assessment

As safeguarding does not infer deep mineral extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the Plan.

The assessment has concluded that all options may have indirect benefits for the environment and communities should the extraction of potash preclude certain types of development from taking place on the surface above. However, Option 1 may not have positive effects in terms of the supply of minerals as land could become sterilised prior to the granting of planning permission for the extraction of potash below. Option 2 would provide benefits in terms of ensuring potash supply could be maintained.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations

It is recommended that option 2 be progressed as it would provide the same benefits as option 1 along with more benefits.

Supply of Gypsum (id36)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+						
2	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+						
3	+	?	?	+	+	+	0	0	?	0	0	0
			-	?	?	?	-	-				?
4	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+	+	+	+	+	+	+
5	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+						
6	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+		-	-		-	-
7	0	0	0	0	0	0	0	0	0	0	0	0
8	-	-	-	+	+	+	+	+	+	+	+	+
9	0	0	0	0	0	0	++	++	++	+	+	+
10	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+						
11	?	?	?	?	?	?	0	0	0	0	0	0
	+	+	+	+	+	+						
12	+	+	+	0	0	?	+	+	+	0	0	0
					?							
13	-	-	-	+	+	+	0	0	0	0	0	0
				?	?	?						
14	0	0	0	0	0	0	0	0	0	0	0	0
15	-	-	-	+	+	+	0	0	0	0	0	0

				?	?	?						
16	+	+	+	+	+	+	0	0	0	0	0	0
	?	?	?	?	?	?						
17	+	+	+	?	?	?	0	0	0	0	0	0

Summary of assessment

Comparatively, Options 1 and 2 result in similar effects given that over the last few years natural gypsum has not been extracted in the Plan area. In the long-term, not expressly supporting the extraction of gypsum through Option 2 may have a minor negative impact on the economy should demand increase while supporting Option 1 would ensure that this is considered more favourably. The effects from the extraction of gypsum on environmental and social objectives would be location specific and commensurate to the scale of the building works/processing above ground as predominantly this mineral is mined underground.

Options 3 and 4 also have negligible effects given that synthetic gypsum is a by-product from existing fossil fuel power stations although would have limited positive effects in terms of air quality, reducing waste and supporting the power stations economically.

Recommendations

Option 1 should be pursued for natural gypsum. In relation to synthetic gypsum, it is likely that the planning processes cannot influence the process of extraction in the long-term given it is a by-product from coal-fired power stations; pursuing either option 3 or 4 in this case would present relatively the same sustainability outcomes.

Safeguarding Gypsum (id37)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	0	0	0	0	0	0
	?	?	?	?	?	?
2	0	0	0	0	0	0
	?	?	?	?	?	?
3	0	0	0	0	0	0
	?	?	?	?	?	?
4	0	0	0	0	0	0
	?	?	?	?	?	?
5	+	+	+	0	-	-
	?	?	?	?	?	?

6	0	0	0	0	0	0
	?	?	?	?	?	?
7	0	0	0	0	0	0
	?	?	?	?	?	?
8	++	++	++	--	--	--
9	0	0	0	0	0	0
10	0	0	0	0	0	0
	?	?	?	?	?	?
11	0	0	0	0	0	0
	?	?	?	?	?	?
12	+	++	++	-	-	-
13	0	0	0	0	0	0
	?	?	?	?	?	?
14	0	0	0	0	0	0
	?	?	?	?	?	?
15	0	0	0	0	0	0
	?	?	?	?	?	?
16	0	0	0	0	0	0
	?	?	?	?	?	?
17	0	0	0	0	0	0
	?	?	?	?	?	?

Summary of assessment
As safeguarding does not infer gypsum extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the plan.

In most cases effects of other options are neutral. However, Option 1 shows positive effects associated with objectives soil/land, resource use, and sustainable economic growth. This is because minerals will not be sterilised or under threat under this option. The inverse is true for Option 2, with negative effects reported for the same objectives.

Under Option 1, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations
The SA indicates that option 1 is the most sustainable option.

Safeguarding Deep Mineral Resources (id38)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	+	+	+
	?	?	?	?	?	?
2	+	+	+	+	+	+
	?	?	?	?	?	?
3	0	0	0	0	0	0
	?	?	?	?	?	?
4	0	0	0	0	0	0
	?	?	?	?	?	?
5	+	+	+	+	+	+
	?	?	?	?	?	?
6	0	0	0	0	0	0
	?	?	?	?	?	?
7	0	0	0	0	0	0
	?	?	?	?	?	?
8	+	+	+	++	++	++
9	0	0	0	0	0	0
10	+	+	+	+	+	+
	?	?	?	?	?	?
11	+	+	+	+	+	+
	?	?	?	?	?	?
12	0	0	0	0	0	0
13	0	0	0	0	0	0

14	+	+	+	+	+	+
	?	?	?	?	?	?
15	+	+	+	+	+	+
	?	?	?	?	?	?
16	0	0	0	0	0	0
	?	?	?	?	?	?
17	++	++	++	-	-	--

Summary of assessment

As safeguarding does not infer deep minerals extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the plan.

Both options may indirectly provide protection the environment and communities through potentially limiting the amount of extraction of deep minerals, although these benefits would be more certain and potentially greater under Option 2 whereby such development would definitely not be supported in certain locations. Whilst Option 2 may robustly safeguard existing extraction processes, it may unnecessarily lead to preclusion of extraction which in could have been undertaken alongside existing extraction.

Under each option, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations

It is recommended that option 1 be pursued provided clarity is provided on how these issues will be considered through the planning application process and in what circumstances the policy may apply.

Supply of Vein Minerals (id39)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	--	0	0	0
			+	-	-	-
2	-	-	-	0	0	0

				-	-	-
3	-	-	-	0	0	0
				-	-	-
4	0	0	0	0	0	0
	-	-	-	-	-	-
5	0	0	0	0	0	0
	-	-	-	-	-	-
6	--	--	--	0	0	0
				-	-	-
7	0	0	0	0	0	0
				-	-	-
8	-	-	-	0	0	0
	--	--	--	-	-	-
9	-	-	-	0	0	0
	--	--	--	-	-	-
10	0	0	0	0	0	0
	-	-	-	-	-	-
11	-	-	--	0	0	0
				-	-	-
12	+	+	+	0	0	0
				-	-	-
13	-	-	-	0	0	0
	+	+	+	+	+	+
14	-	-	-	0	0	0
				-	-	-
15	-	-	-	0	0	0
				-	-	-

16	-	-	-	0	0	0
				-	-	-
17	0	0	0	0	0	0

Summary of assessment

The assessment shows that there are numerous negative effects associated with both options, with Option 1 displaying the possibility of major negative effects for biodiversity / geodiversity, climate change, resource use, waste generation and landscape. This is largely because vein minerals occur close to sensitive receptors (such as wildlife sites and designated landscapes) and extraction techniques can utilise a significant area of land, and extraction is essentially non-renewable and energy intensive.

There are positive economic benefits associated with both options (with Option 1 performing the best), and Option 1 also has both positive and negative effects associated with community vitality.

Recommendations

While both options display broadly negative effects, option 2 performs more favourably against the SA framework . However, the assessment notes significant potential for development of more comprehensive criteria which could lessen environmental effects under both options.

