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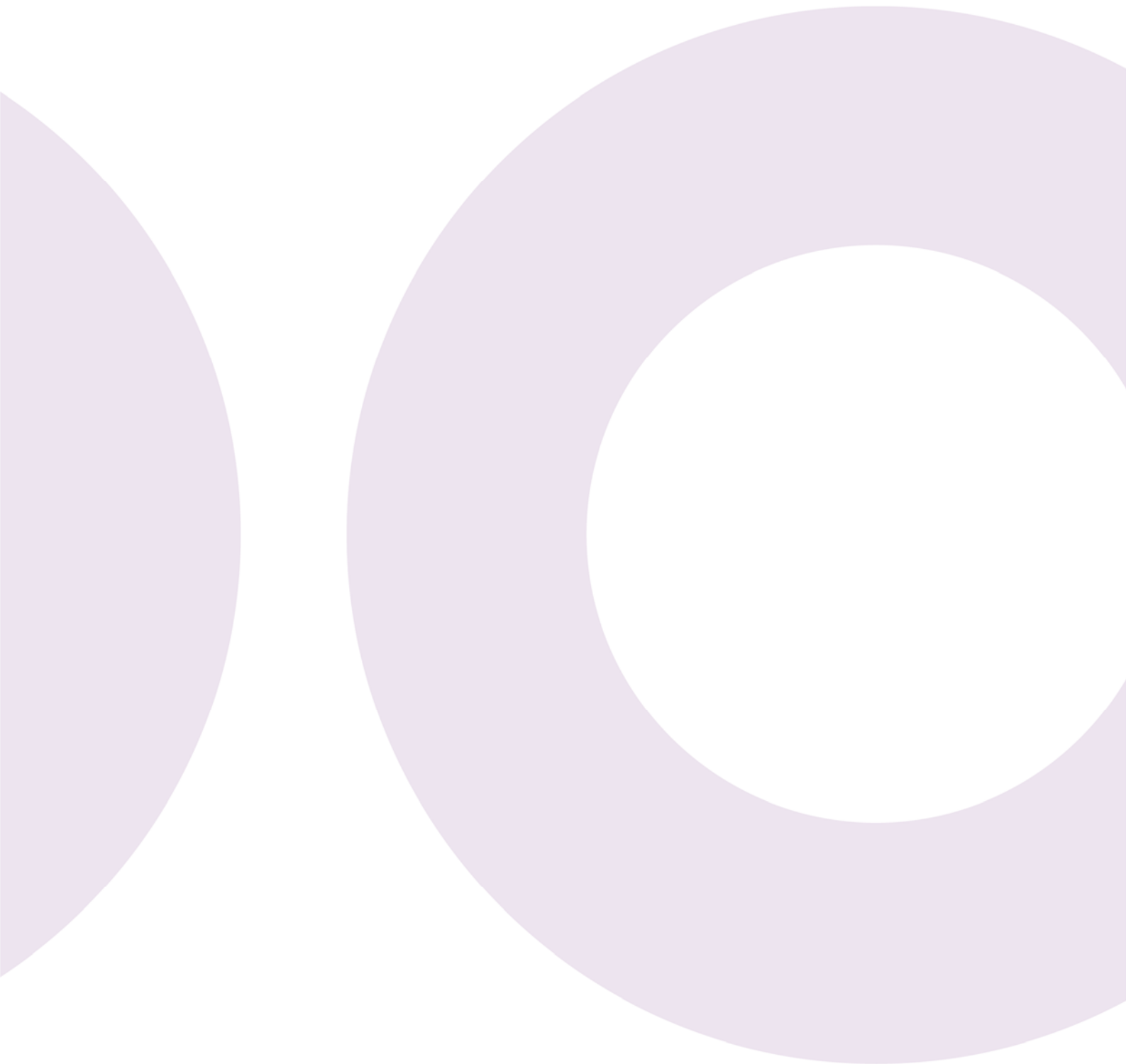
Cleveland Potash Ltd

Boulby Mine Environmental Statement

Volume 2: Main Text



wood.





Report for

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Doc Ref. 40513-WOOD-XX-XX-RP-O-001_S0_1

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Document revisions

No.	Details	Date
1	Draft for Client Review'	October 2019
2	Final Report	October 2019







Executive summary

Purpose of this report

This Environmental Statement has been produced for the purpose of documenting the findings of an Environmental Impact Assessment undertaken on the proposals to extend the operational life of the Boulby Mine in the North York Moors National Park for a period of 25 years from 2023 to 2048. The Environmental Statement will be part of a suite of documents which make up a planning application to be submitted to the North York Moors National Park Authority for the proposals and should be read in conjunction with the other documents making up the application package.







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1. Introduction

1.1 General Introduction

- 1.1.1 This Environmental Statement (ES) accompanies an application by Cleveland Potash Limited ('CPL') for the continued extraction of polyhalite and salt for a period of 25 years from the ending of the current planning permission (2023) to 2048 (hereafter referred to as "the Proposed Development").
- 1.1.2 Boulby Mine is an existing underground mine originally granted planning permission in 1968. Production commenced in 1973 and has continued at the site since that time. The Mine Site is located between the villages of Staithes and Easington, just inside the northern boundary of the North York Moors National Park. The onshore underground extraction area currently extends to 13,740 hectares, mainly within the North York Moors National Park but extending into the administrative area of Redcar and Cleveland Borough Council. It also extends under the North Sea. The mine originally extracted a potash bearing mineral called sylvinite and rock salt, and in 2010 also started extracting another potash bearing mineral called polyhalite. The sylvinite was processed on site to form a range of potash products including Muriate of Potash (MOP). Sylvinite extraction ceased at Boulby Mine in 2018 and going forward the mine will focus on polyhalite and rock salt extraction only.
- 1.1.3 The Proposed Development includes a reduction in the onshore underground mining area from 13,740 ha to 3,840ha, with large areas of East Cleveland, Roxby Low Moor, Ugthorpe Moor, Hutton Mulgrave and Lythe removed. The application will also include the deconstruction of some buildings and structures on site and the early restoration of this decommissioned land. The Mine Site and the proposed underground extraction area is shown on Figure 1.1.
- 1.1.4 Boulby Mine is also home to an underground laboratory run by the Science and Technology Facilities Council which is conducting research into dark matter which will continue on site.
- 1.1.5 The introduction of the Environment Act 1995 required an application to be submitted for the review of the original permission, and the mine currently operates under a set of conditions approved in 1998. This permission requires that all operational aspects of Boulby Mine finish in 2023, with the Mine to subsequently be reclaimed and restored over a two-year period.
- 1.1.6 This ES has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as "The EIA Regulations").
- 1.1.7 The ES will be available via the planning application pages of the North York Moors National Park Authority's website. Printed copies can be provided for £150 or digital copies on a DVD for no charge from the following contact:
- Neil Marlborough, Wood plc: neil.marlborough@woodplc.com / 0191 2726334.

1.2 The Applicant and the Project Team

- 1.2.1 Cleveland Potash Limited is a business unit of ICL Fertilizers and now trades under the name of ICL Boulby in the UK. This names reflects that the company is part of the ICL company but also differentiates between the historic potash production at the mine and the future proposals which move away from potash. For the purposes of clarity the company is referred to as ICL Boulby throughout this document.

- 1.2.2 Wood Environment & Infrastructure Solutions UK Ltd ('Wood')¹ was commissioned to prepare this Environmental Impact Assessment (EIA) to support the planning application for the continued mining of potash and salt.
- 1.2.3 Wood is a registered member of the Institute of Environmental Management and Assessment (IEMA)'s Environmental Impact Assessment Quality Mark. IEMA provides an independent expert review of the company's standards and processes in the production of their ESs. Details of the project team involved in the preparation of the ES is set out in Chapter 2.

1.3 Overview of the Proposed Development

Site Description

- 1.3.1 The operational area is located on flat ground surrounded by rising land to the south and west. To the west, the land rises steeply up to the cliff tops at Boulby and to the south, the land rises more gently up towards the moorland plateau. To the north, the operational area is located a few hundred metres away from the coastal cliffs and to the east, the land follows the coast to the villages of Dalehouse and Staithes. Land in the immediate surrounding area is mainly used for agriculture purposes, as well as including woodland and small settlements.
- 1.3.2 The nearest settlements (as measured from the Mine Site operational area boundary shown in Figure 1.2) are as follows:
- Staithes, 1.55 km to the east;
 - Dalehouse 1.15 km to the east;
 - Roxby, 1.55 km to the south;
 - Easington, 1.27 km to the south west; and
 - Boulby, 0.54 km to the west.
- 1.3.3 Road access is directly from the A174 to the north of the operational area and Boulby Mine is served by its own rail line which connects to port facilities on Teesside

Proposed Development

- 1.3.4 The Proposed Development would see a new planning permission granted which would enable the extraction of polyhalite and salt for a further 25 years than currently permitted. This would initially involve the retention and operation of all surface installations, buildings, plant etc., but with a phased deconstruction strategy being implemented as different parts of the Mine Site become redundant.
- 1.3.5 The extent of the underground area would be reduced by 9,900ha as extraction would focus on polyhalite deposits in offshore areas. The underground on-shore area to remain will mainly be used for pumping and maintenance operations in existing tunnels. There is no intention to increase any of the permitted extraction capacities, which limit the output of Boulby Mine.
- 1.3.6 Polyhalite extraction has been steadily increasing since extraction first commenced in 2010, and is now increasing more rapidly following the cessation of sylvinite extraction and the movement of equipment and staff to the polyhalite seams. Extraction is on track to reach 700,000 tonnes per annum in 2019. Extraction capacity will continue to grow over the next 5 to 10 years to reach a

¹ Wood were formally Amec Foster Wheeler and some supporting documents provided with this Environmental Statement were produced under the former company name.

maximum of around 3 million tonnes per annum. However, based on sales projections ICL Boulby expect annual extraction rates to settle at around 2 million tonnes per annum over this period and then remain at this level through till 2048.

- 1.3.7 Salt would continue to be mined to suit market demand and extraction capabilities. Previous extraction has been at the rate of 200,000 tonnes per annum and this figure has been used for future extraction calculations.
- 1.3.8 After 2048, it is anticipated that Boulby Mine would be restored primarily to agriculture and woodland uses with a five year aftercare period. The remaining plant and above ground structures will be decommissioned and demolished in accordance with the relevant legislation and best practice guidance available at the time of closure.
- 1.3.9 A more comprehensive description of the Proposed Development is included in chapter 3.

1.4 The Need for an EIA

- 1.4.1 Environmental Impact Assessment (EIA) is a process required by European and UK law that brings together information about any likely significant environmental effects of a proposed development. It provides decision-makers and the public with the environmental information needed to make sustainable decisions when determining applications for certain developments. The legal basis for EIA lies in European Community Directive 85/337/EEC (as amended by Directive 97/11/EC, 2003/35/EC, 2011/92/EU and 2014/52/EU).
- 1.4.2 Environmental Impact Assessment (EIA) is required for certain forms of development (EIA Development) under the EIA Regulations. Some projects always require EIA (the EIA Regulations define these under Schedule 1), others only require EIA if they are likely to have significant effects on the environment by virtue of their nature, size or location (the EIA Regulations define these as Schedule 2).
- 1.4.3 ICL Boulby acknowledge that its proposals would be for a new permission for an underground mine, which falls under Schedule 2, 2(b) of the EIA regulations. Developments falling within Schedule 2 must be considered against the selection criteria in Schedule 3 of the EIA Regulations. These include matters such as the scale of the development, the sensitivity of its location and the nature of the impacts. Due to the size of the mine and its location within a National Park, ICL Boulby are therefore offering an Environmental Statement (which documents an EIA) to accompany the application to North York Moors National Park Authority (NYMNP).
- 1.4.4 A Scoping Report for the project was submitted to the NYMNP on 19 June 2017. This set out the potentially significant environmental effects (as identified at that time) that would be assessed in more detail (i.e. scoped-in) as well as those that were unlikely to be significant and could therefore be scoped-out of the assessment. The EIA has been prepared in accordance with the Scoping Opinion issued by the NYMNP on 22 August 2017, and their Scoping Opinion Addendum issued on 2 October 2017 (issued in response to the Scoping Report). These documents are contained within Appendix 1.A. Whilst the Proposed Development has changed since 2017 the Scoping Opinion is still considered to be valid so has been re-used in the production of this ES, Where there has been any deviation from the Scoping Opinion, this is explained in the relevant technical topic chapter.

1.5 Structure of the ES

- 1.5.1 The ES is provided in 3 volumes:
- Volume 1 (this Volume) contains the main Environmental Statement and technical chapters;

- Volume 2 contains all figures referred to in this report and
- Volume 3 contains the appendices referred to in the ES.

1.5.2 There is also a standalone Non-Technical Summary.

1.5.3 The remainder of the ES provided in this volume, Volume 1, is structured as follows:

- Chapter 2 explains the EIA process and the scope of the assessment;
- Chapter 3 describes the Proposed Development;
- Chapter 4 provides an overview of the legislation and policies that are relevant to the ES and
- Chapters 5 – 15 set out the technical assessments for the environmental topics that need to be considered in the ES;
- Chapter 16 provides a summary of all mitigation proposed in the ES.

1.6 Purpose of the ES

1.6.1 Schedule 4 of the EIA Regulations specifies what should be included in an ES. This includes:

- *(a) A description of the location of the development;*
- *(b) A description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;*
- *(c) A description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;*
- *(d) An estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.*

1.6.2 Schedule 4 also describes the information that the EIA Regulations state is '*information for the inclusion in Environmental Impact Assessment Statements*' and thus required for a report to be considered as an Environmental Statement in the context of the Regulations. Table 1.1 below summarises where, in this ES, the information required by Schedule 4 can be found.

Table 1.1 Compliance with Schedule 4 of the EIA Regulations

Schedule 4 requirement	Topic chapters in this ES
<p>1. A description of the development, including in particular</p> <ul style="list-style-type: none"> (a) A description of the location of the development; (b) A description of the physical characteristics of the whole development, including, where relevant, requisite demolition works and the land-use requirements during the construction and operational phases; (c) A description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and sub soil pollution, noise, vibration, light, heat, radiation, and quantities and types of waste produced during the construction and operation phases. 	Chapter 3
<p>2. A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects</p>	Chapter 2, section 1.3
<p>3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.</p>	Chapter 2, section 1.2
<p>4. A description of the factors specified in regulation 4 (2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora) land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape</p>	Chapters 5 – 15
<p>5. A description of the likely significant effects on the environment resulting from, inter alia:</p> <ul style="list-style-type: none"> (a) The construction and existence of the development including, where relevant, demolition works; (b) The use of natural resources, in particular, land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; (c) The emission of pollutants noise vibration, light, heat and radiation, the creation of nuisances and the disposal and recovery of waste; (d) The risks to human health, cultural heritage or the environment (for example due to accidents or disasters); (e) The cumulation of effects with other existing and / or approved projects taking into account any existing environmental problems relating to any particular areas of environmental importance likely to be affected or the use of natural resources; (f) The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; (g) The technology and the substances used. <p>The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC and Directive 2009/147/EC.</p>	Chapters 5 – 15



Schedule 4 requirement	Topic chapters in this ES
6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Chapters 5 – 15
7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Chapters 5 - 16
8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Chapter 15
9. A non-technical summary of the information provided under paragraphs 1 to 8.	Non-technical Summary
10. A reference list detailing the sources used for the descriptions and assessments included in the EIA statement.	Chapters 5-15

- 1.6.3 Regulation 4 (2) also specifies that the ES should provide a description of the factors likely to be significantly affected by the proposed development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.
- 1.6.4 In this ES, these topics are dealt with under the headings set out in Table 1.2. The ES also contains a number of appendices which are referenced throughout the document.

Table 1.2 Factors Likely to be Significantly Affected by the Proposed Development

EIA Regulation Topics	Location in this ES
Population	Landscape and Visual (Chapter 5); Traffic and Transport (Chapter 8); Noise (Chapter 6);
Human health	Human Health (Chapter 15)
Biodiversity (fauna and flora)	Ecology and Ornithology (Chapter 9)
Land	No significant effects predicted



EIA Regulation Topics	Location in this ES
Soil	No significant effects predicted
Water	No significant effects predicted (see Marine Environment, Chapter 10)
Air	Traffic and Transport (Chapter 8); Dust and Air Quality (Chapter 7)
Climate	Climate and Energy (Chapter 14)
Material assets, including the architectural and archaeological heritage	No significant effects predicted
Landscape	Landscape and Visual (Chapter 5)

1.7 Consultation and Engagement

- 1.7.1 ICL Boulby undertook extensive consultation and engagement at the pre-application stage with a range of statutory and non-statutory consultees, local communities, organisations and individuals. A full statement of community involvement has been prepared which forms part of the planning application submission.

2. Approach to Preparing the ES

2.1 The EIA Process

2.1.1 The preparation of the ES is one of the key stages in the EIA process, as it brings together information about any likely significant environmental effects, which the NYMNPA will use to inform its decision about whether the Proposed Development should be allowed to proceed.

2.1.2 The steps followed in the EIA process are summarised below. These are based on the EIA Regulations, government guidance and good practice. Following a short section on terminology, the remainder of this Chapter provides further information about some of the key steps in the process.

- Defining the Proposed Development;
- Deciding on the likely significant effects that need to be assessed and how the necessary assessments will be carried out;
- Using the scoping report as a basis for consulting over the scope of the assessment that is reported in the ES and basing the ES on the outcome of this scoping consultation, refining the scope in response to the comments that are received (with this refinement process continuing as the proposals for the proposed development and the understanding of its environmental effects evolve);
- Assembling further information about the baseline environmental conditions that relate to the likely significant effects;
- Determining whether this baseline is relevant to the assessment or whether it is more appropriate to predict how the baseline will have changed by the time that the development is constructed or operated;
- Identifying measures to avoid, reduce or compensate for negative effects, or to increase the environmental benefits of the development, and liaising with the project design team to incorporate these (where possible) into the proposals;
- Ongoing consultation with statutory consultees and other interested parties, as appropriate;
- Assessing the sensitivity (and where relevant, value) of identified receptors to changes resulting from the proposed development;
- Assessing the magnitude and other characteristics of the environmental effects being assessed;
- Evaluating the significance of the predicted effects;
- Collating the findings in an ES and summarising them in a non-technical summary (NTS);
- Submission of the ES to the relevant competent authority;
- Decision-making, which may involve inter alia ongoing negotiation and requests for further information;
- Informing stakeholders of the decision on whether or not the development is to be permitted; and

- Ongoing environmental monitoring, assessment and other work, as required, including screening for the need for a further ES to be prepared in relation to reserved matters development.

2.2 EIA Terminology

Impacts and Effects

- 2.2.1 EIA is concerned with the identification of likely significant effects on the environment. However, the terms impact and effect are often used synonymously and this can lead to confusion. For clarity for this proposal, a cause and effect logic will be applied where impacts are the changes that arise (e.g. changes in drainage pattern) and effects are the consequences of those changes (e.g. habitat becomes degraded by changes in drainage).
- 2.2.2 Impacts and effects are therefore defined as follows:
- **Impact:** any change attributable to the mining operations that is likely to result in an environmental effect, i.e., they are the cause of the environmental effect; and
 - **Effect:** the result of the change in relation to specific environmental resources or receptors (an effect may in turn produce further change, i.e., an effect may become an impact in its own right).
- 2.2.3 This ES is concerned with assessing the environmental effects of the proposed development, rather than the activities or changes that cause them. However, this requires these activities to be understood and the resultant changes identified, often based on predictive assessment work.

Type of Effect

- 2.2.4 The EIA Regulations (Schedule 4) require consideration of a variety of types of effect, namely direct/indirect, secondary, cumulative, positive/negative, short/medium/long-term, and permanent/temporary. In this ES, effects are considered in terms of how they arise, their nature (i.e., whether they are positive or negative) and duration. Each will have a source originating from the development, a pathway and a receptor and may fall into one of several categories:
- Direct effects are readily identified because of the physical connection between some element of the development and an affected receptor;
 - Indirect effects require some additional pathway for the effect to arise, for example, a listed building may not be directly impacted by any elements of a development, but, if the development affected the setting of the listed building there would be an indirect effect;
 - Secondary effects would typically require further pathway connections, for example, an effect on a receptor population 'A' could have a secondary effect on receptor population 'B', if 'B' was itself dependent on 'A' in some way, as, for example, a food source; and
 - Cumulative effects arise when the receptors affected by one development are also affected by other developments resulting in the aggregation of environmental effects or the interaction of impacts.
- 2.2.5 Schedule 4 of the EIA Regulations also refers to transboundary effects. These would occur when the effects would stretch across national boundaries. It is not considered that the Proposed Development would give rise to this type of effect.

- 2.2.6 Most predicted effects will be obviously positive or negative and will be described as such. However, in some cases it is appropriate to identify that the interpretation of a change is a matter of personal opinion, and such effects will be described as 'subjective'.

Temporal and Spatial Scope

Temporal Scope

- 2.2.7 Likely significant effects will also be considered in terms of their duration. Effects can typically be:
- Temporary – these effects are likely to last for a period of a few days to a few months, they will be related to a particular activity and will cease as soon as the activity ceases;
 - Short-term – this would normally be considered to be between a period of a few months to a few years depending on the effect being discussed and the environment's ability to recover from an impact;
 - Medium-term – this would typically be a period of between a few years and around 10 years;
 - Long-term – this would typically be a period of between around 10 years and the life of the mining operations; and
 - Permanent – this would typically mean an effect resulting in an irreversible change in the environment.
- 2.2.8 The temporal scope of the EIA will focus on the continuation of site operations over the 25 years period of working. In addition, reference is made to the site operations taking place during the restoration and aftercare works. For ease of reporting, the temporal scope is considered in relation to the following key stages of the development:
- Operations over the 25-year period of working – Effects are likely to be similar in nature to that of the current mining operations, with the inclusion of some environmental improvement works. These effects are likely to be short to medium term (whilst environmental improvements mature), and long term for the mining operations; and
 - Restoration and Aftercare – Effects may arise from the restoration of the site. These effects are likely to be temporary and short term. At aftercare, the effects are likely to be permanent.

Spatial Scope

- 2.2.9 In its broadest sense, the spatial scope of an EIA is the area over which changes to the environment may occur as a consequence of the mining operations during the operational period. The spatial scope varies between the environmental topics assessed. For example, the effect of the mining operations on the landscape resource and visual effects is assessed within a much larger zone from the site boundary when compared to terrestrial ecology related effects.

Defining Significance

- 2.2.10 Development proposals affect different environmental elements to varying degrees and not all of these are of sufficient concern to warrant detailed investigation or assessment within the EIA process. The EIA Regulations require a description of those aspects of the environment likely to be significantly affected by the Proposed Development. The scope of the investigation to provide this description is provided through a scoping process as defined below.
- 2.2.11 Conclusions about significance of effects are derived with reference to available information about the nature of the development proposal, the environmental receptors (or 'receiving environment')

and with reference to predictions about the potential changes that the Proposed Development would cause to the affected receptors.

- 2.2.12 In each of the environmental topic chapters, professional judgement is used in combination with relevant guidance to assess the interaction of the receptor's sensitivity (this may be defined in terms of importance, value, rarity, quality) against the predicted magnitude of change to identify a level of effect. Table 2.1 provides a general indication of how receptor sensitivity and magnitude of change combine to establish the level of effect for each environmental topic.
- 2.2.13 The type of categorisation illustrated in Table 2.1 provides a guide only and may be moderated by the professional that undertakes the assessment in accordance with judgement and experience. In particular, the divisions between categories of receptor sensitivity, magnitude of change, and level of effect should not be interpreted as definitive, and the lines that represent the boundaries between categories should in many cases be considered as 'blurred'. In some cases, the judgement can be guided by quantitative values, whilst in other cases qualitative descriptions are used. The significance of the effect may also need to be qualified with respect to the scale over which it may apply (e.g. local, regional, national and international). There are also specific variations for some topics, for example noise where the assessment establishes whether the Proposed Development would meet or exceed limit values defined by the relevant guidance methodology, rather than establishing whether a significant effect would occur. Any such variation is described within the individual technical chapters.

Table 2.1 Guide to Establishing the Level of Effect

Importance or Sensitivity of Receptor					
		HIGH	MEDIUM	LOW	NEGLECTIBLE
Magnitude of Change	LARGE	Very substantial or substantial	Substantial / moderate	Moderate / slight	Negligible / no effect
	MEDIUM	Substantial / moderate	Moderate	Slight	Negligible / no effect
	SMALL	Moderate / slight	Slight	Slight / negligible	Negligible / no effect
	NEGLECTIBLE	Negligible / no effect	Negligible / no effect	Negligible / no effect	Negligible / no effect
Key		Significant in terms of the EIA Regulations.			
		Not significant in terms of the EIA Regulations			

- 2.2.14 As noted, the EIA Regulations guide the assessor to focus on effects that are likely to be significant and, in its simplest form, the outcome of the assessment of a given effect on a particular receptor would be that a determination that it is significant or not significant. However, there may be instances where it is appropriate to further sub-divide the category of 'not significant': for example, by use of the terms 'slight' and 'negligible' in terms of the level of effect. The use of the category of 'slight' may for example be used in acknowledgement that there are instances whereby there may be an effect, albeit that this is not likely to be significant. This approach may better facilitate assessment of cumulative effects where cumulatively several slight effects could be significant. While in general, environmental effects are categorised as substantial, moderate, slight, negligible

or no effect; specific technical assessments may deviate from this, though this will be explained in the relevant methodology section.

- 2.2.15 Having defined a level of effect, professional judgement in combination with guidance and standards are then applied to identify which of those levels of effect are then considered to be equivalent to significant effects in terms of the EIA Regulations. For some of the topics that are assessed in this ES, there is published guidance about significance evaluation and, where such topic-specific guidance exists, it will be used to inform the development of the significance evaluation methodologies. For other topics, a level of effect of substantial or moderate/substantial is generally of most importance to the decision-maker and so these effects are considered significant in terms of the EIA Regulations. Where the level of effect is considered to be moderate or less, these are generally not deemed significant in terms of the EIA Regulations. However, depending on the receptor being considered, it is possible that some potentially moderate effects could be judged as significant in terms of the EIA Regulations, and where this is considered to be the case, the rationale for this conclusion will be provided in the technical assessments.
- 2.2.16 A definition of how the terms are derived for each topic is set out in the corresponding chapter together with the relevant explanation and descriptions of receptor sensitivity, magnitude of change and levels of effect that are considered significant in terms of the EIA Regulations.

Identification of Baseline Conditions

- 2.2.17 The existing planning permission for the current activities at Boulby Mine expires in 2023, and if no permission is granted to extend the operations then the site would need to be demolished, reclaimed and restored. The assessment of potentially significant effects therefore requires a comparison to be made between the likely environmental conditions to be generated from the Proposed Development and those which would be present in its absence (i.e., the 'future baseline' if permission was not granted).
- 2.2.18 Establishment of the future baseline was discussed with the NYMNPA as part of the scoping exercise. The Scoping Opinion set out that, as Boulby Mine is currently required to be restored in 2023 under the terms of the existing planning permission, a decommissioned and restored site should form the baseline scenario. Further discussion was held with the NYMNPA and it was agreed that the current baseline, that of an operational mine, would form part of the baseline scenario together with a position of a decommissioned and restored site, to take account of the likely evolution of the future baseline without implementation of the development¹.
- 2.2.19 The future baseline for the purposes of the EIA has been separated into a number of distinct phases to reflect how the site would evolve in the absence of the Proposed Development. This approach was agreed with the NYMNPA in the addendum scoping opinion issued in October 2017 (see Appendix 1.A). At the scoping stage, four phases were identified covering the period 2019 - 2048. This time period was chosen to reflect the time period over which the new planning permission for the Proposed Development would be in place. It has been considered necessary to include an additional future baseline period to cover the period during which the Proposed Development would be in its restoration, aftercare and maturing period. The dates used have been amended slightly from the scoping discussions in order to be consistent with the Proposed Development programme and therefore provide a clear and understandable assessment. The five phases are summarised in Table 2.2 below, with more detail provided in the technical note included with the Scoping Opinion at Appendix 1.A.

¹ Paragraph 3 of schedule 4 of the 2017 EIA Regulations.

Table 2.2 ES Future Baselines

Time period	Baseline description	Comments
2018 - 2023	Operational mine	The current baseline with a continuation of the existing permitted activities.
2023 - 2025	Decommissioning and restoration	Site decommissioning including removal of buildings and plant, making safe all surface and underground areas, site clearance, ground reprofiling, soil replacement, and establishment of surface features including wildflowers, trees and hedgerows, fencing, water features etc. ²
2025 - 2033	Aftercare	Management and maintenance activities on a restored but immature site.
2033 - 2048	Semi-mature site	A maturing landscape. Given the challenging location and lack of onsite soils, whilst the wildflowers, pasture and hedgerows will have matured by 2048, the new woodland planting can only be considered to be semi mature.
2048 – 2057+	Mature restored site	All aspects of the restored site will have matured.

- 2.2.20 The 2023 end date for the operational mine phase has been chosen on the basis of condition 2 of the current planning permission which requires minerals extraction to cease by May 2023. The 'Operational mine' phase can also be used to see how the effects of the Proposed Development would be seen in practice, as this would involve a continuation of the existing situation rather than any change occurring. The results from this phase can therefore be used to help identify many of the effects which are likely to happen over the 25-year extension period in practice.
- 2.2.21 The decommissioning and restoration phase has been chosen on the basis of condition 5 of the current planning permission which requires the site to be restored by May 2025. This two-year time period and the activities described in Table 2.2 have been used to be consistent with the addendum to the Scoping Opinion issued on 3 October 2017 and are only for the purposes of establishing the ES baseline. As set out in the Planning Statement, the decommissioning of the Proposed Development and its restoration to topsoil levels would actually require a longer period of time.
- 2.2.22 The aftercare phase was previously based on a five-year period as defined in Schedule 5 of the Town and Country Planning Act 1990. The installation of surface features and any tree and hedgerow planting would normally take place during the aftercare period. However, provide a consistent comparison with the Proposed Development programme, this has been extended to 8 years (running to 2033). Also, in order to be consistent with the addendum to the Scoping Opinion issued on 3 October 2017 and only for the purposes of establishing the ES baseline, only management and maintenance activities have been included.
- 2.2.23 For the maturing site phase, the end date of 2048 is used as it represents a further 25 years from the currently approved end date for mining operations.
- 2.2.24 For the mature restored site phase, the period of 2048 – 2057 onwards is used as it equates to the restoration and aftercare period for the Proposed Development.
- 2.2.25 It is against these predicted baseline conditions that the assessment has been carried out. Table 2.3 below illustrates the relationship between the baseline phases and the Proposed Development phases.

² Refer to Appendix 1.A for details of the assumed after uses for the site.

Table 2.3 Timeframe References

Time period	Future Baseline	Proposed Development
2019-2023	Operational mine	Working
2023-2025	Decommissioning and restoration	Working, plus deconstruction of some structures
2025-2033	Aftercare	Working, plus deconstruction of some structures
2033-2048	Semi-mature site	Working (reduced site)
2048-2052	Mature restored site	Demolition and landform creation
2052-2057	Mature restored site	Restoration and aftercare
2057 onwards	Mature restored site	Established restoration

Limitations of Future Baseline Approach

- 2.2.26 As the future baseline scenario requested by the Scoping Opinion is based on a substantial change to the site's current conditions, there is uncertainty about the precise nature of the future baseline conditions. There are a number of variables including the length of time to demolish and clear the site, plant the restoration habitats and the time they will need to become established and then mature. The restoration plan itself may also be subject to amendments as more detailed site investigation is undertaken in the lead up to the site closure.
- 2.2.27 Assumptions therefore need to be made on the precise detail of the restored site, what a baseline without the mine would entail and what effect this baseline scenario will have on the receptors identified. Professional judgement will be needed when making these assumptions, and also in making a comparison assessment between the assumed future baseline conditions and the effects of the Proposed Development.

2.3 EIA Scoping

Scoping Process

- 2.3.1 Scoping an EIA involves identifying:
- ▶ The people and environmental resources (collectively known as 'receptors') that could be significantly affected by the proposed development;
 - ▶ How those receptors may be affected by the proposed development; and
 - ▶ The work required to take forward the assessment of these potentially significant effects.
- 2.3.2 The approach taken in this ES accords with Government Planning Practice Guidance³. In addition, the EIA Regulations state that an ES should not cover every aspect of the proposed development's environmental effects, but should focus on the aspects likely to have significant environmental effects. This has been followed for the Scoping Report and ES. The Planning Practice Guidance states that:

'Whilst every Environmental Statement should provide a full factual description of the development, the emphasis should be on the "main" or "significant" environmental effects to which a development

³ Department for Communities and Local Government, Environmental Impact Assessment, Planning Practice Guidance.

is likely to give rise. The Environmental Statement should be proportionate and not be any longer than is necessary to assess properly those effects. Where, for example, only one environmental factor is likely to be significantly affected, the assessment should focus on that issue only. Impacts which have little or no significance for the particular development in question will need only very brief treatment to indicate that their possible relevance has been considered⁴.

- 2.3.3 At the EIA scoping report stage, the conclusion that is made about significance is based upon professional judgement, with reference to the proposed development description, and drawing on, as appropriate, available information about the magnitude and other characteristics of the potential changes that are expected to be caused by the proposed development, receptors' sensitivity to these changes, the effects of these changes on relevant receptors and, where relevant, the value of receptors. If the information that is available at the scoping report stage does not enable a robust conclusion to be reached that a potential effect is not likely to be significant, the worst case is assumed (i.e. that effect is carried forward for assessment on the basis that the effect is likely to be significant) and the effect is therefore taken forward to further assessment. All other effects that are not specifically identified in the scoping report are unlikely to be significant.

Scoping Opinion

- 2.3.4 The Scoping Report for the Proposed Development was submitted for comment to the NYMNPA and this ES is based upon the Scoping Opinion that was issued on 22 August 2017 and the addendum issued on 3 October 2017 (see Appendix 1.A). Since that time, a number of changes have been made to how Boulby Mine operates which have a bearing on the EIA. The main change is that potash in the form of sylvinite is no longer extracted from the mine and processed into Muriate of Potash (MOP). Instead, potash extraction is focussed on polyhalite, with MOP being imported into the site to process with polyhalite to make products for market. This change has resulted in the following changes:
- As sylvinite is no longer processed, marine deposits via the outfall no longer included suspended solids and consist only of brine (pumped out of the mine workings). Deposits of material on the Boulby Sandpatch therefore no longer take place;
 - Emissions to air and the visible plume are reduced due to the lack of sylvinite processing as energy consumption is not as high and the drying of product is not required;
- 2.3.5 These amendments are however not considered to be incompatible with the Scoping Opinion issued. Further detail is provided within the relevant chapters.
- 2.3.6 The Proposed Development also identifies that some buildings and structures on site will be deconstructed and the land involved restored to pasture (to match the final restoration strategy in these areas). Again, these changes are not felt to be incompatible with the Scoping Opinion. Following the Scoping Opinion will provide a worst case scenario and the proposed deconstruction will lead to fewer buildings and operations and therefore environmental effects within the extent of the original Scoping Opinion.
- 2.3.7 The process of completing topic specific investigations inherently involves further surveys and assessments and discussions with consultees. Topic specific refinements were made as a result of these activities. Where variations have been made from the Scoping Opinion, these are detailed in the relevant technical topic chapter.
- 2.3.8 Consultees who have been contacted about the Proposed Development as part of the scoping exercise and subsequently are listed below:

⁴ Planning Practice Guidance Paragraph: 035 Reference ID: 4-035-20170728.

- Natural England;
- North York Moors National Park Authority;
- Environment Agency;
- Industry Nature Conservation Association;
- Historic England;
- Marine Management Organisation (no response received to scoping request);
- the Highways Authority (North Yorkshire County Council);
- Network Rail;
- Redcar and Cleveland Borough Council.

2.3.9 Schedule 4 of the EIA regulations provides a checklist of topics to include in EIA derived from the relevant European Directives which are those aspects of the environment which are considered likely to be significantly affected by the proposed development. The factors that have been considered in this ES are shown in Table 1.2 in Chapter 1.

2.3.10 Chapters 5 – 15 detail the final scope of the assessment in relation to effects that it was considered could be significant and hence needed to be subject to more detailed assessment.

Matters Scoped Out

2.3.11 The Scoping Opinion and Addendum agreed that a number of matters could be scoped out of the EIA. The technical chapters include an explanation about why some other effects are not likely to be significant. Table 2.4 below provides a summary of topics and effects that have been scoped out.

Table 2.4 Topics Scoped Out

Topic	Potential effect scoped out of the EIA	Justification located in	In agreement with
Landscape and Visual	Landscape, visual and cumulative effects beyond 5km of the site boundary.	Scoping Report and Scoping Opinion	NYMNPA
Ecology and Ornithology	Boulby Quarries SSSI, Staithes-Port Mulgrave SSSI, North York Moors SAC, LWSs other than Oneham's Pasture and Easington Beck Complex and Saltburn to Staithes Coast.	Scoping Report and Scoping Opinion	NYMNPA, Natural England
Hydrology and Hydrogeology	All aspects, i.e. groundwater, private water supplies, surface water.	Scoping Report and Scoping Opinion Addendum	NYMNPA, Environment Agency
Traffic and Transport	Noise and vibration from HGV movements.	Scoping Report and Scoping Opinion	NYMNPA, the Highways Authority

Topic	Potential effect scoped out of the EIA	Justification located in	In agreement with
Dust and Air Quality	Dust effects arising directly from the underground minerals extraction operations; emissions from minerals processing and other surface processes.	Scoping Report and Scoping Opinion	NYMNPA, Redcar and Cleveland Borough Council
Noise and Vibration	Noise from the sea water intake and slurry discharge system.	Scoping Report and Scoping Opinion	NYMNPA
Socio Economic Impacts	All effects.	Scoping Report and Scoping Opinion	NYMNPA
Tourism and Recreation	Visual effects; impacts on tourist accommodation sites.	Scoping Report and Scoping Opinion	NYMNPA,
Marine Environment	All effects scoped out	See text in Paragraph 2.34	
Human Health	Any significant effects on human health from the operations of the mine on external receptors such as local residents or tourists, will be covered in the appropriate chapter.	Scoping Report and Scoping Opinion	NYMNPA
Accidents and Disasters	As above.	Scoping Report and Scoping Opinion	NYMNPA

Cumulative Effects

- 2.3.12 In line with standard practice, a review of relevant projects that have been the subject of full and validated planning applications, DCO applications or Marine Management Organisation marine licences has been undertaken to inform the consideration of potential cumulative effects, with the assumption that they will be successful. Relevant consented but not yet constructed schemes were also identified as part of the cumulative assessment, rather than being considered part of the existing baseline. Other projects substantially in the public domain either by virtue of a scoping report or a consultation into a specific infrastructure project were excluded from the review as there would be insufficient information available to the EIA team and a planning application may never be submitted.
- 2.3.13 This review has not identified any relevant major projects that need to be considered in the assessment of potential cumulative effects that will not already have been included in the baselines, other than the new polyhalite mine granted planning permission near Whitby (the YPL/Sirius Minerals scheme). The Scoping Request only identified any cumulative assessment work as being necessary for the landscape and visual impact chapter. This was accepted by the NYMNPA.

Consideration of Alternatives

- 2.3.14 The EIA Regulations require the ES to include a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

- 2.3.15 Given that minerals can only be mined where they are found and that the Mine is already operational and the Proposed Development is for the continuation of existing operations, there are limited reasonable alternatives which can be considered. Part of the proposals already incorporate an alternative for the major processing activities: to move them to another site outside of the National Park. The ES therefore provides a summary of why alternative sites for the whole Mine Site can not be considered.

2.4 Overview of Assessment Methodology

Introduction

- 2.4.1 For each topic, the detailed assessment of likely significant effects has been undertaken by people with relevant specialist skills, drawing on their experience of working on other development projects, good practice in EIA and on relevant published information. Table 2.5 lists the people that have been involved in each topic in this ES and describes their experience and / or qualifications.

Table 2.5 Staff Involved in the Preparation of the ES

Topic	Staff	Relevant expertise/qualifications
Landscape and Visual Impact	David Stokoe	CMLI
Noise and Vibration	Mark Evans	Institute of Acoustics
Dust and Air Quality	Lauren Grown Alun McIntyre	Associate MIAQM MCIWEM, MI Env Sci, MIAQM
Traffic and Transport	Helen Harding Pranav Yadap	Institution of Highway and Transportation, The Engineering Council Institution of Highway and Transportation
Ecology and Ornithology	Tim Kell James Wilson Jo Rockingham	GradCIEEM MCIEEM MCIEEM
Cultural Heritage	Amy Roberts	ACIfA AEECW
Geology and Subsidence	Frances Wilkinson / Neil Marlborough	Both MRTPI
Tourism and Recreation	Frances Wilkinson / Neil Marlborough	Both MRTPI
Climate and Energy	Frances Wilkinson	MRTPI
Human Health, Accidents, Disasters	Neil Marlborough	MRTPI

- 2.4.2 Following the identification of the scope of the EIA, individual environmental topics are subject to survey, investigation and assessment, and individual topic chapters are prepared for the ES. The assessment methodologies are based on recognised good practice and guidelines specific to each topic area, details of which are provided in the appropriate chapter.
- 2.4.3 The assessments are based on the project description provided chapter 3. Each topic chapter follows a common format, as outlined below:

- Summary – a short summary of each technical chapter is included at the outset, this text also forms the basis of that included in the Non-Technical Summary that accompanies the ES;
- Introduction and overview;
- Policy and legislative context – which provides a summary of the national and local planning policies relevant to the particular topic;
- Methodology and Approach - describing the planning context for the specific aspect of the environment, how receptors were identified through a scoping and consultation process, the specific methods used for data gathering, predicting levels of effects and evaluating significance of effects;
- Baseline information – describing the current state and circumstances of the identified receptors and changes that might be expected to arise with the continued mining operations, and gaps in the information;
- Scope of assessment – details the potential receptors that could be affected by the ongoing mining operations, and the likely significant effects that have been subject to further assessment;
- Predicted effects – an identification of the effects predicted to arise as a result of the continued mining operations;
- Mitigation and enhancement measures – identification of measures which may be necessary to control or manage identified potentially significant effects;
- Conclusion on Significant Effects – a summary of the significance of all those effects that have been subject to assessment;
- Implementation of Mitigation Measures;
- References.

2.5 Issues Arising during Consultation

- 2.5.1 Following the announcement of the public consultation events in 2019, a small group of local residents who occupy some of the closest properties to the Mine Site contacted ICL Boulby to arrange a meeting with regard to certain concerns they had with current operations. These concerns related to the emissions from the main stack, deposition of dusts on their properties, specific noise arisings, waste storage and light pollution. Work is ongoing within ICL Boulby to rectify the waste storage and lighting issues. A scheme of investigation has been designed, in agreement with Redcar and Cleveland Borough Council's Environmental Health team, to examine the dust and noise issues to determine: a) if ICL Boulby's operations are responsible, and if so b) where these arisings are coming from and c) to input into a scheme of mitigation to remedy the issues. These types of issues are considered to be typical of issues which arise from time to time on a major site like Boulby Mine and are dealt with by relatively minor changes to the usual operational regime.
- 2.5.2 With the emissions from the main stack, ICL Boulby have been able to identify areas of improvement needed within the processing regime that creates the emissions, and these improvements are being incorporated within updated plant and equipment being ordered and installed at the Mine. An updated monitoring system is also being installed to provide more accurate results going forward, following problems with the historic system that have been identified. Redcar and Cleveland Borough Council have been kept fully aware of all of the issues

surrounding the emissions complaints and have agreed with the approaches being developed to deal with them.

- 2.5.3 As a result of ICL Boulby's remedial actions in these areas, developed with agreement with Redcar and Cleveland Borough Council, these issues are not assessed within this EIA as they are not considered to represent the usual effects arising from Boulby Mine.



3. Description of the Proposed Development

3.1 Introduction

- 3.1.1 This chapter provides an overview of the Proposed Development. In accordance with Schedule 4 of the EIA Regulations, it includes a description of:
- The location of the Proposed Development;
 - The physical characteristics of the Proposed Development;
 - The main characteristics of the operations undertaken and
 - Expected residues and emissions.
- 3.1.2 The situation with Boulby Mine means that the EIA is different from most EIAs, in that the application is for the continuation of an existing development rather than involving the construction and subsequent operation of a new build development. The description of the Proposed Development does not therefore include any construction specification or construction programme and a construction environmental management plan is not part of the submission.

3.2 Site Location

- 3.2.1 The Proposed Development consists of two main elements, the Mine Site and the underground extraction area. The Mine Site is home to the surface features of Boulby Mine, including the shaft towers, potash and salt storage and processing facilities, supporting workshops and facilities, office/administration/welfare facilities and rail load-house. The Mine Site is located within the North York Moors National Park, close to the Park's northern boundary with Redcar and Cleveland Borough. The grid reference at the entrance to the mine is NZ 764 187. The Mine Site is located adjacent to the A174 between the settlements of Easington and Staithes and within 1km of the coastal cliffs. The location of the Mine Site is shown in Figure 1.1.
- 3.2.2 The nearest settlements (as measured from the operational area boundary shown in Figure 1.2) are as follows:
- Staithes, 1.55 km to the east;
 - Dalehouse 1.15 km to the east;
 - Roxby, 1.55 km to the south;
 - Easington, 1.27 km to the south west; and
 - Boulby, 0.54 km to the west.
- 3.2.3 The distance between the Mine Site and nearby residential properties is set out in Table 3.1 below.

Table 3.1 Distances to Nearby Residential Properties

Location	Distance to mine site boundary (m)
Ridge Hall (and holiday cottages)	
Ridge Farm	

Location	Distance to mine site boundary (m)
East Ridge Lane Farm	
West Ridge Lane Farm	
Twizziegill Farm	
Upyonda	
Ings Farm	
Alandale	
Boulby Lodge	
Boulby Grange	
Boulby Barns Cottages	
Red House Farm	

3.2.4 The current permitted underground extraction area extends from Broughton in the west to the outskirts of Whitby in the east. The southern boundary of the area is generally formed by the A171 road between Cross Butts Farm in the east and the Moorsholm road in the west, with the exception of an area around Roxby High Moor, where the boundary falls to the south of the A171. To the north, the permitted underground extraction area currently extends into the Redcar and Cleveland Borough Council area. This underground extraction area is shown in Figure 3.1. It also extends offshore and extraction in this offshore area takes place under a lease agreement with the Crown Estate.

3.3 Description of Mine Site and Surroundings

3.3.1 The Mine Site consists of two areas:

- The main Mine Site;
- The pump house.

3.3.2 The main Mine Site lies to the south of the A174. The site facilities include two mine shafts and headgear, the ore processing plant and product storage silos. Other buildings house workshops, stores, laboratories and offices. The Mine Site has a dedicated rail loading facility and rail link to Teesside for the transport of products for export and storage. Road access is provided directly from the A174 which passes the Mine Site to the north.

3.3.3 To the north, of the A174, approximately 67m from the cliff top, the pump house pumps the mine tailings out to sea. Access to the pump house is also gained from the A174.

3.3.4 The main Mine Site covers an area of approximately 32 hectares. The pump house site covers an area of approximately 3.6 hectares. Both sites are surrounded by an area of non-operational land that comprises mainly of agricultural and woodland land uses.

3.3.5 Road access is directly from the A174 to the north of the Mine Site. The Mine Site is served by its own rail line which leads to port facilities on Teesside.

Topography and Land Use

- 3.3.6 The Mine Site is located on a cliff-top area of flat ground with an elevation of approximately 80m AOD. The coastal strip of land to the north, which lies between the Mine Site and Boulby Cliffs, slopes steeply down from 200m AOD to the north west of the Mine Site to a level of 80m AOD at the entrance to site. To the west, the land rises steeply up to the cliff tops at Boulby Hill, with a high point of 173m AOD, approximately 1km from the Mine Site. To the south, the land rises more gently up towards the moorland plateau, to Keld Hill (160 m AOD) and Black Hill (194 m AOD) which is 2km to the south east of the Mine Site. Further to the south, the ground level is generally above 200 m AOD on the moors which are approximately 5km distant. To the east, the land follows the coast to the villages of Dalehouse and Staithes.
- 3.3.7 Land in the immediate surrounding area is mainly used for agriculture purposes. There are a number of woodland areas in the valleys to the east of the Mine Site. These generally form a strip of woodland running north to south for approximately 5km. There are a number of small settlements in the vicinity of the mine site including Loftus (3.5km west); the village of Easington, just within the National Park (1.27km west); Staithes, lying partly on the cliff top and partly in the narrow, steep-sided valley leading to the sea (1.55km east) and the village of Hinderwell (3km south east). Further along the coast to the south is the small village of Runswick Bay and some 5km further south-east is Sandsend, a small sea-side village.

Designated Sites

- 3.3.8 There are no designated sites within the Mine Site but there are a number of designated sites in the vicinity.
- 3.3.9 There are a number of ecologically designated sites in the vicinity:
- North York Moors Special Area of Conservation, approximately 2.88km;
 - North York Moors Special Protection Area, approximately 2.8km;
 - North York Moors Site of Special Scientific Interest (SSSI), approximately 2.8km;
 - Boulby Quarries SSSI, approximately 1km;
 - Staithes-Port Mulgrave SSSI, approximately 2km;
 - Runswick Bay Marine Conservation Zone, approximately 2.2km;
 - Oneham's Pasture Local Wildlife Site (LWS) 0.16km;
 - Easington Beck Complex LWS adjacent to the southern boundary of the mine site;
 - Saltburn to Staithes Coast LWS, approximately 1.8km north west.
- 3.3.10 Staithes is the nearest conservation area, approximately 2km to the east.
- 3.3.11 The nearest listed buildings to the Mine Site are (distances from the main Mine Site):
- Three properties at Boulby Grange (grade II), approximately 370m to the north;
 - Red House Farmhouse (grade II), approximately 450m to the north east;
 - Dalehouse Bridge (grade II), approximately 1.27km to the east;
 - Fox and Hounds pub at Dalehouse (Grade II), approximately 1.34km to the east;
 - The Old Mill Dalehouse (grade II), approximately 1.35km to the east;

- Oak House, Roxby Lane (grade II) approximately 1.34km to the south east;
- The remains of a medieval well east of Ings Farmhouse (grade II), approximately 420m to the west;
- Boulby Barns Cottage (grade II), approximately 900m to the north west;
- Listening post to the north of Boulby Barns Cottage (grade II), approximately 950m to the north west;
- A number within the built-up area of Easington and Staithes.

3.3.12 The nearest Scheduled Ancient Monuments are:

- WWI early warning acoustic mirror to the east of Boulby Barns Farm, approximately 900m to the north west;
- Boulby Alum Quarries and Works, approximately 1.2km to the north west;
- Site of Rockcliff Beacon, approximately 1.4km to the north west;
- Moated manor and medieval settlement at Easington, approximately 1.35km to the east and
- Cross base, All Saints Church, Easington, approximately 1.4km to the east.

3.3.13 The North Yorkshire and Cleveland Heritage Coast is located to the north of the A174 which forms the northern boundary of the main Mine Site. The buildings connected to the tailings pipeline are located within the Heritage Coast. The Cleveland Way National Trail provides a coastal path along the whole length of the Heritage Coast. The England Coast Path and associated access rights is now open along the North Yorkshire Coast.

Drainage

3.3.14 The surface water hydrology of the site comprises four catchment areas which outfall to the sea at Skinningrove, Staithes, Runswick Bay and Sandsend. Closest to the Mine Site, the main watercourses are Easington Beck, flowing through the valley just to the south, and Roxby, Dales and Mounter Becks, which join to form Staithes Beck at Staithes. The Mine Site and the streams draining through it have a total catchment area of approximately 2.3km², with the catchment area for Easington Beck upstream of the mine being 10.3km² and downstream being 13km².

3.3.15 The operational area lies in Flood Zone 1, an area that is assessed as having less than a 1 in 1000 annual probability of flooding from rivers or the sea. The nearest Flood Zones 2 and 3 are associated with the Easington Beck, approximately 300m to the south and east. These areas are shown in Figure 3.2. Surface water flooding occurs when intense rainfall overwhelms drainage systems and the Environment Agency has prepared a map of areas at risk of flooding from surface water. This shows that areas within the Mine Site are at flood risk from surface water. This is mainly a low risk but there are smaller areas at medium and high risk. Low risk is defined as a 0.1 - 1% chance of flooding each year; medium risk as a 1 - 3.3% chance and high as a chance of flooding greater than 3.3% each year. These are shown in Figure 3.3. A separate Flood Risk Assessment has been prepared and is included within the planning application package.

Rights of Way and Recreational Routes

3.3.16 There are no public rights of way within the Mine Site although there are a number within the vicinity including a number of footpaths that run through the woodlands to the west, south and east of the mine site (path numbers 109003, 109002, 109004 and 109504). The Cleveland Way is a National Trail covering 175km, running between Filey and Helmsley. It follows the coast between

Filey and Saltburn then turns inland to the west and south. It lies approximately 290m to the north of the Mine Site at its nearest point. The England Coast Path follows the same route in the vicinity of the Mine Site.

Part of the route of the Sustrans National Route 1 follows the A174 approximately 145m from the Mine Site at its nearest point at the mine site entrance. These routes are shown on Figure 3.4.

Services

- 3.3.17 There are no private water supplies or groundwater abstraction points within the Mine Site or wider vicinity. There are no services within the Mine Site other than those required for the mining operations themselves.

3.4 The Proposed Development

Introduction

- 3.4.1 The Applicant is seeking planning permission for a continuation of their current planning permission for a further 25 year period from when the current permission expires (from 2023 to 2048). This would involve the continued extraction of polyhalite and salt and the initial retention and continued operation of all the existing surface installations, buildings, plant etc to produce various products. ICL Boulby are however committing to a phased approach to deconstruction of some features of the Mine Site, over a 10 year period, and to a review of other structures with the National Park Authority every 5 years with a view to removing others where possible. Decommissioning and restoration of the Mine would then take place over a further two year period.
- 3.4.2 The existing site layout is shown in Figure 3.5, with the Proposed Development phasing shown in Figures 3.6 and 3.7. This would see the operations at the mine continue through an extended working period until 2048, then a 'post-working' period consisting of:
- 2048-2052: demolition of the mine site and creation of a new landform;
 - 2052-2057: restoration of the new landform through planting and seeding, and aftercare to ensure the planting is successfully established; and
 - 2057 onwards: the established, restored site.
- 3.4.3 The extent of the Underground Extraction Area would be reduced through the removal of large areas of land in the western, southern and eastern extents of the existing planning boundary. The restricted zone (imposed through condition 4 of the 1998 consent) underneath Easington could be retained.

Method of Extraction

- 3.4.4 The method of extraction proposed is the same as that currently undertaken.
- 3.4.5 Underground access to the workings would be gained via the two existing mine shafts, No1 and No2 Shaft which are used to transport ore, workers and materials respectively. The proposed method of extraction is by pillar and stall methods using strata control techniques. This method is designed to provide an optimum balance between extraction and stability of the workings.
- 3.4.6 Different dimensions of pillars and working panels are used in the different minerals mined. Sylvinitite is more elastic than salt and polyhalite and the workings here were therefore designed to

collapse (to a certain degree) in on themselves after working. This controlled collapse prevents sudden rock falls and thereby restricts underground dangers and surface subsidence events. The polyhalite and salt seams are more stable over longer periods of time and less prone to future collapse. For sylvinitic extraction, the main arterial roadways were driven in the salt seam below the sylvinitic for this reason. The transport of workers, materials, ore, ventilation and services would all occur in these salt roadways. In the polyhalite workings, both the main roadways and extraction panels would occur in the polyhalite seam.

3.4.7 Polyhalite extraction would mainly take place offshore, although provision is also made in this planning application for working under the onshore area as well. Mechanised mining techniques are currently used to extract the polyhalite and this is expected to be the main method of extraction.

3.4.8 Salt is currently mined in two districts, one offshore and one onshore and this would continue.

Processing

3.4.9 At present, different processing activities take place depending on the type of mineral extracted and the end product to be produced. It is proposed that all of these processing activities would continue for a temporary period of time.

3.4.10 The polyhalite and rock salt would be hoisted to surface and received by the polyhalite crushing and screening plant. This plant consists of a number of screening stages together with a crushing stage to reduce the size of the larger particles. The combination of crushing and screening would produce three primary polyhalite products - a granular grade product (2-4mm in size), mini granules (1-2mm) and a standard grade product (the fines from the crushing process used to create the granular products). The granular grade product continues to be refined through research and development at Boulby Mine, in order to find an exact product make up that can stand up to the rigours of transportation but retain the release rates and organic qualities that are attractive to the market.

3.4.11 Potashplus is also processed at the Mine Site, with polyhalite fines and imported MOP combined to make this product. This will continue at the Mine Site under the Proposed Development for a maximum of 10 years, before moving over to the planned Teesside facility.

Transport

3.4.12 It is proposed that products created at the Mine Site would continue to be dispatched from the site by rail and by road. Road exports are currently limited by the planning permission and the terms of the accompanying legal agreement to a maximum of 150,000 tonnes in any 12 month period, and to a maximum of 66 loads of product leaving the Mine Site each day. The routes to be used by HGVs delivering the Mine's product are also defined under the legal agreement, with minor roads in the vicinity of the Mine being avoided unless for specific delivery purposes. The A174, north and south, is therefore the principal route which HGVs would use to reach the wider highway network.

3.4.13 Currently, the majority of products are despatched using the existing rail link to Teesside and Teesdock, and this would continue. Train wagons would be loaded at the rail loading facility to the west of the Mine Site. They would then travel on a private rail line (owned by ICL Boulby) to Carlin How where the track joins a line owned by Network Rail. The track is shared from this point to Saltburn by rail services for the British Steel plant at Skinningrove, and from Saltburn by passenger rail services into Teesside. When the Teesside processing facility is developed, polyhalite from Boulby Mine will be able to be transported via rail to this facility.

3.4.14 The majority of workers would continue to travel to the Mine Site by car, which is necessary due to the rural location and the shift working patterns in place, and the Mine Site includes car parking areas for workers. Most deliveries would also continue to be brought to the Mine Site by road.

Buildings and Plant

3.4.15 The Mine Site currently contains a range of buildings and structures which, in simple terms consist of the following (from south to north across the Mine Site):

- Underground services: helipad (for emergency use), car parking, workers amenities, man shaft, surface fan house and winder house;
- Battery storage system;
- Technical services and fabrication bays;
- Dark matter research building,
- Substation and transformers;
- Rock shaft and vent house;
- Raw ore, salt, polyhalite and finished product storage;
- Salt and polyhalite plant buildings;
- Sewage plant;
- Potash treatment plant building;
- Rail loading facility;
- Combined heat and power plant;
- Water interceptor pit;
- General stores and engineering services;
- Sports dome (for workers);
- Gatehouse, car parking and administration building; and
- Sea water reservoir.

3.4.16 Also connected to the Mine Site are buildings used in the discharge of brine to the sea, which are located close to the coastal cliff line to the north of the site. These include transformers, a shaft to the discharge pipeline, a small winder house and related plant.

3.4.17 It is proposed that a phased deconstruction of a number of structures at the Mine Site will take place as part of the Proposed Development. This will remove a number of structures at the Mine Site which will not be required for the future operations at the site, reduce the size of other buildings where the larger size is no longer required and consolidate the spread of built development on site to a smaller footprint. All of these proposals will reduce the visual impact of the mine in the landscape and provide a more efficient operational site. A phased approach is required in order to allow a transition from the current activities to those required for future operations and provide some degree of flexibility to ICL Boulby in how this transition is managed. A phased deconstruction approach is also proposed, rather than a single demolition approach, as the Mine Site will remain an operational site during this time and the removal of these structures must fit in around though operational activities ongoing. The proposals would see the following

structures deconstructed and removed in two phases, as shown on Figure 3.6 (Phase 1) and Figure 3.7 (Phase 2):

- Phase 1
 - ▶ Slimes and tails thickeners and associated pumping infrastructure;
 - ▶ Centrifuges and belt filter building connected to the potash treatment plant;
 - ▶ Oil storage building;
 - ▶ Sports dome and construction store;
 - ▶ General stores building;
 - ▶ Administration building.
- Phase 2
 - ▶ 2,000 tonne surge bunker, and associated conveyor belts;
 - ▶ Old boiler house
 - ▶ Engineering services building (across phases 1 and 2)

3.4.18 It is expected that Phase 1 will take place over a 5-year period from 2023 (or as agreed in any planning condition), and Phase 2 over a further 5-year following Phase 1. The area to the north of the main Mine Site will therefore be largely cleared of buildings and structures. The car park would be relocated closer to the remaining built structures to further consolidate the spread of built development. The cleared land will be converted to pasture land for grazing, which is compatible with the longer-term restoration ideas for the site (Appendix 3A).

3.4.19 As ICL Boulby move processing facilities to a new site on Teesside, there will also be an opportunity to reduce the size of other buildings on site. Principally this is likely to involve a reduction in the size of the potash processing building and the removal of its stack. At this point in time, ICL Boulby are unable to confirm exactly how this building would change and decisions on now it could be amended would need to consider the exact nature of operational activities in the future, the practicalities of amending a building that will still be required for operational purposes during this time and the exact date a new Teesside processing facility becomes operational. ICL Boulby therefore commit to a review of site operations with NYMNPAs every 2 years through the permission to confirm a rolling 5 year plan for consolidation of other structures on the Mine Site., These discussions will confirm what other changes can be made, when these will happen and secure agreements on any replacement/amended building/structure designs. This could be secured by a condition on any planning permission granted.

3.4.20 The administration building would be replaced by an office building constructed on the site of the existing technical services building at the southern end of the Mine Site during Phase 1. This would be a substantial 2-3 storey building, accommodating offices, stores, laboratories and gym facilities for staff. It would however be located to the southern end of the Mine Site where it would fit in with the bulk and height of the existing buildings, structures and nearby woodland planting in this location. ICL Boulby would expect a condition to be placed on any permission granted to allow final designs to be agreed with NYMNPAs prior to the building's construction.

Utilities

3.4.21 Annual electricity consumption by the mining operation and the surface processes, including the plant and building supplies, is currently in the region of 90-100GWh per year. Due to the increase in

extraction amounts which are proposed, this would increase to around 163GWh per year by 2033 if all processing operations remain on the Boulby Mine site. Annual gas consumption from the boilers and driers used in the surface processing facilities and the combined heat and power (CHP) plant is currently has been in the region of 75-110GWh per year in recent years. This has dropped in 2019 to an expected figure of around 37GWh following the cessation of sylvinitic processing to make MOP. It is expected that this will continue at similar levels across the Proposed Development period if all processing operations remain on the Boulby Mine site.

- 3.4.22 The development of a processing facility on Teesside, and the switch of operations to that plant, would see energy usage at Boulby Mine drop below these levels.
- 3.4.23 The CHP plant was previously used extensively to supply heat into the MOP processing plant. With the cessation of this processing, there is no longer such a demand for heat on the plant and investigations are ongoing as to how the CHP plant can be used more constructively in the future.
- 3.4.24 Boulby Mine is supplied by fresh water from the mains supply. Annual consumption has dropped in recent years from 790,000m³ in 2017 when MOP processing was taking place and will balance out at around 425,000m³ in 2020. This will then increase as extraction increase, reaching a maximum of 610,000m³ a year in 2023 when 3 million tonnes extraction is reached.
- 3.4.25 Seawater is extracted at a rate of approximately 1,000 m³ per day into a sea brine reservoir formerly for use as a transport medium for the refinery tailings which are pumped out to sea. This would continue at a slightly lower rate as the transport medium for the brines pumped from underground. The use of sea water as a transport medium ensures that there will be no adverse impacts from the discharge of warm saline waters into the sea by virtue of the dilution. It also eliminates any potential problems with crystallisation of salts in the pipeline.

Groundwater

- 3.4.26 Due to previous extraction activity, some discreet pathways have been created for saline groundwater from the overlying Sherwood Sandstone to enter the underground extraction area. It is proposed that this water would continue to be pumped out of the underground extraction area to the effluent stream and then discharged out to sea.

Water Disposal

- 3.4.27 The operational area is bunded and surface water run-off from the Mine Site is diverted through the on-site drainage system into an interceptor in the north eastern corner of the site. Water from the culverted streams also feeds into the interceptor. Foulwater flows from the Mine Site pass through an onsite sewage treatment plant before feeding into the interceptor. The pit has a capacity of approximately 2,500 m³ and helps to collect and separate any silt and dirt from the water flows before discharge.
- 3.4.28 All surface water run-off, as well as all treated foulwater, is therefore currently prevented from entering the Easington Beck, the closest surface water course to the Mine Site.
- 3.4.29 The contents of the interceptor pit are pumped into the effluent stream, which already contains a mixture of mine brine and any plant effluents, mixed with seawater (of which around 1000m³ is used per day) and discharged via outfall to the North Sea. The use of sea water as a transport medium ensures that there will be no adverse impacts from the discharge of warm saline waters into the sea by virtue of the dilution. It also eliminates any potential problems with crystallisation of salts in the pipeline. This effluent and seawater mix has previously been used as the transport medium for the refinery tailings. All of this tailing material came from the processing of sylvinitic

however, because sylvinite will no longer be processed on the Mine Site, no refinery tailings will be included in the discharge to the North Sea.

- 3.4.30 No change is proposed to this system although the amount of surface water and foul water entering the system will reduce as deconstruction activities take place and buildings and areas of hard-standing at the Mine Site are removed.

Atmospheric Emissions

- 3.4.31 The processing of the minerals gives rise to a number of atmospheric emissions, including:
- The emission of combustion gases and particulate material from three product driers, which are vented to atmosphere via a 87.5m high dryer stack; and,
 - Fugitive emissions of dust.
- 3.4.32 It is proposed that emissions to atmosphere from the various processes carried out at the Mine would continue to be made subject to regulations imposed by the Environmental Protection Act 1990 Part 1. The surface operations at the Mine Site are classified as a Part B process and are currently regulated by Redcar and Cleveland Borough Council under Authorisation reference MP-CPL-209.
- 3.4.33 There are two permits relating to the CHP, one of which licences the emissions to air through the CHP stack. Permit Number BL7973IW under the Environmental Permitting Regulations, the second is related to Greenhouse Gas Emissions under the EU ETS Scheme.

Employment

- 3.4.34 ICL Boulby currently employs just over 480 employees on its Boulby Site, working underground in various mining and engineering roles, on the surface processing plant in engineering and processing roles and administrative and support roles which range from management, administration, training, safety and planning. It is envisaged that as extraction of polyhalite increases over the coming years, staff numbers will rise to around 820 in 2023 and then remain at that level for the remainder of the permission period.

Economic activity

- 3.4.35 Boulby Mine currently contributes to local economic activity. This includes a £37m wage bill per annum, business rates of £912,000 per annum and a community fund of £30,000 per annum, all of which will, in turn, generate a significant supply chain of economic activity. In addition, ICL Boulby spend around £60 million every year with suppliers, around 90% of which is to companies in the UK.

Restoration and Aftercare

- 3.4.36 Upon completion of mining the site would be decommissioned, restored and become subject to a five year aftercare period.
- 3.4.37 It is proposed that a detailed restoration scheme would be developed and submitted to NYMNPA closer to the end date of any permission granted, to allow for a scheme which reflects the best use of land at that time and the most up to date guidance to be followed in its design. It is however likely that the Mine Site would be restored to a mix of semi-natural woodland and grassland habitats, pastoral fields, public access and industrial/mining heritage interpretation. This would follow the general principles established in the 1998 Closure and Restoration plan submitted

pursuant to condition 6 of NYMR/003/0043B/PA and the subsequent 2012 landscape enhancement and restoration concept work undertaken by Estelle Warren. (Appendix 3A).

3.4.38

The key objectives developed to inform the overall design of the restoration scheme in these documents were:

- Create an undulating landform which is sympathetic to local topographical character and enables culverted watercourses under the mine head to be returned to open channels;
- Create a strong, long-term landscape structure which reflects key local characteristics and contributes to the National Park setting;
- Provide early visual improvement and/ or screening of the Mine Site during the operational phase in local views;
- Provide increased site security through use of dense thorny planting to the perimeter of the Mine Site;
- Retain and manage existing biodiversity habitats and enhance through provision of new habitats in the restored area, supporting existing initiatives where possible;
- Interpret site history, in particular mining history, and reflect within the scheme design as patterns and earthworks;
- Retain existing heritage features and improve settings where possible through management;
- Retain existing agricultural land uses and consider provision of additional agricultural land within the framework established through historical, landscape and biodiversity influences; and,
- Explore opportunities for improving connections within the local public rights of way network.
- Key landscape characteristics identified for incorporation into the restoration plan were:
 - Restore site topography close to pre-mining landforms, including removal or softening of the screening embankment, formation of minor gills along restored watercourses and general softening of the current development plateau;
 - Extend woodland cover along the existing Boulby Gill and restored minor gills, to reflect the presence and key local characteristics of mature woodland within incised valleys (as noted along the valleys of Easington Beck and Roxby Beck to the south of site);
 - Reinforce and/or restore degraded hedgerow field boundaries to the area north west of the minehead and within the parcel of open farmland north of the A174 near Red House Nab;
 - Use tree and shrub species which are local to the area and able to withstand the exposed maritime climate.

Site Decommissioning and Restoration

3.4.39

The plant and above ground structures would be decommissioned and demolished in accordance with the relevant legislation and best practice guidance available at the time of closure. All existing surface structures would be removed with the possible exception of the concrete winding towers where there may be an option to retain these in situ as historic features. Foundations for the removed structures will either be removed or left in situ where regrading proposals enable a minimum cover depth of 1m of new soils to be achieved. Shafts would be filled and capped. Culverts running below the Mine Site would be uncovered and retained as open channels. Culvert headwalls and settling pond structures would be broken out and replaced with soft construction detailing. Rails would be removed from the railhead but the stone ballast trackbed would be

retained in situ as a historic feature. All other hard surfaces would be broken out and removed to the full depth of construction except in areas where a minimum of 1m soils cover could be achieved. In these instances, existing surfaces would be punctured or broken up to aid drainage and left in situ below soil cover. All utilities and services will be disconnected at the site boundary and removed from areas within the Mine Site.

- 3.4.40 For the underground extraction area, all fixed plant would be left in-situ unless it can be re-used on other mine developments. Any equipment containing potentially polluting materials would be cleaned, drained and the materials removed. The effluent tunnel would be stopped up and the nozzles and sea water intakes plugged or capped.
- 3.4.41 All reasonable attempts would be made to reuse and recycle materials arising from the demolition of the structures and hardstanding.
- 3.4.42 Following decommissioning, the Mine would be restored to the landform detailed in the approved restoration design.
- 3.4.43 Restoration of the Mine would include regrading of the existing plateau area to form a landform in keeping with the surrounding countryside, which is likely to include the creation of a series of undulating terraces falling from the high ground in the north west to the Easington Beck valley in the south and south east. Existing culverts running below the operational Mine Site would be opened up and reformed as surface channels, running across the new landform and connecting to existing watercourses on the north western flank of Easington Beck valley. The existing wide ditch running along the western edge of the screening mound would be retained. A series of permanent ponds and flushes would be introduced. Subsoil and topsoil materials would be replaced to maximise the value of the limited topsoil available.
- 3.4.44 It is anticipated that decommissioning and site restoration (i.e. to soils levels) would take approximately 3 years.

Aftercare

- 3.4.45 Aftercare would commence at the completion of final restoration i.e. the replacement of topsoil. The aftercare period would extend for a minimum of 5 years beyond the completion of restoration, in which time the following actions would be undertaken:
- Woodland and hedgerow planting;
 - Cultivations and seeding;
 - Drainage works, including underdrainage;
 - Field boundary treatment, including fencing;
 - Footpath, tracks, roads, any car parking, stiles, gates and signage; and,
 - Ponds and wetlands creation.
- 3.4.46 The type and nature of woodland planting, wildflowers, field boundaries etc. would be agreed with the NYMNPA.
- 3.4.47 The progress of the Mine through the aftercare period will be monitored through the production of annual monitoring reports and site meetings with representatives of the NYMNPA, Natural England and the landowners.

3.5 Environmental Measures/Regulatory Controls

- 3.5.1 There are a number of environmental and regulatory measures currently in place and it is proposed that these would continue during the extended time period for operations. A number of additional mitigation/enhancement measures also proposed to reduce the effects of the Proposed Development.

Atmospheric Emissions

- 3.5.2 It is proposed that emissions to atmosphere from the various processes carried out at the Mine would continue to be made subject to regulations imposed by the Environmental Protection Act 1990 Part 1. The surface operations at the Mine are classified as a Part B process and are regulated by Redcar and Cleveland Borough Council under Authorisation reference MP-CPL-209.
- 3.5.3 Compliance with the specified limits is demonstrated through a comprehensive monitoring programme as detailed in the authorisation. Ongoing visual monitoring is conducted by ICL Boulby personnel; gaseous and particulate stack emissions are determined annually by external consultants.
- 3.5.4 There are two permits relating to the CHP. Permit Number BL7973IW under the Environmental Permitting Regulations (EPR) licences the emissions to air through the CHP stack. The second is related to Greenhouse Gas Emissions under the EU ETS Scheme.
- 3.5.5 Combustion of natural gas into two steam raising boilers and combustion of natural gas to generate electricity in generating engines give rise to the emissions permitted in the CHP EPR licence.

Water Management

Surface and Foul Water

- 3.5.6 The onsite management systems collect surface water run-off, as well as all treated foul water to prevent it from entering the Easington Beck, the closest surface water course to the Mine Site.

Effluent Disposal

- 3.5.7 The disposal of effluent is undertaken subject to a Consent for Discharge issued by the Environment Agency in 2011. The Consent for Discharge places limits on the annual tonnage of insoluble material (clays) and certain heavy metals (mercury and cadmium) that can be discharged. These heavy metals occur naturally in trace concentrations in the ore. The Consent to Discharge stipulates a maximum annual load of insoluble material within the effluent of 150,000 tonnes. This consenting process would continue for the extended period of operations.
- 3.5.8 ICL Boulby and the Environment Agency are obliged to undertake monitoring of the effluent discharge to fulfil the requirements of the Consent to Discharge as well as meeting other international obligations relating to North Sea pollution. In addition, a Monitoring Working Group has been in place since 1996. These monitoring activities would continue during the extended working period.

Transport

- 3.5.9 It is proposed that products created at the Mine Site would continue to be dispatched from the site by rail and by road. Road exports are currently limited by the planning permission and the terms of

the accompanying legal agreement to a maximum of 150,000 tonnes in any 12 month period, and to a maximum of 66 loads of product leaving the Mine Site each day. The routes to be used by HGVs delivering the Mine's product are also defined under the legal agreement, with minor roads in the vicinity of the Mine being avoided unless for specific delivery purposes. The A174, north and south, is therefore the principal route which HGVs would use to reach the wider highway network.

- 3.5.10 Currently, the majority of products are despatched using the existing rail link to Teesside and Teesdock, and this would continue. Train wagons would be loaded at the rail loading facility to the west of the Mine Site. They would then travel on a private rail line (owned by ICL Boulby) to Carlin How where the track joins a line owned by Network Rail. The track is shared from this point to Saltburn by rail services for the British Steel plant at Skinningrove, and from Saltburn by passenger rail services into Teesside. When the Teesside processing facility is developed, polyhalite from Boulby Mine will be able to be transported via rail to this facility.
- 3.5.11 The majority of workers would continue to travel to the Mine Site by car, which is necessary due to the rural location and the shift working patterns in place, and the Mine Site includes car parking areas for workers. Most deliveries would also continue to be brought to the Mine Site by road.

Subsidence

- 3.5.12 The mining method adopted has a significant influence on the likely subsidence. The adopted method, which would continue with the Proposed Development, is one of partial extraction utilising strata control techniques. This method has been found to optimise the balance between the following factors:
- Minerals extraction,
 - Mining logistics, and
 - Physical support.
- 3.5.13 It is considered, therefore, that the mining method adopted is a significant factor in mitigating against subsidence effects. Furthermore, it is proposed that the programme of subsidence monitoring would continue.

Other Mitigation and Enhancement Measures

- 3.5.14 A range of mitigation and enhancement measures are proposed which are detailed within each of the relevant technical chapters.

4. Legislative Context and Planning Policy

4.1 Introduction

- 4.1.1 This Chapter sets out the legislative and planning policy framework that is relevant to the EIA for the Proposed Development. This includes the Development Plan, national planning policy and other relevant considerations. A summary of the relevant legislation, planning policy and other considerations is provided in this Chapter, with the technical topic chapters providing more detail on the policies etc. and why they are relevant to the EIA. Only the legislation and policies that are relevant to the Proposed Development have been included.
- 4.1.2 It is important to note that this Chapter does not include an assessment of the Proposed Development against the planning policy framework or other relevant material considerations. This assessment is undertaken in the Planning Statement that accompanies the planning application.

4.2 Legislation

- 4.2.1 Planning permission for the Proposed Development is being sought under the Town and Country Planning Act 1990. The application site is within the North York Moors National Park so the local planning authority for the purposes of determining the planning application is the North York Moors National Park Authority (NYMNPAA).

4.3 The Development Plan

- 4.3.1 The current Development Plan for the Site comprises three documents but only the North York Moors National Park Core Strategy and Development Policies document (adopted in November 2008) is relevant to the Proposed Development.
- 4.3.2 The key policy of relevance to the Proposed Development is Core Policy E on minerals. This policy sets out a specific approach for Boulby Mine. It was developed in recognition of the national need for potash and means that proposals in respect of potash extraction at Boulby mine will be treated differently from other mineral types. The policy states that the continued extraction of potash at Boulby will be permitted provided that any detrimental effect on the environment, landscape or residential or visitor amenity is not unacceptable in the context of any overriding need for the development.
- 4.3.3 Other relevant Development Plan policies are out in Table 4.1 below.

Table 4.1 Relevant Policies within the Core Strategy and Development Policies Document

Policy	Implications
Core Policy A	This policy sets out criteria to facilitate the delivery of National Park purposes. The LVIA and ecology chapters have been framed within this context as has any mitigation and enhancement measures required.
Core Policy C	The ecology assessment has had regard to the biodiversity interests identified in this policy as has any mitigation and enhancement measures required.

Policy	Implications
Development Policy 1	This policy identifies sources of and receptors to pollution. Consideration has been given to noise, air quality, lighting and other pollution sources and how they may impact on public health, safety and amenity, the water environment and soils.
Core Policy D	The requirements of this policy mean that considerations of how the proposed development can reduce its carbon footprint has been addressed.
Development Policy 2	The hydrology and hydrogeology chapter has considered the effects of the development on flood risk.
Core Policy E	This policy is supportive of further potash extraction at Boulby but requires that landscape and amenity issues should still be considered.
Core Policy G	The LVIA has considered the impacts of the Proposed Development on landscape character and the identification of appropriate mitigation measures.
Development Policy 3	The LVIA has considered the impacts of the Proposed Development on landscape character and the identification of appropriate mitigation measures.
Development Policy 5	The cultural heritage assessment within the ES has considered the impacts of the Proposed Development on listed buildings.
Development Policy 7	The cultural heritage assessment within the ES has considered the impacts of the Proposed Development on Scheduled Ancient Monuments.
Development Policy 14	The tourism and recreation assessment within the ES has considered the impacts of the Proposed Development on the tourism industry and recreational activities.
Development Policy 23	The transport assessment within the ES has considered the capacity of the highways network and any impacts on the safety of other road users.

4.4 The Emerging Development Plan

North York Moors Draft Local Plan

4.4.1 The Draft Local Plan will cover the period from 2016-35 and when adopted it will replace the current Core Strategy and Development Policies document. The Draft Local plan was submitted for examination in July 2019 and an Examination in Public will commence in November 2019. The policies which are proposed which would be key to the determination of this planning application are Strategic Policy D, which generally repeats the major development test found in Paragraph 172 in the NPPF, and Policy ENV8 which repeats the requirement of Core Policy D from the Development Plan. The National Park has undertaken an internal exercise to provide advise on how much weight it believes can be given to the policies in the Draft Local Plan. This assessment considers that no weight can be attached to Strategic Policy D due to significant objections having been received to this policy. It considers that weight can be given to Policy ENV8 as no substantial objections have been received to it that could fundamentally change the policy¹.

4.4.2 Other policies which could be relevant (and the National Park's opinion of the weight which can be afforded to them) are:

- Strategic Policy A: Achieving National Park purposes and Sustainable Development (no weight);

¹ Weight Attributed to the North York Moors National Park Pre-Submission Draft Local Plan (April 2019) Policies, North York Moors National Park Authority, 5 September 2019.

- Strategic Policy E: the Natural Environment (no weight);
- Strategic Policy F: Climate Change Mitigation and Adaption (weight);
- Strategic Policy G: The Landscape (weight);
- ENV2: Tranquillity (no weight);
- ENV4: Dark Night Skies (no weight);
- ENV5: Flood Risk (weight);
- ENV6: Land Instability (no weight);
- ENV7: Environmental Protection (weight);
- Strategic Policy I: The Historic Environment (some weight);
- ENV9: Historic Landscape Assets (some weight);
- ENV10: Archaeological Heritage (some weight);
- ENV11: Historic Settlements and Built Heritage (some weight);
- C02: Transport (weight);
- CO4: Public Rights of Way and Linear Routes (weight).

Draft Minerals and Waste Joint Plan

- 4.4.3 The Minerals and Waste Joint Plan is being prepared jointly by North Yorkshire County Council, the City of York and the NYMNP. The draft Joint Plan was submitted for examination in November 2017, and an Examination in Public was held to consider the plan. Following the initial examination sessions, further hearings were then held and the Inspector's report is still awaited.
- 4.4.4 The Draft Joint Plan includes a specific potash policy (Policy M22) which confirms that the extraction of potash, salt or polyhalite from new sites within the National Park and renewed applications for the existing two sites (which includes Boulby) beyond their current planning permissions will be assessed against the criteria for major development in Policy D04. Policy D04 includes criteria which are similar to the NPPF Paragraph 172 although there are differences (it also includes specific reference to the contribution to the national economy). The policy has been the subject of objections at the publication stage.
- 4.4.5 Table 4.2 below sets out the key policies of relevance to the Proposed Development within the Publication Draft Minerals and Waste Joint Plan that were considered in the examination. Once adopted, Policies M15, M22, S01, S02, D04 and D10 of this plan will replace Core Policy E of the Core Strategy and Development Plan Policies document.
- M22: Potash, polyhalite and salt supply;
 - I01: Minerals and waste transport infrastructure;
 - D01: Presumption in favour of sustainable minerals and waste development;
 - D02: Local amenity and cumulative impacts;
 - D03: Transport of minerals and waste and associated traffic impacts;
 - D04: Development affecting the North York Moors National Park and the AONBs;
 - D06: Landscape;

- D07: Biodiversity and geodiversity;
- D08: Historic environment;
- D09: Water environment;
- D10: Reclamation and afteruse;
- D11: Sustainable design, construction and operation of development.

- 4.4.6 In accordance with paragraph 48 of the NPPF, decision-takers may give weight to relevant policies of emerging plans according to: the stage of the emerging plan; the extent to which they may be the subject of unresolved objections; and their degree of consistency to policies of the NPPF.
- 4.4.7 Relevant policies contained in the Publication Draft Minerals and Waste Joint Plan (as amended by the Addendum of Proposed Changes) are a material consideration and an assessment of the Proposed Development against its policies has been provided. A number of the relevant draft policies including Policy D04 (which sets out the requirements for major development within the National Park) were subject to unresolved objections during the examination process and no information is yet available on how those objections may influence the final policy content. It is therefore considered that while some weight can be given to policies in the Draft Joint Plan, this weight is limited by these circumstances.

4.5 National Planning Policy

- 4.5.1 The NPPF was originally published in March 2012, and most recently updated in 2019, and sets out the Government's policies for achieving sustainable development. This includes the Government's policies for building a strong and competitive economy, conserving and enhancing the natural and historic environment and facilitating the use of minerals. At the heart of the NPPF is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.
- 4.5.2 Paragraph 2 confirms that the NPPF is a material consideration in planning decisions and the NPPF confirms the principles of the plan led system and requires that planning applications are determined in accordance with the development plan unless material considerations indicate otherwise. The NPPF is clearly an important material consideration in the determination of the planning application.
- 4.5.3 Paragraph 205 identifies that "*great weight should be given to the benefits of mineral extraction, including to the economy*". Paragraph 172 looks to refuse major development within National Parks except "*in exceptional circumstances, and where it can be demonstrated that the development is in the public interest*". It also identifies that when considering such applications, assessments should include:
- The need for the development;
 - The impact on the local economy for approving or refusing;
 - Whether it could be developed outside of the national park or the need met in some other way; and
 - The effects on the environment, landscape and recreation and how those effects could be moderated.
- 4.5.4 These parts of paragraph 172 have evolved from the 'major development test' found in previous national planning policy documents and are often still referred to by this title.

- 4.5.5 The other sections within the NPPF considered to be most relevant to the determination of this planning application include the following:
- Chapter 6, building a strong, competitive economy;
 - Chapter 8, promoting healthy and safe communities;
 - Chapter 9, promoting sustainable transport;
 - Chapter 14, meeting the challenges of climate change, flooding and coastal change;
 - Chapter 15, conserving and enhancing the natural environment;
 - Chapter 16, conserving and enhancing the historic environment; and
 - Chapter 17, facilitating the sustainable use of minerals.
- 4.5.6 Polyhalite and salt are identified within the Glossary as minerals of national importance that are necessary to meet society's needs.
- 4.5.7 The online Planning Practice Guidance supports the NPPF and provides guidance on its implementation. The advice in this document has been used to help frame the methodologies for a number of the assessments, such as air quality, and to consider whether some effects are significant, e.g. any exceedance of the recommended noise levels.

4.6 Other Considerations

The English National Parks and the Broads: UK Government Vision and Circular 2010

- 4.6.1 The circular provides guidance and information about the statutory purposes and management of National Parks and the Broads. Regard is had to the priority to be given to the conservation and enhancement of the natural beauty, wildlife and cultural heritage of the National Parks.

North York Moors National Park Management Plan

- 4.6.2 The Management Plan was approved in June 2012. It was subject to a "light touch refresh" in Autumn 2016, with minor amendments being agreed in December 2016. The Management Plan sets out a vision for the National Park and defines its special qualities.



5. Landscape and Visual Impact Assessment

Non-Technical Summary

- 5.1.1 Landscape and visual effects are closely related; however, they are considered separately when undertaking an assessment. Landscape effects describe the landscape including landscape elements e.g. woodland and hedgerows; areas of varying landscape character; and landscape designations e.g. National Parks. Visual effects describe the effects of the proposed changes to the future operation of Boulby Mine on views and visual attractiveness as experienced by people. .
- 5.1.2 The Landscape and Visual Impact Assessment (LVIA) has been undertaken by chartered landscape architects at Wood in accordance with the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (Landscape Institute and IEMA, May 2013), hereafter referred to as GLVIA 3. The LVIA has considered the operational, decommissioning and restoration phases of the Proposed Development.
- 5.1.3 Consultation relevant to the landscape, visual and cumulative assessment has been undertaken with North York Moors National Park (NYMNP) who commented on aspects of methodology, sources of information, scope of assessment and viewpoint selection.

Mitigation and Restoration

- 5.1.4 A number of measures are proposed to mitigate the landscape and visual effects of the Proposed Development. The measures have been developed following consultation with NYMNP and include; the protection of existing areas of woodland and scrub within the site during the operational period; the introduction of additional planting to provide screening of Mine buildings in key views and detail design measures to unify and improve Mine buildings' appearance.
- 5.1.5 Following decommissioning, a restoration scheme will be implemented which will comprise a mix of naturalistic landscape elements including broad leaved woodland, scrub, meadow and improved agricultural land.

Significant Landscape and Visual Effects

- 5.1.6 In order to assess the effects of the Proposed Development on the landscape, it is important to first understand the characteristics of the area within which it is to be located as defined in existing studies. Landscape Character Types and Areas have been identified that allow an understanding to be gained of how new development could alter different types of landscape. The landscape assessment concludes that likely significant effects would be restricted to the defined landscape character type within which the site is located: *Coastal Hinterland (Boulby to Whitby)*, plus two nearby landscape character areas. The landscape assessment has concluded that there will be significant landscape effects will not extend more than 2.0 km from the Proposed Development.
- 5.1.7 The present and Proposed Developments are sited within The North York Moors National Park and adjacent to a section of the North Yorkshire and Cleveland Heritage Coast. Significant landscape effects would continue to be experienced in relation to one of the 28 *special qualities* of the North Yorkshire Moors National Park for a restricted part of the National Park as well as in the closest area of the North Yorkshire and Cleveland Heritage Coast. The Proposed Development will not result in new landscape effects; rather it will extend the existing, long-standing landscape effects further into the future until the Mine Buildings are removed and the proposed restoration has started to become well-established.

- 5.1.8 A Zone of Theoretical Visibility (ZTV) has been produced to show the areas from where people will have views of at least the tallest components of the Proposed Development; the ZTV confirms that views of the Proposed Development will continue to be concentrated within 5km of the present development. The nature of the views will not much change in comparison with the long-established views of the present development. However, under the Proposed Development a proportion of the present buildings and activities will continue to be visible until the Proposed Development is decommissioned in 2048 after which the restoration proposals will take several years to become fully established. The visual assessment includes a comprehensive range of people with potential views and covers three periods: the first and tenth year of operation of the Proposed Development and the beginning of the subsequent restoration period. It includes people in settlements, using transport and recreation routes and those living in the closest properties within 2km. The visual assessment has been guided by photographs showing the current views from 10 viewpoints close to the present development or within the National Park. At three of these viewpoints, photomontages have been produced that show the Proposed Development at Year 10. Significant visual effects have been assessed for people living in four settlements; six property groups; two transport routes; sections of three regional recreational routes, and six networks of public footpaths that are located within 2.5km of the Proposed Development.

