TOWN AND COUNTRY PLANNING ACT 1990

TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015/595

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000/1624

PLANNING INQUIRY UNDER SECTION 77 OF THE TOWN AND COUNTRY PLANNING ACT 1990 IN RELATION TO THE PLANNING APPLICATION REFERENCE 4/17/9007 FOR APPLICATION FOR DEVELOPMENT OF A NEW UNDERGROUND METALLURGICAL COAL MINE AND ASSOCIATED DEVELOPMENT TO BE LOCATED AT

FORMER MARCHON SITE, POW BECK VALLEY AND AREA FROM MARCHON SITE TO ST BEES COAST, WHITEHAVEN, CUMBRIA

PINS REFERENCE: APP/H0900/V/21/3271069

Proof of Evidence on matters relating to project benefits, mining method, coal processing, economic impacts and benefits, national context and project funding & investment.

Mark Kirkbride

On behalf of West Cumbria Mining Ltd

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Appendices (Separately Bound)

1. Summary

1.1. I am Mark Kirkbride, CEO of West Cumbria Mining Ltd. I am providing evidence to the Inquiry on the economic aspects of the project and wider national context of the scheme, together with detailed insight into specific technical areas of the proposal, including mining method and coal processing details. I am a qualified mining engineer, a Chartered Engineer and a Fellow of my Professional Institute.

1.2. I have accumulated more than 28 years' experience in the mining and underground construction industries and have more than a decade of experience in senior corporate leadership roles.

1.3. My proof is based on the depth of work undertaken by WCM since 2014, including site investigation, surveys, design, community engagement, feasibility studies and financial modelling. It reviews the assessments of economic benefits in relation to the local, national and wider context, as set out in the project financial model.

1.4. The description of the chosen mining method, which was very much driven by the benefits in terms of reduced methane, seismicity and subsidence, together with flexibility in terms of the mining operations, is included to specifically explain the innovative, 21st century nature of the approach and equipment to be used in the mine.

1.5. The overview and approach to coal processing is presented to provide further insight and understanding of how modern techniques are being incorporated and combined to ensure that the product metallurgical coal can be tailored to meet specific product quality limits and to provide assurance as to the overall approach to meeting key coal specifications. The review confirms that the process will meet the required limits WCM has imposed on the clean coal product, and that it would be a High Volatile 'A' equivalent that would be desirable to steelmaking companies in the UK and EU.

1.6. The potential benefits of the scheme to Copeland, Cumbria and the UK have been reviewed and considered, in particular the quantity and nature of employee roles, the salaries involved and location of those employees.

1.7. The project will employee up to 532 people when in full operation, over the period from 2028 up until 2049, a period of more than 20 years, with significantly higher average salaries than the national average. This will be extremely significant in terms of socio-economic impacts to the local area, where there are long-standing zones of very high levels of child poverty and

long-term unemployment. The time period for the lifespan of the project is significant and will offer the opportunity for local people to gain new transferable skills and qualifications, together with apprenticeships, to be a core part of the green transition and levelling up agendas.

1.8. Likewise, assessment of expenditure impacts has been considered, including the elements of spend into the supply chain and the additional jobs created as a direct result of the services and supply chain that the mine will require to operate successfully.

1.9. The mine is forecast to produce a total of 65 million tonnes of metallurgical coal over its lifetime, resulting in expected revenues of £7,132 million. It is therefore anticipated that the average annual revenue would be more than £264 million.

1.10. The project is forecast to increase national output by £495 million on average annually. It is also forecast to sustain 1,618 employment opportunities in the country overall annually, including indirect and induced effects.

1.11. The average Gross Value Added (GVA) of the project alone is around £172 million annually, with an overall GVA impact of around £380 million annually.

1.12. At a regional level (Cumbria), the total impact from the project on annual regional output is £299 million. The project also adds £185 million of GVA and supports 637 positions in the region.

1.13. The proposed development will result in a significant GDP boost of more than £5 billion in exports (which is around 1.8% of the balance of trade deficit) over the first 20 years of operations, through valuable exports, together with Tax payments into the UK Treasury of more than £800 million over the life of the mine.

1.14. The separate evidence to be presented by other witnesses, including Wood Mackenzie on market thematics and emerging technologies, further demonstrate that a UK source of this critical raw material is fully aligned with the UK Government targets and Committee on Climate Change aspirations, budgets and targets.

1.15. The significant work and commitments from West Cumbria Mining to implement further methane capture and elimination for the life of the scheme, for environmental and GHG benefits, will represent a major step for the global industry to adopt and embrace.

1.16. My proof of evidence sets out specific aspects of the scheme in relation to the wider national context, including the alignment with the Climate Change Committee comments in relation to UK sourced critical raw materials and the UK Government clarity which has confirmed that industrial coals are excluded from the cessation of coal for electricity generation by mid-2024.

1.17. Separately, I have sought to provide insight into the project funding to date. The project has been wholly funded by private investment from overseas specialist investors and has also concluded extensive due diligence and signed a formal agreement with a major investor to provide the construction funding if the scheme were to secure successful planning approval.

1.18. Finally, the project has also secured a long term and legally binding agreement with a major commodity trading business to purchase and market all of the product produced at Woodhouse Colliery.

2. Qualifications and Experience

2.1. I am Mark Kirkbride and I am the Chief Executive Officer of the Applicant, West Cumbria Mining Limited ("WCM").

2.2. By profession, I am a Chartered Engineer with over 28 years of experience in mine engineering and underground construction. I qualified with a degree in mining engineering (B.Eng (Hons)) in 1993 from the world-famous Camborne School of Mines[1], part of the University of Exeter. I also hold a Masters in Philosophy (M.Phil) research degree in Geomechanics[2] from Camborne.

2.3. I have over two decades of experience of managing the planning, construction and operation of underground projects, including leading large-scale projects to construct mines around the world.

2.4. I am a Fellow of the Institute of Materials, Minerals and Mining and also sit on the Committee on Radioactive Waste Management (CoRWM), which provides independent scrutiny and advice to the UK Government and the Devolved Administrations on the long-term management and disposal of radioactive wastes.

2.5. I became CEO of WCM in June 2014. I have overseen and managed all aspects of the business, including building the scientific and economic case for the Development and the Application. Prior to this I advised the company in a non-executive director board role capacity for two years.

2.6. Whilst others will give the relevant expert evidence, a major part of my personal motivation for involvement in this proposed project is because I am strongly of the opinion that Woodhouse Colliery, if permitted, would have the lowest environmental impact of any equivalent mine in other countries, and the commitments which I and WCM have signed up to will ensure that it is a world class operation, being a key part of the steel industry during this critical transitional period toward net zero emissions.

2.7. I understand my duty to the Inquiry to help the Inspector on matters within my expertise, experience and knowledge. I have complied, and will continue to comply, with that duty. I confirm that this evidence identifies all facts which I regard as being relevant to the opinion that I have expressed and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion. I believe that the facts stated within this proof are true and that the opinions expressed are correct.

Statement of Truth

2.8. The evidence which I have prepared and provide for this planning inquiry (PINS Reference APP/H0900/V/21/3271069) in this Proof of Evidence is to the best of my knowledge and belief true and I confirm that the opinions expressed are my true and professional opinions.

3. Scope and Structure of Evidence

3.1. My evidence will cover the background to the development proposal, how the proposal has been financially modelled and the scope of the local economic benefits of the scheme as well as its wider economic benefits.

3.2. In presenting this, I will address in particular the employment benefits, investment into the local area and the impact the development, that is the subject of the "call in" (hereinafter referred to as the "Proposed Development"), could have on the UK's balance of trade deficit and additional tax revenues.

3.3. Any documents which are appended to this Proof of Evidence are referred to as Appendices whilst reference information is included as endnotes with numerical superscripts.

3.4. My evidence is confined to matters which I consider are relevant to the Inquiry and which are within my area of expertise or on the basis of work commissioned by me to experts in the field of economics. Appendix 1

incorporates a copy of an independent economic assessment completed by NERA consultants.

3.5. At the time of preparing this Proof, the Rule 6 parties have raised no new issues further to those which were raised in opposition to the application prior to previous Committee meetings during the public consultation processes and addressed by WCM and their consultants to the previous satisfaction of the planning authority as evidenced by the recommendation for approval on the third occasion in October 2020.

3.6. My evidence therefore builds upon my previous submissions to the planning authority in support of the project.

3.7. For the purposes of the Inquiry I have updated the evidence accompanying the application by reviewing the current economic markets, along with the impacts of the Covid-19 global pandemic to ensure that my evidence is up to date in light of these developments.

4. Background to the Scheme

4.1. I refer to WCM's Statement of Case ("the SoC") whereby a full description of the Development proposal is given at paragraph 4 thereof.

4.2. At or around September 2013, a substantial analytical exercise was undertaken by WCM in reviewing the historical data regarding the presence of coal from seams present around the St Bees coast and which form part of the wider Cumberland Coal Field. The requisite chemical composition and potential volumes were considered to determine the appropriate location of the Proposed Development.

4.3. From the subsequent exploratory drilling undertaken (as referenced in paragraphs 5 and 6 of the SoC) the core samples that were extracted confirmed that the coal is a premium-grade High Volatile ‘A’ Hard Coking Coal. This led to the plan to develop and operate an underground metallurgical coal mine, which will be known as Woodhouse Colliery.

4.4. Extensive project assessments, design work and community engagement and feedback have all shaped the scheme as it is now presented. It has been designed from the outset as a new 21st century operation, without many of the impacts associated with the historical UK coal mining industry. International best practice has been incorporated where possible to reduce impacts throughout the mine operations, from the chosen mining method and

equipment selection through to the materials handling, environmental mitigation and waste management.

4.5. As explained in paragraphs 8 to 11 of WCM's SoC, metallurgical coal is a rare type of coal that is listed by the European Union as one of 27 critical raw materials. Metallurgical coal of this type is not suitable for use as thermal coal in power stations; instead, 99% of all such coal is used in the manufacture of steel.

4.6. I refer to the overview in paragraph 12 of WCM's SoC in relation to the methods of mining and the processing of the metallurgical coal and present further details within this proof.

5. Benefits Of the Development, Once Operational

5.1. According to WCM's proposed construction timeline, Woodhouse Colliery would become operational approximately two years after planning permission is granted. If permitted to proceed with the Development, WCM plans to operate the Colliery until 2049 and has agreed to a planning condition to that effect.

5.2. As part of the Development, WCM plans to make future investments in the local area. These include local road, rail, cycle and footpath improvements, the refurbishment and future operation of a former local mining heritage museum, and improvements to local wildlife habitats. The Development will also require WCM to remediate legacy contamination from the former chemical works on the Marchon site, making it safer for the surrounding environment and the abandoned Mainband Colliery brownfield site.

5.3. In addition, WCM will also be committed via a section 106 obligation to adopt a policy that avoids, reduces and offsets carbon emissions in respect of the Colliery. WCM is committed to power the mine using renewable electricity and has agreed to a planning condition to that effect. WCM will use a series of methane capture and elimination methods to reduce methane emissions by up to 95%. These measures will aim to remove and offset all of the carbon emissions released by the construction, operation and decommissioning of the Colliery, ensuring that it is net zero emissions. Further details in respect of these measures are given in the proof of evidence of Bill Tonks.

5.4. The approach to methane capture and elimination utilises two well proven technologies, one which generates electricity (methane drainage, vacuum and gas engines) and the other which converts methane to water vapour and

residual CO_2 (bulk air regenerative thermal oxidiser units). The joint application of these techniques together will ensure that Woodhouse Colliery is a world leader in terms of methane capture and abatement, achieving very significant climate impact reduction.

5.5. The Colliery is projected to have annual steady state revenue of more than £264 million, making a £1.5 billion contribution to UK GDP and providing £2.4 billion worth of exports in the first 10 years of operation.

6. Mining Methodology

Summary

6.1. The mining process to be adopted at Woodhouse Colliery is known as 'Run Out and Pocket' and has been adopted for a number of key reasons, including the reduced likelihood of any seismic events and/or subsidence, as a result of the underground extraction methods, and the benefits of operational flexibility and reduced emissions into the mine workings.

6.2. Two common mining methods are briefly explained below to give an insight on how coal can be extracted in a modern coal mine. These two methods are known as 'Longwall' and 'Room and Pillar'. The chosen method 'Run Out and Pocket' is a refined version of 'Room and Pillar' which will allow for a safe and highly efficient process for extracting coal at Woodhouse Colliery.

Mining Techniques: Longwall Mining

6.3. Longwall mining is a method of extracting a long rectangular block of coal which has been defined during the development stage of the mine. The coal is extracted by a coal cutting machine called a shearer in a single continuous operation parallel to the coal face. When the coal has been cut the working area is protected by powered roof supports. As the coal face retreats the immediate roof is allowed to collapse behind the powered roof supports.

6.4. Modern longwall mining faces are extracted by retreating through a rectangular block of coal known as a panel. The panel is first developed by driving two parallel roadway tunnels, known as the main gate and tail gate, which could be up to 3,000m in length. These two roadways are usually between 200m to 400m apart, depending on geology, geotechnical factors and depth of the coal. The two gate roads are subsequently joined up by driving the face line which forms the coal face.

6.5. The coal face equipment is then installed on the face line which includes the hydraulic roof supports, Armoured Face Conveyor and shearer, together with conveyors and face support infrastructure equipment.

6.6. Production then commences mining back towards the trunk roads. The shearer cuts a strip of coal in each direction along the face line, and as it cuts the roof supports are systematically advanced to ensure a continuous canopy of support to ensure a safe working area is maintained on the coal face and the cavity formed behind. The cavity formed behind the face is known as the goaf or gob.