Safeguarding Vein Minerals (id40)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	0	0	0	0	0	0
	?	?	?			
2	0	0	0	0	0	0
	?	?	?			
3	0	0	0	0	0	0
	?	?	?			
4	0	0	0	0	0	0
	?	?	?			
5	0	0	+	0	0	-

	?	?	?			
6	0	0	0	0	0	0
	?	?	?			
7	0	0	0	0	0	0
	?	?	?			
8	++	++	++	--	--	--
9	0	0	0	0	0	0
	?	?	?			
10	0	0	0	0	0	0
	?	?	?			
11	0	0	0	0	0	0
	?	?	?			
12	+	+	+	-	-	-
13	0	0	0	0	0	0
	?	?	?			
14	0	0	0	0	0	0
	?	?	?			
15	0	0	0	0	0	0
	?	?	?			
16	0	0	0	0	0	0
	?	?	?			
17	0	0	0	0	0	0

Summary of assessment

As safeguarding does not infer minerals extraction will take place there is generally no predicted direct effect. Were development to take place it would need to accord with other policies in the Plan.

In most cases effects of both options are neutral. However, Option 1 shows positive effects associated with soil / land, resource use and sustainable economic growth. This is because minerals will not be sterilised under this option. The inverse is true for Option 2, with negative

effects reported for the same objectives.

Under Option 1, effects from displacement of development which would have taken place are uncertain as this will depend upon the stringency of any policy approach applied.

Recommendations
The SA indicates that option 1 is the most sustainable option.

Borrow Pits (id41)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	++	++	++	+	+	+
4	-	-	-	-	-	-
	+	+	+	+	+	+
5	-	-	--	+	+	+
6	++	++	++	+	+	+
	-	-	-			
7	0	+	+	0	+	+
8	-	-	--	++	++	++
9	0	0	0	+	+	+
10	?	?	?	?	?	?
	++	++	++	-	-	-
11	-	-	-	-	-	-
	+	+	+	+	+	+
12	0	0	0	+	+	+
13	?	?	?	?	?	?

14	?	?	?	?	?	?
15	+	+	+	+	+	+
	-	-	-	-	-	-
16	0	+	+	0	+	+
17	++	++	++	++	++	++

Summary of assessment

The assessment has shown that Option 1 would have positive effects in terms of reducing minerals transport miles and also in terms of ensuring that the most appropriate mineral can be sourced for the development. However, it would not help to reduce the overall use of minerals or to use more secondary and recycled minerals. Option 2 would have some, but fewer, benefits in terms of reducing minerals transport miles but would support the aim of reducing the use of primary minerals in favour of alternatives.

Recommendations

It is recommended that option 2 should be followed but should include support for borrow pits where this would enable the most appropriate type of mineral to be sourced.

Provision of Waste Management Capacity and Infrastructure

Overall Approach to the Waste Hierarchy (id42)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	?	?	?	?	?	?	?	?	?
	+	+	+	0	0	0	0	0	0
2	+	+	+	?	?	?	?	?	?
	-	-	-	0	0	0	0	0	0
3	?	?	?	?	?	?	?	?	?
4	-	-	-	?	?	?	?	?	?
	+	+	+				-	-	-
5	-	-	-	-	-	-	-	-	-
	+	+	+	+	+	+	+	+	+
6	+	+	+	+	+	+	?	?	?
							-	-	-
7	0	0	0	0	0	0	0	0	0
8	+	+	+	+	+	+	+	+	+
							?	?	?
9	++	++	++	++	++	++	+	+	+
10	?	?	?	?	?	?	?	?	?
	0	0	0	0	0	0	0	0	0
11	?	?	?	?	?	?	?	?	?
	0	0	0	0	0	0	0	0	0
12	+	+	+	+	+	+	+	+	+
							?	?	?
13	+	+	+	+	+	+	+	+	+

	-	-	-	-	-	-	-	-	-
14	?	?	?	?	?	?	?	?	?
15	?	?	?	?	?	?	?	?	?
16	?	?	?	?	?	?	?	?	?
17	0	0	0	0	0	0	0	0	0
	+	+	+	+	+	+	+	+	+

Summary of assessment

Options 1 and 2 would encourage sustainable waste management by managing waste as high up the waste hierarchy as possible. Both options are likely to have positive effects in relation to resource consumption, waste management and the economy. Option 2 is likely to deliver this higher up the waste hierarchy but would have to be balanced against the practicability of doing so. Option 3 is identified to also have some positive environmental effects as well as positive effects for the economy in being more flexible to choose the waste processing method used. However, it is considered that this approach would not effectively manage waste to deliver the maximum environmental benefits in comparison to Options 1 and 2. All 3 options are identified to have uncertain effects on the remaining environmental and social objectives given that the scales of the impacts would be determined in relation to the proximity and type of waste management facility.

Recommendations

The SA considers that the most sustainable approach would be to pursue option 2.

Strategic Role of the Plan Area in the Management of Waste (id43)

Sustainability Objective	**Option 1**			**Option 2**			**Option 3**		
	S	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**
1	-	-	--	-	-	-	+	+	+
2	-	-	--	-	-	-	-	-	-
3	++	++	++	--	--	--	+	+	+

4	-	-	-	-	-	-	+	+	+
5	-	-	-	-	-	-	-	-	-
6	+	+	+	--	--	--	+	+	+
	-	-	-						
7	-	-	-	-	-	-	0	0	0
8	0	0	0	0	0	0	0	0	0
9	++	++	++	-	-	-	+	+	+
10	-	-	--	-	-	-	+	+	+
11	-	-	--	-	-	-	+	+	+
12	++	++	++	+	+	+	+	+	+
13	?	?	?	?	?	?	?	?	?
14	-	-	--	-	-	-	+	+	+
15	--	--	--	-	-	-	-	-	-
16	-	-	-	-	-	-	0	0	0
17	+	+	+	+	+	+	0	0	0

Summary of assessment

Whilst Option 1 would have positive effects in terms of reducing transport and associated emissions and in supporting the economy and jobs, it is likely to have negative effects on the environment and communities in the Plan area. Option 2 however would have positive effects on the environment (though would increase the potential for impacts from longer distance journeys) and communities but may restrict opportunities for managing waste further up the hierarchy.

Option 3 would have positive effects on the Yorkshire Dales National Park which, on balance due to the nature of the Park, would be more significant than any increases in negative effects in the Plan area and would also provide more opportunities for efficiencies.

Recommendations

It is recommended that a combination of Options 1 and 2 (which would enable facilities to be provided for in the plan area where this would lead to sustainability benefits such as reduced transportation distances) be followed, along with Option 3.

Meeting Waste Management Capacity Requirements – Local Authority Collected Waste (id44)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	+	+	+	+	+	+
4	0	-	-	0	-	-
5	?	?	?	-	-	-
6	+	+	+	+	+	++
		++	++	++	++	
7	0	0	0	0	0	0
8	+	+	+	+	+	+
9	++	++	++	++	++	++
10	-	-	-	-	-	-
11	-	-	-	-	-	-
12	++	++	++	++	++	++
13	+	+	+	+	+	+
14	-	-	-	+	+	+
15	+	+	+	?	?	?
16	?	?	?	?	?	?
17	?	?	?	0	0	0

Summary of assessment

There is some uncertainty as to the sustainability effects of both options. This is largely because it is not known where all local authority collected waste management facilities will be located under the options.

Although uncertain, there is potential for minor negative effects in relation to biodiversity, water, soils, air, the historic environment, landscape and community vitality under both options. In some cases, however, Option 2 may slightly lessen negative effects as it will potentially result in

lower transport impacts as there is potentially more locational flexibility.
There are also a number of positive effects. In particular, both options make a strong positive contribution to sustainable waste management and achieving sustainable economic growth.