5.2 Introduction and Overview

- 5.2.1 The Landscape and Visual Impact Assessment (LVIA) and Cumulative Landscape and Visual Impact Assessment (CLVIA) has been compiled by Wood Environment & Infrastructure Solutions UK Ltd ('Wood') and identifies, predicts and evaluates the potential landscape and visual effects arising from the proposed operation, decommissioning and restoration of Boulby Mine,(the "Proposed Development") in the context of the present Mine's operations having ceased and the agreed restoration works having been implemented under the present planning permission (NYMR/003/0043B/PA). The LVIA has been undertaken in accordance with relevant guidance for undertaking landscape and visual assessments in the UK that is provided by the *Guidelines for Landscape and Visual Impact Assessment, Third Edition* (Landscape Institute and Institute of Environmental Management & Assessment [LI and IEMA], 2013), hereafter referred to as GLVIA3. GLVIA3 provides the following definitions of landscape effects and visual effects:
- 5.2.2 Landscape effects are defined as "*An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.*"
- 5.2.3 This includes direct effects upon the landscape elements and patterns that will be present within the restored Proposed Development site and direct and indirect effects upon landscape character and landscape designations within a defined LVIA study area including the North York Moors National Park (NYMNP).
- Visual effects are defined as: "*An assessment of visual effects deals with the change and development on views available to people and their visual amenity.*"
- 5.2.4 These people are termed visual receptors and include people with views from their residential properties, local communities, transportation routes (including 'A' and 'B' roads, key local routes and cycle routes); along with people undertaking outdoor formal and informal recreational activities ranging from walking along public rights of way (PRoWs) or in open access areas to visiting country parks to people fishing or playing golf. Specific effects will arise as a result of changes in the constituent factors in a visual receptor's view.
- 5.2.5 The structure of the remainder of this chapter is as follows:

- Section 5.2 sets out the planning policy context for the LVIA and how consideration of planning policy has informed the scope of the assessment;
- Section 5.3 provides details the methodology used to undertake the LVIA and consultation responses;
- Section 5.4 includes details of the landscape and visual baseline conditions including consideration of the likely future baseline;
- Section 5.5 provides an assessment of the potential landscape and visual effects which may occur as a result of the implementation of the proposed development with consideration of the embedded mitigation measures (i.e. those measures described in the development description in Chapter 3 but in the absence of any additional mitigation measures being implemented);
- Section 5.7 outlines the proposed additional landscape and visual mitigation measures that will be implemented;
- Section 5.8 identifies any residual landscape and visual effects that remain after additional mitigation measures set out in Section 5.7 have been considered;
- The Summary and Conclusions of the LVIA are set out in Section 5.9; and
- References are set out in Section 5.10.

5.2.6 The LVIA is supported by three appendices:

- Appendix 5.1: Methodology;
- Appendix 5.2: Landscape Character Areas: Sensitivity Assessments; and
- Appendix 5.3: Viewpoint Analysis.

5.3 Policy Context, Legislative Requirements and Guidance

Planning Policy Context

5.3.1 A study of landscape and visual related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site and the LVIA study area in order to highlight any requirements which the Proposed Development needs to consider and to define the scope of the LVIA. Full details of all national and local planning policies relevant to the Proposed Development can be found in the Planning Statement and a summary is provided below in **Table 5.1**.

Table 5.1 Policy Issues Considered in Preparing the Landscape and Visual Assessment

Policy reference	Policy issues
Revised National Planning Policy Framework (NPPF), 2018	
Paragraph 170	<i>"Planning policies and decisions should contribute to and enhance the natural and local environment by (amongst other criteria) a) protecting and enhancing valued landscapes, sites of geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland"</i>

Policy reference	Policy issues
Paragraph 171	<i>"Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries."</i>
Paragraph 172	<p>"Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas and should be given great weight in National Parks. The scale and extent of development within these designated areas should be limited. Planning permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:</p> <p>...</p> <p>c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated¹.</p>
Paragraph 205	<p>With specific regard to mineral developments, this paragraph states that when determining planning applications, local planning authorities should (amongst other criteria):</p> <p><i>"...ensure, that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality, and provide for restoration and aftercare at the earliest opportunity to be carried out to high environmental standards, through the application of appropriate conditions."</i></p>
Planning Practice Guidance Minerals (Reference ID: 27-013-20140306)	
Paragraph 13	The principal issues that mineral planning authorities should address, bearing in mind that not all issues will be relevant at every site to the same degree, include (amongst other criteria) visual impact on the local and wider landscape and landscape character.
Paragraph 39	In terms of when the proposals for land restoration and aftercare should be submitted to the mineral planning authority, the guidance states that: <i>"The minerals operator should submit the proposals as part of the planning application (section 72 and Schedule 5 of the Town and Country Planning Act 1990 advise on the conditions which may be imposed on the grant of planning permission for development consisting of the winning and working of minerals)."</i>
Paragraph 40	This deals with the level of detail required on restoration and aftercare and the paragraph states that this is dependent on the circumstances of each specific site including the expected duration of operations on the site. It must be sufficient to clearly demonstrate that the overall objectives of the scheme are practically achievable.
North Yorkshire County Council, City of York Council and North York Moors National Park Authority Minerals and Waste Joint Plan Publication Draft (2016)	
M22: Potash, polyhalite and salt	<i>"Proposals for the extraction of potash, salt or polyhalite from new sites within the North York Moors National Park and renewed applications for the existing sites at Boulby Mine and Doves Nest Farm beyond their current planning permissions will be assessed against the criteria for major development set out in Policy D04."</i>

¹ Paragraph 173 specifically mentions Heritage Coasts, however it only applies to Heritage Coast areas that are not within other designated areas. The section of the North Yorkshire and Cleveland Heritage Coast that is located within the defined LVIA study area is entirely within the North York Moors National Park i.e. it is covered by NPPF paragraphs 170-172 as quoted.

Policy reference**Policy issues**

Proposals for new surface development and infrastructure associated with the existing permitted potash, polyhalite and salt mine sites in the National Park, or their surface expansion, which are not considered to be major development, will be permitted provided they meet the requirements of Policy D11 and Policy I02 and that no unacceptable impact would be caused to the special qualities of the National Park, its environment or residential or visitor amenity in the context of any need for the development.

Proposals for increased volume of potash extraction, the extraction of other forms of potash not included in existing permissions, or sub-surface lateral extensions to the permitted working area in locations accessible from the existing sites at Boulby Potash Mine and the Doves Nest Farm site as well as proposals for new sites outside of the National Park, will be permitted where it can be demonstrated that the following criteria are met:

i) The proposals would not detract from the special qualities of the National Park, taking account of any mitigation measures proposed;

Policy I02: Locations for ancillary minerals infrastructure

3) The siting of ancillary minerals infrastructure within the North York Moors National Park will only be supported where it would be located within the Boulby mine surface site or Doves Nest Farm mine surface site if developed, or within the Whitby Business Park identified on the Policies Map."

Policy D04: Development affecting the North York Moors National Park and the AONBs

"Part 1) – Major minerals and waste development

Proposals for major development in the National Park, Howardian Hills, Nidderdale, North Pennines and Forest of Bowland Areas of Outstanding Natural Beauty will be refused except in exceptional circumstances and where it can be demonstrated it is in the public interest. The demonstration of exceptional circumstances and public interest will require justification based on the following:

a) The need for the development, which will usually include a national need for the mineral or the waste facility and the contribution of the development to the national economy; and

b) The impact of permitting it, or refusing, it upon the local economy of the National Park or AONB; and

c) Whether the development can technically and viably be located elsewhere outside the designated area, or the need for it can be met in some other way; and

d) Whether any detrimental effect on the environment, the landscape and recreational opportunities, can be moderated to a level which does not significantly compromise the reason for the designation.

Where there are exceptional circumstances and the proposal is considered to be in the public interest, every effort to avoid adverse effects will be required. Where adverse effects cannot be avoided, harm should be minimised through appropriate mitigation measures. Appropriate and practicable compensation will be required for any avoidable effects which cannot be mitigated.

Part 2) – All other developments

Planning permission will be supported where proposals contribute to the achievement of, or are consistent with, the aims, policies and aspirations of the relevant Management Plan and are consistent with other relevant development management policies in the Joint Plan.

Part 3) – Proposals which impact the setting of Designated Areas

Proposals for development outside of the National Parks and AONBs will not be permitted where it would have a harmful effect on the setting of the designated area."

Policy D06: Landscape

"All landscapes will be protected from the harmful effects of development. Proposals will be permitted where it can be demonstrated that there will be no unacceptable impact on the quality and/or character of the landscape, having taken into account any proposed mitigation measures.

2) For proposals which may impact on nationally designated areas including the National Park, AONBs, and the adjacent Yorkshire Dales National Park, a very high level of protection to landscape will be required. Development which would have an unacceptable landscape impact on these areas will not be permitted.

3) Protection will also be afforded to the historic character and setting of York and to areas defined as Heritage Coast. Permission will only be granted where it would not lead to an unacceptable impact on the historic character or setting of York or on the undeveloped character of Heritage Coast, unless the need for, or benefits of, the development outweigh the harm caused.

4) Where proposals may have an adverse impact on landscape, tranquillity or dark night skies, schemes should provide for a high standard of design and mitigation, having regard to landscape character, the wider landscape context and setting of the site and any visual impact, as well as for the delivery of landscape enhancement where practicable."

North Yorks Moors National Park Local Plan (2012)

Policy reference	Policy issues
E1	The landscape character of the National Park will be maintained and enhanced.
E2	Traditional farmed landscape features will be conserved, enhanced and reinstated where possible.
E3	New development will not have a detrimental impact on the landscape of the National Park.
E19	Existing tranquil areas will be protected and expanded where possible.
E20	Dark skies will be protected and improved. New development in the National Park will not cause unacceptable light or noise pollution.
E40	Individual and groups of trees that are of amenity and conservation value will be protected and new environmentally positive tree planting will be encouraged, where appropriate.

Legislative Requirements

The European Landscape Convention

5.3.2 The European Landscape Convention (ELC) is a Council of Europe initiative that provides a broad framework for landscape planning and management across all member states including the UK, which ratified the ELC in 2007. The ELC defines landscape as, "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors." and is committed to several core principles and actions. These commitments are implemented by existing domestic policy and legislation rather than through any ELC-specific framework.

Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (SI No 517)

5.3.3 The Regulations require that the EIA identifies, describes and assesses in an appropriate manner the direct and indirect significant effects of the Proposed Development on a number of factors including landscape.

Hedgerow Regulations

5.3.4 Hedgerows are protected in England and Wales under the Hedgerow Regulations 1997.

Guidance

5.3.5 The LVIA and CLVIA has been undertaken in accordance with the methodology set out in Section 5.3.3 and Appendix 5A which conforms GLVIA3 which is widely accepted throughout the UK as the appropriate approach to use.

5.3.6 Other guidance includes:

- *An Approach to Landscape Character Assessment. Natural England, 2014 (which replaces the 2002 document Landscape Character Assessment Guidance for England and Scotland);* and
- *Photography and photomontage in landscape and visual impact assessment*, Landscape Institute Advice Note 01/11. The Landscape Institute has revised its guidance on visualisations in the September 2019 publication of Technical Guidance Note 06/19 'Visual Representation of Development Proposals' which replaces a previous Advice Note. However, the Landscape Institute website states that the application of the Technical Guidance Note 06/19 only applies to new commissions from 17 September 2019 and as such does not apply to the revised visualisations that accompany this LVIA.

5.4 Assessment Methodology and Significance Criteria

Consultation

- 5.4.1 A range of organisations were consulted as part of the EIA scoping process. **Table 5.2**, below, summarises the key landscape and visual issues that were raised and how they have been addressed within the LVIA.

Table 5.2 Consultation

Consultee	Summary of Response	Addressed in the ES
North Yorkshire National Park Authority (NYMNP)	Landscape, visual and cumulative effects beyond 5km from the site can be scoped out of the assessment.	The LVIA addresses nationally sensitive receptors within 5km of the Site boundary and locally significant receptors within 2km of the Site.
	The impact of light emissions should be considered in the context of minimising impact on night time/dark skies.	The issue of light pollution is considered in the LVIA and in context with the Special Quality of the NYMNP which relates to dark skies.
	Mitigation should include a review of all existing buildings, plant and storage and whether there is scope for demolition or reduction.	The LVIA considers and recommends mitigation proposals in relation to building retention/ demolition and potential enhancements as well as landscape measures as appropriate.
	The scope of the assessment should consider the impact of retaining the mine against its demolition and restoration of the site to an agricultural/woodland use.	This is considered in the LVIA and the assessment is made against a future baseline of a restored site.

Data Gathering Methodology

Definition of the Study Area

- 5.4.2 Review of the location, nature and scale of the proposed development, resulted in the definition of the LVIA study area as a 5km offset from the boundary of Boulby Mine. A 2km detailed LVIA study area has also been defined which places the Proposed Development site within a local context, concentrating assessment upon the potential landscape and visual receptors most likely to sustain higher magnitudes of change in accordance with the principle of proportionality set out in paragraph 3.16 of GLVIA3 that states:

"The level of detail provided should be that which is reasonably required to assess the likely significant effects. It should be appropriate and proportional to the scale and type of development and the type and significance of the landscape and visual effects likely to occur."

- 5.4.3 The defined and detailed LVIA study areas are illustrated in **Figure 5.1**.
- 5.4.4 It is acknowledged that the defined 5km LVIA study area will not mark the absolute limits of the Proposed Development's visibility. However, the field survey observing the landscape and visual role of the present Mine's buildings and stacks indicated that beyond this separation distance it is highly unlikely that the Proposed Development would be a prominent landscape and visual element with the associated potential to generate significant landscape or visual effects. Viewpoints situated at Kettleless and Danby Beacon (location shown in **Figure 5.2** and current views shown in **Figures 5.16 & 5.17**) are included beyond the defined LVIA study area to verify this assessment.

Desk Study

5.4.5 Sources of information used for the landscape and visual assessment are listed in **Table 5.3**.

Table 5.3 Sources of Desk Study Information

Source	Data
OS mapping	Ordnance Survey 1:25,000 scale mapping (OS Explorer Map OL27 North York Moors, Eastern Area)
Natural England (NE)	National Character Areas GIS dataset Published Profile for NCA 25: North York Moors and Cleveland Hills (NE, 2013) and GIS dataset GIS datasets for the North York Moors National Park Authority, North Yorkshire & Cleveland Heritage Coast and Open Access Land
North Yorkshire County Council (NYCC)	North Yorkshire and York Landscape Characterisation Project (RCC, 2011). Public Rights of Way. Available from: https://maps.northyorks.gov.uk/connect/analyst/?mapcfg=Out_and_About
Redcar and Cleveland Borough Council	Public Rights of Way. Available from: https://www.redcar-cleveland.gov.uk/countryside/PROW/Pages/Definitive-Map-and-Planning.aspx
Google Earth Pro	Aerial photography (imagery date July 2018)

Zone of Theoretical Visibility

5.4.6 In addition to the sources of data listed in **Table 5.3**, which have been reviewed as part of the desk study, a computer generated Zone of Theoretical Visibility (ZTV) map has been prepared to determine the potential extent that the Proposed Development would be visible to visual receptors. ZTV is defined in GLVIA3 as *"a map, usually digitally produced, showing areas of land within which a development is theoretically visible"* and represents the desk top component of the visibility analysis.

5.4.7 The ZTV mapping includes the following;

- ZTV within the defined LVIA study area was calculated using ArcGIS software together with a Digital Terrain Model (DTM) (OS Terrain 5). This data illustrates the topographic constraints on the visual influence of the Proposed Development but does not take account of the built elements or vegetation within the defined LVIA study area, which can significantly reduce the area and extent of actual visibility. This ZTV therefore forms an appropriate starting point for undertaking the visual assessment and is illustrated in **Figure 5.2**.
- ZTV within the detailed study area was calculated using Arc GIS software together with a Digital Surface Model (DSM) (2m resolution). As well as the effects of landform, the use of DSM allows the ZTV to show the screening effects of buildings, woodland and other intervening elements although plotting the effects of these screening elements is limited by the accuracy of the available data at the time of the DSM survey. This ZTV is illustrated in **Figure 5.3**.

5.4.8 The ZTVs provide a starting point in the assessment process which is further informed by field observations and visualisations of the present Mine's buildings and surface components.

5.4.9 Parameters used in the modelling of the ZTVs include:

- Chimney stack at a height of 167.52 m above ordnance datum (AOD) and 87.5m above ground level (AGL);



- Main plant building at a height of 121.86m AOD and 41.04m AGL; and
- Rock shaft tower at a height of 132.81m AOD and 51.05m AGL.

Viewpoint Locations

5.4.10 Viewpoint locations have been agreed with the NYMNP for inclusion as annotated panoramic photographs within the LVIA. The viewpoint schedule is set out in **Table 5.4** with viewpoint locations illustrated in **Figures 5.2** and **5.3**. In accordance with paragraph 6.19 of GLVIA3 three categories of viewpoint are defined: representative; specific; and illustrative viewpoints.

Table 5.4 Viewpoint Schedule

Viewpoint reference	Location	Minimum separation distance and direction from the Proposed Development site	Reason for Selection
1	Ings Farm / PRoW 101/3/1 / A174	5m to the north-west of the site.	Specific location illustrating views available to recreational users from PRoW 101/3/1. Also illustrative of most open views available for residential receptors at Ings Farm and vehicular receptors travelling southbound on the A174. Figure 5.8a Photomontage provided in Figure 5.8b .
2	Boulby Bank / PRoW 101/122/1	195m to the north of the site.	Representative of views from group of properties at Boulby Bank situated near access road to Boulby Barns Cottages. Also representative of views available to walkers using PRoW 101/122/1 and vehicular receptors travelling south-east on Boulby Bank. Figure 5.9a , Photomontage provided in Figure 5.9b .
3	Ridge Lane	200m to the south-west of the site.	Representative of views available to residential receptors in properties on the north-eastern side of Ridge Lane as well as vehicular receptors driving along the road near these properties. Figure 5.10 .
4	Cleveland Way and PRoW 101/202/1	295m north of the site.	Representative of views available to recreational receptors using the Cleveland Way, PRoW 101/202/1 and Cowbar Lane (also designated as an on-road cycle route). Figure 5.11 .
5	Tourist Information Centre, Staithes	1250m to the west of the site.	Representative of views available to visitors of the Staithes Tourist information Centre. Figure 5.12 .
6	Roxby Lane	1270m to the south-west of the site.	Illustrative of the most open views available to vehicular receptors using Roxby Lane. Also representative of open views available to residential receptors in Roxby. Figure 5.13a , Photomontage provided in Figure 5.13b .
7	Hinderwell	2250m to the west of the site.	Representative of views available to vehicular receptors travelling east on the A174 and residents at the western edge of the Hinderwell. Figure 5.14 .
8	Ellerby	4590m to the south west of the site	Illustrative of the most open views available from Ellerby and representative of views for walkers travelling east on PRoW 30.34/002. Figure 5.15 .

Viewpoint reference	Location	Minimum separation distance and direction from the Proposed Development site	Reason for Selection
9	Kettleness	6620m to the west of the site.	Representative of views available to residents and visitors to Kettleness as well as recreational receptors on the closest section of England Coast Path and Cleveland Way. Figure 5.16.
10	Danby Beacon	8760m to the south of the site.	Specific location illustrating views available to recreational receptors including visitors and walkers. This viewpoint is beyond the 5km radius study area but has been included at the request of NYMNP and also usefully represents the nature of visibility from the wider upland area. Figure 5.17.

5.4.11 It has been agreed with the NYMNP that three of the viewpoints selected will form the basis for photomontages as follows:

- Viewpoint 1: Ings Farm / PRoW 101/3/1 / A174 (**Figures 5.8a and b**);
- Viewpoint 2: Boulby Bank (**Figures 5.9a and b**); and
- Viewpoint 6: Roxby Lane (**Figures 5.13a and b**).

Table 5.5 Areas Considered and Not Selected as Viewpoint Locations

Location	Reason for exclusion
Area around Brockrigg and Kettleness.	Viewpoint 9 is representative of views from this general area and orientation.
Grinkle Park area.	Site visits have shown that the mature vegetation in this area limits visibility in this area to such a degree that no significant effects would occur (both during summer and winter vegetation coverage conditions).
Scaling / Gerrick Moor / Easington High Moor	Site visits have shown that visibility from these areas is limited and largely restricted by intervening landform. Visibility becomes increasingly available from higher ground to the south west and the viewpoint at Danby Beacon is representative of the nature of visibility from this area.
Moorsholm / Kilton Thorpe and further west	Site visits have shown that visibility from these areas is lower than indicated on the ZTV, with vegetation, buildings and distance all accounting for the lower visibility.

Survey Work

5.4.12 A preliminary site survey was carried out in April 2017. Further field surveys were carried out during October and November 2017 and May 2019 to inform the baseline, selection of viewpoints and the assessment. Viewpoint photography was undertaken during the site visits in November 2017, May and October 2019.

5.4.13 All photography and data recording has been undertaken in accordance with the Landscape Institute’s Advice Note 01/11 Photography and photomontage in landscape and visual impact assessment (LI, 2011) and Scottish Natural Heritage’s (SNH) Visual Representation of Wind Farms



Version 2.2 (SNH, 2017). Whilst the SNH guidance is specifically intended for use in relation to on-shore wind farms, much of its content is applicable to other types of large-scale development.

Methodology for Identifying and Assessing Effects

- 5.4.14 The LVIA has been undertaken in accordance with the methodology set out in **Appendix 5A** and conforms to the GLVIA3 which is widely accepted throughout the UK as the appropriate approach to use.
- 5.4.15 As set out on page A10 of **Appendix 5A** (and paragraph 5.51 in GLVIA3) the duration of landscape and visual effects can be described as temporary; medium term; long term or permanent but the temporal definitions should be defined for individual proposed developments. For the Proposed Development review of the timescales for the phasing in Chapter 3 of the ES results in the following application of the four duration periods:
 - Temporary – up to five years;
 - Medium term - five to ten years;
 - Long term – ten to 25 years;
 - Permanent – in excess of 25 years i.e. extends over a generation.

Significance Evaluation Methodology

- 5.4.16 The level of landscape and visual effect (and whether this is significant) is determined through consideration of the 'sensitivity' of the landscape or visual receptor and the 'magnitude of change' which would be brought about by the Proposed Development.
- 5.4.17 Landscape or visual sensitivity specific to the Proposed Development is ranked from high, through medium to low and the magnitude of landscape or visual change is ranked from high, medium, low to very low as shown in **Table 5.6**. The type of effect is also considered and may be direct or indirect, temporary (reversible) or permanent, cumulative, and positive, neutral, or negative.
- 5.4.18 The landscape and visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible assessment has sought to gain a consensus of professional opinion through consultation, peer review, and the adoption of a systematic, impartial, and professional assessment approach.
- 5.4.19 The EIA Regulations require that a final judgement is made about whether or not each effect is likely to be significant. In this assessment the matrix in **Table 5.6** provides an indication of the significance of effects. However, it should also be noted that judgements relating to the significance of individual effects are subject to the interpretation and professional judgement of the assessor and are not determined solely by use of matrices but are supported by the presentation of clear and accessible narrative explanations of the rationale in accordance with GLVIA3.

Table 5.6 Significance Matrix

Magnitude of change	Sensitivity		
	High	Medium	Low
High	Substantial (Significant)	Moderate/Substantial (Significant)	Moderate (Possibly Significant)



Magnitude of change	Sensitivity		
	High	Medium	Low
Medium	Moderate/Substantial (Significant)	Moderate (Possibly Significant)	Slight/Moderate (Not Significant)
Low	Moderate (Possibly Significant)	Slight/Moderate (Not Significant)	Slight (Not Significant)
Very Low	Slight (Not Significant)	Slight/Negligible (Not Significant)	Negligible (Not Significant)

5.5 Baseline

Baseline Figures

5.5.1 The landscape and visual baseline and assessment is supported by the following figures:

- Figure 5.1** LVIA Study Area;
- Figure 5.2** Zone of Theoretical Visibility with LVIA viewpoints (OS Terrain 50 DTM) within 5km study area;
- Figure 5.3** Zone of Theoretical Visibility with LVIA viewpoints (DSM) within 2km study area;
- Figure 5.4** Local Landscape Character Types and Areas;
- Figure 5.5** Landscape Designations;
- Figure 5.6** Long Distance Recreational Routes and Tourist Destinations within 5km;
- Figure 5.7** PRoWs, individual properties and groups of properties within detailed study area;
- Figure 5.8a** Viewpoint 1 - Ings Farm/PRoW 101/3/1 Existing View;
- Figure 5.8b** Viewpoint 1 - Ings Farm/PRoW 101/3/1 Proposed scenario at Year 10;
- Figure 5.9a** Viewpoint 2 – Boulby Bank Existing View;
- Figure 5.9b** Viewpoint 2 – Boulby Bank Proposed scenario at Year 10;
- Figure 5.10** Viewpoint 3 - Ridge Lane;
- Figure 5.11** Viewpoint 4 - Cleveland Way;
- Figure 5.12** Viewpoint 5 – Staithes Tourist Information Centre,
- Figure 5.13a** Viewpoint 6 – Roxby Lane Existing View;
- Figure 5.13b** Viewpoint 6 – Roxby Lane Proposed scenario at Year 10;
- Figure 5.14** Viewpoint 7 - Hinderwell;
- Figure 5.15** Viewpoint 8 - Ellerby;
- Figure 5.16** Viewpoint 9 – Kettleess; and

Figure 5.17 Viewpoint 10 – Danby beacon.

Current Baseline

The Boulby Mine Site

5.5.2 Boulby Mine is an operational mine comprising several buildings, structures and associated infrastructure. The site visits and baseline viewpoint photographs in Figures 5.8 -5.17 show that the surface components of the Mine that currently have the most influence upon the landscape and visual baseline until its scheduled decommissioning in 2023-2025 are:

- Two chimney stacks, the main dryer stack is 87.5 m high;
- Two cylindrical, concrete shaft winding towers (headgear);
- The main treatment plant building which is the most prominent building;
- The surge bin, rail loadout and associated conveyors;
- The winder house; and
- The raw ore and product silos.

5.5.3 Within the Mine's site there is a range of surface cover including arable, poor semi-improved grassland, neutral grassland, ancient woodland, mixed plantation woodland and maritime hard cliff. The site is largely bordered by semi-natural broad-leaved woodland to the south and east, and a mix of arable, improved and semi-improved grassland to the north and west. The working area of the Mine comprises buildings, bare ground and hardstanding, with occasional areas of tall ruderal and ephemeral/short perennial vegetation, with a railway accessing the site from the south.

Topography and Drainage

5.5.4 The Proposed Development site and its immediate surroundings are located at an elevation of between 30m and 155m AOD. The highpoint is to the northern extent of the site adjacent to the A194 at Ings Farm with the lower elevations being within the incised valley of Easington Beck.

5.5.5 The North Sea is located to the north of the Proposed Development site with elevations within the LVIA study area therefore ranging from sea level to 224m Above Ordnance Datum (AOD) at Borrowby Moor to the south east of the Mine. The landform is shown on **Figure 5.1**.

5.5.6 To the north of the Mine rising ground culminates in a high point of 213m AOD at Rockcliff Hill approximately 1km from the coastline. This topographic feature represents a substantial rise in elevation over a short distance which is illustrative of the dramatic topography within the LVIA study area, particularly along the coastal section. Danby Beacon at 299m AOD lies to the west of the defined LVIA study area but is included as a viewpoint.

5.5.7 There are several deeply incised valleys leading towards the coastline, including; Staithes Beck, Easington Beck, Roxby Beck and Dales Beck.

5.5.8 The village of Staithes lies to the east of the site at an elevation of between 40-60m AOD and on a plateau to the east of the deeply incised Staithes Beck. Part of the village is located further to the north directly adjacent to the coastline at lower elevations which range from approximately 5m to 30m AOD.

Vegetation and Land Use

- 5.5.9 Within the defined LVIA study area the primary land use is agricultural comprising a mix of pastoral and arable field units. These units are medium to large in size with a mix of native hedgerows and stock proof fencing providing boundary enclosure.
- 5.5.10 Tree cover is generally limited within the defined LVIA study area to broad ribbons of predominantly broadleaved woodland associated with several deeply incised valleys such as Easington Beck, Roxby Beck and Dales Beck. There are also several plantations including 'the Warren' and North and South Plantations off Crinkle Lane on elevated land to the south of Loftus.
- 5.5.11 To the south and southeast, and with increased elevation, moorland becomes increasingly evident including Newton Mulgrave Moor, Borrowby Moor, Roxby High Moor, Easington High Moor and Liverton Moor. These moorland areas generally have little enclosure and are managed as grouse moors with low intensity sheep grazing. Vegetation comprises a mix of heathland and upland grassland.

Settlement and Infrastructure Patterns

- 5.5.12 The main settlements within the defined LVIA study area are principally orientated along the coastal strip and the A194 corridor which is the primary access road into and through the area. The settlements which coincide with the ZTV shown in **Figure 5.2** include the following villages:
- Staithes;
 - Easington;
 - Cowbar;
 - Roxby;
 - Scaling;
 - Hinderwell;
 - Newton Mulgrave;
 - Port Mulgrave;
 - Runswick Bank Top; and
 - Ellerby.
- 5.5.13 Staithes is a large, coastal village situated approximately 1km to the east of the Proposed Development site. The settlement comprises the 'old town' which is situated on lower elevations to the north and the more modern 'upper' settlement which is predominantly situated on more elevated land, closer to the A174, to the south. The 'old town' comprises a tightly packed arrangement of two and three storey traditional stone buildings located to the east of Staithes Beck. The 'upper' settlement comprises a more open mix of terraced, semi-detached and detached dwellings principally accessed via Staithes Lane for development to the north of the A174. There is also a school, tourist information centre (selected as Viewpoint 5 in **Figure 5.12**) with associated car park and some industrial units in this sector of the village.
- 5.5.14 Boulby is a small village comprising a disparate group of traditional stone dwellings between approximately 0.1 -1.0km to the north of the Proposed Development site and between the A174 and the North Sea coastline. The properties are accessed via Boulby Bank, which rises steeply from the junction with the A174, and also via a series of minor lanes which connect into Boulby Bank.

- 5.5.15 Easington is a village located approximately 0.5-1.5km to the west of the Proposed Development site extending either side of the A174.
- 5.5.16 Cowbar is a small nucleated group of residential properties principally comprising two terraced rows of housing and a more linear arrangement of properties along Cowbar Bank. The settlement is situated in an elevated position adjacent to the coastline and to the west of Staithes Beck.
- 5.5.17 Roxby is a small village situated approximately 1.25 – 2km to the south of the Proposed Development site, it occupies an elevated position on the upper reaches of the north west facing valley side. The village is linear and comprises a mix of traditional stone properties strung out along Roxby Lane, including farms, farm buildings and St Nicholas Church towards the lower end of the village. Viewpoint 6 in **Figure 5.13a** illustrates the nature of visibility from Roxby Lane at a point to the north of the village.
- 5.5.18 Scaling village is located towards the south of Ridge Lane accessed via the A171 adjacent Scaling Dam. It is located approximately 4.5km to the south of the Proposed Development site.
- 5.5.19 Hinderwell is a large village in the context of the study area (population of approximately 1900), located between 2.4-3.5km to the south east of the Proposed Development site. The village is situated on a relatively flat area of the coastal hinterland and the surrounding area is a moderately open agricultural landscape with sparse vegetation cover. Hinderwell is a generally linear form strongly influenced by the A174 / High Street as the primary access route into and through the village. The village primarily comprises traditional stone-built architecture, including those situated on High Street. There are some more modern developments including those dwellings on Runswick Lane. The village provides a range of local services and facilities including a service station, shops, cafes and pubs, there are also two caravan parks which are described in more detail under 'Caravan and Camping Sites'. Viewpoint 7 in **Figure 5.14** illustrates visibility from the A174 at the western extent of the village.
- 5.5.20 Newton Mulgrave is a small settlement approximately 3km to the south east of the Proposed Development site. It comprises a small number of individual dwellings, farms and farm buildings in an isolated rural location to the east of the A174.
- 5.5.21 Ellerby is a small village towards the south eastern extent of the defined LVIA study area approximately 4.75km from the Proposed Development site. The village is predominantly comprised of stone-built dwellings with a few more recently constructed houses and a single pub. Ellerby is situated on a relatively elevated and open landform to the west of the A174. Viewpoint 8, **Figure 5.15** illustrates the nature of visibility from the northern extent of the village.
- 5.5.22 Outside of these settlements there are occasional individual and small groups of residential properties and farmsteads located alongside minor rural lanes. Those within 2km of the Proposed Development site (i.e. in the detailed LVIA study area) are shown (and listed) on **Figure 5.7**.

Transport Network

- 5.5.23 There are two 'A' roads within the LVIA study:
- The A194 which connects Teeside and Redcar in the north west with Whitby to the south east via the settlements of Saltburn, Brotton and Loftus. The A194 enters the western fringes of the defined LVIA study area at Loftus, continues past the northern and eastern boundaries of the Proposed Development site, through Staithes, Hinderwell and on to Ellerby to the south east of the study area;
 - The A171 connects Guisborough in the north west with Whitby to the south east, its route runs parallel to the A194 for much of its length but is sited further inland. The A171 runs through

the southern extent of the defined LVIA study area along the northern edge of Scaling Reservoir.

- 5.5.24 Beyond the 'A' routes, a network of 'B' roads traverses the defined LVIA study area including the B1366 and B1266, both of which are largely outside of the ZTV. Beyond these primary transport routes, the landscape is cross by a relatively dense network of minor roads and lanes.

Recreational Routes and Tourist Destinations

Long Distance Footpaths

- 5.5.25 The defined LVIA study area contains sections of two long distance walking routes, the distribution of which are shown in **Figure 5.6**.
- Cleveland Way National Trail: This route connects the Market Square in Helmsley with Filey Brigg. From Helmsley the route passes through the western and northern parts of the North Yorkshire National Park towards Saltburn and continues southwards along the coastline, through the defined LVIA study area and on towards Filey; and
 - England Coast Path: This section of the route connects Filey Brigg in the south with Newport Bridge in the north. The route is coterminous with the Cleveland Way National Trail through the study area with the only divergence occurring along the coastline to the east of Staithes.

Cycle Routes

- 5.5.26 In addition to the long-distance walking routes, a section of the Sustrans National Cycle Route 1 (NCR 1) is present within the Defined LVIA study area. This long-distance cycle route connects Dover and the Shetland Islands via the east coast of England and Scotland. A section of the route in the study area connects Staithes with Loftus via minor roads and a short section of the A174. The route passes through Cowbar and Boulby.

Public Rights of Way (PRoWs)

- 5.5.27 The defined LVIA study area falls within the administrative boundaries of Redcar and Cleveland (RC) and North Yorkshire Council (NYC); the PRoW details have been derived from the definitive maps for the respective council areas. PRoWs within the detailed LVIA study area are shown on **Figure 5.7**. To avoid repetition and using experience in undertaking LVIA's with similar baseline conditions, the baseline and the subsequent visual assessment has grouped these extensive PRoWs into eight groups:
- Group A - PRoWs within the development site boundary;
 - Group B - PRoWs to the north east ;
 - Group C - PRoWs in and around Staithes;
 - Group D - PRoWs to the east;
 - Group E - PRoWs to the south east;
 - Group F - PRoWs to south;
 - Group G -PRoWs to the south west; and
 - Group H – PRoWs to the north west..

5.5.28 Within the defined LVIA study area there are several areas on elevated moorland, principally to the south and south east, that are defined as open access land under the Countryside and Rights of Way Act 2000 (open access land). The location and extent of this open access land is shown on **Figure 5.5**.

Caravan and Camping Sites

5.5.29 There are several campsites, caravan site and holiday parks within the defined LVIA study area. These are set out in **Table 5.7** and their locations are shown in **Figure 5.6**.

Table 5.7 Caravan and Camping Sites and Holiday Parks

Ref (see Figure 5.6)	Caravan/camping site	Distance from Proposed Development site	Description
1	Staithe Caravan Park	Approximately 0.8km east	A site for camping and touring caravans. Set within a loop of Staithe Beck at a relatively low elevation to the west of Staithe. Mature woodland associated with the Beck provides considerable visual enclosure.
2	Gatehouse Caravan Site, Hinderwell	Approximately 2.4km east	A relatively small site for static caravans. Set within an open agricultural landscape to the west of Hinderwell. The site slopes gently from a high point in the east to a low point in the west. Belts of mature trees separate the site into land parcels.
3	Serenity Camping, Hinderwell	Approximately 2.6km east	A modest site for camping and touring caravans approximately 70 m to the south of Gatehouse Caravan site. Although situated within a generally, gently sloping and open landscape the site itself is enclosed by strong hedgerows with hedgerow trees.
4	Runswick Bay Caravan and Camping Park	Approximately 4.2km east	A site for static caravans, camping and touring caravans. Set to the north of Runswick Bay Bank Top. The site is gently sloping and structured with some mature woodland and tree planting which provides screening and enclosure to the north of the site area.

Landscape Designations

North York Moors National Park (NYMNP)

5.5.30 The Boulby Mine's site boundary and much of the on-shore part of the defined LVIA study area lies within the NYMNP. This is a national landscape designation with the statutory purposes 'to conserve and enhance the natural beauty, wildlife and cultural heritage of the National Park' and 'to promote opportunities for the understanding and enjoyment of the special qualities of the Park by the public'. The NYMNP covers an area of 1,436km² of which 46km² i.e. 3.2% is located within the defined LVIA study area.

5.5.31 A number of 'special qualities' are identified in the NYMNP Management Plan, A Wider View, 2012. These special qualities are:

- Great diversity of landscape - Sudden dramatic contrasts associated with this;
- Wide sweeps of open heather moorland;
- Distinctive dales, valley and inland headlands;
- An abundance of forest and woodland;



- *Ancient trees and woodland rich in wildlife;*
- *Special landforms from the Ice Age Exceptional coastal geology;*
- *Majestic coastal cliffs and sheltered harbours Distinctive coastal headlands;*
- *A special mix of upland, lowland and coastal habitats - A wide variety of wildlife dependent on these;*
- *Settlements which reflect their agricultural, fishing or mining past;*
- *Locally distinctive buildings and building materials;*
- *Long imprint of human activity;*
- *A wealth of archaeology from prehistory to the 20th Century;*
- *A rich and diverse countryside for recreation;*
- *An extensive network of public paths and tracks Strong religious past and present;*
- *Ruined abbeys and ancient churches;*
- *Strong feeling of remoteness;*
- *A place for spiritual refreshment;*
- *Tranquillity;*
- *Dark skies at night and clear unpolluted air;*
- *Distinctive skills, dialects, songs and customs;*
- *Strong sense of community and friendly people;*
- *A place of artistic, scientific and literary inspiration; and*
- *A heritage of authors, artists, scientists and explorers.*

Tranquillity and Dark Skies

5.5.32 The NYMNP are currently undertaking a consultation exercise upon tranquillity and how this can be addressed in the proposed update to the Local Plan. The consultation document, *A Sense of Tranquillity, A Strong Feeling of Remoteness and Dark Night Skies* (2017), provides the context and background explaining the need to consider the special qualities of the NYMNP in planning applications. Special qualities of relevance to the Proposed Development site are:

- Tranquillity;
- A Strong Feeling of Remoteness; and
- Dark Skies at Night.

Heritage Coast

5.5.33 The North Yorkshire and Cleveland Heritage Coast lies within the LVIA Study Area and the part of the Boulby Mine site boundary to the north of the A174. Heritage Coasts are 'defined' rather than designated and were established to:

- "Conserve, protect and enhance:

- ▶ *The natural beauty of the coastline;*
- ▶ *Their terrestrial, coastal and marine flora and fauna; and*
- ▶ *Their heritage features.*
- *Encourage and help the public to enjoy, understand and appreciate these areas;*
- *Maintain and improve the health of inshore waters affecting heritage coasts and their beaches through appropriate environmental management measures; and*
- *Take account of the needs of agriculture, forestry and fishing and the economic and social needs of the small communities on these coasts" (NE, 2015).*

5.1.1.1 The Heritage Coast extends for 55km between Saltburn by the Sea to near Scarborough with approximately 12km of this length, i.e. 22% of the total length, being in the defined LVIA study area. The North Yorkshire and Cleveland Heritage Coast Management Plan, 2015 – 2020 sets out several "key principles". Key Principle 1 is "*Continue to support measures that will conserve and enhance the unique coastal landscape and retain its open character and extensive uninterrupted views.*"

Landscape Character

National Level Landscape Character

- 5.5.34 The Proposed Development site and the LVIA study area are located entirely within the National Character Area (NCA) 25: North York Moors and Cleveland Hills (Natural England, 2015). This NCA includes an extensive area of the North York Moors National Park which comprises a mix of upland moorland and the coastal strip. The landscape within the northern fringes of the NCA is outside of the National Park boundary and more heavily influenced by industrial land uses and includes the settlements of Loftus, Brotton and Skelton.
- 5.5.35 Key characteristics of NCA 25: North York Moors and Cleveland Hills include:
- *"Upland plateaux, generally below 400 m, dissected by a series of dales – some broad and sweeping but others narrow, steep sided and wooded – creating strong contrasts between open moors and enclosed valleys;*
 - *Extensive areas of heather moorland on plateaux and hills, largely under sporting ownership, including large expanses of upland heathland and blanket bog habitats, creating a sense of space, expansiveness and openness;*
 - *Upland plateau landscape underlain mainly by sandstone and mudstone of Middle Jurassic age and calcareous sandstone and limestone of Upper Jurassic age;*
 - *Mosaics of upland heathland vegetation supporting internationally important populations of breeding merlin and golden plover;*
 - *Some areas of extensive conifer and mixed plantations, especially in the south-east, and broadleaved woodland on steep valley sides;*
 - *Valley landscapes characterised by pastoral farming, with a clear demarcation and strong visual contrast between the enclosed fields with some species-rich grasslands and wetlands, farms and settlements, and the bracken-fringed moorlands above;*
 - *Drystone walls and hedgerows enclosing the small pastures and meadows in dales and fringing farmland, often replaced by fences in arable areas;*

- *Large-scale arable landscapes to the south and east;*
- *Jurassic sandstones, mudstones and limestone forming a dramatic coastal landscape of high cliffs, high vegetated maritime slopes, and small coves and bays, with coastal towns and compact fishing villages;*
- *Sparsely settled, with scattered farmsteads and small villages, and traditional buildings constructed of local sandstone or limestone and with red pantile roofs, creating a strong visual unity;*
- *A rich archaeological heritage from many different periods, especially on the moorland plateaux; and*
- *Panoramic views over moorland plateaux, ridges and dales and out over surrounding lowland landscapes and the North Sea."*

County Level Landscape Character

- 5.5.36 At a county level the landscape character of the defined LVIA study area is defined by the North Yorkshire and York Landscape Characterisation Project (YYLCA) (Chris Blandford Associates, 2011).
- 5.5.37 The YYLCA defines several primary landscape character units (LCU) which are further subdivided into 39 landscape character types (LCT).
- 5.5.38 The defined LVIA study area is comprised of the following YYLCA LCTs:
- Sandstone Moors LCT (2); and
 - Rugged Cliffs, Coastal Valleys and Bays LCT (15)
- 5.5.39 Key characteristics of the Sandstone Moors LCT (2) include:
- *"Elevated sandstone plateaux and moorland hills which support extensive swathes of heather dominated dwarf shrub communities;*
 - *Open and undeveloped character with an absence of artificial structures or trees;*
 - *Dynamic pattern of ecological habitats, including blanket bogs, pools and upland heath habitats;*
 - *Large areas of coniferous woodland are a striking feature in the south and provide a strong sense of enclosure; and*
 - *Strong sense of isolation and tranquillity with associated dark night skies;*
 - *Dramatic views across adjacent Narrow Upland Dales and into lower lying landscapes."*
- 5.5.40 The development site is located within the Rugged Cliffs, Coastal Valleys and Bays LCT (15) the key characteristics of which include:
- *"Dramatic coastal cliffs and bays which form an edge between landscape and seascape;*
 - *Underlying geological formation from the Jurassic period, result in a rugged, jagged edged coastline in many places;*
 - *Historic quarrying and mining features associated with production of jet, ironstone and alum;*
 - *Small coastal settlements and fishing villages crowded into tight cliff foot locations confined in narrow valleys where they meet the sea;*
 - *Areas of ancient semi-natural woodland on steep valley sides which provide a sense of enclosure;*

- *Patchworks of arable fields and improved grassland, interspersed with small pockets of deciduous woodland and suburban development;*
- *Dramatic, open views across an ever-changing open seascape to the east;*
- *A series of valleys which mark the point at which rivers meet the coastal edge;*
- *The late 18th/early 19th century Grade II* listed garden at Mulgrave Castle is a key landscape feature;*
- *There is strong visual unity and settlements have a predominantly historic character; and*
- *Natural beach, cliff and wave cut platforms are key features. A series of broad valleys which punctuate the surrounding upland landscapes.*

Local Level Landscape Character

5.5.41 At a county level the landscape character of the study area is split between the Redcar & Cleveland Landscape Character Assessment (Redcar & Cleveland Borough Council, 2006) which covers the western part of the defined LVIA study area and the North York Moors National Park Landscape Character Assessment (NYMLCA) (Chris Blandford Associates, 2011) which covers the central and eastern parts including that of the Proposed Development site. The landscape character types and areas defined in these assessments represent the most refined level of detail in the hierarchy of landscape character assessments (national, county level and local level) and it is therefore these landscape character types (NYMLCA) and areas (Redcar and Cleveland LCA) that are carried through as receptors in the landscape assessment.

Redcar and Cleveland Landscape Character Assessment

5.5.42 The Redcar & Cleveland Landscape Character Assessment includes four Broad Landscape Areas:

- (a) Eston Hills (the uplands at Eston, Upleatham and Skelton);
- (b) Redcar Flats (the coast and countryside around Redcar and Marske);
- (c) East Cleveland Plateau (the coast from Saltburn to Boulby and the countryside fringing the North York Moors); and
- (d) Guisborough Lowland (the broad valley from Nunthorpe to Margrove Park).

5.5.43 The western part of the of the defined LVIA study area outside of the NYMNP boundary is within Broad Landscape Area (c) East Cleveland Plateau, the key characteristics of which include:

- *“An open, elevated coastal plateau rising towards the south to meet the North York Moors. The plateau has an exposed, open rural character with large-scale farmland bordered by hedges. A number of lanes are also characterised by hedges on each side. The plateau is dissected by a complex system of deeply-incised sheltered, heavily-wooded, valleys or gills, which meet the coast at two points within this Area; these are separated by higher land, where dramatic cliffs fall to wave-cut platforms at sea level;*
- *A history of mining and related industries within the Area has left its mark on the landscape, and pockets of industry associated with villages and in the open countryside, spoil heaps and disused mineral railways have a strong influence on the landscape character. Many of the spoil heaps have now been regraded and planted, as at Liverton Mines and Lumpsey, and some removed as at Lingdale. Others, though, remain, most notably that at Kilton which is visible over a wide area.”*

5.5.44 Under the Redcar and Cleveland Landscape Character Assessment each Broad Landscape Area (such as the East Cleveland Plateau described above) is divided into Landscape Units described as a landscape 'type', (e.g. undulating farmland), followed by a location, (e.g. 'East of Guisborough'). The landscape types and individual areas within the LVIA study area are set out in **Table 5.8** and the location and extent of these areas is shown in **Figure 5.4**.

Table 5.8 Redcar & Cleveland Landscape Types and Individual Units

Landscape Type	Location (landscape unit)	Description
Moorland Fringe Farmland	P4: Moorland Fringe Farmland	<p>Landform: A broad plateau bordering moorland to the south and enclosed (and partly dissected) by incised wooded valleys to the other sides.</p> <p>Land use: Mixed arable farmland with permanent pasture.</p> <p>Wildlife and other designations: Woodland peripheral to the landscape unit is Ancient Woodland and SNCI.</p> <p>Positive attributes are cited as the hedgerows and peripheral woodland, moorland fringe character and the low intensity of farming permanent grassland and scrub provide habitat diversity. Negative attributes relate to the general absence of hedgerow trees.</p>
Plateau Farmland	<p>P5: Lingdale to Brotton</p> <p>P7: South of Loftus</p>	<p>Landform: A broad undulating plateau.</p> <p>Land use: Farmland and dispersed woodland blocks.</p> <p>Wildlife and other designations: SNCIs at Kilton Mine and Kilton Thorpe Railway. Claphow Reservoir Wood and Wygrave Wood. Lumpsey Grassland and Merrys Wood Grassland</p> <p>Positive attributes are cited as:</p> <ul style="list-style-type: none"> ● Hedgerows are significant landscape elements, although in decline; ● Dismantled railways form valuable wildlife and recreation corridors and associated scrub vegetation provides important linear element in the landscape; ● Several woodlands and grasslands are important for wildlife; ● On elevated land in the unit, there is a 'coastal feel', with views of the coast. <p>Negative attributes include some abrupt and intrusive edges to large villages which have a degraded appearance due to industrial/commercial uses on former mining sites and a decline in field hedgerows and hedgerow trees and low level of woodland cover.</p> <p>Landform: A broadly domed landform lying to east of Handale Beck.</p> <p>Landuse: Farmland and woodland blocks and copses.</p> <p>Wildlife and other designations: Warren House Plantation is a SNCI.</p> <p>Positive attributes within the landscape include the hedgerows, which are significant landscape elements and a group of three copses are prominent in the landscape.</p> <p>Negative attributes are cited as a decline in field hedgerows and hedgerow trees and the intensively farmed land with low wildlife value</p>
Incised Wooded Valley	P10: Kilton, Waytail and Handale Becks	<p>Landform: Narrow steep-sided valleys. A complex pattern of wooded valleys, in which are found Clarksons, Whitecliff, Rosecroft and Loftus Woods.</p> <p>Landuse: Dense mixed woodland.</p> <p>Wildlife and other designations: The woodlands are designated as an SNCI. Most of the woodland is designated as Local Nature Reserve and as Ancient Woodland, both ancient semi-natural and ancient replanted woodland. Whitecliff Wood includes a RIGS (a Regionally Important Geological Site).</p> <p>Positive attributes of the landscape include:</p> <ul style="list-style-type: none"> ● Woodland forms a strong visual element in the local landscape of predominantly open agricultural land, and emphasises the topographic valley form; ● 'Natural' visual and botanical quality of semi-natural woodland with associated flora and fauna in a natural wooded river course; ● Intimate enclosure, seclusion and sense of tranquillity; ● Absence of visual intrusion of built elements;



Landscape Type	Location (landscape unit)	Description
		<ul style="list-style-type: none"> Sensory stimulation in running water and bird life. <p>Limited public access is cited as a negative attribute.</p>
Coastal Farmland	P12: East of Skinninggrove	<p>Landform: North-facing undulating slopes, terminated by the valley of Skinninggrove Beck to the west and sea cliffs to the north.</p> <p>Landuse: Predominantly agricultural land. The Cleveland Way provides public access to the cliff top.</p> <p>Wildlife and other designations: Boulby Quarries are an SSSI. The sandstone cliff and the rocks forming the wave-cut platform make up part of the Saltburn to Staithes Coast SNCI, important for birds. The westward- sloping fields near Skinninggrove are an SNCI and support an important diverse flora.</p> <p>Positive attributes of the landscape area cited as:</p> <ul style="list-style-type: none"> Open elevated coastal character; Dramatic sea cliffs and associated wildlife; The landscape unit forms part of the Heritage Coast and lies adjacent to the National Park. <p>No negative attributes are cited in the assessment</p>
	P13: North of Loftus	<p>Landform: An undulating inland-facing slope.</p> <p>Landuse: Agricultural land with few hedges.</p> <p>Wildlife and other designations: None.</p> <p>There are no positive attributes listed in the assessment whilst negative attributes are associated with the general absence of hedgerow trees.</p>

North York Moors National Park Landscape Character Assessment

5.5.45 The study defines several landscape character types (LCT) which are further subdivided into landscape character areas (LCA). The following character types are present within the study area as shown in **Figure 5.4**:

- 1. Moorland LCT;
 - Northern Moors LCA 1c.
- 4. Coast and Coastal Hinterland LCT;
 - Boulby – Whitby LCA 4a.

5.5.46 The Proposed Development site is located within the Coast and Coastal Hinterland LCT and more specifically within LCA 4a Boulby - Whitby. The pertinent key characteristics of LCA 4a include:

- “Undulating coastal and coastal hinterland area, becoming more steeply undulating in the north, rising to over 200m close to the edge of Newton Mulgrave Moor;.*
- Spectacular irregular indented line of crumbling cliffs of sandstone, shale and ironstone, towering to a maximum height of 210m at Boulby Cliff, the highest sea cliff on the east coast of England;*
- Elevated areas allow long distance views across the area and out to sea;*
- The area is drained by a series of steeply incised and winding minor becks that flow towards the coast, or in the north west towards the edge of the National Park. The densely wooded valleys contrast sharply with the openness of the farmed landscape. The becks frequently occur in pairs, following close and parallel courses with occasional waterfalls;*

- *The deep valleys are densely wooded with mainly deciduous linear woodland, much of which is ancient semi natural woodland. Extensive deciduous woodlands occur at Mulgrave, Easington and Roxby Woods. Inland from the coast, the mixed farmland is interspersed with pasture for livestock and occasional generally small plantations. Regular fields of recent enclosure predominate near the coast, divided by a mixture of fences or closely trimmed hedgerows, often thin, gappy and windblown with very occasional trees, creating a bleak and open appearance. In some areas field boundaries have been removed. In the south east of the area, south of the A174, fields become smaller in size and slightly less regular in shape. Around a number of settlements a pattern of historic strip fields remains. Small patches of scrub, bracken and upland heath/ bracken also occur;*
- *Staithes and Runswick Bay are focal points for visitors to the area; at Runswick Bay a cluster of red roofed buildings are perched one above the other at the foot of the cliffs overlooking a broad bay, whilst at Staithes the village and small fishing harbour is confined to a narrow valley and into a breach in the cliffs. Each village has extended onto the flatter land at the cliff top to include more recent development that bears little relation to the historic settlement cores. Villages on the A174 including Easington and Hinderwell have been extended to incorporate modern development. Elsewhere, small traditional villages constructed in stone with pantile roofs are set amongst the rolling farmland. The busy A174 runs through the character area, frequently sited on ridgelines or in very open locations where it has a significant effect on the area. Elsewhere a network of B roads and winding minor lanes link settlements. A number of the minor roads include very steep ascents, particularly at the coast and within steeper inland areas;*
- *The tall chimneys and structures of Boulby Potash Mine, the deepest mine in Britain, dominate the northern part of the character area;*
- *Recreational features include Scaling Dam with its associated sailing club and the sailing club at Runswick Bay. The Cleveland Way Walk follows the cliff line. Camping and caravan sites and car parks occur in coastal areas;*
- *Detractors include the mast north of Easington, Boulby Mine, modern development on the edges of historic settlements, Scaling Dam and Lockwood Beck Reservoirs and overhead utilities lines. The traffic associated with the A174 also detracts considerably from the area. The loss of field boundaries has also detracted from the area”;*

5.5.47

Key characteristics of the Northern Moors LCA 1c includes:

- *“Elevated open expansive upland, part of the Cleveland Hills, forming a gently undulating plateau sloping gradually towards and the western and northern edges of the moors and more steeply towards Eskdale to the south;*
- *Panoramic long distance views are available across the strong horizons of the moors, across the lower lying areas to the west and north, across Eskdale towards the central moors and towards the coast in the east. The open skies create a dramatic and ever-changing backdrop to the landscape. At night, the darkness of the skies is a key feature, although to the north of the area this has become eroded by the glow from the Cleveland conurbation;*
- *Landcover comprises extensive tracts of heather moorland (forming part of the largest continuous area of heather moorland in England, almost all of which is designated as SSSI and Candidate SAC), changing in colour from purple in summer to almost black in winter and managed for grouse shooting, resulting in a distinctive mosaic pattern of different aged plants mixed with burnt areas and lines of grouse butts;*

- *Bracken predominates on the steeper slopes of the moorland edges, particularly in the south, and occurs in mosaic with upland heath in moorland valleys. Smaller areas of heather exist in mosaic with grassland. Scattered boulder fields are present on the moor tops;*
- *Tree cover is very sparse, limited to very small pockets of deciduous woodland in dale head areas and very occasional windswept specimens on the moor tops;*
- *The moorland, grazed by sheep, is generally unenclosed although wire fences are present in some locations;*
- *Settlement is almost entirely absent; very occasional isolated farms occur in moorland valleys surrounded by walled fields;*
- *The moors are rich in archaeological features, including the lines of round barrows that follow the ridgelines of the moors above Eskdale and are visible as skyline features; and areas of earthworks, enclosures and field systems. The remains of ancient crosses, boundary markers and pannier tracks are occasionally visible and a park pale is located on Commondale Moor;*
- *The A171 runs along the northern edge of the character area and the moors are crossed by the C20 and short sections of the B1266 and B1366 and minor roads running north from Danby. Elsewhere, the moors are relatively inaccessible;*
- *Lines of grouse butts cross the landscape in places. The Cleveland Way crosses the western edge of the character area;*
- *The noise of the wind and the call of moorland birds are often the only sounds present in the area;*
- *Detractors include the C20 road, with its inappropriate kerbing and associated snow markers, small coniferous plantations on the moorland fringes, reservoirs (Lockwood Beck and Scaling Dam) just beyond the character area boundary and the scars created by the shooting tracks and quarries of the moorland edges."*

Predicted Future Baseline

5.5.48

The future baseline assumes that the present mining activities at Boulby Mine cease in 2023, with subsequent decommissioning and the restoration of the former mining site in accordance with consented restoration plan under planning permission (NYMR/003/0043B/PA). The future baseline for the purposes of the LVIA has been separated into five distinct phases to reflect how the site would evolve in the absence of the Proposed Development. This approach was agreed with the NYMNP in the addendum scoping opinion issued in October 2017 (see **Appendix 1.A**). At the scoping stage, four phases were identified covering the period 2019 - 2048. This time period was chosen to reflect the time period over which the new planning permission for the Proposed Development would be in place. It has been considered necessary to include additional future baseline scenarios to cover the period during which the Proposed Development would be in its restoration, aftercare and maturing period. The dates used have been amended slightly from the scoping discussions in order to be consistent with the Proposed Development programme and therefore provide a clear assessment. The five phases are summarised in **Table 5.9** below, with more detail provided in the technical note included with the Scoping Opinion at **Appendix 1.A**.

Table 5.9 ES Future Baseline

Time period	Baseline description	Comments
2019 - 2023	Operational mine	The current baseline with a continuation of the existing permitted activities.
2023 - 2025	Decommissioning and restoration	Site decommissioning including removal of buildings and plant, making safe all surface and underground areas, site clearance, ground reprofiling, soil replacement, and establishment of surface features including wildflowers, trees and hedgerows, fencing, water features etc.
2025 - 2033	Aftercare	Management and maintenance activities on a restored but immature site.
2033 - 2048	Semi-mature site	A maturing landscape. Given the challenging location and lack of onsite soils, whilst the wildflowers, pasture and hedgerows will have matured by 2048, the new woodland planting can only be considered to be semi mature.
2048 – 2057+	Mature restored site	All aspects of the restored site will have matured.

5.5.49 In reality, if the Proposed Development is approved, many elements of the Proposed Development site which are contained within the current baseline would be retained for a further 25 years period of operation as described in detail in Chapter 3: the Site and the Proposed Development with the restoration measures being in accord with the drawing; 'Restoration Proposals' (Ref. 2274.21, Estell Warren, December 2012).

5.6 Scope of Assessment

Limitations in the Preparation of the LVIA

5.6.1 Viewpoint photography and site survey work for the LVIA was predominantly carried out during the autumn of October and November 2017 and during October 2019 when deciduous trees were in various stages of defoliation. It is anticipated that visibility of the development will be marginally increased during the later winter months from some viewpoints when some species will be totally devoid of leaf cover.

Spatial and Temporal Scope

Spatial Scope

5.6.2 Whilst the relevant EIA regulations (Town and Country Planning (Environmental Impact Assessment) Regulations 2017) require that the LVIA focuses upon those receptors most likely to experience significant landscape and visual effects, it is also important that a precautionary approach is adopted in defining the spatial and temporal scope of the assessment, in order that all of the potentially significant landscape and visual effects can be captured by the assessment.

5.6.3 The spatial scope of the assessment of landscape and visual impacts covers the Proposed Development site, and the detailed and defined LVIA study areas as shown in **Figure 5.1**.

Temporal Scope

5.6.4 The temporal scope of the LVIA reflects the programme for the Proposed Development as set out in Section 3.3 of the ES. The Proposed Development would require the present mining activities to

extend 25 years beyond 2023 i.e. until 2048. During this period the some of the present buildings, plant and infrastructure would remain in place and operational. The Proposed Development would consist of three phases:

- Phase 1 – would last for five years i.e. until 2028. The following structures would be decommissioned and removed:
 - ▶ Centrifuges and belt filter building connected to the potash treatment plant;
 - ▶ Oil storage building and tanks;
 - ▶ Sports dome and construction store; and
 - ▶ 2,000 tonne surge bunker, and associated conveyor belts.
- Phase 2 - would last for five years i.e. 2028 until 2033. The following structures would be decommissioned and removed:
 - ▶ General stores building;
 - ▶ Administration building;
 - ▶ Old boiler house; and
 - ▶ Engineering services building (across Phases 1 and 2).

- 5.6.5 The structures to be removed would be concentrated in the northern part of the Proposed Development site with the structures' footprints being restored to pasture. Mining operations would continue for a further 15 years i.e. until 2048. Upon completion of mining the remainder of the Proposed Development site would be decommissioned and restored.
- 5.6.6 The restoration would take three years i.e. until 2051 and would accord with the general principles established in the 1998 closure and restoration plan and the subsequent 2012 landscape restoration proposals.
- 5.6.7 Upon completion of the restoration a five years long aftercare plan would be implemented to ensure that the planted and seeded restored areas become well-established. Upon completion of the aftercare period in 2056, the seeded areas would be fulfilling their landscape and visual role and the planted areas would be partly fulfilling their landscape and visual role. It is estimated that the hedgerow and scrub planting would be likely to take approximately 10 years to become fully effective in landscape and visual terms, whilst the woodland planting would be likely to take approximately 15 years i.e. until 2066.
- 5.6.8 This proposed timetable results in the LVIA assessing landscape and visual effects of the proposed development at three temporal points:
- Operational Phase Year 3 (2025) – assessment undertaken against the permitted future baseline in which all surface mining plant, structures and building would be removed, restoration and aftercare would be completed but planting would be immature e.g. whips and transplants would still be protected by tree shelters (see **Table 5.9**).
 - Operational Phase Year 10 (2033) – assessment undertaken against the permitted future baseline in which restoration seeded and planted areas would have experienced a period of up to ten years' growth and establishment.
 - End of Restoration and Aftercare Phases Year 33 (2056) – assessment undertaken against a permitted future baseline of a matured restored site 31 years after landscape restoration

scheme shown in drawing; 'Restoration Proposals' (Ref. 2274.21, Estell Warren, December 2012) would have been completed.

Approach to Identifying Receptors

- 5.6.9 This section sets out information on the process by which receptors were identified; the details of the receptors that could potentially be affected by the Proposed Development; and the potential effects on receptors that could be caused by the Proposed Development.
- 5.6.10 The scope of assessment has been informed by:
- Relevant guidance (primarily provided by GLVIA3);
 - Consultee responses to the Scoping Report; and
 - The professional judgement of the qualified technical specialists who have undertaken the LVIA.
- 5.6.11 Within the context of the framework outlined above, the identification of receptors has been informed by the results of the work detailed in Section 5.4; and the nature of the Proposed Development. In accordance with GLVIA3, potential receptors are considered to include those who may reasonably be expected to have the potential to sustain significant adverse effects in relation to:
- Direct landscape effects (i.e. loss or degradation of landscape elements that may be physically affected by the proposed development and changes to the character of the landscape hosting the Proposed Development as a result of alterations to the fabric of that landscape);
 - Indirect landscape effects (i.e. changes to the character of landscape surrounding the Proposed Development as a result of alterations to the appearance or other perceptual characteristics of the wider landscape); and
 - Visual effects (i.e. changes to the views available to people).
- 5.6.12 The first step in identifying receptors to be included in the LVIA was the definition of the LVIA study area as described in Section 5.4.2. This has been defined as a 5km offset from the Proposed Development site boundary and represents the maximum spatial scope of the landscape and visual assessment.
- 5.6.13 The second step in identifying receptors to be included in the LVIA was the establishment of a potential effects pathway. In relation to receptors that might be subject to direct landscape effects, no effects pathway can be considered to be present for any landscape elements or character areas that are not located wholly or partly within the boundary of the Proposed Development site. In relation to receptors that might sustain indirect landscape effects or visual effects, the potential effects pathway is considered to be visual and dependent upon the availability of views of the Proposed Development. The method used to calculate the ZTV of the Proposed Development is described in paragraphs 5.4.2.6 to 5.4.2.9. The following landscape and visual receptors are excluded from the LVIA due to their spatial relationship to the ZTV:
- All nationally or locally designated landscapes located wholly outside the ZTV;
 - All nationally or locally defined landscape character areas located wholly outside the ZTV; and
 - All visual receptors located outside the ZTV.
- 5.6.14 It is important to note that the ZTV has been generated for the built components within the Proposed Development site and not in relation to potential plume heights from the dryer stack. On

the basis of observations made during the range of site visits listed in Section 5.4.2.12 -13 it is considered that the visibility of a plume of alone (i.e. in the absence of any intervisibility with the built form within Boulby Mine) is highly unlikely to give rise to a magnitude of landscape or visual change which would be sufficient to generate significant landscape or visual effects given the transient and periodic nature of any plumes generated.

5.6.15 The third and final step in identifying receptors was a consideration of the sensitivity of the receptors to the changes that are likely to occur. All landscape character areas included in the LVIA following steps one and two, described above, are considered to possess a sufficiently high sensitivity to have the potential to sustain significant effects as a result of the Proposed Development. In relation to visual receptors, all receptors within the categories: people at their place of residence; people within their community; people engaged in outdoor recreation; and people using the transport network are also considered to be of a sufficiently high sensitivity to have the potential to sustain significant effects as a result of the Proposed Development.

5.6.16 With regards to people at their place of work, paragraph 6.34 in GLVIA3 states the following within the context of visual receptors likely to be less sensitive to visual change:

"People at their place of work whose attention may be focused on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life (although there may on occasion be cases where views are an important contributor to the setting and the quality of working life)."

5.6.17 People at their place of work are therefore only included in an LVIA where views are an important contributor to the setting and the quality of working life. No such receptors have been identified in relation to the Proposed Development.

Likely Significant Effects

5.6.18 This section identifies the potential receptors that have been identified based on the factors listed at paragraph 5.6.1 above and on the Scoping Opinion received from NYMNP. The receptors listed in **Table 5.10** are considered capable of being sustaining significant adverse effects and are therefore be taken forward for further assessment.

5.6.19 In relation to direct and indirect effects on the landscape character as represented by the national and county character areas (NCAs and CCAs) i.e. NCA 25 and YYLCA LCTs 2 & 15, it is considered that these areas are too extensive to potentially sustain significant landscape effects from a development of the type and scale proposed at a single location such as at Boulby Mine. This conclusion is supported by paragraph 5.14 in GLVIA3, which advises that *"Broad scale assessments at national and regional level can be helpful in setting the landscape context, but are unlikely to be helpful on their own as the basis for LVIA – they may be too generalised to be appropriate for the particular purpose."*

Table 5.10 Potential Receptors taken forward for further Assessment

Receptor	Distance from site boundary	Reason for selection
Landscape receptors		
Landscape Elements		
Landscape elements located within the Proposed Development site	Within the site	Potential for direct and indirect effects from operational activities, decommissioning and subsequent restoration.

Receptor	Distance from site boundary	Reason for selection
Landscape Designations		
North York Moors National Park	Covers the site	Potential for direct and indirect effects from operational activities, decommissioning and subsequent restoration
North Yorkshire and Cleveland Heritage Coast	Covers the site	Potential for direct and indirect effects from operational activities, decommissioning and subsequent restoration
North York Moors National Park Landscape Character Assessment		
LCA 4a Boulby – Whitby (Coast and Coastal Hinterland LCT)	Host LCA	Potential for direct and indirect effects from proposed operational activities.
LCA 1c Northern Moorland (Moorland LCT)	Approximately 3.0 km to the south	Potential for indirect effects upon LCA's key characteristics arising from proposed operational activities.
Redcar & Cleveland Landscape Character Assessment		
LCA P7: South of Loftus (Plateau Farmland LCT)	Approximately 1.5 km to the southwest	Potential for indirect effects upon LCA's key characteristics arising from proposed operational activities.
Visual Receptors		
Residents in Settlements	Up to 5.0 km	Potential for changes to permitted future baseline views as a consequence of operational phase activities.
Staithe	0.9 km to the east	
Easington	0.6 km to the west	
Boulby	0.2 km to the north	
Roxby	1.2 km to the south	
Scaling	4.4 km to the south	
Hinderwell	2.4 km to the east	
Ellerby	4.6 km to the east	
Newton Mulgrave	3.1 km to the east	
Residents in individual properties and small groups of properties	Up to 2.0 km	Potential for changes to permitted future baseline views as a consequence of operational phase activities.
Ings Farm	0.1 km to the west	
Red House Farm	0.05 km to the north east	
Ridge Farm and Ridge Hall	0.1 km to the south east	
Twizziegill Farm	0.4 km to the south west	

Receptor	Distance from site boundary	Reason for selection
Dalehouse Farm/Group	0.7 km to the east	
Boulby Barn Farms	0.6 km to the north west	
Cowbar Farm	0.6 km to the north east	
Midge Hall, The Glebe and Oaks Farm	0.9 km to the south east	
Cooper House, Borrowby Grange and Plum Tree House	1.3 km to the south east	
Seaton Hall	1.2 km to the east	
Recreational visual receptors within the 5km LVIA study area and the Proposed Development ZTV		
Recreational routes	Up to 5.0 km	Potential for changes to permitted future baseline views as a consequence of operational activities. Groupings of this category of visual receptors are shown in Figure 5.6 .
Cleveland Way	Adjacent to 5.0 km	
England Coastal Path	Adjacent to 5.0 km	
NCR No1	Adjacent to 5.0 km	
Conclusive Open Country (CRoW)	Up to 5.0 km	Potential for changes to permitted future baseline views as a consequence of operational phase activities.
Caravan and camping sites and holiday parks	Up to 5.0 km	Potential for changes to permitted future baseline views as a consequence of operational phase activities.
Staithe Caravan Park	0.9 km to the east	
Gatehouse Caravan Site, Hinderwell	2.4 km to the east	
Serenity Camping, Hinderwell	2.5 km to the east	
Runswick Bay Caravan and Camping Park	4.0 km to the east	
Recreational visual receptors within the 2km detailed LVIA study area and the Proposed Development ZTV		
Recreational routes	Up to 2.0 km	Potential for changes to permitted future baseline views as a consequence of operational activities. Groupings of this category of visual receptors are shown in Figure 5.7 .
PRoWs within the development site boundary (Group A)	Within site	
PRoWs to the north east (Group B)	0.1 – 1.10 km	

Receptor	Distance from site boundary	Reason for selection
PRowS in and around Staithes (Group C)	0.5 – 2.0 km	
PRowS to the east (Group D)	Adjacent to 2.0 km	
PRowS to the south east (Group E)	0.8 km to 2.0 km	
PRowS to the south (Group F)	Adjacent to 2.0 km	
PRowS to the south west (Group G)	Adjacent to 2.0 km	
PRowS to the north west (Group H)	0.1 – 2.0 km	
Vehicular visual receptors		
Transport (A and B roads)	Up to 5.0 km	Potential for changes to permitted future baseline views as a consequence of operational phase activities.
A174	Adjacent to 5.0 km	
Transport (Minor roads)	Up to 2.0 km	Potential for changes to permitted future baseline views as a consequence of operational phase activities.
C1 Boulby Bank	0.1 – 2.0 km	
C2 Cowbar Lane	0.1 – 1.4 km	
C3 Grinkle Lane	1.1 – 2.0 km	
C4 Ridge Lane	0.1 – 2.0 km	
C5 Roxby Lane	0.6 – 2.0 km	
C6 Borrowby Lane	0.7 – 2.0 km	

5.7 Mitigation and Enhancement Measures

5.7.1 Environmental measures designed to avert or minimise landscape and visual effects have been incorporated into the Proposed Development. These have been developed following consultation; extensive field survey work; review of the baseline (for all technical disciplines) and review of the permitted restoration works.

Operational Phase – Mitigation

5.7.2 Embedded and best practice mitigation measures will be implemented during the operational phaser in accordance with the objectives outlined in the document, *Restoration Proposals* (Estell Warren, 2012) specifically the aim to "Provide early visual improvement and/ or screening of the site during the operational phase in local views". Specific: "interim landscape measures" considered to comprise new areas of planting should be implemented ahead of the final restoration works to screen or filter views of the existing site as follows:

- A174 overlooking the site south eastwards from The Brows;
- A174 looking eastwards from the section of road near Red House Farm and the site entrance;

- General screening of low level mine head clutter and activity in views from the north and east

5.7.3 In addition, the following mitigation measures will be introduced:

- Phased removal of mine buildings and structures in two phases during the first 10 years of operation to reduce the overall mine footprint;
- Application of uniform finish to the majority of retained structures on site for the remaining operational period to provide a unified recessive finish to the built development within the site boundary. (Colour and finish to be agreed with NYMNP); and
- Retention and protection of existing areas of woodland and areas of scrub within the site boundary during the operational phase.

Restoration Phase – Restoration Objectives and Implementation

5.7.4 Design objectives as detailed in the document *Restoration Proposals* (Estell Warren, 2012) include the following:

- Create a strong, long-term landscape structure which reflects key local characteristics and contributes to the National Park setting;
- Provide early visual improvement and/ or screening of the site during the operational phase in local views;
- Provide increased site security through use of dense thorny planting to the operational mine perimeter;
- Retain and manage existing biodiversity habitats and enhance through provision of new habitats in restored area, supporting existing initiatives where possible;
- Interpret site history, in particular mining history, and reflect within the scheme design as patterns and earthworks;
- Retain existing heritage features and improve settings where possible through management;
- Retain existing agricultural land uses and consider provision of additional agricultural land within the framework established through historical, landscape and biodiversity influences; and
- Explore opportunities for improving connections within the local public rights of way network.

5.7.5 The restoration scheme will comprise the following landscape elements towards the overall aim of creating; *"a mosaic of semi-natural woodland and grassland habitats, permeated by pastoral fields with public access"*.

- Remodelled undulating landform;
- Existing mixed woodland;
- New native broadleaved woodland;
- Coastal scrub and woodland edge zone (including existing area at Boulby Bank);
- Neutral wildflower grassland;
- Existing pasture;
- New species rich pasture;
- Arable land;

- Mixed native hedgerow (including incorporation and management of existing remnant hedgerows).

5.8 Predicted Landscape Effects

Effects on Landscape Elements

5.8.1 The assessment of landscape effects as a result of the operational and the restoration phases of Boulby Mine against the permitted future baseline is set out in **Table 5.11**.

Table 5.11 Assessment of Landscape Effects: Landscape Elements within the Site Boundary

Landscape element	Sensitivity	Assessment of landscape effects
Woodland	<p>Low (woodland under the permitted future baseline) The overall value would be Low:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the immature woodland provides limited landscape role (Low). <p>Susceptibility: the newly planted woodland could be replaced and would take a short length of time to achieve a similar landscape (and visual) value and role to that of the future baseline (Low).</p> <p>High (Existing woodland) (Value is Medium to High and Susceptibility is High)</p>	<p><u>Operational phase – Year 3</u> The Proposed Development would introduce considerable change in relation to the newly restored scheme that would otherwise be present under the permitted future baseline scenario. Retention of the built development would ensure that retained buildings associated structures, and infrastructure (roads, areas of hard surfacing and materials stockpiles) would continue to occupy much of the central site area. Under the permitted future baseline scenario this central site area would be the location of a large blocks of immature native, broadleaved woodland set amongst wildflower meadow. At Year 3 this woodland would be a maximum of three years old and would consequently the whips and transplants, all planted at heights of under 1m, would still be small and protected by biodegradable shelters. Hence at Year 3 this recent woodland planting would be immature and would not be providing a strong influence on the landscape character of the site area. However, in the eastern part of the site where there is no surface development under the current baseline and no development scheduled under the Proposed Development, the restoration tree planting that would have recently been provided under the permitted future baseline can also be provided under the Proposed Development.</p> <p>Hence under the Proposed Development a moderate proportion of the restoration tree planting that would be present in the permitted future baseline would continue to be present thereby reducing the magnitude of landscape change.</p> <p>Beyond the central operational area, areas of mature woodland present under the current baseline, principally in the south and southeast of the site, (and which would be retained under the permitted future baseline) would be retained, protected and managed during the operational period ensuring no landscape change to these areas of mature woodland. As a consequence, operational effects on this landscape element against the permitted future baseline would primarily be a result of from the absence of blocks of immature woodland in the central site area.</p> <p>The magnitude of change for the woodland element is assessed as Low resulting in a Slight level of effect in relation to the future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Medium Term and Not Significant.</p>



Landscape element	Sensitivity	Assessment of landscape effects
<p>Medium (woodland under the permitted future baseline)</p> <p>The overall value would be Medium:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the gradually maturing woodland provides a greater landscape role (Medium). <p>Susceptibility: the gradually maturing woodland could be replaced but would require a moderate time (10 years) to achieve a similar landscape (and visual) value and role to that of the permitted future baseline (Medium).</p>	<p>High (Existing woodland)</p> <p>(Value is Medium to High and Susceptibility is High)</p>	<p><u>Operational phase – Year 10</u></p> <p>At Year 10 under the permitted future baseline, areas of restoration woodland planting would not be mature, but the increased stature of individual trees (estimated to be up to 6m in height) would provide a stronger characterising presence within and close to the site area. Under the Proposed Development, the central site area would still be largely occupied by buildings, structures and infrastructure although restoration woodland would be well-established in some eastern parts of the site. The removal of some buildings by Year 10 is scheduled for the area immediately to the north of the central site area which would allow some additional woodland planting towards the boundary with the A174 corridor as part of the ongoing restoration (although under the 2012 restoration plan and as shown in the Year 10 photomontages from Viewpoints 1 & 2 in Figures 5.8b & 5.9b, most of the northern part of the site will be used for the establishment of grazing pasture meadow).</p> <p>The magnitude of change for the woodland element at Year 10 is assessed as Medium resulting in a Moderate level of effect in relation to the permitted future baseline scenario (restored scheme at Year 10). The nature of this effect would be Adverse, Medium Term and Not Significant.</p>
<p>High (woodland under the permitted future baseline)</p> <p>The overall value would be Medium:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the mature woodland provides a greater landscape role and reinforces a key characteristics of the host LCA at a local level (Medium). <p>Susceptibility: the mature woodland could be replaced but would require a considerable time to achieve a similar landscape (and visual) value and role to that of the future baseline (High).</p>	<p>High (Existing woodland)</p> <p>(Value is Medium to High and Susceptibility is High)</p>	<p><u>Restoration phase – Year 33</u></p> <p>Application of a restoration scheme similar to the permitted 2012 restoration scheme would have introduced additional areas of broadleaved woodland in the central part of the site following decommissioning of the mine and removal of the structures eight years previously. At Year 33 this restoration planting would be immature and would not be providing a strong contribution towards integration of the site into the wider landscape. However, there would be emerging visual associations (colours/textures) with the surrounding areas of tree cover including the now mature restoration planting in the eastern part of the site undertaken at the beginning of the operational phase as well as the long-established mature woodland immediately to the south at Easington and Onehams Wood present under the current baseline.</p> <p>By this phase the restored woodland planting that would be provided under the permitted future baseline would be reaching maturity and would be largely assimilated into the wider landscape. Hence it is ascribed with medium value.</p> <p>The magnitude of change for the woodland element at Restoration phase – Year 33 is assessed as Medium resulting in a Moderate level of effect when considered against the permitted future baseline scenario which would be all the woodland planting proposed under the permitted future restoration being mature. The nature of this effect would be Neutral, Medium Term and Not Significant. The level of effect would progressively diminish beyond Year 33 as all woodland planted as part of the restoration scheme becomes fully established and gradually matures until it reaches a similar role to that planted in the eastern part of the site at the beginning of the operational phase or the woodland that would otherwise be planted under the permitted future baseline.</p>

Landscape element	Sensitivity	Assessment of landscape effects
Hedgerows	<p>Low (hedgerows under the permitted future baseline)</p> <p>The overall value would be Low:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the immature hedgerows provide limited landscape role (Low). <p>Susceptibility: the newly planted hedgerows could be replaced and would take a short length of time to achieve a similar landscape (and visual) value and role to that of the future baseline (Low).</p>	<p><u>Operational phase – Year 3</u></p> <p>The Proposed Development would result in the inability to introduce a proportion of the hedgerows that would be planted as part of the restoration scheme that contributes to the permitted future baseline. These would be the hedgerows that would form the boundaries around the four pasture fields in the northern part of the site and the hedgerows proposed for the reprofiled area to the immediate west of the railway line. Under the Proposed Development these parts of the site would be the location of buildings, plant, infrastructure and activities at operation phase - Year 3. However, the hedgerows included in the permitted future development that would be sited in the existing fields on the western part of the site (adjacent to A171) and in the separate part of the site north of A171 close to the pump house would still be capable of being planted. The Proposed Development does not alter the current baseline land-uses in these areas i.e. arable agriculture.</p> <p>The magnitude of change for the hedgerow element is assessed as Low resulting in a Slight level of effect in relation to the permitted future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Temporary and Not Significant.</p>
	<p>Medium (hedgerows under the future baseline)</p> <p>The overall value would be Low:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the hedgerows by Year 10 would be providing a greater landscape role/pattern within the Site and reinforces a key characteristics of the host LCA at a local level (Medium). <p>Susceptibility: An element which could be replaced but would require a moderate amount of time to fulfil a similar landscape role and value to those of the future baseline conditions (Medium).</p> 	<p><u>Operational phase – Year 10</u></p> <p>The hedgerows planted up to Year 3 as part of the Proposed Development (as noted above) would be approaching landscape maturity. Removal of some built elements from the site immediately to the north of the central operational area would allow the partial re-introduction of hedgerows in this area which would be establishing by Year 10 as shown in the Year 10 photomontage from Viewpoint 1 shown in Figure 5.8b.</p> <p>The magnitude of change would be reduced to Very Low in relation to the permitted future baseline scenario as under both the Proposed Development and the permitted future baseline, most hedgerows would be approaching maturity allowing them to fulfil their landscape role resulting in a Slight/Negligible level of effect. The nature of this effect would be Neutral, Medium Term and Not Significant.</p>
	<p>Medium (hedgerows under the future baseline)</p> <p>As set out for Year 10</p>	<p><u>Restoration phase – Year 33</u></p> <p>By Year 33 all hedgerows that would be planted as part of the Proposed Development would have been planted for a minimum of five years and would be establishing well following the application of the five years aftercare programme. As a consequence, they would be at least partly fulfilling their landscape role within the restored site and the wider Boulby-Whitby 4a LCA. These hedgerows would be likely to be located in the central parts of the site; across the majority of the site hedgerows that would have been planted or enhanced in the early operational phases of the Proposed Development would be fully established and mature, allowing them to completely fulfil their landscape roles.</p>

Landscape element	Sensitivity	Assessment of landscape effects
		<p>Under the permitted future baseline all hedgerows would be mature and fulfilling their landscape roles. The difference between the Proposed Development and the permitted future baseline for hedgerows would therefore be minimal in landscape terms by Year 33.</p> <p>The magnitude of change for the hedgerow landscape element at Year 33 is assessed as Very Low resulting in a Slight/Negligible level of effect in relation to the permitted future baseline scenario (restored scheme at Year 33). The nature of this effect would be Neutral, Temporary and Not Significant. The level of effect would diminish over a reasonable short period time as hedgerows planted as part of the restoration scheme would become fully established and gradually mature until they would attain the same landscape role to that assumed under the permitted future baseline.</p>
Wildflower Meadow	<p>Low (meadow under the future baseline)</p> <p>The overall value would be Medium:</p> <ul style="list-style-type: none"> ● Rarity – this is an uncommon element that is likely to be valued in a local context (Medium); ● Condition – managed and improving (Medium); ● Role – the meadow would occupy a moderate proportion of the Site (Medium). <p>Susceptibility: An element which could be replaced and would require a short length of time to fulfil a similar role and value to that of the future baseline conditions (Low).</p> <p>Low (meadow under the future baseline)</p> <p>As set out for Year 3.</p>	<p><u>Operational phase – Year 3</u></p> <p>Under the permitted future baseline by Year 3 restoration works would have established extensive wildflower areas in the central part of site. The Proposed Development not allow the establishment of most of this wildflower meadow as most of its proposed locations would be occupied by buildings, structures, plant and/or infrastructure or required for operational activities.</p> <p>The magnitude of change generated by the inability to establish these meadows by Year 3 with the commensurate retention of extensive man-made landscape elements is assessed as High resulting in a Moderate level of effect when considered against the future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Temporary and Not Significant.</p> <p><u>Operational phase – Year 10</u></p> <p>The Proposed Development would require the removal of a proportion of the buildings, structure and plant by Year 10 and it would be likely that these removals would be concentrated in the northern part of the central site. As a consequence it would be likely that by Year 10 restoration works would be underway that would facilitate the establishment of some of the wildflower meadows proposed for this area under the permitted future development. Given the short time period required for meadows to become established, these meadows would rapidly assume the same landscape role as the longer established meadows that would be present in similar locations under the permitted future baseline thereby reducing differences between the permitted future baseline and the Proposed Development for this landscape element.</p> <p>The magnitude of change is therefore assessed to reduce to Medium by Year 10 resulting in a Slight/Moderate level of effect when considered against the permitted future baseline in which restoration to meadow would be more extensive. The Slight/Moderate level of effect would be Adverse, Medium Term and Not Significant.</p>

Landscape element	Sensitivity	Assessment of landscape effects
<p>Low (meadow under the future baseline)</p> <p>As set out for Year 3.</p>		<p><u>Restoration phase – Year 33</u></p> <p>By Year 33 all wildflower meadows introduced as part of the restoration of the site would be established and would provide an appropriate setting for the other elements of the restoration scheme including native woodlands, scrub and hedgerows. The meadows would introduce some variety into the mosaic of surface vegetation within the restored site area whilst still having an appropriate visual relationship with elements such as the species rich pasture and the predominance of soft landscape elements in the wider landscape. Due to the ability of wildflower meadows to establish quickly, there would be minimal difference between the Proposed Development and the permitted future baseline restoration scheme for this landscape element assuming broadly equivalent areas of wildflower meadow would be established.</p> <p>The magnitude of change for the wildflower meadow landscape element at Year 33 is assessed as Very Low resulting in a Negligible level of effect when considered against the permitted future baseline scenario (restored scheme at Year 33). The nature of this effect would be Neutral, Permanent and Not Significant. .</p>
<p>Agricultural Fields (Pasture / Arable)</p>	<p>Low (agricultural fields under the future baseline)</p> <p>The overall value would be Medium:</p> <ul style="list-style-type: none"> ● Rarity –prevalent within the wider landscape. A non-designated, ordinary landscape element (Low); ● Condition – managed and improving (Medium); ● Role – the fields would occupy a moderate proportion of the Site and are a characteristics of the host LCA (Medium). <p>Susceptibility: An element which could be replaced and would require a short length of time (e.g. a single growing season) to fulfil a similar role and value to that of the future baseline conditions (Low).</p>	<p><u>Operational phase – Year 3</u></p> <p>Under the permitted future baseline the agricultural field units within the site boundary to the south of the A174 would have been established under the restoration proposals. The Proposed Development would require that this part of the site be occupied by a variety of buildings, structures, plant and infrastructure. Similarly, the part of the site to the immediate west of the railway line would be required for continued operational activities precluding restoration to agricultural fields. However, on the remaining western parts of the site and the part to the north of A174 around the pumping house current baseline agricultural activities would be maintained (with hedgerow planting and enhancement) with no variation between the permitted future baseline and the Proposed Development.</p> <p>The magnitude of change associated inability to restore the central area agricultural fields by Year 3 is assessed as Medium resulting in a Slight/Moderate level of effect in relation to the permitted future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Medium Term and Not Significant.</p>
<p>Low (agricultural fields under the future baseline)</p> <p>As set out for Year 3.</p>		<p><u>Operational phase – Year 10</u></p> <p>At Year 10, the reduction of the operational extent of the mine and removal of some buildings in the area immediately to the north of the central operational area would allow partial introduction of the four species rich pasture fields as per the 2012 restoration plan. Their presence is shown in the Year 10 scenario photomontage from Viewpoint 1 in Figure 5.8b. It is also anticipated that more widespread enhancements to the agricultural land parcels would have commenced including the introduction of species rich pasture. Species rich pasture and other grassland improvements should quickly become established and assimilated into the wider landscape. Hence by Year 10 the differences between the Proposed Development and the permitted future baseline for this landscape element would be minor.</p>



Landscape element	Sensitivity	Assessment of landscape effects
<p>Low (agricultural fields under the future baseline)</p> <p>As set out for Year 3</p>	<p>The magnitude of change for the agricultural fields element is assessed as Low resulting in a Slight level of effect in relation to the future baseline scenario (restored scheme at Year 10). The nature of this effect would be Adverse, Medium Term and Not Significant.</p> <p><u>Restoration phase – Year 33</u> At least five years after completion of restoration works under the Proposed Development the species rich pasture and arable field units would be fully established and would have become integrated with the wider agricultural landscape of the host Boulby-Whitby 4a LCA</p> <p>The magnitude of change for this element at restoration is assessed as No Change when assessed against the future baseline scenario (restored scheme at Year 33).</p>	
<p>Coastal Scrub</p> <p>Low (Coastal Scrub under the future baseline)</p> <p>The overall value would be Low:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the immature coastal scrub provides a limited landscape role (Low). <p>Susceptibility: the newly planted coastal scrub could be replaced and would take a short length of time to achieve a similar landscape (and visual) value and role to that of the future baseline at Year 1 (Low).</p> <p>Medium (Coastal Scrub under the future baseline)</p> <p>The overall value would be Medium:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated element (Low); ● Condition – managed and improving (Medium); ● Role - the maturing coastal scrub provides a greater landscape role and would begin to reinforce a key characteristic of the host LCA (Medium). 	<p><u>Operational phase – Year 3</u> Introduction of the Proposed Development would not require the removal of the linear belts of scrub planting to the northern/eastward aspect of native broadleaved woodland proposed within the north-eastern corner of the site under 2012 restoration plan to be applied under the permitted future baseline.</p> <p>At this phase it is anticipated that there would be no change for the scrub elements and as a consequence no landscape effects.</p> <p><u>Operational phase – Year 10</u> No change in comparison to the permitted future baseline.</p>	

Landscape element	Sensitivity	Assessment of landscape effects
	<p>Susceptibility: the gradually maturing coastal scrub could be replaced but would take a moderate length of time (10 years) to achieve a similar landscape (and visual) value and role to that of the future baseline at Year 10 (Medium).</p> <p>Medium (Coastal Scrub under the future baseline)</p> <p>As set out for Year 10.</p>	<p><u>Restoration phase – Year 33</u></p> <p>The areas of scrub retained during the operational phase would be comparable in stature and presence to the mature restored scheme of the permitted future baseline scenario.</p> <p>There would be no landscape change to areas of coastal scrub.</p>
<p>Watercourses / drainage channels / wetland</p>	<p>Low (watercourses under the future baseline)</p> <p>The overall value would be Medium:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated, common element (Low); ● Condition –improving (Medium); ● Role - the watercourses and associated wetland flushes and shallow valley landforms would add greater visual diversity within the Site and would reinforce a key characteristic of the host LCA relating to “winding minor beck” (Medium). <p>Susceptibility: the watercourses could be replaced and would take a short length of time (up to five years) to achieve a similar landscape (and visual) value and role to that of the future baseline (Low).</p> <p>Low (watercourses under the future baseline)</p> <p>As set out for Year 3.</p>	<p><u>Operational phase – Year 1</u></p> <p>The Proposed Development would require the retention of the current baseline which is a relatively flat plateau in the central part of the site as the basis for siting the buildings and structures present in the operational area. Under the permitted future baseline by Year 3 remodelling the landform for the restoration would have introduced various minor watercouses and wetland features as tributaries to Boulby Gill and Easington Beck. These changes to the watercourses would be substantially delayed under the Proposed Development.</p> <p>The magnitude of change for this element is assessed as High resulting in a Moderate level of effect in relation to the permitted future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase – Year 10</u></p> <p>The continued presence of built development in the main operational mine area under the Proposed Development would preclude any landform modification required to introduce the watercourses and associated wetland features that would be present by Year 10 under the 2012 restoration plan that forms the permitted future baseline</p> <p>The assessment for Year 3 remains valid for Year 10.</p>

Landscape element	Sensitivity	Assessment of landscape effects
<p>Low (watercourses under the future baseline)</p> <p>As set out for Year 3.</p>		<p><u>Restoration phase – Year 33</u></p> <p>Introduction of the minor watercourses and associated landform would provide naturalistic, surface level watercourses which would connect into the wider drainage network. These features would also provide the opportunity to introduce vegetation appropriate to a wetland environment and further aid integration of the site into the adjoining landscape. Five years after the completion of restoration under the Proposed Development, the landscape form and nature of the watercourse features would be comparable with those features that would be introduced in permitted future baseline scenario (restored scheme at year 33) but the level of maturity of the associated marginal/aquatic vegetation would not be established to the same level.</p> <p>The magnitude of change for this element at restoration is assessed as Low resulting in a Slight level of effect when assessed against the future baseline scenario (restored scheme at Year 33). The nature of this effect would be Adverse, Medium Term and Not Significant. The level of effect would diminish over time as the marginal vegetation becomes increasingly established within the watercourses and wetland features.</p>
Buildings	<p>Low</p> <p>The overall value would be Low:</p> <ul style="list-style-type: none"> ● Rarity – this is a non-designated, common element which are not listed (Low); ● Condition – moderate (Medium); ● Role - the buildings are of moderate construction and form a key characteristic of the host LCA (Medium). <p>Susceptibility: The buildings could be replaced with relative ease (Low).</p>	<p><u>Operational phase – Year 3 (current mine)</u></p> <p>Retention of the operational mine buildings for the Proposed Development would result in fundamental change in relation to the permitted future baseline scenario (restored scheme Year 3) under which the site would be characterised by a general lack of built elements (with all buildings having been removed to facilitate restoration works).</p> <p>The magnitude of change for this element is assessed as High resulting in a Moderate level of effect in relation to the future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Long Term (some building would be removed by Year 10 but most would remain in -situ for up to 22 years) and Not Significant.</p>
<p>Low</p> <p>As set out for Year 3.</p>		<p><u>Operational phase – Year 10</u></p> <p>At Year 10 some buildings and structures would have been removed within the northern part of the site and a new 2-3 storey building would have been introduced within the main site area. These changes are shown in the Year 10 scenario photomontage from Viewpoint 1 in Figure 5.8b. The presence of built development would continue to dominate the landscape of the central operational area of the Mine and the level of effect would remain as Moderate, Long Term, Adverse and Not Significant.</p>
<p>Low</p> <p>As set out for Year 3.</p>		<p><u>Restoration phase – Year 33</u></p> <p>Under the Proposed Development the commencement of restoration at Year 25 would necessitate the removal of operational buildings and structures. From this year onwards the site would be comparable to the permitted future baseline scenario in terms of the quantity of built form within it. Hence there would be no landscape effects in relation to this element at this phase.</p>

Effects on Landscape Character

5.8.2 A full assessment of the sensitivity of the LCAs to a mining development (deep mine with associated ancillary surface buildings and infrastructure) is included in **Appendix 5B** with a summary included in **Table 5.12**.