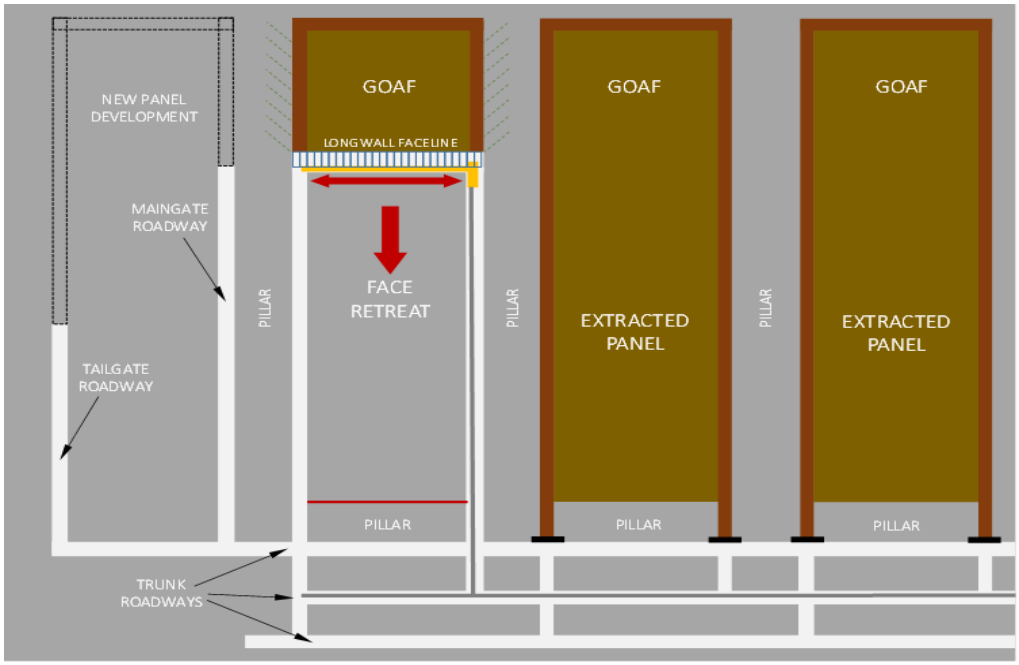

Figure 1: Longwall retreat panel schematic

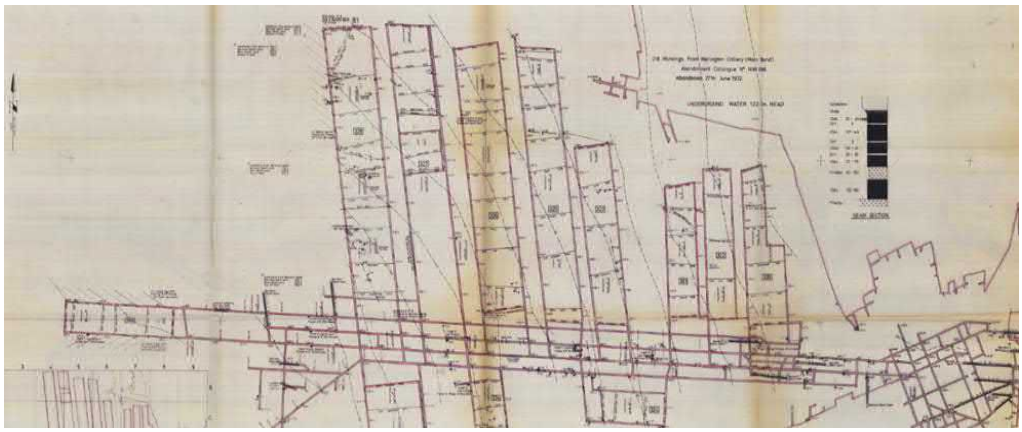

Figure 2: Example of an area of longwall panels worked at Haig Colliery

Figure 3: A longwall face with shearer in operation

Mining Techniques: Room and Pillar

6.7. Room and Pillar, sometimes called Pillar and Stall or Bord and Pillar, is one of the most popular and proven techniques used underground for the extraction of coal. It offers a highly flexible technique, where a series of parallel tunnels (rooms) are driven in the coal, with regular perpendicular or angled cross cuts driven between them, thus forming square or rectangular pillars which remain in-situ during the development of the mining panel.

6.8. The room sizes are normally dictated by the mining equipment employed and the local geotechnical conditions and method of ground support employed; the pillar sizes are normally dictated by the seam thickness, depth of cover, competence of the roof and floor strata, the layout of the room and pillar panel and future plans for the area (long term stability, pillar extraction etc).

6.9. Modern mechanised room and pillar operations are highly productive in good ground conditions and have the benefit of low initial capital expenditure.

6.10. Typical mining equipment comprises of a continuous miner to cut the coal, shuttle cars to transport the coal from the face to the conveyor belt, a feeder breaker to size and control the feed of the coal onto the conveyor and a mobile bolting machine to provide rockbolt ground support.

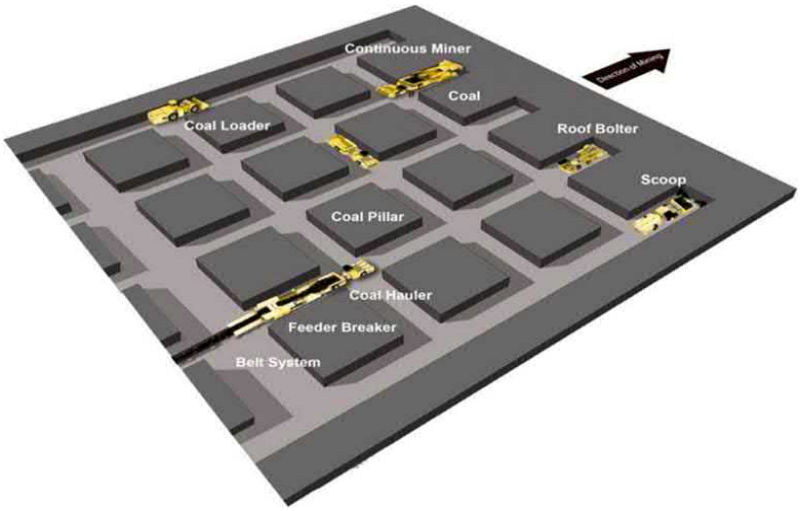

Figure 4: Coal mine schematic of room and pillar mining with coal haulers/shuttle cars

Mining Techniques: Run Out and Pocket

6.11. The method of mining adopted at Woodhouse Colliery would be ‘Run Out and Pocket’, Which is a modified version of ‘Room and Pillar’.

6.12. The system would utilise Bolter Miner and Continuous Miner coal cutting machines for in-seam development and the extraction of coal. Figures 5 & 6 below shows the proposed method in plan view.

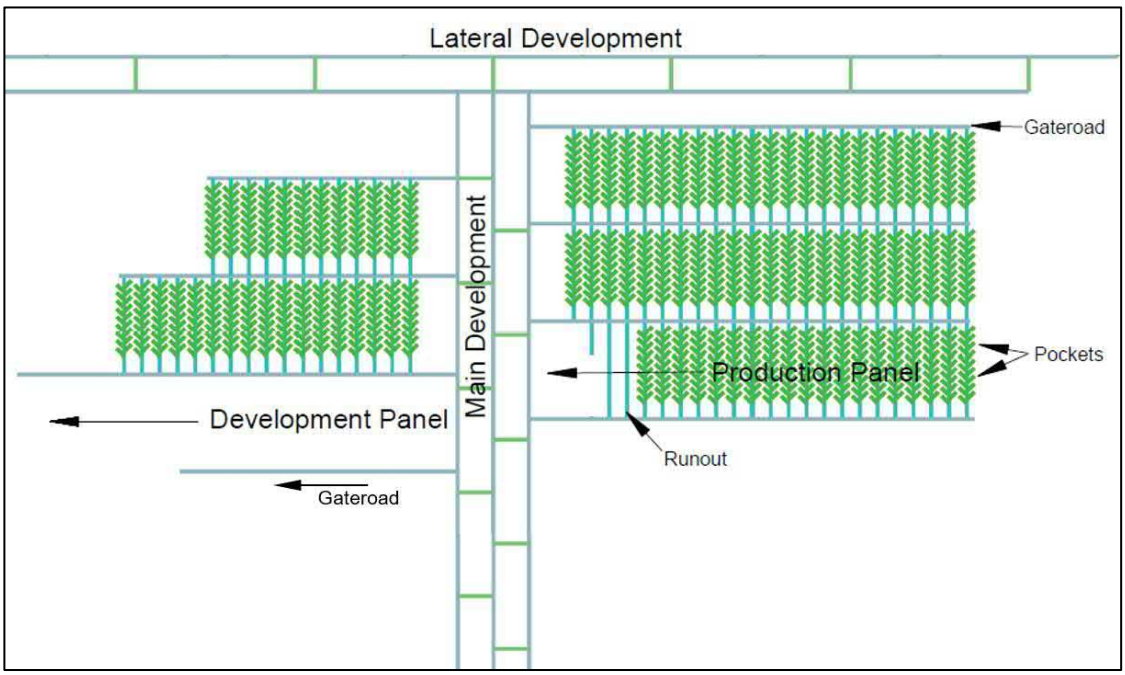

Figure 5: Run Out and Pocket Overall Layout

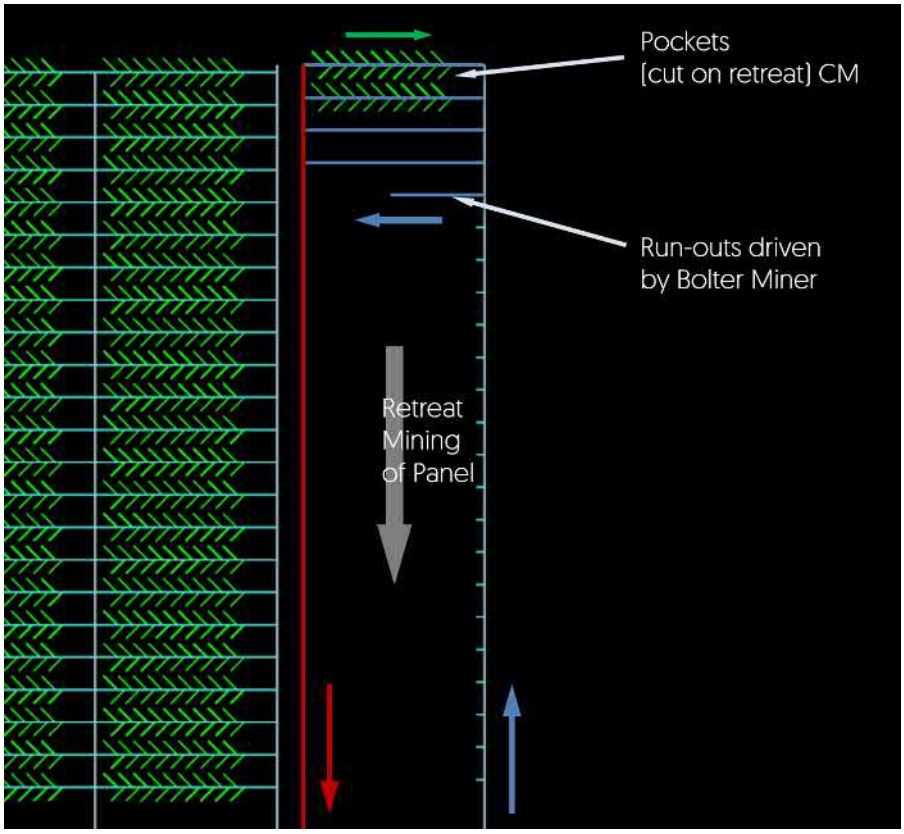

Figure 6: Detailed Run Out and Pocket Plan

Mains and Lateral Development

6.13. The mains and lateral development roadways advance within the coal seam into undeveloped areas of the coal resource. These roadways would have a nominal width and height of 5.8 m and 2.5 m respectively and be developed using a Bolter Miner (Figure 7).

Figure 7: Bolter Miner machine for main roadway development drives

6.14. These permanent/life of mine roadways are fully supported and reinforced with rock bolts and mesh upon excavation and are continually monitored for stability.

6.15. These are the largest in-seam roadways to be developed, such that sufficient clearance exists for routing supplies, personnel, ventilation and mine services to the main production panels. Figures 8 & 9 show modern underground coal mine roadway and transportation, which are to the equivalent standards to those proposed for Woodhouse Colliery.

Figure 8: Fully rockbolt supported main roadway

Figure 9: Underground transportation and conditions

Gateroad Development

6.16. Discrete production panels would be created by developing in seam roadways (‘gateroads’) normally perpendicular to lateral roadways and also developed using a Bolter Miner.

6.17. These are temporary roadways which will last the life of a panel. The length of the gate roads will be nominally 1000m. They are reinforced with rock bolts and are monitored whilst in use for ventilation and access to the production area of the panel.

Run outs

6.18. Run outs are very short life roadways developed and supported by rock bolts. Their purpose is to provide a roadway which can then be “pocketed” on retreat for bulk coal production. The run outs are driven using a Bolter Miner. Run outs are circa 145m in length.

Pockets

6.19. These are excavated along the sides of the run out roadways on retreat, the process being completed within hours. Extraction of the pockets is carried by a remote controlled continuous miner (Figure 10), with the cut coal transported to conveyors using mobile shuttle car units (Figure 11).

Figure 10: Continuous miner for in-seam high production coal mining

Figure 11: Shuttle Car coal transportation system

Benefits of Run out and Pocket

6.20. While longwall mining is highly efficient and productive, the benefits of using the run out and pocket technique are significant in terms of the anticipated geotechnical conditions at Woodhouse Colliery. These include the following key points.

6.21. Any subsidence impacts are significantly reduced due to the pillars left in-situ and the method not creating large areas of collapsing unsupported ground.

6.22. Significantly lower risk of seismicity due to the reduction in unsupported ground and movement of overlying strata.

6.23. Much lower Methane gas released into the working excavations as a result of the reduced impacts on surrounding strata and other coal seams.

6.24. All underground mining equipment is electrically powered, with no prime diesel equipment operating underground within the mining zones.

6.25. Reduced operational risk – longwall mines often rely on one set of equipment and one longwall – any problems related to ground conditions or performance of the overall system results in no production from the mine. Once in full production, Woodhouse Colliery would have five separate run out and pocket working panels, significantly de-risking the impacts of unexpected events or ground conditions.

7. Coal Processing

7.1. WCM has continued to work with specialist suppliers of coal processing plants to further develop the detailed design and performance of the coal processing plant for Woodhouse Colliery.

7.2. This work has been undertaken collaboratively with Parnaby Cyclones Ltd, a leading supplier of plants for metallurgical coal projects, based in the UK. The design of the plant has now progressed to the final detail phase required before moving into the full detailed design, fabrication and construction phase.

7.3. Parnaby have provided confirmation (Appendix 2) that the plant design is capable of accepting WCM's run-of-mine coal and deliver the required clean coal specification outputs.

7.4. The plant will consist of two identical, mirror image modules. Initially the first module will be installed and then as the mine production increases the second module will be installed.