Recommendations
The sustainability appraisal has observed a very slight preference for option 2

Meeting Waste Management Capacity Requirements – Commercial and Industrial Waste (Including Hazardous C&I Waste) (id45)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	-	-	-	-
	+	+	+	+	+	+
2	-	-	-	-	-	-
	?	?	?	?	?	?
3	?	?	?	?	?	?
				+	+	+
4	-	-	-	-	-	-
	?	?	?	?	?	?
5	-	-	-	-	-	-
			+			+
6	+	+	+	+	+	+
	-	-	-	-	-	-
7	0	0	0	0	0	0
8	++	++	++	++	++	++
9	++	++	++	++	++	++
						?

10	?	?	?	?	?	?
11	?	?	?	?	?	?
			+			+
12	+	+	+	+	+	+
13	?	?	?	?	?	?
14	?	?	?	?	?	?
			+			+
15	-	-	-	-	-	-
16	?	?	?	?	?	?
17	+	+	+	+	+	+

Summary of assessment

Options 1 and 2 would both provide significant benefits for the effective and sustainable management of Commercial and Industrial waste in line with the waste hierarchy and minimising waste to landfill. Both would also be positive for minimising the use of resources and creating positive effects for the economy in line with reducing costs associated with landfill, provision of energy from waste and the production of recycled materials. Option 2, is likely to have more positive implications in relation to transportation of waste given that it would support management of C&I arising from outside of the Plan area where it can be demonstrated that the location proposed would present the nearest appropriate installation for the waste to be dealt with. Overall, this would help to minimise journeys/mileage in relation to waste processing. The majority of other environmental and social effects are uncertain given that they would depend upon the scale, location and type of waste facility to be implemented, although negative effects may potentially be greater under Option 2 as more waste would be being managed in the Plan area.

Recommendations

On balance, and assuming that it can be effectively demonstrated to be consistent with other proposals within the plan, it is considered that Option 2 could be the most sustainable.

Meeting Waste Management Capacity Requirements – Construction, Demolition and Excavation Waste (Including Hazardous CD&E Waste) (id46)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	-	-	-	-
	+	+	+	+	+	+
2	-	-	-	-	-	-
3	?	?	?	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
	+	+	+	+	+	+
6	-	-	-	-	-	-
	+	+	+	+	+	+
7	-	-	-	-	-	-
8	+	+	+	+	+	+
9	+	+	+	+	+	+
10	?	?	?	?	?	?
	+	+	+	+	+	+
11	-	-	-	-	-	-
	+	+	+	+	+	+
12	+	+	+	+	+	+
13	?	?	?	?	?	?
14	?	?	?	?	?	?
	+	+	+	+	+	+
15	-	-	-	-	-	-
16	-	-	-	-	-	-

17	+	+	+	+	+	+

Summary of assessment
Under both options it is possible, although uncertain, that there could be negative effects on the environment and communities through provision of new facilities, whilst positive effects would be realised in relation to managing waste further up the waste hierarchy and using resources efficiently.
Option 2 would potentially increase negative effects relating to transport through importing wastes from elsewhere but in turn this may result in greater positives through facilitating high quality reclamation of former quarries.

Recommendations
It is recommended that on balance Option 2 would be more sustainable as it would provide greater opportunity for securing enhancements to former quarries.

Managing Agricultural Waste (id47)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	?	?	?	?	?	?
	-	-	-	-	-	-
2	0	0	0	-	-	-
	?	?	?	+	+	+
3	+	+	+	+	+	+
4	-	-	-	-	-	-
5	+	+	+	++	++	++
				?	?	?
6	+	+	+	++	++	++
7	0	0	0	0	0	0
	+	+	+	+	+	+
8	+	+	+	++	++	++

9	+	+	+	++	++	++
10	0	0	0	0	0	0
11	0	0	0	-	-	-
	?	?	?			
12	0	0	0	+	+	+
	+	+	+			
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	-	-	-	-	-	-
16	0	0	0	0	0	0
17	0	0	0	0	0	0

Summary of assessment

Both options exhibit a range of sustainability effects, however, these are in the main neutral to positive.

Option 1 might result in minor negative effects relating to biodiversity, water, air, and health and wellbeing. However, most other effects are broadly positive as more on site management would reduce transport and associated effects, and would support existing practises of managing farm wastes in positive ways.

Option 2 has similar negative effects, as well as possible negative effects on farm landscapes. However, it also has some strong positive sustainability effects that arise from the benefits of turning farm waste into energy and biodigestate (an end product of anaerobic digestion that can be used as a fertiliser), such as benefits for climate change, minimisation of use of resources and soils and land. One particular area of uncertainty, however, is where crops are specifically grown to produce biodigestate and energy, which could cancel out some sustainability benefits as it would increase land requirements.

Recommendations

Option 2 is considered the more sustainable option, though both options would require a supporting policy framework to maximise sustainability benefits.

Managing Low Level (Non-Nuclear) Radioactive Waste (id48)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	0	0	0	-	-	-
	?	?	?	?	?	?
2	0	0	0	-	-	-
	?	?	?	?	?	?
3	0	0	0	+	+	+
	-	-	-	-	-	-
4	-	-	-	-	-	-
	?	?	?	?	?	?
5	0	0	0	-	-	-
				?	?	?
6	0	0	0	-	-	-
	?	?	?	?	?	?
7	0	0	0	0	0	0
8	0	0	0	?	?	?
9	+	+	+	+	+	+
	0	0	0	0	0	0
10	0	0	0	-	-	-
	?	?	?	?	?	?
11	0	0	0	-	-	-
	?	?	?	?	?	?
12	0	0	0	-	-	-
				?	?	?
13	0	0	0	0	0	0
	?	?	?	?	?	?

14	0	0	0	?	?	?
	?	?	?			
15	0	0	0	?	?	?
	?	?	?			
16	0	0	0	?	?	?
	?	?	?			
17	0	0	0	0	0	0

Summary of assessment

The effects of Option 1 would largely be neutral or beneficial within the plan area given that the waste would be managed elsewhere. The main negative effects under Option 1 would be in relation to transportation of LLRW and associated emissions.

In comparison, under Option 2 effects are largely uncertain as proposals would need to be considered against other policies within the Plan. This option has potential negative effects in relation to the local environment and communities. Given that low levels of LLRW are produced in the Plan area, in terms of viability Option 2 may also result in management of waste which has arisen outside of the Joint Plan area which may exacerbate any negative effects.

Recommendations

On balance, it is considered that option 1 should be pursued.

Managing Waste Water (Sewage Sludge) (id49)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	-	-	-	-
2	+	+	+	+	+	+
3	+	+	+	-	-	-
4	-	-	-	-	-	-
5	-	-	-	-	-	-
	+	+	+			
6	-	-	-	-	-	-

	+	+	+			
7	-	-	-	-	-	-
8	0	0	0	0	0	0
9	+	+	+	+	+	+
10	-	-	-	-	-	-
11	-	-	-	-	-	-
12	+	+	+	+	+	+
13	+	+	+	+	+	+
14	-	-	-	-	-	-
15	-	-	-	-	-	-
	+	+	+	+	+	+
16	-	-	-	-	-	-
17	++	++	++	++	++	++

Summary of assessment

Both options would result in positive effects in relation to provision of infrastructure necessary to support communities and have minor positive effects in relation to employment. Under both options there is also the potential for localised negative effects on the environment although these could be more significant under Option 2 through the likelihood of a greater number of new (rather than extended) facilities.