Table 5.12 Summary of the Landscape Sensitivity Assessment for the LCAs

LCA Reference	Landscape Designation	Overall Value	Overall Susceptibility	Overall Landscape Sensitivity
Landscape Character Areas – North Yorks Moors National Park Landscape Character Assessment				
1c: Northern Moorland LCA	North York Moors National Park	High	High	High
4a: Coast and Coastal Hinterland LCA	North York Moors National Park and the North Yorkshire and Cleveland Heritage Coast	High	Medium	High
Landscape Character Areas – Redcar and Cleveland Landscape Character Assessment				
P7 Plateau Farmland (south of Loftus)	Not designated	Medium – Low	Medium	Medium – Low

LCA 4a: Coast and Coastal Hinterland

5.8.3 The derivation of the overall landscape sensitivity of this receptor is set out in **Appendix 5B**.

Table 5.13 Assessment of Landscape Effects: Coast and Coastal Hinterland; 4a Boulby – Whitby LCA

LCA: 4a Boulby - Whitby	Minimum distance to the Proposed Development site: Host LCA
Overall landscape sensitivity (see Appendix 5B): High	
Commentary and assessment of effects	
Area of LCA within site boundary	
<u>Operational phase – Year 3</u>	
<p>The Proposed Development would introduce fundamental landscape change when assessed against the permitted future baseline scenario (restored scheme Year 3). The retention of the heavily industrialised site would represent a considerable contrast with the restored site scenario in which the site area would be characterised by establishing soft landscape elements including native woodland and coastal scrub, wildflower meadow and agricultural field units structured with native hedgerows. The Proposed Development would result in the landscape character within the Boulby Mine site being strongly influenced by the presence of large-scale industrial buildings and structures including tall linear elements such as the various stacks and towers in the manner shown in the current baseline photographs from Viewpoints located in this LCA e.g. Viewpoints 1, 2, 4 and 5. The site entrance allowing access to large HGV's, extensive areas of hard surfacing including car parks areas together with a range of ancillary buildings and materials stockpiles would also contribute to the industrialised and developed nature of the site. This scale of development is not present elsewhere within the LCA. Away from the main operational mine area, the introduction of a range of softer landscape elements including areas of coastal scrub and woodland would provide a more naturalistic landscape, although such planting would be immature at Year 3 minimising its landscape role. However, overall the presence of the mine development would dominate landscape character within the site boundary in the same manner as it does under the current baseline.</p>	
<p>The magnitude of change is assessed as High resulting in a Substantial level of effect in relation to the permitted future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Medium Term and Significant.</p>	
<u>Operational phase – Year 10</u>	
<p>Removal of some buildings in the northern part of the site would reduce the scale of the operational buildings within the context of the LCA. Also by Year 10 there would be partial implementation of some mitigation measures, principally in the northern central area</p>	



LCA: 4a Boulby - Whitby**Minimum distance to the Proposed Development site: Host LCA**

and adjacent to the A174 where buildings, structures, infrastructure and plant would have been removed by Year 10 under the Proposed Development. However, many of the larger scale mine buildings would still be present and would continue to have a strong influence on the portion of the LCA within the site boundary. As a consequence, magnitude of change compared to the permitted future baseline scenario of a well-established restoration scheme across the site would continue to be High, hence the level of effect would continue to be Adverse, Long Term and **Significant**.

Restoration phase -Year 33

As set out in Chapter 3, the Proposed Development would result in the removal of nearly all surface buildings, structures and infrastructure after the cessation of mining activities scheduled for Year 25. By Year 33 restoration would have been completed for five years and the application of the aftercare period would ensure that restoration landscape elements would be either fully established e.g. agricultural fields, wildflower meadows or becoming well-established e.g. a proportion of the new hedgerows and native woodland (a proportion of these elements introduced during the operational phase would be fully established).

These landscape elements would all reinforce the establishment across the site of a landscape character that is in accordance with the key characteristics of the host Boulby-Whitby 4c LCA. However, in comparison with the permitted future baseline, all of the restoration landscape elements will have reached maturity and therefore be completely fulfilling their landscape character function at the site scale. This would result in the assessment of the Low magnitude of change in comparison with the situation under the mature restoration landscape elements present under the permitted future baseline. It is assessed that full maturity of all the landscape elements restored under the Proposed Development would take approximately another ten years i.e. ~Years 40-45.

The magnitude of change is assessed as Low resulting in a Moderate level of effect in relation to the future baseline scenario (restored scheme at year 33). The nature of this effect would be Adverse, Medium Term and Not Significant.

LCA beyond the site boundaryOperational phase – Year 3)

Beyond the site boundary the host LCA is characterised by distinctive topography, rural agricultural landscapes with scattered isolated farms and individual dwellings. Areas of built development and settlements are principally associated with the A174 corridor including larger settlements such as Staithes and Hinderwell. Away from the immediate environs of the site the effects of the Proposed Development will be almost entirely dependent upon the existence of a visual; effects pathway i.e. the Proposed Development would have to be visible to be able of having any direct effect upon the LCA.

As under the current baseline, the Proposed Development would have a strong characterising influence across large areas of the LCA, concentrated upon its northern part. In the area between the A174 and the North Sea coastline the landscape is relatively flat and open, as a consequence the development would be widely visible with Viewpoint 4 (**Figure 5.11**) providing an example of the nature of this visibility. Within the incised valleys of Easington, Roxby, Staithes and Dales Beck the development would be less influential. These areas of the LCA are at lower elevations and more enclosed by a combination of landform and mature tree cover with the consequence that views of the wider landscape, including the mine development, would be less frequently available. To the east, beyond Staithes the characterising influence of the proposed Development extends to open elevated areas of the LCA within the coastal hinterland and to the north of the A174 although this influence would become less strongly perceived with increasing separation distance from the site. Hence in the part of the LCA around Kettlewell (a separation distance of approximately 7km) the current baseline development, and therefore the Proposed Development, have or would have only a small-scale influence upon the characteristics of the LCA as evidenced by the current baseline photograph from Viewpoint 9 in **Figure 5.16**. The area of the LCA to the south east of the site is an elevated, agricultural area, which slopes in a north westerly direction towards Roxby Beck and the site boundary. Where open views are available, the full eastern elevation of the Proposed Development would be visible above the mature woodland cover present in the intervening valley landscapes. Viewpoint 6 (**Figure 5.13a and b**) provides an illustration of the development as perceived from this area. However, this area is also characterised by a strong hedgerow network to field and highway boundaries which limits the extent to which views of the Proposed Development would be more widely available from this part of the LCA. To the west of the site, the rising landform limits visibility and the extent to which the Proposed Development would have a characterising influence, beyond ~0.5km the landscape role of the Proposed Development would be restricted. The above observations have to be contrasted with the permitted future baseline scenario under which at Year 3 the buildings and stacks would be decommissioned and removed from the site. Under this scenario the recently implemented restoration works would be only rarely discernible from parts of the LCA located away from the immediate environs of the site. Hence the restoration works would have minimal beneficial landscape effects in their own right; however, the beneficial effects from the removal of the main built elements and stacks would be considerable in parts of the LCA within the defined LVIA study area i.e. within 5km.

The Proposed Development would have a strong characterising influence within LCA 4a Boulby – Whitby to a distance of ~0.5km to the west and up to ~2.0km elsewhere within the LCA in the same manner as the characterising influence of the present buildings and stacks do under the current baseline. Within this part of the host LCA the magnitude of change in comparison with the permitted future baseline is assessed as **High** resulting in a **Substantial** level of effect when assessed against the future baseline scenario (restored scheme at Year 3) and the LCA's high overall landscape sensitivity. The nature of this effect would be Adverse, Medium Term and **Significant**.

LCA: 4a Boulby - Whitby**Minimum distance to the Proposed Development site: Host LCA**

Beyond the ~2.0km distance set out above, the current baseline shows that Proposed Development would have a less characterising influence as visibility is restricted by strong landform or the increased separation distance reduces the perceived scale of the Mine in longer range views available much of the host LCA.

Operational phase –Year 10

By Year 10, removal of the buildings and structures in the northern part of the operational site would result in a reduction in the overall scale of the Proposed Development. Simultaneously there would be the partial introduction and gradual maturation of some soft landscape elements as part of the ongoing programme of restoration. These changes would result in a slight reduction in the prominence of the Proposed Development as perceived from across the host LCA. However, it is considered that the retention of the larger scale buildings and stacks would continue to have a strong characterising influence on parts of the LCA and would continue to contrast with the scenario at Year 10 under the permitted future baseline with no building and structures within the site being visible across parts of the LCA and a well-established restoration landscape locally reinforcing many of the LCA's key characteristics. Taking these alternative scenarios into account, the assessment concludes that the High magnitude of change would not change resulting in a **Substantial** level of effect in the closest parts of the LCA that would be Adverse, Long Term and **Significant**.

Restoration phase -Year 33

Under the Proposed Development all buildings, structures and stacks would be removed after the cessation of mining operations in Year 25 subsequently there would be gradually increasing landscape role of soft landscape elements particularly as areas of native woodland, coastal scrub and hedgerows start to mature over the intervening aftercare period. Consequently, by Year 33, the restored site would become assimilated into the wider landscape and would accord with many of the LCA's key characteristics. In comparison to the permitted future baseline scenario (restored scheme year 33) the restored site of the Proposed Development would be less mature and some landscape elements, such as broadleaved woodland, would not yet fulfil a similar landscape and visual role to that of the same elements under the permitted future baseline or that would be present in the surrounding parts of the LCA

The magnitude of change of the Proposed Development is assessed as Low resulting in a Moderate level of effect in relation to the future baseline scenario (restored scheme at Year 33) up to maximum distance of 1km from the proposed development. The nature of this effect would be Adverse, Medium Term and Not Significant. Beyond ~1km and following the establishment of grassed areas, fields and meadows, all of which would reflect the colours and textures present within the wider LCA, the restored site would have a very limited characterising presence. It is estimated that all the restoration landscape elements, most importantly the native woodland blocks and hedgerows, would mature sufficiently to allow them to completely fulfil their landscape role by Years 40-45 by which time the mature, restored site would have a neutral effect in comparison with the permitted future baseline (which would be a similarly mature restored landscape characteristic of the host LCA).

LCA 1c: Northern Moorland

5.8.4 The derivation of the overall landscape sensitivity of this receptor is set out in **Appendix 5B**.

Table 5.14 Assessment of Landscape Effects: Moorland; 1c - Northern Moorland

LCA: 1c Moorland; 1c - Northern Moorland	Minimum distance to the Proposed Development site: 2.2km
Overall landscape sensitivity (see Appendix 5B): High	
Commentary and assessment of effects	
<u>Operational phase – Year 3</u>	
As shown on Figure 5.4 , a small part of the northern extent of this LCA is present within the defined LVIA study area. The potential for the LCA to be affected is limited with visibility of the Proposed Development restricted to a small proportion of the LCA - the highest elevations of Borrowby Moor, as illustrated in the ZTV in Figure 5.2 . This has been confirmed during site visits to this part of the LCA. The upper parts of the main stack and associated occasional plume would be the only visible aspects of the Proposed Development. Partial visibility of this narrow vertical component of Proposed Development at a separation distance of over 2.2km would have a very limited characterising influence in comparison with the permitted future baseline in which the stack would have been removed by Year 3.	
The magnitude of change is assessed as Very Low which combined with the high overall landscape sensitivity would result in a Slight level of effect when assessed against the future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Long Term and Not Significant.	
<u>Operational phase – reduced operation, Year 10</u>	

LCA: 1c Moorland; 1c - Northern Moorland	Minimum distance to the Proposed Development site: 2.2km
No change to the assessment assessed for Year 3.	
<u>Restoration phase -Year 33</u> Upon removal of the stack and completion of the restoration scheme, the Proposed Development would not be perceptible from within this LCA and there would be No Effect.	

LCA P7: Plateau Farmland South of Loftus

5.8.5 The derivation of the overall landscape sensitivity of this receptor is set out in **Appendix 5B**.

Table 5.15 Assessment of Landscape Effects: Plateau Farmland; P7 South of Loftus LCA

LCA: Plateau Farmland - P7 South of Loftus	Minimum distance to the Proposed Development site: 1.6km
Overall landscape sensitivity (see Appendix 5B): Medium	
Commentary and assessment of effects	
<u>Operational phase – Year 3</u> At this separation distance any landscape effects would be confined to the presence of a visual effects pathway i.e. views of the Proposed Development. Site visits conducted under the current baseline show that there would be limited intervisibility between the Proposed Development and the LCA which is confirmed by the ZTV in Figure 5.2 that indicates visibility from the north-eastern slopes of the domed landform. The Proposed Development is situated at a comparatively low elevation (~80m AOD) in relation to this elevated part of the LCA to the west (maximum elevation of 162m AOD). The potential for the Proposed Development to impact upon the key characteristics of this LCA (in the same manner as the present Mine under the current baseline) would be restricted to occasional visibility of the stack and associated plume where an absence of foreground screening elements allows partial or open views to the north-east. This should be assessed against the permitted future baseline in which the stack would be removed by Year 3.	
The magnitude of change is assessed as Very Low resulting in a Slight/Negligible level of effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.	
<u>Operational phase – Year 10</u> No change to assessment for Year 3.	
<u>Restoration phase -Year 33</u> On removal of the stack no components the Proposed Development, including the restoration scheme, would not be perceptible and there would be No Effects.	

Effects on Landscape Designations

- 5.8.6 The Proposed Development is situated within the North York Moors National Park and adjacent to the North Yorkshire and Cleveland Heritage Coast (**see Figure 5.5**).
- 5.8.7 The landscape assessment has considered the effects of the Proposed Development on the overall integrity and special qualities for which these areas are designated.
- 5.8.8 It is relevant to note that regarding valued landscapes such as National Parks, the Landscape Institute (GLVIA3, paragraphs 5.46-47) advises:

“An internationally, nationally or locally valued landscape does not automatically or by definition have high susceptibility to all types of change.”

“It is possible for an internationally, nationally or locally important landscape to have relatively low susceptibility to change resulting from the particular type of development in question, by virtue of both the characteristics of the landscape and the nature of the proposal.”



"The particular type of change or development proposed may not compromise the specific basis for the value attached to the landscape."

North York Moors National Park

- 5.8.9 The Proposed Development site is wholly located within the NYMNP and as illustrated in **Figure 5.5** a large proportion of the defined LVIA study area is within the NYMNP. However, the proportion of the 1436km² area of the NYMNP that is within the study area is small: 3.2% i.e. 46km².
- 5.8.10 As a national landscape designation, the value of the NYMNP is assessed as High. The susceptibility of this landscape to change is assessed to be High in terms of the underlying landscape character. Taking account of these factors, the overall landscape sensitivity of the NYMNP is assessed as High.
- 5.8.11 The document, *North York Moors National Park, Management Plan, A Wider View 2012*, sets out information on the special qualities of the NYMNP with reference to the landform, land use, settlement, authenticity and integrity, time depth, visual experience, emotional response, wildlife and cultural and historical associations as listed in Section 5.2.31.
- 5.8.12 **Table 5.16** sets out 28 special qualities identified in the Management Plan, some of which are grouped together where they are closely related in landscape terms. **Table 5.16** contains an assessment of the effects of the Proposed Development upon each of these qualities against the permitted future baseline under which the current Mine activities would cease, all surface buildings, structure, plant and infrastructure would be removed and restoration completed by Year 3 in accordance with the 2012 restoration plan.

Table 5.16 Assessment of the Proposed Development on the Special Qualities of the NYMNP

Special Qualities	Assessment
<p>Great diversity of landscape</p> <p>Sudden dramatic contrasts associated with this</p>	<p>The Proposed Development would result in the loss of a small proportion of immature woodland, meadow, hedgerows and pasture land from within the central part of the site, which (under the permitted future baseline) would have begun to reinforce the diversity in landscape at a local level. This would cause a slight temporary loss in diversity and contrast at a site level, which would be perceptible from within immediate surrounding part of NYMNP. Beyond the central part of the site, the retention of existing mature woodland and the introduction of new habitats including woodland and coastal scrub within the wider site would result in no change when assessed against the permitted future baseline.</p> <p>Following removal of the mine buildings and completion of the restoration, the landscape elements within the central part of the site would be immature and the contribution to a diverse and contrasting landscape within the site would not be so apparent in comparison to a mature and assimilated future baseline. The Proposed Development would introduce Slight adverse effects in relation to these qualities over area small proportion of the NYMNP (within the site and a maximum of 1km from the site boundary) which would be Not Significant.</p> <p>The gradual maturation of the restoration planting and seeding would result in an eventual scenario (i.e. ~Year 40 onwards) whereby the landscape elements are fulfilling their landscape role and the habitats would make a positive contribution to these special qualities in line with landscape effects that would be sustained by the NYMNP earlier under the permitted future baseline.</p>

Special Qualities	Assessment
<p>Wide sweeps of open heather moorland</p> <p>Distinctive dales, valley and inland headlands</p>	<p>The Proposed Development would occasionally be perceptible as an isolated built element situated on the North Sea coastline in long range views from areas of open heather moorland to the south of the Site. A worst-case scenario of this type of effect is shown in the baseline photograph from Viewpoint 10 at Danby Barrow in Figure 5.17. As a consequence of the perceived small scale of Proposed Development due to the considerable separation distance in these views, the Proposed Development would not have a strong characterising influence upon this special quality. The level of effect is assessed as Slight and Not Significant.</p> <p>The Proposed Development would be regularly visible in views from the east and south east of the site in relation to the mature woodland cover present in the incised valleys of Easington, Roxby and Staithe Becks although intervisibility from within the valleys themselves would be limited. There would also be localised long term (but not permanent) direct landscape effects resulting from the inability to provide (until Year 25) the minor valley landforms to be introduced within the site under a permitted future baseline. In comparison with the permitted future baseline, until Year 25 when restoration would commence, the Proposed Development would result in localised adverse effects on this special quality which are assessed as Moderate and Not Significant.</p> <p>Following removal of the buildings and restoration of the site after Year 25, the Proposed Development would have no influence upon the open heather moorland. The final restoration would recreate the long-lost minor valley landforms within the site which when assessed against the future baseline in which these would already have been recreated, would result in No Effect.</p>
<p>An abundance of forest and woodland</p> <p>Ancient trees and woodland rich in wildlife</p>	<p>There are several woodlands in the vicinity of the site, mainly comprising wooded valleys running down towards the coast. Newton Gill Wood extends to the southwest, Boulby Mine Wood extends to the south and east as far as Easington Beck, and Long Ridge Lane Wood extends further east between Easington Beck and Long Ridge Lane. Some of the woodland adjacent to the site is ancient and semi-natural woodland and ancient replanted woodland. The Proposed Development would not result in the loss of any mature forest, woodland or ancient trees. Hence there would be No Effect.</p> <p>Once the final restoration has been implemented in Years 25-28, the quantity of woodland introduced within the site would be comparable with the permitted future baseline. Whilst the immaturity of a proportion of this woodland planting (some would have been introduced earlier in the operational phase) would contrast with the permitted future baseline scenario of semi-mature woodland cover, adverse effects would gradually become neutral and the woodland would make a positive contribution to these special qualities in line with the permitted future baseline.</p>
<p>Special landforms from the Ice Age</p> <p>Exceptional coastal geology</p>	<p>No geological landscape features would be affected by the Proposed Development. Boulby Quarries SSSI is located approximately 645m to the north west of the site. This has been designated because of its geological interest and value, providing a series of highly important cliff-top exposures which cut through the base of the mid-Jurassic Ravenscar Group into Upper Lias deposits of the Lower Jurassic Period. However, given the nature of the designation and the distance from the Proposed Development it is assessed that there would be No Effect on this SSSI nor on these special qualities as a result of the Proposed Development.</p>
<p>Majestic coastal cliffs and sheltered harbours</p> <p>Distinctive coastal headlands</p>	<p>In some views from the coastal hinterland within the National Park to the east of the site, the buildings and structures of the Proposed Development would be visible in proximity to the coastal landscape particularly the high cliffs at Boulby. There would also be intervisibility of the Proposed Development with Staithe Harbour from a very restricted area within the NYMNP. It is considered that this would introduce localised adverse effects which are assessed as Moderate and Not Significant in comparison with the scenario that would arise under the permitted future baseline. The progressive removal of built development particularly the buildings in the northern part of the main operational area up to Year 10, would reduce the visual prominence of the Proposed Development and provide a simpler less cluttered interface with the coastline as perceived from some areas to the east. As a consequence, the level of effect would be reduced to Slight and Not Significant.</p> <p>Following the removal of the buildings and structures and introduction of the restoration scheme following Year 25 there would be No Effect in relation to this special quality when assessed against the permitted future baseline.</p>

Special Qualities	Assessment
<p><i>A special mix of upland, lowland and coastal habitats</i></p> <p><i>A wide variety of wildlife dependent on these</i></p>	<p>The Proposed Development would result in the loss of a small proportion of immature habitats (woodland, meadow, hedgerows and pasture land) from within the central part of the sSite, which under the permitted future baseline) would have begun to contribute to the mix of habitats at a local level. This would cause a slight temporary reduction at a site level. Beyond the central part of the site, the retention of mature woodland habitat and the introduction of new habitats including some wildflower meadows, woodland and coastal scrub within the more peripheral parts of the site would result in no change when assessed against the permitted future baseline.</p> <p>Following removal of the buildings and completion of the restoration following Year 25, the habitats introduced within the central part of the site would be immature although the quantity and distribution of habitats would be comparable to the future baseline. The gradual maturation of these habitats would result in an eventual scenario (by ~Year 40) whereby they would make a positive contribution to these special qualities in line with the contributions that would be made by the same habitats introduced earlier under the permitted future baseline.</p>
<p><i>Settlements which reflect their agricultural, fishing or mining past</i></p> <p><i>Locally distinctive buildings and building materials</i></p>	<p>The Proposed Development has associations with the mining heritage of the local area although the Proposed Development would be of a greater scale than that related to historical mining activity. There would be no significant effects upon this special quality.</p> <p>There would be no direct effects on any element of the built environment. However, the Proposed Development has the potential to affect the setting of locally distinctive buildings and settlements through the presence of the large-scale Mine Site buildings and plant which would contrast with the smaller scale, traditional construction of those buildings which are characteristic of the local vernacular and widely present within settlements in the National Park. (See the Historic Environment assessment in Chapter 11). Whilst a range of views would be available of the Mine buildings from some settlements within the defined LVIA study area, these would not be sufficient to significantly adversely affect the overall character or perception of these settlements. The Proposed Development would introduce a Moderate adverse effect in relation to this special quality which would be Not Significant.</p> <p>Following the removal of the mine buildings and structures and introduction of the restoration scheme there would be No Effect in relation to this special quality when assessed against the permitted future baseline.</p>
<p><i>Long imprint of human activity</i></p> <p><i>A wealth of archaeology from prehistory to the 20th Century</i></p>	<p>No new buildings or other development is proposed that would be expected to disturb below ground archaeology and there would be no loss of any designated or undesignated archaeological features as a result of the Proposed Development. The Historic Environment Assessment (Chapter 11) concluded that there would be no significant effects on the settings of the nearest cultural heritage assets (SAM/listed buildings and the Staithes Conservation Area) as a result of the Proposed Development. There would be no intervisibility between the Proposed Development and the round barrows on the distant Newton Mulgrave Moor as illustrated by the ZTV in Figure 5.2. As a consequence, there would be no significant effects on these special qualities.</p>
<p><i>A rich and diverse countryside for recreation</i></p> <p><i>An extensive network of public paths and tracks</i></p>	<p>The Proposed Development would not result in the loss of recreational facilities/routes or otherwise introduce direct effects in relation to the countryside as a recreational resource. Indirect effects would arise as a consequence of the availability of views of large industrial buildings and structures which would result in localised adverse effects for a limited number of recreational receptors such as walkers and cyclists using the local PRoW network (see Figure 5.7). The level of effect is assessed to be Slight and Not Significant.</p> <p>Following the final restoration, there would be no effects upon these special qualities when assessed against the permitted future baseline.</p>

Special Qualities	Assessment
<i>Strong religious past and present</i>	These special qualities are concerned with the religious heritage of the NYMNP. The Proposed Development would have no effect on ruined abbeys or ancient churches. Given the absence of heritage features with any religious connotation within the area of the site, the Proposed
<i>Ruined abbeys and ancient churches</i>	Development would not impact on peoples' understanding and enjoyment of the NYMNP's strong religious past and present.
<i>Strong feeling of remoteness</i>	Buildings, structures, infrastructure and activity associated with the mine's operation would introduce a large-scale presence which may adversely affect the sense of remoteness. However, the site and local landscape within the LVIA study area are not defined as remote areas under Policy ENV3 of the North York Moors Pre-Submission Local Plan with the closest remote area located at Newton Mulgrave Moor to the southeast of the site. The busy A174 as a principal transport link with settlements and facilities within the coastal area of the NYMNP detracts from the sense of remoteness currently experienced within the vicinity of the site. The effects upon the sense of remoteness as a result of the Proposed Development would be incremental to these existing lower levels within a small peripheral area of the NYMNP. There would be no changes to the perception of remoteness within other core areas of the National Park where this perceptual quality is stronger. The level of effect is assessed as Slight adverse effects which would be Not Significant.
<i>A place for spiritual refreshment</i>	
<i>Tranquillity</i>	Noise, movement and transient lighting associated with moving vehicles on the A174 together with the presence of built development in nearby settlements such as Staithes and Hinderwell combine to influence existing levels of tranquillity along this major road corridor. This is demonstrated by the tranquillity map within the Management Plan (page 38) which illustrates that the sense of tranquillity at the Proposed Development site on the periphery of the NYMNP is not as strong as the more remote parts of the NYMNP.
	The proposed development would perpetuate the current baseline situation of large-scale built development with associated activity, vehicular movements, lighting and occasional plume emissions into the A174 corridor which would have a localised influence on this special quality. Noise emanating from the Proposed Development as a result of operational activity would be experienced within a very localised area with the conclusions of the Noise Assessment (see Chapter 6) indicating no significant effects as a result of road traffic noise or operational noise. This situation should be contrasted with the tranquillity levels that would be likely to arise under the permitted future baseline in which mining operations and associated plant and traffic movement would cease and restoration works be complete by Year 3. Subsequently activity levels within and associated with the site would strongly decrease. . The contrast between the Proposed Development (and the analogous current baseline) and the permitted future baseline until the site becomes restored result in assessment of a Moderate/Substantial level of effect that would be Significant.
	Following completion of restoration under the Proposed Development, the site would assume a more settled state comparable with that of the future baseline scenario (restoration Year 33). There would be No Effect for this special quality following the completion of restoration works in Year 27.
<i>Dark skies at night and clear unpolluted air</i>	Lighting associated with the Proposed Development would contribute to the pattern of light glow principally emanating from settlements along the A174 corridor within the coastal hinterland as it does under the current baseline. This pattern can be seen in CPRE's Night Blight Mapping. The incremental increase in lighting levels in comparison with the permitted future baseline is likely to be experienced from within some elevated areas of land beyond the defined LVIA study area, including at Leaholm Moor/Beacon Hill where the valley landscape associated with Easington Beck would allow visibility of the operational mine. In these longer range views the lighting would be perceived in relation to a range of other light sources within individual settlements and the highways network. In closer proximity to the site, in an area extending east to Staithes, west to Ings Farm and Boulby Bank and south west to Roxby, it is assessed that the Proposed Development would perpetuate localised effects with the CPRE maps show existing moderate levels of radiance as consequence of highway and domestic lighting within Staithes, Easington and Loftus. In comparison with the permitted future baseline scenario in which the mine ceases to operate and the site is restored, the level of effect would be Moderate and Not Significant.

Special Qualities	Assessment
	Following completion of restoration the majority of light sources and emissions would be removed and the influence of the Proposed Development would be comparable with that of the future baseline scenario (restoration Year 35). There will be No effect upon this Special Quality during this phase.
<i>Distinctive skills, dialects, songs and customs</i>	It is not considered that the Proposed Development would have any effects on the cultural traditions of the NYMNP during the operational or restoration phase. A local business with a large, skilled workforce would provide a range of attractive jobs to local people, which could see more people remain in local communities and help to retain local customs and culture.
<i>Strong sense of community and friendly people</i>	
<i>A place of artistic, scientific and literary inspiration</i>	It is not considered that the Proposed Development would have any effects on any natural or built environment features with an artistic, scientific or literary association during the operational or restoration phase. The mining operations would enable the Science and Technology Facilities Council's underground laboratory project to continue with its research work, so positively contributing to the scientific heritage of the NYMNP.
<i>A heritage of authors, artists, scientists and explorers</i>	

5.8.13 It is considered that the Proposed Development would be likely to result in localised Significant landscape effects would be experienced in relation to the following special qualities of the NYMNP until the completion of restoration works scheduled for Year 27:

- Tranquillity

5.8.14 The levels of effect for the other defined special qualities of the NYMNP in comparison to the permitted future baseline in which mining activities cease and restoration is completed by Year 3 vary between No Change and Moderate. There can be a high level of confidence in these assessments because the operation of the Proposed Development would generally result in the current baseline effects upon these special qualities being extended for up to 25 years. Many of the special qualities would not sustain large scale changes due to the earlier cessation of mining activities and the commensurate earlier completion and maturity of the restoration proposals. This is because there is no or minimal effects pathway between the Boulby Mine site under any land-use and the strength or retention of many individual special qualities.

5.8.15 The assessment concludes that the Proposed Development would have a significant effect upon the special quality of tranquillity that would be adverse, long-term (up to 25 years) albeit at a localised scale within the NYMNP i.e. would be largely restricted to the small proportion (under 4%) of the extensive NYMNP located within the defined LVIA study area. This significant effect would be sustained because the Proposed Development would result in the perpetuation of existing adverse effects upon tranquillity over a further 25 years where as effects from activities and built elements within the site would be almost completely removed following the restoration works that form the permitted future baseline.

5.8.16 It is pertinent to note that the affected part of the NYMNP is not one of its most tranquil parts, is sited on the edge of the NYMNP and that the effects upon tranquillity levels are not solely generated by the operation of the Mine; tranquillity is also adversely affected by the presence of the A174 and comparatively large settlements at Staithes and, just over the boundary of the NYMNP, at Loftus, Skinningrove and Brotton. Hence whilst the closest part of the NYMNP would sustain significant adverse effects upon this special quality, this assessment has to be judged in the context of it being:



- Long-term (25 years) but reversible and not permanent;
- The assessment is made against a future baseline that has not yet developed; instead the current baseline level of tranquillity would be continued but not further reduced;
- The significant adverse effect applies to only one of 28 special qualities; and
- The significant adverse effect would be sustained across less than 4% of the area of the NYMNP.

North Yorkshire and Cleveland Heritage Coast

- 5.8.17 The closest section of Heritage Coast is situated adjacent to the northern boundary (A174) of the Proposed Development, as the A174 defines the southern boundary of the Heritage Coast within much of the defined LVIA study area as shown on **Figure 5.5**. The Heritage Coast's Management Plan does not define special qualities but instead defines several key principles of which the first relates to the conservation and enhancement of the coastal landscape; retention of open landscape character; and retention of extensive, uninterrupted views.
- 5.8.18 As a national landscape designation, the value of the Heritage Coast is assessed as High. The susceptibility of this designation to change is considered to be High in terms of the effects upon its relevant key principles. Taking account of these factors, the overall landscape sensitivity of the Heritage Coast is assessed as High.
- 5.8.19 As the Proposed Development is sited outside the Heritage Coast, landscape effects upon the key principles would be mostly restricted indirect effects which would require the presence of the visual effects pathway as evidence by inclusion within a ZTV. The ZTV in **Figure 5.2** and comparison with **Figure 5.5** illustrates moderate theoretical visibility across the section of the Heritage Coast that lies between White Skerries to the north-west and Runswick Bay to the east i.e. an approximately 8km length within the context of the total length of the Heritage Coast of 55km. Reference to current baseline photographs from viewpoints sited within the Heritage Coast provide a strong indication of the visual role that would be played by the operation of the Proposed Development within this 8km long section.
- Viewpoint 2 (**Figure 5.9a & b**) – this shows that in the closest part of the Heritage Coast the Proposed Development would be a prominent landscape element that would not enhance this localised part of the Heritage Coast in the manner that the restored site would under the permitted future baseline with commensurate adverse effects upon local open landscape character and would interrupt some views;
 - Viewpoint 4 (**Figure 5.11**) – this shows a particularly open inland view (worst case scenario) from the Heritage Coast in which the nearby Proposed Development would be the most prominent element in inland views. Its presence would not enhance this localised part of the Heritage Coast in the manner that the restored site would under the permitted future baseline with commensurate adverse effects upon local open landscape character. The landscape role of the Proposed Development would slightly reduce by Year 10 with the removal of some buildings in the northern (closer) part of the site;
 - Viewpoint 5 (**Figure 5.12**) – this shows that at a separation distance of 2km the landscape role of the Proposed Development reduces as it would be readily apparent as opposed to prominent or dominant in the landscape. Only the tops of the stacks would interrupt views and this would only be in a narrow westerly angle of view;
 - Viewpoint 7 (**Figure 5.14**) – this shows that the Proposed Development would remain readily apparent in some views over a separation distance of 3km but would not impact upon the

retention of open landscape character nor would it interrupt views due to the presence of the more elevated backdrop;

- Viewpoint 9 (**Figure 5.16**) – this shows that over a separation distance of approximately 6km the Proposed Development would be a minor landscape element with minimal role in the coastal landscape and not affecting the open landscape or interrupting views.

5.8.20 This analysis should be taken into account in the context of the most valued views being likely to be out to sea and that viewpoints were selected in locations within the Heritage Coast where particularly open views are available towards the Proposed Development site. Also the separation distances, comparative elevations and intervening screening would generally combine to ensure that few, if any, elements of the restoration scheme that would be in place under the permitted future baseline, would be discernible from locations within ZTV within the Heritage Coast beyond its immediate adjacent part.

5.8.21 It is therefore assessed that the level of effect in comparison with the future baseline situation that would prevail up to Year 25 would be vary between **Moderate/Substantial** and **Significant** within the part of the Heritage Coast within approximately 2km to Slight to None and Not Significant for the remainder of the Heritage Coast. Significant effects would be experienced within a severely limited proportion of the Heritage Coast and would not compromise the integrity of its most relevant and therefore susceptible key principle. These effects would be indirect, long term, reversible, and adverse and would cease after Year 25 when the main buildings and stacks would be removed.

5.9 Predicted Visual Effects

Residential Visual Receptors in Settlements, Property Groups and Individual Properties

5.9.1 The visual effects likely to be experienced from settlements include consideration of residential areas, the public realm and public open spaces within the settlement boundaries.

5.9.2 Residential receptors are assessed as possessing high susceptibility in accordance with GLVIA3 paragraph 6.33 and there is a high likelihood that these receptors attach a medium or high value to the views that are available from the windows and curtilage of their properties. As such the sensitivity of all residential visual receptors is assessed as High.

5.9.3 The assessment of visual effects for residential visual receptors in settlements, property groups and individual properties during the operational phase is set out in Tables 5.17 and 5.18.

Table 5.17 Assessment of Visual Effects for Residential Visual Receptors in Settlements

Receptor	Commentary
Staithe (Old Town)	<p><u>Operational phase (Year 3)</u></p> <p>The older part of Staithe comprises a tightly packed arrangement of two and three storey traditional stone buildings principally located to the east of Staithe Beck. The organic, tightly packed nature of the townscape generally restricts visibility beyond the containment provided by the streetscape. Where views are available beyond the containment of the built environment visibility towards the Proposed Development site is largely restricted by landform, principally, the high cliffs to the west bank of Staithe Beck which defines the western extent of Staithe Harbour. It is anticipated that visibility of the Proposed Development will be limited to the occasional views of plumes from the operational stacks where gaps in the built fabric allow visual receptors' views to the west.</p>

Receptor**Commentary**

The magnitude of change for visual receptors in Staithes Old Town would be Very Low in comparison with the permitted future baseline without the stack and its plume resulting in a Slight level of effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.

Operational phase (Year 10)

No change to assessment.

Restoration

Following decommissioning, removal of the stack and restoration the Proposed Development would not be visible and there would be No Effects.

Staithes (Upper Town)Operational phase (Year 3)

The more elevated situation of this part of Staithes in relation to the 'Old Town' allows greater availability of views to the wider landscape beyond the visual containment provided by built development. Viewpoint 5, **Figure 5.13**, illustrates the nature of visibility from the play area adjacent to the Tourist Information Centre located in this more elevated part of the settlement. The view is illustrative of the most open views available to residential visual receptors from this part of Staithes. This viewpoint is also considered to represent the visual experience for residents at several properties located at the western edge of Staithes, including those on Staithes Lane and Dale Bank which are generally orientated in a manner which allows views out towards the Proposed Development site. Under the current baseline the operational mine is visible from some aspects; either westerly facing windows or from external areas, from most of these properties. The buildings and structures which comprise the eastern elevation of the mine development are largely visible on a semi-elevated plateau of land to the west. Some of the taller buildings and structures can be seen above the skyline of the elevated landform beyond the Mine to the west. This range of views would continue to be available under the Proposed Development in comparison to all built elements within the site being removed under the permitted future baseline.

The level of effect that would be generated (or continued) by the Proposed Development will vary between **Substantial** to None for receptors in this part of Staithes. Where open views are available the magnitude of change would be High resulting in a **Substantial** level of effect in relation to the permitted future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Medium Term and **Significant**.

Operational phase (Year 10)

At year 10 the Proposed Development requires that several mine buildings and structures visible from Staithes will be removed which will change the overall extent of visible development. Buildings to the north of the main operational mine will be removed including the administration building, sports dome, engineering services building and a range of smaller buildings and structures. The 2000 tonne bunker and some of the conveyors will also be removed. It is envisaged that the retained buildings/structures will receive a new paint finish ((final colour to be agreed) with the aim of providing a uniform recessive appearance. Planting introduced to the north of the operational mine will be relatively immature and will not be readily perceptible at Year 10 providing minimal screening.

Overall the extent of visible development will be slightly reduced and built development profile will be simplified and less cluttered. The magnitude of change would be **Medium** resulting in a **Moderate/Substantial** level of effect in relation to the future baseline scenario (restored scheme at Year 10). The nature of this effect would be Adverse, Long-term and **Significant**.

Restoration (Year 33)

Removal of the mine buildings and implementation of the restoration scheme would introduce an appropriate range of soft landscape elements which would be perceived as a mosaic of naturalistic elements and textures allowing assimilation into the wider agricultural landscape as perceived from this part of Staithes by receptors with the most open views. The magnitude of change in comparison with the permitted restored baseline of a similar but fully mature restoration scheme would be Very Low resulting in a Slight level of effect in relation to the future baseline scenario. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade the restoration scheme of the Proposed Development would fully mature and there would be no differences in any visual receptors' views in comparison with the permitted future baseline.

Receptor	Commentary
Cowbar	<p>Cowbar is a small settlement situated to the east of the Proposed Development and principally comprises to parallel rows of two storey dwellings. There are also several detached dwellings situated adjacent to the terraced properties and at lower elevations along Cowbar Bank.</p> <p><u>Operational phase (Year 3)</u> The westerly terrace is orientated in a manner which allows relatively open views from the south western elevation of the properties. In these views the Proposed Development would be partially visible across an area of open gently rising land. The upper elevations of the development would be visible from ground level, lower aspects of built development screened by the intervening rising landform. Visibility would be more comprehensive from first floor windows. Elsewhere within the settlement visibility would be more restricted. Views of residents within the easterly terrace will be limited by the presence of the terraced housing to the west and as a consequence of being situated at a lower elevation. Residents will also experience views of the mine when travelling west on Cowbar Lane to access the A174.</p> <p>The level of effect for walkers using this section of the route is assessed as Moderate/Substantial resulting from a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Medium-term and Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment.</p> <p><u>Restoration</u> Following decommissioning, demolition and introduction of the restoration scheme the site area of the Proposed Development would not be widely visible from Cowbar.</p>
Easington	<p><u>Operational phase (Year 3)</u> There will be very limited visibility of the Proposed Development from Easington. The ZTV (Figure 5.3) illustrates that there would be partial visibility for some areas at the eastern extent of the village. This includes the A174 corridor, properties at Easington Hall Farm, Arglam Farm, Park Lane and Twizziegill View. However, mature trees, hedges and scrub associated with the A174 corridor filter views towards the Proposed Development site particularly for residents in areas to the north of the A174. Site surveys indicate that the top of the stack and the associated plume would be visible for a limited number of residents of properties (first floor windows) at the eastern edge of the settlement where views are orientated east towards the site. However, views of the Proposed Development would generally not be available from publicly accessible areas and the ground floor windows of residential properties across Easington.</p> <p>The magnitude of change introduced by the Proposed Development would be Very Low resulting in a Slight level of effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> Change resulting from the phased removal of mine buildings and infrastructure would not generally be perceptible for residents in Easington. There would be no change to the assessed level of effect.</p> <p><u>Restoration</u> There would be no visibility of the Proposed Development following removal of the buildings and stack and introduction of the restoration scheme.</p>
Boulby	<p><u>Operational phase (Year 3)</u> Boulby is a small village comprising a disparate group of traditional stone dwellings to the north of the proposed development site between the A174 and the North Sea. The properties are accessed via a network of minor lanes including Boulby Bank which link into the A174. Viewpoint 2, Figure 5.10 illustrates the nature of visibility at Boulby Bank. There is a rising area of landform between the A174 and these properties which would restrict visibility from the most westerly properties in the group. Towards the east the landform reduces in height which results in increased levels of visibility for residents in these easterly properties. The frontage and southern elevation of Boulby Grange is orientated towards the site and residents would have views of the northern elevation of the Proposed Development.</p>

Receptor**Commentary**

Existing tree and scrub cover within the A174 corridor and to the north west of the Proposed Development site partially screens and filters views although the upper elevations of large mine buildings, including the main plant building and the stack to the north of the operational area will be visible. Residents in properties sited further to the west of Boulby would experience only partial visibility of the stack and associated plume. This range of views would be available under the Proposed Development in comparison to all built elements within the site being removed under the permitted future baseline.

The magnitude of change introduced by the Proposed Development would vary across the settlement from **High** to Low because of the dispersed nature of the settlement and range of orientation of individual properties. This would result in a **Substantial** to Moderate level of effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Medium Term and **Significant** to Not Significant.

It should be noted that residents would also experience visual effects as a result of the Proposed Development when using the network of access roads linking in to the A174 to access their properties.

Operational phase (Year 10)

By Year 10 of the Proposed Development several buildings would have been removed as part of the programme to reduce the overall extent of the operational area. This visual change resulting from this phased removal will be apparent from some properties and access areas. Although the existing area of woodland to the north east corner of the site and landform will screen the effects of lower level alterations and limit the extent to which this change is perceived. The overall level of effect will not change in comparison with Year 3 in relation to the permitted future baseline.

Restoration

Removal of the all buildings, plant and infrastructure and implementation of the restoration scheme would introduce an increased range of soft landscape elements in some residents' views. In comparison to the future baseline scenario (restored scheme at year 33) the many areas of woodland, scrub and hedgerows will not be fully mature and as a consequence would not provide the same level of integration with the wider landscape. The magnitude of change would be Low resulting in a Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade the restoration scheme of the Proposed Development would fully mature and there would be no differences in any visual receptors' views in comparison with the permitted future baseline.

RoxbyOperational phase (Year 3)

The elevated nature of the settlement on the upper aspects of the north west facing valley side allows extensive visibility to the west and north west where open views are available to residents. Roadside hedgerows frequently filter views from Roxby Lane which provides access to the village. Visibility from the central core of the village is limited by an area of mature trees to the west, existing built development and the orientation of properties which generally do not face towards the Proposed Development. Some visibility of the tip of main stack is available and the plume when present would also be available from publicly accessible locations. Occasional glimpsed views of the development would be visible through gaps in the tree cover at the north west extent of the village where a greater extent of the Proposed Development would be visible. These views may be more widely available in winter when these deciduous trees will be defoliated. It is also likely that limited visibility would be available of the stack and plume from within the curtilage of some properties including external areas and gardens.

The magnitude of change introduced by the Proposed Development is assessed as Low in comparison with the permitted future baseline in which there would be no retained buildings or stacks within the Proposed Development and hence in residents' views. This would result in a Moderate level of effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long-term and Not Significant.

Operational phase (Year 10)

The limited removal of buildings in the northern part of the site by Year 10 would not be perceptible and there would be no change to the Year 3 assessment.

Receptor	Commentary
	<p><u>Restoration</u></p> <p>Following decommissioning and restoration in Years 25-27, the establishing and then the mature restoration of the Proposed Development would not be visible from Roxby and there would be no discernible change in relation to the permitted future baseline scenario i.e. No Effect.</p>
Hinderwell	<p><u>Operational phase (Year 3)</u></p> <p>Visibility of the Proposed Development from the village core will largely be restricted by buildings which are situated on 'High Street' and that limits residents' views beyond the settlement boundary. Views of the wider landscape are further restricted by mature trees to the western extent of the village, vegetation within gardens and within St. Hilda's Church Yard. Generally, views of the Proposed Development would not be widely available from publicly accessible locations or the curtilages of individual properties within the settlement. Some more open views are available from a restricted range of locations. This includes a short section of the minor road travelling westwards towards the A174 which is adjacent to St. Hilda's Church and from the A174 and adjoining path at the western extent of the village. Viewpoint 7, Figure 5.14 provides an illustration of the nature of visibility from this location. The easterly elevation comprising the mine buildings, structures and the stack would be visible for some receptors within a limited area at the western extent of the village. This would compare with a view under the permitted future baseline that would contain almost no built development following the removal of the buildings and stack.</p> <p>Overall the magnitude of change resulting from the Proposed Development that would be sustained by Hinderwell's residents to the village in comparison to the permitted future baseline is assessed as Low. The magnitude of change in relation to residents in a small area at the western extent of the village is assessed as Medium. This would result in a Moderate to Moderate/Substantial level of effects in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant to Significant.</p> <p><u>Operational phase (Year 10)</u></p> <p>Removal of some buildings to the northern extent of the site will reduce the lateral extent of built development as perceived in views from Hinderwell. However, the largest buildings which are the most prominent features in these views, including the main plant building and chimney stack, will remain. Overall the level of effect will remain as assessed at Year 1.</p> <p><u>Restoration</u></p> <p>Removal of the built elements at completion of the mine operation and replacement with a range of soft landscape elements including; native woodland, scrub, meadow and agricultural pasture will allow assimilation with the wider landscape. In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland, scrub and hedgerows will not be fully mature and as a consequence will not provide the same level of integration with the wider landscape. The magnitude of change would be Very Low resulting in a Slight level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant.</p>
Ellerby	<p><u>Operational phase (Year 3)</u></p> <p>Visibility of the Proposed Development from Ellerby would be generally restricted by a combination of built development, roadside hedges and mature vegetation in the intervening landscape. Occasional views are available where there are gaps in built development and roadside vegetation. The minor road which provides access to the village from the A174 is lined with continuous hedgerows which restrict views out to the wider landscape. There is limited visibility from the rear of the Ellerby Country Inn where the Proposed Development would be visible above the boundary hedgerow. Visibility from the ground floor and external/garden areas of residential properties is also limited, although it is likely that views would be available from the upper floors of some easterly facing dwellings. Viewpoint 8, Figure 5.15, illustrates visibility from PRoW 30.34/002 close to the northern extent of the village. This view is illustrative of the most open views available from locations beyond the visual containment provided by buildings and hedgerows at the edge of the village and does not represent the nature of visibility generally available within Ellerby.</p> <p>The level of effect for the settlement's residents is assessed as Moderate resulting from a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.</p>

Receptor	Commentary
	<p><u>Operational phase (Year 10)</u> Under the Proposed Development changes introduced By Year 10 including building removal and partial restoration would be difficult to see the village and there will be no change to the Year 3 assessment</p> <p><u>Restoration</u> Removal of the mine buildings and introduction of the restoration scheme will allow assimilation of the restored site into views of the wider agricultural landscape. There will be no discernible change in relation to the to the future baseline scenario (restored scheme at year 33) and as a consequence there would be no visual effects.</p>
Newton Mulgrave	<p><u>Operational phase (Year 3)</u> The village occupies an elevated position and ZTV analysis in Figure 5.3 indicates partial theoretical visibility. There is a dense belt of mature woodland a short distance to the north east of the village which would result in very limited visibility of the Proposed Development for residents. Glimpsed views of the stack will occasionally be available from a short section of the minor road to the south of the village. The presence of the mine may occasionally be more apparent from a slightly wider area when there is a plume emitting from the stack. It is anticipated that there will be no visibility of the Proposed Development for residents in properties in the core of Newton Mulgrave.</p> <p>The level of effect for the Newton Mulgrave’s residents is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to Year 3 assessment.</p> <p><u>Restoration</u> Following decommissioning and restoration there will be no visibility of the Proposed Development and as a consequence there would be no visual effects.</p>

Table 5.18 Assessment of Visual Effects for Individual Properties and Property Groups

Receptor	Commentary
Ings Farm	<p><u>Operational phase (Year 3)</u> Ings Farm and associated properties are situated immediately to the northwest of the A174 in proximity to the northern site boundary. There is a residential terrace adjoining the A174 as well as a farm and associated farm buildings. The properties are situated in a relatively elevated position with views to the east which overlook the Proposed Development site and coastal hinterland beyond. Residents’ views are partially filtered by deciduous tree cover on the opposite verge although some residents have more open views. The upper elevations of the buildings and structures plus the stack of the Proposed Development would be visible in close range views. This range of views that would be available under the Proposed Development would be in comparison to all built elements within the site being removed under the permitted future baseline.</p> <p>The magnitude of change introduced by the Proposed Development in relation to Ings farm and nearby properties is assessed as High. This would result in a Substantial effect in relation to the permitted future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Medium Term and Significant.</p> <p><u>Operational phase (Year 10)</u> Removal of buildings to the north of the main mine operation would be perceptible as would removal of the surge bunker and associated conveyor structures. The introduction of the new office building within the main operational mine area would also be visible. Overall the large remaining mine buildings would continue to be a strong visual presence and there will be no change to the assessment for Year 3.</p>



Receptor**Commentary**Restoration

Removal of the built elements at completion of the mine operation at Year 25 and replacement with a range of soft landscape elements including; native woodland, scrub, meadow and agricultural pasture would allow assimilation of the restored site with the wider visual context. In comparison to the permitted future baseline scenario (restored scheme at year 33) the areas of woodland planted within the former main site area would not be fully mature and as a consequence would not be of the same stature or provide the same level of integration with the wider visual context. The magnitude of change would be Low resulting in a Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade the restoration scheme of the Proposed Development would fully mature and there would be no differences in any visual receptors' views in comparison with the permitted future baseline.

Red House FarmOperational phase (Year 3)

Residents possess relatively open and close-range views from the south western elevation of the property and external area. In these views the mine buildings and structures of the Proposed Development would be a very strong visual presence. There would therefore be a large-scale difference in comparison with the situation under the permitted future baseline in which all the buildings and built development would be removed from residents' views.

The magnitude of change introduced by the Proposed Development is assessed as High. This would result in a **Substantial** effect in relation to the future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Long Term and **Significant**

Operational phase (Year 10)

Although the proposed removal of some of the buildings and plant in the northern part of the site by Year 10 would be beneficial as would the introduction of a limited proportion of the restoration planting in the part of the site closest to Red House Farm, it is assessed that the proximity and scale of retained buildings and structures plus plant movement would result in no change to assessment for Year 3.

Restoration

Partial introduction of the restoration scheme during the operational period including the creation of pastoral field units with associated hedgerows adjacent to the A174 will be a strong presence in views of the site area from the curtilage of the property when this planting has matured. The hedgerow to the roadside boundary will be mature and provide partial screening of the restored site area beyond. In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland planted within the former main site area and to the north east corner of the site would not be fully mature and as a consequence would not be of the same stature or provide the same level of integration with the wider landscape. The magnitude of change would be Low resulting in a Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.

Ridge Lane GroupOperational phase (Year 3)

There are several individual properties, farms and farmsteads along Ridge Lane which is a minor road orientated in a south west to north west direction. Ridge Lane is aligned with Easington Beck to the north west which marks the development site boundary for this section. There is extensive mature woodland associated with the Beck as well as hedgerows and hedgerow trees which define field boundaries and the highway boundary of Ridge Lane. This vegetation coalesces to provide a considerable level of screening in residents' views towards the Proposed Development with visibility becoming increasingly restricted towards the south west of the group. Properties to the north east of the group including Ridge Hall and associated properties have sporadic visibility from external areas and their north west facing elevations. Where views are available the upper elevations of the Proposed Development (main plant building and stack with associated plume and rock shaft tower) are visible above and through the mature tree cover at the site boundary. This range of views that would be available under the Proposed Development would be in comparison to all built elements within the site being removed under the permitted future baseline. Hence the magnitude of change would be High resulting in a **Substantial** level of effect in relation to the permitted future baseline scenario (restored scheme at Year 3). The nature of this effect would be Adverse, Medium Term and **Significant**.

Receptor**Commentary**Operational phase (Year 10)

It is anticipated that the proposed 2-3 storey office accommodation may be visible and the removal of the surge bunker and conveyors would also be perceived. Removal of buildings to the north of the main operational site and incremental landscape enhancements as part of the incremental introduction of the restoration scheme would be less widely perceived at Ridge Lane. The resultant group of buildings and stack would continue to be visually prominent in residents' northern views. Hence there will be no change to the level of effects assessed for Year 3.

Restoration

Removal of the mine buildings would be a key change in many residents' northern views but ground level changes to landform and vegetation as a result of the restoration scheme would generally not be discernible because of the screening and filtering effects of intervening woodland cover. There would be no discernible change in relation to the future baseline scenario (restored scheme at year 33) and as a consequence there would be no visual effects.

Twizzlegill FarmOperational phase (Year 3)

Twizzlegill Farm lies approximately 300m to the west of the site boundary and comprises several residential properties and assorted farm buildings and working areas. The group lies in a relatively elevated position at the head of a minor valley landform. The valley is orientated in a west-east direction towards the development site and allows views down the valley towards the site. Areas of mature woodland along the western and southwestern boundaries of the site provide a considerable level of visual screening for residents at Twizzlegill Farm although the taller elements of the development would be visible from external areas and north facing windows. These taller elements would have been removed under the permitted future baseline, but intervening woodland would ensure that residents would have no views of the permitted immature restoration at ground level.

The magnitude of change arising from the presence of the taller components of the Proposed Development is assessed as Medium. This would result in a **Moderate/Substantial** effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and **Significant**.

Operational phase (Year 10)

Reduction in the amount of built development in the northern part of the site would not generally be perceptible to residents with this position and orientation. There would be no change to the assessment for Year 3.

Restoration

Removal of the taller mine buildings and stack will remove incongruous elements in residents' northern views. Some changes to landform and the introduction of new area of woodland will be apparent for receptors situated to the east of this group although an intervening area of mature woodland will largely filter views of the restored scheme at ground level. In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland, scrub and hedgerows will not be fully mature and as a consequence will not provide the same stature or level of assimilation with the wider landscape. The magnitude of change would be Very Low resulting in a Slight level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.

DalehouseOperational phase (Year 3)

Dalehouse is a collection of individual properties, including Dale House Farm and a public house situated at a relatively low elevation at the confluence of Staithes Beck and Dale Beck. The properties are situated within an area of mature woodland which restricts residents' visibility. It is anticipated that views of the Proposed Development would be restricted to occasional visibility of the plume associated with emissions from the stack. Under the permitted future baseline the stack would be removed but topography and intervening tree cover would combine so that there would be no views of the immature restoration works within the site.

The magnitude of change introduced by the Proposed Development i.e. the top of the stack and periodic plume, is assessed as Very Low. This would result in a Slight effect in relation to the future

Receptor	Commentary
	<p>baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment at Year 10 as stack and periodic plume would still be visible.</p> <p><u>Restoration</u> At restoration there would be no visibility of the immature restoration at ground level within the site of the Proposed Development and no perceptible difference in relation to the future baseline scenario (restored scheme year 33).</p>
Boulby Barn Farms	<p><u>Operational phase (Year 3)</u> There would be visibility of the stack and associated plume for some residents situated to the east of this group. Residents' views would be restricted by the localised plateau topography: the Farms' location is set back from the plateau edge to the east with the consequence that the majority of the buildings and all ground level activities associated with the Proposed Development would be hidden below the near topographic horizon as is the case under the current baseline. Visibility would further be partially restricted by sporadic roadside planting from some properties although more open views are available from east/south east facing elevations and external areas of properties to the south of the Boulby Bank minor road.</p> <p>The magnitude of change arising from the presence and operation of the Proposed Development would be Medium resulting in a Moderate/Substantial level of effect that would be Significant, Long Term and Adverse.</p> <p><u>Operational phase (Year 10)</u> No change to assessment for Year 3 as the stack and plume would remain the principle elements associated with the Proposed Development in many resident's views.</p> <p><u>Restoration</u> At restoration there would be no visibility of the ground level restoration works in the site of the Proposed Development and therefore no perceptible difference in relation to the future baseline scenario (restored scheme year 33).</p>
Cowbar Farm	<p><u>Operational phase (Year 3)</u> Cowbar Farm is located in an open, elevated site west of Staithes with minimal nearby and screening vegetation to the west where the Proposed Development is sited at a minimum separation distance of 1.2km. A large proportion of the buildings, structures and the stack would be prominent visual elements extending above the more distant horizon in residents' western views. Under the permitted future baseline none of these elements would be present in such views, although the immature restoration works would be minor visual elements.</p> <p>The magnitude of change introduced by the Proposed Development is assessed as High. This would result in a Substantial effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Significant</p> <p><u>Operational phase (Year 10)</u> Although the removal of a proportion of the buildings in the northern part of the site by Year 10 would reduce the mass of the Proposed Development in residents' western views, this change would be insufficient to result in an alteration to the Year 3 assessment.</p> <p><u>Restoration</u> Partial introduction of the restoration scheme during the operational period including the creation of pastoral field units with associated hedgerows adjacent to the A174 will be discernible in views of the site area from the curtilage of the property. The hedgerow to the roadside boundary will be mature and provide partial screening of the site area beyond. In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and as a consequence will not be of the same stature nor provide the same level of integration with the visual context. In the context of the extensive open views available from Cowbar Farm it is assessed that the magnitude of change would be Very Low resulting in a Slight /Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the</p>

Receptor	Commentary
Seaton Hall	<p>Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline</p> <p><u>Operational phase (Year 3)</u> The group comprises several stone-built farm buildings converted into holiday cottages arranged as a quadrangle around an internal courtyard and a detached farm house. The properties are approximately 1.4km to the east of the development site and immediately to the south of Staithes and to the south of the A174. Seaton Hall is situated on a slightly raised area of land which allows views to the west across considerable mature woodland situated in Borrowby Dale and Roxby Beck. Most of the buildings/structures of the Proposed Development would be visible although views of lower level buildings and ground level infrastructure will be screened by intervening mature woodland. Under the permitted future baseline the buildings would be removed from the site and residents' views but the immature ground level restoration works would be screened.</p> <p>The magnitude of change introduced by the Proposed Development is assessed as Medium. This would result in a Moderate/Substantial level of effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment for Year 3 as buildings would continue to be visible.</p> <p><u>Restoration</u> The introduction of a more naturalised landscape with associated textures and muted colours will assimilate the site into the wider landscape context as perceived from this property group. Change in relation to the future baseline scenario (restored scheme at year 33) is anticipated to be Very Low resulting in a Slight level of effect. The nature of this effect would be Neutral, Permanent and Not Significant.</p>
Midge Hall Group	<p><u>Operational phase (Year 3)</u> This group comprises several residential properties and farm buildings accessed via Roxby Lane on elevated land approximately 1km to the south-east of the development site boundary. The properties, which include Midge Hall and Oak House, are situated on the south east valley side of Roxby Beck which provide residents with expansive views to the north west towards the Proposed Development site and coastal strip beyond. There are dense hedgerows associated with Roxby Lane which often restrict visibility from this access road. Vegetation within gardens and to property boundaries will partially screen and filter residents' views from some properties. Other properties are situated in an elevated position which allows views beyond the hedgerows and mature woodland situated in the valley landscapes. Where these views are available, a large part of the eastern elevation of the built development within the Proposed Development would be visible. Some lower elevations of development and ground level activities will be screened by the dense mature woodland associated with Roxby Beck. Under the permitted future baseline the buildings would be removed from the site and residents' views but the immature ground level restoration works would be screened.</p> <p>The magnitude of change introduced by the Proposed Development in relation to Midge Hall and nearby properties is assessed as High. This would result in a Substantial effect in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> Introduction of the proposed 2-3 storey office building within the main operational area is likely to be visible as a relatively minor addition to the extent of visible development. Removal of the surge bunker and introduction of a uniform surface paint finish will provide a cleaner more unified appearance but would not alter the scale and mass of the Proposed Development where north-western views are available to residents in the Midge Hall Group of properties. Overall, because of the scale of retained buildings Year 3 assessment would be unchanged.</p> <p><u>Restoration</u> In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland planted within the north east corner of the site will not be fully mature and as a consequence will not be of the same stature or provide the same level of visual association with existing areas of mature</p>

Receptor**Commentary**

woodland in the intervening valleys. This intervening woodland would screen residents' views of the restoration works within the main part of the proposed Development site throughout the restoration and post restoration periods resulting in minimal variation in comparison with the permitted future baseline mature restoration scheme. . The magnitude of change would be Very Low resulting in a Slight/Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline

Borrowby Grange GroupOperational phase (Year 3)

This group comprises Borrowby Grange, Cooper House and Plum Tree House which are situated 1-1.5km to the south east of the Proposed Development site within a relatively elevated open landscape. The properties are accessed from Borrowby Lane which has dense hedgerows to the roadside boundaries which restricts visibility. Visibility is limited by shelter belts and mature woodland in the intervening landscape although more open views are available from the most southerly property in the group. Within these north-western views the stack and other tall buildings would be readily apparent when seen against the backdrop on the more elevated area to the west. Intervening woodland cover would screen residents' views of lower building and ground level activities. Under the permitted future baseline the buildings would be removed from the site and residents' views but the immature ground level restoration works would be screened.

The magnitude of change introduced by the Proposed Development in relation to one property (Borrowby Grange) will be High. This would result in a **Substantial** effect in relation to the future baseline scenario (restored scheme at year 3) which would be **Significant**. In relation to Plum Tree House and Cooper House the magnitude would be Low and Not Significant. The nature of these effects would be Adverse and Long Term.

Operational phase (Year 10)

No change to Year 3 assessment as the tallest buildings and the stack would continue to be visible.

Restoration

Following the removal of the stack and buildings within the site most ground level restoration activities would be screened. There is some potential for the restoration woodland planting proposed for the north-east part of the Proposed Development site to be visible but within the wooded context of residents' views in would make only an incremental contribution and its initial immaturity would result in negligible change in comparison with the permitted future baseline under which restoration woodland planting in this area would be mature by Year 33. The magnitude of change would be Very Low resulting in a slight/Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline

Recreational Visual Receptors using Long Distance Routes

- 5.9.4 All of the routes have been assessed as being of High sensitivity on account of their High value as recreational routes and the High susceptibility of the people using these routes, mostly walkers and cyclists, whose attention would be focused on the landscape around them.
- 5.9.5 The assessment of visual effects for recreational visual receptors using long distance routes is set out in Table 5.19.

Table 5.19 Assessment of Visual Effects for National and Regional Recreational Receptors within 5km

Receptor	Commentary
Cleveland Way	<p>Within the LVIA study area the route links Runswick Bay in the east with Skinninggrove to the West.</p> <p>Runswick Bay to Port Mulgrave (visual effects will principally be experienced by westbound walkers) <u>Operational phase (Year 3)</u> Within this section of the Way there would be very limited visibility of the operational mine as a result of the intervening landform of Beacon Hill located to the north west of Port Mulgrave. effectively reducing visibility to occasional glimpses of the top of the stack as shown in the current baseline photograph at Viewpoint 9 in Figure 5.16.</p> <p>The level of effect for walkers using this section of the Way is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment for Year 3.</p> <p><u>Restoration</u> Change introduced by removal of the mine development, principally the removal of the stack and introduction of the restoration scheme would barely be perceptible.</p> <p>Port Mulgrave to Staithes (visual effects will principally be experienced by westbound walkers) <u>Operational phase (Year 3)</u> To the west of Port Mulgrave the route of the Way passes through a relatively elevated and open landscape which allows views westward towards individual farm buildings to the south of Staithes and, for some of the Way, the built development which defines the eastern extent of Staithes. Views of the Proposed Development would be available along this section of the rWaye although there are occasional localised areas of rising landform that screen longer range views. Where open views are available the buildings and structures of the main operational site area would be visible set against the backdrop of rising landform at Boulby Bank and Easington. West of Greenacres Farm the Way is orientated towards the north and Staithes Old Town where it is aligned with the lower elevations of Gun Gutter and open views become less widely available. Within this section of the Way recreational receptors would have no visibility of the Proposed Development as their views increasingly become constrained by land form and the built development within Staithes.</p> <p>This magnitude of change in relation to the future baseline scenario (restored scheme at year 3) will be None to Medium. The level of effect for walkers using this section of the Way will range from None to Moderate/Substantial. The Moderate/Substantial level of effect will be experienced where there are open, medium to long distance western views available towards the Proposed Development. The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> Buildings removed as part of the phased reduction in the overall scale of the operational area would result in a decrease in the lateral visible extent of built development. The continued presence of large industrial buildings and structures in these views would continue to be a strong visual influence and the levels of visual effect assessed for Year 3 would remain unchanged.</p>

Receptor

Commentary

Restoration

Following removal of the mine development and implementation of the restoration scheme, the Proposed Development site would become assimilated and not readily perceptible as a distinct feature within the landscape. In comparison to the future baseline scenario (Year 33) the restored landscape will be less mature which will be evident in the smaller stature of woodland areas and, to a lesser extent, hedgerows, although such variances would be difficult to discern for recreational receptors in the context of their extensive and constantly changing views. The magnitude of change would be Very Low resulting in a Slight/Moderate level of effect which would be Not Significant.

Staithes to Boulby (*visual effects will be experienced by westbound and eastbound walkers*)Operational phase (Year 3)

Generally, there would be no visibility of the Proposed Development from this section of the Way as it passes through Staithes Old Town because of the visual containment provided by the surrounding elevated landform and cliffs associated with Staithes Beck. The plume associated with the operational mine will occasionally be visible. Walkers travelling west beyond Cowbar will experience increasingly open views of the Proposed Development as elevation is gained and the relatively flat landscape allows extensive visibility towards the site. Between Cowbar and Boulby the landscape of the coastal landscape is relatively flat and open allowing widespread visibility towards the site where the Proposed Development will be a strong visual presence. The current baseline photograph from Viewpoint 4 in **Figure 5.11** provides a strong indication of the visual role in terms of scale, form, and height that the Proposed Development would have in recreational receptors' views using this section of the Way throughout its operation.

The level of effect for recreational receptors using this section of the Way is assessed as **Substantial** resulting from a High magnitude of change in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and **Significant**.

Operational phase (Year 10)

Removal of several of the buildings to the north of the main operational area as part of the phased reduction of the operational area would simplify the overall appearance of the mine resulting in a less cluttered appearance as viewed from this section of the Way. At this phase planting introduced before Year 10 as part of the incremental implementation of the restoration proposals would not be sufficiently mature to have a strong influence on the views available to recreational receptors. The retention of the main plant building, stack and other larger structures would result in a continuation of the **Substantial** magnitude of change and **Significant** Adverse level of effect.

Restoration

Hedgerows planted at the northern boundary with the A174 during the operational phase would have matured and would provide definition and some screening of the immature restoration scheme in the site to the south. Removal of the buildings would open up some longer range views to the south beyond the site boundary. In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland planted within the former main site area and to the north east corner of the site would not be fully mature and will not be a strong presence in the visual experience. The magnitude of change would be Very Low resulting in a Slight/Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.

Boulby to Skinningrove (*visual effects will principally be experienced by eastbound walkers*)Operational phase (Year 1)

Beyond Boulby views of the operational mine would be unavailable because of an intervening area of rising landform. There would be no further visibility from the route between Boulby and Skinningrove. This is shown in the ZTV in **Figure 5.2 & 5.3**.

None – there is no visibility from this section of the Way.

Operational phase (Year 10)

No change to assessment.

Restoration

No change to assessment.

Receptor	Commentary
England Coastal Path	<p><u>Operational phase (Year 3)</u> The England Coast Path and the Cleveland Way follow the same route alignment through the study area as shown on Figure 5.6. The visual effects for the England Coast Path will largely be as assessed for the Cleveland Way in Table 5.20. One notable difference is where the routes diverge to the south of Staithes. A short section of the England Coast Path follows the alignment of the coastline defined by the high sea cliffs whereas the Cleveland Way is routed further inland. This section of the England Coast Path leads to an elevated vantage point which allows views of the Staithes townscape set in relation to the steep sided gorge which contains Staithes Beck. Views of the wider coastal landscape and inland towards the agricultural landscapes to the west and south west are also available. Beyond Staithes the eastern elevation of the Proposed Development will be visible situated on a flat, plateau area beyond the wooded valleys of Roxby and Easington Becks. The scale and form of the Proposed Development will contrast with the finer grained townscape in Staithes Old Town and the scattered farms, farmsteads and individual dwellings which characterise the wider landscape elsewhere in the view, however, as evidence in the site visits using the current baseline development as a proxy, it would be a relatively small-scale element in these views with a separation distance of at least 2km.</p> <p>The level of effect for recreational receptors using this section of the Coast Path is assessed as Moderate resulting from a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> The proposed removal of some buildings within the Proposed Development would not be sufficient to alter the Year 3 assessment conclusions.</p> <p><u>Restoration</u> Following removal of the mine development and implementation of the restoration scheme the Proposed Development site will become assimilated and not readily perceptible as a distinct feature within views from the Coast Path. In comparison to the future baseline scenario (Year 33) the landscape will be less mature which will be evident in the smaller stature of woodland areas and to a lesser extent hedgerows. The magnitude of change would be Very Low resulting in a Slight level of effect which would be Not Significant.</p>
NCR No1	<p><u>Operational phase (Year 3)</u> Within the study area NCR1 links Staithes with Loftus. As shown in Figure 5.6 the route is contiguous with other roads and paths for much its length. Within Staithes the route follows Staithes Lane towards the Old town and links with Cowbar across Staithes Beck. There would be very restricted visibility of the Proposed Development from this section of NCR1 because of the visual containment provided by built development within Staithes and the elevated landform and cliffs to the north of Staithes Beck. Between Cowbar and Boulby NCR1 follows Cowbar Lane to the A174 junction, utilises a short section of the A174 and then links into Boulby Bank. Cyclists using the section of NCR1 between Cowbar and Boulby Bank would experience open views towards the Proposed Development where the mine buildings will be perceived in close range views and will be a prominent element of the visual experience in the manner indicated by the current baseline photograph at Viewpoint 4 in Figure 5.11.</p> <p>This magnitude of change in relation to the future baseline scenario (restored scheme at year 3) will be None to High. The level of effect for cyclists using this section of NCR1 will range from None to Substantial. The Substantial level of effect will be experienced on the 2km long section of NCR1 between Cowbar and Boulby. The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> Removal of several buildings to the north of the main operation area completed by Year 10 will simplify the overall appearance of the Proposed Development resulting in a less cluttered appearance as perceived from the closest (Cowbar – Boulby Bank) section of NCR1. Hedgerows planted to the site boundary adjacent to the A174 as part of the ongoing site rationalisation and restoration may be tall enough to screen views of some lower level buildings and infrastructure. Overall there will be no change to the Year 3 assessment because of the continued visual role that would be played by the retained principal buildings and stack.</p>

Receptor	Commentary
	<p><u>Restoration</u></p> <p>In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and as a consequence will not be of the same stature or provide the same level of visual association with existing areas of mature woodland within the wider landscape. The magnitude of change would be Very Low resulting in a Slight/Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>



Visual Receptors using Camping and Caravan Sites and Holiday Parks

- 5.9.6 Recreational receptors whose visual experience is an important aspect are assessed as possessing high susceptibility in accordance with GLVIA3 paragraph 6.33 and there is a high likelihood that these receptors attach a medium or high value to the views experienced whilst using these facilities. As such the sensitivity of these recreational receptors is assessed as High.
- 5.9.7 The assessment of visual effects for visitors using these facilities is set out in Table 5.20.

Table 5.20 Assessment of Visual Effects for Caravan and Camping Parks within 5km

Receptor	Commentary
Staithes Caravan Park	<p><u>Operational phase (Year 3)</u> The site is situated at a relatively low elevation adjacent to Staithes Beck which restricts visibility of the wider landscape. Views from the caravan park are further contained by the surrounding mature woodland.</p> <p>No View and no visual effects.</p> <p><u>Operational phase (Year 10)</u> No change to assessment at year 3.</p> <p><u>Restoration</u> No change to assessment at year 3.</p>
Gatehouse Caravan Site, Hinderwell	<p><u>Operational phase (Year 3)</u> There is an area of mature vegetation to the western extent of the site which restricts visibility towards the development site. There is a limited area adjacent to the entrance site where views are available to the west and the operational mine is partially visible above intervening hedgerows and tree cover.</p> <p>The level of effect for receptors using this caravan park is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment at year 3.</p> <p><u>Restoration</u> The development site would become fully assimilated into the wider landscape as perceived from this receptor.</p>
Serenity Camping, Hinderwell	<p><u>Operational phase (Year 3)</u> The site is enclosed by a continuous tall hedge which provides considerable visual containment. Visibility will be restricted to occasional views of the smoke plume emitting from the chimney stack.</p> <p>The level of effect for receptors using this caravan park is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Temporary and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment at year 3.</p> <p><u>Restoration</u> The development site would become fully assimilated into the wider landscape as perceived from this receptor.</p>
Runswick Bay Caravan and Camping Park	<p><u>Operational phase (Year 3)</u> Views out towards the site are restricted by a combination of rising landform to the north west of the site and structure planting within and to the boundary of the site itself. Visibility will be restricted to occasional views of the smoke plume emitting from the chimney stack.</p>



Receptor	Commentary
	<p>The level of effect for receptors using this caravan park is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Temporary and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment at year 3.</p> <p><u>Restoration</u> The development site would become fully assimilated into the wider landscape as perceived from this receptor.</p>

Recreational visual receptors using Conclusive Open Country

- 5.9.8 Visual receptors using conclusive open country (CRoW) have been assessed as being of High sensitivity on account of its High value as a recreational resource and the High susceptibility of the people using the area, mostly walkers, whose attention would be focused on the landscape around them.
- 5.9.9 The assessment of visual effects for recreational visual receptors using long distance routes is set out in Table 5.21.

Table 5.21 Assessment of Visual Effects for National and Regional Recreational Receptors within 5km

Receptor	Commentary
CRoW	<p>Within the LVIA study area there is an area of conclusive open country situated within an elevated area at Newton Mulgrave Moor.</p> <p><u>Operational phase (Year 3)</u> Visibility of the Proposed Development would be limited to occasional views of the tip of the main chimney stack and the associated smoke plume emitting from the stack. More comprehensive visibility is precluded as a consequence of the intervening landform, principally the ridge line to the north western edge of the moor and Borrowby Moor.</p> <p>The level of effect for walkers using this section of the route is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment.</p> <p><u>Restoration</u> Change introduced by removal of the mine development and introduction of the restoration scheme would barely be perceptible other than occasional visibility of the tip of the chimney stack and associated smoke plume no longer being available.</p>



Recreational Visual Receptors using the Public Rights of Way (PRoW) Network

- 5.9.10 This section of the visual assessment considers the visual effects of the Proposed Development on the views from PRoWs within the study area that are at least partly within the ZTV.
- 5.9.11 The sensitivity of recreational receptors using PRoWs is considered to be high.
- 5.9.12 The assessment of visual effects for recreational visual receptors using the PRoW network is set out in Table 5.22. The distribution of the PRoWs with their definitive map references and the manner in which they have been grouped into networks is shown in **Figure 5.7**.

Table 5.22 Assessment of Visual Effects for Local Recreational Visual Receptors within 2km

Receptor	Commentary
PRoW's within the development site boundary - Group A	
R&C PRoW Ref. 101/2/2, 101/3/1	<p><u>Operational phase (Year 3)</u> PRoW Ref. 30.48/010, 101/2/2 is situated adjacent to Easington Beck within the Proposed Development site in proximity to the southern site boundary. Views of the Proposed Development will be restricted by the dense mature woodland in the Easington Beck Valley and will largely be limited to glimpsed and heavily filtered views of built development to the south eastern extent of the operational mine. There are occasional gaps in the woodland cover which will allow slightly more comprehensive visibility although these views would still be short lived and transient.</p> <p>The level of effect for walkers using these PRoWs is assessed as Moderate resulting from a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Temporary and Not Significant.</p> <p><u>Operational phase (Year 10)</u> Change introduced between years 1-10 would not be readily perceptible for receptors using this route. No change to assessment.</p> <p><u>Restoration</u> In comparison to the future baseline scenario (Year 33) the broadleaved woodland introduced to the main operational mine area will not have reached the same level of maturity or have the same stature and presence in the landscape. This change will be perceptible for a short section of the route and will not be a strong influence on the visual experience of receptors. The magnitude of change would be Low resulting in a Moderate level of effect which would be Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
R&C PRoW Ref. 101/4/1, 101/4/2 NYCC PRoW Ref. 30.48/010	<p><u>Operational phase (Year 3)</u> PRoW Ref. 101/4/1 is aligned with Easington Beck to the east of the operational mine area. A section of the route diverges to the north east and passes through more open landscape within the site boundary but to the north of the operational mine. The built elements of the mine (main plant building, chimney stack and ancillary buildings to the northern extent of the operational mine area) will be a visually dominant aspect of the visual experience for walkers using this more open section of the route.</p> <p>The level of effect for walkers using this section of the route is assessed as Substantial resulting from a High magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> The visual experience would change because of the removal of mine buildings and structures in the areas adjacent to this section of the route. Partial introduction of the restoration scheme including hedgerows, native woodland and changes to the field pattern would also be apparent. The continued presence of large mine buildings and structures in close range views would mean that the level of assessed effect would be unchanged.</p>



Receptor	Commentary
	<p><u>Restoration</u> In comparison to the future baseline scenario (Year 33) woodland and hedge planting associated with the reconfigured access road/car parking and agricultural areas will not be fully mature and will not at this stage provide the same level of assimilation. The disparity in scale of broadleaved woodland introduced to the main operational mine area will also be apparent. The magnitude of change would be Low resulting in a Moderate level of effect which would be Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
PRoWs to the north east – Group B	
<p>R&C PRoW Ref. 101/117/1, 101/116/5, 101/124/1, 101/124/2, 101/201/1, 101/201/2, 101.202/1, 101/202/2</p>	<p><u>Operational phase (Year 3)</u> This path network is closely aligned with the Cleveland Way and Coastal Path between Boulby and Staithes. The network also provides linkages with the A174 road corridor. The flat, open nature of the landscape and proximity to the Proposed Development will allow widespread visibility of the operational mine where the presence of large-scale buildings and structures will feature prominently in the visual experience of recreational receptors using the footpath network.</p> <p>Overall the level of effect for walkers using this section of the route is assessed as Substantial resulting from a High magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and will not be a strong presence in the visual experience. The magnitude of change would be Low resulting in a Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
PRoWs in and around Staithes - Group C	
<p>R&C PRoW Ref. 101/145/1, 101/200/1</p> <p>NYCC PRoW Ref. 30.44; 052, 053 055, 058, 059 and 200</p>	<p><u>Operational phase (Year 3)</u> These PRoWs are contained within the lower lying or easterly townscape of Staithes and will generally have limited visibility of the Proposed Development other than occasional visibility of the smoke plume emitting from the chimney stack. There are some short sections of the network where more extensive visibility of the Proposed Development will be available through gaps in built development.</p> <p>The level of effect for walkers using this section of the route is assessed as Moderate resulting from a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment at year 3.</p> <p><u>Restoration</u> At restoration following removal of the operational mine there would be very limited visibility of the Proposed Development and no perceptible change in relation to the future baseline scenario (Year 33)</p>



Receptor	Commentary
<p>NYCC PRoW 30.44; 001, 002, 003, 004, 005, 008 and 011</p>	<p><u>Operational phase (Year 3)</u> These PRoWs are located within an area of open agricultural landscape to the east of Staithes. Footpath No. 30.44, 005 is contiguous with a section of the Cleveland Way and visual effects will be as described for this receptor. Open views towards the coastal hinterland and the elevated landforms to the west are occasionally available. In views where the direction of travel is orientated towards the operational mine the presence of the mine buildings and structures will feature prominently.</p> <p>The level of effect for walkers using this path network is assessed as None to Moderate/Substantial resulting from No change to a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant to Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> Following decommissioning and restoration the Proposed Development site will not be widely discernible as a distinct feature in the landscape. The soft landscape elements introduced will have a visual association with the surrounding network of pasture, hedgerows and mature tree cover. In comparison to the future baseline scenario (Year 33) woodland and hedge planting will not be fully mature although at a separation distance of ~1.7 - 2km this disparity will not be generally perceptible. The magnitude of change would be Very Low resulting in a Slight level of effect which would be Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
<p>PRoWs to the east – Group D</p>	
<p>NYCC PRoW Ref. 30.44; 012, 013, 015, 016, 018, 019, 022, 210. 30.47/001, 30.47/002</p>	<p><u>Operational phase (Year 3)</u> This network of paths is situated to the south of Staithes and the A174 and provide connection between Borrowby Dale and Dalehouse. The paths are generally located within low lying wooded valley areas with wider visibility restricted by the mature woodland cover. Views of the Proposed Development will be limited to those available from short sections on more elevated areas of the network such as those adjacent to Seaton Hall where the eastern elevation will be visible above the intervening woodland cover.</p> <p>Overall the level of effect for walkers using this section of the route is assessed as Moderate resulting from a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> The introduction of a more naturalised landscape with associated textures and muted colours will assimilate the site into the wider landscape context as perceived from this PRoW network. Change in relation to the future baseline scenario (restored scheme at year 33) is anticipated to be Very Low resulting in a Slight level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant.</p>
<p>PRoWs to the south east – Group E</p>	



Receptor	Commentary
NYCC PRoW Ref. 30.47, 003, 30.48; 001, 002, 003, 011, 014, 018, 019, 020, 021, 201, 30.55; 001, 002, 004, 005, 008, 010, 011, 015, 026	<p><u>Operational phase (Year 3)</u> These PRoW's provide connectivity and access within an agricultural landscape comprising a number of farms, farmsteads and individual dwellings. The landscape is relatively elevated and open allowing visibility of the wider landscape. Where views are orientated towards the Proposed Development from the PRoW some open views are available but where the paths are aligned with field boundaries visibility is often filtered or partially filtered by hedgerows, hedgerow trees and occasional smaller areas of woodland. In open views the elevated situation allows visibility of the full eastern elevation of built development. Overall the level of effect for walkers using this section of the route is assessed as Moderate/Substantial resulting from a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> In comparison to the future baseline scenario (Year 35) woodland and hedge planting will not be fully mature although at a separation distance of ~1.5 - 2km this disparity will not be strongly perceived. The magnitude of change would be Very Low resulting in a Slight level of effect which would be Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
PRoWs to the south – Group F	
NYCC PRoW; 30.48; 001, 007, 008, 010, 011, 014, 015, 016, 018, 026.	<p><u>Operational phase (Year 3)</u> This group provides access along Roxby Beck and connections between Roxby and Easington Beck. These paths are generally situated at lower elevations and have restricted visibility towards the site because of the intervening elevated, linear landform 'Ridge Lane' which lies between Easington and Roxby Beck. Generally, visibility will be limited to occasional glimpsed views of the upper elevations (chimney stack and associated smoke plume) of the operational mine. Receptors using paths immediately to the west of Roxby will experience more comprehensive visibility of built development for short sections of the network. The level of effect for walkers using this section of the route is assessed as Moderate to Substantial Moderate resulting from a Low to Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant to Significant. Significant effects would be experienced for short sections of the path network.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> Following decommissioning and completion of the restoration scheme the site will become visually assimilated within the wider landscape as perceived from this path network. In relation to the future baseline scenario (Year 35) will be limited and a consequence of the difference in maturity and stature of the broadleaved woodland element. The magnitude of change would be Low resulting in a slight level of effect which would be Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
PRoWs to the south west – Group G	
R&C PRoW Ref., 101/7/1, 101/7/2, 101/17/1, 101//141/3. 109/1A/1, 109/1/2, 109/1/3, 109/1/4, 109/1/5, 109/34/1	<p><u>Operational phase (Year 3)</u> This PRoW group provides connectivity between Easington, Easington Beck and Grinkle Lane to the south west of the development site. Visibility is limited by an area of intervening landform and further filtered by mature vegetation to the western extent of the site.</p>

Receptor	Commentary
	<p>Where the routes pass through Easington Beck valley there will be occasional and heavily filtered visibility of upper elements of the Proposed Development, (chimney stack and main plant building).</p> <p>Overall the level of effect for walkers using this section of the route is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> Following decommissioning and completion of the restoration scheme it is not anticipated that the Proposed Development will be visible and there will be no further visual effects for these receptors.</p>
<p>R&C PRow Ref. 101/2/1, 101/6/1</p>	<p><u>Operational phase (Year 3)</u> This PRow provides connectivity between the A174 to the north east of Easington, via Twizziegill Farm and Easington Woods to the north of Easington Beck. The upper elevations of the Proposed Development will be visible above the mature woodland cover within the intervening valley landforms of Twizzie Gill and Easington Beck.</p> <p>Overall the level of effect for walkers using this section of the route is assessed as Moderate/Substantial resulting from a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> Following decommissioning and completion of the restoration scheme it is not anticipated that the site area will be widely visible beyond the visual containment provided by the intervening mature woodland. Small gaps in the woodland cover will allow occasional visibility of the immature soft landscape elements beyond which in relation to the future baseline scenario (Year 35) will be of a less stature. The magnitude of change would be Low resulting in a Slight level of effect which would be Not Significant.</p>
<p>PRoWs to the north west – Group H</p>	
<p>R&C PRow Ref. 101/116/1, 101/116/2, 101/116/3, 101/126/1, 101/126/2, 109/110/1, 109/115/1, 109/127/1, 109/130/1, 109/130/2, 109/130/3, 109/132/3, 109/143/1.</p>	<p>There would be no view of the Proposed Development for these PRow users.</p>
<p>R&C PRow Ref. 101/118/1, 101/116/3</p>	<p><u>Operational phase (Year 3)</u> There would be very limited visibility of the Proposed Development for users of these routes. It is likely that views of the smoke plume associated with the chimney will be available and there will be extremely limited visibility of the chimney tip from a restricted area of the network.</p> <p>The level of effect for walkers using this section of the route is assessed as Slight resulting from a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> Following decommissioning and completion of the restoration scheme it is not anticipated that the site area will be visible from this path network.</p>



Receptor	Commentary
R&C PRoW Ref. 101/119/1, 101/122/1, 101/125/1, 101/147/1	<p><u>Operational phase (Year 3)</u> These routes provide links between Boulby Bank and the A174. Relatively close-range views of the Proposed Development will be available for footpath users walking in a southerly direction. In these views the upper elevations of the main operational buildings within the site will be visible above intervening areas of tree and scrub cover at the A174 corridor and within the site boundary. In closer proximity to the A174 visibility becomes increasingly filtered by road side vegetation.</p> <p>Overall the level of effect for walkers using this section of the route is assessed as Substantial resulting from a High magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> No change to the assessment.</p> <p><u>Restoration</u> Following decommissioning and completion of the restoration scheme replacement of built development with a predominantly naturalistic mix of landscape elements will allow assimilation into the existing landscape. In relation to the future baseline scenario (Year 35) woodland elements will be less mature and feature less prominently which will be notable in relation to the north eastern corner of the development site adjacent to the A174 where large areas of scrub and broad leaved woodland are proposed. The magnitude of change would be Low resulting in a Moderate level of effect which would be Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>

Visual Receptors using 'A' Roads

- 5.9.13 This section of the assessment considers the visual effects of the proposed development on the views from key transport routes within the study area, which are within the ZTV for the proposed development.
- 5.9.14 The sensitivity of receptors using roads is generally considered to be medium, due mainly to the speed of travel and the consequent transient nature of the receptors' views and/or the reduced field of view available to drivers as they concentrate on the road ahead. The assessment for these receptors is set out in Table 5.23.