7.5. The two modules have been designed to minimise the disruption that the installation of the second unit will cause.

7.6. Each module will produce metallurgical coal saleable product with a large capacity fines treatment unit comprising spirals plant, flotation columns and fully closed loop effluent treatment. There are two output streams (primary and secondary), to provide further control over the exact proportions and properties of portions of the metallurgical coal product.

7.7. The design includes vacuum filtration of the flotation concentrate and the use of pressure filtration of the flotation tailings, to minimise the water content on the fine's products. To achieve this the plant will consist of several sections and some of the primary crushing equipment will be located underground.

7.8. The resultant plant design has been modified in terms of the detailed stages of the process, including the following key stages:

- Main coal crusher now located underground to reduce noise, vibration and gas emissions on surface;
- Second stage topsize crushing refined to produce an 8mm to 6mm product size range;
- Sizing screens utilised to remove oversize material and desliming screens used to wet the coal and screen it to 1mm;

- Feed now splits down into three distinct size fractions for different cleaning processes;
- Primary cyclone size and configuration modified to improve performance;
- Centrifugal dewatering units updated to ensure moisture control;
- Introduction of spirals (gravity separators) for further fine separation of coal with variable splitter control;
- Introduction of innovative column flotation cells for recovery of ultrafine (<0.15mm) material;
- Updated large diameter high-rate thickener to regenerate process water and produce clarified water for use throughout the plant
- Introduction of vacuum filtration belt units introduced to dewater the flotation froth product
- Introduction of plate presses to treat the reject sludge to produce a cake material for handling and disposal via the backfill plant

7.9. This update work has been undertaken to introduce new technological advancements in the design of specific aspects of the plant since the previous studies completed more than four years ago. They improve overall performance and product yield and quality.

7.10. One of the key features of the revised design is the ability to vary the product quality to meet specific quality criteria, principally to ensure a product which always meets defined targets in relation to sulphur and ash. The multiple stages of treatment allow fine control, with real-time inline sampling within the plant to ensure live control of the process and end product.

7.11. The product produced by the plant will have a strict maximum limit on sulphur content of 1.6%. The target for the majority of the plant output (more than 80% of product) is for a sulphur content below 1.4%. Appendix 3 sets out the Woodhouse Colliery Main Band coal product detailed specification sheet.

7.12. The main variability which would be controlled by WCM is the overall product yield (proportion of clean product produced from a given unit of input raw coal) and the ash content. With these specific sulphur limits, the ash content would be less than 5% for all of the metallurgical coal product.

7.13. The design work undertaken, which included computational flow modelling and mass balance assessments, clearly demonstrates that the input mined

coal will be processed to produce high volatile ‘A’ metallurgical coal at high yields, whilst accommodating the anticipated range of variation within the feedstock mined coal.

7.14. There is no by-product ‘middlings coal’ and the material for disposal is processed such to ensure it can be handled and placed back underground within the mine.

8. Local Economic Benefits

Employment Benefits

8.1. The Proposed Development will have significant employment benefits to the local area by providing jobs from construction of the Development through to working in the Colliery as well as in the wider area as well as indirect jobs which are either created or sustained. The project will create up to 532 permanent staff positions, which will all be necessary to operate the Colliery and business.

8.2. A section 106 obligation is proposed whereby WCM are committed to fill 80% of these, wherever possible, with people from the local community (within 20 miles of the Colliery) for the lifetime of the development. This will also involve WCM offering 50 apprenticeships and working with local educational providers, such as The Lakes College at Lillyhall, to develop training course curricula based on WCM’s future needs.

8.3. WCM has no intention of recruiting overseas employees to fill any of the roles and is confident that the pre-application process which has been implemented over the last few years has demonstrated that there is significant interest and demand for new employment at the mine.

8.4. In addition, independent economic assessment (Appendix 1), show that more than 1,077 indirect and induced jobs will be created in the wider supply chain by the ongoing material and services required to support the mine during its operation. Again, WCM has clearly set-out the aspiration to source as much of this locally where possible, and wherever able to do so, source major machinery and equipment from within the UK.

8.5. Detailed organograms developed by WCM for the mine operations set out every role within the mine structure. These are referred to as Appendix 4. In summary, the organograms show the following headcount:

- Underground Operatives - 313

- Surface Operatives - 121
- Management and administration - 98

8.6. Independent analysis of the supply chain impacts and job creation has been undertaken and is referred to as Appendix 1. This external work clearly demonstrates the significant benefits the scheme will deliver to employment locally.

8.7. The average salary at Woodhouse Colliery (excluding bonus and benefits) has been calculated by WCM to be £43,875 per annum. Including bonus awards, this increases to £64,803 at todays costs.

8.8. These are around 1.86 and 2.75 times the UK average salary respectively, on the basis that the UK median monthly salary was £1,962 in May 2021, which equates to £23,544 per annum.

8.9. As a result, Woodhouse Colliery would generate an equivalent of between 991 and 1,464 direct job equivalents, excluding supply chain and local enterprise job creation.

8.10. These salaries contrast more starkly with the real living wage, which is currently £9.50 per hour – equivalent to a £18,525 per annum salary. At this level, Woodhouse Colliery would generate an equivalent of between 1,260 and 1,861 direct job equivalents.

8.11. Independent economic analysis (Appendix 1) also demonstrates that the very large proportion of income from employees will be invested and spent locally, principally in housing, transport, goods and local services.

Investment in the Local Area

8.12. The local area has struggled to recover from the closure of historical industrial manufacturing, including former coal mining and steelmaking, which were prevalent locally into the 1980s.

8.13. Copeland has a population of around 68,400 whilst there are 35,000 jobs at workplaces in Copeland[3].

8.14. The major employer in the area is Sellafield Ltd, the main Nuclear Decommissioning Authority (NDA) site for radioactive waste reprocessing and storage. Sellafield employs circa 11,000 staff[4], albeit the majority of these roles are skilled and require specific qualifications and educational levels.

8.15. According to the Cumbria observatory data[3] there are only 5 large businesses with more than 250 employees, in Copeland, and 55 across the whole of Cumbria.

8.16. As a result, there remains significant clusters of very low-income households in and around Whitehaven, with high proportions of NEETS (young people not in education, employment or training), particularly in wards close to the Marchon site, including Mirehouse, Harbour, and Sandwith. These three communities are within the 10% most deprived areas in England. Unemployment and crime rates are high, while household incomes and educational attainment are low and health outcomes can be poor. The proportion of children in low-income families can be almost double the national average.

8.17. Unemployment amongst young adults (aged 18 to 24) is well above the national average (5.1% vs GB 3.5%).

8.18. 27% of residents in Copeland hold no qualifications, significantly above the national average of 22.5%.

8.19. The local area would benefit immediately as a result of the investment and use of local products and services during construction and then continued investment during the life of the Development from wages and the purchase of local products and services.

8.20. This is not simply an economic question but also one of wellbeing. For example, it has been well established that Mirehouse's lack of employment, poor educational attainment, health and income deprivation, and poor housing has also created a real problem with isolation and loneliness within the community particularly amongst men[5].

9. UK Economic Impacts

9.1. As part of the development and approval process for any large mineral resource project, a series of feasibility studies are completed as the project evolves.

9.2. WCM have completed the various stages in accordance with international reporting standards, up to and including a definitive feasibility study (often known as a "bankable feasibility study"). This includes independent verification of a series of core aspects of the project, including the geology, mineral resource, product quality and mining reserve. The latter requires a

fully functional and detailed financial model, to clearly set out the economic case in terms of mining costs and revenues.

9.3. This financial model forms the basis for extensive economical modelling and outputs, including all of the income from product sales, operational expenses and taxes to be paid to the UK Government over the lifetime of the mine.

9.4. WCM is a UK registered business and will pay all required UK taxes; there is no connection to any overseas tax jurisdictions and the company will comply fully with all UK tax legislation.

9.5. The viability of the financial model has been independently verified by a series of experts and advisers, including leading mining consultants and economists. For obvious reasons, the detail of this is commercially confidential.

Key Headline Economic Statistics

9.6. The UK balance of trade deficit in 2020 was £14.3 billion, as reported by the Office for National Statistics[6]. This was based on total trade exports of £550.4 billion and imports of £564.7 billion.

9.7. Woodhouse Colliery is forecast, at steady state production (Year 6 to Year 25) to generate £307 million annually in revenue, with around 85% being exported into the EU. This results in £262 million of exports per annum, which equates to more than £5 billion over 20 years. Appendix 5 incorporates a copy of the condensed annual cashflow from the financial model.

9.8. These exports represent an annual improvement of around 1.8% to the UK balance of trade deficit. As a result, there are significant benefits to the UK economy, beyond the local employment, investment benefits and GVA outlined in this section of my evidence.

9.9. Over the life of the mine (up to 2049), the total exports would be circa £6.3 billion.

9.10. Woodhouse Colliery is forecast, at steady state production, to pay more than £280m in corporation and other direct taxes over the first 10 years of operation (this excludes any income tax and National Insurance related to salaries).

9.11. Over the life of the mine, the total corporation tax paid to the Treasury would be in excess of £800 million.

9.12. The total revenue generated by the mine up to 2049 would be around £7.13 billion, of which £3.45 billion represents direct operating costs which flow directly into the local and national economy, along with tax revenues.

9.13. The annual operational spend on salaries, goods and services would average more than £130 million.

9.14. Operating impacts arise once the mine begins production. The most significant "direct impacts" from the mining operations are:

- Increase in the value of UK output, calculated as the mine's total annual revenues / market value of production;
- Creation of gross value added (GVA) available for distribution to the "factors of production", namely, the project's employees ("labour") and providers of capital (equity and debt). Annual GVA can be calculated as total annual project revenue less spending on the inputs provided by other sectors of the economy, including imports; and
- Employment impact, calculated as the number of individuals employed by the project (on a full-time equivalents basis) each year.

9.15. Indirect impacts during the operating phase arise from the project's purchases of inputs produced elsewhere in the UK economy (for example, consumption of electricity and water, purchases of consumables such as lubricants, purchases of metal parts, etc.). Such purchases give rise to additional domestic output, gross value added, and employment by the project's UK suppliers – as well as the UK suppliers to those suppliers, etc.

9.16. Finally, "induced impacts" arise from the wider economic "ripple effects" of the project – principally due to the spending by employees of their wages and other final consumption that arises as a result of the project. Part of employee incomes will be spent on domestically produced goods and services, giving rise to additional output, GVA, and employment in the sectors on which employees' income is spent. Type II multipliers express the magnitude of the induced impact.

9.17. The direct GVA of the project has an average value of £172 million per year. During its lifetime, the project generates indirect GVA that is around £139 million, plus £61 million induced GVA each year. The total average annual impact on national GVA is about £371 million.

9.18. The project operation sustains 491 direct jobs every year on average, increasing gradually from 248 jobs in 2023. The number of full-time employees stays at 532 from 2031 onwards.

9.19. The indirect jobs providing the intermediate inputs to the project each year is 770 jobs per year, and there are 224 induced employment positions in the same period. Overall, from 2023 to 2049, the project operation supports on average 1,486 jobs in the country every year.

10. National Context Update

10.1. I include the following to update the Planning Inspector on four key aspects relevant to the project within the overall context of the UK setting;

10.1.1. Lord Deben's Climate Change Committee (CCC) has now accepted that if critical raw materials can be produced in Britain, then this is better than imports and their creation of offshored emissions[7];

10.1.2. The CCC has also introduced the concept and recommend the implementation of a 'Net Zero Test' to ensure that all Government policy decisions are compatible with the legislated emissions targets[5] (p26);

10.1.3. In its announcement that there will be no more coal used to generate electricity after mid-2024, the Government consciously and specifically volunteered to mention that this announcement was in no way connected to industrial coals such as those used to manufacture steel or their associated 'coal mines'[8];

10.1.4. The nationalisation of Sheffield Forgemasters reflects a new realisation in Government that significant importance, and even protections, should be afforded to indigenous precision steel producers, so that their skills and asset base are maintained and strengthened in the national interest. This new appreciation should and can also apply to the wider supply chain and one which is ideally local, secure and does not rely upon more polluting alternative imports[9];

10.1.5. The Government is increasingly and rightly looking at carbon leakage, offshoring of emissions and even new shipping and carbon border taxation[10].

10.2. Indigenous production of critical raw materials, such as metallurgical coal, will support the steel industry, reduce shipping emissions from imported coal and reduce any risk of yet higher costs. This may well arrive with new carbon border taxation connected with its imposition on, for example, metallurgical coal imports. These extra costs would inevitably be faced by steel producers, further damaging their competitiveness.

10.3. UK indigenous production avoids this and has a much-enhanced overall carbon footprint, together with supply chain resilience for critical goods and raw materials[11] and security of supply vs reliance upon overseas sources.

11. Project Funding and Investment

11.1. To date the project has been fully funded by a privately owned, Australian and Hong Kong based, a mining focussed private equity investment company called EMR Capital[12].

11.2. EMR has successfully raised billions of dollars in funds and deployed these to build a significant portfolio of mining assets, including one of the largest underground operational metallurgical coal mines in Australia.

11.3. In May 2014, WCM entered into an agreement with EMR Capital for an initial investment of £14.7 million to support the exploration of the Licensed Area and the development of the Colliery. EMR Capital invests exclusively in four key resource commodities (gold, copper, potash and metallurgical coal). EMR continues to support WCM in terms of resources, financing and board level experience and capability.

11.4. To date, EMR Capital has invested £34.6 million in WCM. This represents a significant inward international investment into the UK. The funds have principally been used to undertake technical assessments to evaluate the potential viability of the Colliery and to fund a range of studies, applications and other costs required in order to proceed with the Development, including:

- Recruiting a specialist team of industry experts to advise on the Development;
- Conducting exploratory drilling and tests on coal samples to determine quality and its suitability for use in steelmaking;
- Developing a geological model and a detailed understanding of the geology of the region, including formal production of coal resource and reserve statements;
- Conducting a wide range of studies (including ecology and feasibility);

- Assessing the financial viability of the Development;
- Engaging with key stakeholders, including arranging numerous public events and drafting brochures, newsletters and setting up a website; and
- Preparing and submitting the Application.

11.5. In addition to the funding to date, the project has also entered into a legal agreement with respect to the significant level of construction funding required for the delivery of the project.