Recommendations

It is recommended that Option 1 be pursued.

Managing Power Station Ash (id50)

Sustainability Objective	Option 1		
	S	M	L
1	-	-	-
	+	+	+

2	-	-	-
	+	+	+
3	+	+	+
4	-	-	-
5	0	+	+
6	+	+	++
7	0	0	0
8	++	++	++
9	++	++	++
10	-	-	-
11	0	0	0
	-	-	-
12	+	+	+
13	-	-	-
	+	+	+
14	0	0	0
15	-	-	-
16	0	0	0
17	+	+	+

Summary of assessment

There are some minor negative effects on biodiversity, water, local air quality and the historic environment, as well as less certain minor negative effects on landscape, community vitality (for which there are also some positive effects associated with employment) and health and wellbeing associated with this option, arising out of localised problems such as dust generation, possible runoff / leachate and traffic. These may however be offset to a degree by positive environmental and social effects, particularly in relation to reduced land take, resulting from lower levels of primary minerals extraction should support for use of power station ash result in less demand / need for this. There are

some major positive effects associated with climate change, minimising the use of resources and minimising waste generation resulting from the potential for power station ash to reduce demand for primary aggregates, and minor positive effects associated with the economy and meeting the needs of the population.

Recommendations
If this option is pursued, mitigation measures around dust, water pollution and traffic can be strengthened through policies in the plan.

Overall Locational Principles for Provision of New Waste Capacity (id51)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	0	0	0
2	0	0	0	+	+	+	+	+	+	0	0	0
	?	?	?	?	?	?	?	?	?			
3	?	?	?	+	++	++	+	++	++	-	-	-
4	?	?	?	+	+	+	+	+	+	+	+	+
										-	-	-
5	++	++	++	+	++	++	++	++	++	-	-	-
							?	?	?			
6	+	+	+	+	++	++	+	+	+	0	0	0
	?	?	?				?	?	?	-	-	-
7	0	0	0	0	0	0	0	0	0	0	0	0
8	++	++	++	++	++	++	++	++	++	0	0	0
9	++	++	++	++	++	++	++	++	++	0	0	0
	?	?	?				?	?	?			
10	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?			

11	+	+	+	+	+	+	+	-	-	++	++	++
	?	?	?	?	?	?	?	?	?			
12	+	+	+	+	+	+	++	++	++	+	+	+
13	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?			
14	+	+	+	+	+	+	+	+	+	++	++	++
	?	?	?	?	?	?	?	?	?			
15	+	+	+	?	+	+	+	+	+	0	0	0
	?	?	?		?	?						
16	+	+	+	+	+	+	+	+	+	0	0	0
	?	?	?	?	?	?	?	?	?			
17	0	0	0	+	+	+	+	+	+	0	0	0
										-	-	-

Summary of assessment

While all options display a significant amount of diversity, there are a number of positive effects for the first three options. These are chiefly associated with the minimisation of the land and associated infrastructure footprint through maximising use of existing sites and the reduction of transport, which is significantly better for Options 2 and 3 than Option 1. As all three options support the principle of sufficient waste management infrastructure they make a significant contribution to managing waste higher up the waste hierarchy.

Option 4 is considered alongside other options, so cannot be directly compared to them. This option would have overall positive effects on landscape, biodiversity, cultural heritage and on recreational opportunities through protecting the National Park and AONBs. However, it also shows some potential for minor negative effects in relation to transport generated and where it would displace major development to other parts of the Plan area.

Uncertainty is noted with several objectives as the extent of impacts is often dependent on the other detailed waste site identification criteria contained in the Plan, which is uncertain until options for this have been decided upon.

Recommendations

Broadly options 2 and 3 perform best against the SA framework, though on account of its better effects on communities, option 3 is preferred.

Waste Site Identification Principles (id52)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	?	-	-	?
2	+	+	?	+	+	?
3	++	++	?	+	+	+
4	+	+	?	+	+	?
5	-	-	?	+	+	+
6	-	-	?	+	+	++
7	?	?	?	?	?	?
8	+	+	?	+	+	+
9	+	+	?	+	+	+
10	-	-	?	-	-	?
11	-	-	?	-	-	?
12	+	+	?	+	+	+
13	?	?	?	+	+	+
14	?	?	?	?	?	?
15	+	+	?	+	+	+ ?
16	?	?	?	?	?	?
17	-	-	?	+	+	++

Summary of assessment

The assessment reveals that under Option 1 a number of topics would not be sufficiently covered through reference to national waste policy

alone, including biodiversity and geodiversity, agricultural land, climate change, heritage, landscape and recreation. In addition, uncertain effects are recorded over the longer term as the implications of any future changes to national waste policy (beyond the current update being produced) are unknown.
Option 2 provides greater positive effects in terms of the preference for locations close to where heat generated through Combined Heat and Power schemes can be used, which would support climate change objectives as well as having a positive outcome for local communities and businesses. However, the reference to national waste policy in relation to consideration of specific environmental and community issues presents the same uncertainties and potential negative effects as Option 1.

Recommendations
It is recommended that Option 2 be pursued to provide the greatest certainty throughout the Plan period. To alleviate concerns over solely relying on national waste policy to consider issues related to the environment and communities reference should also be given to other policies in the Joint Plan.

Waste Management Facility Safeguarding (id53)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	?	?	?	?	?	?
2	?	?	?	?	?	?
3	+	+	+	+	+	?
4	?	?	?	?	?	?
5	?	?	?	+	+	?
6	+	+	+	+	+	?
7	?	?	?	?	?	?
8	+	+	+	+	+	?
9	++	++	++	+	+	?
10	?	?	?	?	?	?
11	?	?	?	?	?	?

12	?	?	?	+	+	?
13	?	?	?	?	?	?
14	?	?	?	?	?	?
15	?	?	?	?	?	?
16	?	?	?	?	?	?
17	+	+	+	+	+	?

Summary of assessment

It is not possible to identify effects against a number of environmental sustainability objectives without knowing the nature of any proposed development or alternative locations for either this or displaced waste management facilities. Option 1 would provide positive effects against waste management objectives by providing certainty over safeguarding these facilities throughout the Plan period however Option 2 may perform better against wider economic objectives by providing a greater element of flexibility in decision making. Relying on national policies provides uncertainties in the longer term should national policy be amended or replaced (further to the existing proposed updated national waste planning policy).

Recommendations

It is recommended that Option 1 be adopted as this would support the overall approach to provision of waste management facilities in the Plan area in line with other policies in this Plan.

Transport and Other Infrastructure

Transport Infrastructure (id54)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	0	- ?	- ?	0	- ?	- ?
2	?	?	?	?	?	?
3	+	+ ?	+ ?	+	+	+
4	+	+	+	+	+	++
5	0	-	-	0	-	-
6	+	+	+	+	++	++
7	0	0	0	0	0	0
8	+	+ ?	? -	+	+	?
9	0	0	0	0	0	0
10	?	?	?	?	?	?
11	?	?	?	?	?	?
12	+	+	+	+	+	+
13	?	?	?	?	?	?
14	0	0	0	0	0	0
15	+ ?	+ ?	+	+ ?	+ ?	+ ?
16	0 ?	0 ?	?	0 ?	0 ?	?
17	0	0	0	+	+	+

Summary of assessment

Initially just Option 1 was included. This option is likely to have positive impacts through the retention of the existing rail, pipeline and water transportation infrastructure and support for the development of new infrastructure on reducing the need to transport waste and minerals by road and the economy, as well as potentially positive effects on climate change although this is dependent upon individual circumstances. However, the likely social and environmental impacts experienced in relation to the landscape, human health and well-being and biodiversity will be dependent upon the location, type and scale of additional infrastructure as well as the frequency of its use. The majority of effects at the stage are therefore dependent upon implementation.