Table 5.23 Assessment of Visual Effects for Vehicular Receptors – A Roads within 5km

Receptor	Commentary
A174	<p>Ellerby to Hinderwell (<i>visual effects will principally be experienced by westbound road users</i>)</p> <p><u>Operational phase (Year 3)</u> Between Ellerby and Hinderwell the landscape is relatively open and where visibility is available beyond the confines of the roadside hedge transient views of the operational mine become available for elevated sections of the route. Beyond Ellerby the orientation of the route gradually changes towards the north west and views of the eastern elevation of the mine become increasingly available, although still short lived and sometimes partial, because of the intermittent screening and filtering effects of the roadside hedgerow. Towards Hinderwell visibility becomes increasingly restricted by built environment and mature tree cover to the edge and within the settlement.</p> <p>The level of effect for vehicular receptors using this section of the route is assessed as Moderate resulting from a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> Changes at year 10 would not be readily perceptible for users of this section of the A174 and there will be no change to the assessment.</p>



Receptor**Commentary**Restoration

At completion of the restoration phase the site would become an integral element of the wider landscape rather than being perceived as a distinct feature within the landscape. The magnitude of change would be Very Low resulting in a Slight/Negligible level of effect which would be Not Significant.

Hinderwell to Staithes (visual effects will principally be experienced by westbound road users)Operational phase (Year 3)

Within the village of Hinderwell vehicular receptors experience very limited visibility of the wider landscape beyond the containment provided by the buildings along 'High Street'. Towards the west of the village longer range views of the elevated landform and coastal strip to the west start to become available. Beyond St. Hilda's Church the eastern elevation of the operational mine is visible, as illustrated in Viewpoint 7, **Figure 5.14**, above areas of tree cover and hedgerow trees in the intervening landscape. The mine buildings and structures are perceived in relation to the strong landform of Rockcliff Hill and are not visible above the skyline although the smoke plume from the chimney stack will occasionally be visible above the containment provided by the landform.

Towards Staithes there are short sections of the route where the road alignment allows views to be directly aligned with the development and the mine buildings feature prominently in these views. As the route nears Staithes roadside planting effectively screens views towards the site from the road corridor and there is no visibility of the development.

The level of effect for vehicular receptors using this section of the route is assessed as **Moderate/Substantial** as a result of a High magnitude of change in relation to the future baseline scenario (restored scheme at year 3). The nature of this effect would be Adverse, Long Term and **Significant**.

Operational phase (Year 10)

Reduction in the lateral extent of the built development will be perceived in these views although overall the level of effect will continue to be significant.

Restoration

Removal of the built elements at completion of the mine operation and replacement with a range of soft landscape elements including; native woodland, scrub, meadow and agricultural pasture will allow assimilation with the wider landscape. In comparison to the future baseline scenario (restored scheme at year 35) the areas of woodland, scrub and hedgerows will not be fully mature and as a consequence will not provide the same level of integration with the wider landscape. The magnitude of change would be Very Low resulting in a Slight/Negligible level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.

Staithes to Easington (westbound)Operational phase (Year 3)

Vehicular receptors will experience glimpsed views of the upper elevations of the operational mine above and through gaps in built development from the section of the route within the settlement. Towards the west of the settlement views of the open landscape to the west of Staithes become increasingly available and the route becomes orientated towards the operational mine. The built form of the eastern elevation of the mine is visible although visibility of some lower level development is screened by mature tree cover in the valley landscapes to the east of the site. Some larger buildings and structures including the main plant building, chimney stack and rock stack tower are partially perceived above the skyline of the rising landform beyond the development. Visibility is restricted by landform for a short section of the route adjacent to Staithes Beck. As elevation is gained for westbound travellers the operational mine becomes an increasingly dominant aspect of the visual experience in these close-range views because of the development scale. There is limited roadside vegetation for the section of the route in proximity to the mine entrance and relatively unobstructed views are available although these views are generally at an oblique angle and not directly orientated with the direction of travel. Beyond the site entrance the presence of the mine becomes progressively less influential as the direction of travel and visual focus becomes orientated to the west and south west.

Receptor**Commentary**

The level of effect for vehicular receptors using this section of the route is assessed as **Moderate/Substantial** as a result of a High magnitude of change in relation to the future baseline scenario. The nature of this effect would be Adverse, Long Term and **Significant**.

Operational phase (Year 10)

Removal of several buildings and structures to the north of the main plant building and introduction of some native woodland to the north of Easington Beck will reduce the visible presence of the Proposed Development, particularly lower level 'clutter' associated with smaller buildings, structures and infrastructure. However, the level of effect will continue to be **Moderate/Substantial** and **Significant** because of the continued presence and visibility of large-scale structures within the operational mine site.

Restoration

In comparison to the future baseline scenario (restored scheme at year 35) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and as a consequence will not be of the same stature or provide the same level of integration with the wider landscape. The magnitude of change would be Low resulting in a Slight/Moderate level of effect. The nature of this effect would be Adverse, Medium and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.

Easington to Staithes (eastbound)Operational phase (Year 3)

Vehicular receptors travelling east on the A174 will experience occasional visibility from the elevated section of the route to the east of Easington. Gaps in the roadside vegetation allow views across the lower lying coastal plain to the east. The upper elevations of taller structures and buildings within the operational mine are visible in views to the west. To the north of Ings Farm beyond an area of tree cover a gap in roadside planting of ~150m allows more extensive visibility although views of the mine are available at an oblique angle in relation to the direction of travel (Viewpoint 1, **Figure 5.9**). To the north east of this point the visual focus of vehicular receptors is orientated towards the north and views of the mine are less readily perceived.

The level of effect for vehicular receptors using this section of the route is assessed as **Moderate/Substantial** as a result of a High magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Medium Term and **Significant**.

Operational phase (Year 10)

Removal of mine buildings and further maturation of a recently planted area of woodland to the east of the A174 and in close proximity to Ings farm will further reduce the level of visual effect to Moderate. The nature of this effect would be Adverse, Long Term and Not significant.

Restoration

Removal of the mine buildings and implementation of the restoration scheme would introduce an appropriate range of soft landscape elements which would be perceived as a mosaic of naturalistic elements and textures allowing assimilation into the wider agricultural landscape as perceived from this part of Staithes. The magnitude of change would be Very Low resulting in a Slight/Negligible level of effect in relation to the future baseline scenario (restored scheme at year 33). The nature of this effect would be Adverse, Permanent and Not Significant.

Easington to Loftus (visual effects will be principally experienced by eastbound road users)

Beyond Easington there is no visibility of the development from this section of the route.
No view.

Visual Receptors using the Minor Road Network

- 5.9.15 The sensitivity of receptors using roads is generally considered to be medium, due mainly to the speed of travel and the consequent transient nature of the receptors' views and/or the reduced field of view available to drivers as they concentrate on the road ahead.

5.9.16 The assessment for these receptors is set out in Table 5.24.

Table 5.24 Assessment of Visual Effects for Vehicular Receptors – Minor Roads within 2km

Receptor	Commentary
C1 Boulby Bank	<p><i>(visual effects will be principally experienced by eastbound road users)</i></p> <p><u>Operational phase (Year 3)</u> This route links Boulby and the junction with the A174 in the south east with Upton to the north east at the furthest extent of the 2km detailed study area. There is limited visibility for eastbound vehicular receptors for the more elevated section of the route and views are restricted to those of the chimney stack. More comprehensive visibility of the development is intermittently available although visibility is partially restricted as a consequence of the route being in cutting for much of its length. The area of relatively elevated landform between the road and operational mine and the area of woodland to the north west corner of the site boundary also restricts visibility of lower level buildings and structures. Viewpoint 2 (Figure 5.9) provides an illustration of visibility from Boulby cottages which are situated immediately to the north of the road.</p> <p>The level of effect for vehicular receptors using this section of the route is assessed as Moderate as a result of a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> Removal of buildings to the north of the site will result in a reduction of the lateral extent of built development which is intermittently visible for short sections of the route. Change will also be perceived in relation to the removal of some higher level structures including conveyors. The reduction in the number of buildings/ structures together with the application of a recessive paint finish which will result in a simpler, more unified appearance. Overall, the level of assessed effects will not change</p> <p><u>Restoration</u> Removal of the mine buildings and implementation of the restoration scheme would introduce a range of soft landscape elements. In comparison to the future baseline scenario (restored scheme at year 33) the areas of woodland, scrub and hedgerows will not be fully mature and as a consequence providing the same level of integration with the wider landscape. The magnitude of change would be Low resulting in a Slight/Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
C2 Cowbar Lane	<p><i>(visual effects will be principally experienced by road users and recreational receptors travelling southwest)</i></p> <p>The road links the settlement of Cowbar with the A174 at a point adjacent to the northern edge of the operational mine. It is anticipated that this route will be used by residents of Cowbar, people accessing the recreational path network and cyclists using NCR1 which follows the alignment of the road for this section. Consequently, the sensitivity of these receptors is assessed as high.</p> <p><u>Operational phase (Year 3)</u> Adjacent to Cowbar the locally rising landform to the south west precludes visibility of the lower aspects of the development. However, the route steadily gains elevation for road users travelling south west and more comprehensive visibility of the operational mine becomes available. The scale of the built development becomes increasingly apparent in views across the open arable field units particularly in closer range views as the route becomes directly aligned with the mine.</p> <p>The level of effect for vehicular receptors using this section of the route is assessed as Substantial as a result of a High magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Significant.</p> <p><u>Operational phase (Year 10)</u> Removal of buildings to the north of the site will result in a reduction of the lateral extent of built development to the northern extent of the site and an overall simplified appearance.</p>



Receptor	Commentary
	<p>The partial introduction of hedgerows and pastoral field units to the north of the site will also be apparent and will aid integration Overall, the level of assessed effects will not change because of the continued presence of larger operational structures.</p> <p><u>Restoration</u> The hedgerow to the roadside boundary will be mature and provide partial screening of the site area beyond. In comparison to the future baseline scenario (restored scheme at year 35) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and as a consequence will not be of the same stature or provide the same level of integration with the wider landscape. The magnitude of change would be Low resulting in a Slight/Moderate level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
C3 Grinkle Lane	<p><i>(visual effects will be principally experienced by northbound road users)</i></p> <p><u>Operational phase (Year 3)</u> The route links Easington to the north with Lane Farm to the south. The ZTV indicates partial visibility along this section of the route although the mature vegetation cover and roadside planting in the intervening landscape means that the built elements of the development will not generally be perceptible for road users. It is anticipated that the associated smoke plume emitting from the main chimney stack will occasionally be visible.</p> <p>The level of effect for vehicular receptors using this section of the route is assessed as Slight/Negligible as a result of a Very Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment.</p> <p><u>Restoration</u> There will be no discernible change in relation to the future baseline scenario (restored scheme at year 33) and as a consequence there would be no visual effects.</p>
C4 U2269/1/70 Ridge Lane	<p><u>Operational phase (Year 3)</u> The route runs between and parallel with Easington Beck and Roxby Beck along a strong linear landform connecting Dalehouse to the south of Staithes with several individual farms and dwellings within south of the 2km detailed study area. The operational mine is visible from elevated sections of the route to the south of Dalehouse where gaps in the roadside hedgerow and mature woodland allow views out towards the site. To the south of Ridge Hall the screening effects of roadside vegetation and mature woodland in the intervening landscape are increasingly evident and visibility becomes increasingly limited.</p> <p>The level of effect for vehicular receptors using this section of the route is assessed as Moderate as a result of a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> Change introduced as a result of removal of some taller built elements such as the conveyors will be perceived although much of will not generally be visible through a combination of locally rising landform and mature hedgerows and trees in the intervening landscape. There will be no change to the assessed levels of effect.</p> <p><u>Restoration</u> Removal of the mine buildings would be perceptible but changes to landform and vegetation as a result of the restoration scheme would generally not be discernible because of the filtering effects of intervening woodland cover. There will be no discernible change in relation to the future baseline scenario (restored scheme at year 33) and as a consequence there would be no visual effects.</p>

Receptor	Commentary
C5 Roxby Lane	<p><u>Operational phase (Year 3)</u> This route links the A174 to the south of Staithes with the village of Roxby to the southern extent of the 2km detailed study area.</p> <p>There is a short section of the route adjacent to the junction with the A174 at Dalehouse Bank where the full extent of the south eastern elevation of the development is visible in views to the west. Visibility becomes increasingly restricted for road users as the route drops down towards Dalehouse and the screening effects of the mature woodland in the valleys provides comprehensive visual containment. To the south of Dalehouse the road passes through a more open landscape. A more elevated section of the route allows views of the operational mine to the north west through gaps in the roadside vegetation where this aligns with the orientation of travel. Further to the south the route becomes increasingly elevated although the availability of views towards the site from the road corridor is largely restricted by the presence of roadside hedgerows. Visibility from the lane is often restricted by roadside hedges and sometimes by intervening trees and woodland in the wider landscape. However, where open views are available the operational mine features prominently situated on a relatively flat plateau beyond the wooded valleys of Roxby Beck and Easington Beck and set against the strong landform at Boulby Bank with the North Sea visible to the north. In these views the full extent of the eastern elevation comprising the mine buildings and structures is visible.</p> <p>The level of effect for vehicular receptors using Roxby Lane is assessed as Moderate as a result of a Medium magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Long Term and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment.</p> <p><u>Restoration</u> In comparison to the future baseline scenario (restored scheme at year 35) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and as a consequence will not be of the same stature or provide the same level of visual association with existing areas of mature woodland in the intervening valleys within the wider landscape. The magnitude of change would be Very Low resulting in a Slight/Negligible level of effect. The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.</p>
C6 Borrowby Lane	<p><u>Operational phase (Year 1)</u> Borrowby Lane is accessed at Dalehouse via Roxby Lane and connects with the village of Borrowby to the south of the detailed study area.</p> <p>The section of the route adjacent to Dalehouse is set amongst dense woodland cover and there is no visibility of the operational mine. To the south with increased elevation the landscape becomes more open and views out to the wider landscape become more frequently available. Glimpsed views of the operational mine are available through gaps in roadside hedges although generally these views are oblique to the direction of travel. To the southern extent of the detailed study area rising landform to the west of the route increasingly screens visibility.</p> <p>The level of effect for vehicular receptors using Borrowby Lane is assessed as Slight/Moderate as a result of a Low magnitude of change in relation to the future baseline scenario (restored scheme at year 1). The nature of this effect would be Adverse, Temporary and Not Significant.</p> <p><u>Operational phase (Year 10)</u> No change to assessment.</p> <p><u>Restoration</u> In comparison to the future baseline scenario (restored scheme at year 35) the areas of woodland planted within the former main site area and to the north east corner of the site will not be fully mature and as a consequence will not be of the same stature or provide the same level of visual association with existing areas of mature woodland in the intervening valleys within the wider landscape. The magnitude of change would be Very Low resulting in a Slight/Negligible level of effect.</p>

Receptor	Commentary
	The nature of this effect would be Adverse, Medium Term and Not Significant. Within a further decade, the restoration scheme of the Proposed Development would fully mature and there would be no differences in these visual receptors' views in comparison with the permitted future baseline.

5.10 Predicted Effects: Cumulative

Overview

- 5.10.1 GLVIA3 defines cumulative effects as *"the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments taken together"*. This is further separated into cumulative landscape effects which are defined as *"effects that can impact on either the physical fabric or character of the landscape, or any special values attached to it"* and cumulative visual effects which are defined as *"effects that can be caused by combined visibility, which occurs when the observer is able to see two or more developments from one viewpoint and/or sequential effects which occur when the observe has to move to another viewpoint to see different developments"*.
- 5.10.2 Cumulative landscape and visual effects may occur where more than one existing, permitted or proposed development, including the Proposed Development, could be discerned from locations within landscape character areas or landscape designations and/or seen either simultaneously from viewpoints or visual receptor locations, or sequentially from major road routes.

Developments for Inclusion

- 5.10.3 The development included in the CLVIA is set out in **Table 5.25**.

Table 5.25 Development Considered in the CLVIA

Quarry site	Approx. distance from the Proposed Development site	Planning status	Description and rationale for inclusion
Highfields Farm Wind Turbine	~1.8km south west	Active	Existing single 50m high turbine. Situated in agricultural land within the P7: Plateau Farmland, South of Loftus LCA. Tall industrial structure in elevated situation adjacent to NYMNP boundary. Potential for landscape and visual effects to arise from the availability of simultaneous views with the Proposed Development.
Scaling Farm Wind Turbine	~4.2km south west	Active	Existing single 26m high turbine. Situated in agricultural land within the 4a: Boulby to Whitby LCA. Tall industrial structure in elevated situation within NYMNP. Potential for landscape and visual effects to arise from the availability of simultaneous views with the Proposed Development.
Carlin How Works, Skinningrove	~5km west	Active	Existing former steel works situated adjacent to the A174. Large scale works comprising mix of industrial scale buildings and associated infrastructure. Situated within the Urban LCT.

Quarry site	Approx. distance from the Proposed Development site	Planning status	Description and rationale for inclusion
			Location adjacent to A174 and the England Coast Path/Cleveland Way gives rise to the potential for cumulative visual effects to be experienced by vehicular and recreational receptors. Situated within the Urban LCT.

Cumulative Landscape Assessment

Highfields Farm Wind Turbine

- 5.10.4 This development is situated within the Plateau Farmland LCT.
- 5.10.5 The potential for cumulative landscape effects to be experienced within the Plateau Farmland LCT is limited by the restricted visibility of the Proposed Development. Visibility will be restricted to occasional views of the chimney tip/smoke plume which would result in a consequent lack of characterising influence in association with the presence of the wind turbine.
- 5.10.6 The turbine is not widely perceived across the host character area, 4a Boulby – Whitby LCA as a consequence of views restricted by landform to the north east and to the south east. Beyond this a relative lack of scale and mass in relation to increasing separation distance means that the development would not be a strong characterising influence across the wider LCA. Within some restricted areas of the north western parts of the LCA near the boundary with the Plateau Farmland LCT the combined presence of the turbine and Proposed Development would introduce a very low level cumulative effect as a result of the combined presence of tall built development within a landscape otherwise devoid of such characterising features.
- 5.10.7 The turbine would be visible in association with the Proposed Development in some long distance views from elevated areas of the NYMNP to the south. In these views the developments would not be visually prominent which will limit the potential influence on the *special qualities* of the NYMNP. However, it is considered that there would be a limited influence on the cumulative effects for two of these special qualities as follows:
- *Wide sweeps of open heather moorland;*
 - ▶ As a result of a very slight increase in the extent of visible built development in expansive views towards the coastline from upland areas.
 - *Strong feeling of remoteness;*
 - ▶ As a consequence of the very slight increase in the presence of built development within views from undeveloped areas of the national park.
- 5.10.8 The potential for the turbine to influence the North Yorkshire and Cleveland Heritage Coast is limited because of the general lack of intervisibility with the Proposed Development as perceived from the coastal hinterland.

Scaling Farm Wind Turbine

- 5.10.9 This development is situated within the 4a Boulby – Whitby LCA.
- 5.10.10 The development has a very limited characterising influence within the LCA as a consequence of the small scale and limited development footprint. Intervisibility with the Proposed Development is also restricted across the LCA hence there would be no significant cumulative landscape effects.

- 5.10.11 This development is not widely perceived across the NYMNP and there is a lack of intervisibility with the Proposed Development consequently the potential to introduce cumulative effects in relation to the NYMNP's special qualities is very limited.
- 5.10.12 There is no intervisibility as perceived from the Heritage Coast and there would be no cumulative effects.

Carling How Works, Skinningrove

- 5.10.13 This development is situated within the Urban LCT.
- 5.10.14 Cumulative landscape effects experienced within the Urban LCT resulting from introduction of the Proposed Development would be extremely low and limited to the characterising influence of occasional visibility of the plume emitting from the main stack.
- 5.10.15 The potential for the works at Carling How to influence the host landscape character, LCA 4a Boulby – Whitby, through a visual effects pathway is extremely limited because of a lack of intervisibility.
- 5.10.16 This development is perceptible in some long-range views from elevated areas of the NYMNP to the south. Cumulative effects would be experienced in relation to two special qualities of the NYMNP as follows:
- Wide sweeps of open heather moorland;
 - ▶ As a result of a very slight increase in the extent of visible built development in expansive views towards the coastline from upland areas.
 - Strong feeling of remoteness;
 - ▶ As a consequence of the very slight increase in the presence of built development within views from undeveloped areas of the NYMNP.
- 5.10.17 With regard to potential effects on the Heritage Coast there are similarities in relation to the situation of the respective developments which are both located in close proximity to the southern boundary of the Heritage Coast. This gives rise to the potential for the combined influence of the developments to introduce cumulative effects as a result of the presence of large-scale industrial buildings in relation to the relatively flat coastal plain. The influence of Carling How is generally perceived in the context of a larger area of urban development whereas the Proposed Development would introduce built development within a less developed context. In relation to the wider aim of the heritage coast to "*conserve, protect and enhance: the natural beauty of the coastline...*" it is considered that the combined effects of the respective developments would represent a localised negative influence. In the context of the wider Heritage Coast it is considered that a relatively limited extent of its area would be affected and hence the cumulative effects would be Not Significant.

Cumulative Visual Assessment

- 5.10.18 The assessment has considered the extent to which visual receptors will experience intervisibility between the Proposed Development and the other developments in the cumulative assessment. Many of the receptors will have no or very limited intervisibility and accordingly are unlikely to experience simultaneous or successive views. However, there is potential for limited cumulative effects to be experienced as set out below.

Highfields Farm Wind Turbine

- 5.10.19 The turbine is situated on an area of elevated landform to the south west of Easington. There would be limited intervisibility with the Proposed Development as a result of an area of elevated landform to the south of Easington. It is considered that simultaneous or successive visibility will be available for a limited number of receptors. In these views the wind turbine would constitute a very minor addition to the visible extent of built development in relation to the overall scale and mass of the Proposed Development. As a consequence it is anticipated that not significant cumulative effects will be experienced by a limited range of receptors as follows:
- Recreational receptors using the PRow network;
 - ▶ Groups E, F. Simultaneous and successive views may be available from elevated areas where open views are available to the west and north west.
 - ▶ Group G; Successive views may be available from elevated areas of the network.
 - Residents within elevated areas to the south and south west of the Proposed Development where open views are available.

Scaling Farm Wind Turbine

- 5.10.20 The wind turbine is situated within an elevated area of agricultural land to the south of the defined LVIA study area. The turbine is a lattice tower construction allowing a certain degree of visual permeability which reduces its visual prominence. This factor combined with areas of elevated landform and mature tree cover between the wind turbine and the Proposed Development result in a very limited extent of intervisibility. The contribution of the wind turbine in relation to the overall combined level of effect introduced in association with the Proposed Development would be minimal and would not result in significant cumulative effects.

Carling How Works, Skinninggrove

- 5.10.21 Many of the visual receptors considered within the assessment have no intervisibility between the Proposed Development and the Works and accordingly are unlikely to experience simultaneous or successive views. There is potential for limited sequential cumulative effects to be experienced as set out below.
- 5.10.22 Vehicular receptors travelling east on the A174 experience views of the works from an elevated section of the route to the west of the A174/Kilton Lane roundabout adjacent to Brotton. In these views the linear, large scale industrial buildings are perceived in relation to the North Sea coastline with the strong form of Micklow Hill and Boulby Cliffs beyond. This dominant landform limits intervisibility between the Works and the Proposed Development in relation to views from the A174. In closer range views from lower elevations, visibility becomes more restricted and limited to the building frontages as the A174 passes the Proposed Development. Travelling west through the defined LVIA study area, visibility of the Carling How Works is restricted by intervening built development until a point in close proximity to the Works.
- 5.10.23 Walkers travelling in both directions of the Cleveland Way/England Coast Path will experience views from short sections of the route where the Carling How Works are perceived as an isolated large-scale industrial development. In combination with sequential views of the Proposed Development this would introduce low level cumulative visual effects as a consequence of the visual associations walkers would experience between the two developments.
- 5.10.24 In summary the Carling How Works would not be visible in successive or simultaneous views with the Proposed Development from areas within the defined LVIA study area. More widely there will

be very limited visibility in simultaneous views of the Proposed Development. from longer range views beyond the defined LVIA study area to the south resulting in very limited cumulative visual effects. It is also considered that very limited sequential cumulative effects would arise for vehicular and recreational receptors using long distance routes in relation to the very short sections of the route where the works will be briefly perceived as a development of comparable scale and nature to that of the Proposed Development as well as the separation in time between the views of the works and the Proposed Development. The cumulative effects would be Not Significant.

5.11 Conclusions of Significance Evaluation

5.11.1 The LVIA has considered the potential landscape and visual effects of the Proposed Development, Boulby Mine at year 3, year 10 and at restoration in relation to the future baseline scenario under which the current Mine will be decommissioned and the site subject to restoration by 2025 to provide naturalistic landscape that will gradually become fully established. The following landscape and visual receptors have been considered:

- Landscape elements and character;
- Designated landscapes; and
- Views and visual amenity.

Effects on Landscape Elements and Character

Landscape Elements

5.11.2 The assessment scenario considers introduction of the Proposed Development against a future baseline of a recently restored site area. At year 3 the presence of the operational mine area with associated buildings, structures. and infrastructure is assessed against a future baseline of immature elements of the restoration scheme. Considerable areas of broadleaved woodland, meadow, agricultural pasture and arable field units would be affected. At this early stage in the establishment of the restoration landscape, these elements would not be a strong presence and as such would be replaceable in a relatively short time period. Hence, there would be no significant effects from the replacement of the future baseline situation by the Proposed Development.

5.11.3 At year 10 of the operational phase elements of the restored landscape under the future baseline would be at different states of maturity. Areas of broadleaved woodland would not be fully mature but will have experienced a period of growth such that the woodland would be well-established and have a stronger presence within the site area. There would be no significant effects.

5.11.4 At restoration the assessment scenario considers the recently completed restoration scheme that would be implemented following decommissioning of the Proposed Development in relation to the future baseline restoration scheme having reaching maturity. Some adverse effects would be experienced as a consequence of the differential between the physical presence of a semi-mature to mature landscape elements in the future baseline restoration in relation to the Proposed Development under which the restoration scheme would include recently planted transplants or whips. These effects are not considered to be significant.

Landscape Character

5.11.5 At year 3 the Proposed Development would result in a comprehensive loss of landscape elements and the introduction of large-scale industrial buildings with associated infrastructure in comparison with the future baseline. This would result in fundamental change to the landscape character within

site area and would result in direct landscape effects within the site area which would be significant at the scale of the site. Rationalisation of the surface activities to reduce the operational mine footprint will reduce the physical presence of the Proposed Development and allow the progressive introduction of some components the proposed restoration scheme in peripheral parts of the site. Significant effects would no longer be experienced at restoration of the Proposed Development following decommissioning with associated removal of all buildings, infrastructure and plant, an almost complete cessation of movement within the site and introduction of the restoration scheme.

- 5.11.6 Indirect significant landscape effects would also be experienced more widely across the host 4a Boulby – Whitby LCA as a result of the characterising influence of the large-scale mine buildings, including a stack and periodic associated plume. These significant effects are assessed to extend to an area of approximately 2.0km from the site boundary where the mine buildings would be perceived as a strong characterising presence. These significant adverse effects would be long term as they would persist throughout the 25 years operational period but would be reversible with the subsequent decommissioning and restoration. Beyond this distance within the 4a Boulby – Whitby LCA there would be no significant effects. Likewise, the LVIA concludes that there would be no significant effects upon any of the other LCAs located within the 5km radius LVIA study area.

Effects on Designated Landscapes

North York Moors National Park

- 5.11.7 The assessment has concluded that there would be one localised significant landscape effect in relation to the special qualities of the National Park for the 25 years long operational period of the Proposed Development before decommissioning and restoration is implemented.
- Tranquillity;
 - ▶ As a consequence of the influence of large-scale built development with associated activity, vehicular movements, lighting and occasional plume emissions into the A174 corridor which would have a localised influence on this special quality.

North Yorkshire and Cleveland Heritage Coast

- 5.11.8 There will be localised significant effects on the Heritage Coast extending to a maximum distance of 2.0km from the Proposed Development due to the presence of large-scale industrial buildings and structures as perceived from this section of the Heritage Coast for the 25 years long operational period.
- 5.11.9 In drawing a conclusion upon the weight to be given to the assessment of significant adverse effects upon two nationally designated landscapes, several mitigating factors should be considered. These include the assessment that the significant effects would be sustained within only a small area of these extensive designations: under 4% of the National Park; would affect only a limited number of the special qualities or key management principles; and all effects would be reversible. Finally, it is pertinent to note that for many years, the National Park and Heritage Coast successfully complied with their numerous purposes whilst the current Boulby Mine has been operational on the National Park's edge or adjacent to the Heritage Coast.

Effects on Views and Visual Amenity

- 5.11.10 Significant effects will be experienced by the following visual receptors during the operational phase due to the visibility of the Proposed Development taking into account the adoption of mitigation measures:

Settlements - Staithes (Upper Town), Cowbar, Boulby; and Hinderwell.

Property groups - Ings Farm, Red House Farm; Twizziegill Farm; Ridge Lane, Boulby Barn Farm, Cowbar Farm; Seaton Hall and Midge Hall.

Long distance routes – The closest sections of the Cleveland Way, England Coast Path; and NCR 1.

PRoWs – ProW networks within the development site boundary; PRoWs to the north east; PRoWs in and around Staithes; PRoWs to the south east; PRoWs to the South, and PRoWs to the north west.

Transport routes – The closest section of A174 and Cowbar Lane.

Table 5.26 Summary of Landscape Effects

Landscape Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Landscape elements				
Woodland				
Operational phase year 1	Medium-High	Low	Slight	Not Significant
Operational phase year 10	Medium-High	Medium	Moderate	Not Significant
Restoration	Medium-High	Medium	Moderate	Not Significant
Hedgerows				
Operational phase year 1	Low	Low	Slight	Not Significant
Operational phase year 10	Medium	Very Low	Slight/Negligible	Not Significant
Restoration	Medium	Very Low	Slight/Negligible	Not Significant
Meadow				
Operational phase year 1	Low	High	Moderate	Not Significant
Operational phase year 10	Low	Medium	Slight/Moderate	Not Significant
Restoration	Low	Very Low	Negligible	Not Significant
Pasture				
Operational phase year 1	Low	Medium	Slight/Moderate	Not Significant
Operational phase year 10	Low	Low	Slight	Not Significant
Restoration	Low	No Change	No Effect	N/A
Coastal Scrub				
Operational phase year 1	Low	No Change	No Effect	N/A
Operational phase year 10	Medium	No Change	No Effect	N/A
Restoration	Medium	No Change	No Effect	N/A

Landscape Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Watercourses				
Operational phase year 1	Low	High	Moderate	Not significant
Operational phase year 10	Low	High	Moderate	Not significant
Restoration	Low	Low	Slight	Not significant
Buildings				
Operational phase year 1	Low	High	Moderate	Not significant
Operational phase year 10	Low	High	Moderate	Not significant
Restoration	Low	None	No Effect	N/A
Landscape character				
LCA: 4a Boulby – Whitby (Host LCA) – direct effects within the site				
Operational phase year 3	High	High	Substantial	Significant
Operational phase year 10	High	High	Substantial	Significant
Restoration	High	Low	Moderate	Not Significant
LCA: 4a Boulby – Whitby (Host LCA) – indirect effects beyond the site				
Operational phase year 3	High	High	Substantial	Significant
Operational phase year 10	High	High	Substantial	Significant
Restoration	High	Low	Moderate	Not Significant
LCA: Moorland: 1c- Northern Moorland Indirect effects				
Operational phase year 1	Medium	Very Low	Slight	Not significant
Operational phase year 10	Medium	Very Low	Slight	Not significant
Restoration	Medium	Zero	No Effect	N/A
LCA: Plateau Farmland: P7 South of Loftus Indirect effects				
Operational phase year 1	Medium	Very Low	Slight/Negligible	Not significant
Operational phase year 10	Medium	Very Low	Slight/Negligible	Not significant
Restoration	Medium	Zero	No Effect	N/A
Landscape designations				
North York Moors National Park Special qualities				

Landscape Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Tranquillity	High	Medium	Moderate/Substantial	Significant (for a restricted area less than 4% of the Park within the LVIA study area)
Remaining 27 of 28 special qualities	High	Zero-Low	None to Moderate	Not Significant
North Yorkshire and Cleveland Heritage Coast	High	Zero-High	None to Substantial	Not Significant to Significant (significant effects would be experienced up to a maximum distance of 2km from the Proposed Development)

Table 5.27 Summary of Visual Effects

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Residential visual receptors in settlements within 5km				
Staithes (Old Town)				
Operational phase year 1	High	Very Low	Slight	Not significant
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Staithes (Upper Town)				
Operational phase year 1	High	High to Zero	Substantial to No View	Significant to Not Significant
Operational phase year 10	High	Medium to Zero	Moderate/Substantial to No View	Significant to Not Significant
Restoration	High	Very Low	Slight	Not Significant
Cowbar				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Very Low	Slight	Not Significant
Easington				

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Operational phase year 1	High	Very Low	Slight	Not Significant
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Boulby				
Operational phase year 1	High	High to Zero	Substantial to No View	Significant to Not Significant
Operational phase year 10	High	High to Zero	Substantial to No View	Significant to Not Significant
Restoration	High	Low	Moderate	Not significant
Roxby				
Operational phase year 1	High	Low	Moderate	Not significant
Operational phase year 10	High	Low	Moderate	Not significant
Restoration	High	Zero	No View	N/A
Hinderwell				
Operational phase year 1	High	Medium to Low	Moderate/Substantial to Moderate	Significant to Not Significant
Operational phase year 10	High	Medium to Low	Moderate/Substantial to Moderate	Significant to Not Significant
Restoration	High	Very Low	Slight	Not significant
Ellerby				
Operational phase year 1	High	Low	Moderate	Not significant
Operational phase year 10	High	Low	Moderate	Not significant
Restoration	High	Zero	No View	N/A
Newton Mulgrave				
Operational phase year 1	High	Very Low	Slight	Not significant
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Residential visual receptors in property groups and individual properties within 2km				
Ings Farm				
Operational phase year 1	High	High	Substantial	Significant
Operational phase year 10	High	High	Substantial	Significant
Restoration	High	Low	Moderate	Not significant

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Red House Farm				
Operational phase year 1	High	High	Substantial	Significant
Operational phase year 10	High	High	Substantial	Significant
Restoration	High	Low	Moderate	Not significant
Ridge Lane Group				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Zero	No View	N/A
Twizziegill Farm				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Low	Moderate	Not significant
Dalehouse				
Operational phase year 1	High	Very Low	Slight	Not significant
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Boulby Barn Farms				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Zero	No View	N/A
Cowbar Farm				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Low	Moderate	Not significant
Seaton Hall				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Very Low	Slight	Not significant
Midge Hall Group				
Operational phase year 1	High	High	Substantial	Significant

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Operational phase year 10	High	High	Substantial	Significant
Restoration	High	Low	Moderate	Not significant
Borrowby Grange Group				
Operational phase year 1	High	High to Low	Substantial to Moderate	Significant to Not Significant
Operational phase year 10	High	High to Low	Substantial to Moderate	Significant to Not Significant
Restoration	High	Low	Moderate	Not significant
Recreational visual receptors using long distance routes				
Cleveland Way				
Operational phase year 1	High	High to Zero	Substantial to No View	Significant to Not Significant
Operational phase year 10	High	High to Zero	Substantial to No View	Significant to Not Significant
Restoration	High	Low to Zero	Moderate to No View	Not significant
England Coastal Path				
Operational phase year 1	High	High to Zero	Substantial to No View	Significant to Not Significant
Operational phase year 10	High	High to Zero	Substantial to No View	Significant to Not Significant
Restoration	High	Low to Zero	Moderate to No View	Not significant
NCR No1				
Operational phase year 1	High	High to Zero	Substantial to No View	Significant to Not Significant
Operational phase year 10	High	High to Zero	Substantial to No View	Significant to Not Significant
Restoration	High	Low to Zero	Moderate to No View	Not significant
Visual receptors using camping and caravan sites and holiday parks				
Staithes Caravan Park				
Operational phase year 1	High	Zero	No View	N/A
Operational phase year 10	High	Zero	No View	N/A
Restoration	High	Zero	No View	N/A
Gatehouse Caravan Site, Hinderwell				
Operational phase year 1	High	Very Low	Slight	Not significant

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Serenity Camping, Hinderwell				
Operational phase year 1	High	Very Low	Slight	Not significant
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Runswick Bay Caravan and Camping Park				
Operational phase year 1	High	Very Low	Slight	Not significant
Operational phase year 10	High	Very Low	Slight	Not significant
Restoration	High	Zero	No View	N/A
Recreational visual receptors using the Public rights of Way Network				
PRoW's within the development site boundary - Group A				
Operational phase year 1	High	High to Low	Substantial to Moderate	Significant to Not Significant
Operational phase year 10	High	High to Low	Substantial to Moderate	Significant to Not Significant
Restoration	High	Low	Moderate	Not significant
PRoWs to the north east – Group B				
Operational phase year 1	High	High	Substantial	Significant
Operational phase year 10	High	High	Substantial	Significant
Restoration	High	Low	Moderate	Not significant
PRoWs in and around Staithes - Group C				
Operational phase year 1	High	Medium to Zero	Moderate/Substantial to No View	Significant to Not Significant
Operational phase year 10	High	Medium to Zero	Moderate/Substantial to No View	Significant to Not Significant
Restoration	High	Very Low to Zero	Slight to No View	Not significant
PRoWs to the east – Group D				
Operational phase year 1	High	Low	Moderate	Not significant
Operational phase year 10	High	Low	Moderate	Not significant
Restoration	High	Very Low	Slight	Not significant

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
PRoWs to the south east – Group E				
Operational phase year 1	High	Medium	Moderate/Substantial	Significant
Operational phase year 10	High	Medium	Moderate/Substantial	Significant
Restoration	High	Low	Moderate	Not significant
PRoWs to the south – Group F				
Operational phase year 1	High	Medium to Low	Moderate/Substantial to Moderate	Significant to Not Significant
Operational phase year 10	High	Medium to Low	Moderate/Substantial to Moderate	Significant to Not Significant
Restoration	High	Low	Moderate	Not significant
PRoWs to the south west – Group G				
Operational phase year 1	High	Medium to Very Low	Moderate/Substantial to Slight	Significant to Not Significant
Operational phase year 10	High	Medium to very Low	Moderate/Substantial to Slight	Significant to Not Significant
Restoration	High	Low	Moderate	Not significant
PRoWs to the north west – Group H				
Operational phase year 1	High	High to Zero	Substantial to No View	Significant to Not Significant
Operational phase year 10	High	High to Zero	Substantial to No View	Significant to Not Significant
Restoration	High	Low to Zero	Moderate to No View	Not significant
Visual receptors using A Roads				
A174				
Operational phase year 1	Medium	High to Zero	Moderate/Substantial to No View	Significant to Not Significant
Operational phase year 10	Medium	High to Zero	Moderate/Substantial to No View	Significant to Not Significant
Restoration	Medium	Low to Zero	Slight/Moderate to No View	Not significant
Visual receptors using the minor road network				
C1 Boulby Bank				
Operational phase year 1	Medium	Medium	Moderate	Not Significant
Operational phase year 10	Medium	Medium	Moderate	Not Significant
Restoration	Medium	Low	Moderate	Not Significant

Visual Receptor	Receptor sensitivity	Magnitude of change	Level of effect	Significance
C2 Cowbar Lane				
Operational phase year 1	Medium	High	Moderate/Substantial	Significant
Operational phase year 10	Medium	High	Moderate/Substantial	Significant
Restoration	Medium	Low	Slight/Moderate to No View	Not significant
C3 Grinkle Lane				
Operational phase year 1	Medium	Very Low	Slight/Negligible	Not Significant
Operational phase year 10	Medium	Very Low	Slight/Negligible	Not Significant
Restoration	Medium	Zero	No View	N/A
C4 U2269/1/70 Ridge Lane				
Operational phase year 1	Medium	Medium to Zero	Moderate to No View	Not Significant
Operational phase year 10	Medium	Medium to Zero	Moderate to No View	Not Significant
Restoration	Medium	Zero	No View	N/A
C5 Roxby Lane				
Operational phase year 1	Medium	Medium to Zero	Moderate to No View	Not significant
Operational phase year 10	Medium	Medium to Zero	Moderate to No View	Not significant
Restoration	Medium	Very Low to Zero	Slight/Negligible to No View	Not significant
C6 Borrowby Lane				
Operational phase year 1	Medium	Low to Zero	Slight/Moderate to No View	Not significant
Operational phase year 10	Medium	Low to Zero	Slight/Moderate to No View	Not significant
Restoration	Medium	Very Low to Zero	Slight/Negligible to No View	Not significant

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6. Noise and Vibration

Non-Technical Summary

This assessment considers the environmental effects of Noise and Vibration effects associated with the operation of Boulby Mine upon existing sensitive receptors. Noise surveys have been undertaken at the Mine Site during operations, and during a shutdown period to provide a view of what noise is generated by the mine and what noise is likely in the area if the mine wasn't operating.

The assessment found that there would be no significant effects on noise sensitive receptors from either operational activities or road traffic associated with the development. This is due to the nature and level of noise sources and the location and layout of the receptors.

6.1 Introduction and Overview

- 6.1.1 This chapter assesses whether significant environmental effects are likely as a result of noise associated with the workings of Boulby Mine. This chapter should be read in conjunction with the development description in **Chapter 3 and Chapter 8**.
- 6.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and a detailed assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.

6.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 6.2.1 A study of noise and vibration related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site in order to highlight any requirements which the scheme needs to consider. It is important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues.

Table 6.1 Relevant Planning Policy

Policy Reference	Policy Issue
National planning policies	
National Planning Policy Framework 2019 (NPPF) Paragraph 109	The NPPF states that new development should contribute to and enhance the environment by preventing new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution. It should be noted that the NPPF does not invalidate the considerable range of British Standards and other guidance documents relevant to the assessment of environmental noise in the UK.



Policy Reference	Policy Issue
Noise Policy Statement for England (NPSE) 2010	The NPSE sets out the vision and aims for dealing with noise (except for workplace/occupational noise). The NPSE requires that noise and vibration assessments identify impacts that would result in significant adverse impacts on health and quality of life from a proposed development. The aims of NPSE include: avoiding significant adverse impact on health and quality of life; mitigating adverse impacts on health and quality of life; and to contribute to the improvement of health and quality of life.
Planning Practice Guidance (PPG-N) 2014 Paragraph 005	The NPPG relates in terms of a noise hierarchy the levels of perception to noise exposure with expected outcomes and required actions.
Planning Practice Guidance - Minerals – Noise associated with the Operations (2014 Paragraph 021)	Provides appropriate noise standards for mineral operators for normal operations.
<i>Local planning policies</i>	
North York Moors National Park Authority - Core Strategy and Development Policies (2008)	Development Policy 1 'Environmental Protection' " <i>aims to conserve and enhance the special qualities of the North York Moors National Park, development will only be permitted where it will not generate unacceptable levels of noise or vibration</i> ". Development Policy 14 "Tourism & Recreation" - The quality of the tourism and recreation in the National Park will be maintained and improved through adopting the principles of sustainable tourism. New tourism development and the expansion or diversification of existing tourism businesses will be supported where, amongst others, " <i>The development will not generate an increased level of activity, including noise, which would be likely to detract from the experience of visitors and the quality of life of local residents</i> ".
North York Moors National Park Authority – Minerals and Waste Joint Plan (November 2016)	Provides advice on the suitable guidance to follow during assessment of Minerals and Waste. The document largely relates to adopting the guidance set out in the NPPF with some further good practice guidance such as proposed set back distances from activities.

Legislative Requirements

Table 6.2 Legislation Considered in Preparing the ES

Legislation reference	Legislative issues
Environmental Protection Act 1990 (EPA)	Section 79 of the EPA (as amended by the Noise and Statutory Nuisance Act 1993) provides the principal controls over so-called 'statutory nuisances' and declares a number of items as statutory nuisance. Under the provisions of the EPA, local authorities have a duty to periodically inspect their areas to detect any nuisance and, where a complaint of statutory nuisance is made, to take such steps as are reasonably practicable to investigate the complaint. Should a local authority be satisfied of the existence of a statutory nuisance, it is obliged to serve an Abatement Notice on the person responsible. Though businesses have a defence of "best practicable means", failure to comply with a Notice is a criminal offence.
Noise Insulation Regulations 1975	The Noise Insulation Regulations 1975 (as amended 1988) were made under Part II of the Land Compensation Act 1973. Regulation 3 imposes a duty on authorities to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings. This is subject to meeting certain criteria given in the Regulation. Regulation 4 provides authorities with discretionary powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings, subject to meeting certain criteria given in the Regulation.

Guidance

Table 6.3 Guidance Considered in Preparing the ES

Guidance reference	Guidance issues
BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'	Provides methods for assessing potential effects of sound generated by new fixed plant and deliveries to proposed retail and employment uses affecting existing and proposed noise-sensitive receptors. Sound from commercial activities will be assessed against BS 4142:2014. BS 4142:2014 does not apply to sound associated with the passage of vehicles on public roads or from railway systems.

6.3 Methodology and Approach

Consultation

- 6.3.1 A range of organisations were consulted as part of the EIA scoping process. No comments were raised in the scoping responses with respect to the noise methodology proposed in the scoping report. Section 2.5 of the ES provides information on how certain issues regarding noise, which have been raised during the recent consultation programme, are being dealt with.

Data Gathering Methodology

Sound Monitoring Methodology

- 6.3.2 Baseline sound monitoring surveys and on-site source measurements were completed by Wood at various locations in and around the Site between the 31st July and 24th August 2017. The purpose of these surveys was to quantify sound levels at the closest noise sensitive receptors (NSR's). The first week of the sound monitoring surveys coincided with a shutdown period at the Mine and is therefore considered to be representative of a baseline condition without the operational mine. The remainder of the survey period gathered source measurements of Site operations at the operational boundary of the Site. These measurements considered daytime (07:00 hrs – 23:00 hrs) and night-time (23:00 hrs – 07:00 hrs) periods. The NSR's are illustrated in Figure 6.1. These measurements have been recorded within the last three years. Furthermore, no major developments are known in the area which would significantly change the acoustic environment. Therefore, the monitoring surveys are still considered to be valid for this assessment.
- 6.3.3 The survey methodology comprised the following:
- Extensive sound level monitoring was undertaken over a 4-week period at four long-term (LT) locations at the NSR's. Additional short-term (ST) measurements were also undertaken on the boundaries of the Site over a 24-hour period as well as source noise measurements of fixed and mobile plant operating on the site. In both instances, daytime and night-time observations were made. Sound level meters (SLMs) were used for all measurements conforming to relevant standards and within industry standard external calibration periods. Where possible, the long-term measurements were taken in close proximity to the NSR's however, due to site access and security, this was not always possible. In this instance, a location considered representative of the noise climate of the NSR's was adopted;
 - The SLMs were calibrated before and after each measurement, with no significant drift in calibration recorded. Windshields were also fitted to the microphones to minimise the effects of any wind induced sound;

- Details of the monitoring instrumentation (model/serial numbers etc.) are presented in Error! Reference source not found.. All measurements were conducted, where possible, in accordance with BS 7445-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures' and BS 4142:2014;
- The weather conditions during SLM deployment on the 31st July and 1st August 2017 were noted to be overcast and damp with average wind speeds less than 5 ms⁻¹. The average temperature was 15°C with approximately 90% cloud coverage. There was no precipitation during setup however, due to the precipitation earlier during the day, road conditions were damp. The wind direction was south westerly; and
- A meteorological station was set up on-site throughout the long-term and short-term surveys. All 15 minute periods (plus 15 minutes before and after the occurrence) with an average wind speed of 5ms⁻¹ or greater, or periods of rain have been excluded from the measurements. Due to initial connectivity issues with the weather station for the duration from deployment to 23:59 hrs on 4th August 2017, data from a nearby weather station¹ has been adopted for the missing periods. A total of 261, 15 min periods out of 2165 have been excluded.

6.3.4 A summary of the sound monitoring locations is provided in Table 6.4 which are also shown in Figure 6.2.

Table 6.4 Sound Monitoring Positions

Position reference	Description	Type of monitoring
LT1	Red House Farm – This property lies approximately 550m east of the Site gatehouse. The sound survey was undertaken in the paddock to the west of the property, which was equidistant from the A174 from 14:30 hrs on 31 st July 2017 to 13:00 hrs on 23 rd August 2017.	LT 4-week duration
LT2	Boulby Grange – This property lies approximately 360m north-west of the Site gatehouse. The sound survey was undertaken in the field in front of the property in a position considered representative of the noise climate at the house from 16:00 hrs on 31 st July 2017 to 12:00 hrs on 17 th August 2017*.	LT 3-week duration
LT3	Ings Farm – This property lies approximately 600m to the north west of the rail facilities. The sound survey was undertaken in the front garden approximately 4m from the house facade from 16:45 on 31 st July 2017 to 12:45 on 23 rd August 2017.	LT 4-week duration
LT4	Ridge Farm – This property is located approximately 440m south east of the operational Site boundary. The sound survey was undertaken in the field to the rear of the property in a position considered representative of the noise climate at the house from 11:15 hrs on 1 st August 2017 to 13:45 hrs on 23 rd August 2017.	LT 4-week duration
ST1	Lies to the south-eastern operational boundary of the site measuring any noise from the fabrication bay area and mine shafts from 16:00 hrs on 23 rd August 2017 to 13:30 hrs on 24 th August 2017.	ST 24-hour duration
ST2	Lies to the eastern operational boundary of the Site measuring noise from the treatment plant and mobile plant around the Raw Ore silo from 15:45 on 23 rd August 2017 to 13:45 on 24 th August 2017.	ST 24-hour duration

¹ IREDCARA2 (Brotton), 31 July 2017 - 4 August 2017. Source: www.wunderground.com

Position reference	Description	Type of monitoring
ST3	Lies to the west of the Site measuring noise from the Rail load out movements, the finished product store and the main exhaust stack from 15:30 hrs on 23 rd August 2017 to 12:15 hrs on 24 th August 2017.	ST 24-hour duration
N/A	Multiple source measurements were undertaken across the site from 09:00 to 14:30 on 24 th August 2017.	Minimum 1-minute duration

* Measurements ceased at Boulby Grange on 17th August 2017 due to the premature discharge of batteries.

Methodology for Identifying and Assessing Effects

6.3.5 This section sets out the assessment criteria used to predict effects and to undertake the evaluation of their significance.

Assessment Approach

6.3.6 This section details the assessment criteria applied to each of the assessments in this chapter.

6.3.7 The 2017 EIA Regulations require that assessments consider the likely significant effects of a proposed development. The likely significant effects were considered in the following categories:

- Adverse effect – an increase in noise or vibration levels; and
- Beneficial effect – a decrease in noise or vibration levels.

6.3.8 The information provided in the Noise Policy Statement for England (NPSE, 2010), requires that noise and vibration assessments identify effects that would result in significant adverse effects on health and quality of life from a proposed development.

6.3.9 The National Planning Policy Framework (NPPF, February 2019) advises that significant adverse impacts on health and the quality of life as a result of noise from new development should be avoided. It also advises that other adverse impacts on health and quality of life arising from noise from new development should be reduced to a minimum.

6.3.10 The NPPF is taken into account by Local Authorities when preparing their local and neighbourhood plans which form the basis for noise (including vibration) policies within an area.

6.3.11 Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst other considerations):

“Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability”.

6.3.12 The NPPF goes on to state in Paragraph 123 that *“Planning policies and decisions should aim to:*

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established, and

- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.”

6.3.13 The NPPF document does not refer to any other documents regarding noise other than the Noise Policy Statement for England (NPSE, 2010).

6.3.14 In NPSE (2010) and NPPG (2019) the effect levels in relation to adverse impacts on health and quality of life are set out as:

- NOEL – No Observed Effect Level – level below which no effect on health and quality of life is detected;
- LOAEL – Lowest Observed Adverse Effect Level – level above which adverse effects on health and quality of life can be detected;
- SOAEL – Significant Observed Adverse Effect Level – level above which significant adverse effects on health and quality of life occur; and
- UAEL – Unacceptable Adverse Effect Level – level above which adverse effects are unacceptable.

6.3.15 The NPPG (2014) links the increasing effect levels to an effect, perception by receptor and associated action, as summarised in Table 6.5.

Table 6.5 NPPG – Summary of Noise Exposure Hierarchy

Increasing effect level	Effect	Perception	Action
Less than NOEL (No Observed Effect)	No effect	Not noticeable	No specific measures
Greater than NOEL (No Observed Effect)	Effect	Noticeable and not intrusive	No specific measures
Greater than LOAEL (Lowest Observed Adverse Effect Level)	Adverse effect	Noticeable and intrusive	Mitigate and reduce to a minimum
Greater than SOAEL (Significant Observed Adverse Effect Level)	Significant adverse effect	Noticeable and disruptive	Avoid
Greater than UAEL (Unacceptable Adverse Effect Level)	Unacceptable adverse effect	Noticeable and very disruptive	Prevent

6.3.16 In relation to the effect levels summarised in Table 6.5, NPSE (2010) sets out three aims:

- Avoid developments or activities which are demonstrated to have significant observed adverse effects i.e. greater than the SOAEL;
- Mitigate and minimise developments or activities where the effect lies between the LOAEL and the SOAEL; and
- Contribute to the improvement of health and quality of life through the effective management and control of environmental noise.

6.3.17 The NPSE (2010) states that it is not possible to have a ‘single objective’ noise (or vibration) based measure applicable to all sources and receptors that define the onset of the LOAEL or the SOAEL. It



is however possible to define threshold levels for the onset of each of the effect levels, based upon available Standards and technical guidance.

- 6.3.18 The Standards and technical guidance used within this assessment to define the NPSE (2010) threshold levels, and associated reasoning, are detailed below.

Significance Evaluation Methodology

- 6.3.19 The evaluation of significance differs depending on the sensitivity of the assessed receptor(s). The approach to defining significance criteria for residential and non-residential receptors is set out in the following sections.

Residential Receptors

- 6.3.20 For assessment purposes, where the calculated noise or vibration exposure at a residential receptor is greater than the SOAEL and is therefore a significant observed adverse effect on health and quality of life in government noise policy terms this will also be treated as a likely significant adverse effect in this assessment.
- 6.3.21 Noise or vibration exposure at residential receptors which is lower than the LOAEL is not considered to constitute a significant effect. However, where possible, measures have been incorporated into the proposed development to positively improve the health and quality of life of those receptors. This approach is in keeping with the third aim of NPSE (2010).
- 6.3.22 The second aim of NPSE (2010) refers to situations where the noise or vibration exposure lies between the LOAEL and the SOAEL, where there is a requirement to '*mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development*'. In this case reasonable steps should be taken to mitigate and minimise the effect. The NPSE (2010) however recognises that this does not necessarily mean such adverse effects cannot occur.
- 6.3.23 The EIA significance evaluation process as to whether or not a significant adverse effect at a residential receptor occurs when the noise or vibration exposure is between the LOAEL and SOAEL can require additional quantitative and qualitative considerations. These require elements of professional judgement and consideration of the context within which the effect occurs. In summary, these considerations include:
- The magnitude of the effect;
 - The change in magnitude of the effect;
 - The type of effect, including its intermittency;
 - The existing acoustic environment;
 - The effectiveness of measures to mitigate effects, including best practicable means (BPM); and
 - The duration of effect.
- 6.3.24 The NPPG (2014) advises that noise effects may be partially offset if the residents of affected dwellings have access to:
- A relatively quiet facade (containing windows to habitable rooms) as part of their dwelling, and/or;
 - A relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be

reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;

- A relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;
- A relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

6.3.25 Furthermore, the NPPF (2019) requires consideration to be made to the likely noise and vibration effects at receptors both from the proposed development in isolation and in-combination with other relevant committed and proposed development projects. No cumulative assessment is considered necessary as there are no developments likely to generate any cumulative noise and vibration effects.

Assessment Criteria

Operational Sound – Fixed and Mobile Plant

BS 4142:2014

- 6.3.26 BS 4142:2014 is used to rate and assess new, modified or additional sound sources of an industrial and commercial nature. BS 4142:2014 contains guidance on the monitoring and assessment of industrial and commercial noise sources, in particular from factories, industrial premises, fixed installations or sources of an industrial nature in commercial premises. BS 4142:2014 is not suitable for assessing sound measured inside buildings or when the background sound levels and rating levels are measured within 10 dB above the noise floor of the sound measuring equipment.
- 6.3.27 Using the assessment methodology advocated within BS 4142:2014, to fully understand the effects associated with operational sound from the proposed development, it is necessary to get an understanding of the margin by which the rating level (the specific sound level plus adjustments for any distinguishable features) exceeds the background sound level (the level that would be occur without the development), and the context in which the sound occurs.
- 6.3.28 The assessment of the rating level compared to the background sound level is considered to be the initial assessment framework, whereby the final determination of effect is modified taking into account its context.
- 6.3.29 For the initial assessment framework the rating level, $L_{Ar,Tr}$, of the specific sound is determined using subjective and objective methods. The maximum penalties associated with each of the characteristics are:
- Tonality – up to + 6 dB penalty;
 - Impulsivity – up to + 9 dB penalty;
 - Intermittency – a + 3 dB penalty; and
 - Other sound characteristics (i.e. neither tonal nor impulsive, but still distinctive) - a + 3 dB penalty.
- 6.3.30 The BS 4142:2014 penalties allow for, as an absolute worst case, linear summation of the penalties set out above up to +18 dB. This correction would only apply to specific sources that are described in BS 4142:2014 as being “*highly perceptible*” in terms of tonality and impulsivity, and “*readily*

distinctive against the residual acoustic environment” in terms of intermittency. It is considered, based on experience, that overall penalties greater than + 9 dB are rare.

6.3.31 The derived rating level is compared with the background sound level over a representative time period. The representative time period depends on the operational times of the assessed noise source, i.e. 1 hour during the day-time and 15 minutes during the night-time. The BS 4142:2014 assessment methodology states greater effects where there is a larger difference between the rating level and the background sound level, as summarised in Table 6.6.

Table 6.6 BS 4142 Assessment Guidance

Guidelines	Comment
Rating level from site operations of around +10 dB or more above the existing LA90 background sound level.	An indication of significant adverse impact, depending on the context.
Rating level from site operations of around +5 dB above the existing LA90 background sound level.	An indication of an adverse impact, depending on the context.
Rating level from site operations does not exceed the existing LA90 background sound level.	An indication of a specific sound source having a low impact, depending on the context.

6.3.32 The assessment guidance in Table 6.6 is considered to be an initial framework for the determination of effects from operational noise. Additional considerations in determining whether there was a likely significant adverse effect are summarised in the Significance Evaluation Methodology section; which takes into account the assessment’s context. Considerations specific to the assessment of operational noise are detailed in BS 4142:2014, and summarised below:

- The magnitude of the effect – such as consideration of the absolute level of noise;
- The existing acoustic environment – the character of the existing acoustic environment, including consideration of its frequency spectrum and temporal variation; and
- The sensitivity of receptors – whether noise sensitive receptors already incorporate design measures that secure good internal and/or outdoor acoustic conditions. This includes façade insulation treatment, mechanical or passive ventilation which would remove the requirement to open windows for ventilation, and/or a noise barrier.

6.3.33 In keeping with the methodology advocated within BS 4142:2014, the determination of impact threshold levels for the assessment of operational noise is based upon the difference between the rating level and the background sound level; over a representative time period.

6.3.34 A significant adverse effect, and SOAEL in terms of government policy, is determined to occur when the rating level (free-field) exceeds the background sound level by 10 dB or more; subject to taking into account factors relating to context. This applies both during daytime (0700-2300) and night-time (2300-0700) periods.

6.3.35 The LOAEL in terms of government policy is determined to occur at the point when the rating level (free-field) exceeds the background sound level.

LOAEL and SOAEL Effect Thresholds

The threshold levels related to operational noise (fixed and mobile plant) are summarised in Table 6.7. A significant adverse effect was determined to occur when the calculated sound level was greater than the SOAEL threshold level.



Table 6.7 BS 4142 Assessment Guidance

Sound source	Period*	LOAEL threshold level	SOAEL threshold level
Operational rating level, $L_{A,r,Tr}$ dB	Daytime	Background sound level, $L_{A90,T}$ (including consideration of context)	Background sound level, $L_{A90,T} + 10$ dB (including consideration of context)
	Night-Time	Background sound level, $L_{A90,T}$ (including consideration of context)	Background sound level, $L_{A90,T} + 10$ dB (including consideration of context)

* Daytime – (0700-2300), Night-time – (2300-0700)

6.3.36 Where the calculated operational noise (fixed and mobile plant) effects at residential receptors lay between the LOAEL and the SOAEL, taking into account context, consideration was given to the items listed in the Significance Evaluation Methodology section; in order to evaluate the likelihood of a significant effect.

Minerals - Planning Policy Guidance

6.3.37 The Planning Policy Guidance on Minerals states that Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:

- Give rise to a significant adverse effect;
- Give rise to an adverse effect; and
- Enable a good standard of amenity to be achieved.

6.3.38 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.

6.3.39 A noise limit should be aimed to be established at the noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) $L_{Aeq, 1h}$ (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) $L_{Aeq, 1h}$ (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) $L_{Aeq,1h}$ (free field) at a noise sensitive property.

6.3.40 Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing beepers, may also require separate limits that are independent of background noise (e.g. L_{Amax} in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

6.3.41 Care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed.



- 6.3.42 In keeping with the guidance advocated within the Minerals – Planning Policy Guidance document, the determination of impact threshold levels for the assessment of operational noise is based upon the difference between the operational level and the background sound level; over a representative time period and the overall operational level at the receptor.
- 6.3.43 A significant adverse effect, and SOAEL in terms of government policy, is determined to occur when the operational level exceeds 55 dB, $L_{Aeq, 1hr}$ for the daytime (0700-2300) and 42 dB, $L_{Aeq, 1hr}$ for the night-time (2300-0700); subject to considering factors relating to context. An evening period is not considered as the Site is operational 24/7 and therefore its daytime operational hours would be 0700 – 2300.
- 6.3.44 The LOAEL in terms of government policy is determined to occur at the point when the operational level (free-field) exceeds 10 dB over the background sound level.

LOAEL and SOAEL Effect Thresholds

- 6.3.45 The threshold levels related to operational noise are summarised in Table 6.8. A significant adverse effect was determined to occur when the calculated sound level was greater than the SOAEL threshold level.

Table 6.8 Minerals – Planning Policy Guidance

Sound source	Period*	LOAEL threshold level	SOAEL threshold level
Operational rating level, $L_{Ar,Tr}$ dB	Daytime	Background sound level $L_{A90, T}$ + 10 dB	Operational sound level, 55 dB $L_{Aeq, 1hr}$ at receptor
	Night-Time	Background sound level $L_{A90, T}$ + 10 dB	Operational sound level, 42 dB $L_{Aeq, 1hr}$ at receptor

* Daytime – (0700-2300), Night-time – (2300-0700)

- 6.3.46 Where the calculated operational noise effects at residential receptors lay between the LOAEL and the SOAEL, taking into account context, consideration was given to the items listed in the Significance Evaluation Methodology section; in order to evaluate the likelihood of a significant effect.

Operational Sound – Road Traffic

- 6.3.47 The determination of effect thresholds for road traffic noise was based upon the guidance values set out within the Noise Insulation (Amendment) Regulations (NIR, 1988) and the WHO Guidelines for Community Noise (WHO, 1999) which were updated in 2018 for daytime noise criteria. It is acknowledged that the 1999 document has been largely replaced by the WHO Environmental Noise Guidelines for the European Region (2018), but the latter only provided source specific guidelines in terms of the L_{den} parameter which is a 24 hr term with evening and night-time sound levels weighted, but not a very practical parameter for the purposes of this assessment. The WHO Night Noise Guidelines for Europe (WHO NNG, 2009) have been used for night-time noise criteria.
- 6.3.48 A significant adverse effect is deemed to occur when noise exposures exceed 63 dB $L_{Aeq, 16hr}$ free-field (equivalent to 68 dB $L_{A10, 18hr}$ façade level) at assessed residential receptors, during the daytime. The 68 dB $L_{A10, 18hr}$ façade level is one of the requirements set out within the NIR (1988); under which buildings may qualify for statutory noise insulation. In the event that the assessment identifies any requirements for mitigation under the NIR, these would be clarified. The 63 dB $L_{Aeq, 16hr}$ free-field threshold level was considered a suitable value for the SOAEL for the purpose of the assessment of likely significant effects.



- 6.3.49 The 55 dB $L_{Aeq, 8hr}$ free-field threshold level was considered to be representative of SOAEL during night-time hours and is consistent with advice presented within WHO NNG (2009).
- 6.3.50 The day-time and night-time LOAEL were set at 50 dB $L_{Aeq, 16hr}$ (free-field) and 40 dB $L_{Aeq, 8hr}$ (free-field), respectively, based upon advice set out within WHO (1999) and WHO NNG (2009).

LOAEL and SOAEL Effect Thresholds

- 6.3.51 The road traffic noise threshold levels due to the construction and operation of the proposed development are summarised in Table 6.9. A significant adverse effect was deemed to occur when the calculated noise levels were greater than the SOAEL threshold level. The threshold levels are presented for the daytime and night-time periods and are free-field (i.e. away from acoustically reflective surfaces).

Table 6.9 Summary of Road Traffic Noise Threshold Levels

Noise Sources	Receptor	Period*	LOAEL	SOAEL
Operational noise – road traffic	Residential	Daytime	50 dB $L_{Aeq, 16hr}$	63 dB $L_{Aeq, 16hr}$
		Night-time	40 dB $L_{Aeq, 8hr}$	55 dB $L_{Aeq, 8hr}$

* Daytime – (0700-2300), Night-time – (2300-0700)

- 6.3.52 Consideration has been given to the items listed in the Significance Evaluation Methodology section to evaluate the magnitude of significance where the road traffic noise effects at residential receptors lay between the LOAEL and the SOAEL.
- 6.3.53 In addition to the considerations summarised in the Significance Evaluation Methodology section, the determination as to whether there is a significant adverse effect from road traffic noise takes into account the likely magnitude of change.
- 6.3.54 The Highways Agency (now Highways England) Design Manual for Roads and Bridges (DMRB) (Highways Agency, 2011) presents a method for determining the potential magnitude of impact from changes in road traffic noise levels ($L_{A10, 18hr}$). DMRB sets out differing criteria associated with change in noise level for short term (i.e. immediately after the proposed development opening) and long term (15 years from the proposed development opening) impacts; as outlined in Table 6.10 and Table 6.11, respectively.

Table 6.10 DMRB Classification of Magnitude of Noise Impacts in the Short Term

Noise Change in dB $L_{A10, 18hr}$, dB	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5+	Major



Table 6.11 DMRB Classification of Magnitude of Noise Impacts in the Long Term

Noise Change in dB $L_{A10,18hr}$, dB	Magnitude of Impact
0	No Change
0.1 – 2.9	Negligible
3 – 4.9	Minor
5 – 9.9	Moderate
10+	Major

- 6.3.55 The classification of magnitude of noise impacts in Table 6.10 and Table 6.11 have been used to assist the evaluation of significance for receptors located in proximity to existing road networks.
- 6.3.56 At residential receptors where the baseline road traffic noise was already greater than the SOAEL threshold level, a significant adverse effect would be likely to occur when the overall magnitude of change was greater than 1 dB. This approach is in keeping with the DMRB short-term criteria, summarised in Table 6.10.
- 6.3.57 At residential receptors where both the existing and proposed levels of road traffic noise exposure were calculated to be less than the SOAEL threshold level but above the LOAEL thresholds, there is a potential for a significant adverse effect where the magnitude of change was 3 dB. This approach is in keeping with the DMRB long-term criteria, summarised in Table 6.11.

Assessment Methodology

Operational Sound – Fixed and Mobile Plant

- 6.3.58 In order to assess the operational noise impact at the NSRs to the site, a comprehensive noise model was developed to include the effects of operational sound sources upon the acoustic environment across the site.
- 6.3.59 Developed by Stapelfeldt Ingenieuresellschaft mbH, LimA has been widely used in noise modelling and sound mapping projects throughout the UK and Europe. LimA can implement a number of methodologies for the calculation of sound levels, including ISO 6913-2 as used in the operational sound assessments presented in this chapter.
- 6.3.60 The LimA noise modelling suite allows a 3-dimensional environmental model to be constructed using digital mapping and topographic data. As part of this assessment, 3-dimensional models have been constructed for different operating scenarios for the site.
- 6.3.61 The noise modelling process is complex, but in simple terms it considers the following data:
 - Sound source location – based on digital base mapping and site layout plans for the scheme;
 - Sound emission data – sound power levels or sound pressure levels taken from published sources, field measurements or data supplied by manufacturers;
 - Sound source on-time – this reflects the operational hours and duration of intermittently operating sound sources;
 - Road traffic data – detailing road traffic statistics such as existing and forecast flows, vehicle composition and speeds;



- Distance between sound source and receptor – based on the scheme designs and digital mapping data;
- Receptor locations – based on digital mapping data;
- Ground contours – from digital terrain data;
- Existing building heights – Building heights have been supplied by the applicant;
- Locations and dimensions of barriers between sound source and receptor; and
- Ground attenuation – related to the type of ground cover between the source and the receptor.

6.3.62 LimA allows the calculation of sound levels at specific points (e.g. at selected receptors) or on a grid basis at a specified intervals.

6.3.63 In order to assess the potential effects of operational noise during daytime and night-time periods, free-field sound levels were calculated at the location of the NSRs. Calculation heights of 1.5m and 4m were used to represent ground floor and first floor habitable spaces, respectively, in the model.

6.3.64 The calculation methods given in ISO 9613 Parts 1 and 2 have been used to predict the sound propagation in the model as advocated within BS 4142:2014. The calculation results are considered to be worst case as they assume downwind propagation, which in reality would not occur at all times due to changes in wind direction. Predictions assume hard ground attenuation on site (10%) and soft ground off site (70%).

6.3.65 Calculated sound levels from the model have been used to determine the specific sound level at the NSR for use in the BS 4142:2014 assessment.

Operational Sound – Road Traffic

6.3.66 The prediction methodology for assessing the change in road traffic noise levels due to the development was based upon the *Calculation of Road Traffic Noise* (CRTN) (DfT, 1988).

6.3.67 CRTN calculations were undertaken based on road traffic data provided by Wood for all road links predicted to experience a change in road traffic as a result of the proposed development. For existing roads:

- Only segments predicted to experience an increase in total traffic volumes of greater than 25%; or
- A decrease of more than 20% (i.e. those advised in DMRB (DfT, 2011) to experience a noise level change of approximately +/- 1 dB $L_{A10, 18hr}$); or
- With a substantial change in percentage of HGV traffic (at least 30% change) have been considered.

6.3.68 Data were provided for the 'with' and 'without' development scenarios for the opening year (2023) and the future assessment year (2040).

6.3.69 Based on the above, road traffic noise emission levels (in terms of $L_{A10, 18hr}$) for each road link were calculated for the 2023 baseline v 2023 'with development' and 2023 baseline v 2040 'with development' scenarios. A comparison between the scenarios is used to estimate the change in noise level in the short- term and long-term with reference to DMRB methodology.

6.3.70 The change in noise level due to proposed development related traffic on surrounding roads has been calculated using the traffic data provided in **Chapter 8**. The following equation has been used:

- Change in Noise Level (dBA) = $10 \times \log(\text{flow}_2/\text{flow}_1)$.

6.3.71 Where:

- Flow1 = without development; and
- Flow2 = with development.

6.3.72 Noise levels ($L_{A10,18hr}$) for each road segment are calculated at a standardised 10 m between the road and receptor. Although the actual distance for various receptors on each road segment would vary, as would the amount of screening, angle of view etc., these variables would not change between the future ‘with’ and ‘without’ development scenarios for the same receptor on each road segment. Since assessment of significance for this effect was based upon the relative change between scenarios only, and not the absolute level of noise generated, only variations in traffic volume HGV percentages and average vehicle speeds between the scenarios were important in calculating the change in noise level, and hence the significance of the noise effect.

6.4 Baseline

Current Baseline

6.4.1 This section describes the baseline conditions of the surrounding area and representative noise sensitive receptors in each direction from Boulby Mine. This section should be read in conjunction with **Chapter 3** where a broader site description is provided.

6.4.2 A summary of the measured baseline sound level data is shown in Table 6.12 to Table 6.15. All results have been rounded to the nearest decibel. Graphs of the full sound level data set are provided in Error! Reference source not found. for reference.

Current Baseline – Excluding Operations at Boulby Mine

6.4.3 Existing sound levels in the surrounding area were generally low and typical of a rural environment. Sound levels are principally influenced by local road traffic noise on the A174 as well as agricultural sources (e.g. farm animals) in the surrounding fields.

6.4.4 The $L_{Aeq, T}$ has been derived using the log average of the measured levels during the relevant time period. The $L_{Amax, T}$ shown is the maximum measured. The $L_{A90, T}$ mean has been derived from the arithmetic average of the 15-minute measurements during each relevant time-period.

Table 6.12 Sound Monitoring Results: Excluding Operations – Week 1 (01/08/2017 – 06/08/2017)

Monitoring location	Date / time (hh:mm)	Period	dB $L_{Aeq, T}$	dB $L_{Amax, T}$	dB $L_{A90, T}$ (mean)	dB $L_{A90, T}$ (mode)
LT1	01/08/2017 00:00 – 06/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	59	82	41	41
	01/08/2017 00:00 – 06/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	52	76	33	33
LT2	01/08/2017 00:00 – 06/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	53	75	42	46



Monitoring location	Date / time (hh:mm)	Period	dB $L_{Aeq, T}$	dB $L_{Amax, T}$	dB $L_{A90, T}$ (mean)	dB $L_{A90, T}$ (mode)
	01/08/2017 00:00 – 06/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	47	69	34	31
LT3	01/08/2017 00:00 – 06/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	69	92	42	44
	01/08/2017 00:00 – 06/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	62	87	35	36
LT4	01/08/2017 00:00 – 06/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	49	82	39	36
	01/08/2017 00:00 – 06/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	40	62	34	33

Current Baseline – Including Operations at Boulby Mine

6.4.5 Throughout the survey whilst the Site was in operation, the main exhaust stack was audible at all locations during the night-time during periods of low traffic. The main exhaust stack was most discernible at LT4. During the daytime, this sound was audible at LT4 along with very faint vehicle movements servicing the treatment plant area.

Table 6.13 Sound Monitoring Results: Including Operations – Week 2 (07/08/2017 – 13/08/2017)

Monitoring location	Date / time (hh:mm)	Period	dB $L_{Aeq, T}$	dB $L_{Amax, T}$	dB $L_{A90, T}$ (mean)	dB $L_{A90, T}$ (mode)
LT1	07/08/2017 00:00 – 13/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	58	73	41	40
	07/08/2017 00:00 – 13/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	51	75	34	33
LT2	07/08/2017 00:00 – 13/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	52	75	40	41
	07/08/2017 00:00 – 13/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	45	68	34	31

Monitoring location	Date / time (hh:mm)	Period	dB $L_{Aeq, T}$	dB $L_{Amax, T}$	dB $L_{A90, T}$ (mean)	dB $L_{A90, T}$ (mode)
LT3	07/08/2017 00:00 – 13/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	69	96	41	42
	07/08/2017 00:00 – 13/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	62	87	33	30
LT4	07/08/2017 00:00 – 13/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	46	73	40	39
	07/08/2017 00:00 – 13/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	44	66	39	39

Table 6.14 Sound Monitoring Results: Including Operations – Week 3 (14/08/2017 – 20/08/2017)

Monitoring location	Date / time (hh:mm)	Period	dB $L_{Aeq, T}$	dB $L_{Amax, T}$	dB $L_{A90, T}$ (mean)	dB $L_{A90, T}$ (mode)
LT1	14/08/2017 00:00 – 20/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	59	88	44	46
	14/08/2017 00:00 – 20/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	52	79	41	43
LT2	14/08/2017 00:00 – 17/08/2017 06:45	Daytime (07:00 hrs- 23:00 hrs)	54	71	45	46
	14/08/2017 00:00 – 17/08/2017 06:45	Night-time (23:00 hrs- 07:00 hrs)	49	69	41	39
LT3	14/08/2017 00:00 – 17/08/2017 12:45	Daytime (07:00 hrs- 23:00 hrs)	69	100	44	44
	14/08/2017 00:00 – 17/08/2017 12:45	Night-time (23:00 hrs- 07:00 hrs)	62	87	40	44
LT4	14/08/2017 00:00 – 20/08/2017 23:59	Daytime (07:00 hrs- 23:00 hrs)	49	73	43	46
	14/08/2017 00:00 – 20/08/2017 23:59	Night-time (23:00 hrs- 07:00 hrs)	46	68	42	40

Table 6.15 Sound Monitoring Results: Including Operations – Week 4 (21/08/2017 – 23/08/2017)

Monitoring location	Date / time (hh:mm)	Period	dB $L_{Aeq, T}$	dB $L_{Amax, T}$	dB $L_{A90, T}$ (mean)	dB $L_{A90, T}$ (mode)
LT1	21/08/2017 00:00 – 23/08/2017 13:15	Daytime (07:00 hrs-23:00 hrs)	57	75	41	41
	21/08/2017 00:00 – 23/08/2017 13:15	Night-time (23:00 hrs-07:00 hrs)	51	73	39	40
LT3	21/08/2017 00:00 – 23/08/2017 12:45	Daytime (07:00 hrs-23:00 hrs)	70	90	43	43
	21/08/2017 00:00 – 23/08/2017 12:45	Night-time (23:00 hrs-07:00 hrs)	63	86	42	41
LT4	21/08/2017 00:00 – 23/08/2017 13:45	Daytime (07:00 hrs-23:00 hrs)	46	70	41	42
	21/08/2017 00:00 – 23/08/2017 13:45	Night-time (23:00 hrs-07:00 hrs)	45	61	42	42
ST1	23/08/2017 16:00 – 24/08/2017 13:30	Daytime (07:00 hrs-23:00 hrs)	50	64	48	49
	23/08/2017 16:00 – 24/08/2017 13:30	Night-time (23:00 hrs-07:00 hrs)	49	55	48	48
ST2	23/08/2017 15:45 – 24/08/2017 13:45	Daytime (07:00 hrs-23:00 hrs)	62	67	61	60
	23/08/2017 15:45 – 24/08/2017 13:45	Night-time (23:00 hrs-07:00 hrs)	62	65	61	60
ST3	23/08/2017 16:00 – 24/08/2017 13:30	Daytime (07:00 hrs-23:00 hrs)	53	64	51	51
	23/08/2017 16:00 – 24/08/2017 13:30	Night-time (23:00 hrs-07:00 hrs)	52	61	50	50

Relevant Measured Sound Levels

6.4.6 A summary of the background sound levels used in the BS 4142:2014 assessment for fixed and mobile operational plant is shown in Table 6.16. The lowest value when comparing the $L_{A90, T}$ mean and mode has been selected as a conservative approach.



Table 6.16 Relevant Background Sound Levels

Time Period	LT1 dB $L_{A90, T}$	LT2 dB $L_{A90, T}$	LT3 dB $L_{A90, T}$	LT4 dB $L_{A90, T}$
Daytime (07:00 hrs-23:00 hrs)	41	42	42	36
Night-time (23:00 hrs-07:00 hrs)	33	31	35	33

Source Sound Measurements

6.4.7 Measurements were taken across the Site of the most significant sound sources in order to model the sound emissions from the Site at the closest residential receptors. The operations measured are considered to be representative of a typical working day. A summary of the measured source sound measurements is provided in Table 6.17. A subjective tonality penalty has been applied to the Potash Treatment Plant (PTP) section of the building of which houses the main exhaust systems as it is considered that this is the dominant sound emitted from the site of which can be heard at each NSR. Other sources are deemed not to be subjectively tonal, intermittent, impulsive nor uncharacteristic of the existing ambient sound climate at the NSR's and therefore do not warrant any further penalties. 100% on-time is assumed for both daytime and night-time for all activities to inform a conservative assessment.

Table 6.17 Daytime Operations Measured Source Sound Level Data

Sound Source	Measured Specific Sound Level $L_{Aeq,T}$ (dB)	Penalty Applied (dB)	Rating Level (dB(A))
4 - Compressor @ 1m	81.1	0	81.1
5 - Side of Grit Blasting Tent @ 2m (Daytime only)	83.7	0	83.7
6 - Front of Grit Blasting Tent @ 4m (Daytime only)	97.9	0	97.9
7 - HBF machine @ 1m	88.0	0	88.0
8 - 3 x compressors (2 running) @ 3m	82.8	0	82.8
9 - 2 x generators @ 2m	81.8	0	81.8
10 - PTP Doorway @ 1m	82.5	0	82.5
11 - Compressor @ 1m	91.8	0	91.8
12 - Ambient on side of HBF	73.5	0	73.5
13 - Side Door @ 3m	82.7	0	82.7
14 - Belt pump @1m	82.9	0	82.9
15 - Compressor @ 1m	86.8	0	86.8
16 - PTP Doorway @ 3m	80.0	0	80.0
17 - Generator @ 1m	84.7	0	84.7

Sound Source	Measured Specific Sound Level $L_{Aeq,T}$ (dB)	Penalty Applied (dB)	Rating Level (dB(A))
18 – Pumping Station Doorway @ 1m	79.2	0	79.2
19 - Raw Ore Silo Loader @25m	73.5	0	73.5
20 – Surge Bunker Doorway Belt @1m	77.9	0	77.9
21 – PTP Exhaust Building Doorway @ 3m	70.9	LT1, LT2, LT3 = +2 LT4 = +4	LT1, LT2, LT3 = 72.9 LT4 = 74.9
22 - CHP Louvrer @ 1m	79.2	0	79.2
23 - Air valves @2m	83.6	0	83.6
24 - Gas Line Shed @1m	70.9	0	70.9
25 - Side of CHP Building @ 3m	67.6	0	67.6
26 - Rail Loading @2m	72.8	0	72.8
27 – North-west Ambient	52.9	0	52.9
28 - Static Compensator @ 2m	92.7	0	92.7
29 – South-west Ambient	53.1	0	53.1
30 - Man Shaft building @4m	87.6	0	87.6
31 - Fan house @10m	71.6	0	71.6
32 - Winder House Doorway @ 3m	65.4	0	65.4
33 - Loader moving Polyhalite @30m-5m	72.6	0	72.6
34 - Poly Building Doorway @ 3m	80.3	0	80.3
35 - Poly Building Doorway @ 3m	74.8	0	74.8
36 - Train Movement @25m	63.5	0	63.5
37 - HGV Delivery @ 5m (Daytime only)	72.2	0	72.2

Predicted Future Baseline

- 6.4.8 If this Proposed Development is not approved, the mine would cease to operate in 2023 and be restored to a mixture of agricultural land, woodland and grassland. The restoration of the site would see noise created from the demolition of structures on the site and its clearance, and the landscaping works required to create the final landscape. Many of the works involved in the restoration of the site would be expected to be similar to the operational practices involved in terms of noise: vehicle movements, working plant and the movement of materials. There could be some increased noise from the demolition of buildings and structures although this is likely to be limited in duration and occurrence. The site demolition and restoration is expected to take around 4 years to complete. A period of aftercare would then be entered which would involve occasional trips to the site by small contractor teams to check on the landscaping provided and undertake maintenance of fences/gates/footpaths etc or replacement planting where needed. Noise created from this work is expected to be no different from typical agricultural work.
- 6.4.9 However, if the Proposed Development is approved, in practical terms the future baseline is expected to remain the same as the Current Baseline for the further 25 year period of operation. The future baseline would then change with the subsequent demolition and restoration of the site at that time.