11.6. Albeit under strict commercial confidentiality, the terms implemented by WCM would ensure that all the capital expenditure required for the construction activities would be available, post any planning approval, to support the construction of the mine through to full production.

11.7. This investor is a very experienced, privately owned European business, which has extensive experience and knowledge of the specialist commodity market.

11.8. It is important to note that there has been no public money involved in the project at all to date. There have been no loans, grants or participation in any other Government schemes, other than participation in the Coronavirus Job Retention Scheme.

11.9. Finally, WCM has also entered into an exclusive agreement with a major commodity trading business, Javelin Commodities, who will purchase and market all of the product produced at Woodhouse Colliery. A letter from Javelin (Appendix 6) confirms the offtake arrangements agreed between the parties.

12. The History of the Application

12.1. The history of the Application has been protracted and I would refer the Inspector to the high-level chronology of the key developments from paragraphs 22 to 63 of WCM's SoC.

Signed: Mark Kirkbride Dated: 10.8.20

13. References

[1] A Short History of the Camborne School of Mines; https://www.exeter.ac.uk/csm125/history.html

[2] M Kirkbride, 1996, MPhil Thesis; A Geotechnical Assessment Scheme for Boom Type Tunnelling Machines

[3] Cumbria Intelligence Observatory website; https://www.cumbriaobservatory.org.uk/economy-employment/

[4] The economic impact of Sellafield Ltd; Oxford Economics, June 2017; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi3_cKPlabyAhWfTBUIHSq_CtoQFnoECCUQAw&url=https%3A%2F%2Fassets.publishing.service.gov.uk%2Fgovernment%2Fuploads%2Fsystem%2Fuploads%2Fattachment_data%2Ffile%2F730958%2FThe_economic_impact_of_Sellafield_June_2017_Oxford_economics.pdf&usg=AOvVaw3H52KCVnaM7s81UWzo_a1H

[5] Men in Sheds combating social isolation, 21 August 2018, Cumbria Community Foundation; https://www.cumbriafoundation.org/grant_story/mirehouse-community-centres-men-sheds-combating-social-isolation/

[6] Office for National Statistics website, UK trade: March 2021; https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/bulletins/uktrade/march2021

[7] Committee on Climate Change; Progress in reducing emissions: 2021 Report to Parliament; https://www.theccc.org.uk/publication/2021-progress-report-to-parliament/

[8] UK Government Announcement on coal elimination for electricity by 2024; Gov.uk website; 30 June 2021; https://www.gov.uk/government/news/end-to-coal-power-brought-forward-to-october-2024

[9] UK Government to acquire Sheffield Forgemasters International Limited; UK Government Press Release; 28 July 2021; https://www.gov.uk/government/news/uk-government-to-acquire-sheffield-forgemasters-international-limited

[10] U.K. Should Adopt Carbon Border Tax, Former Minister Fox Urges; Bloomberg, 26 May 2021; https://www.bloomberg.com/news/articles/2021-05-26/u-k-should-adopt-carbon-border-tax-former-minister-fox-urges

[11] Global Britain in a Competitive Age: the Integrated Review of Security, Defence, Development and Foreign Policy, Policy Paper, 2 July 20201; https://www.gov.uk/government/publications/global-britain-in-a-competitive-age-the-integrated-review-of-security-defence-development-and-foreign-policy/global-britain-in-a-competitive-age-the-integrated-review-of-security-defence-development-and-foreign-policy

[12] EMR Capital overview, team and investments; https://www.emrcapital.com/en-us

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/MAK/2

This is the Appendix marked WCM/MAK/2 referred to in the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Document No.

Document No.1

This is document 1 referred to in the Appendix marked WCM/MAK/2 on the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

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NERA
ECONOMIC CONSULTING

Economic Impact of Cumbria Metallurgical Coal Project

Prepared for West Cumbria Mining Limited

FINAL

10 August 2021

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Executive Summary

Table ES.1 and Table ES.2 summarise the average annual impacts of CMCP from construction to 2049, on the national and regional level, respectively. These are the total impacts, from capital spending during construction and ongoing capex, as well as from operating expenditure during project operation. With an average annual revenue of £264 million, our analysis suggests that the project will increase national output by £495 million on average annually. The average GVA of the project itself is around £172 million, and its average impact on GVA overall is £380 million annually. In terms of employment, the project itself will directly employ on average 491 employees annually, and it will sustain 1,618 employment opportunities in the country overall including indirect and induced effects.

Table ES.1: National Impacts of CMCP (Average per year, 2023-2049)

	Capex (construction and ongoing)	Opex	Total
Output (£m)	**20.9**	**474.5**	**495.4**
Direct		264.1	264.1
Indirect	19.2	168.4	187.6
Induced	1.6	42.0	43.7
GVA (£m)	**8.2**	**371.3**	**379.5**
Direct		171.9	171.9
Indirect	6.8	138.7	145.6
Induced	1.3	60.7	62.0
Employment (number of jobs)	**132**	**1,486**	**1,618**
Direct		491	491
Indirect	113	770	883
Induced	20	224	244

At regional level, the total impact from CMCP on annual regional output is £299 million. The project also adds £185 million of GVA and supports 637 positions in the region.

Table ES.2: Regional Impacts of CMCP (Average per year, 2023-2049)

	Capex (construction and ongoing)	Opex	Total
Output (£m)	**10.2**	**289.2**	**299.3**
Direct		264.1	264.1
Indirect	8.3	20.1	28.5
Induced	1.8	4.9	6.7
GVA (£m)	**3.2**	**182.0**	**185.2**
Direct		171.9	171.9
Indirect	2.9	6.3	9.2
Induced	0.3	3.8	4.1
Employment (number of jobs)	**39**	**598**	**637**
Direct		491	491
Indirect	36	65	102
Induced	3	41	44

1. Introduction

NERA Economic Consulting has been asked by West Cumbria Mining ("WCM") to undertake an independent analysis of the economic impacts of a proposed deep mine to extract metallurgical coal from a site in Whitehaven in Cumbria (the "Cumbria Metallurgical Coal Project").

NERA Economic Consulting is a global firm of experts dedicated to applying economic, financial and quantitative principles to complex business and legal challenges. For 60 years, NERA's economists have been creating strategies, studies, reports, expert testimony and policy recommendations for governments, regulators, corporations, investors and law firms. We bring academic rigour, objectivity and real-world industry experience to bear on issues arising from market design, regulation, competition, strategy, finance and litigation.

NERA's Energy and Environment Practice has particular expertise in policy design and appraisal, investment due diligence, cost-benefit analysis, and economic impact analysis. We have extensive experience assessing the economic impact of policies, programs and projects on a wide range of industries, and have developed estimates of the national and local contributions of these policies and projects. NERA advises governments, multi-lateral development banks, and private investors on policy and market design, regulatory risk, and market due diligence.

NERA's current analysis of CMCP focuses on **economic output**, **gross value added**, and **employment** impacts, considering **direct**, **indirect**, and wider **induced effects** of the project. It draws on details about the project provided by WCM, as well as government statistics and economic literature sources.

Chapter 2 provides an overview of the project over its lifetime, including its output, its costs and revenues, and its employment. Chapter 3 details the methodology we have used to assess the project's economic impacts, including data sources. Chapter 4 presents the results of the analysis of the impact of the project's mining operations and associated expenditures, at national and regional levels. Chapter 5 does the same for the capital expenditure of the project. Chapter 6 presents our results for the combined impact of the project.

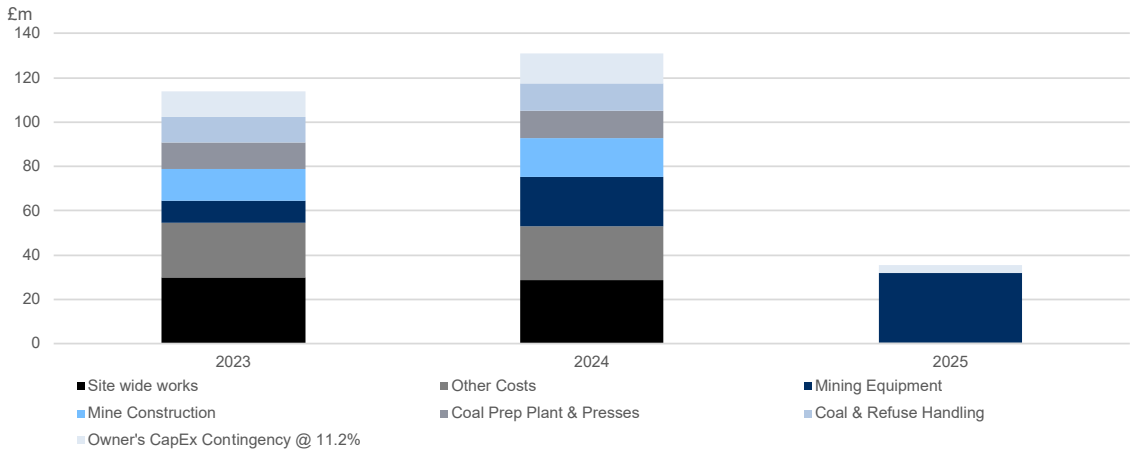
2. CMCP: Project Overview

The Cumbria Metallurgical Coal Project (CMCP, "the project", "the mine") is an underground coal mine currently under development that is to be built and operated by West Cumbria Mining in Whitehaven. The mine will produce metallurgical coal for use in steelmaking. The construction of CMCP is scheduled to begin in 2023.

2.1.1. Construction Phase

The construction phase is expected to last close to three years and will entail, inter alia, the purchase and installation of mining equipment, construction of the mine itself and building of the coal processing and preparation plants. These items are expected to result in total capital expenditure (capex) of £280 million (referred to as "construction capex" in what follows). Figure 2.1 presents the breakdown of construction capex by year, differentiating by the main categories of expenditure. The figure indicates that around half of capex is to be spent on two categories: site-wide works (which includes civil works, electrical systems, and rail sidings, among others) and mining equipment.

Figure 2.1: Annual Construction Capex by Type of Expenditure



Note: Construction in the third year runs until end of September
Source: West Cumbria Mining Financial Model

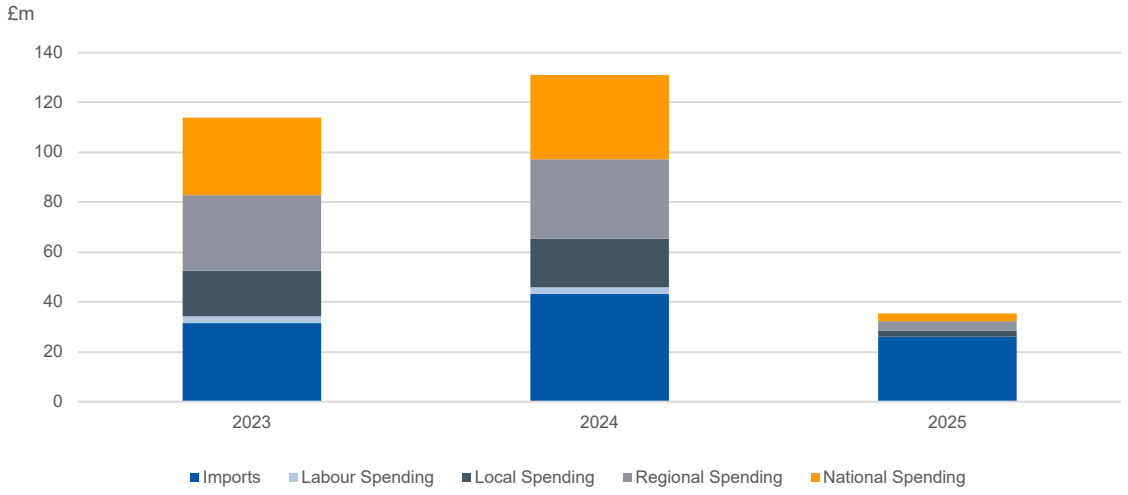
Figure 2.2 provides an alternative breakdown of yearly capex, namely, by the "destination" of the expenditure, i.e., spending on UK-produced versus imported goods and services, with the UK component broken down further into local[1], regional[2] (but excluding the local portion) and the residual national spending. Labour expenditure (compensation of the project's staff during the construction phase) is shown as a separate item below. Note that this labour expenditure only covers the compensation of the project's staff, not the compensation of construction staff who are not employed directly by the project. Over the three-year construction period, the import share in the total capex outlay is 36%. Of the £174 million UK-sourced, non-labour construction capex, 23% (£39 million) is expected to be spent

[1] Local is defined to encompass the district in which the Whitehaven site is located, which is Copeland.

[2] The region is Cumbria.

locally in the Copeland district, and 38% more (£66 million) is expected to be spent regionally in Cumbria but not in Copeland.

Figure 2.2: Annual Construction Capex by Destination of Expenditure



Notes: Regional spending does not include local spending, national spending does not include local or regional spending.
The labour spending reflects only the labour spending on the project's own staff, not the labour spending on construction staff which are not hired directly by the project.
Source: West Cumbria Mining Financial Model, Additional information provided by WCM

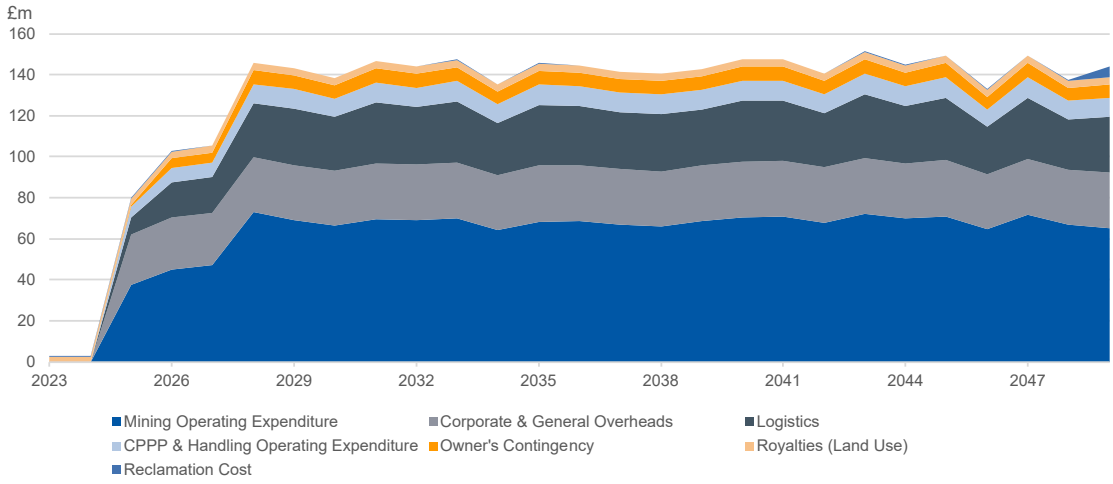
2.1.2. Operating Phase

Following construction, the mine is expected to operate until the end of 2049. The operating costs are expected to be £3,455 million (in 2018£) over the lifetime of the project, leading to project revenues of £7,132 million. Details of the operating phase are set out below.