Recommendations

An alternative option could seek to encourage the retention of infrastructure and the development of new rail, water and pipeline facilities informed by an appraisal of the carbon impacts . Although it is broadly sustainable to transport by these methods it is uncertain how minerals and waste development link to this. A possible alternative approach to this would be to support the retention and development of the infrastructure that would represent environmentally sound approach to transporting waste and minerals and also to assess the net carbon impacts of transport modes utilised. The assessors consider that this is supported by NPPF policy on transport and climate change whereby a low carbon future is supported.

With both options…

Both options are likely to have positive impacts through the retention of the existing rail, pipeline and water transportation infrastructure and support for the development of new infrastructure. These positive effects are on reducing the need to transport waste and minerals by road and potentially on climate change and economic objectives. Option 2 would have greater positive effects in relation to mitigating climate change through the requirement to consider carbon implications at the planning application stage. It may indirectly also have stronger positive effects in relation to air quality as it may promote better logistical practice and fuel efficiency as an alternative to using non road transport. Under both options the likely social and environmental impacts experienced in relation to the landscape, human health and well-being and biodiversity will be dependent upon the location, type and scale of additional infrastructure as well as the frequency of its use. The majority of effects at the stage are therefore dependent upon implementation.

Recommendations

While option 2 performs marginally better than option 1 (on account of its positive climate change and air pollution effects) positive effects could be further enhanced at the policy development stage via a strong policy arising from this option, which could require the consideration of non road forms of transport wherever possible and require a justification for not utilising them.

Transport Infrastructure Safeguarding (id55)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
2	?	?	?	0	0	0	0	?	?
				+	+	+	?		
3	++	++	++	++	+	+	++	+	+
	?	?	?	?	-	-	?	?	?
4	?	?	?	0	?	?	?	?	?
				?					
5	+	+	+	+	+	+	+	+	+
	-	-	-	?	-	-	?	?	?
6	+	+	+	+	+	?	+	+	+
	?	?	?	?	?		?	?	?
7	0	0	0	0	0	0	0	0	0
8	+	+	+	+	+	+	+	+	+
					-	-			
9	0	0	0	0	0	0	0	0	0
10	-	-	-	0	+	+	0	+	+
	?	?	?	?	?	?	?	?	?
11	-	-	-	-	-	-	0	+	+
	?	?	?	?	?	?	?	?	?
12	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?
13	0	?	?	0	0	+	0	?	?

	?			?	?	?	?		
14	0	?	?	0	?	?	?	?	?
	?		-	?		+			
15	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
16	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?
17	0	?	?	0	?	?	?	?	?
	?		-	?		+			

Summary of assessment

Option 1 is likely to provide the most flexibility compared to both Options 2 and 3 in terms of the future movement of minerals to the market. This would have a positive effect in ensuring that all possibilities for transporting minerals using these methods are safeguarded. However, this option may result in greater potential for vacant sites. Option 3 would only safeguard where there is identified potential now and in the future, which would link the location of minerals movement with assessment of actual and projected use and would allow sites without sufficient potential to be redeveloped for alternative (non-minerals related) uses. Option 2 could restrict future transport capability by only safeguarding currently used rail heads, links and wharves, which could have negative effects on the economy and minerals supply in the longer term.

Recommendations

It is considered that Option 3 shows more positive benefits overall when compared to option 1 and 2, although it is acknowledged that for the majority of objectives no strong preference for any option was identified.

Any policy would need to address potential for vacant sites and length of time / issues related to this would need to be considered when considering alternative developments.

Locations for Ancillary Minerals Infrastructure (id56)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L

1	?	?	?	?	?	?	?	?	?	+	+	+
		-	-	+	+	+	+	+	+	?	?	?
2	-	-	-	-	-	-	-	-	-	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
3	+	+	+	+	+	+	+	-	-	0	-	-
							-					
4	+	+	+	+	+	+	+	+	+	+	+	+
	-	-	-	-	-	-	-			-	-	-
5	?	?	?	?	?	?	+	+	+	+	+	+
6	+	+	+	+	+	+	-	-	-	-	-	-
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	?	?	?	?	?	?	?	?	?	+	+	+
	-	-	-	+	+	+				?	?	?
11	?	?	?	+	+	+	+	+	+	+	+	+
	-	-	-	?	?	?	-	-	-	-	-	-
12	+	+	+	+	+	+	+	+	+	+	+	+
	-	-	-	-	-	-						
13	-	-	-	-	-	-	-	-	-	+	+	+
					+	+	+	+	+			
14	-	-	-	+	+	+	+	+	+	+	+	+
15	?	?	?	?	?	?	?	?	?	?	?	?
	-	-	-	-	-	-	-	-	-	-	-	-
16	?	?	?	?	?	?	?	?	?	?	?	?
17	0	0	0	0	0	0	0	0	0	0	0	0

Summary of assessment

All of the options are likely to have positive effects on the economy through supporting ancillary functions associated with minerals extraction and processing, although Option 3 in conjunction with option 1 would provide the greatest flexibility in this respect.

All of the options would support development that would not have significant adverse effects on the environment (which is positive). Minor negative effects in terms of transport miles are likely to be greater under Options 3 and 4 where an additional location may be added into the overall supply chain, although these options are likely to have positive effects through reducing the amount of greenfield land required.

Options 2 and 4 would have significant positive benefits in terms of landscape and recreation by protecting the National Park and the AONBs.

Many of the effects identified are location and use dependent which creates uncertainty on the overall effects from the options. In particular, the type of use would influence the effects on dust, odour and noise on adjacent uses / the local community. This is particularly relevant for Options 3 and 4 which would guide ancillary functions to previously developed land and industrial locations, which are most likely to be located nearer to local communities.

Recommendations

Overall it is considered that Options 2 and 4 would have the most sustainability benefits but may be more applicable to different ancillary functions. The SA recommends that they could be combined to optimise positive effects.

Minerals Ancillary Infrastructure Safeguarding (id57)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	?	?	?	?	?	?	?	?	?	?	?	?
2	?	?	?	?	?	?	?	?	?	?	?	?
3	?	?	?	?	?	?	?	?	?	?	?	?
4	?	?	?	?	?	?	?	?	?	?	?	?
5	+	+	+	+	+	+	+	+	+	+	+	+
	-	-	-	-	-	-	-	-	-	?	?	?
6	+	+	+	+	+	+	+	+	+	?	?	?
	?	?	?	?	?	?	?	?	?			

7	0	0	0	0	0	0	0	0	0	0	0	0
8	++	++	++	++	++	++	++	++	++	++	++	++
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	?	0	0	?	0	0	?	0	0	?
	?	?		?	?		?	?		?	?	
11	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
12	+	+	+	+	+	+	+	+	+	+	+	+
	?	?	?	?	?	?	?	?	?	?	?	?
13	?	?	?	0	?	-	?	?	?	?	?	?
	0		-	?		?	0		-	0		
14	0	?	-	0	?	-	?	?	?	?	?	?
	?		?	?		?	0		-	0		
15	0	0	0	0	0	0	0	-	-	?	?	?
	?	?	?	?	?	?	?	?	?	0		
16	0	0	0	0	0	0	0	0	0	0	0	0
	?	?	?	?	?	?	?	?	?	?	?	?
17	0	?	?	0	?	?	0	?	?	0	+	+
	?			?			?			?	?	?