6.5 Scope of Assessment

Limitations in the Preparation of the ES

- 6.5.1 The following assumptions and limitations apply to this assessment:
- Whilst the Proposed Development will eventually result in the reduction of activities at Boulby Mine, and a subsequent reduction in noise generated, the precise nature of the noise immissions relevant to the proposed Development are unknown at this time. It is therefore assumed that there will be no major changes to the plant, machinery or operational aspects of the mine workings, and therefore no changes to sound levels from within the red line boundary as a result of the development. This presents a worst case scenario for assessment purposes; and
 - It is assumed that the 2017 measured baseline noise levels are representative of 2023 baseline noise levels at the NSRs.

Potential Receptors

- 6.5.2 National noise policy and standards documents generally focus on the effects of noise on residential receptors in isolation, whilst there is a requirement within the NPSE (2010) and PPG-N (2014) to evaluate the effects on a community basis; such as within a neighbourhood. The evaluation of significance within a community is therefore a combination of advice derived from Standards and policy, in addition to considerations of context and receptor sensitivity.
- 6.5.3 Non-residential receptors, such as offices, hospitals and schools, are often cited as containing buildings and/or activities that are potentially noise sensitive. The World Health Organisation (WHO) Guidelines for Community Noise (WHO, 1999) introduce the concept of differentiating between these uses in terms of the degree of sensitivity to noise effects. The evaluation of significance for non-residential receptors may therefore differ from that adopted for residential receptors and communities.
- 6.5.4 As highlighted within the NPPF (2019), the noise and vibration assessments should also consider effects upon quiet areas 'which have remained relatively undisturbed by noise and are prized for

their recreational and amenity value for this reason'. However, no such receptors of this type have been identified in the vicinity of the Site.

6.5.5 In summary, the assessment considers the appropriate noise and vibration effects upon the following receptors:

- Existing residential receptors

6.5.6 The nearest noise-sensitive receptors have been identified as:

- Existing noise sensitive receptors (NSRs) – local residents in areas surrounding the Site, and along road traffic routes potentially experiencing a change in road traffic noise levels as a result of the proposed development.

6.5.7 A summary of the receptors included in this assessment is detailed below:

6.5.8 NSRs in close proximity to the Site with the potential to be affected are primarily located along surrounding local roads, particularly the A174 (Boulby Bank/Whitby Road). The NSRs are considered to be Red House Farm (300m to the north east), Boulby Grange (225m to the north west), Ings Farm (600m to the west), and Ridge Farm (480m to the south east) (see Figure 6.1).

6.5.9 For the purposes of this assessment, it is assumed that NSRs located on road segments predicted to undergo an increase in total two way traffic movements greater than 25% or a decrease of more than 20% (or a substantial change in the percentage of HGV traffic) may potentially be affected by changes in road traffic noise as a result of the proposed development, and are therefore included as receptors in the assessment.

Likely Significant Effects

Effects Scoped in to the Assessment

6.5.10 The potentially significant effects relating to the proposed development, which are subject to further assessment in this chapter, are summarised below:

- Potential effects on existing dwellings as a result of changes in levels of road traffic noise during operational stages; and
- Potential effects on existing dwellings as a result of operational activity.

Effects Scoped Out of the Assessment

6.5.11 Assessment of the following potential effects has led to the conclusion that they are not likely to be significant and hence do not require further assessment:

- Potential effects on existing dwellings as a result of operational vibration; no sources of significant vibration are expected as part of the development; and
- Potential effects on existing dwellings as a result of operation of the minewater discharge system;
- A specific assessment of the deconstruction activities during the first 10 years of the Proposed Development. As the deconstruction activities will have to take place within the operational Mine Site (and therefore will not involve typical demolition and clearance works), the noise and vibration effects would be similar to ongoing operational activities on the Mine Site. No additional noise immissions would therefore result which would be greater than that which is already being assessed.

6.6 Predicted Effects: Operational

Fixed and Mobile Plant

- 6.6.1 The noise model has been used to calculate the specific sound level at the NSRs using measured sound source levels for each plant item/activity. The sound power levels for each item are detailed in Table 6.17. Consideration has been given to a conservative operating scenario for daytime (07:00-23:00) and night-time (23:00-07:00) periods as the site is operational 24 hours a day.
- 6.6.2 As shown in Table 6.6, the greater the rating level is above the background sound level, $L_{A90,T}$ the greater the significance of impact. The background sound levels have been determined by comparing the mean and mode of the 15 minute measurements for each operational scenario period. Where these are different the lower of the two values has been used as a worst case assessment. The adopted background sound levels based on the sound survey are given in Table 6.16 **Error! Reference source not found.**
- 6.6.3 Table 6.18 and Table 6.19 provide the assessment in accordance with BS 4142:2014, with Table 6.20 and Table 6.21 providing an assessment in accordance with the Minerals – Planning Practice Guidance of sound from the proposed development during daytime and night periods.

Table 6.18 BS 4142:2014 Assessment - Daytime

Description	LT1 – Red House Farm	LT2 – Boulby Grange	LT3 – Ings Farm	LT4 – Ridge Farm
Specific Sound Level	41	41	41	40
Rating level ($L_{Ar,1h}$ dB)	41	41	42	41
Background sound level (dB $L_{A90,T}$)	41	42	42	36
BS 4142 Rating Sound Level and Background Sound Level Margin, dB	0	-1	0	+5
BS 4142 Comment/Outcome (depending on context)	Low Impact	Low Impact	Low Impact	Adverse Impact

Table 6.19 BS 4142:2014 Assessment – Night-time

Description	LT1 – Red House Farm	LT2 – Boulby Grange	LT3 – Ings Farm	LT4 – Ridge Farm
Specific Sound Level	39	40	41	40
Rating level ($L_{Ar,1h}$ dB)	40	41	42	41
Background sound level (dB $L_{A90,T}$)	33	31	35	33
BS 4142 Rating Sound Level and Background Sound Level Margin, dB	+7	+10	+7	+8

Description	LT1 – Red House Farm	LT2 – Boulby Grange	LT3 – Ings Farm	LT4 – Ridge Farm
BS 4142 Comment/Outcome (depending on context)	Adverse Impact	Significant Adverse	Adverse Impact	Adverse Impact

Table 6.20 Minerals - PPG Assessment - Daytime

Description	LT1 – Red House Farm	LT2 – Boulby Grange	LT3 – Ings Farm	LT4 – Ridge Farm
Specific Sound Level	41	41	41	40
Rating level ($L_{Ar,1h}$ dB)	41	41	42	41
Background sound level +10 (dB $L_{A90,T}$)	51	52	52	46
Operational Sound Level and Background Sound Level Margin, dB	-10	-11	-10	-5
Operational Sound Level and Operational Sound Limit of 55 (dB $L_{Aeq,1hr}$) Margin, dB	-14	-14	-13	-14
Significance Level	Not Significant	Not Significant	Not Significant	Not Significant

Table 6.21 Minerals - PPG Assessment – Night-time

Description	LT1 – Red House Farm	LT2 – Boulby Grange	LT3 – Ings Farm	LT4 – Ridge Farm
Specific Sound Level	39	40	41	40
Rating level ($L_{Ar,1h}$ dB)	40	41	42	41
Background sound level +10 (dB $L_{A90,T}$)	43	41	45	43
Operational Sound Level and Background Sound Level Margin, dB	-3	0	-3	-2
Operational Sound Level and Operational Sound Limit of 42 (dB $L_{Aeq,1hr}$) Margin, dB	-2	-1	0	-1
Significance Level	Not Significant	Not Significant	Not Significant	Not Significant

6.6.4 The BS 4142 assessment has determined that there is the potential of an Adverse Impact in the daytime at receptor LT4. It should be noted however, that in terms of the existing ambient sound level at the NSR (without the inclusion of noise associated with the Site), this is currently already greater than 10 dB over the adopted background sound level. Therefore, it is considered that this

assessment does not portray the true impacts upon the NSR's. Furthermore, the Minerals – PPG assessment for the daytime shows the site specific noise levels falls comfortably below both sets of daytime criteria for all NSR's. In addition to the above, a conservative assessment has been completed in terms of assuming that all plant is operational for 100% of the time as well as adopting the lowest background calculated from the mean and mode. It is therefore considered that the impacts of the Site on existing NSR's during the daytime is *Not Significant* in terms of EIA.

- 6.6.5 The BS 4142 assessment has determined that there is the potential of an Adverse Impact in the night-time at receptors LT1, LT3, and LT4 and a potential of a Significant Impact at receptors LT2. As discussed above for the daytime assessment, it should again be noted that the existing ambient sound level during the night-time at the NSR's (without the inclusion of noise associated with the Site) is a minimum +7 dB over the adopted background sound level. Therefore, it is considered that a BS4142:2014 assessment in isolation does not portray the true impacts upon the NSR's. Furthermore, the Minerals – PPG assessment for the night-time shows the Site-specific noise levels falls below both sets of adopted night-time criteria for all NSR's. In addition to the above, a conservative assessment has been completed in terms of assuming that all plant is operational for 100% of the time as well as adopting the lowest background calculated from the mean and mode. To add further context to the night-time assessment, BS 4142:2014 states that it should be used to assess external amenity areas only. It is considered unlikely that residents would inhabit the external amenity areas during the night-time and thus the impact shown in the BS 4142 assessment does not illustrate the true impact upon the NSRs. It is therefore considered that the impacts of the Site on existing NSR's during the night-time is *Not Significant* in terms of EIA.

Road Traffic Noise

- 6.6.6 The predicted changes in road traffic noise are shown in Table 6.22.

Table 6.22 Predicted Change in Road Traffic Noise Levels

Road	AAWT 18 hour two-way traffic flows			
	A	B	C	Change in noise level +/- (dB) (B-C)
	2017 without development	2023 without development	2040 with development	
A174 (Whitby Road) west of site entrance	3420 (2.2% HGVs)	3590 (2.2% HGVs)	4919 (2.57% HGVs)	+1.5

Effects on Existing Dwellings

- 6.6.7 As natural increases in traffic flows are relatively low (~5%) between the 2017 and 2023 baseline (without development), this would not result in a noticeable increase in baseline noise level as the change is less than 25%. Therefore, 2017 measured baseline noise levels at the NSRs are considered to be representative of the 2023 baseline noise levels for the purposes of this assessment. These traffic flows are shown in Table 6.22 for reference.
- 6.6.8 Measured levels at existing receptors are 49 dB $L_{Aeq,16hr}$ at LT4 which is below 50 dB $L_{Aeq,16hr}$ (LOAEL), 54-60 at LT1 and LT2 which is below 63 dB $L_{Aeq,16hr}$ (SOAEL), and 69 dB $L_{Aeq,16hr}$ at LT3 which is above SOAEL. Effects are not considered to be significant at LT4 as it is below LOAEL. Effects are not considered to be significant at LT1 and LT2 as baseline noise levels are between LOAEL and SOAEL and the magnitude of change is less than 3 dB. LT3 has the potential to experience significant effects as baseline noise levels are greater than SOAEL and the magnitude of change is greater than 1 dB (+1.5 dB). Although it has been determined that significant effects are possible, this is based

on measured noise levels at LT3 facing directly onto the road. This NSR has access to additional outdoor space to the rear of the dwelling which is screened from the road, and it is more likely that residents would choose to spend their time in this area. It is reasonable to assume that noise levels would be considerably lower in this area (~10 dB lower) which would reduce noise levels to be below SOAEL (63 dB $L_{Aeq, 16hr}$). It is therefore considered that significant effects would not be likely to occur at any of the NSRs.

6.7 Mitigation and Enhancement Measures

6.7.1 Opportunities to mitigate potential adverse effects have already been incorporated within the development or are imposed through a number of existing regulatory controls. It is the development that exists with these measures and controls in place that has been subject to assessment. No assessment has been undertaken of the Proposed Development excluding these measures and regulatory controls as a scheme is not being proposed without them. No other measures are proposed as mitigation in relation to the effects that are identified in this ES.

6.8 Conclusions of Significance Evaluation

Summary of effects in this assessment

- Potential effects of noise from road traffic associated with the development – the assessment has predicted no significant effects for existing NSRs;
- Potential effects of noise from operational activities associated with the development – the assessment has predicted no significant effects for existing NSRs.

6.8.1 Table 6.23 sets out a summary of effects.

Table 6.23 Summary of Significance of Beneficial or Adverse Effects

Receptor and Summary of Effects	Significance	Summary Rationale for Significance Evaluation
Road traffic noise effects on residential receptors	Not significant	Noise levels in primary external amenity areas for the NSRs are likely to be below 63 dB $L_{Aeq,T}$ (SOAEL) and predicted to experience a noise change below 3 dB which is considered to be negligible.
Operational noise effects on residential receptors	Not significant	Noise levels have been shown to fall below the background sound level +10 dB (SOAEL) and given the context of the existing sound environment as well as meeting the criteria within the Minerals - PPG, the impact is considered to be not significant.

6.9 References

- 6.9.1 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'. British Standards Institute, London Department of Transport and the Welsh Office (1988) – 'Calculation of Road Traffic Noise'. HMSO, London.
- 6.9.2 Department of Transport (2011) – 'Design Manual for Roads and Bridges' Volume 11 Environmental Assessment. HMSO, London.



- 6.9.3 BSI, British Standard BS 7445-1:2003, Description and measurement of environmental noise. Guide to quantities and procedures (BSI, 2014).
- 6.9.4 Department for Environment, Food and Rural Affairs, Noise Policy Statement for England (2010).
- 6.9.5 Ministry of Housing Communities and Local Government, National Planning Policy Framework (2019).
- 6.9.6 World Health Organisation, Guidelines for Community Noise (WHO, 1999).
- 6.9.7 World Health Organisation, Night Noise Guidelines For Europe (WHO, 2009).



7. Air Quality and Dust

Non-Technical Summary

This assessment considers the environmental effects of Air Quality and Dust associated with activities undertaken at Boulby Mine as described in Chapter 3.

A source-pathway-receptor semi-quantitative assessment was carried out to determine whether continuing operations at Boulby Mine would significantly affect sensitive residential receptors in the local area. Given that visual inspection on site at Boulby Mine suggests there is minimal wind-blown dust beyond the site boundary and air quality concentrations are well within recommended levels, as well as very few sensitive receptors in the area, it is concluded that there will be no significant effects.

7.1 Introduction and Overview

- 7.1.1 This chapter assesses whether significant environmental effects are likely as a result of air quality and dust. This chapter should be read in conjunction with the development description in Chapter 3 and Chapter 8 Transport.
- 7.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and a detailed assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.
- 7.1.3 Operations at Boulby Mine have the potential to give rise to emissions to air, including:
- Emissions of combustion gases and particulate matter from product driers, which are vented through an 87.5 m stack;
 - Emissions of combustion gases and particulate matter from CHP and boilers, which are vented through separate stack
 - Exhaust gases from extraction systems; and
 - Fugitive dust emissions from stockpiles.
- 7.1.4 The level of assessment required has been considered against relevant guidance. A qualitative assessment of dust has been undertaken considering meteorological conditions and the distance between Boulby Mine and potential sensitive receptors.

7.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 7.2.1 Table 7.1 lists relevant planning policies that have been considered in preparing this air quality and dust assessment.

Table 7.1 Relevant Planning Policy

Policy Reference	Policy Issue
National planning policies	
National Planning Policy Framework (NPPF)	<p>The National Planning Policy Framework (NPPF) sets out the Government's reform of the planning system. The NPPF states:</p> <p><i>"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas or Clean Air Zones is consistent with the local air quality action plan."</i></p> <p>In considering proposals for mineral extraction, minerals planning authorities should:</p> <ul style="list-style-type: none"> ● <i>"Ensure that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality"; and</i> ● <i>"Ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source".</i> <p>This chapter assesses the risk and significance of dust disamenity effects to existing receptors. It takes into account the baseline air quality in the vicinity of Boulby Mine and discusses mitigation measures.</p>
National Planning Practice Guidance (NPPG)	<p>The Government's online National Planning Practice Guidance (NPPG) states that air quality concerns are more likely to arise where development is proposed within an area of existing poor air quality, or where it would adversely impact upon the implementation of air quality strategies and / or action plans. It is stated in the NPPG that air quality is relevant to planning applications when the Development could:</p> <p><i>"Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality."</i></p> <p>The NPPF is supported by the NPPG which states that <i>"Where dust emissions are likely to arise, mineral operators are expected to prepare a dust assessment study, which should be undertaken by a competent person/organisation with acknowledged experience of undertaking this type of work."</i></p> <p>The minerals section of the NPPG states that <i>"There are five key stages to a dust assessment study:</i></p> <ul style="list-style-type: none"> ● <i>Establish baseline conditions of the existing dust climate around the site of the proposed operations;</i> ● <i>Identify site activities that could lead to dust emission without mitigation;</i> ● <i>Identify site parameters which may increase potential impacts from dust;</i> ● <i>Recommend mitigation measures, including modification of site design; and</i> ● <i>Make proposals to monitor and report dust emissions to ensure compliance with appropriate environmental standards and to enable an effective response to complaints".</i> <p>This chapter includes a dust assessment study which takes into account the recommended stages of assessment.</p>
Regional planning policies	
Minerals and Waste Joint Plan for North Yorkshire	<p>The Minerals and Waste Joint Plan was developed to provide guidance to developers, local communities and other interested parties on minerals and waste activities may be taking place over the next 15 years, and how these activities should be managed.</p> <p>Policy D03: Transport of minerals and waste and associated traffic impacts explains that <i>"where practicable minerals and waste movements should utilise alternatives to road transport including rail, water, pipeline or conveyor"</i> to reduce impact to air quality.</p>

Policy Reference	Policy Issue
Local planning policies	
Redcar and Cleveland Local Development Framework (LDF)	The LDF was developed in order to provide a spatial planning framework and aid decisions on planning applications. In relation to air quality, Policy DP6 – Pollution Control states that increased levels of air pollution will require mitigation measures to reduce pollution levels to meet acceptable limits.
Redcar and Cleveland Local Plan	A new draft Local Plan was adopted in May 2018. Policy SD 4 outlines the general development principals, one of which is to reduce pollution to meet acceptable limits.
North York Moors National Parks Authority Core Strategy and Development Policies	This document is part of the Local Development Framework for North York Moors and outlines development policies to ensure sustainable development in the area. Development Policy 1 – Environmental Protection states: <i>"To conserve and enhance the special qualities of the North York Moors National Park, development will only be permitted where:</i> 1. <i>It will not have an unacceptable adverse impact on surface and ground water, soil, air quality and agricultural land".</i>
North York Moors National Parks Authority Local Plan Preferred Options	A new Local Pan is currently being produced to guide development at North York Moors up to 2035. Policy ENV 7 – Environmental Protection states: <i>"In order to protect the natural environment, development will only be permitted where:</i> ... 5. <i>It does not have an adverse impact on air quality".</i>

Legislative Requirements

- 7.2.2 The legislative framework for air quality consists of legally enforceable EU Limit Values, transposed into UK legislation as Air Quality Standards (AQS), that must be at least as challenging as the EU Limit Values. Action in the UK is then driven by the UK’s Air Quality Strategy (Defra, 2007) that sets the Air Quality Objectives (AQOs).
- 7.2.3 Relevant legislation concerning air quality which will need to be considered in this ES chapter includes:
 - Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe;
 - The Air Quality Standards Regulations 2010;
 - The Air Quality Regulations 2000, as amended;
 - The Environment Act 1995; and
 - The Environmental Protection Act 1990.
- 7.2.4 The regulated pollutants of importance to this assessment due to the activities carried out on the site are particulate matter smaller than 10 µm in diameter (PM₁₀) and PM_{2.5}. In addition, pollutants associated with transport emissions, PM₁₀ and nitrogen dioxide (NO₂), will be discussed in relation to impact to air quality.
- 7.2.5 Table 7.2 sets out the AQOs that are relevant to this assessment, and the dates by which they are to be achieved.



Table 7.2 Summary of Relevant Air Quality Standards and Objectives

Pollutant	Objective (UK)	Averaging Period	Date to be Achieved by and Maintained thereafter (UK)
Nitrogen dioxide - NO₂	200 µgm ⁻³ not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 µgm ⁻³	Annual mean	31 Dec 2005
Particles - PM₁₀	50 µgm ⁻³ not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 µgm ⁻³	Annual mean	31 Dec 2004
Particles - PM_{2.5}	25 µgm ⁻³	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020

- 7.2.6 The amount of dust that may cause annoyance is difficult to determine. Dust can be a statutory nuisance under Section 79 (1)(d) of the Environmental Protection Act (EPA) 1990 Part III Statutory Nuisances and Clean Air. However, there are no UK dust deposition standards which can be used to assess whether a nuisance has occurred due to the normal variability of atmospheric dust and the variability of dust monitoring equipment.
- 7.2.7 In the UK, a criterion of 200 mg m⁻² day⁻¹, based on monthly averages, has been used as a threshold for nuisance in the past. This is comparable with the "complaints likely" guidance reported by Vallack and Shillito (1998). Comparison to this threshold is considered to be indicative in the absence of an accepted UK standard.

Guidance

Environmental Protection UK and Institute of Air Quality Management

- 7.2.8 Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) has produced guidance regarding the assessment of air quality issues within planning applications, which includes a summary of relevant legislation and the assessment of significance. Using this guidance, the magnitude of change due to an increase/decrease in the annual mean concentration of NO₂ and PM₁₀ and other pollutants due to the development is described using specified criteria. The overall significance of the development is then determined using professional judgement.

Institute of Air Quality Management

- 7.2.9 IAQM has produced specific guidance for assessing the impact of mineral dust for planning, including good practice approaches for operational assessment for use in the planning process. The criteria for undertaking a detailed assessment is provided and a source – pathway – receptor approach for assessing dust at mineral sites is suggested.

7.3 Methodology and Approach

Consultation

- 7.3.1 A range of organisations were consulted as part of the EIA scoping process.
- 7.3.2 Table 7.3 below summarises the key air quality and dust issues that were raised and how they have been addressed within the ES.

Table 7.3 Consultation

Consultee	Summary of Response	Addressed in the ES
North York Moors National Park Authority	Agreed that the proposed methodology for the air quality and dust assessment was appropriate	ES follows methodology proposed in the Scoping Request

Data Gathering Methodology

- 7.3.3 Sources of information used for the air quality and dust assessment are listed in Table 7.4.

Table 7.4 Sources of Desk Study Information

Source	Data
Defra	Predicted background NO ₂ , PM ₁₀ and PM _{2.5} concentrations based on 2015 base maps
Ordnance survey maps	Sensitive receptor locations
Boulby Mine	Daily inspection data and annual monitoring data

- 7.3.4 No survey work has been undertaken by Wood in completion of this assessment.

Methodology for Identifying and Assessing Effects

Air Quality

- 7.3.5 The potential impact on air quality from emissions due to operations at Boulby Mine will be considered with regard to EPUK & IAQM guidance, detailed in paragraph 1.2.13, including sensitivity of receptors.

Dust

- 7.3.6 The potential for impact of dust emissions to human health and disamenity will be assessed with regard to IAQM guidance on assessment of mineral dust impacts for planning using the source – pathway – receptor approach.
- 7.3.7 A conservative assumption that operations will remain constant in the coming years has been used, whereas in reality it is likely that emissions will decrease with improvements in best available techniques and practices in the future.

7.4 Baseline

Current Baseline

7.4.1 Please see section 2.5 of this ES for information on current dust and air quality which are considered to be an uncommon occurrence.

Continuous monitoring

7.4.2 Redcar and Cleveland Borough Council (RBC) operates one continuous monitor in Dormanstown, which records concentrations of both NO₂, PM₁₀ and PM_{2.5}. Table 7.5 and Figure 7.1 shows the location of the continuous monitor, and Table 7.6 shows monitored concentrations the most recent years monitored concentrations of NO₂ and PM₁₀.

Table 7.5 RBC Continuous Monitor Site Information

Site ID	Type	X	Y	Distance to relevant exposure (m)	Distance to kerb of nearest road (m)	Height (m)
Redcar Dormanstown	Suburban	458379	523486	1	150	2.5

Table 7.6 Redcar Dormanstown Monitor NO₂ and PM₁₀ Concentrations (µg m⁻³)

Pollutant	Data capture 2017	2013	2014	2015	2016	2017
NO₂	100	13.4	12.8	12.7	-	12.0
PM₁₀	96	18.6	15.7	15.7	12.7	12.0
PM_{2.5}	100	13	11	11	8.9	8.4

7.4.3 Annual mean concentrations of both NO₂ and PM₁₀ have been below their respective 40 µg m⁻³ AQOs for the past five years. Annual mean concentrations of PM_{2.5} were below the 25 µg m⁻³ target in all years. It should be noted, however, that the automatic monitor is located approximately 18 km from Boulby Mine in a more urban area than that of the site, where concentrations may be expected to be more heavily influenced by traffic emissions. Therefore, it is reasonable to assume that concentrations will be lower in the vicinity of Boulby Mine.

Passive Monitoring

7.4.4 RBC also undertakes passive monitoring of NO₂ at a number of locations across the Borough using diffusion tubes. The diffusion tubes closest to Boulby Mine are included in Table 7.7 and shown on Figure 1.1; Table 7.8 shows the latest years of available monitoring data. It should be noted that RO31 and RO32 have only been installed since 2016.

Table 7.7 RBC Passive Monitoring Locations

Site ID	Type	X	Y	Distance to site (km)	Distance to relevant exposure (m)	Distance to kerb of nearest road (m)	Height (m)
RO30	Urban background	465523	518376	10	0	6	2
RO31	Roadside	471967	518208	4	0	5	2
RO32	Roadside	463609	522253	13	0	13	2

Table 7.8 Redcar Dormanstown Monitor NO₂ Concentrations (µg m⁻³)

Site ID	Data capture 2017	2016	2017
RO30	100	6.3	6.2
RO31	100	-	12.9
RO32	100	-	10.2

7.4.5 Annual mean concentrations of NO₂ were well below the 40 µg m⁻³ AQO in 2017. Even though none of the above tubes are in close proximity to Boulby Mine, they are located in more urban areas likely to have a higher volume of traffic than at the site. Therefore, it is reasonable to assume that annual mean concentrations of NO₂ close to Boulby Mine will not be significantly higher than those shown above.

Figure 7.1 Monitoring Locations in the Vicinity of Boulby Mine



Estimated Ambient Background Concentrations

- 7.4.6 Defra has made estimates of background pollutant concentrations on a 1km² grid for the UK for seven of the main pollutants using a base year of 2017, including NO₂, PM₁₀ and PM_{2.5}. Table 7.9 shows the Defra mapped concentrations for grid square 476500, 518500 in which Boulby Mine is located.

Table 7.9 Defra Mapped Predicted Background Concentrations of NO₂, PM₁₀ and PM_{2.5} for 2019 (µg m⁻³)

Pollutant	2019
NO ₂	8.5
PM ₁₀	12.9
PM _{2.5}	6.9

Permit Requirements

- 7.4.7 The CHP plant operates under a permit from the Environment Agency which identifies a number of monitoring points related to the engines making up the CHP facility. These monitoring points measure emissions of NO_x (different limits set for different monitoring points), CO (242 mg m⁻³ and non-methane VOCs (200mg m⁻³). It is understood that the facility runs in compliance with the requirements of this permit.

Dust

- 7.4.8 Dust deposition rates are not monitored extensively in the UK. Monitoring that is undertaken, is usually connected with specific activities such as mining and mineral extraction operations and major infrastructure projects. Dust monitoring may also be undertaken to investigate specific complaints received by local authorities, who are then empowered to investigate dust nuisance under the Environmental Protection Act (1990).
- 7.4.9 At Boulby Mine, daily inspections are carried out by operators as per the current permit (CPL-209A) to ensure no visible dust is present beyond the site boundary. Specific areas around the site are also visually inspected for dust, such as close to stockpiles. A daily record of inspections shows that generally low levels of dust are recorded. Where a moderate to high level of dust is identified, the likely cause of the dust is also recorded.
- 7.4.10 Annual stack monitoring is required for compliance with the current permits, which states that for the dryer stack, concentrations of PM should be below 100 mg m⁻³, with efforts made to reduce concentrations to 50 mg m⁻³ by 2017, to maintain compliance.

Predicted Future Baseline

- 7.4.11 If the Proposed Development is refused, operations at Boulby Mine will cease in 2023 and the site will be decommissioned and restored to agricultural and nature conservation uses. This would see all of the air pollutant emissions and dust arisings from Boulby Mine cease. It is not possible to predict future baseline without Boulby Mine as the mine predates monitoring data, so it is not possible to isolate its potential contribution to pollutant concentrations or dust levels in the area.
- 7.4.12 In practical terms, the approval of the Proposed Development would see operations at Boulby Mine continue. In this scenario, current background air pollutant concentrations are expected to be well below their respective AQOs, so with expected improvements to the UK vehicle fleet in general and

continued application of best available techniques for industrial activities, it is likely that background concentrations will continue to improve. Defra mapped predicted background concentrations at the site (for grid square 476500, 518500) in 2030 (most distant predicted background concentrations available) are included in Table 7.10 and show the predicted downward trend in background concentrations into the future.

Table 7.10 Defra Mapped Predicted Background Concentrations of NO₂, PM₁₀ and PM_{2.5} for 2030 (µg m⁻³)

Pollutant	2030
NO ₂	7.0
PM ₁₀	12.1
PM _{2.5}	6.3

7.4.13 With respect to dust, a future baseline scenario without the Mine would see the cessation of wind blown dust arisings from the Site. Due to good practice in managing stockpiles and the prevailing wind direction (blowing from the south west), whilst wind blown dust is visually noticeable, this activity has only led to a small number of complaints from the nearest residential properties (along Roxby Lane) during the operational years of the existing Mine. As such the future baseline is not expected to be drastically different in terms of dust.

7.5 Assessment of Air Quality and Dust Effects

Limitations in the Preparation of the ES

- 7.5.1 Raw data from the stack emissions monitoring has not been available to inform this assessment,. Discussion with the applicant regarding their performance against the permits has informed the assessment and it is understood that emissions are generally below permitted levels as defined and monitored by Redcar and Cleveland Borough Council the Environment Agency.
- 7.5.2 There will be changes to surface activities from the proposed deconstruction of various buildings and structures, and these will lead to a consolidation of activities on site which will reduce the emission of air pollutants and raising of dust. The eventual cessation of processing to create compound fertilisers will also see a substantial reduction in air pollutant emissions. These changes will take place over the first 10 years of the new permission, but it is uncertain at this point in time exactly when they will occur. A worst case scenario has therefore been adopted where the continuation of all existing operational practices is considered for all operational activities over the Proposed Development timeframe.

Potential Receptors

Air Quality

- 7.5.3 With regard to impacts to air quality from transport emissions associated with operations at Boulby Mine, EPUK & IAQM guidance states that potential impacts to sensitive receptors may be experienced where an increase in light duty vehicles (LDV) of 500 annual average daily traffic (AADT) flows or 100 AADT change in heavy duty vehicles (HDV). Vehicle movements are expected to stay at the current level into the future, therefore there are no sensitive human or ecological receptors identified.



- 7.5.4 With regard to pollutant emissions from the site, as previously stated annual stack monitoring is carried out to ensure that Boulby Mine is operating within permitted limits. Performance is regulated by Redcar and Cleveland Borough Council and the Environment Agency and as no records of any enforcement actions have been found it is assumed that stack emissions are within legal limits. In addition, the release height of the emissions is 50m for the CHP stack and 87.5m for the dryer stack (above surrounding ground level), therefore it is likely that any pollutants released will have dispersed by the time they reach ground level. As such, there are no human receptors identified that could be significantly affected.
- 7.5.5 Industrial processes have the potential to impact air quality at sensitive ecological receptors within 10 km of the site. North York Moors Special Area of Conservation (SAC) and Special Area of Conservation (SPA) is located approximately 2.5km south of Boulby Mine. This is considered in more detail in Chapter 9 on Biodiversity.

Dust

- 7.5.6 The IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning states receptors up to 1000 m of dust generating activities may experience dust impacts.
- 7.5.7 The IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning (IAQM, 2016) defines receptor sensitivity:
- High sensitivity receptors:
 - ▶ Users can reasonably expect enjoyment of a high level of amenity; or
 - ▶ The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.
 - Medium sensitivity receptors:
 - ▶ Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or
 - ▶ The appearance, aesthetics or value of their property could be diminished by soiling; or
 - ▶ The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.
 - Low sensitivity receptors:
 - ▶ The enjoyment of amenity would not reasonably be expected; or
 - ▶ The property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or
 - ▶ There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
- 7.5.8 Screening criteria in IAQM guidance state that for soft rock, such as potash, a detailed assessment may be screened out if sensitive receptors are greater than 250 m from dust generating activities at the site, where it is unlikely that the AQO for PM₁₀ will be breached. The closest highly sensitive residential receptor is located to the north-west of Boulby Mine at a distance of 415 m approximately. The closest receptor downwind of the potentially dusty activities is Red House Farm holiday rental cottages which are approximately 480 m north-east of the site. It should be noted that there are no other potential receptors within 1 km to the north-east of Boulby Mine.

7.5.9 In addition, as shown Section 7.4, concentrations of PM₁₀ in this area are well below the AQO and not likely to be breached.

Effects Scoped out of the Assessment

- Effect of traffic emissions on air quality at sensitive human receptors as a result of continued operations at Boulby Mine. Currently, potash is transported via rail directly from the site and in the future it is expected that volume of material transported by rail will remain constant. In addition, as operations are not expected to significantly increase in the future, there are not expected to be any additional vehicle movements from the site, as the operator intends to maintain the current 66 Heavy Goods Vehicles (HGV) per day threshold (see Chapter 8: Transport). Therefore, with the gradual improvement in vehicle fleet emissions over time, it is likely that the impact on air quality from traffic emissions will decrease over time;
- The impact to human receptors from the release of dust from activities undertaken at Boulby Mine. As previously discussed, background concentrations of PM₁₀ are below 17 µg m⁻³; therefore, any process contribution from Boulby Mine is unlikely to breach AQOs according to IAQM guidance and, therefore, does not require further assessment of potential impact to human health;
- The impact of emissions to air from activities at the site are not currently exceeding legal limits as demonstrated by concentrations monitored annually by external consultants as part of the existing permit. Additionally, with the release height of any pollutants at 87.5 m it is likely that pollutants will have effectively dispersed by ground level;
- Effect of impacts to air quality from Boulby Mine on nearby ecological receptors is discussed in the screening report for a Habitats Regulations Assessment (HRA), which concluded that there are no likely significant effects as a result of continued operation at Boulby Mine at the North York Moors SAC/ SPA, therefore an HRA is not required.

7.6 Predicted Effects: Operational

Dust

7.6.1 IAQM guidance suggests a source-pathway-receptor approach should be adopted when considering impact of dust from operational mineral sites.

Source

7.6.2 The storage and processing of the mineral above ground has the potential to give rise to effects from fugitive dust, which is effectively a source of emissions.

7.6.3 In line with the Environmental Permit, site operatives carry out visual inspection of dust at 7 locations around the site daily. Table 7.11 shows that on-site dust has been predominantly ranked as 'Minimal', therefore it is reasonable to assume that off-site dust is minimal. If 'Severe' or 'Major' dust is observed, appropriate action is taken by operatives to resolve the issue.

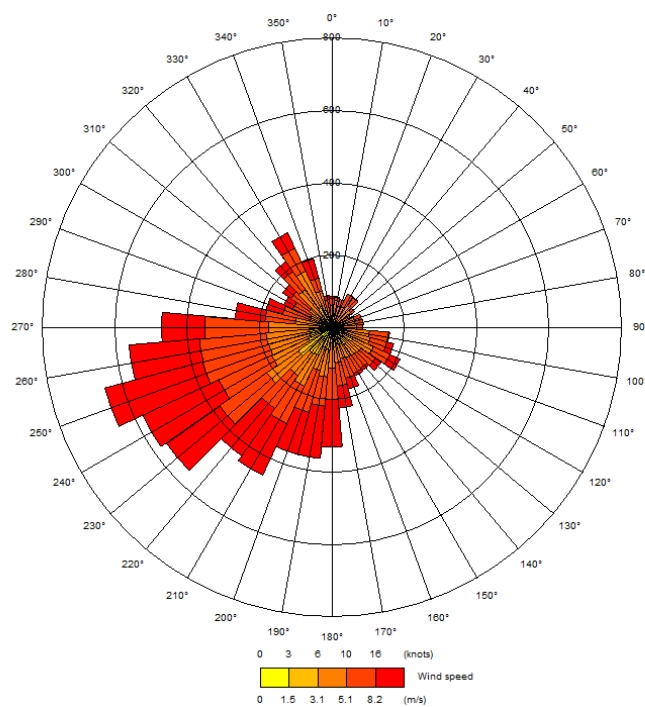
Table 7.11 Visual Dust Inspections - % of Ranking Per Year

Rating	2012	2013	2014	2015	2016	2017	2018
1 - 2 – Minimal Dust	100.0	100.0	97.3	97.3	99.0	99.1	100.0
3 – Severe Dust	0.0	0.0	2.6	2.6	1.0	0.9	0.0
4 – Major Dust	0.0	0.0	0.1	0.1	0.0	0.0	0.0

Pathway

- 7.6.4 Uncovered stockpiles are often subject to windblow, which allows dust particles to be carried from the source to the receptor, acting as a pathway.
- 7.6.5 Loftus Weather Station is located approximately 2.5 km to the north-west of Boulby Mine. Figure 7.2 shows a wind rose for Loftus meteorological data; the predominant wind direction is south-westerly.

Figure 7.2 Wind Rose for Loftus Weather Station (2015)



Receptor

- 7.6.6 Given that daily site observations show very few instances of ‘Severe’ or ‘Major’ dust and there are no receptors downwind of the facility within 250 m of process units, it is not considered necessary to progress to a detailed assessment as dust impacts, both health impacts and disamenity, as a result of operations at Boulby Mine are not considered to be significant.
- 7.6.7 There are expected to be no likely significant effects to air quality or dust as a result of continued operation at Boulby Mine.



7.7 Predicted Effects: Cumulative

- 7.7.1 A review of the area surrounding Boulby Mine indicates that it is unlikely there will be cumulative impact to dust or air quality as there have been no similar industries identified in the vicinity.
- 7.7.2 With regard to cumulative impact to air quality from transport emissions, Chapter 8 Transport states that it is likely vehicles from the site will have dispersed into the wider network past the junctions with the A173 and A171, therefore cumulative impacts would be most likely on the A174. However, there are no committed proposed developments within the primary A174 route that would need to be considered.

7.8 Mitigation and Enhancement Measures

- 7.8.1 Opportunities to mitigate potential adverse effects have already been incorporated within the development or are imposed through a number of existing regulatory controls. It is the development that exists with these measures and controls in place that has been subject to assessment. No assessment has been undertaken of the Proposed Development excluding these measures and regulatory controls as a scheme is not being proposed without them. No other measures are proposed as mitigation in relation to the effects that are identified in this ES.

7.9 Conclusions of Significance Evaluation

- 7.9.1 As described in the preceding section, the proposed development would have no significant air quality or dust effects.

7.10 References

- Department for Communities and local Government (DCLG) (2019) National Planning Policy Framework;
- Department for Communities and Local Government (DCLG) (2014) National Planning Practice guidance – Air Quality;
- North Yorkshire County Council (2016) Minerals and Waste Joint Plan: Publication Draft;
- Redcar and Cleveland Borough Council (2007) Local Development Framework;
- Redcar and Cleveland Borough Council (2016) Publication Local Plan (November 2016);
- North York Moors National Park Authority (2008) Core Strategy and Development Policies;
- North York Moors National Parks Authority (2018) Local Plan: Preferred Options;
- IAQM and EPUK (2015) Land-Use Planning & Development Control: Planning for Air Quality;
- Institute of Air Quality Management (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning;
- Defra (2019) Background mapping data for Local Authorities – 2017;
- European Commission (2007) Methodical Guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;
- Amec Foster Wheeler (2017) Boulby Mine: Habitats Regulations Assessment Screening.

8. Traffic and Transport

Non-Technical Summary

This assessment considers the environmental effects of the traffic generated by Boulby Mine on the surrounding local road network. The assessment takes into account the forecast future day to day operation of the site and assesses these movements against the Institute of Environmental Management and Assessment (IEMA) guidelines which specify general thresholds for traffic flows that trigger the need for the assessment of effects.

This chapter analyses the impacts on sensitive receptors for the two main routes between Boulby Mine and the wider higher network. It has been established that for a future baseline of 2048, the impact of the development triggers the threshold for further assessment on all sections of both routes, for which further analysis has confirmed that the impact is not significant.

8.1 Introduction and Overview

- 8.1.1 This chapter presents the results of an assessment of potentially significant road traffic effects on receptors (including road users), as a result of the proposed extension to the operation of Boulby Mine. This chapter should be read in conjunction with the development description in Chapter 3, the noise and vibration assessment in Chapter 6 and the dust and air quality assessment in Chapter 7.
- 8.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and a detailed assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.

8.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 8.2.1 Table 8.1 lists the issues from the relevant planning policies and policy guidance which have been considered in the assessment of traffic and transport effects.

Table 8.1 Relevant Planning Policy

Policy Reference	Policy Issue
National planning policies	
National Planning Policy Framework	To integrate planning and transport to promote more sustainable transport choices, to promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling and to reduce the need to travel, especially by car.
Local planning policies	

Policy Reference	Policy Issue
North Yorkshire County Council Policy I01: Minerals and waste transport infrastructure	1) The development of rail, water, pipeline or conveyor transport infrastructure, or use of existing infrastructure, will be encouraged and permitted for the transport of minerals and waste produced or arising in the Plan area, as well as for the reception of any large-scale imports of minerals or waste into the area. 2) Where proposals for minerals or waste development would be located in close proximity to an existing wharf or rail head, they should include information to demonstrate that the potential for use of such facilities has been considered and, where practicable, should prioritise use of alternatives to road transport. Proposals involving the development of, or use of existing, non-road transport infrastructure (other than pipelines and conveyor systems) should also be well located in relation to the main road network in order to facilitate multi-modal movements of minerals and waste and will be required to demonstrate compliance with other relevant development management policies in the Joint Plan. Where new minerals or waste transport infrastructure is proposed in the Green Belt the development should preserve openness and be consistent with the purposes of Green Belt designation.
The North York Moors National Park Core Strategy and Development Policies	In order to effectively minimise the overall need for journeys and reduce the environmental impacts of traffic on the National Park, development will be permitted where highway detailing, road improvements and street furniture are complementary to the character of the area and are the minimum required to achieve safe access and parking is provided in accordance with the relevant maximum standards adopted by the Authority.

Legislative Requirements

8.2.2 There is no legislation that needs to be considered when determining the scope of this assessment.

Guidance

8.2.3 The following planning advice and professional guidance document has also been taken into account in assessing the potential effects of the proposed development on the existing public road network:

- Guidelines for the Environment Assessment of Road Traffic (GEART) (Institute of Environmental Assessment, now Institute for Environmental Management and Assessment (IEMA) 1993.

8.3 Methodology and Approach

Consultation

8.3.1 A formal scoping report was submitted to the relevant consultees as part of the EIA scoping process. The scoping report included the same access routes, transport routes and site location as the previously approved submission (NYMR/003/0043B/PA). A summary of the responses has been included in Table 8.2 below:

Table 8.2 Consultation Responses

Consultee	Summary of Response	Addressed in the ES
North Yorkshire County Council	<p>Generally acceptable to the local authority. Consideration should be given to:</p> <ul style="list-style-type: none"> • A travel plan being produced to assist in promoting sustainable travel and address the sustainable requirements of NPPF; • The level of materials exported from the mine should not increase beyond existing levels which is limited to 66 loads per day. 	<p>A separate Travel Plan can be produced under a planning condition.</p> <p>It is the intention of the operator to retain the existing daily HGV limit of 66 loads per day.</p>
Network Rail	Rail infrastructure is capable of accommodating the proposals at current levels. Any increase in the length of train would require investigation and works.	There will be no increase in the volume of material exported by rail over what has historically occurred. Infrastructure maintenance is not considered within this assessment and therefore no further consideration to rail exports is given within this chapter.
North York Moors National Park	Request that the assessment consider a future baseline both 'without' and 'with' the Site traffic in order to quantify its impact on the surrounding area.	The assessment approach included within this chapter accords with the request from North York Moors National Park.

Data Gathering Methodology

8.3.2 The sources of information used for the traffic and transport assessment are listed in Table 8.3 below.

Table 8.3 Sources of Information used for the Traffic and Transport Assessment

Source	Data
Google Earth, Google Maps	Online mapping
Axiom Traffic Limited	Traffic counts, flows and vehicle classification
Crashmap	Personal Injury Accidents (PIA)
Redcar and Cleveland Borough Council	Road accident data
North Yorkshire County Council	Road accident data

8.3.3 The traffic data referenced in Table 8.3 was captured using two automated traffic counters (ATC) on the A174 to record average daily traffic flows on the highway and one manual classified count (MCC) survey at the Boulby Mine entrance to record site-related movements.

8.3.4 For the ATC's, one was situated to the east of the site and the other to the west. Data was captured over a 7 day period between the 8 and 14 July 2017. The MCC survey was located at Boulby Mine access and captured data on the 13 July 2017 between 07:00-19:00. Figure 8.1 illustrates the surveys locations. The survey results are considered to still be valid for the submission of the

planning application in 2019, as HGV numbers from Boulby Mine transporting product are generally similar, or occasionally fewer in number, to those seen in 2017.

- Site one: west of Boulby Mine access at NZ 75539 18578;
- Site two: east of Boulby Mine access at NZ 77227 18360;
- Site three: Mine Site access on the A174 at NZ 76409 18700.

Figure 8.1 ATC and MCC Locations



Methodology for Identifying and Assessing Effects

Assessment Methodology

8.3.5 The guidance that is followed when assessing the potential significance of road traffic effects is summarised in GEART (IEA, 1993), which states that:

"The detailed assessment of impacts is...likely to concentrate on the period during which the absolute level of an impact is at its peak, as well as the hour at which the greatest level of change is likely to occur." (Paragraph 3.10).

8.3.6 To assess the impact at its peak, the likely percentage increase in traffic is determined by the comparing the level of traffic generated by the development with future predicted baseline traffic flows (in 2048) on the road links in the vicinity of Boulby Mine.

8.3.7 GEART provides two rules that are used to establish whether an environmental assessment of traffic effects should be carried out on receptors:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include sensitive areas where traffic flows are predicted to increase by 10% or more.

8.3.8 It should be noted that, according to GEART, predicted traffic flow increases below 10% are generally not considered to be significant as daily variations in background traffic flow may

fluctuate by this amount. Changes in traffic flows below this level are, therefore, assumed not to result in significant environmental effects and have therefore not been assessed further as part of this study.

Receptors

- 8.3.9 Receptors are the users or beneficiaries of highway network assets and facilities such as pedestrians, cyclists, equestrians and drivers who travel within the vicinity of the proposed development.
- 8.3.10 GEART identifies the following groups and special interest groups that may be affected:
- People at home;
 - People at work;
 - Sensitive groups including children, elderly and disabled;
 - Sensitive locations such as hospitals, churches, schools and historical buildings;
 - Pedestrians;
 - Cyclists;
 - Open spaces, recreational areas and shopping areas;
 - Sites of ecological and nature conservation value; and
 - Sites of tourist/visitor attractions.

Receptor Sensitivity

- 8.3.11 The sensitivity of each highway link included in the assessment has been assigned a sensitivity in accordance with GEART. This is based on the proximity of sensitive receptors to the highway link and the highway environment. Table 8.4 summarises the rationale used to determine the sensitivity against the corresponding receptors as part of the assessment as contained in GEART. Professional judgement is also used to determine the sensitivity of the receptor.

Table 8.4 Receptor Sensitivity

Sensitivity	Description/reason	Receptor
High	Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident blackspots, retirement homes and urban/residential homes without footways that are used by pedestrians and cyclists	Residents/workers travelling to and from work or home on foot and by bicycle, school children, leisure walkers and equestrians
Medium	Traffic flow sensitive receptors including: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centres, parks, recreation facilities	Residents/workers travelling to and from work or home on foot and by bicycle, people visiting these land uses
Low	Receptors with some sensitivity to traffic flows: places of worship, public open space, nature conservation areas, listed buildings, tourist/visitor attractions and residential areas with adequate footway provision	Residents/workers travelling to and from work or home on foot or bicycle and people visiting these land uses

Sensitivity	Description/reason	Receptor
Negligible	Receptors with low sensitivity to traffic flows: Motorway and Dual Carriageways and/or land uses sufficiently distant from affected routes and junctions	Residents/workers travelling by foot or by bicycle

- 8.3.12 Sensitivity judged as High or Medium results in Rule 2 being considered for that highway link. Sensitivity judged as Low or Negligible results in Rule 1 being considered for that highway link.

Environmental Effects

- 8.3.13 If the threshold for assessment is exceeded (Rule 1/Rule 2) then an assessment of the traffic related environmental effects on the receptors is undertaken. The environmental effects are as follows:

- Severance: the separation of people from places and other people;
- Driver delay: traffic delays to non-development traffic;
- Pedestrian delay: the ability of people to cross roads as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions of the site;
- Pedestrian amenity: the effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width/separation from traffic;
- Accidents and safety: the risk of accidents occurring where development is expected to produce a change in the character of traffic; and
- Hazardous loads: the effect of transportation of dangerous or hazardous loads by road.

- 8.3.14 The significance of each effect has been considered against the criteria within GEART, where possible. However, GEART states that:

'For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.' (Paragraph 4.5, IEA, 1993).

Severance

- 8.3.15 There are no predictive formulae which give simple relationships between traffic factors and levels of severance. GEART states that changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance. In general, marginal (slight) changes in traffic flow are, by themselves, unlikely to create or remove severance. The magnitude of effect can also be assessed against increases in pedestrian journey length along roads and/ or PROWs for between four weeks and six months.

Driver Delay

- 8.3.16 GEART states that delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system. The capacity of a road or a particular junction can be determined by establishing the ratio of flow to capacity (RFC).
- 8.3.17 For this assessment, criteria from GEART has been used to assess the effects on traffic levels and driver delay, which states the need for assessment where changes in traffic flows exceed 30%.

Pedestrian Delay

- 8.3.18 Given the range of local factors and conditions which can influence pedestrian delay, GEART does not recommend that thresholds be used as a means to establish the significance of pedestrian delay, but recommend that reasoned judgements be made instead. However, GEART suggests a lower threshold of 10 seconds delay and upper threshold of 40 seconds delay which, for a link with no crossing facilities, equates to the lower threshold of a two-way flow of 1,400 vehicles per hour.

Pedestrian Amenity

- 8.3.19 GEART notes that changes in pedestrian amenity may be considered significant where the traffic flow is halved or doubled, with the former leading to a positive effect and the latter a negative effect.

Accidents and Safety

- 8.3.20 Informed by a review of existing collision patterns and trends based upon the existing personal injury collision records and the forecast increase in traffic.
- 8.3.21 Table 8.5 provides details of thresholds used to determine the magnitude of levels of each transport effect.

Table 8.5 Magnitude of Effect

Transport effect	Magnitude of effect			
	Major	Moderate	Minor	Negligible
Severance	Change in total traffic or HGV flows over 90%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of less than 30%
	And/or	And/or	And/or	And/or
	Where there will be a temporary maximum increase in pedestrian journey length of 500m or more along a road or other public right of way for more than 6 months over a 12 month period	Where there will be a temporary maximum increase in pedestrian journey length of 250m – 500m along a road or other public right of way for a 3-6 month period over 12 months	Where there will be a temporary increase in pedestrian journey length of up to 250m along a road or other public right of way for between 4 weeks and 3 months over a 12 month period	Where there will be no temporary increase in pedestrian journey length.
Driver delay	Change in total traffic or HGV flows over 90%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of less than 30%
Pedestrian amenity and delay	Change in total traffic or HGV flows over 90%	Change in total traffic or HGV flows of 60-90%	Change in total traffic or HGV flows of 30-60%	Change in total traffic or HGV flows of less than 30%
Accidents and road safety	Informed by a review of existing collision patterns and trends based upon the existing personal injury accident records and the forecast increase in traffic.			

Effect Evaluation

- 8.3.22 The classification of a likely traffic and transport effect is derived by considering the sensitivity of the receptor (derived from Table 8.4) against the magnitude of impact (derived from Table 8.5). The resultant significance matrix is presented within Table 8.6.

Table 8.6 Significance Matrix

	Magnitude of effect				
		Major	Moderate	Minor	Negligible
Receptor sensitivity	High	Major increase – Significant	Major increase – Significant	Major increase – Significant	Negligible
	Medium	Major increase – Significant	Major increase – Significant	Minor to moderate decrease – Not significant	Negligible
	Low	Major increase – Significant	Minor to moderate decrease – Not significant	Minor decrease – Not significant	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

- 8.3.23 The following terms have been used to classify the level of effects, where they are predicted to occur:
- Major adverse or Major beneficial – where the development would cause a significant deterioration (or improvement) to the existing environmental effect;
 - Moderate adverse or Moderate beneficial – where the development would cause a noticeable deterioration (or improvement) to the existing environmental effect;
 - Minor adverse or Minor beneficial – where the development would cause a small deterioration (or improvement) to the existing environmental effect; and
 - Neutral – no discernible deterioration or improvement to the existing environment.
- 8.3.24 Note that for the purposes of the EIA, Major and Moderate adverse effects are considered to be significant, whilst Minor and Negligible adverse effects are considered 'neutral/not significant'.
- 8.3.25 Effects can also be described, for example, as:
- Beneficial, negligible or adverse;
 - Temporary (short term, medium term, long term) or permanent; and
 - Local, district, regional or national.

8.4 Baseline

Current Baseline

- 8.4.1 Boulby Mine is served from the A174 and is situated between the villages of Easington in the west and Staithes in the east. The A174 broadly routes in an east-west direction, connecting Whitby in the east with Teesside in the west. Both employee and HGV traffic travelling between Boulby Mine

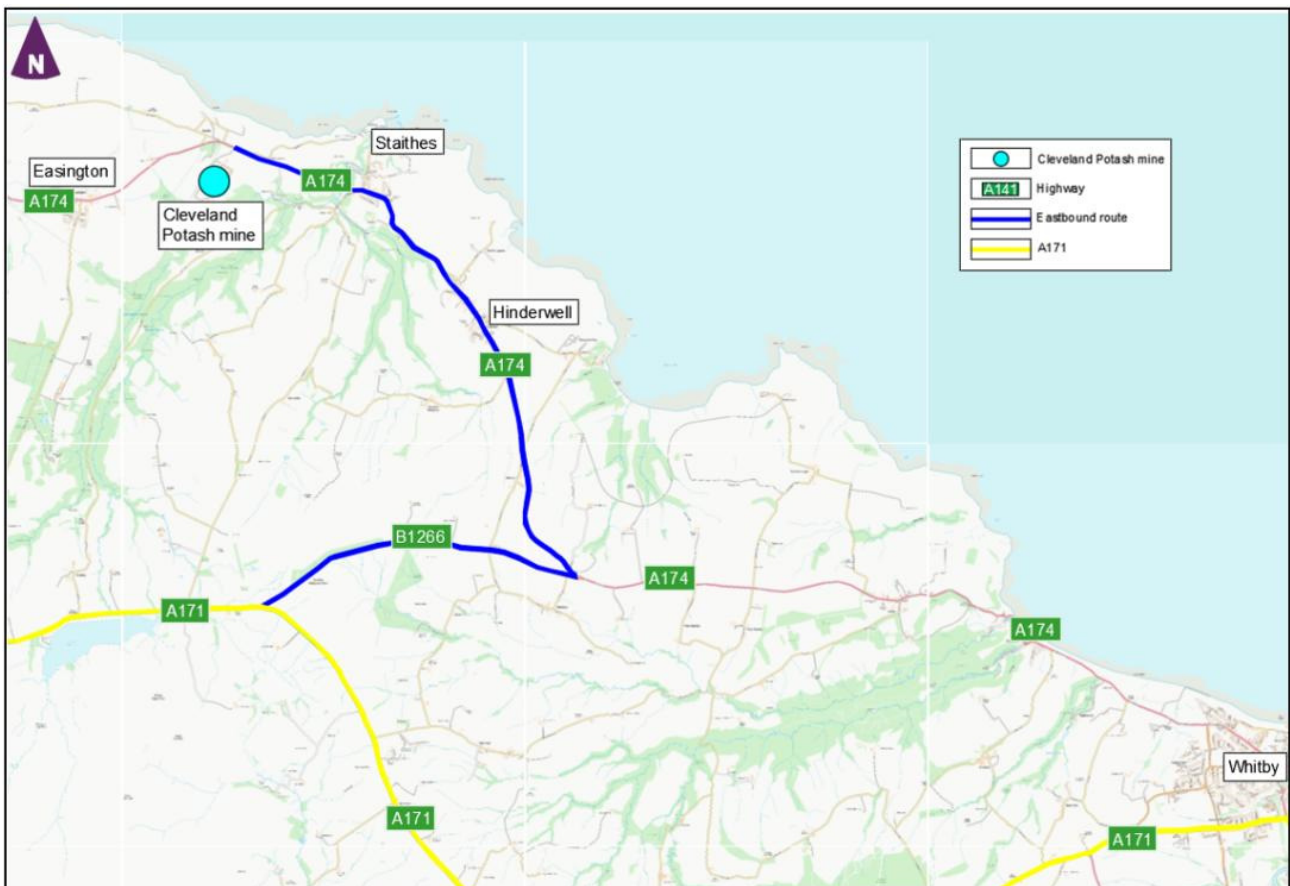
and the surrounding area utilises the A174, with the former travelling towards neighbouring towns, villages, Whitby and Teesside and the latter travelling towards Whitby (via a connection with the A171) and Teesside and the wider highway network.

- 8.4.2 Given the significance of the A174 and its use as the principal means of access between Boulby Mine and the surrounding area, the highway forms the focus of this assessment. The following provides a narrative of the routes between Boulby Mine and the A171 to the east and the A173 on the edge of Teesside to the west, where the wider highway network can be reached, identifying the location of sensitive receptors.

Eastern Route

- 8.4.3 The eastern route provides access to the A171 along the A174 to the east of Boulby Mine, and routes through Staithes and Hinderwell before using the B1266 to join the A171 for access to Whitby and beyond.
- 8.4.4 The route between Boulby Mine and the A171 to the east is illustrated within **Figure 8.2** and a more detailed route description is provided below.

Figure 8.2 Eastern Route from Boulby Mine Access



- 8.4.5 From the site entrance to Staithes (approximately 1.5km) the A174 is subject to a 60mph speed limit and affords no street lighting or public footway. Upon reaching Staithes, the speed limit reduces to 30mph with street lighting and footways provided on both sides of the carriageway for approximately 350m, following which only a northern footway is provided, which continues towards Hinderwell. Within the village there are three pedestrian crossing points on the A174, consisting of a signal-controlled crossing situated towards the west, a pedestrian refuge island situated within

the middle and a dropped kerb courtesy crossing towards the east of the village. The village frontage is largely residential, but all dwellings are set back from the edge of the carriageway and segregated by a mixture of wide grassed verge, grassed berms and/or hedgerow.

- 8.4.6 Leaving Staithes, the speed limit increases to 40mph for approximately 240m before increasing to 60mph for approximately 1km, until reaching Hinderwell, where the speed limit reduces to 30mph. The highway routes through Hinderwell for approximately 1km. Hinderwell does not provide any street lighting along this section of highway but does provide footways on both sides of the carriageway. On-street parking is permitted within the village, though a Traffic Regulation Order (TRO) in the form of double yellow lines, controls parking to the west and centre of the village, ensuring vehicles are only parked on one side of the carriageway. To the east of the village, the carriageway widens and no TRO is enforced, thus accommodating on-street parking on both sides of the carriageway. Private residences predominantly front the highway with local businesses, services and facilities interspersed, which includes a church. The majority of the dwellings are set back from the carriageway and segregated by a mixture of boundary walls, front gardens and driveways. A small number of dwellings directly adjoin the back of the footway.
- 8.4.7 Leaving Hinderwell, the speed limit increases to 60mph for approximately 3km to the junction with the B1266. This section of the highway is rural in nature with very little development (limited to Ellerby, which does not directly front the road) and does not provide street lighting or footways. The B1266 is similarly rural in nature, subject to a 60mph speed limit with no development (bar a single dwelling), street lighting or footway, routing approximately 4.2km, the highway connects to the A171.
- 8.4.8 Based on the route description, Table 8.7 sets out the receptor sensitivity of the route, along with the rationale and applicable GEART assessment threshold (Rule 1/2).

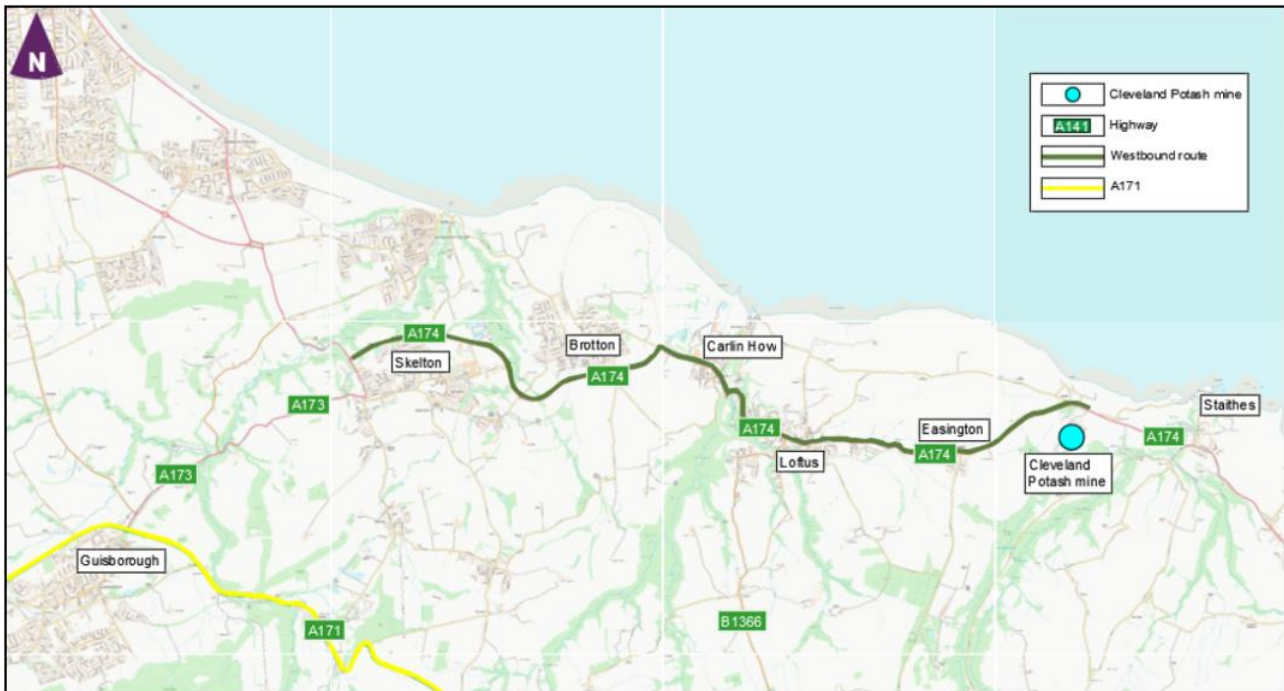
Table 8.7 Eastern Route Sensitivity

Location	Receptor Sensitivity	Assessment (Rule 1/2)	Rationale
A174 (Site Access to Staithes)	Negligible	1	No development or footways and therefore no receptors.
Staithes	Low	1	All dwellings are set back and segregated from the carriageway. There are no particularly sensitive land uses fronting the road.
A174 (Staithes to Hinderwell)	Negligible	1	No development. The existing footway provides a link between the two villages, but it is unlikely to accommodate a high number of users.
Hinderwell	Low	1	The majority of the dwellings are set back from the carriageway, footways are provided along both sides of the road and there is only one sensitive land use.
A174 (Hinderwell to B1226)	Negligible	1	No development directly fronting the road or footways and therefore no receptors.
B1226 (High Street)	Negligible	1	No development or footways and therefore no receptors.

Western Route

- 8.4.9 The western route runs through Easington, Loftus and around Skelton-in-Cleveland before reaching the junction with the A173. Here traffic can use the A173 to access the Guisborough area, or continue on the A174 towards Redcar and Teesside.
- 8.4.10 The route between Boulby Mine and the A173 to the west is illustrated within **Figure 8.3** and a more detailed route description is provided below.

Figure 8.3 Western Route from Boulby Mine Entrance



- 8.4.11 From the site entrance to Easington (approximately 2km) the A174 is rural in nature, is subject to a 60mph speed limit and provides no street lighting or public footway. On entering Easington, the speed limit reduces to 30mph where the highway adopts a semi-rural nature. Street lighting is present throughout the village though footways are intermittent, particularly in the eastern half of the village, where boundary walls directly adjoin the carriageway, which includes three dwellings whose front gates directly open out onto the road. Routing west through the village, the footway provision improves and on approach to the centre and eastern part of the village, where development lines both sides of the carriageway, footways are provided on both sides. Courtesy crossings are provided in two locations within the village, which comprise dropped kerbs and tactile paving. The road is largely lined with dwellings, which are low density towards the eastern part of the village and higher density towards the west. A church is situated on the southern side of the road, though the access is situated on an adjacent side road.
- 8.4.12 Leaving Easington the speed limit increases to 40mph for 1km before entering Loftus. This section of the highway has full street lighting, with very little development and provides a footway on the northern edge of the carriageway connecting the two villages. Through Loftus, the A174 is subject to a 30mph speed limit with full street lighting and footways on both sides of the highway for the majority of its length. Loftus is urban in nature with a mixed use of residential, retail and public buildings fronting the road, though in the case of the latter two land uses, the footway is exceptionally wide. Residential properties are largely set back from the road and segregated by

front gardens and boundary walls, with the exception of a short section of dwellings situated towards the west of the village whose front doors open onto the footway.

- 8.4.13 Leaving Loftus, the A174 speed limit increases to 40mph, passing through Carlin How, which comprises a short section (approximately 370m) of residential development situated along the southern side of the carriageway, following which the route continues towards the A174/Lorn Terrace roundabout, east of Skelton (approximately 4.3km). This section of the route provides a footway along on the northern side of the carriageway. Leaving the roundabout at the first exit and continuing on the A174, the speed limit increases to 60mph routing south of Brotton and north of Skelton-in-Cleveland. Along this section of the route there are no footways and street lighting is only provided at junctions.
- 8.4.14 Based on the route description, Table 8.8 sets out the receptor sensitivity of the route, along with the rationale and applicable GEART assessment threshold (Rule 1/2).

Table 8.8 Westbound Route Sensitivity

Location	Receptor Sensitivity	Assessment (Rule 1/2)	Rationale
A174 (site to Easington)	Negligible	1	No development or footways and therefore no receptors.
Easington (east)	High	2	The village has no footway adjacent to three dwellings to the east of the village and a narrow footway on the northern side of the carriageway.
Easington (west)	Low	1	Footway provision is afforded along both sides of the carriageway, the road is lined by dwellings on both sides, which are set back and segregated by front gardens and boundary walls/hedgerows.
A174 (Easington to Loftus)	Negligible	1	No development or footways and therefore no receptors.
Loftus	Low	1	Adequate footway provision is afforded within the village with all major sensitive land uses set back from the road and segregated by footways.
A174 (Loftus to Carlin How)	Low	1	Adequate footway provision is afforded within the village and there are no particularly sensitive land uses fronting the road.
A174 (up to its junction with the A173)	Negligible	1	No development or footways and therefore no receptors.

Traffic Flows

- 8.4.15 Boulby Mine operates on a 24-hour basis and according to the legal agreement, HGVs used for dispatching minerals can only enter the site after 06:45, and HGVs dispatching minerals can only leave after 07:00 and before 19:00. However, for the purpose of this assessment a 12-hour period between the hours of 07:00 and 19:00 has been assessed as it covers the typical morning and evening peak periods and the inter-peak, and it corresponds well to the time limits placed on when minerals delivery vehicles can enter/leave Boulby Mine each day. There would be a negligible number of vehicle movements between 06:45 and 07:00 and also this time period is outside of typical peak hours.

8.4.16 The flows recorded from the turning count have been used to identify the impact of the site-related movements, which have been deducted from the ATC data in order to determine the baseline traffic flows. Table 8.9 summarises the 12-hour two-way 2017 baseline flows for traffic travelling along the eastern route and traffic travelling along the western route, which are referenced as Site 2 and 1 respectively. A full copy of the data is included within Appendix 8A.

Table 8.9 2017 Base Flows

	Total Vehicles	HGV's	HGV %
Site 2 (East)	3,195	57	1.8%
Site 1 (West)	2,421	77	3.2%

Sources: Axiom

8.4.17 The existing two-way development traffic flows for the same period and routes are summarised in Table 8.10.

Table 8.10 Existing Development Flows

	Total Vehicles	HGV's	HGV's %
Site 2 (East)	185	12	6.5%
Site 1 (West)	644	26	4.0%

Source: Axiom

8.4.18 To calculate the 2019 baseline, a TEMPro growth factor has been applied to the 2017 base flows (which exclude the existing development flows). TEMPro is the industry standard means of forecasting future traffic flows. This factor has been modified within TEMPro Version 7.2 using the NTM AF 15 dataset to calculate the adjusted local growth figure for Redcar and Cleveland 016. The resulting daily local growth factor for 2017 to 2019 is 1.02165 for light vehicles and 1.0263 for HGVs.

8.4.19 The factors referenced above have been applied to the 2017 data minus the existing development traffic resulting in the 12-hour two-way 2019 baseline flows for traffic travelling along the eastern and western routes, shown in Table 8.11.

Table 8.11 2019 Base Flows

	Total Vehicles	HGV's	HGV %
Site 2 (East)	3,261	58	1.8%
Site 1 (West)	2,471	79	3.2%

Sources: Axiom

8.4.20 It should be noted that the operator intends to retain the 66 HGV per day (132 two-way trips) threshold as part of the renewed planning agreement. This assessment has been carried out to assess the worst-case scenario (132 two-way HGV trips).

8.4.21 It is envisaged that the proportion of future development traffic using the east and west route will not change. Therefore, the existing percentage split (east and west) of the development traffic has



been applied to the proposed future development traffic on site 1 (68.4%) and site 2 (31.6%). The 12-hour two-way proposed development traffic flows are summarised in Table 8.12.

Table 8.12 Proposed Development Flows

	Total Vehicles	HGV's	HGV's %
Site 2 (East)	215	42	19.4%
Site 1 (West)	708	90	12.8%

Predicted Future Baseline

- 8.4.22 The assessment approach, as prescribed by North York Moors National Park, requires consideration of the development impact for a future assessment year, which based on the license period, is 2048. In order to determine the level of background traffic growth between the base year and the future assessment year, factors have again been derived from TEMPro Version 7.2.
- 8.4.23 In terms of HGV growth rates, the traffic forecast contained within TEMPro only covers a period up to 2040 and as a result the 2039 to 2040 HGV growth rate has been used as proxy for each year between 2040 and 2048 to calculate the final HGV growth rate for 2019 to 2048.
- 8.4.24 Therefore, the adjusted local traffic growth figures for Redcar and Cleveland 016 between 2019 to 2048 is 1.189 for light vehicles and 1.174 for HGV.
- 8.4.25 The factor referenced above has been applied to the 2019 data (which excludes the existing development flows) and Table 8.13 sets out the 12-hour two-way 2048 baseline flows for traffic travelling along the eastern and western routes.

Table 8.13 2048 Predicted Flows, Without the Development

	Total Vehicles	HGV's	HGV %
Site 2 (East)	3,881	69	1.8%
Site 1 (West)	2,940	93	3.2%

- 8.4.26 As noted in Para 8.5.20, the proposed development will comply with the 66 HGV per day threshold and therefore the 12-hour two-way proposed development traffic flows summarised in Table 8.12 are still applicable in 2048.

Personal Injury Accident Data

Link Assessment

- 8.4.27 Personal Injury Accident (PIA) data has been obtained from the online database crashmap, which plots accidents recorded by UK police forces across the UK. Accident data within the vicinity of the site for the most recent five-year period (2014 to 2018) has been assessed.
- 8.4.28 The observed number of PIAs has been compared with the number of PIAs predicted by national default accident rates. This analysis was undertaken for both the eastern and western routes from Boulby Mine access.

- 8.4.29 National default accident rates were taken from COBA, the industry-standard DfT software for predicting accident numbers during transport appraisals. COBA accident rates vary depending on the speed limit of the road and its classification (e.g. Modern Dual-Carriageway, Motorway, Older Single-Carriageway).
- 8.4.30 The PIA data analysis therefore required the two routes to be split into several different sections, depending the roads characteristics.
- 8.4.31 Accident rates in COBA are quoted in accidents per million vehicle-kilometres (Veh-Km). Veh-km are derived by multiplying the length of a road by its flow.
- 8.4.32 The length of each of section of road was measured using Google Earth, and the flow was derived using the 2017 ATC data and the TEMPro growth factor. The flow was then multiplied by 365 to derive the level of traffic for a whole year.
- 8.4.33 A summary of the assessment outcome is presented within Table 8.14, Appendix 8B presents the full technical note.

Table 8.14 PIA Assessment

	Predicted No PIA (5 Years)	Actual No. PIA (5 Years)	Difference
Site 2 (East)	27	11	-16
Site 1 (West)	41	31	-10
Total	67	42	-26

- 8.4.34 The assessment indicates that overall, the number of accidents that have occurred over the latest 5-year period is lower than the predicted number of accidents for a road of this type.

Cluster Assessment

- 8.4.35 In addition to the COBA assessment, accident patterns at cluster sites have been investigated. Detailed accident data has been obtained from Redcar and Cleveland Borough Council (western route) and North Yorkshire County Council (eastern route) and after analysing the data five accident clusters on western route and one accident cluster on eastern route have been identified. Table 8.15 summaries the number of accidents over the assessment period recorded at accident clusters, with a copy of the raw data presented within Appendix 8C.

Table 8.15 Summary of Accident Records at Accident Clusters

Cluster	Number of Accidents					
	Total Records	Fatal	Serious	Slight	Vulnerable	HGV
Western Route from Mine Site						
1 A174 Arlington Street (between High St and North Rd)	5	0	2	3	2	0
2 Westfield Terrace/A174 Junction	2	0	0	2	0	0
3 A174 East/A174 West/West Park Avenue Junction	2	0	0	2	1	0

Cluster	Number of Accidents					
	Total Records	Fatal	Serious	Slight	Vulnerable	HGV
4 A174 Brotton Road (between Mount Pleasant and 150 northwest of Gladstone St)	7	1	0	6	3	0
5 A174 Brotton Road/A174/Lorne Terrace Junction	3	0	3	0	0	0
Eastern Route from Mine Site						
6 B1266 High Street/A171 Junction	4	0	1	3	0	1

8.4.36 The following is a brief description of the accidents recorded within the identified clusters.

- **Cluster 1 (A174 Arlington Street/High Street):** Three slight and two serious accidents were recorded at this cluster. Of the three slight accidents two were caused by driver error, losing control and failure to stop in time. One of the slight accidents occurred when a pedestrian ran into the path of a moving vehicle. A serious accident occurred due to a failure to look. Another serious accident occurred when a pedestrian ran across the carriageway and was struck by a vehicle;
- **Cluster 2 (Westfield Terrace/A174 Junction):** Two slight accidents were recorded at this junction. Both accidents were a result of driver error, where one driver failed to stop at a red light and collided with another vehicle and another driver took a right turn across the path of another vehicle causing a collision;
- **Cluster 3 (A174 East/A174 West/West Park Avenue Junction):** Two slight accidents were recorded at this junction. One accident occurred when a pedestrian ran across the carriageway from behind a parked vehicle into the path of a vehicle. The other slight accident occurred when a vehicle slowed for a school crossing patrol but the vehicle behind failed to slow and therefore collided with the rear of the vehicle in front;
- **Cluster 4 (A174 Brotton Road):** One fatal and six slight accidents were recorded at this cluster. The fatal accident occurred when a vehicle travelling south east on the A174 collided with the pedestrian who was crossing the road. Slight accidents were caused by different factors such as failure to stop in time, dazzling sun, careless overtaking by a moped and a passenger falling when alighting;
- **Cluster 5 (A174 Brotton Road/A174/Lorne Terrace Roundabout):** Three serious accidents occurred at this roundabout. All serious accidents occurred due to driver error such as failure to look, losing control and failure to stop in time;
- **Cluster 6 (B1266 High Street/A171 Junction):** One serious and three slight accidents occurred at this junction. The serious accident occurred because there was a failure to look at the junction. All slight accidents occurred due to driver error such as failure to look properly and failure to stop in time.

8.4.37 The above information shows that most of the accidents were caused by driver error. Therefore, it is concluded that driver awareness is the main cause of most of the accidents rather than the highway infrastructure. Overall there are no trends suggesting the development would exacerbate this situation.

8.5 Scope of Assessment

Limitations in the Preparation of the ES

- 8.5.1 The on-site survey data collection was performed in July 2017 which is considered to be a non-neutral month. However, both the ATC and the MCC was undertaken before the start of the summer holidays and therefore the survey data is considered to be representative of 'normal' traffic flow conditions.
- 8.5.2 The assessment considers the movement of traffic along the A174 from Boulby Mine to the A171 (via the B1266) to the east and the A173 to the west, it is assumed from these points the site-related vehicle movements would dissipate onto the wider highway network.

Potential Receptors

- 8.5.3 Based on the assessment of the access routes, the following receptors have been identified:
- People at home;
 - People at work;
 - Sensitive groups including children, elderly and disabled;
 - Sensitive locations such as hospitals, churches, schools and historical buildings;
 - Pedestrians;
 - Cyclists; and
 - Open spaces, recreational areas and shopping areas.

Potentially Significant Effects Scoped In

- 8.5.4 The environmental effects that have been scoped in are:
- Severance;
 - Driver delay;
 - Pedestrian delay; and
 - Pedestrian amenity.

Potentially Significant Effects Scoped Out

- 8.5.5 The environmental effects that have been scoped out are:
- Accidents and safety; and
 - Hazardous loads.
- 8.5.6 The first has been scoped out as it has been established that the number of PIAs along the eastern and western routes combined is lower than would be expected. Plus, the accident cluster analysis has shown that driver awareness is the main cause of accidents rather than the highway infrastructure; suggesting the development would not exacerbate this situation. The second effect has been scoped out as Boulby Mine does and will not generate any hazardous loads.

8.6 Predicted Effects: Operational

8.6.1 As assessment, which considers the future year baseline, has been undertaken. Table 8.16 summarises the predicted increase in traffic if Boulby Mine was operating in 2048, based on the proposed development flows presented within Table 8.12 and the 2048 future baseline presented within Table 8.13.

Table 8.16 2048 Future Base Year + Development of Operational Mine

	Base Traffic Flows			Development Traffic			Base + Development			% change in traffic flows	
	Total Vehicle	HGV's	HGV %	Total Vehicle	HGV's	HGV's %	Total Vehicle	HGV's	HGV %	Total Vehicle	HGV's
Site 2 (East)	3,881	69	1.8%	215	42	19.4%	4,095	110	2.7%	5.5%	60.7%
Site 1 (West)	2,940	93	3.2%	708	90	12.8%	3,648	183	5.0%	24.1%	97.4%

8.6.2 As can be seen from Table 8.16 above, the increase in total vehicles and HGVs for the eastern route are expected to be 5.5% and 60.7% respectively. Therefore, the change in the number of HGVs is above the Rule 1 threshold of 30%. As such a further assessment of the environmental effects on the eastern route has been undertaken.

8.6.3 With regards to the western route, the increase in total vehicles and HGVs are expected to be 24.1% and 97.4% respectively. Based on the route assessment presented within Table 8.8, the expected increases are above the threshold for assessment (Rule 1: 30% increment in number of HGVs and Rule 2: 10% increment in number of vehicles at sensitive receptor), as such a further assessment of the environmental effects on the western route has been undertaken.

8.6.4 However, in terms of the assessment it should be noted that the Proposed Development will actually see a continuation of the existing traffic numbers from Boulby Mine using the road network, and there would be no actual increase in traffic numbers or additional effects created by the proposals.

Assessment of Environmental Effects: Eastern Route

Severance

8.6.5 The eastern route is predominantly rural where pedestrian activity in the area is negligible. The total traffic volumes on the eastern route (4,095 from Table 8.16) would still be low in comparison to the design capacity of 13,000 AADT (DMRB TA 46/97) which is equivalent to 10,192 12-hour traffic flow. Consequently, there would be ample safe crossing opportunities and it is considered that the severance effects would be **not significant**.

Driver Delay

8.6.6 Delay to non-development traffic can occur on the network due to the additional traffic generated by the development. The GEART note that these additional delays are only likely to be significant when the traffic on the network in the study area is already at, or close to, the capacity of the system. On free-flowing sections of the highway network driver delay occurs mainly at junctions.

- 8.6.7 In the area of assessment, most of the junctions which will be affected by the development traffic are standard rural priority junctions which are formed by side roads with the main route. None of the junctions is considered to be at or close to capacity based on their design, the discussion in paragraph 8.7.4 and the Google traffic tool, which shows no trend of traffic congestion along this route. Therefore, the effect on driver delay is considered to be **not significant**.

Pedestrian Delay and Amenity

- 8.6.8 The GEART notes that there is a lower threshold of 10 seconds or 1,400 vehicle per hour, below which it can be assumed that pedestrian delay is acceptable. Using DfT Road Traffic Statistics (TRA) – 2017, the 2048 12-hour flows have been converted to a peak hour flow of 389 as this value is below the 1,400 vehicle per hour /10 second threshold, the impact on pedestrian delay is considered to be **not significant**.
- 8.6.9 Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic. The GEART note that changes in pedestrian amenity may be considered to be significant where the traffic is halved or doubled. As the proposed development traffic does not double the future base traffic it can therefore be concluded that the effect on pedestrian amenity is considered to be **not significant**.

Assessment of Environmental Effects: Western Route

Severance

- 8.6.10 Approximately half of the western route is rural and half passes through villages which can be classed as urban. Pedestrian activity in the rural areas can be considered negligible but in the urban areas, even though they are not densely populated, pedestrian movements will be evident. Table 8.17 presents a comparison of the total traffic volumes on the western route and the design capacity of the road to establish whether there will be ample safe crossing opportunities and therefore negligible severance effects.

Table 8.17 Comparison of Capacity Versus 2048 Traffic Flow

Guidance	Road Type	Capacity (two-way)	Capacity (12-hour equivalent)	2048 flow (Table 8.16)	Difference
DMRB TA 46/97	Rural S2	13,000 (AADT)	10,192	3,648	6,544 (36%)
DMRB TA 79/99	Urban UPA1	2,640 (Hourly)	27,777	3,648	24,129 (13%)

- 8.6.11 Table 8.17 shows that the difference between the capacity and the 2048 forecast flows is substantial and consequently, there would be ample safe crossing opportunities. Therefore, it is considered that the severance effects would be **not significant**.

Driver Delay

- 8.6.12 Delay to non-development traffic can occur on the network due to the additional traffic generated by the development. The GEART note that these additional delays are only likely to be significant when the traffic on the network in the study area is already at, or close to, the capacity of the system. On free-flowing sections of the highway network driver delay occurs mainly at junctions.

- 8.6.13 In the area of assessment, the junctions which will be affected by the development traffic are in the form of standard roundabouts, signalised junctions and priority junctions. None of the junctions is considered to be at or close to capacity based on their design, the available capacity presented in Table 8.17 and the Google traffic tool, which shows no trend of traffic congestion along this route. Therefore, the effect on driver delay is considered to be **not significant**.

Pedestrian Delay and Amenity

- 8.6.14 The GEART note that there is a lower threshold of 10 seconds or 1,400 vehicle per hour, below which it can be assumed that pedestrian delay is acceptable. Using DfT Road Traffic Statistics (TRA) – 2017, the 2048 12-hour flows have been converted to a peak hour flow of 347. As this value is below the 1,400 vehicle per hour /10 second threshold, the impact on pedestrian delay is considered to be **not significant**.

Pedestrian amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic. The GEART note that changes in pedestrian amenity may be considered to be significant where the traffic is halved or doubled. As the proposed development traffic does not double the future base traffic it can therefore be concluded that the effect on pedestrian amenity is considered to be **not significant**.

Sensitive Receptor: Easington (east)

- 8.6.15 As mentioned in Table 8.8, the village has no footway adjacent to three dwellings to the east of the village and a narrow footway on the northern side of the carriageway. This location has been considered as sensitive due to its close proximity to the road and lack of pedestrian facility. However, it is envisaged that the pedestrian activity from three dwellings would be negligible and also the predicted development traffic along this route would be (on average) only one vehicle every minute. Therefore, the increase in the quantity of traffic and its impact on the severance, driver delay, pedestrian delay and amenity is considered to be **not significant**.

8.7 Predicted Effects: Cumulative

- 8.7.1 Given the primacy of the A174 as the route from Boulby Mine to the wider highway network for HGVs dispatching minerals product and the number of options for onward routes of these vehicles once they reach the wider network at either the A173 junction or the A171, the effects of this HGV traffic therefore becomes diluted after these points to a position where assessment is not possible. Similarly, cumulative impacts from other developments would only be relevant along these primary sections of the A174. There are no known proposed new developments within this primary A174 route that would need to be considered. Traffic growth has been applied to the base line, which includes the forecast traffic growth as a result of developments being brought forward in the interim between the baseline and the future assessment year, as a result it is considered that any cumulative impacts have been considered within the main operational assessment.

8.8 Mitigation and Enhancement Measures

- 8.8.1 Opportunities to mitigate potential adverse effects have already been incorporated within the development or are imposed through a number of existing regulatory controls. It is the development that exists with these measures and controls in place that has been subject to assessment. No assessment has been undertaken of the proposed development excluding these

measures and regulatory controls as the scheme is not being proposed without them. No other measures are proposed as mitigation in relation to the effects that are identified in this ES.

- 8.8.2 Notwithstanding the above, a separate Travel Plan for the site can be produced, under a condition attached to any planning permission, which will help to further reduce the impact of the development by encouraging modal shift.

8.9 Conclusions of Significance Evaluation

- 8.9.1 As described in the preceding section, the proposed development would have **no significant** traffic and transport effects.

8.10 References

- Guidance Notes No.1: Guidelines for the Environmental Assessment of Road Traffic (GEART) (Institute of Environmental Assessment, 1993);
- Crashmap <http://www.crashmap.co.uk/> (2019);
- COBALT [COBA] Department for Transport, (November 2015);
- DMRB TA 46/97 (February 1997);
- DMRB TA 79/99;
- Road Traffic Statistics <https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra#annual-daily-traffic-flow-and-distribution-tra03> (Department for Transport, 1997).



9. Ecology and Ornithology

Non-Technical Summary

This assessment considers the environmental effects of the proposed development on biodiversity, including any effects within the Mine Site of the proposed development and the surrounding area. The assessment has considered the potential effects of the proposed development on statutory and non-statutory biodiversity sites, priority habitats and species, and legally protected and controlled species that are within a defined zone of influence (ZOI). These are the sites, habitats and species that are of sufficient importance that effects upon them could be significant, and are therefore the focus of the assessment. Those present, within the ZOI, and for which a potential effect is possible are listed below:

- North York Moors SAC;
- North York Moors SPA;
- Bats;
- Great crested newts (GCN);
- Amphibians;
- Notable aquatic fauna (for example brown trout);
- Birds;
- Invertebrates;
- Terrestrial mammals;
- Semi-aquatic mammals; and
- Reptiles.

During the future baseline phases (operational, decommissioning and restoration, and aftercare and semi-maturing restored site) the assessment concludes that there is potential for direct and indirect effects, none of which are significant, upon valued biodiversity receptors. These are primarily linked to the removal of or disturbance to habitats to allow for operation, decommissioning and restoration, and may necessitate the need for derogation licensing in some instances.

During the operational phase the potential for direct and indirect effects is considered to be limited to statutory sites only, with potential for direct and indirect effects on bats and GCN during the decommissioning and restoration phase. The restored site phase has the potential for effects on a range of ecology receptors. The receptors assessed within the ES are those that potentially could be significantly affected by the Proposed Development on the Mine Site.

Environmental measures incorporated into the proposed scheme would include minimising land take within valued habitats, habitat creation and management, the employment of standard best practice working methods, and replanting of habitats as close to their location and type as is possible, with the aim of biodiversity gain. A Habitat Management Plan (HMP) would be developed, which incorporates all mitigation measures.

For the purpose of this chapter, "the Mine Site" is shown in Figure 1.3 and includes the "operational area" and the surrounding landholdings owned by Cleveland Potash Ltd. "Operational area" is defined as the mine footprint, ~32ha. "Offsite" is used to describe any land outwith the Site. The proposed development consists of four phases, the "working" phase which will be the continuation the working mine until 2048. "Demolition

and landform creation” from 2048-2052 includes the decommissioning of the mine, site clearance, ground reprofiling, soil replacements and planting. “Restoration and aftercare” (2052-2057) and established site (2057 onwards).