2.1.2.1. Operating costs

Operating costs (also referred to "opex" below) include, first and foremost, the on-going cost of the core mining operations, along with logistics and handling costs as well as administrative overheads and miscellaneous smaller items. Figure 2.3 presents the breakdown of operating costs into these different categories of expenditure during the project lifetime.

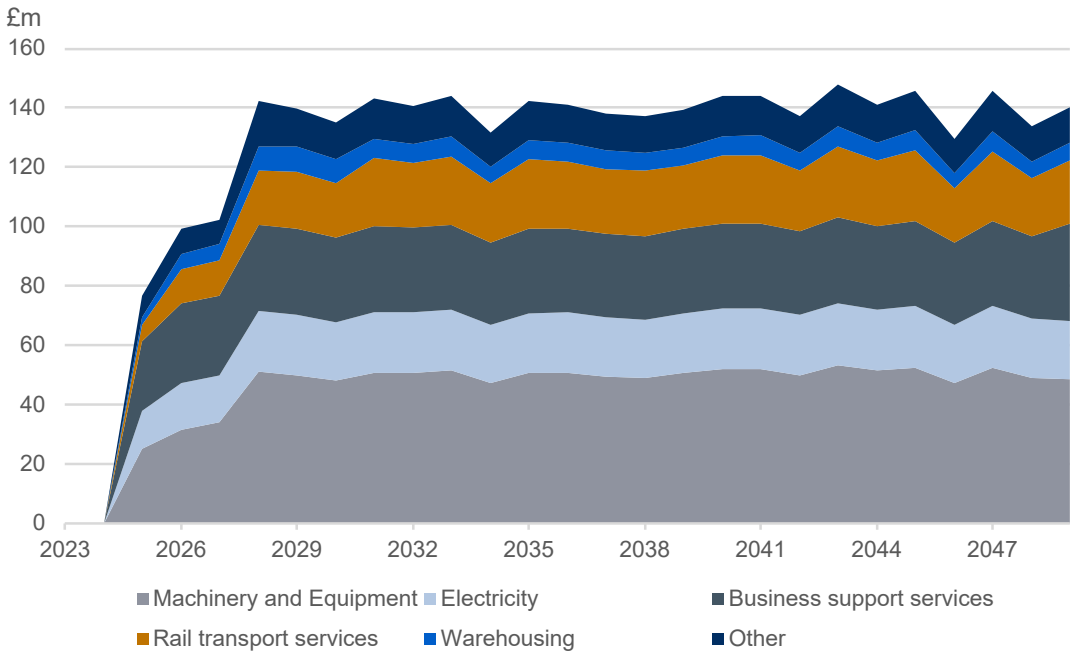
Figure 2.3: Annual Operating Costs by Type of Expenditure



Note: The expenditures are based on the Financial Model and may be subject to change
Source: West Cumbria Mining Financial Model

We also show operating expenditure categorised into different Standard Industrial Classification (SIC) sectors to which the spending is directed. Figure 2.4 shows this breakdown and evolution of opex by SIC sector.

Figure 2.4: Annual Operating Costs by SIC Sector



Note: The "other" category includes the following SIC sectors: Construction, electricity equipment, fabricated metal products, coke and refined petroleum products, cement, lime, plaster and articles of concrete, cement and plaster, natural water, water treatment and supply services, wholesale trade services, except of motor vehicles and motorcycles, and other mining and quarrying products. The "Royalties (Land Use)" line item in the

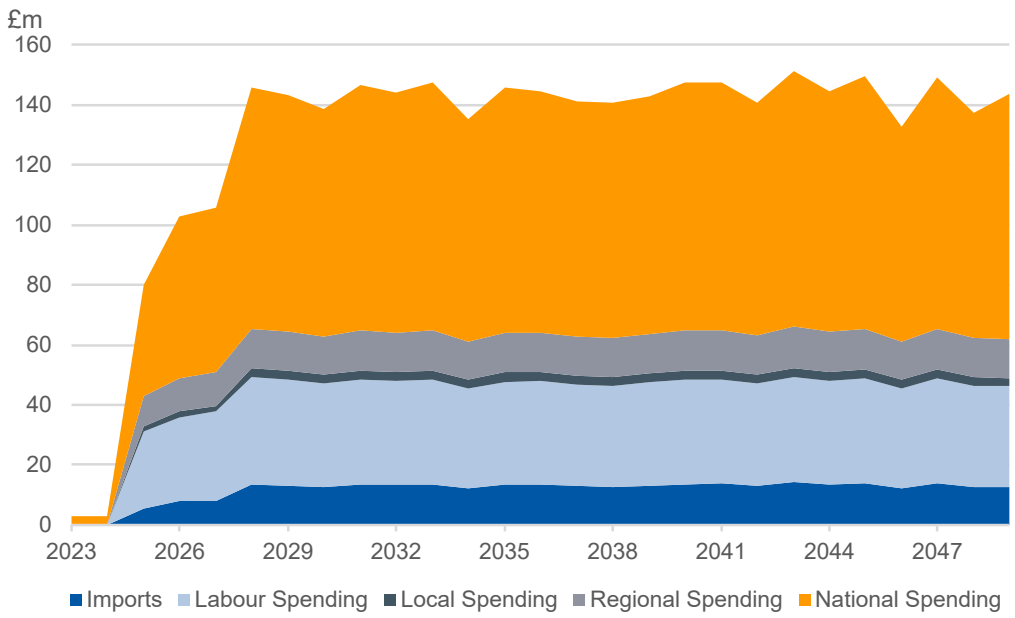
financial model has not been assigned a sector classification, so it is not reflected in the chart.
Source: West Cumbria Mining Financial Model, Additional information provided by WCM

Similar to the breakdown of capex shown above, we also consider how opex spending breaks down into spending on imported goods and services versus domestic spending, which is further divided into spending on employee compensation (labour) as well as the local[3], regional, and residual national components in the non-imported, non-labour portion of opex.

The import share in operating expenditure is around 9%, on average. 27% the non-imported opex are labour costs. Of the non-imported, non-labour part of opex, 83% is spent outside the regional area. 3% is spent locally, and the remaining 14% is spent regionally outside the local area. This translates to, on average, £128 million opex per year, composed of £11.5 million in imports, £31.2 million in labour costs, £2.6 million in local spending, £12.0 million in regional spending outside the local area, and £70.7 million in national spending, outside the regional area.

Figure 2.5 shows the evolution of the different components over the lifetime of the mine.

Figure 2.5: Annual Operating Costs by Destination of Expenditure



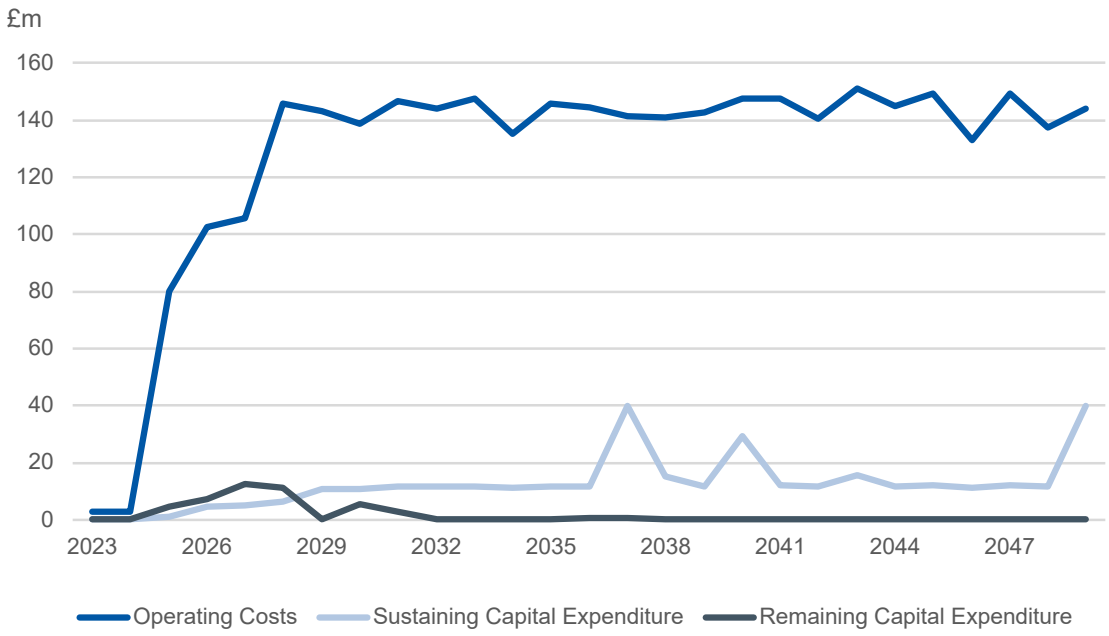
Notes: Regional spending does not include local spending, national spending does not include local or regional spending.
Most of the labour costs are paid to employees who live locally, see also the Employment Section below.
Source: West Cumbria Mining Financial Model, Additional information provided by WCM

In addition to ongoing operational expenditure, the operating phase will also entail additional capex spending, as mining facilities continue to be expanded / upgraded or previously built facilities are maintained (e.g., by the replacement of parts). These two types of capex are referred to as "remaining capex" (i.e., remaining after the end of the construction period /

[3] We note that labour spending is predominantly local too. However, we account for it separately throughout for analytical purposes, for reasons explained further in the following section.

beginning of operations) and "sustaining capex" in the summary below.[4] Total capex during the operating phase is expected to be £385 million. Figure 2.6 shows the evolution of these costs during the lifetime of the plant.

Figure 2.6: Evolution of Costs during the Mine's Operating Phase



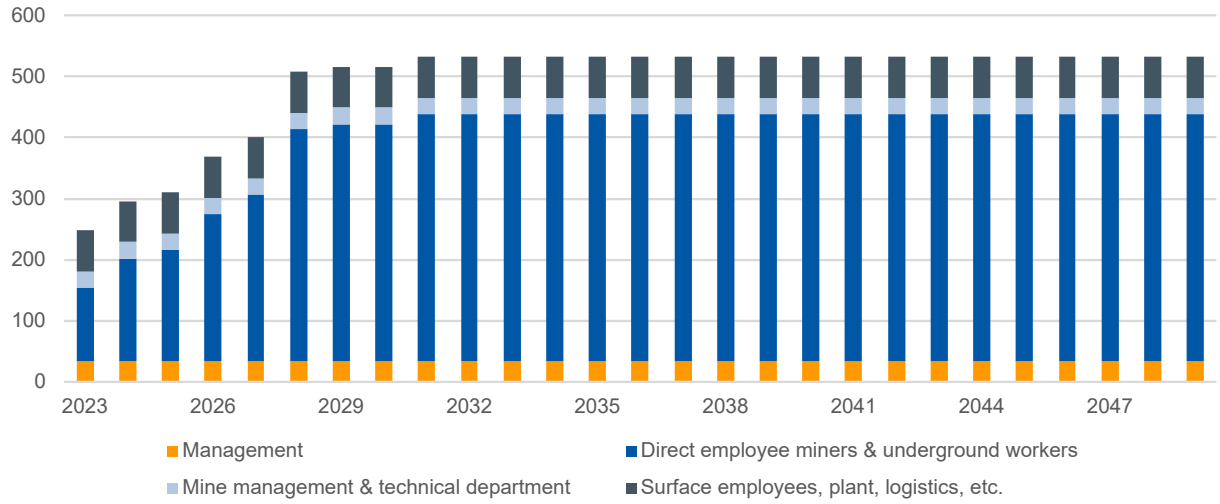
Source: West Cumbria Mining Financial Model

2.1.2.2. Employment

After a "ramp-up" phase covering the period from 2023-2030, the mine is expected to have 532 employees. During construction and the first years of operation, the number of employees will grow steadily to reach this maximum value by 2031. Figure 2.7 shows this progression, also differentiating by the main categories of employees.

[4] WCM have indicated that around 75% of the "remaining capex" is imported. Of the non-imported part, 25% is spent locally, and 25% regionally, with the remainder spent nationally. Of the "sustaining capex", 50% is imported; 10% of the rest is spent locally, 10% is spent regionally, and the remainder is spent nationally.

Figure 2.7: Yearly Number of Jobs Sustained by the Project by Category of Job



Source: West Cumbria Mining Financial Model

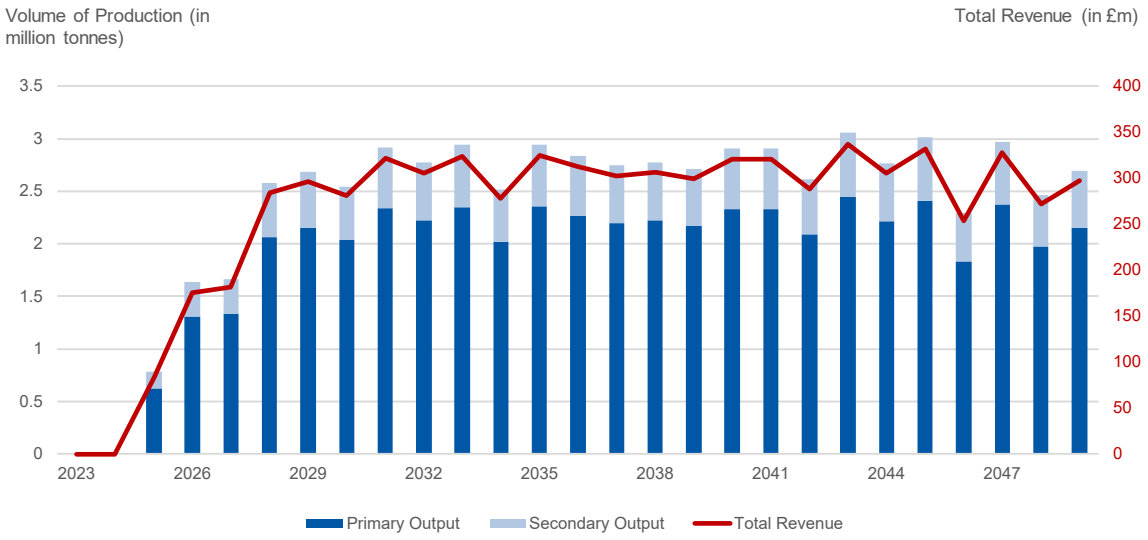
According to information provided by WCM, all direct employee miners and underground workers, mine management and technical department employees, and surface, plant, and logistics employees are expected to live locally (i.e., in the district of Copeland). In addition, 90% of management are expected to live locally, with the remaining 10% living regionally (i.e., in the wider Cumbria area).