Summary of assessment

Option 1 is likely to have economic benefits through enabling choice for minerals operators. However, it is possible that pursuing this option may result in the creation of vacant sites with associated effects on landscape and community safety and wellbeing. Options 3 and, most significantly, 4 are likely to create more flexibility around future alternative uses for these sites than Option 1, with Option 4 providing the most economic benefits in this respect. All of the options are likely to have uncertain social and environmental impacts, dependent upon the nature of any displaced development.

Recommendations

On balance, it is considered that option 4 would have the most sustainability benefits. However, this option would benefit from considering which sites have the most potential for continuing use in the future.

Development Management

Presumption in Favour of Sustainable Minerals and Waste Development (id58)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	- ?	0	0	?	+	+	++
2	0	0	- ?	0	0	?	+	+	+
3	0	0	0	0	0	0	0	0	0
4	0	0	- ?	0	0	?	+	+	+
5	0	0	- ?	0	0	?	+	+	+
6	0	0	0	0	0	0	0	0	0
7	0	0	0	+	+	+	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	--	0	0	--	0	0	0
10	0	0	- ?	0	0	?	+	+	++
11	0	0	- ?	0	0	?	+	+	++
12	0	0	+ ?	0	0	+	?	?	?
13	0	0	+	++	++	++	?	?	?
14	0	0	- ?	0	0	?	+	+	++
15	0	0	-	++	++	++	0	0	0

			?						
16	0	0	0	+	+	+	0	0	0
17	0	0	+	++	++	++	-	-	-

Summary of assessment

The assessment has revealed that under Options 2 and 3 more positive effects are likely, particularly in the longer term should policies in the Plan be considered to become out of date. Option 2 would have significant positive effects in relation to community engagement and may also enable other effects of development to be mitigated through this engagement process. Option 3 would provide significant positive effects for the landscape and environment of the National Park and the AONBs.

A significant negative effect of using the model policy under both Options 1 and 2 is that, through just referring to the NPPF and not PPS10 or its replacement, in the longer term it would provide no policy basis for the consideration of waste proposals. Negative effects under Option 3 are associated with potentially restricting or controlling minerals and waste developments coming forward in the longer term, however this may be compared against the potential for cumulative negative effects on the economy (in terms of tourism and maintaining the wider North Yorkshire area as an attractive location for investment) should development be allowed to go ahead with limited control.

In the short and medium term the positive effects are negligible as all options essentially state that development which accords with the Plan should go ahead, which is generally the case either with or without such a policy.

Recommendations

It is likely that a combination of Options 2 and 3 would provide the most positive effects on the sustainability objectives, provided reference to national waste planning policy is included alongside reference to the NPPF. Reference to 'national policy' rather 'NPPF' would resolve this issue and would account for any changes to the NPPF in the future, although would still retain an element of uncertainty.

Local Amenity and Cumulative Impacts (id59)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	+	+	+	+	+	+

	?	?	?	?	?	?
4	+	+	+	+	+	+
5	0	0	0	0	0	0
6	+	+	+	+	+	+
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	+	+	+	+	+	+
10	0	0	0	0	0	0
11	+	+	+	+	+	+
12	?	?	?	?	?	?
13	+	+	+	+	+	+
14	+	+	+	+	+	+
15	++	++	++	++	++	++
16	0	0	0	0	0	0
17	0	0	0	+	+	+

Summary of assessment

Both Options 1 and 2 would minimise negative effects and may lead to positive effects on communities and the local environment. Option 2 would provide additional greater positive effects by supporting the involvement of local communities.

Recommendations

To maximise the positive opportunities for local amenity, the SA recommends that option 2 is taken forward.

Transport of Minerals and Waste and Associated Traffic Impacts (id60)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	?	?	0	?	?	0	0	0

2	0	?	?	0	?	?	0	0	0
3	+	+	+	0	+	+	+	+	+
					-	-			
4	+	+	+	0	-	-	+	+	+
					?	?			
5	0	0	0	0	0	0	0	0	0
6	+	+	+	0	-	-	+	+	+
7	0	0	0	0	0	0	0	0	0
8	+	+	+	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	?	?	?	0	0	0
11	?	?	?	?	?	?	?	?	?
	+	+	+						
12	-	-	-	+	+	+	+	+	+
	?	?	?						
13	+	+	+	0	?	?	+	+	+
14	+	+	+	0	0	0	0	0	0
15	+	+	+	-	-	-	+	+	+
							?	?	?
16	0	0	?	0	0	?	0	0	0
	?	?							
17	0	0	0	0	0	0	+	+	+

Summary of assessment

Option 1 is likely to have positive environmental and social effects through reducing use of road vehicles. Option 1 could also have implications for minerals supply due to relatively low availability of alternative modes of transport across the Plan area. Option 2 is likely to have greater positive economic effects through providing a more flexible approach although may result in effects on air quality, noise and vibration on local communities. Option 3 would result in additional positive effects for the local environment, climate change and communities

where used in conjunction with Option 1 or 2.

Recommendations
Option 2 and option 3 are jointly taken forward given that option 3 would directly and indirectly positively effect the outcomes of option 2 and both options would require demonstration of the effects resulting from road transportation; together this is likely to be more robust.

North York Moors National Park and the AONBs (id61)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	+	+	+	++	++	++	0	0	0
2	+	+	+	+	+	+	0	0	0
3	+	+	+	+	+	+	0	0	0
4	+	+	+	++	++	++	0	0	0
5	-	-	-	0	0	0	-	-	-
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	+	+	+	++	++	++	0	0	0
11	+	+	+	++	++	++	++	++	++
12	+	+	+	+	+	+	+	+	+
				-	-	-	-	-	-
13	+	+	+	++	++	++	+	+	+
14	+	+	+	++	++	++	++	++	++

15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0

Summary of assessment

Option 2 scores more positively than Option 1, particularly in relation to sustainability objectives that reflect the special qualities of these areas, such as those related to biodiversity, landscape, cultural heritage and clean air. Whilst the assessment recognises there may be negative effects for the economy of these areas through restricting minerals and waste developments it also identifies potential positive effects on the tourism economy of maintaining these high quality environments. Option 3, which could be applied in combination with either Option 1 or Option 2, would on balance have positive effects for the environment of the Plan area, although recognises there may be localised negative effects elsewhere should development be directed away from these protected areas and their surroundings.

Recommendations

It is recommended that a combination of Options 2 and 3 be pursued.

Minerals and Waste Development in the Green Belt (id62)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	+	+	?	+	+	+	+	+	+
	-	-	-	-	-	-	-	-	-
6	?	?	?	?	?	?	?	?	?
7	0	0	0	0	0	0	0	0	0

8	0	0	0	0	0	0	0	0	0
9	-	-	-	++	++	++	+	+	+
10	?	?	?	-	-	-	+	+	+
	+	+	+	?	?	?	?	?	?
11	?	?	?	?	?	?	?	?	?
	+	+	+	-	-	-	+	+	+
12	-	-	-	+	+	+	+	+	+
			?			?			?
13	0	0	0	0	0	0	0	0	0
14	?	?	?	?	?	?	?	?	?
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	?	0	0	0	0	0	0

Summary of assessment

Option 1 is likely to have positive effects on the landscape and historic environment as they are part of the reason for local Green Belt designation. However, this may result in effects on the economy and minerals supply through potentially restricting extraction in the Green Belt. Under option 2 there would be no local policy basis for the consideration of minerals proposals in the Green Belt so effects would, by default, be the same as option 1, although with greater uncertainty as to what the policy framework would be.