The future baseline phase “Decommissioning and restoration area” is defined as any area within the Mine Site where works such as decommissioning of the mine, site clearance, ground reprofiling, soil replacements and planting will occur. The “restored site” is defined as the restored land following decommission and restoration.

9.1 Introduction and Overview

- 9.1.1 This chapter assesses whether significant environmental effects are likely as a result of the proposed development on biodiversity. This chapter should be read in conjunction with the development description in Chapter 3 and other technical chapters such as air quality (Chapter 7).
- 9.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and a detailed assessment of the potential significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.
- 9.1.3 The EU Biodiversity Strategy¹ and national biodiversity strategies² state the requirement for the conservation of biodiversity with regards to development. Ecological Impact Assessment (EcIA) is the process by which the national biodiversity strategies and national planning policies are implemented, by evaluating the potential impacts on ecosystems or their components, in order to support biodiversity and sustainable development. It is therefore essential to understand the proposed development before considering its environmental effects, including on biodiversity; the details of the proposed development can be found at the front end of the Environmental Statement (ES).
- 9.1.4 The following appendices are included within the chapter:
- Appendix A: The scientific names of all species that are mentioned in the text;
 - Appendix B: Biodiversity Scoping Information;
 - Appendix C: Relevant Terminology;
 - Appendix D: Protected Species Legislation;
 - Appendix E: Extended Phase 1 Habitat Survey Technical Note;
 - Appendix F: Phase 2 Botanical Technical Note;
 - Appendix G: Bat Survey Technical Note;
 - Appendix H: Great Crested Newt Survey Technical Note;
 - Appendix I: Reptile Survey Results;
 - Appendix J: Priority Species Survey Technical Note;
 - Appendix K: Invertebrate Survey Results;
 - Appendix L: Confidential Badger and Otter Survey Technical Note;
 - Appendix M: Breeding Bird Baseline Ornithology Report;

- Appendix N: Habitat Regulations Assessment Screening.

9.2 Policy Context, Legislative Requirements and Guidance

Policy Context

9.2.1 National and local planning policies relating to biodiversity may have a bearing on the scope of the assessment of effects on biodiversity. Relevant policies are listed in Table 9.1, along with an outline of the issues included in these policies that need to be considered when determining the scope of the biodiversity assessment.

Table 9.1 Relevant Planning Policy

Policy Reference	Policy Issue
National planning policies	
NPPF Section 11 (paragraph 118)	Conserve and enhance biodiversity, including through avoiding developments which result in the loss or damage of irreplaceable habitats.
Local planning policies	
The North York Moors National Park Core Strategy and Development Policies document (Core Policy C)	Natural environment, biodiversity and geodiversity
The North York Moors National Park Core Strategy and Development Policies document (Development Policy 1)	Environmental protection
Planning Practice Guidance (011-033 and 036-059)	Assessing environmental impacts and restoration and aftercare

Legislative Requirements

- 9.2.2 In preparing this biodiversity assessment, account has been taken of relevant legislation and regulations, namely:
- *The Conservation of Habitats and Species Regulations 2017* (SI 2017/No 490) (hereafter referred to as the Habitats Regulations);
 - *Wildlife and Countryside Act 1981* (as amended including by The Countryside and Rights of Way Act 2000);
 - Protection of Badgers Act 1992;
 - Natural Environment and Rural Communities Act 2006 (NERC Act); and
 - The Hedgerow Regulations 1997.



Guidance

9.2.3 In preparing this biodiversity assessment, account has been taken of best practice guidance, namely CIEEM (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. 2nd edition*. Chartered Institute of Ecology and Environmental Management, Winchester. During the course of this assessment, CIEEM issued updated EcIA guidance (the "2018 guidelines¹"). Where relevant, any changes/additional information provided in the 2018 guidance have been used within this assessment.

9.3 Methodology and Approach

Consultation

- 9.3.1 A range of organisations were consulted as part of the EIA scoping process including Natural England, North York Moors National Park Authority (NYMNPA), and the Industry Nature Conservation Association (INCA), who are currently working closely with ICL Boulby to manage the landholdings at Boulby Mine to monitor, maintain and enhance habitats and species on the Mine Site.
- 9.3.2 Table 9.2 below summarises the key biodiversity issues that were raised during consultation and how they have been addressed within the ES.

Table 9.2 Consultation Responses

Consultee	Summary of Response	Addressed in the ES
Natural England (NE)	ES should assess potential for the works to affect statutory designated sites (including North York Moors (NYM) SPA & SSSI), giving particular attention to the nitrogen deposition on the NYM SAC. All other potential impacts to NYM SAC can be scoped out due to the distance of the mine from the designated site ² .	Habitat Regulations Assessment (HRA) screening was carried out to assess nitrogen deposition on the NYM SAC & SPA. ES to assess direct and indirect impacts on statutory designated sites, and ascertain where a potential significant effect is possible.
	Agree that Boulby Quarries SSSI and Staithes-Port Mulgrave SSSI can be scoped out due to their geological features.	
	ES should assess likely impacts on non-statutory designated sites.	ES to assess direct and indirect impacts on non-statutory designated sites, and ascertain where a potential significant effect is possible.
	ES should assess likely impacts on protected species and habitats.	ES to assess direct and indirect impacts on protected species and habitats, and ascertain where a potential significant effect is possible.

¹ The 2018 Guidelines, covering both terrestrial and marine ecology, are essentially the 2016 Terrestrial Guidelines, plus marine components, e.g. marine case studies and examples, description of important marine ecological features, list of activities that can cause marine impacts, marine designations, reference to marine policy/legislation. The 2018 Guidelines also give emphasis to the particular marine context of EcIA, including the need to consider the dynamic nature of marine ecosystems during the assessment of marine impacts, and the principles of Adaptive Management (paragraphs 5.36 – 5.37). In addition, the 2018 Guidelines update the previous Guidelines in terms of changes in policy/legislation references, sources of information, etc.

² Email from Claire Argent (Natural England), to Frances Wilkinson (Wood) on 28th September 2017.



Consultee	Summary of Response	Addressed in the ES
		Standard best practice to be employed as appropriate for all survey work.
North York Moors National Park Authority (NYMNP)	<p>Satisfied with the scope of species and habitat surveys outlined in scoping report³. Stated that white-clawed crayfish are extremely unlikely to be found on or near the Mine Site. Recommended that harvest mouse survey take place.</p> <p>Given the North York Moors is suffering from atmospheric emissions, a habitat regulations assessment screening should be submitted.</p>	<p>White-clawed crayfish are scoped out in Table B.1; supporting information is provided together with the scoping opinion.</p> <p>A harvest mouse survey was carried out on the Mine Site in accordance with best practice (see Table 9.4)</p> <p>Standard best practice to be employed for all survey work.</p> <p>A habitat regulations assessment screening was carried out and provided in Appendix 9.N.</p>
INCA	<p>Satisfied with the scope of species and habitat surveys. Relevant surveys to be undertaken; given that INCA have already carried out some surveys as part of their collaboration with ICL Boulby for the site's BAP (INCA 2012), there is a requirement to avoid duplication.</p>	<p>Wood have liaised regularly with INCA, working closely to agree a programme of species and habitat surveys which had not already been undertaken on the Mine Site, and collaborating on some surveys to support INCA's work on the Mine Site. INCA have provided Wood with results from their respective surveys. Results from all surveys are produced and assessed within ES.</p> <p>Standard best practice (outlined in Table 9.5) to be employed for all survey work.</p>

Future Baseline

Following consultation with the NYMNP, it was determined that the predicted future baseline throughout the ES will be based on a "restored site" scenario: this consists of a 25 year period where the landscape within the Mine Site is maturing following restoration. This scenario assumes that closure of the mine would take place in 2023, at the end of the current planning permission. It is assumed that a subsequent two year decommissioning and restoration phase would follow the closure (2023-2025). It is then assumed that following this restoration phase, the Mine Site's landscape will be maturing, until 2048 when the restored site will have reached maturity/semi-maturity depending on the habitat type, as outlined below. This is to enable the NYMNP to gain a better understanding of what effects the mine has on the National Park, given that the current application effectively proposes to delay the decommissioning and restoration phase by ~25 years compared to the current permission. A brief overview summary of assumptions of habitats present within the future baseline is as follows, as shown on Appendix 3A (Restoration Concept) and described in the Implications of Scoping Opinion document (Wood, 2017):

- Following the decommissioning and restoration phase of the future baseline:
 1. No buildings would be present with the possible exception of a few features that may be left in situ as historic features;
 2. Mature wildflower meadows within the former operational area and adjacent areas;

³ Email from Rona Charles (Ecological Advisor, NYMNP), to Mark Hill (Head of Development Management, NYMNP) on 26th September 2017.



3. Species rich pasture to the north of the former operational areas, and fields to the east and west of the former operational area;
4. Near mature hedgerows bounding the species rich pasture fields mentioned above and the arable fields;
5. Stands of semi-mature broad-leaved woodland within the former operational area and to the east of the former operational area (currently pasture);
6. Stands of coastal scrub to the east of the former operational area adjacent the planted woodland mentioned above (currently pasture);
7. The opening up of the existing culverts to create open water courses as well as flushes and ponds.

- 9.3.3 Given that the EcIA assessment is based on surveys and data gathered to date (November 2017), it cannot therefore be taken as a precise picture of the potential presence and significance of important biodiversity receptors that could be affected by the proposed scheme for the future baseline due to the changing conditions which would result from that scenario. Within the next 31 years, factors such as legislation and climate conditions may change, habitats/species that are currently protected and/or are considered notable may not be in 2048, while similarly, species may become protected/notable that are not currently considered to be. As such, assumptions have been made within this ES regarding the potential presence of important biodiversity receptors for the future baseline. The assumptions have been based on the current legislation, baseline survey data, and professional judgement. For example, "reptiles" as a receptor was recorded during 2017 within the mosaic of grassland, scrub and woodland within the southern area of the Mine Site, and it would therefore be reasonable to assume reptiles are likely to be present within the wildflower meadows/woodland habitat expected on the former operational area in the future baseline.
- 9.3.4 Furthermore, given the possibility of legislation/species changes relating to the future baseline, important biodiversity receptors will be considered at a relatively high taxonomic level rather than for particular species. For example, "amphibians" will be considered as the receptor, rather than focussing on "common toad".
- 9.3.5 In addition, due to the potential for legislation change within the next ~30 years, and the fact that it is only possible to make assumptions on what will be present on the Mine Site in 2048, it is not possible to carry out a detailed assessment of the potential significance of effects in relation to the proposed development when considered against the future baseline from 2025 onwards (when the future baseline would be in the aftercare and semi-mature phases).
- 9.3.6 Broad assumptions have therefore been made on the value of ecological receptors during these later phases in the future baseline. These assumptions have been made based on the information gained from the current baseline conditions in the non-operational areas of the Mine Site, and the nearby off-site areas. Professional judgement on how the current baseline would evolve, and how the restoration plans would complement and interact with these conditions, has therefore been used to make the assumptions on value. As such, the predicted restored site future baseline is not subject to the methodology for identifying and assessing effects described below in Sections 9.3.10-9.3.23, and is not therefore assessed within Section 9.6 Scope of Assessment, but instead is only assessed within Section 9.8 Predicted Effects: restored site.
- 9.3.7 Likewise, the demolition and landform creation assessment uses those receptors deemed to potentially be significantly affected within the decommissioning and restoration phase of the future baseline. This is because the aforementioned phase is the equivalent of the decommissioning and restoration phase, but 25 years later on. For similar reasons mentioned above, professional judgement has been used to assume the same biodiversity issues that are relevant for the

decommissioning and restoration phase will still be relevant for the demolition and landform creation phase.

Data Gathering Methodology

- 9.3.8 A data-gathering exercise was undertaken to obtain any available information relating to statutory and non-statutory biodiversity sites, priority habitats and species, and legally protected and controlled species (Boxes 1 and 2). These are the sites, habitats and species that are of sufficient importance that effects upon them could be significant, and are therefore the focus of this chapter.

Designated biodiversity sites, and priority habitats and species

Statutory biodiversity sites

Internationally important sites (collectively referred to in this report as European sites – whilst recognising that Ramsar sites are designated at a global level): Special Area of Conservation (SACs), candidate SACs, Sites of Community Importance (SCIs), Special Protection Areas (SPAs), listed or proposed Ramsar sites, potential SPAs, possible/proposed SACs and sites identified or required as compensatory measures for adverse effects on other European sites

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not European sites; also National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as biodiversity. Their level of importance is defined by their other statutory or any non-statutory designations (e.g. if an LNR is also an SSSI but is not a European site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of borough/district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Sites of county importance: Non-statutory nature conservation sites in North Yorkshire are notified as Local Wildlife Sites (LWS)

Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England are identified as of national species/habitat importance reflecting the fact that the importance of these species/habitats has been defined at a national level. The level of importance pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued (other than for waterfowl, for which thresholds have been defined for national/international 'population importance').

- International importance: populations of species or areas of habitat for which European sites are designated;
- International importance: populations of birds meeting the threshold for European importance (1% of the relevant international population);
- National importance: Priority habitats and species of principal importance for the conservation of biological diversity in England. These are listed on: <http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/prioritylist.aspx>;
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern Red List⁴;
- National importance: Nationally Rare and Nationally Scarce species, which are species recorded from, respectively, 1-15 and 16-100 hectads (10x10km squares of the national grid);
- National importance: Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available);
- Local importance: Habitats and species listed in the Local BAP.

⁴ Eaton M.A., Brown A.F., Noble D.G., Musgrove A.J., Hearn R., Aebischer N.J. Gibbons D.W., Evans A. and Gregory R.D. (2009). Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 102, pp296-341.



Legally protected and controlled species

Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this ES, legal protection refers to:

- Species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding:
 - ▶ Species that are only protected in relation to their sale (see Section 9[5] and 13[2]), given that the proposed development does not include any proposals relating to the sale of species, and
 - ▶ Species that are listed on Schedule 1 but that are not likely to breed on or near the site, given that this schedule is only applicable whilst birds are breeding;
- All breeding birds as detailed within *Wildlife and Countryside Act 1981* (as amended) Part 1;
- Species included on Schedules 2 and 5 of the *Habitats Regulations 2017*;
- Badgers, which are protected under the *Protection of Badgers Act 1992*; and
- Hedgerows, some of which are protected under *The Hedgerow Regulations 1997*.

Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it is an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

9.3.9

Given the potential for the Proposed Development to affect biodiversity resources located off- as well as on-site, data were obtained for:

- Statutory sites of biodiversity interest located on or within 10km of the Mine Site of the proposed development;
- Non-statutory sites of biodiversity interest located on or within 5km of the Mine Site;
- Records of priority habitats and priority, legally protected and controlled species to a distance of 5km from the Mine Site boundary; and
- Water bodies (potential great crested newt breeding habitat) located on or within 0.5km of the Mine Site⁵.
- Sources of desk study information are listed in Table 9.3.

Table 9.3 Source of Desk Study Information

Information obtained	Source of information
Statutory biodiversity sites	Multi-Agency Geographic Information for the Countryside (MAGIC) website (http://magic.defra.gov.uk/home.htm)
Non-statutory biodiversity sites	North-east Environmental Records Information Centre (ERIC)
Ancient woodland and priority habitats	MAGIC website, Tees Valley and Boulby Mine BAPs
Records of legally protected and priority species	ERIC v-c 62 North-east Yorkshire BSBI (Botanical Society of Britain & Ireland INCA Tees Valley and Boulby Mine BAPs

⁵ The basis for selecting these areas of search is set out in Box 4.

Information obtained	Source of information
Water bodies (potential great crested newt <i>Triturus cristatus</i> breeding habitat)	1:10,000 scale OS maps, MAGIC aquatic priority habitats and aerial photographs of the area (obtained from the website MAGIC and Google Earth)

9.3.10 A summary of the ecological surveys carried out to inform the preparation of this chapter is provided in Table 9.4. The detailed methodologies for, and results of, these surveys can be found in Appendices 9.E-9.M and, for badger, in a confidential badger appendix (Appendix 9.L)⁶. The scope of surveys undertaken was agreed in consultation with INCA, NYMNPA and NE. Survey methodologies were developed with reference to standard guidance as detailed in Section 9.12.

Table 9.4 Baseline Surveys

Survey requirement	Survey specification	Survey area	Date of survey	Location of survey report in this ES
Extended Phase 1 habitat survey	Habitat mapping following JNCC Handbook for Phase 1 Habitat Survey 2010 and habitat assessments for protected/notable species	Mine Site and surrounding land (to ~50m where access allowed)	September 2016 - August 2017 & October 2019	Appendix 9.E
Important hedgerows	Hedgerows were assessed during the extended Phase 1 habitat survey to identify whether any hedgerows are likely to be classed as 'important' under the Hedgerow Regulations 1997	Mine Site	September-October 2016	Appendix 9.E
Non-native species	Presence recorded during the extended Phase 1 habitat survey and other taxa surveys	Mine Site	September 2016-October 2017	Appendix 9.E
Habitats and plants	National Vegetation Classification (NVC) and rare plant survey (Hill, 2012 and Rodwell, 1990-2000)	Species-rich woodlands and grassland within the Mine Site	July-August 2017	Appendix 9.F
Badger*	Presence/ likely absence survey in accordance with best practice guidance (The Inverness Badger Survey, 2003, and Scottish Natural Heritage Best Practice Badger Survey Guidance Note methodology, 2006)	Mine Site and surrounding land (to ~30m where access allowed)	February-September 2017	Confidential Appendix 9.L

⁶ Information about badgers is treated as confidential given that if such information was in the public domain, it could be used by people who partake in illegal activities relating to badgers or their setts.

Survey requirement	Survey specification	Survey area	Date of survey	Location of survey report in this ES
Bats*	Preliminary ground level roost assessment of buildings and structures for bat roost potential in accordance with current BCT guidelines (2016)	All buildings within the Mine Site	August 2017	Appendix 9.G
	Emergence/re-entry survey of buildings in accordance with current BCT guidelines (2016)	All buildings within the Mine Site	August-October 2017	Appendix 9.G
	Bat box check in accordance with current BCT guidelines (2016)	All bat boxes within the Mine Site	August 2017	Appendix 9.G
	Static automated bat activity survey in accordance with current BCT guidelines (2016)	Mine Site only	May-October 2017	Appendix 9.G
	Bat activity transect survey in accordance with current BCT guidelines (2016)	Representative habitats within the Mine Site	May-October 2017	Appendix 9.G
	Autumn swarming survey* in accordance with current BCT guidelines (2016)	Tunnels and mines on site	September-October 2017	Appendix 9.G
	Autumn swarming static automated survey in accordance with current BCT guidelines (2016)	Tunnels and mines on site	September-October 2017	Appendix 9.G
Birds	Breeding bird territory mapping survey	Site and surrounding 250m buffer zone	April-June 2017	Appendix 9.M
	INCA Breeding bird survey (2006), casual bird records (2009-2013), nest box survey (2007) and additional records in BAP document.*	Mine Site and surrounding land.	2006-2013	Appendix 9.M
Great crested newt	Assessment of water bodies' suitability for great crested newt in accordance with Oldham <i>et al.</i> (2000) and English Nature (2001)	All water bodies on the Mine Site and surrounding land (to ~500m)	April 2017	Appendix 9.H
	Presence/likely absence survey eDNA in accordance with Biggs <i>et al.</i> (2015)	All water bodies assessed as suitable on the Mine Site and surrounding land (to ~500m)	April 2017	Appendix 9.H

Survey requirement	Survey specification	Survey area	Date of survey	Location of survey report in this ES
Otter*	Presence/likely absence survey based on principles outlined in Chanin (2003)	Watercourses and ditches within the Mine Site	February 2017	Confidential Appendix 9.L ⁷
Reptiles**⁸	Presence/likely absence survey in accordance with Sewell <i>et al.</i> (2013) and Herpetofauna Workers Manual (2003)	Area of mosaic grassland, scrub and woodlands within the Mine Site	April-June 2017	Appendix 9.I
Invertebrates*	Targeted presence/likely absence survey for butterflies and moth priority species relevant to the Mine Site. Presence also recorded via incidental records during above surveys	Appropriate habitats were searched during flight periods associated to the target species	April 2008-September 2017	Appendix 9.K
Harvest mouse*	Presence/likely absence survey in accordance with Cresswell <i>et al.</i> (2012)	Representative tussocky grassland areas around the Mine Site	October 2017	Appendix 9.J
Brown hare*	Presence/likely absence survey carried out during bat and badger surveys, in accordance with Cresswell <i>et al.</i> (2012). Presence also recorded via incidental records during above surveys	Mine Site	May-October 2017	Appendix 9.J
Other priority species: European hedgehog*	Presence/likely absence survey carried out during bat surveys, in accordance with Cresswell <i>et al.</i> (2012). Presence also recorded via incidental records during above surveys	Mine Site	May-October 2017	Appendix 9.J
Other priority species: common toad*	Presence/likely absence survey carried out during GCN and reptile surveys. Presence also recorded via incidental records during above surveys	Mine Site	April-June 2017	Appendix 9.J

*denotes surveys that INCA either carried out or collaborated with.

⁷ INCA produced a single report detailing the otter and badger survey results. This can be seen in Appendix C within the Confidential Appendix 9.N.

⁸ INCA carried out the reptile surveys and confirmed this was carried out in accordance to best practice guidance. They provided Wood with the results on 13th June 2017. No report was produced so only the results of the surveys are presented within Appendix 9.J.

Methodology for Identifying and Assessing Effects

- 9.3.11 The starting point for the assessment was to undertake a scoping exercise, using the baseline data that were collected through the desk study and field surveys (see Section 9.3), to subdivide the recorded biodiversity receptors (i.e. designated sites, together with species populations and habitats) into:
- Those that could be significantly affected by the proposed development or for which the development could result in the contravention of relevant legislation, and that therefore required more detailed assessment; and
 - Those that were assessed as not being likely either to be significantly affected or for relevant legislation to be contravened, and that did not therefore require further assessment (i.e. that were 'scoped out' of the assessment).
- 9.3.12 The first stage of the approach that was used for differentiating these receptors involved determining:
- Which, if any, of the species that have been recorded are legally protected or controlled (see Box 2); and/or
 - Which, if any, sites, areas of habitat and species that have been recorded are of importance for biodiversity conservation, notwithstanding any legal protection that they may have (see Box 1).
- 9.3.13 For sites/habitats/species that are important for biodiversity conservation, the next stage of the scoping assessment was to determine whether the identified receptors are likely to be of sufficient 'biodiversity conservation value' that an effect upon them could be significant in EIA terms. In this context:
- Biodiversity conservation value relates to the quality and/or size of sites or habitats, or the size of species populations (see Box 3); and
 - Potential significance means that the effect could be of sufficient concern, or for positive effects, of such substantial benefit, that it could influence the decision about whether or not planning permission/a specified consent should be granted.

Value and importance for biodiversity conservation

The distinction between importance and value can be illustrated by common species such as the house sparrow. This species is important at a national level because it is a priority species (Section 41, NERC Act 2006). However, a small population that could be affected by a development would often be assessed as being of insufficient value for an effect (whether adverse or beneficial) to be of potential significance. On this basis it would not need to be assessed further within the ES (i.e. it would be 'scoped out' of the assessment).

- 9.3.14 Receptors that are of sufficient value that an effect upon them would have the potential to be significant, together with all relevant legally protected species, were then taken through to the next stage of the scoping assessment. This involved:
- Identifying, for each receptor, any environmental changes that are likely to be caused by the proposed development (allowing for cumulative changes associated with other developments that are already built, are under construction or are likely to be constructed), which have the potential to lead to a significant effect and/or to contravene relevant legislation;
 - For these environmental changes, determining the area within which each change could cause a potential significant effect on each relevant receptor and/or could contravene relevant legislation (i.e. an 'ecological zone of influence' - see Box 4);

- Comparing the area where the receptor occurs with the ecological zone of influence, recognising that the receptor may be wholly or partly associated with an area located outside of the Mine Site of the proposed development (e.g. where a species breeds off-site but its foraging area includes the Mine Site or off-site areas that would be affected by the proposed development); and
- If the receptor occurs or is likely to occur within the zone of influence, concluding that
 8. Either the receptor could be subject to a significant effect and/or the relevant legislation could be contravened - with the result that the receptor has been taken forward for more detailed 'post-scoping assessment';
 9. Or, if the environmental changes that could affect the receptor are insufficient for there to be a potential significant effect (allowing for cumulative effects), the receptor has been scoped out of the assessment.

Defining ecological zones of influence

The ecological zone of influence that is the most straightforward to define is the area affected by land-take and direct land-cover changes associated with the development. This zone is the same for all affected receptors. By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (e.g. changes in noise associated with development activities within the land-take area), the zone of influence may vary between receptors, dependent upon the receptors' sensitivity to the change and the precise nature of the change.

For example, badger might be unaffected by noise associated with a development unless the noise is generated very close to where the badger resides, while another mammal species might be disturbed at much greater distances; other species (e.g. of invertebrate) may be unaffected by changes in noise. A further complication is that the response of a receptor to a change associated with one development may differ to the response of the same receptor to a similar change on another development. This can occur as a result of the wide range of variables that influences the precise nature of any change (e.g. for noise this can include: differing baseline noise conditions; specific magnitude, timing or other characteristics of the noise; and the effects of screening and topography).

In view of these complexities, the definition of the zones of influence that extend beyond the land-take area was based upon professional judgement, informed by discussions with the technical specialists who were working on other chapters of the ES. These specialists provided information about the environmental changes that they assessed in their ES chapters. This information was then combined with available ecological information about receptors' sensitivities to different environmental changes in order to define the extent of each ecological zone of influence. The potential outcome of this was that a zone of influence could be so extensive that a larger than expected species population or area of habitat could be affected, which in turn could lead to a potential significant effect being identified when it was previously assessed that this would be unlikely. In light of this possibility, it was necessary to review the list of receptors that were initially scoped out to determine whether any of them should be scoped back into the assessment on the basis of a larger area/population being affected by the scheme.

Equally, if a zone of influence extended beyond the area that was initially used for baseline data collection, there would be a need to review additional data in order to identify if there were any receptors located further away that could be subject to a significant effect.

Methodology for Prediction of Effects

- 9.3.15 The assessment is based upon not only the results of the desk study and field surveys, but also relevant published information (on potential biodiversity receptors' status, distribution, sensitivity to environmental changes and ecology), and professional knowledge of ecological processes and functions.
- 9.3.16 For each scoped-in receptor (see Table 9.6), effects were assessed against the predicted baseline conditions for that receptor during operation, decommissioning and restoration.
- 9.3.17 Throughout the assessment process, findings about potential significant effects were used to inform the definition of requirements for additional baseline data collection and the identification of environmental measures that the developer has agreed to incorporate into the scheme design (in order to avoid or reduce adverse effects or to deliver enhancements - see Section 9.5). The results of the assessment, as set out later in this chapter, reflect the final scheme design (i.e. incorporating the environmental measures).

- 9.3.18 The spatial extent of the assessment of each potential significant effect reflects the area occupied by the receptor that is being assessed and the zone of influence associated with the environmental changes that are likely to affect the receptor (see Box 4). Thus, if part of a designated biodiversity site is located within the ecological zone of influence relating to a particular environmental change, an assessment was made of the effects on the Mine Site as a whole. A similar approach was taken for areas of notable habitat. For species that occur within an ecological zone of influence that relates to a change that could significantly affect the species, an assessment was carried out on the total area that is used by the affected individuals or population of the species (e.g. for foraging or as breeding territories).
- 9.3.19 For each receptor, the assessment deals, in an integrated way, with the effects of the proposed development against operational, decommissioning and restoration, and the restored site.

Significance Evaluation Methodology

Negative Effects

- 9.3.20 For habitat areas and species, an effect is assessed as being significant if the favourable conservation status of a receptor would be compromised by the proposed development. Conservation status is defined by the CIEEM guidelines as follows:
- “Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area”; and
 - “Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.”.
- 9.3.21 The decision as to whether the conservation status of each specified biodiversity receptor has been compromised has been made using professional judgement, drawing upon the results of the assessment of how each receptor is likely to be affected by the proposed development.
- 9.3.22 A similar procedure has been used for designated sites that are affected by the development, except that the focus is on the effects on the integrity of each site, defined by the CIEEM guidelines as *“the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified”*. The assessment of effects on integrity draws upon the assessment of effects on the conservation status of the features for which the site has been designated. Where these features are not clearly defined (for example non-statutory biodiversity sites), it was necessary to use our professional judgement to identify the interest features.

Positive Effects

- 9.3.23 A positive effect is assessed as being significant if development activities are predicted to cause:
- An improvement in the condition of a habitat/species population from unfavourable to unfavourable recovering or favourable (noting that condition data are only available for SSSIs but that professional judgement has been used to apply the same principle to habitats/species elsewhere); or
 - Partial or total restoration of a site’s favourable condition.
- 9.3.24 If a species population, habitat or site is already in favourable condition, it is still possible for there to be a significant positive effect. There is, however, no simple formula for determining when such

effects are significant and decisions about significance therefore have to be made on a case by case basis using professional judgement.

9.4 Baseline

Current Baseline

Statutory Nature Conservation Sites

- 9.4.1 There is one SAC and SPA within 10km of the Mine Site (North York Moors, located ~2.51km to the south). There are two biological SSSIs within ~5km of the Mine Site (North York Moors, located ~2.51km to the south). There are three biological LNRs within ~5km of the Mine Site. The locations of these statutory sites are shown in Appendix D within Appendix 9.E.
- The North York Moors SPA is located approximately 2.5km to the south-east of the Site at the closest point. The SPA citation states that "during the breeding season, the area regularly supports: merlin - at least 2.7% or 35 pairs of the GB breeding population (1996); and golden plover - [North-western Europe - breeding] at least 2.3% or 526 pairs of the GB breeding population (1996)";
 - The North York Moors is also designated as a SSSI and the citation states the following in relation to birds "The site supports a nationally important assemblage of moorland breeding birds including merlin, golden plover, snipe, curlew, redshank, whinchat, ring ouzel, hen harrier, peregrine and short-eared owl";
 - The Tranmire Bogs SSSI is located approximately 3km to the south-east of the Site and in addition to botanical interest it supports breeding birds including snipe, curlew and redshank.

Non-Statutory Nature Conservation Sites

- 9.4.2 There are 23 Local Wildlife Sites within ~5km of the Mine Site; two LWSs are situated within the Mine Site boundary; Oneham's Pasture and Easington Beck Complex (see Appendix E in Appendix 9.E).

Habitats

Site Context and Surrounding Habitats

- 9.4.3 The Mine Site is ~127ha in size and is set in a predominately agricultural area between the villages Easington and Staithes in North Yorkshire; there are large areas of woodland to the east and south of the Mine Site. The Mine Site consists of two parcels of land; the larger southern area that comprises the mining operational area, and a smaller area ~150m to the north that contains pump room buildings for the main tailings; this smaller northern area is referred to as the pump house site. The northern boundary of the smaller area abuts onto the coastal cliffs.

On-Site Habitats

- 9.4.4 The operational area is situated within the centre of the larger southern area of the Mine Site and is ~32ha, comprising mostly hardstanding, bare ground and industrial buildings, with occasional areas of ephemeral/short perennial vegetation, amenity and poor-semi improved grassland. To the south, west and east of the operational area, but within the Mine Site, is plantation semi-mature woodland (broad-leaved, mixed and coniferous). Within the woodland to the south-east is a cleared

area that contains a mosaic of grassland (semi-improved neutral and unimproved neutral) and scrub. An additional area of scrubby woodland is situated to the north of the Mine Site. Areas of grassland and scrub are located to the east of the Mine Site. The western side of the Mine Site contains poor-semi improved grassland (cattle grazed) and arable fields; these fields are bounded by scattered scrub/defunct hedgerows. Areas of recently planted trees are located to the north and east of the Mine Site. Easington Beck runs through the woodland to the east, which is fed into by Boulby Gill and Newton Gill.

- 9.4.5 The smaller pump house area to the north comprises poor semi-improved grassland and two buildings, with a hardstanding track flanked by tall ruderal vegetation. The northern boundary that adjoins to the North Sea is maritime cliff.
- 9.4.6 The distribution of the habitats is shown on the Phase 1 Habitat map (see Figure 3.2 in Appendix 9.E).

Species

- 9.4.7 The field surveys have identified the presence of the following legally protected and/or priority species on or adjacent to the Mine Site:
- Breeding Schedule 1 birds – black redstart, barn owl and kingfisher;
 - Breeding birds – NERC Section 41 list: skylark, song thrush, dunnoek, house sparrow, tree sparrow, linnet, bullfinch, yellowhammer, wood warbler;
 - Breeding birds – BoCC red list: herring gull, marsh tit, mistle thrush, grey wagtail, pied flycatcher;
 - Nesting birds;
 - Bats:
 - ▶ Bat roosting: Operational Area: Single common pipistrelle roost present in building 6 supporting a single common pipistrelle. All buildings within the operational area are not considered suitable for maternity purposes, buildings 2, 12, 60 and 61 are considered to have low to moderate hibernation potential;
 - ▶ Bat Roosting: Mine Site: ~twenty two brown-long eared bats in the disused mineral line tunnel were recorded during emergence survey and bat box checks (bat box 14 and bat box 17) during surveys in 2017. Single common pipistrelle was recorded roosting in bat box 2, single *Myotis* sp. was recorded in bat box 1 and four whiskered bats were recorded in bat box 19 during bat box checks in 2014. Single common pipistrelle was recorded roosting within the disused mine shaft during 2017. Single potential *Myotis* sp. roosting within the disused mine adjacent the archaeological dig during 2017;
 - ▶ Bat assemblage: Bat transect and static/automated surveys within the Mine Site recorded the following species common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Leisler's, brown long-eared and *Myotis* sp. Nathusius' pipistrelle and Leisler's were recorded on static detectors only in very small numbers (~0.14-1.5 mean number of files per night and 0.03 mean number of files per night respectively at a single static detector location). Common pipistrelle were the most common species onsite recorded, with up to 257 mean number of files per night at SM4 detector location 2. Good numbers of *Myotis* sp. were recorded within deciduous woodland, 98.5 mean number of files per night at SM4 detector location 3. No bats were recorded within the operational area during transect surveys, all bat activity was focussed within woodland, scrub and pasture. The only species recorded within the operational area are common pipistrelle and noctule during the suite of

emergence surveys. Data recorded during the swarming season at three potential swarming sites within woodland did not indicate any potential swarming activity of any species.

- Great crested newt;
- Otter;
- Reptiles (slow worm);
- Invertebrates (including bloomers rivulet, brown-spot pinion, dingy skipper, grayling, green-brindled crescent, shaded broad-bar, small pearl-bordered fritillary, small phoenix, wall, white ermine, and white-letter hairstreak);
- Brown hare;
- Brown trout;
- Common toad;
- European hedgehog;
- Non-native invasive plant species (including giant hogweed, grey squirrel, montbretia and rhododendron); and
- Plants (plants (including bristly ox-tongue, sea pearlwort, water whorl-grass, wood vetch, common valerian, goldenrod, sanicle, common quaking-grass and tormentil).

9.4.8 Further details on the findings of the field surveys together with the results of the biological desk study are set out in Appendix 9.E-9.M (the badger and otter survey results are included in confidential Appendix L).

Future Baseline

9.4.9 The current permission for the mine expires in 2023, and if the Proposed Development is not approved then the future baseline would see the Mine Site undergo a decommissioning and restoration phase (2023 to 2025). This will incorporate decommissioning of the mine, site clearance, ground reprofiling, and soil replacement. A five year aftercare period (2025-2030) will then include hedgerow, scrub, woodland, and wildflower meadow planting. It is envisaged by 2048 the wildflowers, pasture and hedgerows will have matured, while the woodland will be semi-mature (Mature restored site). These phases will be used to determine the anticipated biodiversity value of the future baseline.

- Further information on the assumptions made on the future baseline scenario is provided in Section 9.8 against each relevant receptor group.

9.5 Design Evolution

Environmental Measures Incorporated into Proposed Scheme

9.5.1 The environmental measures that have been incorporated into the scheme in order to avoid or reduce potential adverse effects on biodiversity, to prevent breaches of the legislation listed in Section 9.2.2, compensate for adverse effects and/or deliver environmental enhancement, are listed below. Information on how these measures would be implemented is provided in Section 9.11.

9.5.2

General principles of mitigation that are to be followed during the entire lifecycle of the proposed development are summarised below, followed by receptor specific measures which are described in Table 9.5.

- All activities would be subject to standard best practice mitigation measures employed to avoid and minimise potential effects to habitats and species under the supervision of an appointed project ecologist where necessary. This will include buffer zones to key habitats and species, minimising the removal of vegetation, and considered location of works;
- Activities would aim to minimise the land take for works and locate (and micro-site) those works away from the more sensitive habitat and species receptors, particularly non-statutory designated sites, priority habitats, boundaries and watercourses, including ditches and hedgerows, as well as wetland features and florally diverse habitats, which will consequently limit effects on associated species interest;
- Where valued habitat loss is unavoidable, habitat removal would be timed and phased to minimise potential effects, and compensatory habitat created, or existing habitat enhanced in advance of the works. Habitat connectivity would be retained wherever possible by maintaining green corridors such as hedgerows and watercourses;
- For all options, existing field access points and watercourse crossings would be used for works traffic wherever possible. Where this is not feasible, trackway panels would be used in preference to stone roads;
- Any new access roads would avoid sensitive habitats or key areas of value to protected species wherever possible and the scale of any new accesses would be minimised;
- A minimum stand-off of ~2m from all watercourses and water bodies would be adopted if possible with a ~30m stand-off from larger watercourses including Easington Beck, excluding required access crossing points where appropriate method statement would be employed. Standard pollution prevention measures should be implemented during construction to prevent the pollution of surface water and groundwater and should be based on the Environment Agency's Pollution Prevention Guidance (PPG) notes⁹, the Groundwater Protection Policy (Environment Agency, 2013), CIRIA guidance (CIRA, 2001) and other current best practice. Should a new access over a watercourse be required, open-span bridges would be installed in preference to culverts where possible;
- Standard dust management measures in line with the Institute of Air Quality Management's dust management guidance should also be implemented;
- Pre-demolition and landform creation update surveys would be undertaken for all protected species and notable habitats.

⁹ Although now withdrawn, these still represent current best practice.

Table 9.5 Rationale for Incorporation of Environmental Measures

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Statutory designated sites	Damage and loss to/of qualifying habitats from atmospheric pollution (N deposition)	<p>Adhere to current conditions to the environmental permit controls that are in place throughout the working proposals. See also Boulby Mine HRA Screening Assessment (Wood, 2017) in Appendix N, and environmental measures within Chapter 3 Project Description and Chapter 7 Dust and Air Quality.</p> <p>A HMP will be produced for the Mine Site (which should also reflect recommendations within the Tees Valley and Boulby Mine BAPs), for enhancements during the workings, which may include the following:</p> <p>Habitat surveys of the survey area within the NYM SAC, including a baseline survey and repeat surveys in 2028, 2033 and 2043, to assess any changes from the initial baseline survey and to provide information to assist with the Natural England conservation objectives for this SAC.</p> <p>Boulby Mine will endeavour to assess ways to reduce the emission of nitrogen and will look to develop a plan in order to further reduce the effect of emissions within the surrounding area.</p> <p>Investigate the use of mitigation practices such as the planting of shelter belts to reduce the dispersal of emissions from the traffic associated with Boulby Mine.</p>



Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Non-statutory designated sites	Loss/damage of habitat, disturbance to qualifying features	<p>During the entire lifecycle of the proposed development, all habitats within non-statutory designated sites will be retained where possible. Should any habitat loss/damage be required (potentially during landform creation phase i.e. planting of woodland on grassland), advice from the project ecologist and the local authority should be sought immediately. Habitat loss will be kept to a minimum and fully reinstated. Habitat reinstatement would be outlined within a specific habitat management plan provided under condition.</p> <p>Throughout the proposed workings, demolition and landform creation, standard Pollution Prevention Guidelines (PPGs) (although these PPGs have been withdrawn, they are still relevant) will also be followed for works adjacent to non-statutory sites.</p> <p>Also see environmental measures within Chapter 3 Project Description and Chapter 7 Dust and Air Quality, and recommendations within the Flood Risk Assessment (Wood 2017) for proposed working activities.</p> <p>A HMP will be produced for the Mine Site for enhancements during the proposed working activities, including Oneham's Pasture, Easington Beck Complex, and the grasslands and woodland throughout the Mine Site, which may include the following:</p> <p>Oneham's pasture LWS:</p> <ul style="list-style-type: none"> Maintain the integrity of the neutral grassland; Maintain a suitable grazing regime; and Do not plant scrub within the LWS or allow scrub to encroach. <p>Easington Beck Complex LWS:</p> <ul style="list-style-type: none"> Maintain the integrity of the woodland; Ensure dead wood is left within the woodland; Carry out control programme for rhododendron.

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Habitats (all)	Changes to habitats	<p>During demolition and landform creation, changes to valued habitats have been avoided as part of the restoration design (for example, see invertebrates in relation to grayling habitat). If unavoidable, habitat loss would be kept to a minimum as far as practicable. Consideration would be given to retention/replacement of any of these habitats which are lost as part of the development, via offsetting or enhancements where appropriate.</p> <p>Following landform creation, the Mine Site would comprise additional areas of newly created habitat such as woodland, flower-rich grassland meadows, and hedgerows. These habitats would include open water surface channels (restored streams on previously culverted channels), and wetland flushes and ponds. These would be designed and managed as habitats for wildlife, including a five year after care period, and would support native trees and shrubs of local provenance. The addition of proposed native hedgerows throughout the Mine Site would also provide some linkage between the various habitats around the Mine Site, and to areas off-site; hedgerows will also be planted with native trees and shrubs.</p> <p>Where required, site-specific HMPs would be prepared for enhancements during the proposed workings, (in conjunction with the Mine Site's already pre-existing biodiversity action plan) for areas of valued retained semi-natural habitats, as well as the newly created habitats. The HMPs would set out the environmental measures that are needed to conserve and, where appropriate, enhance existing areas of valuable habitats, and to enhance the value of newly created habitats. A management mechanism would be put in place to ensure that the plan is implemented (e.g. by LPA or a management organisation as defined in Section 9.11).</p> <p>See measures for non-statutory sites.</p>
Watercourses and water bodies	Damage through pollution, dust	<p>All watercourses would have a minimum 2m buffer from any proposed workings, demolition and landform creation activities. All proposed workings, demolition and landform creation activities would adhere to current Substance Spill Management practices. Standard Pollution Prevention Guidelines (PPGs) will also be followed for works adjacent to water dependent habitats. Also see environmental measures within Chapter 7 Dust and Air Quality, and Chapter 3 Project Description, and recommendations within the Flood Risk Assessment (Wood 2017).</p> <p>During demolition and landform creation, three culverts running below the Mine Site will be uncovered and retained as open channels. These channels should adhere to best practice guidance recommendations to maximise their suitability for wildlife.</p>
Non-native invasive species	Potential spread of schedule 9 WCA (as amended) invasive species	<p>Any proposed workings, demolition and landform creation works within the vicinity of non-native invasive plant species (i.e. along access track towards the switch rooms and within the grassland adjacent the railway line) would follow an invasive species method statement and include a tool box talk by the project ecologist.</p> <p>Best practice would be employed throughout proposed workings, demolition and landform creation work, including implementing an appropriate buffer zone and fencing off contaminated areas. Should contaminated areas be affected, the method statement would include detailed removal and disposal plans and restrict the timing of removal to prevent the spread of the species.</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Badger	Damage/disturbance to habitats and individuals	<p>A ~30m buffer from any potential setts identified will be implemented and maintained at all times, with no workings activities or demolition and landform creation works taking place within this buffer unless advised otherwise . For consistency with other species a tool box talk would be included prior to the start of any workings, demolition and landform creation activities close to these buffer zones.</p> <p>In advance of the demolition and landform creation phase, a method statement would be prepared that would include details of pre-demolition surveys to check on the presence of badgers and the approach that would be followed to avoid contravening the Protection of Badgers Act 1992. If required, this would involve obtaining a Natural England licence with respect to development. Best practice guidelines would be followed during the works. This includes making all contractors aware of the potential presence of badgers, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered). Any obvious mammal trails will be kept clear of obstruction. All works to be undertaken between dawn and dusk where possible. The Mine Site will not be lit at night where possible.</p> <p>A mammal management plan would be produced as part of the overall HMP for enhancements during the proposed workings phase, for the Mine Site which may include the following:</p> <p>Monitoring surveys of the terrestrial mammal populations;</p> <p>Include fruiting plants/shrubs such as bramble into the hedgerow planting mix which will provide a foraging resource for badger;</p> <p>Improve the connectivity of the Mine Site to aid badger commuting and dispersal via gapping up the hedgerows. Additional hedgerow planting will be required to link the planted woodland within the former operational area following landform creation, in order to connect this woodland stand to the other woodlands across the Mine Site.</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Bat roosting: Operational Area	<p>Potential disturbance/damage to roosts</p> <p>Kill/injure individuals</p> <p>Destroy habitat</p>	<p>For consistency with other species a tool box talk would be included in advance of the demolition phase.</p> <p>A method statement would be prepared that would include details of pre-demolition verification surveys for bats, and would describe the approach that would be followed to avoid contravening the Wildlife and Countryside Act 1981 (as amended) (WCA) and The Conservation of Habitats and Species Regulations 2010. Where required, this would involve obtaining a Natural England licence with respect to development; this may be particularly pertinent to the bat roost in Building 6 (Building 6 can be seen on Figure 1.2 in Appendix 9.G). The method statement would also describe habitat enhancements to be implemented as part of the proposed development (including the installation of bat boxes) if required.</p> <p>Any workings, or demolition works on the tailings switch room should be carried out under a method statement to cover any residual risk of bats roosting within the building.</p> <p>A lighting strategy would be implemented to minimise the extent to which lighting associated with demolition activity affects areas of habitats on or in the vicinity of the Mine Site. This strategy would be informed by latest research and guidance. External lighting, including security lighting would be minimised during the hours of darkness where possible. Should Mine Site security lighting be required these would be on a timer and motion sensitive.</p> <p>Following updated surveys and in accordance with best practice guidance, and where roosts may be affected (e.g. demolition of building 6) all works will be in accordance with a Natural England development licence. This will include a detailed mitigation strategy to avoid and reduce the effects of disturbance and will ensure the loss or damage of any roost is appropriately mitigated.</p> <p>Demolition of any buildings with bat hibernation potential should be undertaken outside the hibernation period (~November to April inclusive).</p> <p>See measures for Bat roosting: Non-operational area</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Bat roosting: Non-operational area	Changes in condition and quality of bat roosts	<p>If the need to affect trees arises or any structures such as the mines or tunnels, advice would be sought from a suitably qualified ecologist, and additional bat survey, assessment and mitigation may be required. It is recommended that best practice guidelines are followed during the works.</p> <p>A bat management plan would be prepared as part of the overall HMP for the Mine Site for enhancements during the proposed workings phase, which may include the following:</p> <ul style="list-style-type: none"> Monitoring surveys of the bat populations and roosts; Continue maintaining the 24 bat boxes within the woodland and tunnels; Continue managing the woodland to support bat populations; Increasing the number of bat boxes within the woodland; Monitoring surveys of the bat populations and roosts, including the brown long-eared bats roosting within the disused mineral line tunnel; Improve the connectivity of the Mine Site to aid bat commuting and dispersal via gapping out the hedgerows, linking the woodlands and hedgerows together. Additional hedgerow planting will be required to link the planted woodland within the former operational area following landform creation, in order to connect this woodland stand to the other woodlands across the Mine Site.
Bat assemblage: Foraging and commuting within the Mine Site	Disturbance to foraging, commuting bats	<p>For consistency with other species a tool box talk would be included in advance of the demolition phase. A method statement would be prepared that would describe the approach that would be followed to avoid contravening the Wildlife and Countryside Act 1981 (as amended) (WCA) and The Conservation of Habitats and Species Regulations 2010. Where required, this would involve informing contractors of the presence of bats, and minimising work throughout the Mine Site from dusk to dawn.</p> <p>A lighting strategy would be implemented to minimise the extent to which lighting associated with demolition activity affects areas of habitats on or in the vicinity of the Mine Site. This strategy would be informed by latest research and guidance. External lighting, including security lighting would be minimised during the hours of darkness where possible. Should Mine Site security lighting be required these would be on a timer and would be motion sensitive.</p> <p>Improve the connectivity of the Mine Site to aid bat commuting and dispersal by gapping out hedgerows. Hedgerows should connect different parcels of woodland and habitats throughout the Mine Site, including the planted woodland within the former operational area following landform creation.</p> <p>See measures for Bat roosting: Non-operational area</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Great crested newts	Damage/disturbance to habitats and disturbance/injuring/killing of individuals	<p>For consistency with other species a tool box talk would be included in advance of the demolition and landform creation phase.</p> <p>A method statement would be prepared that would include details of pre-demolition verification surveys for GCN, and would describe the approach that would be followed to avoid contravening the Wildlife and Countryside Act 1981 (as amended) (WCA) and The Conservation of Habitats and Species Regulations 2010; particularly relating to the demolition work (e.g. soil profiling of the bund) near Pond 1. Where required, this would involve obtaining a Natural England licence with respect to the proposed development. The method statement would also describe habitat enhancements to be implemented as part of the proposed development if required.</p> <p>If the need to affect ponds arises, advice would be sought from a suitably qualified ecologist, and additional GCN survey, assessment and mitigation may be required. It is recommended that best practice guidelines are followed during the workings and demolition and landform creation works.</p> <p>An amphibian management plan would be produced as part of the overall HMP for the Mine Site for enhancements during the proposed workings, which may include the following:</p> <p>Monitoring surveys of the amphibian populations;</p> <p>Where possible, leave an uncut margin of vegetation ~5m width around pond margins;</p> <p>Create 10x hibernacula piles adjacent and within the vicinity of the ponds/watercourses on the Mine Site. This could be in accordance with Froglife activity sheet (http://www.froglife.org/wp-content/uploads/2015/09/Hibernacula.pdf?x97996);</p> <p>Improving the habitat and phasing the habitat creation both immediately around and within the vicinity of the ponds/watercourses to incorporate suitable habitat, including refuging, hibernation and foraging (e.g. scrub, rough grassland and woodland as described in the great crested newt mitigation guidelines by Natural England (2001) and the great Crested Newt Conservation Handbook (Froglife, 2001);</p> <p>During demolition and landform creation, ensure the ponds/flushes are designed so they are suitable for amphibians as described in the great crested newt mitigation guidelines by Natural England (2001) and the great Crested Newt Conservation Handbook (Froglife, 2001). This includes for example having a surface area between 100 and 300m², a depth up to ~4m, and planted with suitable egg laying aquatic plants of local provenance such as water mint;</p> <p>Improve the connectivity of the Mine Site to aid GCN commuting and dispersal by gapping out hedgerows and creating wide rough hedgerow margins. Hedgerows should connect different parcels of woodland and habitats throughout the Mine Site, including the connection of ponds to suitable terrestrial habitat within the former operational area following landform creation;</p> <p>Will eventually entail connecting the planted woodland within the former operational area to the hedgerows and woodlands throughout the Mine Site following landform creation, and connecting the ponds/flushes across the Mine Site.</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Otter	Disturbance, killing/injuring/ /destruction of habitat	<p>No works within ~5m of any watercourse without approval by a suitably qualified ecologist during proposed workings, demolition and landform creation activities.</p> <p>A pre-works check for holts and resting sites to be undertaken at each works location prior to any activities.</p> <p>The footprint of any working areas along watercourses should be as minimal as possible. Method statement and tool box talks may be required to avoid contravening the WCA (as amended) and The Conservation of Habitats and Species Regulations 2010. Best practice guidelines would be followed during all phases of the project. This includes making all personnel aware of the potential presence of otters, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered). Any obvious mammal trails will be kept clear of obstruction. All works to be undertaken between dawn and dusk where possible. The Mine Site will not be lit at night where possible.</p> <p>A mammal management plan would be produced as part of the overall HMP for the Mine Site for enhancements during the proposed workings, which may include the following:</p> <p>Otter monitoring surveys would be carried out, as defined within the proposed HMP.</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Reptiles	Low risk of killing/injuring small numbers.	<p>In advance of the demolition and landform creation phase, a method statement and tool box talks are required to avoid contravening the WCA (as amended). Best practice guidelines would be followed during all phases of the project. This includes making all personnel aware of the potential presence of reptiles, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered).</p> <p>Where there is potential for reptiles, within areas of the Mine Site that would be affected by the proposed development during the workings, demolition and landform creation phase. Any habitat removal work in these areas would be supervised by a suitably qualified ecologist, and carried out according to a method statement. This will be designed to avoid the risk of injury to reptiles, through environmental measures such as timing ground works to avoid the reptile hibernation period and the gradual removal of habitat, which would allow reptiles passively to move away from the affected areas to avoid contravening the WCA (as amended). Should any areas of potential hibernacula/refugia be affected (e.g. log/brush/rubble piles) these would be removed by hand under ecological supervision outside the hibernation period.</p> <p>In the event that reptiles need to be captured and translocated, they would be moved to newly created habitats on Mine Site or within the already pre-existing adjacent suitable habitat, which would be designed to provide good quality reptile habitat (e.g. with hibernacula, compost heaps, log/brush piles and basking areas).</p> <p>A reptile management plan would be produced as part of the overall HMP for the Mine Site for enhancements during the proposed workings, which may include the following:</p> <ul style="list-style-type: none"> Monitoring surveys of the reptile populations; Managing the existing grassland/scrub/woodland mosaic habitats so it incorporates suitable habitat for all reptile life stages; Limit scrub encroachment within the habitat mosaic to the south of the Mine Site in order to preserve a balance of suitable habitats for basking, foraging and refuging; Create 10x hibernacula throughout the Mine Site, including the periphery of the operational area (see great crested newt); Improve the connectivity of the Mine Site to aid reptile commuting and dispersal by gapping up hedgerows and creating a rough wide hedgerow margin with species to be defined within the HMP. Hedgerows should connect different parcels of woodland and habitats throughout the Mine Site. Additional hedgerow planting will be required to link the woodland planted within the former operational area to the woodlands across the Mine Site following demolition and landform creation.

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Brown hare	Low risk of killing through prohibited methods	<p>Brown hare would be included within a method statement which would include best practice guidelines would be followed during the demolition and landform creation works. This includes making all contractors aware of the potential presence of brown hare, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered). Any obvious mammal trails will be kept clear of obstruction. All works to be undertaken between dawn and dusk where possible. The Mine Site will not be lit at night where possible.</p> <p>See measures for badger.</p>
Brown trout (aquatic notable fauna)	Changes to habitats during decommissioning and restoration (including 2048 restored site) affecting population; pollution	<p>All watercourses would have a 2m buffer from any proposed workings, demolition and landform creation activities.</p> <p>During proposed workings, demolition and landform creation phase, adhere to current Substance Spill Management practices. Standard Pollution Prevention Guidelines (PPGs) will also be followed for works adjacent to water dependent habitats. Also see environmental measures within Chapter 7 Dust and Air Quality, Chapter 3 Project Description, and recommendations within the Flood Risk Assessment (Wood 2017).</p> <p>See measures for watercourses and water bodies.</p>
Common toad	Changes to habitats during decommissioning and restoration (including 2048 restored site) affecting population	<p>Common toad would be included within a method statement which would include best practice guidelines would be followed during the demolition and landform creation works. This includes making all contractors aware of the potential presence of common toad, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered). All works to be undertaken between dawn and dusk where possible. The Mine Site will not be lit at night where possible.</p> <p>See measures for great crested newts.</p>
European Hedgehog	Changes to habitats during decommissioning and restoration (including 2048 restored site) affecting population	<p>European hedgehog would be included within a method statement which would include best practice guidelines would be followed during the demolition and landform creation works. This includes making all contractors aware of the potential presence of European hedgehog, and not leaving trenches uncovered overnight (or leaving an escape plank if excavations cannot be covered). Any obvious mammal trails will be kept clear of obstruction. All works to be undertaken between dawn and dusk where possible. The Mine Site will not be lit at night where possible.</p> <p>See measures for badger.</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Breeding Schedule 1 birds	Disturbance during the nesting period	<p>Black redstart nests within the operational area and is a species adapted to industrial and urban environments, hence disturbance impacts from on-going activities are likely to have minimal effect. Any proposed changes to operations which could impact on this species, for example through loss of a nest site, would be first considered in consultation with the project ecologist to ensure that the nesting birds remain protected. Decommissioning works in the vicinity of the nest site (as identified through surveys close to the time of decommissioning) would be undertaken outside of the nesting season for this species.</p> <p>Prior to decommissioning, surveys for breeding Schedule 1 birds (e.g. kingfisher and barn owl) will be undertaken within 100m of the operational area and any identified nests will be subject to protection measures drawn up by the project ecologist, to ensure that the nests are protected from disturbance impacts.</p>
Nesting birds	Damage or destruction of nests or nesting birds	Works undertaken during the decommissioning phase which could impact upon nesting birds (i.e. demolition of buildings) will be undertaken outside of the bird nesting season (March to August inclusive) wherever possible. Works within the nesting season will first be subject to a nesting bird survey by a qualified ornithologist to ensure that any nests present are protected whilst active.

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
Invertebrates	Changes to habitats during decommissioning and restoration (including 2048 restored site) affecting population	<p>An invertebrate management plan would be produced as part of the overall HMP for the Mine Site for enhancements during the proposed workings, which may include the following:</p> <p>Monitoring surveys of the invertebrate populations;</p> <p>Management of the grasslands and woodland within the Mine Site, including;</p> <p>Ensuring the scrub does not encroach on the grasslands and open mosaic habitats on previously developed land;</p> <p>Create 5x invertebrate habitat piles i.e. "bug hotels" around the periphery of the operational area, and within grassland habitat. This may follow an example from the Cheshire Wildlife Trust advice sheet: https://www.cheshirewildlifetrust.org.uk/sites/default/files/files/advice_invertebrate_habitat2.pdf</p> <p>Habitat mosaics, including open mosaic habitats on previously developed land, should be incorporated into the larger habitat areas e.g. patches of bare ground areas within the wildflower meadows; many invertebrates such as dingy skipper and grayling rely on a range of habitat features to complete their life cycle;</p> <p>A targeted planting strategy to include suitable host plants for notable invertebrate species. For example, increasing the proportion of birds foot trefoil within the wildflower meadows (the host plant for the dingy skipper);</p> <p>Leave some areas of the designated wildflower meadows to recolonise naturally without seed which will provide a varied structure that presents a range of foraging and nesting opportunities for invertebrates.</p> <p>Include protected fence installation around areas with the highest quality for invertebrates to prevent damage from members of the public.</p> <p>Include glades/rides/open areas within the woodland;</p> <p>Proposed woodland planting will not encroach upon suitable grayling habitat, and additional linked habitat will be created within the wildflower meadows;</p> <p>Improve the connectivity of the Mine Site to aid invertebrate commuting and dispersal by gapping out the hedgerows and having a diverse ground flora along wide margins at the hedgerow base. Additional hedgerow planting will be required to link the woodland planted within the former operational area to the woodlands across the Mine Site;</p>

Potential receptor	Predicted changes and potential effects	Incorporated environmental measure
All	Damage to habitats and/or species through dust and atmospheric deposition (terrestrial and aquatic)	<p>During proposed workings, demolition and landform creation activities, pollution prevention control measures (including the management of noise, dust, atmospheric, and water quality issues) would be detailed in a method statement (as part of the Management Plan) and implemented during all phases to avoid damage to habitats/species.</p> <p>Dust control measures would be implemented during all phases of work. These would include: using a system of on-site vehicle routes, turning areas and loading areas with suitable speed limits and signage; sheeting of potential dust-generating materials being transported on lorries/vans to and within the Mine Site; using road sweepers as necessary; damping down haul roads during dry weather; vehicle washing, dust suppressors, and spraying of stockpiles in dry weather.</p> <p>During all phases of work, practices would comply with the current Substance Spill Management practices and the Environment Agency's Pollution Prevention Guidelines with a view to preventing the pollution of ground and surface water. Standard Pollution Prevention Guidelines (PPGs) will be followed for works adjacent to water dependent habitats.</p> <p>Also see environmental measures within Chapter 7 Dust and Air Quality, and Chapter 3 Project Description details further measures.</p>

9.6 Scope of Assessment

- 9.6.1 In assessing the effects of any development on ecology it is necessary to define the areas of land cover and the species and habitats that need to be considered in the ecological impact assessment. In doing this, two inter-related factors need to be considered:
- Development can affect habitats and species directly (e.g. the land-take required) and indirectly (e.g. disturbance), with the impacts potentially extending beyond the boundaries of the Mine Site; and
 - It is impractical and inappropriate for an ecological assessment to consider every individual species and habitat that may potentially be affected, rather it should focus on 'important biological receptors', i.e. species and habitats that are valued in some way (e.g. designated sites, species populations that are of sufficiently high value in terms of biodiversity conservation, or species which have economic value) and which could potentially be affected by the Project.
- 9.6.2 It is against this background that the scope of this assessment is defined. The ecological impact assessment is based on the desk study, extended Phase 1 habitat survey as well as further species specific survey work detailed in Appendices 9.E – 9.M. The scope of the survey work undertaken is considered appropriate for this site and sufficient to allow a robust assessment of impacts to be undertaken.
- 9.6.3 While the operational area is dominated by habitat of limited nature conservation value, the impact of the Project on valued habitats, such as woodland, grassland and watercourses will be considered in the assessment where these are present.
- 9.6.4 The impact of the Project on species scoped in (Appendix B) will be considered in the assessment.
- 9.6.5 In addition, in respect of protected species for which significant effects are unlikely but which are subject to legal protection, appropriate mitigation measures will be developed to avoid legislative breach.

Limitations in the Preparation of the ES

- 9.6.6 As discussed in Section **9.3.3** to **9.3.4**, the important biological receptors present in the predicted future baseline are based on assumptions made according to the current baseline survey results and professional judgement. In terms of the future baseline: after the decommissioning and restoration phase, an accurate picture of significance cannot be attained due to the potential for legislation/species status change, and as such significance has been assessed only in Section 9.8 and 9.9 and is not included within the scope of assessment tables (Appendix B). This was using professional judgement and assumptions on what the future baseline would be during this period.

Receptors that could be Subject to a Potential Significant Effect

- 9.6.7 Based on the methodology that is set out above in "Methodology for Identifying and Assessing Effects" and "Significance evaluation methodology", Table B.1 in Appendix B lists the receptors that are relevant to the assessment because they are either important or legally protected, and could be affected by the proposed development. A justification is provided for any receptors that are scoped out because they are assessed as being of insufficient value for effects to be likely to be significant.
- 9.6.8 For receptors that have not been scoped out (in Table B.1), Table B.2 in Appendix B sets out information about the relevant ecological zones of influence relating to the environmental changes that are likely to be caused by the proposed development (where relevant, during operation and

decommissioning), which have the potential to cause significant effects and/or contravention of wildlife legislation. These have been identified as:

- Land-take/land-cover change;
- Changing levels of light, noise and/or vibration;
- Dust deposition;
- Atmospheric pollution;
- Direct harm and disturbance impacts during decommissioning;
- Change in vehicle movements; and
- Water pollution.

- 9.6.9 The final column of Table B.3 sets out a conclusion about the potential for significant effects to occur or for protected species legislation to be contravened.
- 9.6.10 A third table (Table B.2 in Appendix B) provides a justification for the extent of the ecological zones of influence that have been used in Table B.3. These zones of influence reflect the design of the project incorporating the environmental measures that are set out in Section 9.5.
- 9.6.11 Table 9.6 summarises the information detailed in Appendix B: Tables B.1 - B.3 about the receptors that have been identified (through the scoping process that is outlined above) as having the potential to be significantly affected by the proposed development and/or for which legislation could be contravened. The table also identifies the potential effects that needed to be assessed. The identified receptors are taken forward (in Section 9.7) for further, post-scoping assessment.

Potential Receptors

Table 9.6 Potential Receptors Scoped in for Further Assessment

Potential biodiversity receptor	Valued and/or legally protected?	Relevant criteria (from Box 1.1) and legislation (from Box 1.2)	Potentially significant effects/legal contravention and causal changes	Operational phase	Decommissioning and Restoration phase
Bat Roosting: Operational Area	Biodiversity conservation value Legally protected under the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended)	NERC Act 2006 Section 41 species of principal importance Tees Valley BAP priority species Habitats Regulations Wildlife and Countryside Act 1981 (as amended)	Land-take/Land cover change: Loss of roost (1x common pipistrelle) Increased light, resulting in displacement from foraging areas and commuting routes.	X	✓

Potential biodiversity receptor	Valued and/or legally protected?	Relevant criteria (from Box 1.1) and legislation (from Box 1.2)	Potentially significant effects/legal contravention and causal changes	Operational phase	Decommissioning and Restoration phase
Great crested newts	Biodiversity conservation value Legally protected under the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended)	NERC Act 2006 Section 41 species of principal importance Tees Valley BAP priority species Habitats Regulations Wildlife and Countryside Act 1981 (as amended)	Land cover change: creation of bunds located ~30m from pond 1, and hedgerows immediately adjacent pond 1, during decommissioning & restoration phase. Resulting in death or injury of great crested newts and other amphibians. Death or injury from falling into/becoming trapped in uncovered excavations. An increase in vehicle movement may result in death or injury.	X	✓
North York Moors SSSI	Biodiversity conservation value Legally protected under the Wildlife and Countryside Act 1981 (as amended)	Wildlife and Countryside Act 1981 (as amended)	Damage and loss to/of qualifying habitats and in turn qualifying species from atmospheric pollution (N deposition)	✓	X
North York Moors SAC	Biodiversity conservation value Legally protected under EC Habitats and Birds Directives	EC Habitats and Birds Directives	Damage and loss to/of qualifying habitats from atmospheric pollution (N deposition)	✓	X
North York Moors SPA	Biodiversity conservation value Legally protected under EC Habitats and Birds Directives	EC Habitats and Birds Directives	Atmospheric deposition may result in a change and degradation of habitats and in turn qualifying species: golden plover and merlin.	✓	X

9.7 Predicted Effects: Existing Receptors

Assessment of Effects: Bats Roosting: Operational Area

Current Conditions

- 9.7.1 The habitats present within the mining operational area (where building 6 is located) comprise of hardstanding, bare ground, industrial buildings, and occasional areas of grassland and ephemeral/short perennial vegetation. A number of the buildings within the operational area provide roosting opportunities for bats. The bat roost assessment of the buildings identified bat droppings at Building 6 which were confirmed to be common pipistrelle by DNA analysis¹⁰. Emergence/re-entry surveys identified this roost to be used by a single common pipistrelle. The emergence/re-entry bat surveys did not identify any further bat roosts within any other buildings. The Tailings Switch Room has previously had several bats roosting within a crack at the door in 2014, while Building 12 has also historically held a bat roost; no roosting bats at these buildings were observed during 2017 surveys. As such the bat roost in building 6 is protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended). It is therefore considered the Proposed Development may result in the contravention of relevant legislation only, and as such is considered for assessment below.

Predicted Effects and their Significance

Effects on Bat Roosts

- 9.7.2 Building 6 is located within the operational area and would continue to be in place during the operational phase of the future baseline scenario. The building, and the roost, would then be lost during the decommissioning and restoration phase of the future baseline. This building contains a transitional roost used by a single common pipistrelle. Common pipistrelle makes up at least 90% of the total number of bats in the Tees Valley, and is the only species not to be included on the Tees Valley BAP (Tees Valley BAP, 2012). It is therefore not considered to be of sufficient biodiversity conservation value for a potential significant effect to occur in EIA terms regarding its biodiversity conservation value, but solely in respect of contravention of the legislation.
- 9.7.3 The Proposed Development would see the mine continue to work during these periods of the future baseline. During the operational phase of the future baseline, there would be **no change** from the development proposals and therefore **no effect** on the bat roost and thus no breach of legislation.
- 9.7.4 During the decommissioning and restoration phase of the future baseline, the Proposed Development would see building 6 (along with a small number of other buildings located in the northern area of the operational area) demolished within approximately the first 5 years of this phase, meaning this area would therefore be restored to pasture and hedgerow ~20 years earlier than the rest of the operational area. This would make this area more attractive to bats, but the young age of hedgerow would restrict any natural roost opportunities. Building 6 will be demolished ~20years prior to the majority of the operational area meaning there would not be any potential effects of light, noise and vibration associated with decommissioning activities for the majority of the operational area. The decommissioning of building 6 and adjacent buildings (within the first ~5 years) will be carried out under an ecological method statement with relevant environmental measures included (and also potentially under Natural England development licence pending future survey work), meaning there would be no illegal effects as a result of potential effects of light, noise and vibration associated with decommissioning and restoration activities.

¹⁰ Email to Tim Kell from EcoWarwicker Ecological Forensics on 07th September 2017.

Therefore, the Proposed Development is considered to represent a non-significant adverse effect compared to the decommissioning and restoration phase of the future baseline.

- 9.7.5 During the aftercare, semi-mature and mature restored site phases of the future baseline, the Site will become more attractive to bats, but the comparatively young age of the trees and lack of structures would restrict any natural roost opportunities. The bat boxes in the surrounding woodland may however become more well-used for roosting, as there would be less disturbance without the operational mine activities nearby. The Proposed Development would therefore see a **non-significant adverse** effect in comparison with these phases of the future baseline, until the Proposed Development itself is demolished and the site restored when the impacts would reduce to a position of **no change** and **no effects**.
- 9.7.6 What this means in practice is that the current situation, of the Mine Site offering some bat roost potential from the buildings on site, will continue for another 25 years before the Site is cleared and restored to a more natural, rural condition, albeit the confirmed bat roost in building 6 and a small number of other buildings would be lost after 5 years rather than 25 years, meaning the restoration of this area will begin after 5 years.
- 9.7.7 The environmental measures described in Section 9.5, will ensure that the proposed development does not result in an adverse effect on the conservation status of bat populations, and therefore there will be no significant effects on bats in relation to EIA regulations as a result of the scheme. The embedded mitigation would ensure no illegal effects would result.

Assessment of Effects: Great Crested Newts

Current Baseline

- 9.7.8 Terrestrial habitats within the operational area are generally unsuitable for great crested newts (GCN), dominated by hardstanding and bare ground. Habitats to the east, south and west of the mining operational area, such as woodland, scrub, and grassland provide more suitable terrestrial habitats for foraging, commuting, hibernating and refuging.
- 9.7.9 Nine ponds were identified during the desk study within the survey area that may have potential for breeding GCN. eDNA presence/likely absence surveys returned a positive presence for GCN within two ponds; ponds 1 and 3. Pond 6 could not be accessed and therefore GCN presence cannot be ruled out. P7 and 8 returned indeterminate results but these are scoped out due to poor habitat suitability index scores and bad water quality respectively. Ponds 5 and 9 returned a negative result. Pond 4 was scoped out as being unsuitable to support GCN.
- 9.7.10 Pond 1 is within the Mine Site and is approximately 100m west from the operational area and is within the proposed decommissioning and restoration area. The pond is located within a pasture field that is frequently grazed by cattle. The pond is immediately bordered by trees, scrub and rough grass. A treeline runs from the pond in a south-westerly direction to the stand of woodland that is located ~30m to the south from the pond. The woodland provides good terrestrial habitat for foraging, commuting, refugia and hibernation. The cow pasture lies directly between the pond and the mining operational area.
- 9.7.11 Pond 3 is located ~250m northwest (as the crow flies) from the southerly Mine Site boundary, with the A174 road providing a minor impediment to commuting to the main Mine Site. Pond 3 is ~290m west (as the crow flies) of the pump house site further to the north. The pond is surrounded by largely grazed improved grassland, although more optimal habitat with areas of scrub, hedgerows and rough grass is present within the vicinity. Farm buildings, stone walls and hardstanding tracks lie between the northern site and the pond. Although there is suitable

commuting habitat from the pond to the sites/decommissioning area, it is considered unlikely GCN will commute to the Mine Site because:

- The distance is more than 250m (habitat within ~250m of a pond is the area most likely to be used by GCN (English Nature, 2001)). The commuting distance is ~300m when taking into account the suitable commuting routes around the unimproved grassland fields which lie directly in the between the pond and the Mine Site; and
- There is already suitable habitat within ~250m of the pond i.e. stone walls, scrub and hedgerows for refugia and hibernation.

- 9.7.12 Pond 6, which could not be accessed and therefore GCN presence cannot be ruled out, is located ~400m southeast of the decommissioning and restoration area. Although there is suitable commuting habitat from the pond to the decommissioning area, it is considered unlikely GCN will commute to the Mine Site because there is a large area of suitable woodland between the pond and the decommissioning area. Given GCN mostly utilise habitat within ~250m of the pond, it is considered unlikely that GCN would commute through the suitable habitat to the decommissioning area.
- 9.7.13 Ponds 1 and 3, and the GCN they support are protected under the *Wildlife and Countryside Act 1981* (as amended) and the *Conservation of Habitats and Species Regulations 2010* (as amended). It is therefore considered the Proposed Development may result in the contravention of relevant legislation only, and as such is considered for assessment below.

Predicted Effects and their Significance

Effects on GCN Breeding Ponds, Foraging and Commuting GCN

- 9.7.14 Pond 1 is located within the Mine Site and ~100m west from the operational area, and would continue to be in place under the same conditions during the operational phase of the future baseline scenario. During the decommissioning and restoration phase of the future baseline scenario, ground works will occur that include hedgerow planting immediately adjacent the pond, as well as ground reprofiling works to be undertaken on the screening mound west of the railhead, located ~30m east of the pond, which have the potential to cause disturbance to GCN including killing/injury to individuals, and damage to Pond 1. The distance from pond 1 to ponds 3 and 6 is ~930m and ~860m respectively, and as such is fairly isolated, particularly given the minor impediment of the A174 that lies in-between ponds 1 and 3. Although GCN have been known to commute to distances of 1000m or more, the majority likely stay within ~250m from a breeding pond (Froglife, 2013), particularly when there is high quality habitat readily available; there is woodland ~30m to the southwest from pond 1. It is therefore likely pond 1 supports a single GCN population, rather than a metapopulation. Although GCN are widely distributed across the Tees Valley, there are few records from the lower Tees Estuary, with populations seemingly small and fragmented (Tees Valley BAP, 2012). The pond and the GCN population it supports is therefore not considered to be of sufficient biodiversity conservation value for a potential significant effect to occur in EIA terms regarding its biodiversity conservation value, but solely in respect of contravention of the legislation.
- 9.7.15 The Proposed Development would see the mine continue to work during these periods of the future baseline. During the operational phase of the future baseline, there would be **no change** from the development proposals and therefore **no effect** on the pond or any GCN individual /population, and thus no breach of legislation.
- 9.7.16 During the decommissioning and restoration phase of the future baseline, the proposed development would see the pond remain in its current landscape, rather in a period of landscape change with ground works being undertaken such as reprofiling and planting. This would also

avoid any potential effects of light, noise, vibration and vehicle movement that would be associated with the decommissioning and restoration activities. Therefore the proposed development is considered to represent a **non-significant positive** effect compared to the decommissioning and restoration phase of the future baseline.

- 9.7.17 During the aftercare, semi-mature and mature restored site phases of the future baseline, the Site will become more attractive to GCN due to there being less disturbance around Pond 1 without the operational mine activities nearby. The Proposed Development would therefore see a **non-significant adverse** effect in comparison with these phases of the future baseline, until the Proposed Development itself is demolished and the site restored when the impacts would reduce to a position of **no change** and **no effects**.
- 9.7.18 What this means in practice is that the current situation, of the Mine Site offering GCN habitat in and around Pond 1 will continue for another 25 years before the Site is cleared and restored to a more natural, rural condition.
- 9.7.19 The environmental measures described in Section 9.5 will ensure that the proposed scheme does not result in an adverse effect on the conservation status of the GCN population, and therefore there will be no significant effects on GCN in relation to EIA regulations as a result of the scheme. The embedded mitigation would ensure no illegal effects would result.

Assessment of effects: North York Moors SSSI

Current Baseline

- 9.7.20 North York Moors SSSI qualifying features include the largest continuous tract of heather moorland in England. The site is of national importance for its mire and heather moorland vegetation communities and of international importance for its breeding bird populations, particularly merlin and golden plover. The site also supports a nationally important assemblage of moorland breeding birds including merlin, golden plover, snipe, curlew, lapwing, redshank, whinchat, wheatear, ring ouzel, red grouse, hen harrier, peregrine and short-eared owl.
- 9.7.21 The SSSI is located ~2.5km south of the Mine Site, and comprises ~44,000ha. The SSSI site boundary is coincident with North York Moors SPA, for which consultation with the NYMNP made reference to the fact the North York Moors is suffering from atmospheric (N) emissions, and environmental measures to reduce aerial emissions should be vigorously pursued, while NE requested the North York Moors SAC (which shares the same boundary with the SPA and SSSI) should be included with the HRA screening and assessed against potential effects from nitrogen deposition only (see North York Moors SAC and SPA assessment sections below).

Predicted Effects and their Significance

- 9.7.22 In practice, the Proposed Development will see similar levels of road transport movement, which will continue due to the operation of the mine. For the purposes of this assessment, a worst case scenario has been considered where the operation of Boulby Mine, including associated road traffic, has been assumed to continue to produce and emit nitrous oxides at current levels throughout the 25 year timeframe of the Proposed Development. This will have the potential to cause permanent damage to the qualifying habitats within the SSSI via nitrogen deposition.
- 9.7.23 Road transport will include both employee travel (albeit limited) and material/product distribution. The principle route for HGVs transporting product from the site follow the A174 onto the B1266 and then the A171, which partly runs through/immediately adjacent a small area of the SSSI. A distance of 200m is normally used as the cut off point for consideration of nitrogen deposits from traffic.

- 9.7.24 From assessing MAGIC, only lowland heathland and upland heathland (i.e. not blanket bog, woodland etc) is present within ~200m of roads to be used by Boulby traffic through the SSSI (B1266 and A171). Vehicle use in relation to Boulby mine within ~200m of the qualifying habitats is likely to be a very small proportion of the total vehicle usage of the roads. Also as stated within Natural England (2015) in relation to North York Moors SAC (for which the boundary of SSSI is coincident); "of the roads which pass through the site, the A171 (which intersects sub-site C)... road transport is not thought to be the main threat to the whole SAC or sub-sites C and D, respectively, with road emissions representing well below 10 % of total N deposition". Given the low level of road use within ~200m of qualifying features attributed to the operation of Boulby Mine and that N deposition as a result of road transport is not considered a significant threat to the SAC, it is therefore also not considered a significant threat to the habitat communities within the SSSI either.
- 9.7.25 Given the predicted level of N deposition as a result of road transport is not considered to be a significant threat on the habitat communities within the SSSI (or SAC), it is concluded that there will not be a significant effect on the bird assemblage of the North York Moors SSSI.
- 9.7.26 When compared against the future baseline phases, there will be no change when considered against the operational future baseline and similar effects during the decommissioning and restoration phase. During the aftercare and semi-matured site future baseline phases, there would be an adverse effect from continued operation of the Mine compared to the restored site, but for the reasons outlined above, this is considered to be a non-significant effect.

Assessment of Effects: North York Moors SAC

Current Baseline

- 9.7.27 North York Moors SAC qualifying features include blanket bogs, North Atlantic wet heath including cross-leaved heath and European dry heaths. The SAC contains the largest continuous tract of upland heather moorland in England. Dry heath covers over half the site. The nationally scarce creeping forget-me-not can be found in the acid moorland streams and pools.
- 9.7.28 The SAC is located ~2.5km south of the Mine Site, and comprises ~44,000ha. Additional habitats found within the SAC include heath, scrub, and grassland, broad-leaved, coniferous and mixed woodland.
- 9.7.29 Consultation with the NYMNPAs made reference to the fact the North York Moors is suffering from atmospheric (N) emissions, and environmental measures to reduce aerial emissions should be vigorously pursued, while NE requested the North York Moors SAC should be included with the HRA screening and assessed against potential effects from nitrogen deposition only.

Predicted Effects and their Significance

Effects on SAC qualifying features (for full assessment see the HRA screening undertaken (Appendix 9.N_Wood, 2017))

- 9.7.30 In practice, the Proposed Development will see a reduction in the emissions of nitrous oxides as there will no longer be any processing of sylvinitite to MOP taking place, and the processing of minerals into fertiliser products will cease after 10 years and move to a Teesside processing facility. However, the exact quantity and nature of the emissions that will take place in the future cannot be exactly confirmed at this stage. This will ultimately depend on the amount of polyhalite and salt extracted and how much simple processing (crushing and grinding) takes place.
- 9.7.31 For the purposes of this assessment, a worst case scenario has been considered where the operation of Boulby Mine, including associated road and rail traffic, has been assumed to continue

to produce and emit nitrous oxides at current levels throughout the 25 year timeframe of the Proposed Development. This will have the potential to cause permanent damage to the qualifying habitats within the SAC via nitrogen deposition.

- 9.7.32 The majority of emissions produced and associated with the operation of Boulby Mine will be carried in a north east direction from the site; the North York Moors SAC boundary is to the south and as such the wind rose indicates that only a low to negligible proportion of the emissions from Boulby Mine would move towards the North York Moors SAC. In addition, the principle routes for HGVs transporting product from the site follow the A174, onto the B1266 and then the A171, which partly runs through the SAC. A distance of 200m is normally used as the cut off point for consideration of nitrogen deposits from traffic.
- 9.7.33 The North York Moors air quality study (Natural England, 2015) attributes 12.9% of the total nitrogen deposition to *potentially local non-agricultural and background sources* of which would in this case contain Boulby Mine. The study also names RAF Fylingdales and industrial activity on Teesside as the most significant emitters of nitrous oxides in the study area. It is therefore considered that only a small proportion of the nitrogen deposition on the SAC would be from Boulby Mine. Taking into consideration the wind rose data and likely dispersal due to distance between the mine and SAC qualifying habitats (>3.5km), these factors would further reduce the likely amount of nitrogen deposition attributed to the operation of Boulby Mine upon the qualifying habitats of the SAC.
- 9.7.34 When compared against the future baseline phases, there will be no change when considered against the operational future baseline and similar effects during the decommissioning and restoration phase. During the aftercare and semi-matured site future baseline phases, there would be an adverse effect from continued operation of the Mine compared to the restored site, but for the reasons outlined above, this is considered to be a **non-significant** effect.
- 9.7.35 All works will continue to be undertaken under the environmental permit controls that are currently in place.

Assessment of effects: North York Moors SPA

Baseline Conditions

- 9.7.1 The North York Moors Special Protection Area (SPA) is located ~2.5km south of the proposed application site; (this is the same area of land as that subject to the SAC designation). Qualifying features are golden plover (526 pairs representing at least 2.3% of the GB breeding population in 1996) and merlin (35 pairs representing at least 2.7% of the GB breeding population in 1996). The only potential impact pathway is through atmospheric pollution, through the impact of nitrogen deposition degrading habitats on which golden plover and / or merlin are reliant.
- 9.7.2 These potential impacts have also been considered within a Habitats Regulations Assessment screening report, provided in Appendix 9N.

Predicted effects and their significance

- 9.7.3 The Natural England (2017)¹¹ Supplementary Advice note states the following in relation to golden plover habitat preferences: *"Found across the SPA, managed moorland provides a favourable habitat for Golden Plover. Golden Plover nest in a diversity of upland habitats (from heather moorland and blanket bog to damp acidic grasslands), where they prefer to nest on high, flat or gently sloping*

¹¹ Natural England, 2017. European Site Conservation Objectives: Draft supplementary advice on conserving and restoring site features. North York Moors Special Protection Area.

plateaux, away from the moorland edge. However they favour a vegetation mosaic to provide nesting cover and foraging areas, particularly for chicks and wet flush and bog areas for invertebrate richness.

- 9.7.4 Golden plover typically nest in a shallow scrape on the ground often hidden by moorland vegetation. Eggs are typically laid between April-mid-May and one brood is raised per year. Their diet consists of invertebrates (mainly beetles, crane-fly larvae and earthworms), and so marginal or low-intensity grassland and marshy areas rich in invertebrate food, adjacent to or nearby moorland nesting habitat, are important feeding grounds in the summer."
- 9.7.5 The report states the following in relation to merlin habitat preferences: "Found across the SPA, Merlins nest amongst mature or degenerate heather. A majority of merlin in the UK nest in a shallow scrape on the ground, lined with small twigs, pieces of heather, bracken and other material and concealed by heather. Territories are traditional, and are used repeatedly from year to year by successive generations of birds..... They feed mostly on small birds such as pipits, larks and wheatears."
- 9.7.6 In respect of air quality impacts on golden plover and merlin, the report states: "The structure and function of the habitats which support this SPA feature may be sensitive to changes in air quality.
- 9.7.7 Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. At this SPA, critical levels and loads are currently being exceeded."
- 9.7.8 The Air Pollution Information System (APIS) states that there is no expected negative impact on merlin as a result of nutrient nitrogen, ammonia or NO_x deposition impacts on the species' broad habitat – dwarf shrub heath. No adverse impacts on merlin as a result of impacts on the species' supporting habitats for prey species are anticipated, as any shift from heather to grass dominated communities would likely maintain pipit and lark populations. No critical level has been assigned for sulphur dioxide impacts on either species.
- 9.7.9 The table below summarises the information from the APIS website regarding the potential effects of nitrogen deposition within the North York Moors SPA on the habitats used by golden plover.

Table 9.7 APIS information regarding air pollution impacts on golden plover

Broad habitat	Exceedance impacts	Potential impacts on the species
Nitrogen, Ammonia (NH₃) and Nitrogen oxides (NO_x) deposition		
Bogs	"Increase in vascular plants, altered growth and species composition of bryophytes, increased N in peat and peat water."	"1. Potential negative impact on species due to impacts on the species' broad habitat. 2. Potential positive impact on species due to impacts on the species' food supply."
Montane habitats	"Effects upon bryophytes or lichens."	"1. Potential negative impact on species due to impacts on the species' broad habitat. 2. Potential positive impact on species due to impacts on the species' food supply."
Dwarf shrub heath	"Decreased heather dominance, decline in lichens and mosses, increase N leaching."	"1. Potential negative impact on species due to impacts on the species' broad habitat. 2. Potential positive impact on species due to impacts on the species' food supply."

- 9.7.10 As with the North York Moors SAC, the structure and function of the habitats which support the SPA features may be sensitive to changes in air quality and atmospheric pollution. A potential pathway for impacts on the golden plover population of the North York Moors SPA could arise as a

result of emissions resulting in nitrogen deposition which could alter the broad habitats utilised by the species. These habitats are broadly blanket bog, wet and dry heaths and montane habitats (all except montane habitats having been assessed to have no potential for significant effects in the North York Moors SAC section above). Acidification is not expected to impact on this species through changes in the species' broad habitats. In respect of nitrogen deposition, the critical loads for montane habitats are the same as for blanket bog, and therefore the consideration of potential impacts on blanket bogs detailed above is also applicable to montane habitats. For the reasons provided in relation to the North York Moors SAC qualifying habitats detailed above, the proposed application is considered to result in limited additional nitrogen deposition within the boundary of the SPA, at levels which are unlikely to impact on the broad habitats utilised by golden plover.

- 9.7.11 When compared against the future baseline phases, there will be no change when considered against the operational future baseline and similar effects during the decommissioning and restoration phase. During the aftercare and semi-matured site future baseline phases, there would be an **adverse** effect from continued operation of the Mine compared to the restored site, but for the reasons outlined above, this is considered to be a **non-significant** effect in relation to any of the conservation objectives of qualifying features of the North York Moors SPA.
- 9.7.12 All works will continue to be undertaken under the environmental permit controls that are currently in place.

9.8 Predicted Effects: Future Receptors

- 9.8.1 This section includes the assessment of the anticipated effects of the proposed development on the receptors that are predicted to be relevant during the future baseline i.e. those species that currently do not use the Site but are expected to on after it is restored in the future baseline scenario and moves through the maturing phase. As previously discussed in Section 9.3.3 – 9.3.6, the limitations of assessing the significance of important biodiversity receptors has ensured that potential significance of effects and ecological receptor values will not be included. Instead, the predicted effects against important biodiversity values will be considered at a relatively high taxonomic level. Due to limitations of not knowing which species will be present on site and where (if present), assumptions have been made on what the future baseline would be during this period, and these assumptions are based on baseline survey data and professional judgement.

Assessment of Effects: Amphibians

Baseline Conditions

Predicted Future Baseline

- 9.8.2 Following completion of the decommissioning and restoration phase in the future baseline, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed that immediately following the aftercare, given the shallow soil depths and the local climate, the landscape including hedgerows, woodland, and scrub may still be relatively immature. It is assumed however that new species rich grasslands (meadows and pastures) within the restored site will establish quickly (within a five year period following sowing) and may provide additional foraging habitat due to a possible increase in prey such as flies and ants which would be associated with this habitat. These however are unlikely to provide any refuge or hibernacula potential.
- 9.8.3 The planting of broad-leaved woodland, hedgerows and scrub will take longer to mature. Immediately following the aftercare period when immature, it is likely these habitats will not be

conducive for commuting or inhabiting due to their restrictive growth and a subsequent lack of foraging and refuge potential. The initial 10-15 years of establishment would likely resemble scrubby habitats with an open canopy. These may therefore provide some potential cover for amphibian commuting, although it is more likely the habitat is still not conducive to dispersal. In addition, there is likely to be little dead wood and leaf litter in the understory providing refuge/hibernacula potential. In combination with an open canopy, the lack of dead wood and leaf litter increases the risk of predation and desiccation from the sun. They may however provide some additional foraging habitat due to a possible increase in prey such as invertebrates which may be associated with these habitats. Between 15-25 years the woodland, hedgerows and scrub may reach thicket stage and thus increase the potential to support amphibians. There will likely be an increase in foliage cover and so leaf litter, as well as the build-up of dead wood, twigs and branches which provide refuge/hibernacula potential. As the woodland matures it will also likely support a higher invertebrate species assemblage and population numbers, and therefore increase the foraging resource by the end of this future baseline period (in 2048). These resources will gradually improve throughout the 25 year restoration period.