2.1.2.3. Output

The mine is forecast to produce a total of 65 million tonnes of coal over its lifetime, resulting in expected revenues of £7,132 million (in real 2018£'s). This implies, on average, an annual revenue of £264 million, and annual EBITDA of £136 million.

Figure 2.8 shows the evolution of output volumes and associated revenue during the project life.

Figure 2.8: Coal Production and Revenue



Source: West Cumbria Mining Financial Model

3. Methodology and Assumptions

In the remainder of this report, we analyse the economic impact of CMCP along a variety of dimensions. First, we distinguish between impacts during:

- the **construction phase** of the project (referred to as "construction impacts" in what follows); and
- the **operating phase** of the project (referred to as "operating impacts").

In this chapter and in the remainder of the report, we discuss the operating phase before the construction phase, thereby reversing the chronology. We do this because the operating phase has a much greater overall economic impact and also for ease of exposition, as the basic parts of our modelling approach are more easily explained by focusing first on the project's operations.

Moreover, we distinguish impacts geographically, by differentiating between:

- **National** impacts (i.e., at the level of the UK economy as a whole);
- **Regional** impacts (Cumbria);
- **Local** impacts (district of Copeland).

3.1. Operating Impacts

For ease of exposition, we focus here on operating impacts at the *national* level. We discuss regional and local impacts below, in Section 3.3.

Direct impacts

Operating impacts arise once the mine begins production. The most significant "**direct impacts"** from the mining operations are:

- Increase in the value of UK **output,** calculated as the mine's total annual revenues / market value of production;[5]
- Creation of **gross value added** (GVA) available for distribution to the "factors of production", namely, the project's employees ("labour") and providers of capital (equity and debt). Annual GVA can be calculated as total annual project revenue less spending on the inputs provided by other sectors of the economy, including imports. In what follows, we refer to the value of intermediate consumption of inputs as the project's "operating expenditure" ("opex")[6];
- **Employment impact**, calculated as the number of individuals employed by the project (on a full-time equivalents basis) each year.

Indirect impacts

[5] In what follows, unless explicitly stated otherwise, "output" always refers to the *monetary value* of a company's or sector's production over a certain time interval.

[6] Spending on inputs does not include depreciation of project assets (otherwise it would be "net value added").

"**Indirect impacts"** during the operating phase arise from the project's purchases of inputs produced elsewhere in the UK economy (for example, consumption of electricity and water, purchases of consumables such as lubricants, purchases of metal parts, etc.). Such purchases give rise to additional domestic output, gross value added, and employment by the project's UK suppliers – as well as the UK suppliers to those suppliers, etc. (The focus on the UK supply chain means that imported inputs must be excluded from the analysis before indirect impacts in the UK can be calculated.)

Indirect impacts can be estimated using appropriate multipliers ("**Type I multipliers**"), which can be derived from input-output tables of the UK economy. Type I multipliers have been calculated e.g. by the Office of National Statistics for all of the impacts considered above, namely, output, GVA, and employment.[7] For example, a Type I *output* multiplier of 1.5 implies that direct and indirect impacts of a project on overall UK output is equal to 1.5 times the project's direct output. In other words, the indirect impacts of the project on its supply chain add a further 50% of the project's direct output to the economy overall.[8]

Induced impacts

Finally, "**induced impacts**" arise from the wider economic "ripple effects" of the project – principally due to the spending by employees of their wages and other final consumption that arises as a result of the project. Part of employee incomes will be spent on domestically produced goods and services, giving rise to additional output, GVA, and employment in the sectors on which employees' income is spent. **Type II multipliers** express the magnitude of the induced impact. For example, a Type II output multiplier of 2.0 for the project (given also a Type I output multiplier of 1.5), implies that induced output impacts each year amount to 50% (2.0 – 1.5) of the project's annual output.[9] As noted, Type II multipliers can be estimated for GVA and employment impacts, as well as for output.

3.2. Construction impacts

During the construction phase or, more precisely, before the project starts producing output (which in the case of CMCP is expected to happen before construction is completed), the value of project *output* is necessarily zero, which also implies no GVA or employment attributable to project revenues. The economic impact of the project during this phase is therefore determined by the impacts associated with any capital expenditure ("capex") in the supply chain during this period. The economic impacts from this supply chain capex spending depends on the magnitude of the expenditure and on the sectors in which it occurs.[10]

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7 See below for a discussion of the sources for multipliers that we have relied on.

8 By convention, Type I multipliers express the magnitude of the sum of the direct and indirect effect. Hence, for the pure indirect effect, one must subtract 1 from the multiplier.

9 By convention, Type II multipliers express the magnitude of the sum of the direct, indirect, and induced effect. Hence, for the pure induced effect, one must subtract the Type I from the Type II multiplier.

10 Although we apply this approach based on the projects spending on supply chain inputs principally for estimating the economic impacts of capex, as a robustness check we also apply this approach to the project's operating expenditure in Appendix A, below. In Appendix A we use the sectoral breakdown of annual opex spending (presented in Figure 2.4, above) to calculate individual sector-specific economic impacts for opex inputs. This allows us to calculate the direct, indirect and induced impacts of opex spending in the same way as the impacts from capex spending set out in this

We distinguish the following "capex-related" impacts:[11]

- Direct impact from capex spending: This refers to the direct impact of the project capex in the different sectors to which it is directed. For example, if £100 million is spent on (UK-manufactured) mining machines in a year, this will boost output in the domestic "Machinery and Equipment" sector by the same amount and will also lead to increases in GVA and employment in that sector (the magnitudes of which depend on the specific relationship between output and GVA or employment that apply in the sector).
- Indirect impact of capex spending: This refers to the indirect impact from the increases in output in the different sectors in which the capex is spent. For example, if the Type I output multiplier for "Machinery and Equipment" is 1.5, the increase in sectoral output by £100 million will give rise to an additional £50 million worth of output in the wider economy.
- Induced impact of capex spending: Analogous to the indirect impact, this last item refers to the induced impact associated with the increases in output in the different sectors on which capex is spent.

3.3. Regional and local impacts

Analysis of regional and local impacts of the project focuses attention on the direct, indirect, and induced impacts at a sub-national level (a region of the country or local area within a region). As noted, in the case at hand, we define the region hosting the project as Cumbria, and the local area is defined to be the district of Copeland.

According to the UK Office of National Statistics (ONS), in mid-2020, Cumbria had a population of 499,781, while 68,041 people lived in Copeland.[12] Of these, 223,900 people in Cumbria and 29,400 people in Copeland were in employment.[13] The unemployment rate was 2.5% in Cumbria, and slightly higher in Copeland, at 4.3%.[14] In addition, ONS (2021)

section. This approach can help to validate our primary methodology (set out in section 3.1), by "diversifying" the risk of relying on a single multiplier value to capture the entire project's operating impacts.

[11] BIGGAR Economics's economic impact assessment (February 2020) for SSE Renewables adopts the same approach for devex/capex impact (see https://biggareconomics.co.uk/wp-content/uploads/2020/06/Economic-Assessment-of-SSE-Projects-in-the-Great-Glen-0903.pdf). See also KPMG's report (March 2021) for the BBC for a similar approach with regard to opex (http://downloads.bbc.co.uk/aboutthebbc/reports/reports/kpmg-economic-impact.pdf).
Note that in what follows we consider capex-related impacts for all capex spent by the project, including capex incurred *after* the project has begun to produce output.

Induced operating impacts resulting from spending by the project's own employees are not captured by this approach, as such spending is not contained in the project's expenditure on external suppliers. These impacts are estimated separately, using a methodology that we describe below.

[12] ONS (2020), Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland.

[13] ONS (2020), Annual Population Survey.

[14] Ibid.

estimates the GVA of Cumbria to be £11,950 million in 2019, while Copeland generated £1,474 million in the same year.[15]

In general terms, economic impacts at a sub-national level are likely to be muted compared to the national impacts, as there is more "leakage" when it comes to indirect and induced impacts. To see this, consider, e.g., the regional Type I and II output multipliers for the project. Any spending by the project on UK suppliers based outside Cumbria does not "count" towards the indirect regional impact, resulting in a *regional* Type I multiplier that is smaller than the *national* Type I multiplier.[16] Similarly, any spending by the project's employees (or employees of its suppliers, or of their suppliers, etc.) on goods and services sourced from outside the region does not count towards the induced output impact, resulting in a smaller Type II multiplier for the regional impact compared to the national one.

3.4. Key assumptions and data sources

In this section, we discuss key modelling assumptions and data sources we have relied upon for the economic impact assessment.

3.4.1. CMCP Financial Model

As the starting point for our analysis, we have relied on information provided by WCM in their financial model for CMCP ("Financial Model"). The model contains information about the timing and magnitude of expenditures and revenue, income, employment, and production volumes.

3.4.2. Multipliers

We have relied on the UK Office of National Statistics (ONS) and Scottish Input-Output (IO) Tables for our multipliers. We have used the 2015 ONS IO Tables (released in 2018), as this is the most recent ONS publication with all multipliers (including output, GVA, and employment)[17], and we have used the 2017 Scottish IO Tables (released in 2020), this being again the most recent version.[18]

We apply the ONS multipliers for our base case impacts analysis, to ensure that we capture impacts across the whole of the UK.

In the case of the ONS tables, the "employment multipliers" do not reflect the impact of an investment in terms of number of jobs, but rather in terms of employment expenditure. For

[15] ONS (2021), Regional gross value added (balanced) by industry: all ITL regions.

[16] And likewise for suppliers' purchases from their suppliers etc. When applying the approach to a regional area, purchases of inputs outside the region are excluded in the same way as imports are excluded when applying the national multiplier.

[17] ONS (2018). UK input-output analytical tables. Retrieved from https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/ukinputoutputanalyticaltablesdetailed

[18] Scottish Government (2020). Supply, Use and Input-Output Tables. Retrieved from https://www.gov.scot/publications/input-output-latest/

the impact on jobs, we have relied on the ONS Full Time Equivalent (FTE) Analysis for the year 2015, which publishes employment multipliers in terms of the number of jobs.[19]

The Scottish tables contain Type II multipliers, but ONS does not report them at the UK level. To obtain UK-level Type II multipliers, we have analysed the statistical relationship (a simple linear regression) between Scottish Type II multipliers for each sector and their corresponding Type I multipliers. We then scale the ONS Type I multipliers based on the statistical relationship derived from the Scottish data to derive UK-level Type II multipliers (for output, GVA, and employment effects – see Appendix C.1 for details).[20]

3.4.3. Relationship between Turnover and GVA or Employment

Our primary source of information about GVA is the CMCP financial model provided by WCM. However, when considering other sectors supplying CMCP (e.g. when analysing the project impact during the construction phase), we also calculate the GVA and employment in these sectors using sector-specific ratios of GVA-to-turnover or employment-to-turnover.[21] These ratios are based on (2019 data in each case):

- GVA by sector, obtained from the UK Annual Business Survey (ABS);[22]
- Employment by sector, obtained from the ONS Annual Survey of Hours and Earnings (ASHE);[23]
- Turnover by sector, obtained from the UK Annual Business Survey (ABS).

3.4.4. Sectoral Breakdown of CMCP Opex and Capex

Multipliers from the ONS and Scottish IO tables are reported by sector, where sectors are identified by Standard Industrial Classification (SIC) codes. As noted above, we break down capex spending (as well as opex for some of our analyses of operating impact) into the sectors on which it is spent.

According to information provided by WCM, project spending (opex and capex) occurs in the following 20 sectors.

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19 ONS (2019). FTE multipliers and effects, reference year 2015, bespoke industry groups. Retrieved from https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/adhocs/009747ftemultipliersandeffectsreferenceyear2015bespokeindustrygroups

20 As an alternative approach, for each sector we also calculate the ratio between Type I and Type II multipliers. We then apply this ratio to the corresponding ONS Type I multiplier to calculate the relevant sector Type II multipliers.

21 For example, we multiply the project's expenditure on the machinery and equipment sector by the GVA-to-turnover ratio for that sector to calculate the GVA associated with the project's use of (intermediate) inputs from that sector.

22 ONS (2021). Non-financial business economy, UK and regional (Annual Business Survey): 2019 results. Retrieved online from https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/nonfinancialbusinesseconomyukandregionalannualbusinesssurvey/2019finalresults

23 ONS (2019). Employee earnings in the UK. Retrieved online from https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/bulletins/annualsurveyofhoursandearnings/2019

Table 3.1: SIC Sectors used to classify CMCP opex and capex

SIC Code in ONS IO Table	Sector Name
08	Other mining and quarrying products
09	Mining support services
19	Coke and refined petroleum products
23.5-6	Cement, lime, plaster and articles of concrete, cement and plaster
25OTHER	Fabricated metal products, excl. machinery and equipment and weapons & ammunition
27	Electrical equipment
28	Machinery and equipment n.e.c.
33OTHER	Rest of repair; Installation
35.1	Electricity, transmission and distribution
36	Natural water; water treatment and supply services
41-43	Construction
46	Wholesale trade services, except of motor vehicles and motorcycles
49.1-2	Rail transport services
49.3-5	Land transport services and transport services via pipelines, excluding rail transport
52	Warehousing and support services for transportation
62	Computer programming, consultancy and related services
64	Financial services, except insurance and pension funding
69.1	Legal services
77	Rental and leasing services
82	Office administrative, office support and other business support services

Source: ONS Input-Output Table (2015), NERA Analysis.

3.4.5. Labour Shares

Using the above-mentioned detailed breakdown of opex and capex line items in the CMCP financial model, we have collected information from WCM concerning the labour shares of each opex and capex item. This allows us to remove the labour costs when calculating the indirect and induced impacts of the expenditure of the project and to account for the impact of employee spending separately. For simplicity, we assume that labour shares remain the same throughout the lifetime of the project.