Option 1 may have implications for provision of sufficient waste management facilities around York and the southern part of the Plan area. However, Option 2 would enable a more flexible approach which would deal with these issues, although could result in effects similar to Option 1 on the landscape and historic character and setting of the historic towns and cities. Similarly, Option 3 would have a flexible approach to location using existing sites in the greenbelt. This option may have positive implications for land use efficiency and potentially minimise additional adverse effects on the landscape and historic environment although it is acknowledged that it may also reduce opportunities where alternative locations in the greenbelt may be preferable.

Recommendations

It is recommended that option 1 is pursued for minerals and option 3 pursued for waste. However, to minimise the effects on the green belt, more specific criteria could be developed, particularly in relation to waste sites in option 3, to address outstanding concerns regarding the historic character and landscape setting.

Landscape (id63)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	++	?	?	?
2	-	-	-	-	-	?
	?	?	?	?	?	
3	0	0	0	0	0	?
	+	+	+	+	+	
4	0	0	0	0	0	0
5	-	-	-	-	-	?
6	+	+	+	+	+	?
7	+	+	+	?	?	?
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	+	+	+	?	?	?
11	++	++	++	+	+	?
12	+	+	+	+	+	?
				0	0	
13	+	+	+	+	+	?
	0	0	0	0	0	
14	+	+	+	+	+	?

15	0	0	0	0	0	?
	+	+	+	+	+	
16	-	-	-	-	-	?
17	0	0	0	0	0	0

Summary of assessment

Generally these options have a neutral to positive effect on sustainable development, with Option 1 performing moderately better against a number of objectives. A greater level of uncertainty would result under Option 2 as the implications of future revisions to national policy are unknown.

The most positive associations under option 1 relate to biodiversity / geodiversity, climate change mitigation and adaptation, heritage, landscapes and recreation. Similar benefits would result from Option 2, though with greater uncertainties in relation to climate change adaptation and the historic environment. Under both options there are minor negative effects on soils and flooding, largely due to development being favoured in the more fertile lowlands (and thus often in floodplain), which are less recognised for their landscapes, and on water.

Recommendations

In terms of this sustainability appraisal, while there are benefits and dis-benefits associated with both options, option 1 is favoured. However, policies elsewhere in the Local Plan should address the potential negative effects associated with soils, flooding and the water environment.

Biodiversity and Geodiversity (id64)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	++	++	?	++	++	++	++	++	++	+	+	+
							?	?	?	?	?	?
2	+	+	?	+	+	+	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	+	+	?	+	+	+	0	0	0	0	0	0
5	+	+	?	+	+	+	0	0	0	0	0	0
6	0	0	0	+	+	+	?	?	?	?	?	?

7	+	+	?	+	+	++	+	+	++	+	+	++
										-	-	-
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	+	+	?	+	+	+	0	0	0	0	0	0
12	-	-	?	-	-	-	?	?	?	?	?	?
	+	+		+	+	+						
13	-	-	?	-	-	-	?	?	?	?	?	?
	+	+		+	+	+						
14	+	+	?	+	+	+	0	0	0	0	0	0
15	0	0	0	0	0	0	+	+	+	-	-	-
16	0	0	0	0	0	0	0	0	0	0	0	0
17	-	-	?	-	-	-	0	0	0	0	0	0

Summary of assessment

Whilst Option 1 would enable a level of protection and enhancement to be afforded to biodiversity and geodiversity, it would not provide direct links with meeting the objectives or local priorities established for example through the Local Nature Partnership and the local Biodiversity and Geodiversity Action Plans. Option 2 would have greater benefits for biodiversity in the Joint Plan by linking with local objectives. In the longer term effects under Option 1 would be uncertain as the implications of any future changes to national policy are unknown. Both Option 3 and Option 4, where considered together with earlier options, would enable gains to be made for biodiversity which are not currently realised, yet option 3 would have greater benefits in terms of contributing to biodiversity objectives in the Joint Plan area on the basis that offsetting is not considered to be a means of making the development itself acceptable.

Recommendations

It is recommended that options 2 and 3 be followed but that reference is included to ensuring that any offsetting includes consideration of replacing the community and climate regulation value attached to the biodiversity of the site to be developed.

Historic Environment (id65)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	?	?	?	? -	? -	? -
9	0	0	0	?	?	?	? -	? -	? -
10	+	+	? +	+	+	+ ?	++	++	++
11	+	+	+ ?	+	+	?	+	+	+
12	?	?	?	+ -	+ -	?	+ -	+ -	+ -
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0

Summary of assessment

All of the options would provide positive effects for both the historic environment and landscape of the Plan area. Option 1 would present an element of uncertainty as the implications of any future revisions to national policy are unknown. Option 2 would have greater positive effects through the requirement for enhancements. Option 3, where used together with earlier options, would have significant positive effects for the setting of the City of York.

Recommendations

In order to maximise the protection for the historic environment but also balance the economic needs of providing flexible choices, the SA recommend that option 1 and option 3 are taken forward.

Water Environment (id66)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	?	++	++	++
2	+	+	?	++	++	++
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	+	+	?	++	++	++
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	0	0
12	+	+	?	++	++	++
13	+	+	?	++	++	++
14	+	+	?	+	+	+
15	+	+	?	+ +	+ +	+ +

16	-	-	-	+ +	+ +	+ +
17	+	+	+	+	+	+

Summary of assessment

Both options report positive effects in relation to biodiversity, the water environment, climate change adaptation, the economy, community vitality, recreation, health and wellbeing and meeting the needs of a changing population. However, these are generally stronger for Option 2 than for Option 1. Option 1 could have negative effects on flooding by resulting in the Plan having no reference to the need to consider impacts on and from flooding, while Option 2 strongly supports the sustainability objective to minimise flood risk. In the long term, there is uncertainty with Option 1 in relation to the continued operation of the NPPF in its present format.

Recommendations

The SA recommends that option 2 is pursued.

Strategic Approach to Reclamation and Afteruse (id67)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	++	++	++
2	+	+	+	0	0	0
3	+	+	+	+	+	+
				-	-	-
4	+	+	+	0	0	0
5	+	+	+	++	++	++
6	++	++	++	0	0	0
7	+	+	++	++	++	++
8	-	-	-	0	0	0
9	-	-	-	0	0	0
10	+	+	+	++	++	++

11	+	+	+	++	++	++
12	?	?	?	0	0	0
13	0	0	0	0	0	0
14	0	0	0	++	++	++
15	++	++	++	+	+	+
16	+	+	+	++	++	++
17	++	++	++	0	0	0

Summary of assessment

Option 1 is likely to lead to a range of positive environmental and social effects, including in relation to biodiversity, air and water quality, soils and agricultural land, landscape and reusing materials, with particularly strong positive effects recorded in relation to mitigating and adapting to climate change and engaging with communities. Uncertain effects are recorded in relation to sustainable waste management as the option provides less scope for wastes other than those generated on site to be used in reclamation with uncertain implications for the management of other wastes.