- 9.8.4 The creation of new ponds following restoration is likely to provide additional breeding opportunities. It is unlikely however amphibians will use these to breed within the first few years of creation due to the lack of suitable commuting habitat to these newly create ponds. In addition, for species such as GCN who require substrate to lay their eggs on to protect from predation, it may take several years for suitable egg laying substrate to become available.
- 9.8.5 Overall, the restored site would complement the woodland/farmland/grassland habitats in the surrounding area, but the fact the restored site would still be semi-mature during this future baseline phase would limit its value. It is expected that by 2048 the creation of new watercourses along with a series of permanent ponds and flushes, in addition to the mature wildflower meadows and semi-mature woodland may increase the Mine Site's potential to support amphibians. The ponds and flushes may provide suitable breeding habitat, with the grasslands and woodlands likely to provide foraging and refugia/hibernating potential. The near mature hedgerows planted throughout the Mine Site, along with the watercourses, may provide suitable commuting routes. Thus, it is assumed the restored site is likely to support a similar range of amphibian species such as GCN and common toads, and are likely to be present throughout the Mine Site including within the former operational area.
- 9.8.6 As such, under the future baseline the Mine Site can overall be considered to be of moderate-high biodiversity conservation value for amphibians, during the semi-mature restored site phase.

Predicted Effects

- 9.8.7 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the restoration plan. This means there is likely to be less breeding and terrestrial habitat available and the amphibian population would probably be smaller than if the Mine Site is restored. In addition, the populations of the species listed above which may otherwise colonise the site will probably not do so during this time. Pond 1 will however continue to be located on site and will still support GCN. The proposed development incorporates environmental enhancement measures (as outlined in Section 9.5) to seek to enhance habitats within the landownership area ahead of the start of the proposed development working period (2023) and to promote local populations of such species during this period (2023-2048). These will complement the creation of pasture and hedgerows in the land to the north of the main site which will be delivered through early restoration works. These measures will comprise:
- Many of the restoration measures proposed outwith the operational area will be implemented prior to 2023. These include the creation and enhancement of hedgerows, creating a network

of native shrubs which will connect up habitats in the area and provide commuting and dispersal routes for amphibians. In addition, the broad-leaved woodland creation to the north of Boulby Gill will be implemented, providing additional foraging, refuge/hibernacula terrestrial habitat for amphibians. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period;

- In addition, measures for habitat enhancement for amphibians will be provided, including the creation of hibernacula piles, and creation of wide grasslands strips along field margins and around ponds. This will seek to enhance the field habitats for amphibians beyond the measures proposed within the current restoration plan.

9.8.8 The proposed development would therefore see the Mine Site retain the current ponds and terrestrial habitat, but lose the opportunity for many of the natural enhancements provided under the future baseline scenario. The environmental measures and enhancements above and described in Section 9.5 are likely to enhance the habitat resource to the local amphibian assemblage outwith the operational area during the proposed current workings, and will seek to promote local population levels. It is considered that there will not be a significant adverse effect on the conservation status of GCN species in relation to EIA regulations. In addition, the embedded mitigation would ensure no illegal effects would result.

Assessment of Effects: Notable Aquatic Fauna

Baseline Conditions

Predicted Future Baseline

9.8.9 Following completion of the decommissioning and restoration phase, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed the creation of new watercourses along with a series of permanent ponds and flushes are unlikely to increase the Mine Site's potential to support aquatic notable fauna such as brown trout, nor would the re-opening of watercourses that are currently culverted (e.g. Boulby Gill). This is because these watercourses and features are likely to be too small to support notable species. Thus, it is expected aquatic notable fauna may remain within the Easington Beck only.

9.8.10 As such, under the future baseline the Mine Site can be considered to be of low biodiversity conservation value for notable aquatic fauna, during the semi-mature restored site phase.

Predicted Effects

9.8.11 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the restoration plan. For reasons above, it is unlikely this will have an impact on notable aquatic fauna population size, species richness or distribution. The proposed development incorporates environmental measures (as outlined in Section 9.5) in order to seek to avoid and reduce the impact of potential indirect, temporary/permanent disturbances, for example water pollution, that may adversely affect brown trout and the prey species that rely on the current good water quality within watercourses connected to the Mine Site.

9.8.12 The proposed development would therefore see the Mine Site retain the existing culverts and existing terrestrial habitat, but lose the natural enhancements provided under the future baseline scenario. The environmental measures described in Section 9.5 are likely to ensure that the proposed development does not result in an adverse effect on the conservation status of the

aquatic notable fauna populations (brown trout). It is therefore considered that effects on notable aquatic fauna in relation to EIA regulations from the continuation of the operational mine would not be significant, the embedded mitigation would ensure no illegal effects would result.

Assessment of Effects: Birds

Baseline Conditions

Predicted Baseline

- 9.8.13 It is assumed that new species rich grasslands (meadows and pastures) within the restored site will establish quickly (within a five year period following sowing) and will support a limited range of nesting bird species, notably skylark. The grasslands will however provide invertebrate food resources for a range of breeding species, such as yellowhammer, dunnock, linnet, bullfinch and song thrush, and this resource will gradually improve throughout the 25 year restoration period.
- 9.8.14 The planting of broadleaved woodland will take longer to mature, however it could support a range of NERC and red listed species throughout its development. The initial 10-15 years of establishment may support breeding species of scrub habitats such as dunnock and bullfinch. Between 15-25 years the woodland may reach thicket stage and support additional species such as song thrush. It is unlikely to develop sufficiently mature trees for species of mature woodland or hole nesting species such as pied flycatcher and marsh tit.
- 9.8.15 Overall, the restored site would complement the woodland / farmland habitats in the surrounding area and, over the 25 year restoration period, is likely to support a similar range of NERC and red listed species to those recorded within the survey area (excluding the mature woodland specialists). The restored site would however be unsuitable for nesting black redstart as the buildings would be removed.

Predicted Effects and their Significance

- 9.8.16 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the habitat restoration plan for a period of 25 years. This means that the populations of the NERC and BoCC red listed species listed above which would otherwise colonise the site will not do so for at least a further 25 years. As such, the proposed development incorporates measures to seek to enhance habitats within the landownership area ahead of the start of the extension period (2023) to seek to increase the local populations of such species during the proposed extension period (2023-2048). This will comprise:
- The restoration measures proposed within the habitat management area but outwith the operational area will be implemented prior to 2023. These are the creation and enhancement of hedgerows, creating a network of native shrubs which will connect up habitats in the area and provide nesting habitat for a range of farmland bird species. In addition, the broadleaved woodland creation to the north of Boulby Gill will be implemented, providing additional habitat for woodland species relative to baseline levels. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period;
 - As part of the habitat management plan for the areas within the landownership boundary but outwith the operational boundary, measures for habitat enhancement for farmland birds will be provided, including skylark plots within arable fields, creation of wide grassland strips along field margins and a grazing management plan for the pasture fields. This will seek to enhance

the field habitats for farmland birds beyond the measures proposed within the current restoration plan.

Conclusion

The measures above will enhance the habitat resource available to the local bird assemblage, which will help to enhance the local populations of NERC and red listed bird species relative to current baseline levels. The proposed application will however result in a delay to the restoration of habitats within the operational area for a period of 25 years, and therefore bird populations of certain species within the Site will be lower than they would otherwise have been if the site was restored from 2023. The proposed measures will partially address this and given that the baseline habitat for breeding birds will be enhanced from 2023 and that the operational site restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of NERC and red listed bird species as a result of the proposed development.

Assessment of Effects: Invertebrates

Baseline Conditions

Predicted Future Baseline

- 9.8.17 Following completion of the decommissioning and restoration phase, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed immediately following the aftercare, given the shallow soil depths and the local climate, the landscape including hedgerows, woodland, and scrub may still be relatively immature. It is assumed however that new species rich grasslands (meadows and pastures) within the restored site will establish quickly (within a five year period following sowing). As such, it is assumed this habitat will support a range of grassland invertebrate species. The close proximity of the new grasslands to the existing grasslands, including those to the south suggests it may not take long for the new grasslands to become colonised. The grassland planting mix includes species such as bird's foot trefoil and red fescue, which are hostplants for the dingy skipper and grayling. However, given the aftercare is only for a five year period, it is possible in the absence of continued management the grassland over a number of years may become dominated by grasses, decreasing the floral species diversity of the grassland. This would reduce the potential to support many invertebrate species. Continued management tailored to the preservation of the grasslands however is likely to keep it diverse and suitable for a range of invertebrate species.
- 9.8.18 The planting of broad-leaved woodland, hedgerows and scrub will take longer to mature. The initial 10-15 years of establishment would likely resemble scrubby habitats with an open canopy. These may therefore provide limited potential to support a woodland invertebrate assemblage. In addition, there is likely to be little dead wood and leaf litter in the understory which will reduce its potential to support woodland invertebrate ground fauna. Between 15-25 years the woodland, hedgerows and scrub may reach thicket stage and its respective ground flora will become more established, thus likely increasing the potential to support invertebrates due to an increase in leaf foliage cover, leaf litter, build-up of dead wood, twigs and branches, all which provide numerous different micro habitats for a variety of species. As the woodland matures it will likely support a higher invertebrate species assemblage and population numbers by the end of this future baseline period (in 2048) These resources will gradually improve throughout the 25 year restoration period.
- 9.8.19 Overall, the restored site would complement the woodland/farmland/grassland habitats in the surrounding area, but the fact the restored site would still be semi-mature during this future baseline phase would limit its value. It is assumed by 2048 the creation of new watercourses along with a series of permanent ponds and flushes, in addition to the wildflower meadows, scrub and

woodland may increase the Mine Site's potential to support invertebrates. The wildflower meadows, woodland, scrub and hedgerows, and ponds/flushes/watercourses are likely to provide a range of suitable habitats for a variety of species. The near mature hedgerows planted throughout the Mine Site, along with the watercourses, may provide suitable habitat linkages as well as suitable host plants for species including green-brindled crescent (hostplant includes blackthorn and hawthorn). Thus, the restored site may support a similar range of invertebrate species as those recorded within the survey area, such as dingy skipper (hostplant includes bird's foot-trefoil) and grayling (hostplant includes red fescue) within the grasslands, and brown-spot pinion (hostplants include oak and hawthorn) within the woodland, and are likely to be present throughout the Mine Site including within the former operational area.

9.8.20 As such, under the future baseline the Mine Site can be considered to be of moderate-high biodiversity conservation value for invertebrates, during the semi-mature restored site phase.

Predicted Effects

9.8.21 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working proposed development and will result in a delay to the implementation of the restoration plan. This means there is likely to be less habitat available and the invertebrate population will probably be smaller than if the Mine Site is restored. In addition, the populations of the species listed above (including others) which may otherwise colonise the site will probably not do so. The proposed development incorporates environmental enhancement measures (as outlined in Section 9.5) in order to seek to enhance habitats within the landownership area ahead of the start of the proposed development working period (2023) and to promote the local populations of such species during this period (2023-2048). These will comprise:

- Many of the restoration measures proposed outwith the operational area will be implemented prior to 2023. These include the creation and enhancement of hedgerows, creating a network of native shrubs which will connect up habitats in the area and provide suitable commuting and dispersal routes for invertebrates. In addition, the broad-leaved woodland creation to the north of Boulby Gill will be implemented, providing additional habitat for woodland invertebrate species. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period;
- In addition, measures for habitat enhancement for invertebrates will be provided, including a targeted host planting strategy for invertebrate priority species e.g. increase the composition of bird's foot trefoil (hostplant for dingy skipper) within the wildflower planting mix, as well as including patches of bare ground within the wildflower meadows which are required by both dingy skipper and grayling. In addition to this invertebrate habitat piles, and wide grasslands strips along field margins will be created. These will seek to enhance the field habitats for invertebrates beyond the measures proposed within the current restoration plan.

9.8.22 The proposed development would therefore see the operational area retain the existing terrestrial habitats, but lose the opportunity for the natural enhancements provided under the future baseline scenario. The environmental measures and enhancements above and described in Section 9.5 are likely to enhance the habitat resource to the local invertebrate assemblage, and will seek to promote the local population levels. The proposed application will however result in a delay to the restoration of habitats within the operational area for a period of 25 years, and therefore invertebrate populations within the Mine Site will be lower than they would otherwise have been than if the Mine Site were restored from 2023. The proposed measures will address this to some extent, and given that the baseline habitat for invertebrates will be enhanced from 2023 and that the operational area restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of invertebrates species in relation to EIA

regulations from the continuation of the operational mine. The embedded mitigation would ensure no illegal effects would result.

Assessment of Effects: Mammals

Bats

Baseline Conditions

Predicted Future Baseline

- 9.8.23 Following completion of the decommissioning and restoration phase, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed immediately following the aftercare, given the shallow soil depths and the local climate, the landscape including hedgerows, woodland, and scrub is likely to still be relatively immature. It is assumed however that new species rich grasslands (meadows and pastures) within the restored site will establish quickly (within a five year period following sowing) and may provide additional foraging habitat due to a possible increase in prey such as flies which would be associated with this habitat. Although unsuitable commuting habitat for species such as pipistrelles, it may however be suitable for species such as noctule which fly over open fields and habitats.
- 9.8.24 The planting of broad-leaved woodland, hedgerows and scrub will take longer to mature. Immediately following the aftercare period it is likely these habitats will not be conducive for commuting due to their restrictive immature growth. The initial 10-15 years of establishment would likely resemble scrubby habitats. These will likely provide additional foraging habitat due to a probable increase in its invertebrate assemblage, and would now likely be mature enough to provide commuting opportunities for bats such as common and soprano pipistrelle which are reliant on linear landscape features. It is unlikely however they will be mature enough to provide roosting opportunities by the end of this future baseline period (in 2048). These resources will gradually improve throughout the 25 year restoration period.
- 9.8.25 Overall, the restored site would complement the woodland/farmland/grassland habitats in the surrounding area, but the fact the restored site would still be semi-mature during this future baseline phase would limit its value. It is assumed by 2048 the creation of new watercourses along with a series of permanent ponds and flushes, in addition to the wildflower meadows, woodland and scrub may increase the Mine Sites potential to support bats. The ponds and flushes may provide suitable commuting and foraging habitat, with the grasslands and woodlands likely to provide additional foraging potential. The near mature hedgerows planted throughout the Mine Site, along with the watercourses may provide suitable commuting routes; the opened up culverts may increase the distribution of daubenton's bat for example. By the end of the semi-mature restored site baseline scenario, and being subject to the weather conditions for a period of time, some trees within the woodland may start to provide potential roost features to support roosting bats, although the woodland is likely to be sub optimal for roosting given the age of the trees and the suboptimal growing conditions. At this stage, this is likely to be only for species such as pipistrelles and *Myotis* sp. which are usually crevice dwelling bats i.e. behind loose bark or within splits, rather than larger sized species such as Noctule that require features like rot and woodpecker holes which are usually present within older, taller and bigger trees. Thus, the restored site is likely to support a similar range of bat species as those recorded within the survey area, such as common pipistrelle and noctule, and the species are likely to be present throughout the Mine Site including within the former operational area.

9.8.26 As such, under the future baseline the Mine Site can be considered to be of moderate biodiversity conservation value for bats, during the semi-mature restored site phase.

Predicted Effects

9.8.27 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the restoration plan. This means there is likely to be fewer roosting, commuting, and foraging habitat available and the bat population may be smaller than if the Mine Site is restored. In addition, the populations of the species listed above which may otherwise colonise the site will probably not do during this time. Building 6 will however continue to be located on site and will still provide potential for a bat roost. The proposed development incorporates environmental measures (as outlined in Section 9.5) in order to seek to enhance habitats within the landownership area ahead of the start of the proposed development working period (2023) and to promote local populations of such species during this period (2023-2048). This will comprise:

- Many of the restoration measures proposed outwith the operational area will be implemented prior to 2023. These include the creation and enhancement of hedgerows, creating a network of native shrubs which will connect up habitats in the area and provide commuting and dispersal routes for bats. In addition, the broad-leaved woodland creation to the north of Boulby Gill will be implemented, providing additional foraging and eventually roosting habitat for bats. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period;
- In addition, measures for habitat enhancement for bats will be provided, including the increasing an increase in the number of bat boxes for a variety of species.

9.8.28 The proposed development would therefore see the operational area retain the Building 6 bat roost, but lose the opportunity for the natural enhancements outwith the operational area provided under the future baseline scenario. The environmental measures and enhancements above and described in Section 9.5 are likely to enhance the habitat resource to the local bat assemblage, and will seek to promote the local population levels. It is considered that there will not be a significant adverse effect on the conservation status of bat species in relation to EIA regulations from the continuation of the operational mine. The embedded mitigation would ensure no illegal effects would result.

Terrestrial Mammals

Baseline Conditions

Predicted Future Baseline

9.8.29 Following completion of the decommissioning and restoration phase, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed immediately following the aftercare, given the shallow soil depths and the local climate, the landscape including hedgerows, woodland, and scrub is likely to still be relatively immature. It is assumed however that new species rich grasslands (meadows and pastures) within the restored site will establish quickly (within a five year period following sowing) and may provide additional foraging habitat due to a possible increase in prey such as invertebrates which would be associated with this habitat. However, given the aftercare is only for a five year period, it is possible the grassland over a number of years without management may become dominated by grasses, and so

become rank and tussocky which may increase its suitability for harvest mouse. Continued management tailored to the preservation of the grasslands however is likely to keep it diverse and suitable for a range of invertebrate species and thereby likely increasing its foraging value.

- 9.8.30 The planting of broad-leaved woodland, hedgerows and scrub will take longer to mature. Immediately following the aftercare period it is likely these habitats will not be conducive for commuting or for inhabiting due to their restrictive immature growth, and will contain limited foraging potential due to the probable lack of invertebrates. The initial 10-15 years of woodland establishment would likely resemble scrubby habitat, which would probably increase commuting, foraging and inhabiting potential due to an increase in leaf foliage cover and invertebrate assemblage. Between 15-25 years the woodland, hedgerows and scrub may reach thicket stage and thus potentially further increase commuting and inhabiting potential, while a potential increase in leaf litter provides suitable hibernacula resource for European hedgehog. As the woodland matures it will also likely support a higher invertebrate species assemblage and population numbers, and so increase the foraging resource. These resources will gradually improve throughout the 25 year restoration period.
- 9.8.31 Overall, the restored site would complement the woodland/farmland/grassland habitats in the surrounding area, but the fact the restored site would still be semi-mature during this future baseline phase would limit its value. It is assumed by 2048 the creation of new wildflower meadows, woodland and scrub may increase the Mine Sites potential to support terrestrial mammals. The grasslands, hedgerows, woodlands and scrub may provide additional foraging, commuting and residence potential for a variety of species such as badger, brown hare and European hedgehog. Thus, it is assumed the restored site is likely to support a similar range of terrestrial mammal species and are likely to be present throughout the Mine Site including within the former operational area.
- 9.8.32 As such, under the future baseline the Mine Site can be considered to be of moderate biodiversity conservation value for terrestrial mammals, during the semi-mature restored site phase.

Predicted Effects

- 9.8.33 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the restoration plan. This means there may be less foraging and residence habitat available, and the terrestrial mammal population may be smaller than if the Mine Site is restored. In addition, the populations of the species listed above which may otherwise colonise the site will probably not do so during this time. The proposed development incorporates environmental enhancement measures (as outlined in Section 9.5) in order to seek to enhance habitats within the landownership area ahead of the start of the proposed development working period (2023) and to promote local populations of such species during this period (2023-2048). This will comprise:
- Many of the restoration measures proposed outwith the operational area will be implemented prior to 2023. These include the creation and enhancement of hedgerows, creating a network of native shrubs which will connect up habitats in the area and provide commuting and dispersal routes for terrestrial mammals. In addition, the broad-leaved woodland creation to the north of Boulby Gill will be implemented, providing additional foraging and inhabiting habitat for mammals. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period;
 - In addition, measures for habitat enhancement for terrestrial mammals will be provided, including the addition of fruiting plants/shrubs into the hedgerow planting mix to provide additional foraging resources for mammals. Creation of wide grassland strips along field

margins will seek to enhance the field habitats for terrestrial mammals beyond the measures proposed within the current restoration plan.

- 9.8.34 The proposed development would therefore see the operational area retain the grasslands, but lose the opportunity for the natural enhancements provided under the future baseline scenario. The environmental measures and enhancements above and described in Section 9.5 are likely to enhance the habitat resource outwith the operational area to the local terrestrial mammal assemblage during proposed current workings, and will seek to promote the local population levels. The proposed application will however result in a delay to the restoration of habitats within the operational area for a period of 25 years, and therefore terrestrial mammal populations within the Mine Site will be lower than they would otherwise have been than if the Mine Site were restored from 2023. The proposed measures will address this to some extent, and given that the baseline habitat for terrestrial mammals will be enhanced from 2023 and that the operational area restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of terrestrial mammal species in relation to EIA regulations from the continuation of the operational mine. The embedded mitigation would ensure no illegal effects would result.

Semi-aquatic Mammals

Baseline Conditions

Predicted Future Baseline

- 9.8.35 Following completion of the decommissioning and restoration phase, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed immediately following the aftercare, given the shallow soil depths and the local climate, the landscape including hedgerows, woodland, and scrub is likely to still be relatively immature. While it is assumed the new species rich grasslands (meadows and pasture) within the restored site will establish more quickly; the planting of broad-leaved woodland, hedgerow and scrub will take longer to mature. Immediately following the aftercare period it is likely these habitats will not be suitable for holt/resting site creation due to their restrictive immature growth and subsequent lack of cover for protection, The initial 10-15 years of woodland establishment would likely resemble scrubby habitat, which would probably increase commuting and inhabiting potential. Between 15-25 years the woodland, hedgerows and scrub may reach thicket stage and thus likely further increase commuting and inhabiting potential. These resources will gradually improve throughout the 25 year restoration period.
- 9.8.36 Overall, the restored site would complement the woodland/farmland/grassland habitats in the surrounding area, but the fact the restored site would still be semi-mature during this future baseline phase would limit its value. It is assumed by 2048 the creation of new watercourses along with a series of permanent ponds and flushes, in addition to the wildflower meadows, woodland and scrub may increase the Mine Sites potential to support semi-aquatic mammals. Although the watercourses to be opened up (i.e. Boulby Gill) may not be suitable for foraging, they may provide opportunity for commuting to a resting place/holt location, for which the woodland and scrub are likely to provide potential for. This potential is limited however, as these watercourses do not connect to additional watercourses and as such their potential for commuting is reduced. Thus, it is assumed the restored site is likely to support a similar range of semi-aquatic mammal species as those recorded within the survey area, such as otter, and are likely to be present throughout the Mine Site including within the former operational area.

9.8.37 As such, under the future baseline the Mine Site can be considered to be of low-moderate biodiversity conservation value for semi-aquatic mammals, during the semi-mature restored site phase.

Predicted Effects

9.8.38 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the restoration plan. This means there is likely to be less resting place/holt creation and commuting habitat available. Although there may be less habitat, it is likely the semi-aquatic mammal population may not decrease as a result of the Mine Site not being restored. In addition, the populations of the species listed above which may otherwise colonise the site will probably not do during this period. Due to a residual amount of potential commuting and residential opportunities lost, the proposed development incorporates environmental enhancement measures (as outlined in Section 9.5) in order to seek to enhance habitats within the landownership area ahead of the start of the proposed development working period (2023) and to promote local population and the distribution of such species during this period (2023-2048). This will comprise:

- Many of the restoration measures proposed within the habitat management area but outwith the operational area will be implemented prior to 2023. These include the broad-leaved woodland creation to the north of Boulby Gill will be implemented, providing additional foraging, holt creation/resting site habitat for semi-aquatic mammals. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period.

9.8.39 The environmental measures and enhancement above and described in Section 9.5 are likely to enhance the habitat resource outwith the operational area to the local semi-aquatic mammal population during the proposed current workings, and will seek to promote the local population levels. The proposed application will however result in a delay to the restoration of habitats within the operational area for a period of 25 years, and therefore semi-aquatic distribution within the Mine Site will be lower than they would otherwise have been than if the Mine Site were restored from 2023. The proposed measures will address this to some extent, and given that the baseline habitat for semi-aquatic mammals will be enhanced from 2023 and that the operational area restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of semi-aquatic mammal species in relation to EIA regulations from the continuation of the operational mine. The embedded mitigation would ensure no illegal effects would result.

Assessment of Effects: Reptiles

Baseline Conditions

Predicted Future Baseline

9.8.40 Following completion of the decommissioning and restoration phase, a five year aftercare period will ensue that intends to bring the land to the required standard for the after uses. It is assumed immediately following the aftercare, given the shallow soil depths and the local climate, the landscape including hedgerows, woodland, and scrub is likely to still be relatively immature. It is assumed however that new species rich grasslands (meadows and pastures) within the restored site will establish quickly (within a five year period following sowing) and may provide additional foraging habitat due to a possible increase in prey such as flies and ants which would be associated

with this habitat. These however are unlikely to provide any additional refuge or hibernacula opportunities, but may increase opportunities for basking. The close proximity of the new grasslands on the former operational area to the existing grasslands adjacent to the south suggests it may not take long for the new grasslands to become colonised.

- 9.8.41 The planting of broad-leaved woodland, hedgerows and scrub will take longer to mature. Immediately following the aftercare period it is likely these habitats will not be conducive for commuting or for inhabiting (refuge/hibernation) due to their restrictive immature growth, and will contain limited foraging potential due to a lack of invertebrates. The initial 10-15 years of establishment would likely resemble scrubby habitats with a fairly open canopy that may provide some opportunity for basking within. The maturing hedgerows may provide an increase in commuting opportunities. Between 15-25 years the woodland, hedgerows and scrub may reach thicket stage and thus increase the potential to support hibernating/refuging reptiles even further; there will likely be an increase in cover and leaf litter to assist with predator avoidance, as well as the build-up of dead wood, twigs and branches for refugia and hibernacula. However, as the woodland matures and the canopy closes up it will reduce basking potential within the woodland due to a decrease in sunlight entering, and reptiles are likely to be only present at the woodland edge rather than within the woodland.
- 9.8.42 Overall, the restored site would complement the woodland/farmland/grassland habitats in the surrounding area, but the fact the restored site would still be semi-mature during this future baseline phase would limit its value. It is assumed by 2048 the creation of new wildflower meadows, woodland, hedgerows and scrub may increase the Mine Site's potential to support reptiles. The wildflower meadows may provide suitable foraging and basking habitat, with the scrub and woodland likely to provide foraging and refugia/hibernating potential. The near mature hedgerows planted throughout the Mine Site, along with the greater grassland extent may provide suitable commuting routes. Thus, it is assumed the restored site is likely to support a similar range of reptile species as those recorded within the survey area, such as slow worm, and are likely to be present throughout the Mine Site including within the former operational area.
- 9.8.43 As such, under the future baseline the Mine Site can be considered to be of moderate-high biodiversity conservation value, during the semi-mature restored site phase.

Predicted Effects

- 9.8.44 Although some land will be restored to pasture early, as a result of the deconstruction works proposed during the first 10 years of the Proposed Development, the majority of site will continue working and will result in a delay to the implementation of the restoration plan. This means there is likely to be less foraging, commuting, and refugia/hibernacula habitat available and the reptile population may be smaller than if the Mine Site is restored. In addition, the populations of the species listed above which may otherwise colonise the site will probably not do so during this time. As such, the proposed development incorporates environmental measures (as outlined in Section 9.5) in order to seek to enhance habitats within the landownership area ahead of the start of the proposed development working period (2023) and to promote local populations of such species during this period (2023-2048). This will comprise:
- Many of the restoration measures proposed outwith the operational area will be implemented prior to 2023. These include the creation and enhancement of hedgerows, creating a network of native shrubs which will connect up habitats in the area and provide commuting and dispersal routes for reptiles. In addition, the broad-leaved woodland creation to the north of Boulby Gill will be implemented, providing additional foraging, refuge/hibernacula terrestrial habitat for reptiles. A detailed habitat management plan will be produced for these areas, which will specify measures for planting and aftercare for a 25 year period;

- in addition, measures for habitat enhancement for reptiles will be provided, including the creation of hibernacula piles, and creation of wide grasslands strips along field margins, in addition to the scrub management of the open mosaic habitat to prevent the scrub encroaching. This will seek to enhance the field habitats for reptiles beyond the measures proposed within the current restoration plan.

9.8.45 The proposed development would therefore see the existing terrestrial habitat outwith the operational area being retained. The environmental measures and enhancements above and described in Section 9.5 are likely to enhance the habitat resource to the local reptile assemblage outwith the operational area, and will seek to promote the local population levels during proposed current workings. The proposed application will however result in a delay to the restoration of habitats within the operational area for a period of 25 years, and therefore reptile populations within the Mine Site will be lower than they would otherwise have been than if the Mine Site were restored from 2023. The proposed measures will address this to some extent, and given that the baseline habitat for reptiles will be enhanced from 2023 and that the operational area restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of reptile species in relation to EIA regulations from the continuation of the operational mine. The embedded mitigation would ensure no illegal effects would result.

9.9 Predicted Effects: Post Working Phase

This section includes the assessment of the predicted effects of the proposed development during demolition and landform creation on the predicted future baseline. As previously discussed in Section 9.3.3 – 9.3.7, the limitations of assessing the significance of important biodiversity receptors has ensued that potential significance of effects and ecological receptor values has been assessed at a high level. Due to limitations of not knowing which species will be present on site and where (if present), assumptions have been made on what the future baseline would be during this period, and these assumptions are based on baseline survey data and professional judgement.

Assessment of Effects: Bat Roosting: Non-operational Area (mature restored site phase)

9.9.1 Following the working phase of the proposed development, the proposals would see the Mine Site enter the demolition and landform creation phases, then restoration and aftercare before becoming the established final site. By this time the future baseline scenario would see a mature restored site in place. The Proposed Development would essentially be the same process as the prior phases of the future baseline and can therefore be seen as a delay to the restoration of habitats within the operational area for a period of 25 years. Bat populations within the Mine Site will be lower than they would otherwise have been than if the Mine Site were restored from 2023. The proposed measures under the habitat management plan will address this to some extent, and given that the baseline habitat for bats will be enhanced from 2023 and that the operational area restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of bat species in relation to EIA regulations once the final restored site is established. In addition, the embedded mitigation would ensure no illegal effects would result.

Assessment of Effects: GCN (mature restored site phase)

9.9.2 Following the working phase of the proposed development, the proposals would see the Mine Site enter the demolition and landform creation phases, then restoration and aftercare before becoming the established final site. By this time the future baseline scenario would see a mature restored site in place. The Proposed Development would essentially be the same process as the prior phases of the future baseline and can therefore be seen as a delay to the restoration of habitats within the operational area for a period of 25 years. GCN populations within the Mine Site will be lower than

they would otherwise have been than if the Mine Site were restored from 2023. The proposed measures under the habitat management plan will address this to some extent, and given that the baseline habitat for GCN will be enhanced from 2023 and that the operational area restoration will still occur from 2048, it is considered that there will not be a significant adverse effect on the conservation status of GCN species in relation to EIA regulations once the final restored site is established. In addition, the embedded mitigation would ensure no illegal effects would result.

9.10 Mitigation and Enhancement Measures

9.10.1 Opportunities to mitigate potential adverse effects have already been incorporated within the development or are imposed through a number of existing regulatory controls. It is the development that exists with these measures and controls in place that has been subject to assessment. No assessment has been undertaken of the Proposed Development excluding these measures and regulatory controls as a scheme is not being proposed without them. No other measures are proposed as mitigation in relation to the effects that are identified in this ES.

9.11 Conclusions of Significance Evaluation

9.11.1 This chapter of the ES sets out an assessment of the effects of the proposed development on the following receptors, which were identified as having the potential to be significantly affected and/or for wildlife legislation to be contravened.

9.11.2 Table 9.8 sets out a summary of effects.

Table 9.8 Summary of Adverse Effects

Receptor and Summary of Effects	Significance	Summary Rationale for Significance Evaluation
Bats: Decline in population size; injure/kill; impair ability to survive; damage/destroy resting place	Not significant	The future baseline conditions would see an improvement to the habitats available for bat use, and therefore should see an increase in bat usage. However, this would be from a small current baseline population within the operational area and the sub-optimal areas to the north, east and west of the Mine Site, where the majority of enhancements is proposed. Environmental measures and site specific mitigation in relation to bats would boost the importance of an ongoing operational mine for this species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status
GCN: Decline in population size; injure/kill; impair ability to survive; damage/destroy resting place	Not significant	The future baseline conditions would see an improvement to the habitats available for GCN use, and therefore should see an increase in GCN usage. However, this would be from an assumed likely small current baseline population from one pond within the Mine Site. Environmental measures and site specific mitigation in relation to GCN would boost the importance of an ongoing operational mine for this species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status

Receptor and Summary of Effects	Significance	Summary Rationale for Significance Evaluation
North York Moors SAC: Damage to habitats of qualifying features	Not significant	Levels of nitrogen deposition from operations at Boulby would be limited due to distances from the SAC, prevailing wind direction, HGV routes and the nature of the emissions produced. This would render effects to a level which would not affect the receptor's Favourable Conservation Status
North York Moors SPA: Damage to habitats of qualifying features	Not significant	For the reasons provided in relation to the North York Moors SAC qualifying habitats, the proposed application is considered to result in limited additional nitrogen deposition within the boundary of the SPA, at levels which are unlikely to impact on the broad habitats utilised by golden plover and merlin. As a result, it is considered that there would be no significant effects in relation to any of the conservation objectives of qualifying features of the North York Moors SPA.
Amphibians: Decline in population size; injure/kill; impair ability to survive; damage/destroy resting place	Not significant	The future baseline conditions would see an improvement to the habitats available for amphibian use, and therefore should see an increase in amphibian usage. Environmental measures and site specific mitigation in relation to amphibians would boost the importance of an on-going operational mine for these species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Aquatic notable fauna: injure/kill; impair ability to survive; damage/destroy resting place	Not significant	The future baseline conditions would see an inconsequential effect for amphibian use, as they would neither increase nor decrease aquatic notable fauna usage. Environmental measures and site specific mitigation in relation to aquatic notable fauna would render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Birds: delay to restoration of habitats within the operational site resulting in reduced habitat resource for bird species.	Not significant	Compensatory habitat creation to be provided within the landownership area outwith the operational area and restoration will still occur from 2048, hence no significant impacts on conservation status of priority bird species.
Invertebrates: Decline in population size	Not significant	The future baseline conditions would see an improvement to the habitats available for invertebrate use, and therefore should see an increase in invertebrate usage. Environmental measures and site specific mitigation in relation to invertebrates would boost the importance of an on-going operational mine for these species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Terrestrial mammals: Decline in population size; injure/kill; damage/destroy resting place	Not significant	The future baseline conditions would see an improvement to the habitats available for terrestrial mammal use, and therefore should see an increase in terrestrial mammal usage. However, this would be from an assumed likely small current baseline population. Environmental measures and site specific mitigation in relation to terrestrial mammals would boost the importance of an on-going operational mine for these species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status

Receptor and Summary of Effects	Significance	Summary Rationale for Significance Evaluation
Semi-aquatic mammals: Injure/kill; impair ability to survive; damage/destroy resting place	Not significant	The future baseline conditions would see an improvement to the habitats available for semi-aquatic mammal use, and therefore should see an increase in semi-aquatic mammal usage. However, this would be from an assumed likely small current baseline population. Environmental measures and site specific mitigation in relation to semi-aquatic mammals would boost the importance of an on-going operational mine for these species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status
Reptiles: Kill/injure	Not significant	The future baseline conditions would see an improvement to the habitats available for reptile use, and therefore should see an increase in reptile usage. However, this would be from an assumed likely good current baseline population. Environmental Measures and site specific mitigation in relation to reptiles would boost the importance of an on-going operational mine for these species. This should render residual effects to a level which would not affect the receptor's Favourable Conservation Status

9.11.3 For the reasons that are set out in Sections 9.7 – 9.8 none of the potential negative effects on these receptors in relation to EIA regulations is assessed as likely to be significant. Furthermore it is concluded that the scheme would not contravene legal requirements relating to legally protected species. The embedded mitigation would ensure no illegal effects would result.

9.12 Implementation of Mitigation Measures

9.12.1 Details of the proposed environmental measures, responsibilities and compliance mechanism for implementing these, are provided in Table 9.9.

Table 9.9 Implementation of Environmental Measures/Mitigation

Environmental measure/mitigation	Responsibility for implementation	Compliance Mechanism
Habitat management and creation	ICL Boulby	Preparation and implementation of a Habitat Management Plan (HMP) to the satisfaction of LPA required through a planning condition
Dust control and associated monitoring	ICL Boulby	The continuing implementation of dust control measures that are currently in place, and adherence to relevant best practice guidance. Required through a planning condition.
Water pollution and associated monitoring	ICL Boulby	The continuing implementation of water pollution control measures that are currently in place, and adherence to relevant best practice guidance. Required through a planning condition.
Atmospheric pollution and associated monitoring	ICL Boulby	The continuing implementation of atmospheric pollution measures that are currently in place, and adherence to relevant best practice guidance. Required through a planning condition.

Environmental measure/mitigation	Responsibility for implementation	Compliance Mechanism
Bat mitigation	ICL Boulby	Preparation and implementation of a Habitat Management Plan (HMP) to the satisfaction of LPA required through a planning condition
GCN mitigation	ICL Boulby	Preparation and implementation of a Habitat Management Plan (HMP) to the satisfaction of LPA required through a planning condition
Statutory site mitigation (see atmospheric pollution)	ICL Boulby	The continuing implementation of atmospheric pollution measures that are currently in place, and adherence to relevant best practice guidance. Required through a planning condition.

9.13 References

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10. Marine Environment

- 10.1.1 At the time of the Scoping exercise, it was proposed that the Proposed Development would include the extraction of sylvinitic and the processing required to convert sylvinitic into MOP. It is this process that created the mine tailings which were then discharged to sea in an effluent form. This effluent consisted of sea water, groundwater pumped out of the underground mine workings and surface water run off from the Mine Site. The solid particles from the tailings settled onto the sea bed in the Boulby Sand Patch and it is this settlement of materials that had the potential to change the benthic habitats and impact on the marine life using the sand patch.
- 10.1.2 Since the Scoping exercise, the extraction of sylvinitic has ceased at Boulby Mine and it is not proposed to re-commence this extraction as part of the Proposed Development. No tailings will therefore be produced and discharged to sea, and no settlement of solids will occur on the sea bed. Over time, the material which has previously settled will be eroded away by the movement of the tidal waters, eventually returning the Boulby Sand Patch to a natural condition.
- 10.1.3 In the Proposed Development, effluent will continue to be discharged in order to manage the groundwater and surface water runoff collected from the Mine. Surface water run-off is already treated to ensure no pollutants reach the effluent discharge and the groundwaters from the underground working have no opportunity to pick up pollutants. The groundwaters may contain some dissolved mineral from the mine workings. However, the groundwaters are mixed with around 1,000m³ of seawater per day before being discharged. This both cools the groundwaters and also dilutes the effects of any dissolved mineral in the waters. Further dilution then occurs once the discharge reaches the North Sea. All of these factors mean that there will be no discernible impact on the marine environment. No assessment of the marine environment is therefore progressed in the EIA as no significant effects can occur.



11. Historic Environment

Non-Technical Summary

This assessment considers the effects of the proposed development upon the historic environment and incorporates an assessment of indirect effects upon designated assets that surround the site. Due to the indicative nature of restoration plans and the potential for the historic environment to be better recorded during the continued operation of Boulby Mine direct effects and indirect effects upon non-designated assets arising from decommissioning of the proposed development have not been assessed at this time. The assessment of indirect effects has been undertaken to the presence or eventual absence of the mine's buildings alone.

The assessment has identified that no significant negative effects would occur as a result of the continued use of the Boulby Mine although there is the potential for significant beneficial effects to arise from the restoration of the site.

11.1 Introduction and Overview

- 11.1.1 This chapter assesses whether significant effects are likely to occur upon the Historic Environment as a result of the proposed Development at Boulby Mine (hereafter the site). This chapter should be read in conjunction with the development description in Chapter 3 and the Landscape and Visual assessment in Chapter 5.
- 11.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and a detailed assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.
- 11.1.3 Boulby Mine began construction in 1969 and has been in operation since the first potash deposits were extracted in 1973, and as such the site is an established feature within the landscape of the area. Due to the extraction occurring deep below ground level with no material changes occurring at the surface, it does not pose any risk of direct effects occurring upon the historic environment whilst still in use. The site, although established, does appear within the setting of a number of historic assets within the surrounding area. The assessment of this extension of time for the Site will consider the indirect effects arising through change in the setting of assets in relation to the information provided within Chapter 3 of this document.

11.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 11.2.1 A study of Historic Environment related planning policy, legislation and guidance at the national, regional and local level has been undertaken for the site and its locality in order to highlight any requirements which the Proposed Development needs to consider. It is always important that policies, legislation and guidance are taken into consideration as they help to define the scope of assessment and can inform the identification of particular local issues. The importance of cultural heritage and archaeology is recognised in legislation and heritage assets that are deemed to be of particular importance are given legal protection.

11.2.2 Legislation is enforced through planning policy which also protects non-designated elements of the historic environment. The site is located within an area protected by the North York Moors National Park authority for planning purposes and as such it is their policy which is of relevance to this assessment.

Table 11.1 Legislation, National and Local Planning Policies Relevant to Historic Environment

Legislation or Policy Reference	Legislation Summary or Policy Information Relevant to Historic Environment and Proposal
Legislation:	
Ancient Monuments and Archaeological Areas Act 1979	Changes to the fabric of scheduled monuments require consent from the Secretary of State, as advised by Historic England.
Planning (Listed Buildings and Conservation Areas) Act 1990	Covers the registration of Listed Buildings (buildings that are seen to be of special architectural or historic interest) and designation of Conservation Areas (areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance).
National Planning Policy:	
National Planning Policy Framework (NPPF) 2019	<p>Section 16 of the NPPF relates to the Historic Environment, key paragraphs within this section include:</p> <p>Paragraph 193, states that when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset’s conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.</p> <p>Paragraph 194, which states that any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:</p> <ul style="list-style-type: none"> a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional; b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional. <p>NB: Non-designated heritage assets of archaeological interest, which are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.</p> <p>Paragraph 195, states that where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss.</p>
Local Policies:	
North York Moors National Park Authority Local Development Framework: Core Strategy and Development Policies 2008	<p>Chapter 7 of this document focuses on the historic environment of the area and contains a number of policies relating to the historic environment including:</p> <p>Core Policy G, Landscape, Design and Historic Assets: The landscape, historic assets and cultural heritage of the North York Moors will be conserved and enhanced. High quality sustainable design will be sought which conserves or enhances the landscape setting, settlement layout and building characteristics of the landscape character areas identified in the North York Moors Landscape Character Assessment.</p> <p>Development Policy 5, Listed Buildings: Any development which would have an unacceptable impact on the setting of a Listed Building will not be permitted.</p> <p>Development Policy 7, Archaeological Assets: Proposals for development that would have an unacceptable impact on the integrity or setting of a Scheduled Monument, or other sites or remains considered to be of national archaeological importance will not be permitted.</p>



Legislation or Policy Reference	Legislation Summary or Policy Information Relevant to Historic Environment and Proposal
Emerging Local Policies:	
<p>North Yorkshire County Council, City of York Council and the North York Moors National Park Authority Draft Minerals and Waste Joint Plan 2016</p>	<p>Policy D04, Development affecting the North York Moors National Park and the AONBs states that proposals for major development will be refused except in exceptional circumstances and where it can be demonstrated it is in the public interest. The demonstration of exceptional circumstances and public interest will require justification based on the following:</p> <ul style="list-style-type: none"> • Whether any detrimental effect on the environment, the landscape and recreational opportunities, can be moderated to a level which does not significantly compromise the reason for the designation.

Legislative Requirements

- 11.2.3 Under the Ancient Monuments and Archaeological Areas Act 1979, as subsequently amended by the National Heritage Acts 1983 and 2002, sites assessed to be of national importance are required to be compiled in a Schedule of Monuments. These sites are accorded statutory protection and as such their settings must be considered.
- 11.2.4 The Secretary of State is required to compile a list of buildings of special architectural or historical interest under the Planning (Listed Buildings and Conservation Areas) Act 1990. The buildings included in this list are classified as Grades I, II* and II. These assets are accorded statutory protection and as such, any alterations to these building would require listed building consent obtained through the planning process, and their settings must be considered in planning. This act also means that areas of special architectural or historic interest can be designated as conservation areas, the character or appearance of which it is desirable to preserve or enhance.

Guidance

- 11.2.5 Together with the legislation and policy outlined above further guidance is available through the Chartered Institute for Archaeologists (CIfA) and Historic England’s Good Practice Advice in Planning Notes. Guidance that is relevant to this assessment includes:
 - Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment, CIfA 2014;
 - Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment, Historic England 2015;
 - Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets, Historic England 2017.

11.3 Methodology and Approach

Consultation

- 11.3.1 A range of organisations were consulted as part of the EIA scoping process, it was proposed that effects upon the historic environment be scoped out as the extension of time would have no direct impacts upon archaeological remains and no development is going to occur which would present any perceptual change in the settings of heritage assets during the continued operation of the



mine. The Head of Development Management at the North York Moors National Park Authority responded to state that:

‘Boulby mine is less than 2km from the designated Staithes Conservation Area and within a few hundred metres of several listed buildings including Red House Farmhouse to the east, Three Crosses Well to the west and Boulby Grange Farmhouse, barn, pigsty/henhouse and stable to the north. Due to the proximity of the mine to these heritage assets and the baseline position that needs to be considered if the mine were to be decommissioned and the site restored in 2023, the impact on the setting of the Historic Environment should be included and not scoped out of the ES.’

11.3.2 As a result of this response further consultation was undertaken with Historic England and the North York Moors Senior Archaeological Conservation Officer and Head of Development Management. Table 11.2 below summarises this consultation and its implications on this assessment.

Table 11.2 Consultation

Consultee	Summary of Response	Addressed in the ES
Historic England: Martin Lowe Principal Inspector of Historic Buildings and Areas North East Region	On the basis that above ground form of the mine would not change markedly in scale, if at all then we agree that a 2km buffer zone of analysis would be adequate to consider impacts upon the historic environment.	All designated assets within 2km and identified assets out to 5km of the site boundary were considered during the production of a refined scope of assessment which forms Appendix A of this chapter.
Historic England: Keith Emerick Inspector of Ancient Monuments Yorkshire Region	The Historic England Development Management team at the York office is content with the suggested 2km search area for setting affects alone for designated heritage assets. They understand that the proposal refers to the continued use of the existing mine.	No further adjustment to the methodology required.
North York Moors Senior Archaeological Conservation Officer and Head of Development Management	The proposed approach of assessing the impact against both presence and eventual absence of the mine on known designated assets is acceptable. The approach of dealing with undesignated assets close to when the restoration plans are being actively finalised seems appropriate in the circumstances.	The assessment has been undertaken with restoration plans being considered as indicative at this stage. The full methodology for assessment of the presence and eventual absence of Boulby Mine is provided in paragraph 1.3.5-1.3.13.

Data Gathering Methodology

11.3.3 Following the consultation outlined above, data relating to the National Heritage List for England (NHLE) was collected out to 5km from the site boundary (hereafter study area) from the Historic England GIS datasets (Historic England Dataset website) and relevant Planning Authority websites in relation to Conservation Areas. The size of the study area was selected in order to compare the historic environment data to the Zone of Theoretical Visibility (ZTV) of the Mine’s chimney stack provided within the EIA Scoping Request (Amec Foster Wheeler, 2017).



- 11.3.4 A site survey was undertaken on 10th November 2017 in order to assess the setting of the historic assets contained within the scope and the potential impact of the presence and removal of the site upon these.

Methodology for Identifying and Assessing Effects

- 11.3.5 Historic England guidance on the setting of heritage assets provides a 5 step approach to proportionate decision-taking. Step 1 is to identify which heritage assets and their settings are affected. Step 2 of this process is to assess whether, how and to what degree the setting makes a contribution to the significance of the heritage asset and Step 3 is to assess the effects of the proposed development. Step 2 is provided in Section 11.6 with Step 3 undertaken in Section 11.7. Step 4 explores the way to maximise enhancement and avoid or minimise harm which is started within Section 11.8. Step 5 involves making and documenting the decision on the proposal and monitoring the outcome and as such will occur as a result of the planning process although Section 11.10 of this report will feed into this process.

Step 1: Identification of Heritage Assets

- 11.3.6 The Heritage Scope provided in Appendix A forms Step 1 of the assessment process. The designated data gathered for the study area was inspected and compared to the ZTV of the site. All assets outside of the ZTV were scoped out and the remaining heritage assets were considered for further assessment based on their current setting, distance from site and the level of potential impact.

Step 2: Assessment of Setting Contribution

- 11.3.7 The NPPF defines the setting of a heritage asset as:

'The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a beneficial or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.'

- 11.3.8 In order to assess the contribution that the setting of an asset makes to the heritage significance of that asset, the setting of the asset must be understood. In some instances, settings of individual assets may be contained within wider asset groups which would in turn have their own setting, such as individual historic buildings within a conservation area or a scheduled monument within a world heritage site. The Historic England Good Practice Advice on Setting states that:

'While setting can be mapped in the context of an individual application or proposal, it cannot be definitively and permanently described for all time as a spatially bounded area or as lying within a set distance of a heritage asset. This is because the surroundings of a heritage asset will change over time, and because new information on heritage assets may alter what might previously have been understood to comprise their setting and the values placed on that setting and therefore the significance of the heritage asset.'

- 11.3.9 Due to the flexible and multi-faceted nature of an assets setting, in the most basic sense, the setting should be considered as anywhere from which the asset can be viewed or experienced.

- 11.3.10 All of the assets included within the Historic Environment scope of assessment are considered to be of high significance and nationally important as a result of their designations. A number of elements can contribute to the significance of an asset and the NPPF states:

‘Significance (for heritage policy): The value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset’s physical presence, but also from its setting.’

11.3.11 Section 11.6 will provide information on the significance of each asset contained within the scope of assessment, as identified in Step 1, and detail the current setting of the assets. It will identify aspects of the setting that tie into its significance and thereby state whether, how and to what degree the setting contributes to this.

Step 3: Assessment of Effects

11.3.12 This step, carried out in Section 11.7, will focus on how the Proposed Development at the site and the subsequent final decommissioning of the site will affect the setting of the assets contained within the scope, specifically relating to those aspects that contribute to the assets significance as identified in Step 2. Affects upon the setting of heritage assets can be both beneficial and negative as explained within the Historic England guidance on the setting of heritage assets which states:

‘Where the significance of a heritage asset has been compromised in the past by unsympathetic development affecting its setting, to accord with NPPF policies, consideration still needs to be given to whether additional change will further detract from, or can enhance, the significance of the asset. Negative change could include severing the last link between an asset and its original setting; positive change could include the restoration of a building’s original designed landscape or the removal of structures impairing key views of it.’

11.3.13 Due to the potential for beneficial and negative effects to occur upon the heritage significance an assets setting, both potential outcomes need to be considered. The assessment of effects upon aspects of the setting that contribute to a heritage asset’s significance will be described against the framework set out in Table 11.3 below.

11.3.14 Due to the standard use of the word ‘significance’ in the description of sensitivity for heritage assets, there is potential for confusion between significance in a sensitivity context and an EIA context (i.e. whether the effects would be significant or not significant). Therefore in this chapter, the assessment text does not describe the effects as significant or not significant and only describes the effects as a description from negligible to substantial. For clarity, anything described as substantial would be considered significant in EIA terms.

Table 11.3 Assessment of Effects

Magnitude of Impact	Heritage Significance			
	Negligible	Low	Medium	High
High Negative	Low	Moderate	Substantial	Substantial
Medium Negative	Low	Low	Moderate	Substantial
Low Negative	Negligible	Low	Moderate	Moderate
Negligible Negative	Negligible	Negligible	Low	Low
Negligible Beneficial	Negligible	Negligible	Low	Low
Low Beneficial	Negligible	Low	Moderate	Moderate



Magnitude of Impact	Heritage Significance			
	Negligible	Low	Medium	High
Medium Beneficial	Low	Low	Moderate	Substantial
High Beneficial	Low	Moderate	Substantial	Substantial

Step 4: Maximising Enhancement and Minimising Harm

11.3.15 Any harm or enhancement to the setting of the heritage assets as a result of the Proposed Development of the site and the subsequent decommissioning of the site; as identified within Step 3 will be further discussed within Section 11.9.

Step 5: Making and Documenting Decisions

11.3.16 This step will largely occur as a result of the planning process and the decision of the application although Section 11.10 will put forward mechanisms for how these decisions and subsequent monitoring could be implemented.

11.4 Baseline

Current Baseline

11.4.1 As the Site has been in operation since the 1970s and the extraction would occur far beneath the superficial geological deposits, the mine is an established part of the landscape and does not currently cause any new harm to potential archaeology within the site or the setting of surrounding historic assets.

Predicted Future Baseline

11.4.2 If this Proposed Development is not approved, the mine would cease to operate in 2023 and be restored to a mixture of agricultural land, woodland and grassland. The restoration of the site would not affect any of the identified heritage assets directly but it may affect the site archaeological remains. The setting of some assets may also be affected as the surface features and activity associated with the existing mine are removed and replaced with more natural features. The restoration scheme is also expected to incorporate interpretive features to highlight the industrial heritage of the site.

11.4.3 However, if the Proposed Development is approved, in practical terms the future baseline would retain many elements of the Site which are contained within the Current Baseline for the further 25 year period of operation. Some buildings and structures would be removed over the first 10 years of the Proposed Development, reducing the footprint of built development at the Site and the height of development in some places and bringing forward elements of the final restoration scheme. The future baseline would then undergo a substantial change with the subsequent final demolition and restoration of the remainder of the site at the end of the planning permission. Restoration measures may have an impact upon the setting of the surrounding historic landscape and do have the potential to impact upon on site archaeological remains. As the detail of restoration and demolition is key to the assessment of direct effects upon the archaeology, a full assessment of this should be undertaken when the restoration plans are confirmed. The impact upon setting is however included within this report as the specific appearance of the site will not have such a precise impact but the lack of buildings on site will be a notable change.



11.5 Scope of Assessment

Limitations in the Preparation of the ES

- 11.5.1 Other than the general limitations relating to the future baseline identified in Chapter 2, the following is relevant.
- 11.5.2 Due to the detail of restoration and demolition being key to the assessment of direct effects upon archaeology a full assessment of this should be undertaken when the final restoration plans are confirmed. The proposed deconstruction works would not alter this view, as the land within this area was fully excavated and examined prior to the original site clearance works in the late 1960s¹. This is also true for the Grade II listed Three Crosses Well (NHLE 1139651) which is the only designated heritage asset present within the site boundary. Change to setting of designated assets is however included within this report as the specific appearance of the site will not have such a precise impact on assets further afield, but the lack of buildings on site will be a notable change.
- 11.5.3 As this proposal is for an extension in time with the restoration and demolition to be fully detailed nearer that time, the assessment of non-designated assets for both direct and indirect effects arising from decommissioning should be undertaken when the restoration plans are confirmed and nearer the end of the mine's operation. This would allow for any inclusions to the Historic Environment Record or National Heritage List for England during the remaining operation time to be considered and avoid any unnecessary repetition of information.

Assessment of Effects

- 11.5.4 This scope provided in Appendix A outlined that effects arising through change to the settings of non-designated heritage assets have been scoped out. This was due to the generally lower significance of non-designated assets which in relation to the proposal for retention of a feature that is already part of the current landscape and therefore setting meant that no significant effects were anticipated upon these. If known non-designated assets of higher significance and sensitivity were present within the area these would be considered at the request of the local authority archaeologist as they are considered to have a greater understanding of the study area and the non-designated assets contained therein. No non-designated assets were requested for consideration as it was agreed that these should be assessed at the time of final decommissioning.
- 11.5.5 The inspection of designated assets within the study area compared to the ZTV and with consideration of the assets nature, location and importance clarified that the following assets would be included within the assessment of effects:
- The Staithes Conservation area and associated listed buildings within the ZTV:
 - ▶ The Royal George Public House (NHLE 1148908);
 - ▶ Grimes Cottage (NHLE 1148935);
 - ▶ 3 and 4, Boathouse Yard (NHLE 1148936);
 - ▶ Premises occupied by Mrs Thompson (NHLE 1179472);
 - ▶ York House (NHLE 1301928);
 - ▶ Lifeboat House (NHLE 1312642);

¹ Aberg, A, & Smith, AN, 1988 'Excavations at the medieval village of Boulby, Cleveland' in Manby, TG (ed), Archaeology in Eastern Yorkshire. Sheffield: Department of Archaeology and Prehistory, University of Sheffield, 149–75.

- ▶ Royal George Warehouse (NHLE 1316069);
- ▶ 2, Boathouse Yard (NHLE 1316077);
- ▶ 67, High Street (NHLE 1316102);
- ▶ East View (NHLE 1316105); and
- ▶ 4, North Side (NHLE 1329582).
- Scheduled Monuments:
 - ▶ Boulby Alum Quarries and works (NHLE 1018336);
 - ▶ Round barrow on Boulby Cliffs known as the site of Rockcliff Beacon (NHLE 1018657); and
 - ▶ WWI Early Warning Acoustic Mirror east of Boulby Barns Farm (NHLE 1020760).
- Grade II Listed Buildings outside of Staithes:
 - ▶ Red House Farmhouse (NHLE 1139650);
 - ▶ Three Crosses Well (NHLE 1139651);
 - ▶ Boulby Barns Cottage (NHLE 1139690);
 - ▶ Boulby Grange Farmhouse (NHLE 1139691);
 - ▶ Stable Block northwest of Boulby Grange Farmhouse (NHLE 1139692);
 - ▶ Barn and Pigsty/Henhouse northwest of Boulby Grange Farmhouse (NHLE 1139693);
 - ▶ Church of St Nicholas (NHLE 1148616);
 - ▶ Gin-Gang to east of Manor Farmhouse (NHLE 1148617);
 - ▶ Oak House Farmhouse and attached Stable and Barn (NHLE 1148618);
 - ▶ Manor Farmhouse (NHLE 1173281);
 - ▶ Listening Post west of Boulby Barns Cottage (NHLE 1263428);
 - ▶ Ging-Gang to west of Home Farmhouse (NHLE 1316229);
 - ▶ Blacksmiths Shop at Turton Cottages (NHLE 1389511).

11.5.6 These assets are illustrated in Figure 11.1.

11.6 Contribution of Setting

Staithes Conservation Area and Associated Grade II Listed Buildings

Significance

11.6.1 This conservation area has a high architectural interest due to the quantity of listed buildings contained within, a high historical interest due to the early origins of the settlement demonstrated by its name coming from the Old English for 'landing-place', it's rich fishing and mining background and its associations with Captain James Cook (Welcome to Staithes website). The early origins of activity here also suggest a potentially high archaeological interest.

- 11.6.2 The individual listed buildings included within the scope all date from the late-18th or early-19th century with the exception of the Royal George Warehouse (NHLE 1316069) which may be earlier and York House (NHLE 1301928) which was built in the mid-19th century. The buildings are built of stone, often rendered and display pantile or welsh slate roofs. These all have a high historical interest. They also have a high architectural interest as a group although individually this interest is reduced.
- 11.6.3 All assets at Staithes included within this assessment are of **high heritage significance** as demonstrated by their designated status.

Setting

- 11.6.4 The historic village of Staithes is located at the mouth of the Staithes Beck in a gap with the cliffs of Cowbar Nab and Penny Nab on either side. It is these cliffs, together with the neighbouring sea that predominantly provide the setting of the conservation area and this topography provides a sheltered, enclosed feel to the older settlement located here. The newer elements of Staithes (which are outside of the conservation area) together with the higher agricultural land surrounding the conservation area are not visible from the lower levels although more visibility of inland element looking away from the designated area are available from the southern extents of the conservation area.
- 11.6.5 The setting of the listed buildings contained is largely provided by the conservation area itself and the surrounding historic buildings contained within. A number of buildings, including the Royal George Warehouse (NHLE 1316069) and the Lifeboat House (NHLE 1312642) are also clearly connected to the sea.

Contribution of Setting

- 11.6.6 The shelter provided by the cliffs has resulted in very limited recent development within the Staithes Conservation area and due to the screening that this provides it has preserved the historic character of the old village as a whole. The coastal location allows for the historic interest of the area to be easily understood and demonstrates the reason for the settlements development.
- 11.6.7 The individual buildings contained, although important in their own rights, have a far greater architectural and historical interest as a group and their appearance, nestled between the cliffs, and their relationship to each other and the sea significantly contributes to their individual significance, experience and understanding.

Boulby Alum Quarries and Works Scheduled Monument (NHLE 1018336)

Significance

- 11.6.8 This asset is of **high heritage significance** as demonstrated by its scheduled status. It is one of only 50 Alum sites identified within the UK and is a superb example that contains elements relating to many aspects of the extraction, initial processing and transportation of the material.
- 11.6.9 The Boulby alum works was one of the most productive and long lived in the region, first started in the 1650s. Despite fluctuations in the price of alum in the 18th century, the works thrived and expanded westward with the opening of the New Works in 1784. Technological improvements led to further increases in production and the halving of the workforce. The sale of by-products such as Epsom salts and slam (a material used in glass manufacture) prolonged its life until the closure of the works in 1871 (Historic England List Entry).

- 11.6.10 Due to the longevity of this mine together with the rarity of this asset type, the Boulby Alum Quarries and Works have a high value for its historic interest and the remains of processing works and transport also provides a high archaeological interest.

Setting

- 11.6.11 The setting of this heritage asset changes as the viewer moves around the designated area. Many of the central aspects where extraction took place are set within the wider workings and screened from the neighbouring land. Views along the coast and down the cliff are available from many points around the scheduled area with the neighbouring land between this monument and the site only available from the southern extents of the designated area.

Contribution of Setting

- 11.6.12 The coastal location of this asset is typical of alum mining and as such, views of the sea aid the understanding of the monument as alum shale was extracted from quarries sited on steep inland hillsides or coastal cliffs. The inland setting of this monument, although less prominently visible, also makes a significant contribution to the assets importance as it is this mine that provided much of the employment within the area at the time as described within Pigot's 1834 Directory of County Durham which states that:

'Staithes is a hamlet, in the parish of Hinderwell, in the same division and liberty as Skipton, 12 miles N.E. from Guisborough, and 11 N.W. from Whitby, situate on the coast of the North Sea, immediately under Cow-bar Nab. About one mile hence are the extensive Boulby Alum Works, belonging to Messrs. Baker and Jackson, superintended by Mr. George Westgarth; these works employ many of the industrious poor'. (Durham Mining Museum website).

- 11.6.13 This connection between the industrial site and the wider area around it is also illustrated through the hamlet of Boulby itself which was built almost exclusively for the alum workers (Historic England List Entry).

Round Barrow on Boulby Cliffs known as the site of Rockcliff Beacon Scheduled Monument (NHLE 1018657)

Significance

- 11.6.14 This round barrow is of **high heritage significance** due to its archaeological interest as a monument dating back to the late Neolithic or early Bronze Age period. It was partially excavated in 1913, revealing a cist burial, consisting of stone slabs set into the old ground surface beneath the mound which would originally have surrounded a cremation. The remains of two cremations were found as well as cup-marked stones (Historic England List Entry). The presence of cup-marked stones also provide this monument with a potentially high level of artistic interest.

Setting

- 11.6.15 This barrow is one of several that are located along the northern and eastern edges of the North York Moors and as such it is the National Park that provides the primary setting for this asset. This is an area that has been defined in recent times although it has provided protection against further change and has helped to preserve associated monuments within the wider landscape. Some more recent developments are however present including farmsteads, cottages and a telecommunications mast.

Contribution of Setting

- 11.6.16 The open areas of agricultural land surrounding this monument contribute to the understanding of the original landscape although it is still much changed due to agricultural practices and cultivation. The coastal views may also contribute to the experience of the asset today although we cannot know with certainty why the location was chosen at the time of construction. Due to the age and funerary nature of this monument none of the surrounding designated assets included within the scope contribute to the setting of this asset.

WWI Grade II Listed Listening Post (NHLE 1263428) and Scheduled Early Warning Acoustic Mirror East of Boulby Barns Farm (NHLE 1020760)

Significance

- 11.6.17 This monument, built in 1916, was designed to provide early warning of approaching aircraft during the First World War. It was used specifically to provide early warning of Zeppelin attacks on the Skinningrove Iron Works 5km to the north west. The Skinningrove works were bombed many times because at the time they manufactured high explosives and later in the war, mustard gas (Historic England List Entry). Due to the quick advancement in aviation technology these sound mirrors provided less warning as aircraft became faster and eventually this early warning system was replaced by radar.
- 11.6.18 A national survey of acoustic early warning devices has identified only around 11 sites where remains of acoustic detection survive. This sound mirror is one of four known surviving examples in the north east of England. It is the only one where the location and earthwork remains of the listening trench survive and important evidence of how the mirror operated in the field will be preserved (ibid.). Due to the rarity of this monument and the time period that it related to, this Acoustic Mirror and its associated earthworks are considered to have a high historical, architectural and archaeological interest. These aspects demonstrate that the asset is of **high heritage significance**.

Setting

- 11.6.19 The coastal setting of this monument is key to the understanding of the acoustic mirror as this is from where aircraft and zeppelins would approach. The wider setting of the asset incorporates surrounding industrial aspects such as mining together with closer, rural, quiet agricultural land.

Contribution of Setting

- 11.6.20 Due to this asset relating to defence of the surrounding area both the views out to sea and the associated surrounding industrial complexes, particularly Skinningrove and the intervening area to the west of the asset make an important contribution to the understanding and experience of the asset and as such its setting and heritage significance. The ability to be able to listen for approaching aircraft or zeppelins was essential to the use of this asset and as such the peaceful and quiet nature of the surrounding open land is also a key aspect to the setting of the monument. Although there are farmsteads and smaller settlements also contained in the immediate area, these do not offer any connection to the acoustic mirror.

Grade II Listed Farm Buildings at Boulby (NHLE 1139650, 1139690, 1139691, 1139692 and 1139693)

Significance

- 11.6.21 These buildings are all considered to be of **high heritage significance** as demonstrated by their listed status and predominantly date from the early-mid 19th century with the exception of the Boulby Barns Cottage (NHLE 1139690) which dates back to the mid-17th century as a direct result of the scheduled Boulby Alum Works (NHLE 1018336) to the north and the need for accommodation of the workers there. The buildings at Boulby Grange are also connected to the alum works as this provided housing for George Dodds (The Telegraph website) who was appointed chief agent at Boulby Alum Works in 1772 (Durham University website). The buildings are constructed of dressed sandstone with either welsh slate or pantile roofs which is typical of the historic settlements within the wider area. These structures have value for their architectural and historical interest.

Setting

- 11.6.22 The current setting of these buildings is predominantly provided by the surrounding rural landscape with sea views and their coastal location also being notable. Modern structures such as the Grade II listed Listening Post (NHLE 1263428) and the current Boulby Potash Mine appear in the wider surroundings.

Contribution of Setting

- 11.6.23 Due to the origins for the majority of these buildings the scheduled remains of the Boulby Alum Works (NHLE 1018336) along the cliffs provides an important aspect of the setting for the structures at Boulby Grange the Boulby Barns Cottage as it provides understanding of their origins and growth of settlement in the area. Their continued use and success is also linked to the surrounding cultivated landscape which gives the structures their current context as part of a rural farming community and it is this that provides the primary setting for Red House Farmhouse (NHLE 1139650) further to the east. The coastal views and open rural landscape add to the experience of the structures and demonstrates their scenic location within the North York Moors National Park which also exhibits the traditional nature of the structures through the materials used matching many other settlements within the park.

Grade II Listed Three Crosses Well (NHLE 1139651)

Significance

- 11.6.24 This listed building is of **high heritage significance** as demonstrated by its listed status. The building itself consists of the remains of a medieval well that is built into earth bank, now partly buried and not a particularly notable feature within the landscape. It is, however, linked to many surrounding historic settlements due to the water it provided and is in the vicinity of the former Boulby Hall, the site of which is shown on first edition Ordnance Survey maps in the area of the existing Boulby Mine complex. Due to these links this asset is considered to have a high significance for its historic interest and a potentially high value for its architectural and archaeological interest.

Setting

- 11.6.25 Three Crosses Well is currently located within a field boundary within the agricultural land surrounding the existing Boulby Mine. The topography of the area lends itself to views looking out

to the east and southeast across the current mine and to the coast open areas beyond. Further buildings, particularly Ings Farmhouse, are also visible from the well.

Contribution of Setting

- 11.6.26 Although not immediately notable from the location of Three Crosses Well, the historic buildings within the area do make an important contribution to the asset's setting as they provide some context for its use despite the original structures that would have been contemporary to this building being no longer visibly present within the landscape.

Grade II Listed Farm Buildings at Roxby (NHLE 1148617, 1173281 and 1316229)

Significance

- 11.6.27 These buildings are all of **high heritage significance** as demonstrated by their listed status. Manor Farmhouse (NHLE 1173281) dates from around 1700 although does have 18th-century and 20th-century alterations. The gin-gangs (NHLE 1148617 and 1316229) both thought to be late-18th century in date. Roxby is mentioned within the Domesday Book where a number of carucates are recorded suggesting that the area was arable during this time. The age of the settlement in the area and the continued use gives these buildings a high value for historic interest.

Setting

- 11.6.28 These buildings, although belonging to two separate farms, are in close proximity to each other and help to provide the immediate setting of the individual buildings. The settlement itself is set within an elevated position within the North York Moors National Park with views out across the surrounding arable and pasture land. Further buildings, both residential and ecclesiastical, are also in close proximity to these structures.

Contribution of Setting

- 11.6.29 The agricultural land surrounding these listed buildings provides a key part of the setting as it aids in the understanding of these structures. The more immediate surrounding provided by further farm buildings and structures further supplement this. The other neighbouring buildings, including the Church of St Nicholas (NHLE 1148616) also contribute to the setting of these listed farm buildings through providing a sense of the community of which they served.

Grade II Listed Church of St Nicholas (NHLE 1148616)

Significance

- 11.6.30 The current church dates back to the 17th century although it was considerably altered in 1818. It is located on the site of an earlier church in this location which may date to the medieval period. Three potentially medieval architectural fragments, possibly from Roxby Hall or an earlier church building, are re-used in the church boundary wall. A number of features contained within the church also predate the existing building including a monument slab with brass plaque dedicated to Thomas Boynton who died in 1523, and a 13th-century font on modern stone plinth. These aspects provide the asset with a high value of architectural, archaeological and historical interest and as such has a **high heritage significance**.

Setting

- 11.6.31 The Church of St Nicholas is surrounded by its own graveyard and boundary wall which provide an immediate setting for the church itself although elements of the wider landscape also provide a wider setting including the settlement of Roxby and the remains of the former Roxby Hall. This historic asset is located on an elevated position within the surrounding North York Moors National Park with long views available particularly to the north and west.

Contribution of Setting

- 11.6.32 The graveyard and surrounding settlement of Roxby provides context to the church and allows people visiting the area an understanding of the community that the church served together with its history. The history is also demonstrated by the dates provided on many of the headstones in the graveyard and the neighbouring remains of Roxby Hall which allow an understanding of origins of this asset and the archaeological potential of the site. The longer views out from the church across the North York Moors National Park, although adding to the general experience of the asset as a result of the picturesque surroundings do not contribute to the understanding or appreciation of the site. The longer views available look out to the west and north of the graveyard whilst the majority of the surrounding parish lies to the east and south and as such these do not provide any context of the wider district serviced by the church.

Grade II Listed Oak House Farmhouse and attached Stable and Barn (NHLE 1148618)

Significance

- 11.6.33 Oak House Farmhouse is an early to mid-18th century structure with later-19th century alterations. Due to the age and listed status of the building it is of **high heritage significance** and holds a high value for its historical interest.

Setting

- 11.6.34 This farmhouse and associated buildings are primarily surrounded by cultivated land although there are a number of neighbouring structures located to the west of the farm itself. Long views out over the surrounding area are available to the north and east although views are limited to the south due to a steep slope and to the west by shelter planting and neighbouring buildings.

Contribution of Setting

- 11.6.35 The setting of these buildings is primarily related to the surrounding arable land which provides the buildings with their context and continued use. The neighbouring settlements are partially obscured in views out of the asset by planting and where visible detract from the open land in which Oak House Farmhouse originally sat. The longer views available from the buildings contribute to the experience of the asset as a result of their picturesque nature but these are not designed views and do not contribute to the understanding or immediate experience of moving around the asset.

Grade II Listed Blacksmiths Shop at Turton Cottages (NHLE 1389511)

Significance

- 11.6.36 This building is dated 1858 above the doorway and the façade has an unusual entrance formed by raised gable section with large central doorway which has an ashlar surround in the form of a horse-shoe. Either side of this central doorway are single stable doors each in a round headed flush

ashlar surround with the Turton coat-of-arms inscribed on each tympanum (Historic England List Entry). These features provide the building with a high value of historic and architectural interest which in turn provide the structure with a **high level of heritage significance**.

Setting

- 11.6.37 This building is located to the south of Roxby within an open farmed landscape of the North York Moors. There are neighbouring buildings scattered along Cliff Brow Road on which it is located and long views are available out in all directions.

Contribution of Setting

- 11.6.38 This building now appears to be a private residence although the surrounding agricultural landscape and neighbouring structures, particularly the farms at Roxby do allow the building to be understood better as they provide a link to the use of the building when originally constructed. The longer views out across the North York Moors do contribute to the experience of the asset although these views are fortuitous rather than designed and do not provide any further contributions to the understanding of the asset.

11.7 Assessment of Effects

- 11.7.1 This section will assess the impact of the existing Boulby Mine upon the setting of each of the assets included within the scope. This will be done for the future baseline scenario and the continued operational and later decommissioned state of the mine within the landscape taking into consideration observation from the site survey and the aspects of the setting that contribute to the assets' heritage significance as set out in Section 11.6.

Staithes Conservation Area and Associated Grade II Listed Buildings

Field Observations

- 11.7.2 The site survey demonstrated that visibility of Boulby Mine was only available from the very south-western extents of the conservation area and even at these locations it was only the chimney stack that was visible. The other structures were screened from the designated area by the intervening topography. Slightly more visibility may be possible from the upper floors of the Cowbar Cottages although if visible from here the chimney stack would not be in direct views out and would appear as a peripheral feature within the wider landscape. There is no visibility of the existing mine from any of the individual listed buildings included within the scope of this assessment.

Future Baseline Assessment

- 11.7.3 During the Operational mine phase, the mine will continue to be of limited visibility and with it being located within an aspect of the setting that does not contribute to the heritage significance of the Staithes Conservation Area, namely the coastal and cliff-side location, it is considered that the continued operation of the mine during this 4 years of this phase would have a **negligible negative impact** upon these assets resulting in a **low effect**.
- 11.7.4 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), there Proposed Development would initially see the chimney remain in place for a period of up to 10 years, which would continue to create a **negligible negative impact** upon the experience of the asset resulting in a **low effect**. After that time, the chimney would be removed

resulting in a **negligible beneficial impact** bringing the Proposed Development effects in line with the future baseline scenario with a **low effect** occurring.

- 11.7.5 This situation would continue once into the mature restored site phase, with the chimney no longer being visible a **negligible beneficial impact** would occur with a **low effect** occurring.

Boulby Alum Quarries and Works Scheduled Monument (NHLE 1018336)

Field Observations

- 11.7.6 Although some limited visibility of the mine was suggested by the ZTV, the site survey revealed that it was fully screened from the scheduled area by the intervening topography, planting and buildings. Whilst the Mine therefore has no direct effects on the asset, the presence of the mine within the wider landscape does provide a sense of continuity for the mining industry in the area.

Future Baseline Assessment

- 11.7.7 The retention of the Mine during the Operational, Decommissioning, Aftercare and Semi-matured phases of the future baseline would see the Mine continue to be fully screened from the asset, and providing a beneficial impact due to the association with the mining industry of the area. This would be a **negligible beneficial impact** upon this asset resulting in a **low effect**.
- 11.7.8 Once into the Mature restored site phase, the Mine would start to be demolished and the association provided will lessen. The restored site of the proposed development would still retain features providing information about the site's mining heritage. This would still provide an association, but at a less obvious level in the wider landscape. This would be a **negligible negative impact** upon this asset resulting in a **low effect**.

Continued Working

- 11.7.9 In practical terms, if the Proposed Development is approved, there would be no change to the current situation for this asset.

Round Barrow on Boulby Cliffs known as the Site of Rockcliff Beacon Scheduled Monument (NHLE 1018657)

Field Observations

- 11.7.10 The site survey revealed that only the chimney stack from the Mine Site was visible from the scheduled area and this appeared as a distant feature that did not break the horizon. A telecommunications tower located c.200m to the south of the barrow further distracts from the mine's presence within the wider area as this provides a dominant feature in the setting of the asset when looking out of the scheduled area in the direction of the site.

Future Baseline Assessment

- 11.7.11 During the Operational mine phase, the mine will continue to be of limited visibility and the telecommunications tower will continue to be the dominant distracting feature for this asset. It is considered that the continued operation of the mine during this 4 years of this phase would have a **negligible negative impact** upon these assets resulting in a **low effect**.
- 11.7.12 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), there Proposed Development would see the chimney remain in place which

would continue to create a **negligible negative impact** upon the experience of the asset resulting in a **low effect**.

- 11.7.13 Once into the mature restored site phase, the Proposed Development would also see the chimney removed resulting in a **negligible beneficial impact** bringing the Proposed Development effects in line with the future baseline scenario with a **low effect** occurring.

Continued Working

- 11.7.14 In practical terms, if the Proposed Development is approved, there would be no change to the current situation for this asset for a further 25 year period from 2023, with the Mine creating a **negligible negative impact**, resulting in a **low effect**. When the Mine is decommissioned at the end of this period a **negligible beneficial impact** resulting in a **low effect** will occur. So the Proposed Development would simply see a delay in the beneficial effects from decommissioning for a period of 25 years.

WWI Grade II Listed Listening Post (NHLE 1263428) and Scheduled Early Warning Acoustic Mirror East of Boulby Barns Farm (NHLE 1020760)

Field Observations

- 11.7.15 The site survey revealed that only the chimney stack from the Mine Site was visible from the scheduled area and listed building, viewed between buildings that are present on the opposite side of Boulby Bank. The other structures present within the site were screened from the asset by the intervening topography. This limited visibility does occur in views of the monument from the north although it appears as a distant feature of the landscape in an aspect of the assets' setting that does not contribute to the understanding of the monument.

Future Baseline Assessment

- 11.7.16 During the Operational mine phase, the mine will continue to be of limited visibility and it is considered that the continued operation of the mine during this 4 years of this phase would have a **negligible negative impact** upon these assets resulting in a **low effect**.
- 11.7.17 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), there Proposed Development would see the chimney remain in place which would continue to create a **negligible negative impact** upon the experience of the asset resulting in a **low effect**.
- 11.7.18 Once into the mature restored site phase, the Proposed Development would also see the chimney removed resulting in a **negligible beneficial impact** bringing the Proposed Development effects in line with the future baseline scenario with a **low effect** occurring.

Continued Working

- 11.7.19 In practical terms, if the Proposed Development is approved, there would be no change to the current situation for this asset for a further 25 year period from 2023, with the Mine creating a **negligible negative impact**, resulting in a **low effect**. When the Mine is decommissioned at the end of this period a **negligible beneficial impact** resulting in a **low effect** will occur. So the Proposed Development would simply see a delay in the beneficial effects from decommissioning for a period of 25 years.

Grade II Listed Farm Buildings at Boulby (NHLE 1139650, 1139690, 1139691, 1139692 and 1139693)

Field Observations

- 11.7.20 Although the chimney within the Site is visible from Boulby Bank in front of Boulby Barns Cottage (NHLE 1139690) the building is surrounded by shelter planting that is also present on the opposite side of the road. This vegetation further heavily filters any views of the chimney making it difficult to discern and the windows of the structure focus views out of the asset away from the site. Planting on the southern side of Boulby Bank opposite Boulby Grange and its associated structures (NHLE 1139691, 1139692 and 1139693) provides a similar situation to that of Boulby Barns Cottage although the mine is more visible above the tree line from these assets. Views out of the farmhouse itself (NHLE 1139691) would have these structures appearing in the peripheral elements of views out to the southeast. Red House Farm (NHLE 1139650) does not have views out to the buildings at Boulby Mine although there are unobstructed views of the mine within its wider setting. These views are obscured from ground level directly surrounding the farm buildings due to a boundary hedge that now encloses the structure to the south.

Future Baseline Assessment

- 11.7.21 During the Operational mine phase, the mine will continue to be of generally limited visibility from most of the views available from these assets, although with some unobstructed views available in places. It is considered that the continued operation of the mine during this 4 years of this phase would have a **negligible negative impact** upon these assets resulting in a **low effect**.
- 11.7.22 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), there Proposed Development would see Mine remain in place which would remain as a **negligible negative impact** upon the experience of the assets resulting in a **low effect**.
- 11.7.23 Once into the mature restored site phase, the Proposed Development would see the buildings on the Mine Site demolished and the site cleared which are likely to create **negligible negative impacts** from the demolition activities, resulting in a **low effect** (4 years). Once into the restoration and aftercare activities of the Proposed Development, the effects would be in line with the future baseline scenario with **negligible to medium beneficial impacts** leading to **low to substantial effects** occurring.

Continued Working

- 11.7.24 In practical terms, if the Proposed Development is approved, there would be no change to the current situation for this asset for a further 25 year period from 2023, with the Mine creating a **negligible negative impact**, resulting in a **low effect**.
- 11.7.25 When the Mine is decommissioned at the end of this period, beneficial impacts will occur. These will range from a **negligible beneficial impact** upon Boulby Barns Cottage (NHLE 1139690) leading to a **low effect**, a **low beneficial impact** upon the buildings at Boulby Grange (NHLE 1139691, 1139692 and 1139693) leading to a **moderate effect** and a **medium beneficial impact** upon Red House Farm (NHLE 1139650) leading to a **substantial effect**. So the Proposed Development would simply see a delay in the beneficial effects from decommissioning for a period of 29 years.

Grade II Listed Three Crosses Well (NHLE 1139651)

Field Observations

- 11.7.26 This asset is not easily visible from the ground surface although due to its location there are unobstructed views from the well out to Boulby Mine. The mine is also a dominating feature within the landscape in views towards this asset.

Future Baseline Assessment

- 11.7.27 During the Operational mine phase, the mine will continue to be of unobstructed visibility from the asset, and a dominating feature in views towards the asset. Key views from the asset towards buildings which would originally have relied on the well are however not orientated towards the Mine. It is considered that the continued operation of the mine during this 4 years of this phase would have a **low negative impact** upon this asset resulting in a **moderate effect**.
- 11.7.28 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), there Proposed Development would see the majority of the Mine remain in place which would continue to create a **low negative impact** upon the experience of the asset resulting in a **moderate effect**.
- 11.7.29 Once into the mature restored site phase, the Proposed Development would see all of the buildings on the Mine Site demolished and the site cleared which are likely to continue the **low negative impacts** from the demolition activities, resulting in a **moderate effect** (4 years). Once into the restoration and aftercare activities of the Proposed Development, the effects would be in line with the future baseline scenario with a medium beneficial impact occurring as a result of the Mine buildings being removed leading to a **significant effect** occurring.

Continued Working

- 11.7.30 In practical terms, if the Proposed Development is approved, there would largely be no change to the current situation for this asset for a further 29 year period from 2023, with the Mine creating a **low negative impact**, resulting in a **moderate effect**.
- 11.7.31 The decommissioning of the Mine at the end of this period would lead to less visual intrusion in views of the well, although the absence of the buildings would not resolve the disconnect from the origins of this structure. The experience of the asset would improve as the mine would no longer be a dominant feature within the landscape and would allow the historic buildings within the wider area that do make a beneficial contribution to the assets setting to be more noticeable in comparison. A **medium beneficial impact** will therefore occur which will result in a **substantial effect**. So the Proposed Development would simply see a delay in the beneficial effects from decommissioning for a period of 29 years.

Grade II Listed Farm Buildings at Roxby (NHLE 1148617, 1173281 and 1316229)

Field Observations

- 11.7.32 The site survey revealed that each of these listed buildings were screened from Boulby Mine by further more recent farm structures, the Church of St Nicholas (NHLE 1148616) and surrounding woodland.
- 11.7.33 Due to the lack of visibility of the site from these assets the Proposed Development would have no impact upon the experience or understanding of these listed structures and would not impact upon aspects of their setting that contribute to their heritage significance.

Grade II Listed Church of St Nicholas (NHLE 1148616)

Field Observations

- 11.7.34 The site survey of this asset revealed that the existing mine buildings were predominantly screened in views of the church from Roxby and Cliff Bank by the church itself although views of the mine were revealed when moving along the entrance of the graveyard and church with unobstructed views occurring from the rear of the building over the graveyard wall. The remains of Roxby Hall which contribute to the understanding of this asset were visible in views together with the church and the mine was visible behind these structures in the shared view.

Future Baseline Assessment

- 11.7.35 During the Operational mine phase, the mine will continue to be visible in the landscape in views towards, and from, the church as well as in relation to surrounding contextual buildings. It is considered that the continued operation of the mine during this 4 years of this phase would have a **low negative impact** upon this asset resulting in a **moderate effect**.
- 11.7.36 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), the Proposed Development would see the Mine remain in place which would continue to have a **low negative impact** upon the experience of the asset resulting in a **moderate effect**.
- 11.7.37 Once into the mature restored site phase, the Proposed Development would see the buildings on the Mine Site demolished and the site cleared which are likely to continue the **low negative impacts** from the demolition activities, resulting in a **moderate effect** (4 years). Once into the restoration and aftercare activities of the Proposed Development, the absence of the Mine buildings in views of this asset would be a medium beneficial impact with a substantial effect in line with the future baseline scenario.

Continued Working

- 11.7.38 In practical terms, if the Proposed Development is approved, there would be no change to the current situation for this asset for a further 29 year period from 2023, with the Mine continuing to have a **low negative impact**, resulting in a **moderate effect**.
- 11.7.39 When the proposed Development is demolished, the removal of the mine buildings in views out of the graveyard to the rear of the church will enhance the sense of tranquillity from this area. The absence of the large modern complex in views of the asset in conjunction with other historical remains will further enhance the assets setting as it will remove distractions from aspects that provide context and understanding to the building. As such the restoration of the Boulby Mine site would have a **medium beneficial impact** upon the setting of the Church of St Nicholas resulting in a **substantial effect**. So the Proposed Development would simply see a delay in the beneficial effects from decommissioning for a period of 25 years.

Grade II Listed Oak House Farmhouse and attached Stable and Barn (NHLE 1148618)

Field Observations

- 11.7.40 Boulby Mine is visible from areas surrounding these listed buildings although it is viewed behind the neighbouring buildings which provide a sense of scale and detracts from the mine's presence. Views from the buildings at Oak House Farmhouse itself do not look out toward the mine and as such it would not be visible from within these structures.

Future Baseline Assessment

- 11.7.41 During the Operational mine phase, the mine will continue to be visible in the landscape around the asset, although it will not be visible in key views from the asset and will be screened in other places by other buildings. It is considered that the continued operation of the mine during this 4 years of this phase would have a **negligible negative impact** upon this asset resulting in a **low effect**.
- 11.7.42 During the Decommissioning and restoration, Aftercare and Semi-mature site phases of the future baseline (25 years), the Proposed Development would see the Mine remain in place which would create a **negligible negative impact** upon the experience of the asset resulting in a **low effect**.
- 11.7.43 Once into the mature restored site phase, the Proposed Development would see the buildings on the Mine Site demolished and the site cleared which are likely to continue the **negligible negative impacts** from the demolition activities, resulting in a **low effect** (4 years). Once into the restoration and aftercare activities of the Proposed Development, a **low beneficial impact** would occur due to the buildings no longer being present in views from these assets. This would be a moderate effect and be in line with the future baseline scenario.

Continued Working

- 11.7.44 In practical terms, if the Proposed Development is approved, there would be no change to the current situation for this asset for a further 29 year period from 2023, with the Mine creating a **negligible negative impact**, resulting in a **low effect**.
- 11.7.45 The decommissioning of the Mine at the end of this period would lead to less visual intrusion in views from the asset, improving the understanding and experience of these structures. However, due to the presence of further more recent structures in the foreground and the screening presence that they create, it is considered that the impacts from this would be restricted to a **low beneficial impact** upon the setting leading to a **moderate effect**. So the Proposed Development would simply see a delay in the beneficial effects from decommissioning for a period of 29 years.