3.4.6. Import and Regional/Local Content Shares

We have collected information from WCM concerning the import shares of each capex and opex item. Expenditure on imported goods and services does not contribute to the UK or below-national-level economic impacts, so these costs are excluded before we calculate the economic impacts of the project.

We have also collected information from WCM regarding local and regional spending shares for each cost line item. These shares describe how much of the expenditure will be spent

locally and regionally. (In the case of regional shares, these describe the amount that is spent in Cumbria, but which is *not already accounted for in the local share*.)

For simplicity, we assume that the import shares, as well as the regional and local spending shares, remain the same throughout the lifetime of the project. In fact, if enough demand for imports exists as a result of the project, new suppliers may decide to locate operations within the UK or local region. This would boost economic impacts further.

3.4.7. Application of Multipliers

National – Operating Phase

To assess the national economic impact during the operating phase of the project, we apply a single output, GVA, or employment multiplier to the corresponding quantity for the project in each year.

Because there is no previous similar deep-mined metallurgical coal production in the UK, there is some uncertainty about which of the sectors represented in UK IO tables best matches the characteristics of CMCP. To address this uncertainty, we have reviewed the multipliers associated with a number of potentially relevant sectors whose activities are similar to the activities at CMCP. These sectors include:

- Coal and lignite production,
- Mining support services,
- Construction,
- Extraction of crude petroleum and natural gas & mining of metal ores,
- Other mining and quarrying products, and
- Coke and refined petroleum products

We apply the median output, GVA, and employment, multipliers of these sectors (presented below in Table 3.2) to estimate the national indirect and induced impact. We conduct sensitivity analyses using a "low impact" median value, in which the highest two multipliers are removed and the median is calculated with the remaining values. (In the table these two highest multiplier values are shaded grey). We present the results of the sensitivity analysis in Section 4.1.1.

Table 3.2 presents the value of the ONS Type I and Type II multipliers in these sectors, as well as their median and the low median. The grey cells represent the top two multipliers which are removed in the "low median" sensitivity analysis.

Table 3.2: Reference Sector Multipliers and Median

	Output		Employment		GVA	
	Type I	*Type II*	*Type I*	*Type II*	*Type I*	*Type II*
Coal and lignite production	2.01	2.10	2.74	3.23	2.99	3.58
Mining support services	1.56	1.74	1.50	1.76	1.48	1.76
Construction	1.92	2.02	1.98	2.33	2.04	2.44
Extraction of crude petroleum and natural gas & mining of metal ores	1.59	1.76	6.42	7.60	1.52	1.82
Other mining and quarrying products	1.69	1.84	2.39	2.81	1.64	1.96
Coke and refined petroleum products	1.35	1.56	5.03	5.95	1.97	2.36
Median	1.64	1.80	2.57	3.02	1.81	2.16
"Low impact" Median	1.58	1.75	2.19	2.57	1.58	1.89

Source: ONS IO Tables (2018), Scottish Government (2020), NERA Analysis.
Note: Cells shaded in grey are the highest two values, which are excluded from the median value used for the "Low impact" sensitivity.

As a further sensitivity analysis, we break down opex by sector, as described above (section 3.4.4) and apply the sector-specific multipliers as appropriate for each economic impact indicator. We report the results of this sensitivity analysis in Appendix A.

National – Construction Phase

To calculate the national indirect and induced impacts for the construction phase, we break down the construction capex by sector, as described above (section 3.4.4) and apply the sector-specific multipliers as appropriate for each economic impact indicator.

Regional and Local

When assessing the regional and local impacts of CMCP, we must rely on regional and local multipliers, which are not published by ONS or the Scottish Government.

For the derivation of local and regional multipliers, we have therefore relied on the "Additionality Guide", published by the Homes & Community Agency in 2014.[24] Table 4.12 of the Guide reports local and regional Type II multipliers.

We calculate average local and regional multipliers and calculate the ratio of these average multipliers to the relevant national Type II multipliers. We apply these ratios to the Type I

[24] See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf

and Type II national multipliers for each sector of interest to obtain the local and regional multipliers.[25]

Using the sectoral breakdown of opex and capex (see section 3.4.4), together with the local and regional spending as well as labour and import shares provided by WCM (see section 3.4.6), we calculate non-import spending per sector on a local and regional basis. We then use the sectoral employment to turnover and GVA to turnover ratios to calculate regional and local employment and GVA. Finally, we apply the local and regional multipliers described above to calculate the indirect and induced local and regional impacts by sector.

As a sensitivity analysis, we also use the Scottish multipliers as regional multipliers. This analysis can be thought of as an assessment of the impacts on a somewhat larger "regional" scale than Cumbria only – for example, impacts on the North of England overall. We report the results of this sensitivity analysis in Appendix B.

[25] To estimate the local and regional multipliers by sector, we therefore make the simplifying assumption that the relationship between regional and national as well as between local and national impacts is the same for all sectors.

4. The Economic Impact of Mining Operations

In this chapter, we present the economic impact from CMCP's mining operations on the national, regional, and local level, from the perspective of output, GVA, and employment respectively. We discuss the economic impact of CMCP's capital spending in the next chapter. In Chapter 6, we show the combined impacts from mining operations and capital expenditure on the national level.

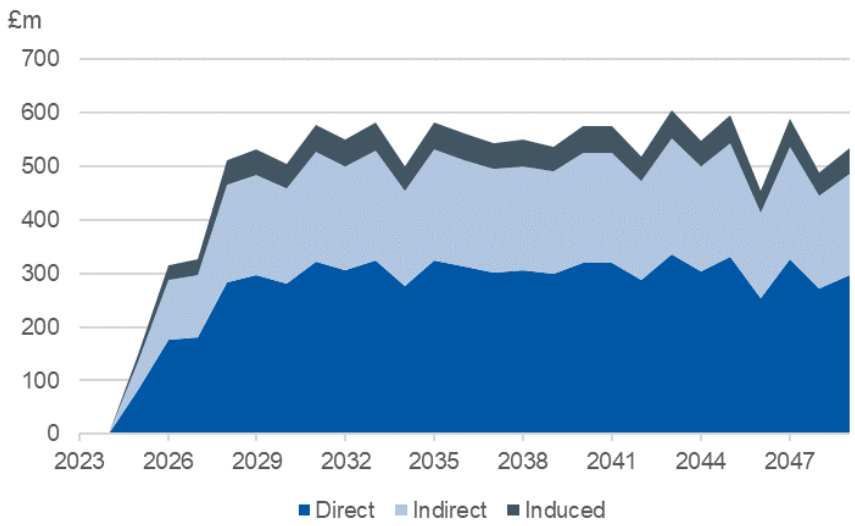
4.1. National Economic Impact from Mining Operations

4.1.1. National Output Impact from CMCP Operation

As noted above, because the project involves underground coal mining of metallurgical coal, which differs from the recent UK open-cast steam coal mining operations, the multipliers of the "coal and lignite" sector may not accurately reflect the economic impact of the project. Given this uncertainty, we identify a number of sectors that we deem to be relevant or similar to the activities of CMCP and apply the median of these sectors' multipliers to estimate the impact of the project. The relevant multipliers are presented in Table 3.1 above.

Figure 4.1 shows the impact of the project on national economic output over time, as estimated by applying the median multipliers. The dark blue area of the figure shows project revenue (the direct output impact), which increases from £83 million in the first year of production to more than £280 million from 2030. Applying the median Type I and II output multipliers, the project has a total impact on economic output of around £475 million per year on average during project lifetime. This includes the annual value of the direct output (worth around £264 million annually, on average), an indirect impact around £168 million per year, and an induced impact of around £42 million each year.

Figure 4.1: Mining Operations National Output Impact

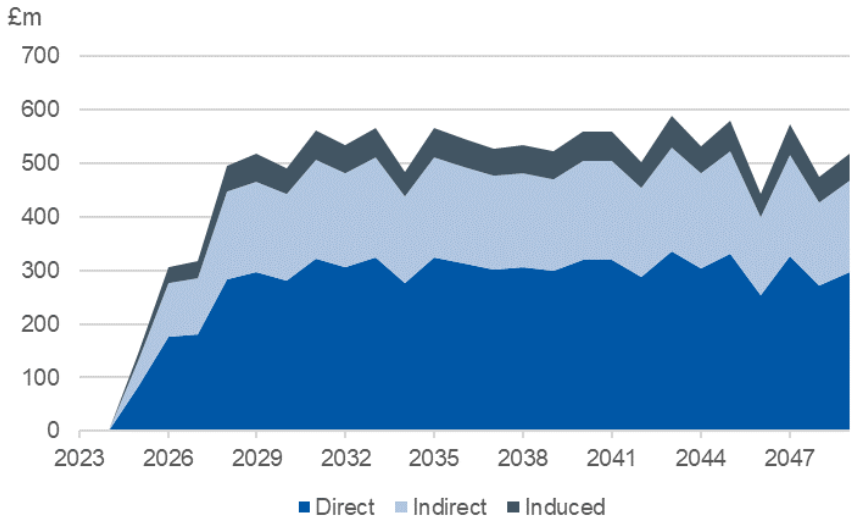


Source: West Cumbria Mining Financial Model, NERA Analysis.

As noted, for a sensitivity analysis, we apply a lower output multiplier, excluding the two sectors with the highest output multipliers from our identification of the median multiplier value. The new median values of the multipliers (1.58 for Type I and 1.75 for Type II) are

applied to calculate "low-multiplier" economic impacts. Under this sensitivity analysis, the indirect output effect reduces to around £152 million every year, while the induced output effect increases slightly to £45 million per year (due to the slightly increased gap between Type I and Type II multipliers). The total impact of the project on economic output – including direct, indirect, and induced effects – is nearly £461 million per year on average.

Figure 4.2: Mining Operations National Output Impact – Low Multiplier Sensitivity

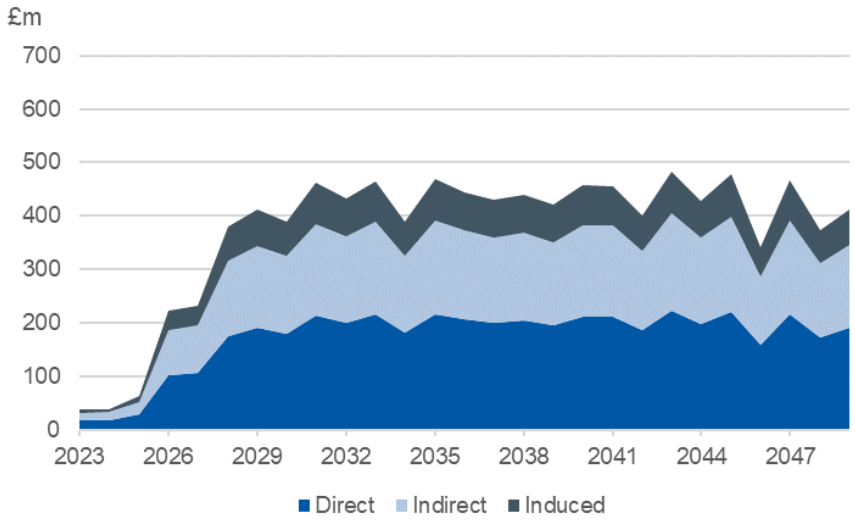


Source: West Cumbria Mining Financial Model, NERA Analysis.

4.1.2. National GVA Impact from CMCP Operation

Figure 4.3 shows the GVA impacts of the mining operation at the national level. The direct GVA of the project has an average value of £172 million per year. During its lifetime, the project generates indirect GVA that is around £139 million, plus £61 million induced GVA each year. The total average annual impact on national GVA is about £371 million.

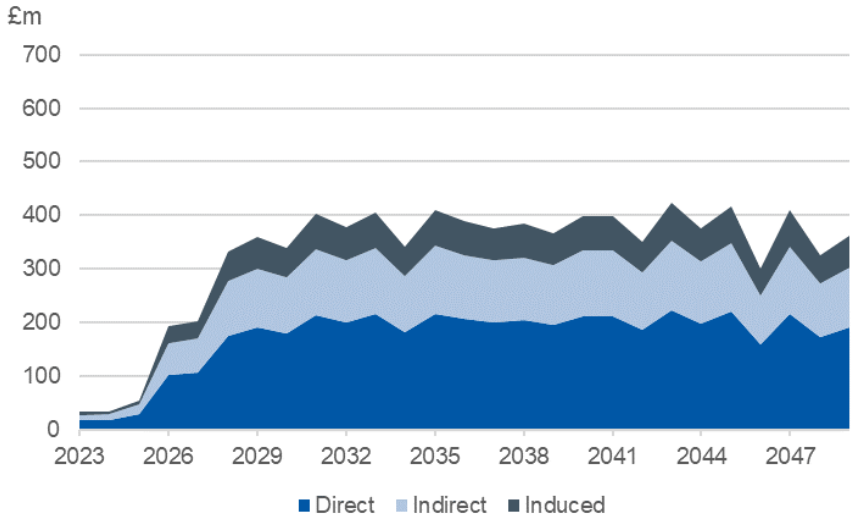
Figure 4.3: Mining Operations National GVA Impact



Source: West Cumbria Mining Financial Model, NERA Analysis.

Figure 4.4 below presents the sensitivity for the GVA impact analysis using a lower multiplier (again, after removing coal and lignite and construction from the list of relevant sectors). The GVA multipliers now used are 1.58 for Type I and 1.89 for Type II. Both indirect and induced impacts decrease, which results in a total annual GVA impact of £325 million, on average.