Acting in combination with Option 1, Option 2 is likely to result in stronger positive effects for biodiversity, agricultural land and soils, climate change adaptation (specifically reducing potential for flooding), the historic environment, landscape and opportunities for recreation. Minor negative effects may be observed in relation to impacts from transport should new areas for recreation in National Parks and AONBs be created, as these are generally distant from populations. However, these effects are unlikely to be significant due to the low level of extraction activity in these areas.

Recommendations

It is recommended that both options be followed, with the inclusion of reference to landscape in option 2.

Sustainable Design, Construction and Operation of Development (id68)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L

1	+	+	+	0	0	0
				?	?	?
2	+	+	+	?	?	?
3	+	+	+	0	0	0
4	+	+	+	0	0	0
5	+	+	+	+	+	+
6	+	+	+	0	0	0
7	+	+	+	0	0	0
8	+	+	+	++	++	++
9	+	+	+	++	++	++
10	+	+	+	?	?	?
11	+	+	+	+	+	+
12	?	?	?	?	?	?
13	0	0	0	0	0	0
14	0	0	0	0	0	0
15	0	+	+	-	-	-
				?	?	?
16	+	+	+	0	0	0
17	0	0	0	0	0	0

Summary of assessment

The options for sustainable design and construction should have an overall positive effect on environmental sustainability objectives. The remit to support development which requires demonstration of how it minimises greenhouse gas emissions, reuses resources and promotes renewable technologies, as well as energy efficiency and high quality (through BREEAM), will have positive effects for climate change, air quality and resource use. Furthermore, Option 1's criteria support development with sustainable drainage systems and minimising flood risk which would have positive effects in the long-term for adapting to climate and minimising risk to people or businesses from flooding.

Option 2, which would be implemented in combination with Option 1, is beneficial by extending the criteria to include the effective management of waste through the lifecycle of the development further reducing resource use and waste arisings.

Both options have uncertain effects on the historic environment and landscape. Where practicable, the reuse of buildings would also minimise the land requirements elsewhere and may reduce impacts where they are co-located with similar uses. However, both options may have implications for the costs associated with developing a site given that the options would require high standards of sustainable design and construction to be met and additional mitigation where required. Also, option 2 may increase these costs through requiring more land for the sorting and storage of waste arising through the construction. These would need to be balanced with the gains that are likely to accrue through low running costs due to the energy efficiency of any development and cost reduction through reusing resources.

Recommendations

Whilst there are some economic implications from the implementation of this policy, it is considered that maximising the environmental benefits from this policy will have a net positive effect overall. It is therefore considered that option 1 in combination with option 2 should be taken forward.

Other Key Criteria for Minerals and Waste Development (id69)

Sustainability Objective	Option 1			Option 2		
	S	M	L	S	M	L
1	+	+	+	-	-	?
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	++	++	++	++	++	?
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	++	++	++	+	+	?
11	++	++	++	+ / -	+ / -	?
12	++	++	++	-	-	?

13	+	+	+	-	-	?
	?	?	?			
14	+	+	+	+	+	
				-	-	?
15	++	++	++	-	-	?
16	0	0	0	0	0	0
17	?	?	?	0	0	0

Summary of assessment

Option 1 is likely to have positive effects as it covers a range of additional criteria that would provide a more in-depth consideration of the wider implications of minerals and waste development on social, environmental and economic objectives. The option would have particularly strong positive effects in relation to the local economy, tranquillity, recreation, safety of communities, landscape and protecting high quality agricultural land with less significant positive effects for biodiversity. Option 2 provides the same positives in relation to heritage and tranquillity but would potentially result in negative effects for local economies, landscape (specifically the contribution that tranquillity and dark skies makes to landscape) and protecting the safety of communities. In terms of recreation whilst Option 2 would have positive effects in relation to protecting specific assets, it would have negative effects in terms of providing opportunities to understand and enjoy the National Park (which is part of the statutory National Park purposes). Option 2 also presents an element of uncertainty in the long term should the NPPF be replaced or amended.

Recommendations

It is considered that option 1 should be taken forward.

Developments Proposed within Mineral Safeguarding Areas (id70)

Sustainability Objective	Option 1			Option 2			Option 3			Option 4		
	S	M	L	S	M	L	S	M	L	S	M	L
1	+	+	+	0	0	0	0	0	0	0	0	0
2	+	+	+	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	+	+	+	0	0	0	0	0	0	0	0	0

5	+	+	+	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	-	-	-	-	-	-
7	0	0	0	0	0	0	0	0	0	0	0	0
8	+	+	+	+	+	+	++	++	++	+	+	+
9	0	0	0	0	0	0	0	0	0	0	0	0
10	+	+	+	0	0	0	0	0	0	0	0	0
11	+	+	+	0	0	0	0	0	0	0	0	0
12	-	-	-	+	+	+	-	-	-	-	-	-
13	-	-	-	0	0	0	-	-	-	-	-	-
14	+	+	+	0	0	0	0	0	0	0	0	0
15	+	+	+	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	- / +	- / +	- / +	+	+	+	-	-	-	-	-	-

Summary of assessment

It is difficult to predict the effects with any certainty as this would depend on the particular circumstances of each case as to whether the development would or would not cause unacceptable sterilisation of the mineral. Potential negative effects from each of the options include effects on the economy of potentially precluding certain developments from taking place. However the exemptions provided under Option 2 would help to ensure that certain developments could still take place.

Considered together with either Option 1 or Option 2, Option 3 is considered to be more beneficial in terms of safeguarding objectives than Option 4, as it provides more certainty over the types of development where safeguarding deep mineral resources would be relevant and it also refers to safeguarding potash.

Recommendations

It is recommended that a combination of Options 1, 2 and 3 are pursued.

Consideration of Applications in Mineral Consultation Areas (id71)

Sustainability Objective	Option 1		
	S	M	L
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	++	++	++
9	0	0	0
10	+	+	+
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	+	+	+

Summary of assessment

This option scores positively by adding additional certainty over the process of operating the Minerals Safeguarding Areas policy, thus ensuring minerals are not sterilised by development being given permission by district or borough councils.

Recommendations

It is recommended that this option be pursued to ensure that the Minerals Safeguarding Area policy is applied consistently across the Joint Plan area.

Coal Mining Legacy (id72)

Sustainability Objective	Option 1			Option 2			Option 3		
	S	M	L	S	M	L	S	M	L
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	+	+	++	+	+	? +	0	0	0
6	0	0	0	0	0	0	0	0	0
7	+	+	+	+	+	+ ?	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0
15	+	+	+	+	+	+ ?	0	0	0
16	+	+	+	+	+	+ ?	0	0	0
17	+	+	+	+	+	+	0	0	0

Summary of assessment

There are unlikely to be widespread effects as a result of either of these options. However, there are some small scale effects on soil / land, climate change adaptation, health and wellbeing, flood risk and meeting the needs of the population. These effects are generally positive, however, greater uncertainty is observed under Option 2 (which is subject to changes in national policy in the long term).

Option 3 is generally considered to have neutral effects on trends observed in the baseline to this assessment as the relevant Local Plans' policy approach and sites have been, and will continue to be, subject to their own sustainability appraisals.

Recommendations

All options are broadly beneficial, but the most certain positive effects are associated with option 1. Should option 3 be followed, policy would need to be included in the Joint Plan in relation to the North York Moors National Park and the City of York area.