Grade II Listed Blacksmiths Shop at Turton Cottages (NHLE 1389511)

Field Observations

- 11.7.46 The site visit of these cottages revealed that views out of these buildings did not look towards the site and no visibility of the mine, including the chimney stack was available from the area surrounding the asset.
- 11.7.47 Due to the lack of visibility of the site from these assets the Proposed Development would have no impact upon the experience or understanding of these listed structures and would not impact upon aspects of their setting that contribute to their heritage significance.

11.8 Mitigation and Enhancement Measures

- 11.8.1 Opportunities to mitigate potential adverse effects have already been incorporated within the development or are imposed through a number of existing regulatory controls although there is still the potential to further reduce the effects of the existing mine and increase the enhancement of the subsequent restoration. Due to the possibility of change to the setting of designated assets, the restoration of the site and potential enhancement of the historic environment should be considered in further detail nearer the time of decommissioning although some broad consideration are provided below.

Continued Operation

- 11.8.2 Although the continued operation of the Boulby Mine site will not have a significant effect upon the historic environment as a result the absence of change in visibility it is possible to further reduce the current visual intrusion present. Recommendations to reduce the present impact upon the setting of historic assets are set out with the LVIA (Chapter 5). These mitigation measures include the introduction of further planting around the current structures which would soften the industrial presence of the site and screen any ground movement in views towards the site thereby reducing eye catching elements of ongoing operations.

Decommissioned Site

- 11.8.3 Although this aspect of the setting enhancement should be more fully considered nearer the time of the decommissioning of the site in order to assess the potential for enhancement against the setting present at that time, there are broad aspects that could be taking into consideration for the restoration plans. Given the agricultural nature of a large number of the listed buildings within the area, particularly Red House Farmhouse (NHLE 1139650) and Oak House Farmhouse (NHLE 1148618) means that arable land incorporated into the restoration plans would enhance the setting of assets of this nature. Elements of the mining history of the area should also be considered due to the former Alum Quarries (NHLE 1018336) and associated structures (NHLE 1139690, 1139691, 1139692 and 1139693) and landscape features illustrating this aspect such as using old tramways as access routes could allow visitors a better understanding of the historic nature of the area. In the case of Three Crosses Well (NHLE 1139651), the lack of connection to the current landscape and the difficulty in identification means that there is the potential to increase both the experience and understanding of this asset through the restoration process through providing indication of former land use within the quarry site and/or removing the field boundaries that currently obscure its presence.

11.9 Conclusions of Significance Evaluation

- 11.9.1 As described in the preceding sections, the proposed development would have no significant indirect historic environment effects for the duration of its continued operation. There is the potential for significant beneficial effects to occur as a result of the restoration of the site. The full extent and magnitude of this beneficial enhancement would be dependent upon the finalised restoration plans of the site in conjunction the setting of assets within the wider area at that time.

11.10 Implementation of Mitigation Measures

- 11.10.1 As the full implications of the impact upon the setting of designated assets cannot be fully known at this time in regards to the restoration of the site due to the potential for change occurring in the intervening period a further assessment of effects and enhancement measures should be undertaken as part of the planning process upon decommissioning of the site. This should be carried out in conjunction with an assessment of both direct and indirect effects upon both designated and non-designated heritage assets.
- 11.10.2 For the continued operation of Boulby Mine, mitigation to reduce the visual intrusion of the site together with its implementation is supplied within the LVIA chapter. These measures would help to reduce the effects of the site upon the historic environment and the methods for implementation provided in Chapter 5 should be applied.

11.11 References

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Welcome to Staithes: <http://www.welcometostaithes.co.uk/index.php/history/> Accessed 03/11/2017.

12. Geology and Subsidence

Non-Technical Summary

This assessment considers the environmental effects of subsidence resulting from the Proposed Development. Subsidence caused by Boulby Mine has been monitored on a regular basis since 1976 and so a good knowledge of the subsidence patterns has been established. The results of the subsidence monitoring indicate that the area affected by the workings is wide but that, as a result, the ground subsides in a uniform manner and that the possible effects of potentially damaging differential settlements and lateral strains are of a very low magnitude.

The subsidence which has occurred since 1976 is predominantly a result of the extraction of sylvinitic. Sylvinitic has more elastic properties than the salt or polyhalite which is also extracted, and the voids left behind by its extraction slowly close up over time. The rock salt and polyhalite materials which are worked have very different qualities to the sylvinitic. These are much harder seams with less elastic properties than sylvinitic. These properties, plus the methods of working, mean that the risk and rate of any subsidence is reduced.

The existing voids in the sylvinitic seams will continue to be monitored and managed to reduce their closure where appropriate as part of the Proposed Development. The extraction of polyhalite and salt to take place within the Proposed Development, plus the continued management of the sylvinitic subsidence, will mean the rates of subsidence occurring at the surface are estimated to slow over the Proposed Development period from what has been recorded since 1976. Therefore no significant effects have been predicted.

12.1 Introduction and Overview

- 12.1.1 This Chapter assesses whether significant environmental effects are likely from the Proposed Development as a result of subsidence. This Chapter should be read in conjunction with the development description in Chapter 3.
- 12.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and an assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The Chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.

12.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 12.2.1 This section outlines the policy issues that are relevant to the subsidence topic and have been used to ensure that the scope of the assessment is appropriate. The relevant policy documents are summarised in Table 12.1 below together with a brief summary of the policy requirement.

Table 12.1 Relevant Planning Policy

Policy Reference	Policy Issue
<i>National planning policies</i>	
National Planning Policy Framework	
170	This paragraph requires planning decisions to prevent development from contributing to land instability.
Draft Minerals and Waste Joint Plan	
Draft Policy M22	This policy seeks to ensure that the effects of subsidence can be monitored and controlled to prevent unacceptable impacts, relating to proposals to increased volumes of potash extraction, the extraction of other forms of potash not included in existing permissions or sub surface lateral extensions.

Legislative Requirements

12.2.2 The main legislative requirements relating to subsidence from mineral extraction are specific to coal mining rather than other forms of mineral extraction.

Guidance

12.2.3 The Planning Practice Guidance provides some guidance on land stability issues although much of this is in relation to potential issues created by former coal workings or inherently unstable ground, rather than through new underground mine workings.

12.3 Methodology and Approach

Consultation

12.3.1 The Scoping Request issued to the NYMNPA on 19 June 2017 was based on a continuation of sylvinitic mining, alongside polyhalite and salt mining. It is the extraction of sylvinitic and the voids left behind in this seam that have the potential to create subsidence issues from Boulby Mine due to the elastic properties of sylvinitic. This means that the voids created in the sylvinitic seams 'close' in on themselves over time. This process is a slow process and the voids and maintenance regime is designed to allow this closure to occur in a controlled manner when void space is no longer used for operational purposes. Polyhalite and salt have very low elastic properties and therefore this slow closure effect does not occur to the same extent. Although the Proposed Development is now focused on the extraction of polyhalite and salt only, the existing sylvinitic voids will continue to close over time. Where roadways and voids need to be kept open for operational and maintenance purposes (for example to allow pumping operations to take place), ICL Boulby will continue to manage the restriction of the closure of these voids.

12.3.2 The Scoping Request explained the difficulties in predicting the exact nature of future subsidence caused by the closure of sylvinitic voids as this differs across different locations due to the changing quality of the mineral across the deposit and the management measures which may be used in the future. The assessment on subsidence impacts will therefore be based on a worst case scenario



approach. It will be informed by the understanding that ICL Boulby has built up over many years of monitoring how their mining activities impact on subsidence potential. Receptors that will be included in the assessment include:

- Houses, buildings and structures;
- Surface water features;
- Drainage systems;
- The coastline;
- The seabed;
- Sites of ecological interest.

12.3.3 The Scoping Opinion issued by the NYMNPAs confirmed that this approach was acceptable for the EIA. No other consultation has taken place on subsidence matters.

Data Gathering Methodology

12.3.4 Information on the existing pattern of subsidence and how this is managed through working practices has been provided by ICL Boulby. This incorporates subsidence monitoring work which ICL Boulby are required to undertake, and which has been ongoing since 1976. In addition separate studies have also been ongoing during this timeframe looking at coastal erosion on this stretch of the coastline. ICL Boulby believe that the length of time that monitoring has been undertaken for, and the amount of monitoring activities which have taken place, provide one of the most detailed evidence bases on subsidence and coastal erosion in the UK. In addition, previous assessments which have been undertaken on the risk of subsidence and the implications this may have for coastal erosion to support applications to mine within the 1.5km coastal zone have been considered together with the assessment and conclusions of the ES prepared to support the 1996 planning application¹.

Methodology for Identifying and Assessing Effects

12.3.5 The extraction of the minerals results in subsidence. Mining subsidence can cause impacts at the surface through three principal mechanisms:

- Total subsidence - the total vertical movement which has occurred at any point. In general terms, total subsidence does not necessarily result in damaging effects at the surface;
- Differential settlement - the variation in total subsidence which has occurred between two points and represents a change in gradient in the ground; this can adversely affect tall buildings and structures, drainage and sensitive machinery used in industrial processes;
- Lateral strain - the most commonly observed cause of subsidence damage, as a vertical depression in the ground develops, horizontal strains result in adjacent land.

12.3.6 Subsidence effects are assessed in terms of the latter two.

12.3.7 The magnitude and lateral extent of subsidence due to mineral extraction is dependent on several factors including the mining method used, the depth of the workings, the quantities of mineral extracted and the nature of the overlying strata. The nature of the underground mining of sylvinites leads to a degree of subsidence, as sylvinites have 'elastic' properties, meaning that over time the

¹ Sir Alexander Gibb & Partners Ltd (1996), Cleveland Potash Ltd Environmental Statement.

voids left by mining will close up as the sylvinitic slowly flows into the voids. The mining methods used in the sylvinitic are designed to allow this to happen slowly and safely, reducing the risk of any sudden collapse events which may result in greater subsidence effects at the surface. The risk of subsidence associated with salt and polyhalite extraction is less because these materials have very low elastic properties. The mining methods employed here are therefore designed to retain structural strength and the voids will experience much lower levels of closing over time, resulting in significantly less subsidence at the surface.

- 12.3.8 The limitation of subsidence is important to the operation of the Mine. Excessive movement of the strata overlying the workings is unsafe and can lead to the collapse of workings or the ingress of groundwater. In the coastal area, ICL Boulby has a major interest in ensuring the integrity of the tailings shaft and tunnel which are also inherently important to operations. The mining methods based on strata control techniques have therefore been developed and refined to prevent such problems. This has the benefit of limiting subsidence at the surface.
- 12.3.9 Subsidence has been monitored since 1974, with regular monitoring commencing in 1976. Monitoring is based on the surveys of 9 lines above the underground extraction area and along the tailings tunnel below the North Sea. Subsidence contours are plotted based on the data obtained from the monitoring lines. The monitoring data provides a good understanding of the subsidence pattern.
- 12.3.10 There is no specific formal methodology for the assessment of the potential effects from subsidence. In the absence of this, the guide to establishing the level of effect in Table 2.1 in Chapter 2 has been used, supplemented by currently available knowledge, experience and judgement. However, due to the nature of the receptors being considered, the changing future baseline scenario would not change the sensitivity of the receptors. To provide a comparison between the future baseline and the Proposed Development as assessment of the effects in terms of the magnitude of change and the significance has therefore been included for both the future baseline scenario, and for the Proposed Development.
- 12.3.11 The conclusions of this chapter are provided in this context.

12.4 Baseline

Current Baseline

Houses, Buildings and Structures

- 12.4.1 Housing, buildings and structures may have differing sensitivities depending on their use, but a worst case approach has been taken where they are all considered to have a **high** sensitivity.
- 12.4.2 The results of the latest subsidence monitoring report prepared for and submitted to the National Park on an annual basis, suggest that the subsidence resulting from mineral extraction is insufficiently large to cause structural damage. Over the 40 year life of the mine so far, subsidence is predicted to have lowered the ground level by a maximum of around 750mm. This subsidence however occurs in a very shallow bowl feature, with the deepest part around the central area of historic extraction, and the shallowest at the edges of the extraction area. This bowl feature means that there is very little differential settlement or lateral strain created, which are the main cause of structural damage or landscape changes from subsidence. This supports the assessment of effects predicted in the 1996 ES which concluded that the impact of mining subsidence upon existing houses, buildings and structures will be negligible, considering the worst-case results for differential settlement and lateral strains.

12.4.3 The current baseline situation therefore presents a scenario where the conclusions of the 1996 ES have been proved correct: based on a **negligible** magnitude of change and a **high** sensitivity of receptor, the current subsidence effect on houses, buildings and structures is **negligible** and therefore **non-significant**.

Coastal Area

12.4.4 With regard to the effect of subsidence in the coastal region, interactions may arise from:

- An increased depth of water caused by total subsidence, leading to increased wave energy and greater wave heights impacting on the shoreline;
- Structural damage to coastal structures, either direct or resulting from greater wave heights;
- Overtopping of coastal defences resulting from greater wave heights;
- Influences upon the stability of existing slopes and cliffs by; i) changing surface gradients; ii) inducing horizontal strains which may open bedding, joints, fissures, faults, or weakening strata; and iii) inducing changes in hydrogeology.

12.4.5 The 'COBRA' report (Appendix 12A) produced by Durham University, shows that the mining activities from Boulby Mine have created no acceleration in the rate of cliff erosion and that the variations in coastal erosion seen across the monitored area cannot be explained by mining-induced subsidence.

12.4.6 A report prepared on behalf of the National Park Authority by Amec in 2012² assessed whether a ICL Boulby application to mine within the 1.5km coastal zone would be acceptable. This report concluded that the magnitude of change on coastal erosion as a result of mining subsidence was low or even negligible. The 1996 ES considered that the magnitude of change was negligible. The Amec report took the position that the sensitivity of the coastline in the area in question was medium given the nature of the geology at the cliff base which reduces its susceptibility to erosion. The 1996 ES assessed the sensitivity of the coastline as high given the fact that it is Heritage Coast, the presence of a number of SSSIs and coastal defences.

12.4.7 A worst case position is therefore taken in this ES that the sensitivity of the coastal receptors is **high**. It is considered that, under a worst case view, the current baseline situation is most likely creating a **negligible** magnitude of change. On a high sensitivity of receptor this is therefore creating a subsidence effect on the coastal region which is **negligible** and therefore **not significant**.

Surface Water

12.4.8 Subsidence has the potential to impact on the hydraulic flow of streams within the area. The 1996 ES examined Roxy Beck and Staithes Beck to examine the magnitude of impact. This assessment found that there were very small changes in the gradient of the streams – an increase of 0.62 for Roxby Beck and a decrease of 1 for Staithes Beck. The conclusion was that these changes in gradient are unlikely to alter the hydrological regime to any significant extent. The current subsidence effect on surface water is **negligible** and therefore **not significant**.

² Amec (2012), Boulby Potash: Proposed Ellerby Extension.

Predicted Future Baseline

- 12.4.9 If the proposals to extend the working life of the Mine are not approved, the Mine would close, be decommissioned and restored to mainly nature conservation and agricultural uses. The decommissioning and restoration activities would not alter the sensitivity of any of the receptors relevant. Given that extraction of sylvinites ceased at Boulby Mine in 2018, the only difference between the current situation and a future baseline scenario without an operational mine, is that the ongoing maintenance of sylvinites voids would not occur. This would see certain areas of the sylvinites voids start to close up, rather than continue to be supported and either remain open or close up over a longer timeframe.
- 12.4.10 The future baseline activities would however lead to differing effects on the receptors.
- 12.4.11 Subsidence would initially continue to occur as void spaces underground slowly close up. The main influences on the subsidence trough – the nature of the geological strata above the workings, the retention of barrier pillars and any structural support in place – would remain very similar to the current baseline. The subsidence effect would therefore remain as **negligible** and therefore **not significant** for all receptors.
- 12.4.12 Monitoring of the inactive underground mine areas has shown that the rate of subsidence decreases each year. However it is not possible to accurately predict when subsidence may no longer occur. It has therefore been assumed for the future baseline, that subsidence effects will cease once the decommissioning and restoration and the aftercare phases have been completed. After this time there will be a **no effect** position.

12.5 Predicted Effects: Proposed Working Phases

- 12.5.1 The Proposed Development would see some of the voids within the sylvinites seam continue to be supported structurally. This is currently done through a range of engineering measures depending on the need to keep that particular location accessible. Where there is a need to retain access, current practice is usually for steel support beams to create a structural frame within the void. Where access is not required, a variety of other measures can be used to slow the closing of the voids. This can include the retention of columns of sylvinites or placement of wooden supports, both of which are designed to eventually collapse under the pressure of the closure but will slow the process. Rock bolts and geomesh can also be used in conjunction with any of the measures to further reduce pressure and prevent rocks falls from happening. In the Proposed Development, these options are likely to continue to be used but ICL Boulby are also exploring the use of solid blocks (created from Air Pollution Control Residue (APCR: residues extracted from pollution filters on waste incinerators). ICL Boulby are currently seeking confirmation from the Environment Agency that this material would not be classed a waste material (as a useful product has been made from a waste, rather than the waste simply being disposed of) and that it is suitable for use without a significant pollution risk. The Kilroot Mine in Northern Ireland already uses blocks of this nature for the purpose of subsidence management and the Northern Ireland Environment Agency has approved the use of blocks there. On the assumption the Environment Agency make the same decision here, the blocks would be considered to be a simple engineering material (the same as steel, concrete or timber would be considered) and no specific consideration from an EIA perspective would be needed.
- 12.5.2 The proposed focus on extraction within the polyhalite and salt seams is not expected to result in any further, quantifiable subsidence over the 25 year timeframe. These two seams both have much lower elastic properties than sylvinites meaning that any subsidence that does occur, takes place over a much longer period of time.

- 12.5.3 The current situation with subsidence due to Boulby Mine is only seeing a **negligible** magnitude of change on-shore and off-shore. The extraction of polyhalite and salt, and the continuation of subsidence management in the sylvinite seam through the Proposed Development will see an improved situation instead, but the difference between the two is likely to be too small to be quantifiable over the 25 year Proposed Development timeframe.
- 12.5.4 It is therefore considered for on-shore surface features such as houses, buildings, structures and surface water features, and for the coastline, there will be of a **negligible** magnitude of change. On high sensitivity receptors this will result in a **negligible** effect which is **not-significant**.

12.6 Predicted Effects: Demolition, Restoration and Aftercare and Established Restoration Phases

- 12.6.1 In the future baseline scenario, Boulby Mine would have finished working and have been closed for around 25 years under these phases of the Proposed Development. Subsidence management would have stopped at the same time. Although subsidence for the closed mine would continue, this would still be at a slow rate and the rate would slow further over time as voids close up and eventually reach a static position where no effect is occurring. The Proposed Development would see this slow down taking place 25 years after the future baseline, but given the negligible effects experienced from subsidence from the operational mine, this delay is considered to create a **negligible** magnitude of change. On **high** sensitivity receptors this would result in a **negligible** effect which is **not-significant**.

12.7 Mitigation and Enhancement Measures

- 12.7.1 Opportunities to mitigate potential adverse effects have already been incorporated within the processes at the mine, through the working practices adopted to keep voids open or to manage the rate of void closure, and the continual monitoring of subsidence at the surface. It is recommended that monitoring of subsidence is continued over the life of any permission granted. Given the results of the monitoring and investigations take over 40 years, it is considered that this could however be relaxed from annual monitoring reporting, to every two years for the first 10 years of the permission, and to every 5 years thereafter (providing the results continue to support this revised programme).

12.8 Conclusions of Significance Evaluation

- 12.8.1 The underground extraction of the minerals inevitably has some subsidence effects which are apparent at the surface. The combination of the mining method used, the depth of working and the geological conditions has resulted in a wide area that experiences some degree of subsidence but the ground subsides in a slow and uniform manner and localised effects are not significant. The nature of the subsidence is unlikely to differ to any significant extent as the mining method and the geological conditions are expected to be similar to that currently experienced.
- 12.8.2 Should a new planning permission be granted, subsidence would continue to occur. However, this would not have a significant effect on any potential receptors. As described in the preceding section, the Proposed Development would have **no significant** subsidence effects.

12.9 Implementation of Mitigation Measures

12.9.1 Details of how the determining authority can secure the mitigation/enhancement measures are set out in Table 12.2 below.]

Table 12.2 Implementation of Environmental Measures/Mitigation

Environmental measure/mitigation	Responsibility for implementation	Compliance Mechanism
Ongoing monitoring programme	NYMNPA/ICL Boulby	Planning condition

12.10 References

Sir Alexander Gibb & Partners Ltd (1996), Cleveland Potash Ltd Environmental Statement.

Amec (2012), Boulby Potash: Proposed Ellerby Extension.



13. Tourism and Recreation

Non-Technical Summary

This assessment considers the environmental effects of the Proposed Development on tourism and recreation. It focuses on recreational activities, public access and any indirect effects on tourism and the perception of visitors to the area. No information is available on how popular the local area would be for tourism and recreational activities without Boulby Mine being present. No records exist from prior to Boulby Mine being developed and there is no way to quantify what level of effect the Mine may have had. Instead the assessment has considered how tourism and recreational activity is established in the local area, with Boulby Mine being in existence. Some significant adverse effects are likely to be occurring on tourist accommodation facilities in very close proximity to Boulby Mine. The proposals to continue operations at the Mine are not considered to create significant effects on recreational users in the nearby area, or on tourism facilities further afield in the National Park.

13.1 Introduction and Overview

- 13.1.1 This Chapter assesses whether significant environmental effects are likely from the Proposed Development on tourism and recreation receptors. This chapter should be read in conjunction with the development description in Chapter 3.
- 13.1.2 Following a summary of relevant policy and legislation, this Chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and an assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The Chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.

13.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 13.2.1 This section outlines the policy issues that are relevant to the tourism and recreation topic and have been used to ensure that the scope of the assessment is appropriate. The relevant policy documents are summarised in Table 13.1 below together with a brief summary of the policy requirement.

Table 13.1 Relevant Planning Policy

Policy Reference	Policy Issue
National planning policies	
National Planning Policy Framework	
Paragraph 83	This seeks to support a prosperous rural economy, including sustainable rural tourism.



Policy Reference	Policy Issue
Paragraph 92	This recognises the important contribution that access to high quality open space can make to health and wellbeing.
Paragraph 98	This seeks to ensure the provision of better facilities for users of public rights of way and access.
Local planning policies	
NYMNP Core Strategy and Development Policies	
Core Policy A	This gives priority to strengthening and diversifying the rural economy and providing tourism based opportunities for the understanding and enjoyment of the Park's special qualities.
Core Policy H	This seeks to strength and support the rural economy through Sustainable tourism based on recreation activities and tourism development related to the understanding and enjoyment of the Park.
Development Policy 14	This states that the quality of tourism and recreation product in the National Park will be maintained and improved.
Development Policy 23	This includes a requirement that existing public rights of way, linear routes and other access routes for pedestrians, cyclists and horse riders are protected.
North York Moors Draft Local Plan	
Policy C04	This policy states that development should protect and where possible enhance public rights of way and other access routes used by pedestrians, cyclists and horse riders.
Draft Minerals and Waste Joint Plan	
Draft Policy D02	This seeks to ensure that there will be no unacceptable impacts on users of the public rights of way network and public open space.

Legislative Requirements

- 13.2.2 There is no specific legislation relating to tourism and recreation other than that relating to the stopping up or diversion of public rights of way, neither of which are relevant for the Proposed Development.

Guidance

- 13.2.3 The Scottish Natural Heritage (SNH) Handbook on Environmental Impact Assessment (2013) provides some guidance on the factors to consider when assessing potential effects on open air recreation and access. The Handbook notes that factors which might lead to changes in recreational behaviour include loss, closure, or diversion of access routes; obstructing access routes; enhancing access; reduction or enhancement in amenity and changes in the setting of recreational receptors. The Handbook identifies potential impacts from mineral extraction on open air recreational uses in the countryside as being from noise, dust, vibration, visual impact and the

closure or diversion of linear facilities for long periods of time, noting that the effect of these impacts are generally reversible.

13.3 Methodology and Approach

Consultation

- 13.3.1 The Scoping Request issued to the NYMNPA on 19 June 2017 set out that consideration will be given to direct and indirect effects on recreation and recreational activities; direct and indirect effects on public access and indirect effects on tourism and perception of visitors. The Scoping Opinion issued by the NYMNPA confirmed that this approach was acceptable for the EIA.
- 13.3.2 No other consultation has taken place on tourism and recreation matters.

Data Gathering Methodology

- 13.3.3 Information on potential tourism and recreation receptors has been sourced from web research including the Visit England website, published reports including any STEAM reports and local knowledge.

Methodology for Identifying and Assessing Effects

- 13.3.4 There is no specific formal methodology for the assessment of potential effects of a development on tourism and recreation. The method adopted is therefore to establish the existing characteristics and receptors through a desk based analysis drawing on a range of information to identify current tourism and recreation businesses and activities in the area. The area identified for consideration is 5km to coincide with the LVIA, on the basis that there is unlikely to be any significant effects beyond this distance.
- 13.3.5 Receptor sensitivity is then defined. The potential effects of the Proposed Development are then assessed using professional judgement, taking account of the potential change that the receptors would experience (the magnitude of change) as a result of the Proposed Development.
- 13.3.6 In the absence of a specific formal methodology for the assessment of the potential effects on tourism and recreation, the guide to establishing the level of effect in Table 2.1 of Chapter 2 has been used, supplemented by currently available knowledge, experience and judgement.
- 13.3.7 The sensitivity of tourism and recreation receptors are defined in Table 13.2.

Table 13.2 Sensitivity of Tourism and Recreation Receptors

Sensitivity	Definition
High	Where the receptor is defined as being of international or national status or has high visitor numbers.
Medium	Where the receptor is defined as being of regional status or has medium visitor numbers
Low	Where the receptor is defined as being of local status r has low visitor numbers.

- 13.3.8 The magnitude of change will be judged by estimating the level of change on the receptor as a result of the Proposed Development in line with the criteria in Table 13.3.



Table 13.3 Magnitude of Change

Magnitude of Change	Definition
Large	Where the extent of effects is large and a large number of people or activities will be affected; or where there is an obvious view of the Proposed Development with potential to cause significant effects, as assessed by the relevant technical chapter.
Medium	Where the extent of effects is small in scale but a large number of people or activities will be affected; or where the extent of effects is large in scale but only a small number of people or activities will be affected.
Small	Where the extent of effects is small in scale and would only affect a small number of people or activities; or where the Proposed Development would be unlikely to be visible.
Negligible	Where the extent of effects are so small that they can not be quantified.

13.3.9 Based on the approach summarised in Table 2.1, effects that would result in a change identified as very substantial, substantial or substantial/moderate are considered to be significant in terms of the EIA Regulations and this assessment.

13.3.10 A key factor in establishing any potential for impacts on tourism and recreation is the extent to which any adverse effects on the physical environment (due to landscape changes, changes in visual amenity, noise, dust etc) may reduce the attractiveness of individual destinations or attractions thereby potentially resulting in a reduction in visitor or user numbers and expenditure. The assessment therefore draws on the conclusions of other relevant Chapters of the ES.

13.3.11 The conclusions of this chapter are provided in this context.

13.4 Baseline

13.4.1 This section provides a comprehensive overview of the current tourism and recreation baseline situation applicable to the Proposed Development. As stated above, it considers a 5km radius around the Mine Site.

Current Baseline

Tourism and Leisure - Economics

13.4.2 The tourism sector is important both to the national economy and to the economy of the National Park and its surrounding area. The STEAM report (for 2016) for the National Park and its influence area shows tourism accounts for around 10,900 FTE employees, 42% of which were in the accommodation sector. Tourism activity within this area was estimated to be just under £656 million, with the majority of direct visitor expenditure being on the accommodation, food and drink and shopping sectors. The largest contributors to the growth in the local economic value came from staying visits in non-serviced accommodation and the day visitor market, both accounting for around one third of the economic value.

13.4.3 Tourism employment is also important within the more local coastal area. The annual STEAM report (2014) indicates that the real term value of tourism for the North York Moors coast and hinterland increased by 4% in the twelve months from 2013 to reach £329 million in 2014, with 3.8 million visitors (+5%), 6 million visitor days (+3.9%) and employing around 5,750 FTE (+2.1%). Information

from NOMIS indicates that tourism related employment within the vicinity of the Mine Site is about 43%¹.

Recreation

- 13.4.4 Outdoor recreation based tourism is important to the National Park, with key activities cited in the most recent visitor survey being walking, visiting the beach, watching wildlife and cycling.
- 13.4.5 Although the Mine Site does not contain any recreational facilities, there are a number of recreational routes within the 5km radius study area:
- The Cleveland Way (national trail, high level of sensitivity);
 - The England Coast Path (national trail, high level of sensitivity);
 - A number of local rights of way (low level of sensitivity);
 - National Cycle Route 1 (A174 adjacent to the Mine Site, high level of sensitivity);
 - Cattersty sands (Skinningrove), approximately 5km to the west (medium level of sensitivity);
 - Port Mulgrave beach, approximately 4km to the south east (medium level of sensitivity).
 - ▶ (Runswick Sands are covered along with Runswick Bay in the tourist attraction section)
- 13.4.6 The route of the National Cycle Route 1 in this location utilises land in ICL Boulby's ownership and was agreed with ICL Boulby's cooperation. The National Trust also own land along the coast in this area which is open for public access. Although access has been impeded by coastal erosion, this includes Cowbar Nab, where ICL Boulby provided funding to the National Trust to assist in their purchase of the land.

Tourism Accommodation

- 13.4.7 Villages within the study area include Staithes, Port Mulgrave, Dalehouse, Easington and Roxby, all of which have tourism accommodation facilities including bed and breakfasts, holiday cottages, eateries and a caravan site (Staithes). There are also a number of accommodation facilities located at properties outside of the villages within the surrounding area. The closest of these to the Mine Site is Ridge Hall Farm (4 self-catering cottages) approximately 800m to the south.
- 13.4.8 It has not been possible to find occupancy rate data for the local area or for England. However, Visit Scotland does publish information on occupancy rates. The latest is for 2016 and shows that:
- Hotels had an average room occupancy rate of 71%, although this varied over the season with it peaking at 87% in August;
 - Guest Houses and B&Bs had an average room occupancy rate of 42%, peaking between May and September;
 - Self-catering accommodation had an average occupancy rate of 48%, peaking at 81% in August with January, November and December being the quietest months;
 - Caravan and camping parks had an average occupancy rate of 44% during the season (April-October), with larger sites (100-199 pitches) having a higher pitch occupancy.

¹ NOMIS Official Labour Market Statistics, Business Register and Employment Survey 2018. Super output Area (mid layer) for Easington and Staithes areas.

<https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=189> accessed 11 October 2018.

- 13.4.9 The tourism accommodation facilities are therefore considered to be of medium sensitivity, as they provide a local to regional important function and that they are likely to have a medium level of use.

Visitor Attractions

- 13.4.10 The most visited paid attractions in the Yorkshire and Humber region in 2016 were Flamingo Land, York Minster and the Scarborough Cliff Railway. The most visited free attractions were the Millennium Gallery in Sheffield, The National Railway Museum in York and the Yorkshire Sculpture Park. The Dalby Forest Visitor Centre and the Moors National Park Centre were 11th and 14th. None of these visitor attractions are considered to be affected by the Mine and are therefore scoped out of the assessment.
- 13.4.11 Visitor attractions in the study area for this assessment, which are not covered in the recreational assessment (Cleveland Way, England Coast Path, National Cycle Route 1) are the villages of Staithes (heritage, Captain Cook links, beach/coast: High sensitivity due to national interest) and Runswick Bay (beach/coast: Medium sensitivity as regionally important).

Predicted Future Baseline

- 13.4.12 Whether the Proposed Development is approved or refused it is difficult to know whether there would be any changes to the tourism and recreation baseline that would be substantial enough to impact on the assessment of the Proposed Development. The presence of the mine within the National Park for the last 40 years has not prevented tourism from growing in Staithes, and this growth appears to be comparable with other coastal villages located further away from Boulby Mine such as Runswick Bay, Sandsend and Robin Hoods Bay. Businesses like the self-catering cottages at Ridge Hall Farm have also become established. Similarly, the Cleveland Way has become a popular national trail since construction on the mine commenced, and the English Coast path and National Cycle Route 1 have been established in this time. Whether the growth of tourism in Staithes would have been greater without the mine being located nearby, and if so to what degree, is impossible to quantify. Therefore the removal of the mine from the landscape is similarly difficult to assess.
- 13.4.13 If the Proposed Development was approved, it could be expected that tourism in the nearby area will continue in a similar vein, consisting of small scale, local businesses and that recreational use of the public rights of way network would continue at similar levels to at present.
- 13.4.14 If the Proposed Development was refused, the future baseline for recreation use could see a very localised improvement, with opportunities made available for informal recreation on the restored site and links created to footpaths nearby. The removal of the mine would also see an improvement in the attractiveness of the A174 at Boulby Bank as a 'gateway' to the National Park. It is difficult to quantify though how successful this would be in attracting people into the National Park over current numbers and in comparison with other tourism/recreational promotional activity. For the purposes of this assessment, a position has been taken that if the Mine was removed in 2023, the future baseline of the area would see a small, localised beneficial effect from the closure of the mine which would be incurred gradually over the 25 year period being considered.

13.5 Predicted Effects

Recreational Receptors

- 13.5.1 Due to the distance between the Mine Site and the beaches at Skinningrove and Port Mulgrave, and the lack of visibility of the Mine Site from these locations, it is not considered that there would

be any direct impact on their use from the Proposed Development being either approved or refused. They are therefore scoped out from further assessment.

- 13.5.2 The Cleveland Way, England Coast Path and National Cycle Route 1 all pass between the Mine Site and the coast. The three routes will all have views of the Mine Site as they drop down from the top of Boulby Cliffs to the west, and as they pass on similar routes across the cliff tops to the north of the mine and then enter Staithes, via Cowbar, to the east – an approximate 3km distance. ICL Boulby are currently working on an interpretation board to be installed on the Cleveland Way to provide walkers with information on the mine. This is being produced following a suggestion from North York Moors National park that walkers are interested in knowing more about Boulby Mine as they pass by it. There may also be glimpsed views of the higher parts of the Mine Site, in particular the stack, on the Cleveland Way and England Coast Path from further down the coast to the south of Staithes.
- 13.5.3 The Mine Site will also be highly visible on a number of public rights of way, but topography and tree cover will restrict this to a relatively small area roughly covering land between Easington, Boulby village, Dalehouse and Ridge Hall.

Future Baseline Assessment

Operational Mine

- 13.5.4 During the operational phase there will be no change to the existing baseline situation from the operation of the mine. This is considered to currently cause a Small magnitude of change to the Cleveland Way, England Coast Path and National Cycle Route 1, resulting in Moderate/Slight and Not Significant negative effects.
- 13.5.5 On the local public rights of way network it is considered to currently cause a Medium (a large effect on a small number of users) magnitude of change, resulting in a Slight and Not Significant effect.

Decommissioning and Restoration Phase

- 13.5.6 During the Decommissioning and Restoration phase of the future baseline, there would be increased activity on the Mine Site from the demolition activities being undertaken and the land restoration work. Some of these activities could create greater disturbance than the Proposed continuation of operations, but many of the effects seen would be the same or comparable. The Proposed Development would therefore continue to see a **Medium** magnitude of change (a large effect on a small number of users) on the local public right of way network, resulting in a **Slight** and **Not Significant** beneficial effect on these receptors from the retention of the Mine instead.
- 13.5.7 Due to the distance between the Mine Site and the Cleveland Way, England Coast Path and National Cycle Route 1, and the experience of Boulby Mine as a small part of a longer distance route, it is expected that the Proposed Development would continue to result in a **Small** magnitude of change, giving a **Moderate/Slight** and **Not Significant** beneficial effect.

Aftercare Site and Semi-mature phases

- 13.5.8 During the Aftercare and Semi-mature phases of the future baseline, the vegetation and tree planting would be slowly becoming established, and the interpretive heritage features would be in place, creating a more attractive setting for informal recreation. The Proposed Development would involve both the continued operations of much of the Mine Site, plus the deconstruction activities as the Mine Site's footprint is reduced. Compared to a future baseline scenario where the Mine Site has been cleared and the vegetation and tree plant is starting to become established, the Proposed

Development would give rise to a **Large** magnitude of change to users of the local public rights of way network, which would result in a **Moderate/Slight** and **Not Significant** negative effect. It would also give rise to a **Large** magnitude of change to users of the Cleveland Way, England Coast Path and National Cycle Route 1, which would result in a **Substantial** and **Significant** negative effect. The effects during this phase would last for around 5 years.

Mature Restored Site

- 13.5.9 During the Mature restored site phase, the Proposed Development would see the demolition of the Mine Site and the land then enter restoration and aftercare before becoming the established, restored site. The magnitude of change from impacts from the Proposed Development would reduce from **Large** and **Medium** (4 years), during the demolition activities, then to **Small** as the site becomes established, to eventually having no magnitude of change as it reaches maturity and is compatible with the future baseline position. The effects will therefore move from **Substantial** through **Moderate, Slight** to **No Effect**, which will result in changes from **Significant** through **Non-Significant** negative effects over this time.

Continued Working

- 13.5.10 In practical terms, if the Proposed Development is approved, what will actually happen is a continuation of the current baseline situation for a further 25 year period, and then changes occurring as the Mine Site goes through demolition, the new landform creation, restoration and aftercare. Once the restored site is established and the various habitats and planting mature, the site will become largely the same as it would be if the Proposed Development is not approved and it has to be decommissioned and restored after 2023: it would just happen 25 years later. In terms of the recreational receptors considered, and the current baseline situation outlined in Section 13.4, it is acknowledged that the removal of Boulby Mine would result in a more attractive landscape in which to undertake recreation, but it is not considered that that the presence of the Mine has substantially hindered the use of these receptors. The Cleveland Way for example was officially opened in 1969, the year after construction started on the Mine, and is a successful National Trail, growing in popularity since then. The England Coast Path and National Cycle Route 1 have both been established while Boulby Mine has been operational. It is therefore considered that the Proposed Development would continue to result in effects which are **Not Significant** over the additional 25 year working period, as it currently does (paragraph 13.5.4 and 13.5.5).

Tourism Accommodation

- 13.5.11 Due to the distance between the Mine Site and Easington in the west and Port Mulgrave in the east, and the low visibility of the Mine Site from here, it is not considered the Mine effects any impact on tourism accommodation facilities in these locations or further afield. All tourist accommodation facilities in these locations are scoped out of further assessment.
- 13.5.12 The assessment therefore considers tourism accommodation in Staithes, Dalehouse, Roxby and at Ridge Hall Farm. It is considered that these locations will give a representative assessment of any other facilities located at properties outside of these settlements and in the nearby area.

Future Baseline Assessment

Operational Mine

- 13.5.13 During the operational phase there will be no change to the existing baseline situation from the operation of the mine. For the tourism accommodation facilities in Roxby, Ridge Hall Farm and from west facing facilities on Staithes Lane in Staithes the Mine is a prominent feature in their views

and it could be expected that the Mine may be off-putting to some visitors. A conservative assessment has therefore been taken that a **Large** magnitude of change is currently occurring, which results in a **Moderate** and **Significant** negative effect.

- 13.5.14 For the facilities in Dalehouse and in the remainder of Staithes, there will be reduced visibility of the Mine due to topography, other buildings and/or woodland. It is expected that the Mine plays a much less prominent role in the experience of visitors at these facilities and therefore a **Small** magnitude of change is currently occurring, which results in a **Slight** and **Not Significant** effect.

Decommissioning and Restoration Phase

- 13.5.15 During the Decommissioning and restoration phase of the future baseline there would be increased activity on the Mine Site from the demolition activities being undertaken and the land restoration work. Some of these activities could create greater disturbance than the proposed continuation of operations, but many of the effects seen would be the same or comparable. For Ridge Hall Farm, the proximity to the Mine and potential noise impacts, and for west facing facilities in Staithes, Ridge Hall Farm and Roxby, the visual impact, means that the Proposed Development is likely to continue to give rise to **Large** magnitude of change which would result in **Moderate** and **Significant** negative effects from the retention of the Mine instead.
- 13.5.16 From Dalehouse and the rest of Staithes, there is unlikely to be any visual impact and the distance involved means that any magnitude of change would be **Negligible**. The Proposed Development would therefore see a **Negligible** magnitude of change resulting in a **Negligible** and **Not Significant** effect on these receptors.

Aftercare and Semi-mature Site

- 13.5.17 During the Aftercare and Semi-mature phases of the future baseline, the mine buildings will have been removed, the vegetation and tree planting would be slowly becoming established creating a more attractive visual setting for tourism accommodation. This could be of benefit to existing facilities with prominent views of the Mine Site, or to the setting up of new tourism accommodation businesses in properties around the Roxby, Ridge Hall Farm, Boulby village and to west facing properties on Staithes Lane. The Proposed Development would therefore give rise to a **Large** magnitude of change to these facilities, which would result in a **Moderate** and **Significant** negative effect from the retention of the Mine.
- 13.5.18 For the facilities in Dalehouse and the remainder of Staithes the Proposed Development would give rise to a **Small** magnitude of change, which would result in a **Slight** and **Not Significant** negative effect from the retention of the Mine.

Mature Restored Site

- 13.5.19 During the Mature restored site phase of the future baseline, the Proposed Development would see the demolition of the Mine Site and the land then enter restoration and aftercare before becoming the established, restored site. For the facilities at Roxby, Ridge Hall Farm and Staithes Lane, the magnitude of change from impacts from the Proposed Development would reduce from a **Large** negative magnitude of change during the demolition activities, before moving through **Medium** and **Low** as the site becomes more established, to eventually having no magnitude of change as it reaches maturity and is compatible with the future baseline position. The effects will therefore move from **Substantial** through **Moderate, Slight** to **No Effect**, which will result in changes from **Significant** through **Non-Significant** negative effects over this time.

Continued Working

- 13.5.20 In practical terms, if the Proposed Development is approved, what will actually happen is a continuation of the current baseline situation for a further 25 year period, and then changes occurring as the Mine Site goes through demolition, the new landform creation, restoration and aftercare. Once the restored site is established and the various habitats and planting mature, the site will become largely the same as it would be if the Proposed Development is not approved and it has to be decommissioned and restored after 2023: it would just happen 25 years later. In terms of the tourism accommodation receptors considered, and the current baseline situation outlined in Section 13.4, it is acknowledged that the removal of Boulby Mine would result in a more attractive landscape for tourism accommodation, but it is not considered that the presence of the Mine has substantially hindered the growth of the tourism accommodation as a sector in the last 50 years. Any negative effects which the Mine may have had are likely to be very localised to the areas of Roxby, Ridge Hall Lane and possibly Boulby village. It is therefore considered that the Proposed Development would continue to result in effects which are **Significant** at this very localised level, but **Not Significant** at a wider local or when looking at the National Park as a whole over the additional 25 year working period.

Tourist Attractions

- 13.5.21 Runswick Bay is considered to be located far enough away from the Mine Site, and in a location where the topography prevents any views across to the Mine, that there is no effect from the Mine on Runswick Bay as a tourist attraction. It is therefore scoped out from further assessment.

Future Baseline Assessment

Operational Mine

- 13.5.22 During the operational phase there will be no change to the existing baseline situation from the operation of the mine. For Staithes, the key elements that make it a popular tourist attraction are located in 'Old' Staithes, in the steep sided valley which runs down to the harbour. The enclosed nature of this valley and waterfront location means that the Mine exerts no influence over the shops, museum, pubs/cafes and beach, which are of interest to tourists. The Mine does however exert an influence over the entry to Staithes, from its prominent location adjacent to the A174 for those arriving from the north and from the clear views of Mine available from the car parking area and pedestrian entrance to Old Staithes at the top of the valley. Given the focus of tourist interest on Old Staithes, it is debateable as to what level of influence the Mine has. A professional judgement has been made that most visitors would prefer for the Mine not to be in the landscape, but that it is unlikely to be a major factor in their decision to visit, or re-visit, Staithes. On this basis it is considered that a **Small** magnitude of change is currently occurring, which results in a **Moderate/Slight** and **Not Significant** negative effect.

Decommissioning and Restoration Phase

- 13.5.23 During the Decommissioning and restoration phase due to the distance to Old Staithes itself, the nature of the demolition activities taking place and the benefits which will begin to emerge from the loss of the buildings, there is unlikely to be any change from the Operational effects, with the Proposed Development likely to give rise to **Small** magnitude of change which would result in **Moderate/Slight** and **Not Significant** negative effects from the retention of the Mine instead.

Aftercare and Semi-mature Site

- 13.5.24 During the Aftercare and Semi-mature site phases, the views from Staithes would not offer any real opportunity to view the vegetation and tree planting which would be slowly becoming established. There would however be a beneficial effect as the Mine Site buildings would have been removed. For the reasons described in Paragraph 1.5.22, it is considered that the Proposed Development would therefore give rise to a **Small** magnitude of change to Staithes as a tourist attraction, which would result in a **Moderate / Slight** and **Not Significant** negative effect from the retention of the Mine.

Mature Restored Site

- 13.5.25 During the Mature restored site phase, the Proposed Development would see the demolition of the Mine Site and the land then enter restoration and aftercare before becoming the established, restored site. For Staithes as a tourist attraction, the magnitude of change from impacts from the Proposed Development would reduce from a **Small** negative magnitude of change during the demolition activities, before reducing to a **No effect** scenario as the experience of the Mine Site matches what would be seen from the mature restored site in the future baseline scenario. The effects will therefore move from **Moderate/Slight** which would be a **Not Significant** negative effect during demolition, to a **No effect** scenario.

Continued Working

- 13.5.26 In practical terms, if the Proposed Development is approved, what will actually happen is a continuation of the current baseline situation for a further 25 year period, and then changes occurring as the Mine Site goes through demolition, new landform creation and restoration. Once the restored site is established the site will become largely the same as it would be if the Proposed Development is not approved and it has to be decommissioned and restored after 2023: it would just happen 25 years later. In terms of Staithes as a tourist attraction, and the current baseline situation outlined in Section 13.4, it is acknowledged that the removal of Boulby Mine would result in a more attractive setting for Staithes, but it is not considered that that the presence of the Mine has substantially hindered the growth of Staithes as a tourist attraction in the last 50 years. It is therefore considered that the Proposed Development would continue to result in effects which are **Not Significant** as a whole over the additional 25 year working period.

13.6 Mitigation and Enhancement Measures

- 13.6.1 Opportunities to mitigate potential adverse effects have already been incorporated within the processes at the Mine through the deconstruction and site consolidation activities proposed. The Landscape and Visual assessment provided in Chapter 5 provides other mitigation which will help to improve the landscape and visual effects of Boulby Mine, which in turn would be beneficial to tourism and recreation. No further mitigation measures are proposed here.

13.7 Conclusions of Significance Evaluation

- 13.7.1 When compared with the future baseline scenario, where the mine will be closed and the site demolished and restored after 2023, a further 25 years would give rise to a number of significant negative effects due to the comparison between the large scale of the site and buildings and an open, natural looking site. These would include effects on users of the Cleveland Way, England Coast Path and National Cycle Route 1 for a 3km stretch of their routes close to the Mine Site, and on tourist accommodation facilities either close to the Mine Site or with clear views of the Mine (for example at Roxby, Ridge Lane and Staithes Lane).

- 13.7.2 When considered as a continuation of the existing Mine, it is however considered that users of the Cleveland Way, England Coast Path and National Cycle Route 1 are not currently experiencing significant effects, due to the established position the Mine has had in the landscape for nearly 50 years. Significant effects could be occurring on the tourist accommodation sector for a very localised area of land around Roxby, Ridge Hall Lane and possibly Boulby village and these would continue.

13.8 References

- 13.8.1 Scottish Natural Heritage (2013), *A Handbook on Environmental Impact Assessment*, Appendix 5.

14. Climate

Non-Technical Summary

This assessment considers the environmental effects of the Proposed Development on climate, taking into account energy use and associated greenhouse gas emissions and the effects that the provision of fertiliser products can create. The assessment finds the Boulby Mine would be a significant source of greenhouse gas emissions within the National Park, which would create a significant adverse effect at this level. Looking more widely at the Redcar and Cleveland level and up to the national level, these effects would be adverse but not significant. The provision of fertiliser products to the UK market from a UK source would bring significant positive effects.

14.1 Introduction and Overview

- 14.1.1 This chapter assesses whether significant environmental effects are likely from the Proposed Development on climate. This chapter should be read in conjunction with the development description in Chapter 3.
- 14.1.2 Following a summary of relevant policy and legislation, this chapter describes the adopted assessment methodology and the overall derived baseline conditions. The scope of the assessment and an assessment of the likely significant effects are presented, along with details of any environmental measures required to avoid, minimise, mitigate or compensate for any remaining adverse effects. The chapter provides a summary of residual effects and an evaluation of their significance. It concludes with the mechanisms for implementing the mitigation measures.

14.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 14.2.1 This section outlines the policy issues that are relevant to the climate topic and have been used to ensure that the scope of the assessment is appropriate. The relevant policy documents are summarised in Table 14.1 below together with a brief summary of the policy requirement.

Table 14.1 Relevant Planning Policy

Policy Reference	Policy Issue
<i>National planning policies</i>	
National Planning Policy Framework	
Paragraph 95	This requires local planning authorities to plan for new development in locations and ways which reduce greenhouse gas emissions and to actively support energy efficiency improvements to existing buildings.
Paragraph 96	This establishes that new development should take account of matters such as landform, building orientation etc. to minimise energy consumption and should comply with any local plan policies for decentralised energy supply.



Policy Reference	Policy Issue
Paragraph 99	This addresses the factors arising from climate change over the longer term and requires new development to be planned to avoid increased vulnerability to the range of impacts arising from climate change; when new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.
Paragraphs 100- 104	These paragraphs establish the approach to minimising the risk of flooding to new developments and as a result of new developments.
Paragraphs 105 – 108	These paragraphs establish the approach to ensuring reliance of developments to coastal change.
Local planning policies	
NYMNPA Core Strategy and Development Policies	
Core Policy D	This policy seeks to reduce greenhouse gas emissions from development within the National Park. It requires larger scale development to generate energy onsite from renewable sources to displace at least 10% of predicted CO ₂ emissions, giving recognition to the potential unacceptable impacts from renewable energy development within the National Park.
Development Policy 2	This policy sets out the approach that should be adopted for reducing flood risk from development.
Draft Minerals and Waste Joint Plan	
Draft Policy D09	This draft policy sets out the approach that should be adopted for reducing flood risk from minerals and waste development.
Draft Policy D10	This draft policy requires the reclamation and after use of sites to take into account potential impacts on and from climate change factors.
Draft Policy D11	This draft policy relates to sustainable design and operation of minerals and waste sites, including the minimisation of greenhouse gas emissions by incorporating energy-efficient siting, design and operational practices including those relating to bulk transport of materials, minimisation of water consumption, generation and utilisation of renewable or low carbon energy where appropriate.

Legislative Requirements

14.2.2 The main legislation of note is the Climate Change Act 2008, which underpins the Government’s activities to reduce carbon emissions, setting a target of at least an 80% reduction in emissions by 2050 from 1990 levels. This Act also incorporated a requirement to undertake Climate Change Risk Assessments on a five yearly cycle and to develop a National Adaption Programme to address the opportunities and risks from climate change.

Guidance

14.2.3 There are several strategies and plans that have been produced at the national level to support the move towards a low carbon economy, including the Energy White Paper (2011), the UK Energy Roadmap in 2011 (with updates in 2012 and 2013).



- 14.2.4 The latest National Climate Change Risk Assessment was reported in 2017 and identifies the top six areas of inter-related climate change risks for the UK – flooding and coastal change, high temperatures, shortages of public water supply, risks to natural capital, risks to food production, new and emerging pests and diseases. The National Adaption Programme was published in 2013 and contains a range of policies and actions to help adapt successfully to future weather conditions.

14.3 Methodology and Approach

Consultation

- 14.3.1 The Scoping Request issued to the NYMNPA on 19 June 2017 set out that consideration will be given to any greenhouse gas emissions from the Proposed Development and any mitigation measures that have already been, or could be put in place. The Scoping Opinion issued by the NYMNPA confirmed that this approach was acceptable for the EIA.
- 14.3.2 No other consultation has taken place on climate matters.

Data Gathering Methodology

- 14.3.3 Information on the energy use of the mine and measures that have been put in place to reduce energy consumption have been provided by ICL Boulby. Calculations made on CO₂ equivalent are based on information from DECC (2019).

Methodology for Identifying and Assessing Effects

- 14.3.4 There is no specific formal methodology for the assessment of potential effects of a development on climate, although IEMA has published a guide to climate change resilience and adaption in the EIA process. This guidance advises that an ES could report on the scheme design, greenhouse gas mitigation, climate change resilience of the project, impact of the project in combination with climate change and significance of effects.
- 14.3.5 The assessment takes a more generic approach to the assessment of effects than other chapters. This is because the impact of any development on the climate leads to effects being felt on other receptors (such as flood risk to property or ecology) and these effects will be assessed where relevant in the individual ES chapters, or in the Flood Risk Assessment which is included with the planning application. These effects are not repeated here and instead 'receptors' are used which provide a wider picture of climate change – in this instance greenhouse gas emissions into the atmosphere and crop production for food supply. For these receptors no specific sensitivity or importance is given as any changes on climate would on such a large scale as too make the exercise meaningless. A higher level consideration of significance, using professional judgement, is therefore utilised.

14.4 Baseline

Current Baseline

- 14.4.1 The National Park Management Plan identifies that in 2006 the National Park produced around 704,000 tonnes of CO₂e. Information from Office of National Statistics¹ shows that Redcar and

¹ ONS, UK local authority and regional carbon dioxide emissions national statistics: 2005-2017, June 2019.

Cleveland Borough produced an average of 7.4 million tonnes of CO₂e between 2005 and 2017. In 2017, the UK as a whole produced over 370 million tonnes of CO₂e.

- 14.4.2 Boulby Mine's overall energy requirements have dropped from around 386GWh per year in 1996 to around 174GWh in 2018. It is not possible to accurately identify what the carbon emissions from this energy usage will have been as the carbon emitted per GWh of energy use will have changed dramatically over this time period. It is expected though that Boulby Mine has been a **significant** contributor to carbon emissions from the National Park during this time, but the Mine's contributions to carbon emissions at the Redcar and Cleveland and UK levels have been at such a low proportion to be **non-significant**.
- 14.4.3 The minerals extracted are used to make fertiliser helps sustain and increase food production whilst reducing the need for additional land to do so. The provision of UK produced fertiliser products to the UK market keeps transport emissions lower than by using imports and this therefore represents a **positive** effect, which is considered **significant** on a UK scale.

Predicted Future Baseline

- 14.4.4 The UK Climate Projections (UKCP09) website provides climate information for the UK and its regions and is designed to help with the process of adapting to climate change. For the Yorkshire/Humber region the UKCP09 projections show that, under a medium emissions scenario in the 2020s time period, the region is projected to warm, with similar rises projected for both summer and winter. Projections for average annual precipitation is that it changes little although winter mean precipitation is projected to increase and summer mean precipitation to decrease. Relative mean sea levels are projected to rise around the UK but more so in the south. Sea surface temperatures rise while salinities decline.
- 14.4.5 Specifically relating to the Mine, if the proposals to extend the working life are not approved, the Mine would close, be decommissioned and restored to mainly nature conservation and agricultural uses.
- 14.4.6 The Mine would require energy and there would be carbon emissions associated with this and the transport of staff and materials during the operational phase (2018-2023) and also during the decommissioning and restoration phase (2023-2025). As with the existing baseline, effects during this phase could be expected to be **significant and adverse** at the National Park level, but **non-significant and adverse** when considered at Redcar and Cleveland or UK levels. Once the Mine has been restored and is in the aftercare and semi mature restored site phases, the CO₂ emission would reduce to those being generated by visitors to the features at the restored site and the ongoing management and maintenance of the nature conservation, woodland and farming land. The effects during these phases would be **negligible**. This would also be the case for the matured restored site over the long term future.
- 14.4.7 The minerals would not be available to contribute to the supply of fertiliser from 2023, from the decommissioning and restoration phase onwards. Fertiliser products would instead need to be imported from abroad. Although the benefits of the fertiliser use would remain, the increased transport required would increase carbon emissions. This would represent an **adverse** effect which would **potentially be significant** depending on where the product is imported from.

14.5 Predicted Effects

Background

- 14.5.1 The use of electricity and gas is difficult to predict over the Proposed Development period, as the ongoing refinement of the processing activities and the switch over the processing operations at

Teesside provide uncertainties which cannot be estimated at this point in time. An assumption has therefore been that all processing activities will remain at Boulby Mine until 2033 (the latest year they could remain at Boulby Mine under the Proposed Development) and then they will switch to Teesside for 2024. Also, predictions of how gas use would change over the period to 2033 are more difficult to develop than electricity, as it is the activities using gas which will be subject to most potential change as the processing activities are refined. An assumption has therefore been made that gas usage will increase at the same rate as the electricity usage estimated for the processing activities, in response to the increase in volume of product being processed.

- 14.5.2 Annual electricity consumption consists of a fixed baseload amount and a variable operational amount. The fixed baseload comes mainly from the operation of the underground working, where the same amount of electricity is required to operate the underground pumps and fans/ventilation regardless of the amount of mineral being extracted in any particular time. This equate to around 51GWh per year and, not accounting for efficiency improvements from new technology, is likely to remain fixed throughout the Proposed Development period of 25 years. The variable operational amount covers the actual extraction activities underground and the surface processing activities. As the volume of mineral being extracted and subsequently processed changes over time, this amount also varies.
- 14.5.3 In 2020, at an extraction rate of around 1 million tonnes per year, the total electricity usage at Boulby Mine is expected to be around 89GWh. If all processing activities were to remain on the Boulby Mine site, the total electricity requirements would reach around 163GWh per year in 2033 at 3 million tonnes capacity. This figure would then drop as the processing switches to Teesside to around 112GWh per year from 2033 to 2048.
- 14.5.4 In addition, the mine also uses gas to power the boilers and dryers used in the processing activities, and to power the Combined Heat and Power (CHP) plant when this is used. The use of the CHP plant depends on the price of the gas, when it rises above a certain level it is more economical to buy electricity from the National Grid. As the processing of sylvanite to MOP required significant use of the boilers and dryers, historic energy use required for these activities was high. The current processing of polyhalite and the creation of PotashpluS on site does not require such intense heat use.
- 14.5.5 In 2020, at an extraction rate of around 1 million tonnes per year, the total gas usage at Boulby Mine is expected to be around 114GWh for both the processing activities and use of the CHP plant. If all processing activities were to remain on the Boulby Mine site, the total gas requirements would reach around 209GWh per year in 2033 at 3 million tonnes capacity. This figure would then drop as the processing switches to Teesside to around 58GWh per year from 2033 to 2048.
- 14.5.6 Overall total energy requirements are therefore predicted to rise from around 204GWh in 2020, up to a maximum of around 372 GWh per year in 2033 when 3 million tonnes capacity is reached. Total energy usage would then drop to around 170GWH per year from 2033 through to 2048.
- 14.5.7 In 2020 the electricity use would generate around 256 tonnes of CO₂e per GWh used². This figure is projected to drop to 41 tonnes per GWh by 2035³ as the electricity generation sector rapidly decarbonises. From the predicted electricity requirements of Boulby Mine and the conversion factors available, it is estimated that the Mine would use an average of 10,167GWh of electricity per year over the Proposed Development period.
- 14.5.8 Gas is predominantly used by the processing facilities to make PotashpluS and the generation of electricity from the CHP plant. Gas as fuel gives rise to 184 tonnes of CO₂e for every GWh used. No projections are available for how this figure may change in the future, so the same figure has been

² BEIS and DEFRA, UK Government GHG Conversion Factors for Company Reporting, 2019.

³ BEIS, Updated Energy and Emissions Projections 2018, April 2019.

used for each year of the Proposed Development. This would equate to 29,582 tonnes of CO₂e arisings of reach year proposed.

- 14.5.9 Carbon emissions are likely to decrease over the Proposed Development period as the UK decarbonises its energy generation production and drives down greenhouse gas emissions towards 2050. The UK has a target of reducing CO₂e emissions to 575 million tonnes per year by 2028. Boulby Mine's proportional contribution to local and national carbon emissions over the Proposed Development period will therefore vary this period due to these changes and the changing operational activities of ICL Boulby. In 2028, the average CO₂e production figure from Boulby Mine would equate to 0.005% of the UK total.

Operational Phase

- 14.5.10 During the period from 2018 – 2023 when the Mine remains operational, the climate effects from CO₂ emissions would remain similar to the current baseline. The products would continue to be transported mainly by rail and ship rather than by road. Although the mine is a large user of electricity there are already a number of energy efficiency and sustainable energy measures in place that have reduced electricity demand (and therefore CO₂ emissions) by around 25% over the period from 1996 and there is the potential for technology improvements to be made or the electricity grid to continue to decarbonise, which has the potential to reduce emissions further. Furthermore, the plans going forward are based on a scenario where polyhalite is the main focus of extraction, and sylvinitic extraction is reduced. This will lead to less processing than that currently associated with the Mine where sylvinitic is the main focus of extraction. Effects are likely to remain the same as for the baseline situation, being **significant and adverse** at a National Park level but **non-significant and adverse** when considered at a wider scale.
- 14.5.11 The minerals would continue to be available for the manufacture of fertiliser so effects would remain the same as the baseline situation, as **significant and positive**.

Decommissioning and Restoration Phase

- 14.5.12 Without a new planning permission, from 2023 – 2025, all mineral extraction and processing would cease and the Mine would be decommissioned and restored. The underground extraction area would be made safe. All surface structures would be dismantled or demolished, the site cleared and re-profiled to an agreed landform. Soils which were saved in mounds when the mine was originally constructed would be spread around the site, and planting undertaken to provide a mixture of agricultural land and nature interest. A car park, footpaths, information signs and landscape features would be created to allow visitors to access the site.
- 14.5.13 Energy use would be required during the decommissioning and restoration phase albeit at a level which is likely to be lower than for the operational Mine. CO₂ would still be emitted. In comparison, a new planning permission would continue the working practices over this period with the associated demand for energy. Effects would remain the same as the baseline scenario, being **significant and adverse** at a National Park level but **non-significant and adverse** when considered at a wider scale.
- 14.5.14 If planning permission is not granted then the minerals would not be available from the UK for the manufacture of fertiliser to help with food production. In comparison, a new planning permission would continue the supply of material for fertiliser to help sustain and increase food production. Effects would be potentially **significant and positive** compared to potentially significant and adverse in the future baseline scenario.

Aftercare and Semi-mature Restored Site Phases

- 14.5.15 Once the Mine is restored, it will enter a period of aftercare for 5 years, where the restoration works are monitored and if any planting fails to survive or other elements are not as successful as anticipated, they would be replaced by ICL Boulby. Once this 5 year period has finished, the responsibilities for the site would pass into the hands of the landowner(s) and the planting would continue to mature and the site evolve under natural processes.
- 14.5.16 Any energy use and therefore CO₂ emissions would be restricted to those visiting the features at the restored site and the ongoing management and maintenance of the nature conservation, woodland and farming land. In comparison, a new planning permission would continue the working practices over this period with the associated demand for energy. CO₂ emissions when would be **significant and adverse** at a National Park level but **non-significant and adverse** when considered at a wider scale.
- 14.5.17 If planning permission is not granted then the minerals would not be available from the UK for the manufacture of fertiliser to help with food production. In comparison, a new planning permission would continue the supply of material for fertiliser to help sustain and increase food production. Effects would be potentially **significant** and **positive** compared to potentially significant and adverse in the future baseline scenario.

Matured Restored Site

- 14.5.18 Without a new planning permission the Mine would have been restored for 23 years and would represent a mature restored site.
- 14.5.19 Any energy use and therefore CO₂ emissions would be restricted to those visiting the site to make use of the access tracks and visit the industrial/mining heritage interpretation features and the ongoing management and maintenance of the nature conservation, woodland and farming land. In comparison, a new planning permission would see the Mine demolished and the restored landform created during this phase. Energy use would be required during this demolition and landform creation phase. Effects would be **non-significant and adverse** compared to negligible adverse in the future baseline scenario. Once the site is restored, any energy use and therefore CO₂ emissions would be restricted to those visiting the features at the restored site and the ongoing management and maintenance of the nature conservation, woodland and farming land. The effects would remain as **negligible adverse** as in the future baseline scenario.
- 14.5.20 Mineral extraction would have ceased in this phase and so no minerals would be contributing to the supply of fertiliser. The effects would be the same as for the matured restored site in the future baseline scenario, as a **potentially significant, adverse** effect.

Continued Working

- 14.5.21 In practical terms, if the Proposed Development is approved, what will actually happen is a continuation of the current baseline situation for a further 25 year period, and then changes occurring as the Mine Site goes through demolition, the new landform creation, restoration and aftercare. Over the 25 year period of additional operations, this likely see **significant, adverse** effects in terms of energy use and carbon emissions at a National Park level; **non-significant, adverse** effects at the Redcar and Cleveland and UK levels and **non-significant, positive** effects in terms of fertiliser supply to the UK. After 25 years, the reduction in energy use and greenhouse gas emissions will see a **significant, positive** effect at the National Park level, and a **non-significant, positive** effect when considered more widely. The end of supply of fertiliser from a UK source would see a **potentially significant, adverse** effect.

14.6 Mitigation and Enhancement Measures

- 14.6.1 Opportunities to mitigate potential adverse effects have already been incorporated within the processes at the Mine. Further consideration could be given to:
- Additional sources of renewable energy onsite if that can be achieved in an acceptable way;
 - Sourcing electricity from renewable sources;
 - Offsite measures to help offset the CO₂ emissions from the mine operations.

14.7 Conclusions of Significance Evaluation

- 14.7.1 As described in the preceding section, the Proposed Development is likely to have significant adverse effects from energy use when considered as a contributor to the National Park’s carbon emissions, but non-significant, adverse effects when considered at the Redcar and Cleveland or national levels. Climate change effects from the provision of fertiliser to the UK market would see a potentially significant, positive effect.

14.8 Implementation of Mitigation Measures

- 14.8.1 Details of how the determining authority can secure the mitigation/enhancement measures are set out in table 14.2 below.]

Table 14.2 Implementation of Environmental Measures/Mitigation

Environmental measure/mitigation	Responsibility for implementation	Compliance Mechanism
Offsite compensatory measures	ICL Boulby/NYMNPA	Planning obligation

14.9 References

- 14.9.1 DECC (2013), *Greenhouse gas reporting – conversion factors 2013*, Available at <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2013>. Accessed 13 November 2017.
- 14.9.2 UK Climate Projections, *Maps and key Findings Yorkshire and Humber*, <http://ukclimateprojections.metoffice.gov.uk/21708?projections=23723>. Accessed 13 November 2017.
- 14.9.3 BEIS (2017), *2016 UK Greenhouse Gas Emissions, Provisional Figures*, Executive Summary.



15. Health and Safety

Non-Technical Summary

This assessment considers the effects of the mine operations on the health and safety of employees at Boulby Mine. Mining is an inherently dangerous activity and Boulby Mine is heavily regulated by the Health and Safety Executive and the Mines Inspectorate. It cannot operate without the approval of these organisations. So whilst the operational activities proposed create a significant risk to the health and safety of employees, every effort is made to undertake working at the mine in a safe and healthy manner.

15.1 Introduction and Overview

- 15.1.1 This chapter assesses whether significant environmental effects are likely on the health and safety of employees at Boulby Mine as a result of the proposals. The health and safety impacts on members of the wider population have been covered in other technical chapters where relevant (e.g. air quality, noise of traffic and transport) and it was agreed that any further considerations would be excluded in the Scoping Opinion (Appendix 1A).
- 15.1.2 The chapter also covers the requirements of the EIA regulations in how they relate to accidents or disasters. The Scoping Opinion confirmed the approach that a major accident or disaster at the mine would only create significant effects (for the purposes of the EIA) on health and safety of the employees. No other significant effects need to be considered.
- 15.1.3 This chapter follows a slightly different approach to other technical chapters, in that the health and safety of employees at the mine is strictly controlled by legislation and directives issued by the HSE and the Mines Inspectorate. ICL Boulby are bound by this legislation and regulations and therefore there is less scope for examining alternatives. In theory, if all of the measures in the legislations and directives are followed then the mine will be the safest it could be and there is little scope for introducing additional measures to make the mine safer.
- 15.1.4 This chapter provides a summary of relevant policy and legislation and describes how this is implemented at the mine. The chapter provides a summary of potential effects and an evaluation of their significance.

15.2 Policy Context, Legislative Requirements and Guidance

Policy Context

- 15.2.1 This section outlines the policy issues that are relevant to the health and safety topic and have been used to ensure that the scope of the assessment is appropriate. The relevant policy documents are summarised in Table 15.1 below together with a brief summary of the policy requirement.

Table 15.1 Relevant Planning Policy

Policy Reference	Policy Issue
National planning policies	
National Planning Policy Framework	



Policy Reference	Policy Issue
Paragraph 120	This requires planning policies and decisions to ensure that new development is appropriate to its location to prevent unacceptable risks from pollution and land stability and that the effects of pollution on health is taken into account.
Paragraph 123	This sets out the aims relating to minimising the health effects from noise from new developments, with reference to the Noise Policy Statement for England.
Paragraph 144	This requires planning authorities to ensure that there are no unacceptable adverse impacts on human health when granting planning permission for mineral development.
Local planning policies	
NYMNPA Core Strategy and Development Policies	
Development Policy 1	This states that development will only be permitted where there will be no adverse effects arising from sources of pollution which would impact on the health, safety and amenity of the public and users of the development.
Draft Local Plan	
Draft Policy ENV7	Includes that there should be no unacceptable adverse effects arising from pollution which would impact on the health, safety and amenity of the public and users of a development.
Draft Minerals and Waste Joint Plan	
Draft Policy D02	Proposals will need to demonstrate that there are no unacceptable impacts as a result of public health and safety.
Draft Policy D11	This sets out a number of criteria covering sustainable design, construction and operation of minerals development, including the need to consider tip stability and dewatering activity to minimise any hazard to people and property to ensure the safety of the public and employees.

Legislative Requirements

- 15.2.2 The main legislation of note are the Mines Regulations 2014, which came into force on 6 April 2015 and replaced all previous mine specific health and safety legislation. The Regulations complement the considerable amount of general health and safety legislation that is also applicable to the mining industry. The Mine Regulations and other relevant legislation is shown below:
- Mines Regulations 2014;
 - Notification of Mining Operations.
- 15.2.3 Other health and safety legislation that applies to mining operations, or which may be relevant include:
- The Mines Regulations 2014 make specific reference to other health and safety regulations which apply to mining operations;
 - Health and Safety at Work etc. Act 1974;
 - Explosives Regulations 2014;

- Control of Substances Hazardous to Health Regulations 2002;
- Dangerous Substances and Explosives Atmospheres Regulations 2002;
- Management of Health and Safety at Work Regulations 1999;
- Provision and Use of Work Equipment Regulations 1998;
- Health and Safety (First Aid) Regulations 1981;
- Health and Safety (Consultation with Employees) Regulations 1996;
- Workplace (Health, Safety and Welfare) Regulations 1992;
- Personal Protective Equipment at Work Regulations 1992;
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013;
- Lifting Operations and Lifting Equipment Regulations 1998;
- Control of Noise at Work Regulations 2005;
- Control of Vibration at Work Regulations 2005;
- The Electricity at Work Regulations 1989;
- Confined Space Regulations 1997;
- Construction (Design and Management) Regulations 2015;
- Asbestos 2016;
- Fire Regulations 2005;
- Manual Handling Operations Regulations 1992;
- Working at Height 2005.

Guidance

- 15.2.4 A large amount of guidance is also available on health and safety issues in relation to the mining industry on the UK. An overview of this can be found at the Health and Safety Executive (HSE) website, in their mining pages: <http://www.hse.gov.uk/mining/information.htm>

15.3 Methodology and Approach

Consultation

- 15.3.1 The Scoping Request issued to the North York Moors National Park on 19 June 2017 set out that health and safety considerations within the EIA would be limited to the health and safety implications on the employees at Boulby Mine, and wider considerations on the health and safety of the wider public would not be included. Certain technical subjects within the EIA do consider the health and safety of the public where relevant and the assessment of these matters are included within the relevant chapters and not repeated here. The Scoping Request also proposed that considerations of accidents and disasters would be limited to their impact on the health and safety of employees at the mine.
- 15.3.2 The Scoping Opinion issued by the National Park Authority confirmed that these proposals were acceptable for the EIA.

15.3.3 No other consultation has taken place on health and safety matters.

Data Gathering Methodology

15.3.4 Information on how Boulby Mine complies with the relevant health and safety legislation has been provided by ICL Boulby.

Methodology for Identifying and Assessing Effects

15.3.5 There is no specific formal methodology for the assessment of potential effects of a development on health and safety. Instead, judgement is employed which draws on the best currently available knowledge and experience. All receptors being considered will be human health and safety and will therefore have the highest sensitivity rating. Effects on health and safety in the mining industry could quite easily lead to fatalities and major life changing injuries or illnesses. As such the assessment of effects would be significant in almost all circumstances. The implementation of all relevant safety and health protection measures will reduce the likelihood of impacts occurring, but a mining activity can never completely rule out the possibility of accidents or unforeseen events so a risk will always remain. The conclusions of this chapter are therefore provided in this context.

15.4 Baseline

15.4.1 The mine currently operates under the jurisdiction of the HSE, which has the power to investigate any incidents or activities where health and safety may be at risk and issue improvement notices if these investigations find any working practices which require amending to provide a safer working environment. An improvement notice does not necessarily mean that a mine operator has not been following procedures, it could reflect a change needed where a practice which was thought to be safe can be improved in light of new information.

Current Working Practices

15.4.2 The health and safety of employees at the mine is maintained by various working practices, depending on the roles the employees have, and the locations where they work.

Underground Mining Methods

15.4.3 The method of mining is designed to provide a safe working environment, whilst at the same time allowing minerals to be extracted in an efficient and profitable manner, and to ensure environmental harm (e.g. from subsidence) is not realised.

15.4.4 As described in Chapter 3, the pillar and stall method of extraction with strata control is used to mine the minerals from the underground workings. Suitably sized pillars are left in situ during the extractive works to support the roof of the working area. Different designs have been utilised in the different minerals subject of extraction (polyhalite, sylvinitite and salt). The size and location of these pillars has been designed depending on the precise geological conditions of the area being mined and will therefore vary across the underground area. For the sylvinitite extraction, the main arterial roadways were driven through the salt seam as this is a more stable material over the longer term. The extractions within the sylvinitite were therefore relatively smaller drives just to access the material for extraction. The polyhalite however is stable, like the salt, and the main driveways can be driven through this mineral directly.

15.4.5 As mineral is extracted, supporting material is added to help keep the roadways stable and safe. Immediately following mineral extraction, high tensile steel break-out bolts are placed in a set

pattern in the roofs and sidewalls which spread the pressure on the surfaces into the deeper rock structure behind.

- 15.4.6 In sylvinitic all of the pillar and stall workings have been designed to close in on themselves (to some degree) over the long term. This means that after mineral extraction a degree of collapse will occur, reducing the pressure on the remaining 'opening' and surrounding area, which reduces the risk of sudden or substantial collapses. Within the sylvinitic seams, which is a much more elastic material than the polyhalite or salt, this is particularly important. The rate and type of collapse will depend on the pillars remaining after working.
- 15.4.7 In areas of greater use, such as around the shaft bottoms and workshop areas, heavy duty steel frames are set at one metre intervals to provide longer term stability to older mine workings.
- 15.4.8 The extractive methods are also designed to prevent water ingress into the workings. This can occur where fault lines run between the working areas and water which is found below ground, such as in aquifers. Historically, this was more difficult to achieve and saline water ingress does occur in areas of older mine workings. This is managed through the creation of lagoons from which the brine is pumped to the surface and out to sea. Technology has improved significantly and water ingress is now able to be designed out of new mine workings, reducing the risks of losing an extraction district and ensuring a safe working environment for the underground workforce.
- 15.4.9 At the working face, managers rules, method statements and daily produced mine plans are in place to ensure strict controls during mining operations. District Overseers have a specific Health and Safety responsibility to ensure the extraction district itself is safe to extract minerals from, and also that the workforce are following the required mining procedures for the geological conditions.
- 15.4.10 The mine's ventilation is provided by the means of two main shafts. Air is forced down the No2 shaft by two fans at the surface. This air is then circulated along the main roadways leading to each mining district while the foul air returns to shaft No1 through the conveyor roadways, with booster fans pulling air along these routes. This air is drawn up No1 shaft and expelled through filters. The ventilation system is monitored daily for its efficiency and not only provides sufficient air for breathing and to clear dust and working emissions, but also assists in keeping working temperatures down. Temperatures in the virgin rocks can reach up to 45°C.

Underground Personal Measures

- 15.4.11 In addition to the design of the extraction and working methods, personal measures are in place for all workers both surface and underground. Management of the underground workforce is more complicated due to the expanse of the geographical and geological areas that are covered. As a rule the work force are in teams but there are lone workers within the mine that have to report to the Control Room Operators (CRO's) on a 2 hourly basis.
- 15.4.12 Initially, deployment of the workforce is undertaken by Production and Shift Managers and implemented by the Overseers. Detailed records of where each person is working are kept and maintained by the CRO's. All contractors and visitors entering the mine are permanently supervised and have to undertake an underground induction and a work/visit location form is completed by their supervisor and kept and maintained by the CRO's.
- 15.4.13 These procedures ensure that ICL Boulby knows exactly how many people are underground at any one time. A tally system is also in place as a final control measure to count the workers who have gone underground and then then count them out again as they return safely to the surface.
- 15.4.14 Strict controls are maintained regarding the use and wearing of Personal Protective Equipment (PPE). Everyone working on the plant or underground must comply with ICL Boulby's PPE policy. Surface and underground inductions explain in detail what PPE is required and how to wear it.

- 15.4.15 All underground personnel, including contractors and visitors, are trained in the use of a self-rescuer and must carry one at all times. The purpose of the self-rescuer is to allow sufficient breathing time to reach a safe haven in the event of a major accident such as a fire or a gas leak.
- 15.4.16 There are a number of safe havens strategically located throughout the mine. The safe havens provide a dedicated location for workers to retreat to in the event of an underground emergency. Each haven can be sealed off to prevent smoke or gas ingress and has an internal oxygen and water supply with communications to the surface.
- 15.4.17 Due to high temperatures in certain parts of the mine, rehydration is a key factor in maintaining a healthy workforce. All staff working underground have to carry sufficient water for the duration of their shift. The calculation of how much water is needed is based on the length of time they will spend underground and their geographical location. Workers take regular breaks from their work duties to ensure they cool down and take on water. Additional water can be sourced from various locations across the mine. This practice is monitored by their Overseer. Regular reminders concerning the effects of dehydration are circulated to the workforce through tool box talks.

Above Ground

- 15.4.18 Above ground, the working operations are akin to a heavy industrial site and therefore the health and safety measures in place are more standard practices, common on industrial or construction sites across the UK.
- 15.4.19 All employees undergo appropriate training to the roles and activities they will be involved in and are provided with appropriate PPE for their jobs. Tools, plant and machinery are inspected routinely to ensure they are fit for purpose and are suitable for the tasks they have been design for. Vehicles speeds are restricted to 20 MPH across the site, and appropriate warning lights and sirens are installed on large plant for movement awareness.
- 15.4.20 All contractors and visitors must go through a surface induction to make them aware of the hazards that can be encountered throughout the site. All contractors must complete a Certificate of Competence and Medical questionnaire before being allowed on site and their equipment is checked for compliancy and signed off for use. Method statements and risk assessments have to be prepared in advance and agreed by ICL Boulby before work can commence. If any specialist information is required for any activities, then this is also supplied by the contracting firm in advance.
- 15.4.21 Visitors' rights of access are determined by the level of clearance they have received and training / induction information supplied. Access may be restricted to certain areas, or may require a ICL Boulby employee to accompany them, depending on the scenario.

Current Baseline

- 15.4.22 Despite the extensive working practices in place at the mine, and the overview role provided by the HSE, a mine (of any type) remains an inherently dangerous place to work. The mining and quarrying sector has had the third or fourth highest rate of fatalities (per 100,000 workers) across all industry sectors in the UK (HSE 2019¹), with only agriculture, water supply/sewerage/waste management/remediation and construction having higher rates. The mine has been subject to high profile incidents, most recently in 2016. One of these involved the fatality of an underground worker and the other a fire. The inquest into the fatality found that appropriate safety procedures were in place but these had not been strictly followed and a verdict of misadventure was returned. The fire led to 11 workers being trapped underground, seven of which required hospital treatment,

¹ Table 1 of 'Riddor reported fatal injuries', rate of fatal injury per 100,000 workers, data from 2013-2017.

and saw supposedly inflammable material catch fire. An improvement notice was issued by the HSE after the inquiry into the event which has now been implemented.

- 15.4.23 The current baseline must be recognised as inherently hazardous to human health and safety and is therefore a **significant adverse** effect is created on health and safety. However, it must also be recognised in the baseline that every effort is made to undertake working at the mine in a safe and healthy manner.

Predicted Future Baseline

- 15.4.24 If the proposals to extend the working life of the mine are not approved, the mine would close, be decommissioned and restored to mainly nature conservation and agricultural uses. Health and safety risks would remain during the period of continued working until 2023, and then during the decommissioning activities at the site. Once these have been completed however, no access to underground areas would remain, nor would any structures or processes relating to the industrial type activities remain on the surface, and with this, all risks from the mining activities would also be removed. The effects on health and safety would therefore remain as **significant and adverse** during the decommissioning activities, **reducing to non-significant and adverse** as the land is restored and becoming **negligible** once into the aftercare period and beyond.

15.5 Predicted Effects

Operational

- 15.5.1 During the period from 2018 – 2023 when the mine will remain in operational use, the risk to health and safety of employees and visitors at the mine will remain as it is in the current baseline. The mine will be an inherently dangerous place, but with all measures being taken to reduce risks and maintain health and safety of the people involved. Effects will remain as **significant and adverse** during this period.

Decommissioning and Restoration Phase

- 15.5.2 Without a new planning permission, from 2023 – 2025, the mine would be decommissioned, with all underground workings coming to a stop and the mine being abandoned and the shafts closed up. The underground works will be left in a condition where there should be no risk of major subsidence events which would affect the safety of people or structures at ground level and once the shafts are closed, there will be no access to the underground void remaining. All surface structures will be dismantled or demolished, the site cleared and re-profiled to an agreed landform. Soils which were saved in mounds when the mine was originally constructed will be spread around the site, and planting undertaken to provide a mixture of agricultural land and nature interest. A car park, footpaths, information signs and landscape features will be created to allow visitors to access the site.
- 15.5.3 In comparison, a new planning permission would continue the operative practices over this period. Practices would continue to be refined and improved in response to evolving legislation but they would remain as **significant and adverse**, compared to being adverse, but reducing from significant to non-significant.

Aftercare and the Maturing Site

- 15.5.4 Once the site is restored, it will enter a period of aftercare for 5 years, where the restoration works are monitored and if any planting fails to survive or other elements are not as successful as anticipated, they would be replaced by ICL Boulby. Once this 5 year period has finished, the

responsibilities for the site would pass into the hands of the landowner(s) and the planting would continue to mature and the site evolve under natural processes. Any health and safety obligations on the landowners would be restricted to those required by law relating to anyone worker on the land (for e.g. in agriculture) or to any people otherwise lawfully using the land (e.g. on public rights of way). There will be potential risks from agricultural practices (livestock, vehicles and machinery) but the low number of people expected to use the site for agricultural or leisure uses will mean these risks are very low.

15.5.5 In comparison, a new planning permission would continue the operative practices over this period. Practices would continue to be refined and improved in response to evolving legislation but they would remain as **significant and adverse**, compared to being negligible.

15.5.6 Once the operations have been completed under a new permission in 2048, the site would be decommissioned and restored and risks to health and safety would reduce in the same manner as described in paragraph 15.4.24, ultimately leaving the site in the same condition as if it decommissioning and restoration were commenced in 2023. The Proposed Development will therefore effectively see the health and safety issues involved with working a mine continued for another 25 years before they are then removed by the closure of the mine.

15.6 Mitigation and Enhancement Measures

15.6.1 Opportunities to mitigate potential adverse effects have already been incorporated within the working practices utilised at the mine or are imposed through a number of existing regulatory controls. Regulatory measures and best practice will be utilised through all future works but it is not possible to predict what these might be at this time. It has been assumed that all such measures will be utilised, and this is how the development has been assessed above.

15.7 References

15.7.1 RIDFATAL: Riddor reported fatal injuries, HSE, 2019. www.hse.gov.uk/statistics/tables/ridfatal.xlsx accessed 14 October 2019.

16. Mitigation

16.1 Introduction

16.1.1 This chapter collates the mitigation which is identified within the Environmental Statement to a single location so the recommendations can easily be identified and if necessary secured during the planning application process. This includes a range of mitigation measures which are incorporated within the Proposed Development, due to the way that Boulby Mine already operates or which have been built in to the Proposed Development from the outset (Table 16.1 Incorporated Mitigation). It also includes the recommendations for mitigation which have been made in addition to these incorporated measures (Table 16.2 Recommended Mitigation).

Table 16.1 Incorporated Mitigation

Measure	Method of implementation	Details
Phased transfer of operations to Teesside and associated deconstruction at Boulby Mine	Section 106 agreement	Over the first 10 years of the Proposed Development, many of the processing operations will switch to a new processing facility on Teesside, resulting in a reduction in noise, dust arisings, emissions to air, water consumption and energy use at Boulby Mine. This proposal will also allow a number of buildings to be deconstructed at Boulby Mine, or reduced in scale, which will provide mitigation on landscape and visual effects, effects on the settings of heritage assets nearby, reduce surface water runoff and provide opportunities for early restoration of parts of the Mine Site.
Dust control and associated monitoring	Planning Condition	The continuing implementation of dust control measures that are currently in place, and adherence to relevant best practice guidance.
Water pollution and associated monitoring	Planning Condition	The continuing implementation of water pollution control measures that are currently in place, and adherence to relevant best practice guidance.
Atmospheric pollution implementation	Planning Condition	The continuing implementation of atmospheric pollution measures that are currently in place, and adherence to relevant best practice guidance.
Subsidence and coastal erosion monitoring	Section 106 agreement	To monitor the effects of mining activities on subsidence and coastal erosion, but on a reduced programme from previous requirements.
Limits on movement of product by HGV	Planning Condition	Except with the prior written approval of the National Park Authority, the total weight of material transported by road from Boulby Mine in any period of twelve consecutive months shall not exceed 150,000 tonnes. The maximum number of loads of Product to leave the Site by road during each day shall not exceed 66. Cleveland Potash shall send to the National Park Officer each month details of the numbers of lorries which have been used each day during the previous month for the dispatch of Product and such details shall include information on the direction of arrival and departure to and from the Site together with the type and tonnage of Product dispatched by road.
Avoidance of dust arisings from product transportation	Planning Condition	All road vehicles carrying mineral from the site shall be securely covered or sheeted and all rail wagons carrying mineral from the site shall be fully enclosed or covered.
Avoidance of disturbance by HGVs transporting product	Section 106 agreement	No lorries to be used for the dispatching of Product shall enter the site before 6.45 am or leave before 7.30 am each day and no lorries to be used for the despatching of Product shall leave the Site after 7.00 pm each day. Lorries will only be loaded on site between 7.00 am and 5.30 pm Mondays to Saturdays inclusive No lorries shall leave the Site for the purpose of transporting Product on Sundays or Public Holidays. Cleveland Potash shall provide to its contractors as a condition of hauling for Cleveland Potash written instructions that the lorries of each contractor shall in particular not use the Blakey Ridge Road (C20) for access to the Site or for the dispatch of Product except for the purpose of direct access to properties along such road and in any event comply with the Hauliers Code of Good Practice.



Measure	Method of implementation	Details
Screening through tree planting	Planning Condition	Tree planting and management: alongside the A174 overlooking the site south eastwards from The Brows; alongside the A174 looking eastwards from the section of road near Red House Farm and the site entrance; and general screening around the operational area to screen low level minehead clutter and activity in views from the north and east
Management of existing woodland	Planning Condition	Management of existing woodland and tree planting areas around the operational area to retain screening properties.
Finish of buildings	Planning Condition	Application of uniform colour finish to the majority of retained structures on site for the remaining operational period to provide a unified recessive finish to the built development within the site boundary. (Colour and finish to be agreed with NYMNPA)

Table 16.2 Recommended Mitigation

Measure	Method of implementation	Compliance Mechanism
Traffic Plan	Planning Condition	To further reduce the impact of staff travel by encouraging modal shift.
Habitat management and creation	Planning Condition	Preparation and implementation of a Habitat Management Plan (HMP) to the satisfaction of LPA.
Bat mitigation	Planning Condition	Preparation and implementation of a Habitat Management Plan (HMP) to the satisfaction of LPA.
GCN mitigation	Planning Condition	Preparation and implementation of a Habitat Management Plan (HMP) to the satisfaction of LPA.
Restoration Scheme	Planning Condition	A detailed Restoration Scheme should be developed prior to the final decommissioning of the Proposed Development in 2048 to ensure the restoration of the site is undertaken in accordance with best practice at the time. The restoration scheme would also be able to be used to provide measures to enhance the setting of historic assets in the nearby area at this time.