Figure 4.4: Mining Operations National GVA Impact – Low Multiplier Sensitivity

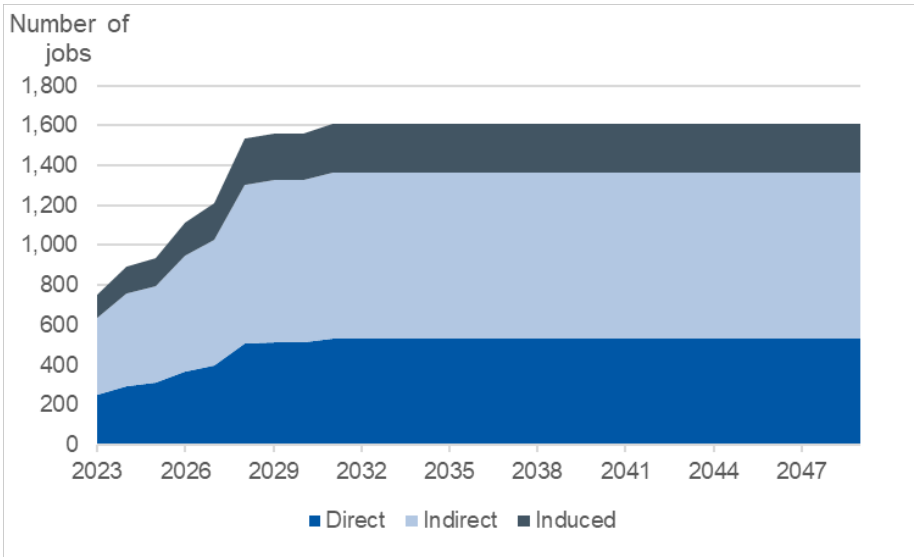


Source: West Cumbria Mining Financial Model, NERA Analysis.

4.1.3. National Employment Impact from CMCP Operation

Figure 4.5 shows that the project operation sustains 491 direct jobs every year on average. Increasing gradually from 248 jobs in 2023, the number of employees stays at 532 from 2031 onwards. The number of indirect jobs sustained by providing the intermediate inputs to the project each year is 770, and there are 224 induced employment positions annually. Overall, from 2023 to 2049, the project operation supports on average 1,486 jobs in the country every year.

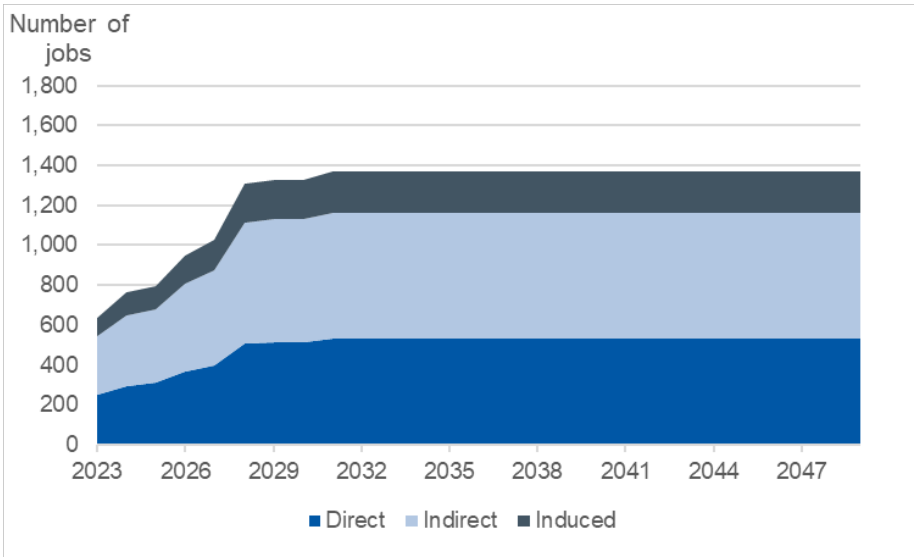
Figure 4.5: Mining Operations National Employment Impact



Note: This chart is based on the Financial Model and subject to potential revision.
Source: West Cumbria Mining Financial Model, NERA Analysis.

The alternative employment impact assessment using the median of the four sectors with the lowest multipliers (i.e., coal and lignite, mining support services, construction and other mining and quarrying products) is illustrated in Figure 4.6 below. The employment multipliers are 2.19 and 2.57 for Type I and Type II effects, respectively. Similar to the GVA impact, both indirect and induced employment numbers are lower than in our base case. The total number of job opportunities created by the project every year is around 1,264 on average.

Figure 4.6: Mining Operations National Employment Impact – Low Multiplier Sensitivity



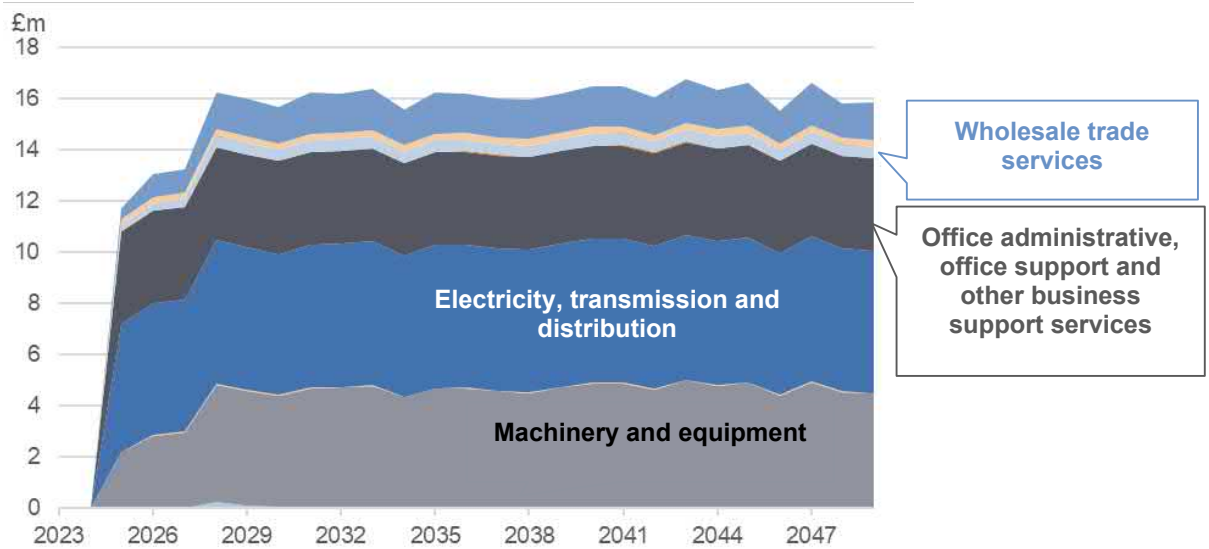
Note: This chart is based on the Financial Model and subject to potential revision.
Source: West Cumbria Mining Financial Model, NERA Analysis.

4.2. Indirect and Induced Regional Economic Impact of Mining Operations

4.2.1. Sectoral Breakdown of Regional Opex Spending

Figure 4.7 below outlines the non-labour operating expenditure in Cumbria broken down into different sectors. While the four major sectors are labelled in the chart, there are a total of ten sectors supplying to the project operation. The project's non-labour opex in the region is around £15 million, which is 19% of the total non-labour operating expenses nationally. This sectoral breakdown serves as the basis of our subsequent analysis of the opex impact on the regional level, in terms of output, GVA and employment.

Figure 4.7: Mining Opex Regional Sectoral Breakdown



Source: West Cumbria Mining Financial Model, NERA Analysis.

4.2.2. Indirect and induced regional output impact of CMCP operation

Figure 4.8 below depicts the impact on economic output calculated from the operating activities in the region, focusing on non-labour operating expenses – essentially, goods and services purchased from suppliers located in the region. We first calculate the output impact of each input sector using its respective sector multiplier published by ONS (2015), scaled to reflect the reduced region-specific impact. The total impact on economic output from non-labour opex is the sum of all the sectoral impacts.

To this, we add the induced regional output impact from the remuneration of CMCP's own employees, which is not captured by our analysis of the different supplying sectors.

To estimate the induced impact from CMCP's employees, we scale the induced impact from CMCP's suppliers (the impact referred to as "Induced from non-labour opex" in the chart below) by the ratio between

- CMCP's annual wage bill; and
- the increase triggered by CMCP in the wage bill of its (direct and indirect) regional suppliers.

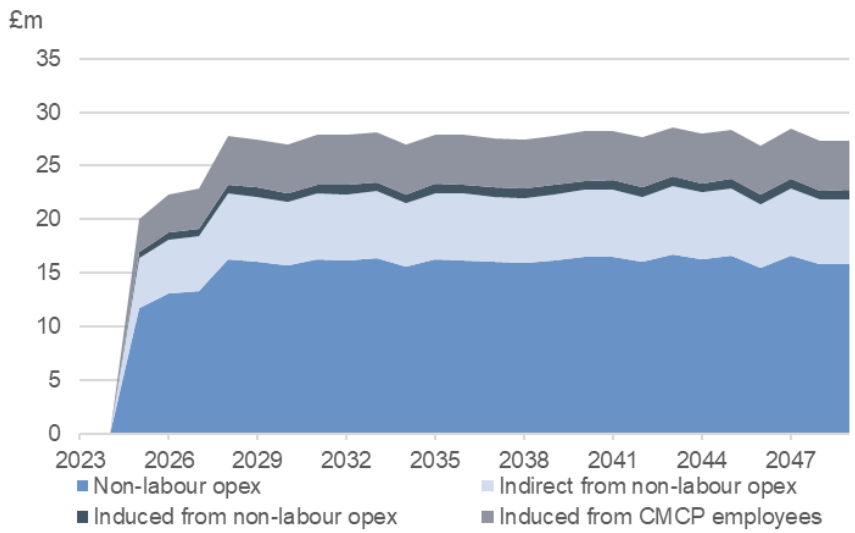
The second item is estimated by using appropriate sectoral multipliers for labour income, as explained further in Appendix C.2.

To illustrate our approach, if in a given year CMCP's total wage bill is 50% higher than the increase in the wage bills of its regional suppliers, suppliers to these suppliers etc. triggered

by CMCP, the "Induced impact from CMCP employees" exceeds the "Induced impact from non-labour opex" by the same percentage.[26]

Figure 4.8 shows that the indirect output effect of the opex spending in the region is £5.6 million on average, while the induced output effect adds another £4.8 million every year in the region due to both wages paid by suppliers and CMCP staff. In total, the project's indirect and induced impacts on the region add nearly £25 million every year, on top of the direct impacts.

Figure 4.8: Indirect and Induced Regional Output Impact of Mining Operations



Source: West Cumbria Mining Financial Model, NERA Analysis.

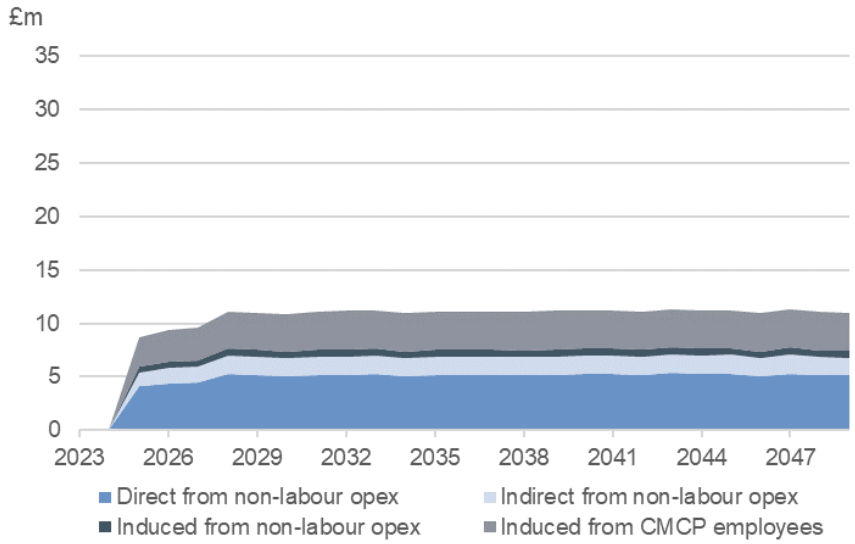
4.2.3. Indirect and induced regional GVA impact of CMCP operation

Similar to the approach to calculate the output impact from opex, the GVA impact shown in Figure 4.9 below is the aggregate of all sectoral GVA impacts from opex spending, plus the induced impact from CMCP labour income. We derive the GVA impact for each sector by multiplying the sectoral opex spending with the sectoral GVA-output ratio, as well as the sectoral GVA multiplier that is scaled by a regional discount.

The direct GVA impact from the supplying sectors of the project opex – which is an *indirect* effect of the project itself – is £4.7 million on average every year. The additional indirect GVA impact from the opex spending is on average £1.6 million every year, while the induced impact attributable to supplier employee wages is around £0.6 million. The induced regional impact from CMCP employee compensation is £3.2 million every year. The total indirect and induced regional GVA impacts are £10.1 million annually, in addition to the direct impacts of the project, which of course are concentrated in the region.

[26] Below, we apply the same approach to GVA and employment impacts at the regional level as well as to output, GVA and employment impacts at the local level. For an analogous analysis at the national level, see Appendix A

Figure 4.9: Indirect and Induced Regional GVA Impact of Mining Operations

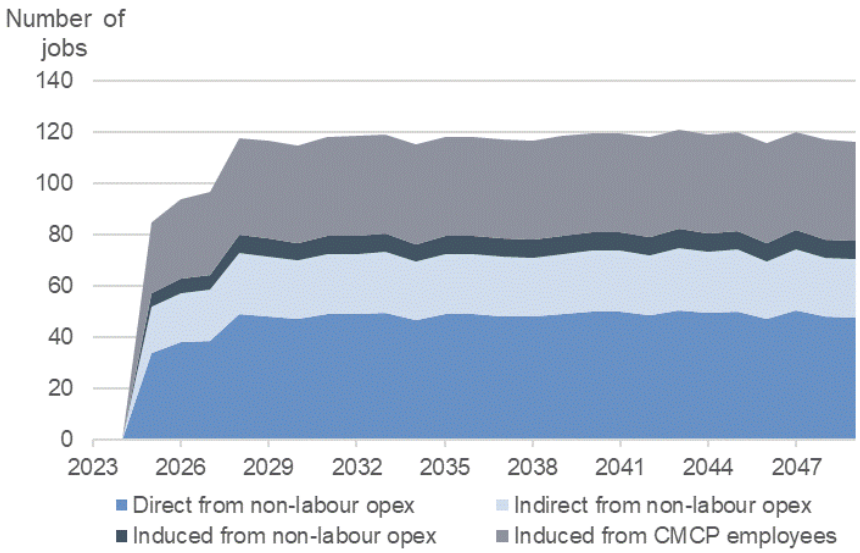


Source: West Cumbria Mining Financial Model, NERA Analysis.

4.2.4. Indirect and induced regional employment impact of CMCP operation

The indirect and induced employment impacts are calculated from sectoral opex spending in a similar way to output and GVA impacts, but using sectoral employment-to-output ratios and employment multiplier instead. The project's non-labour opex spending in the region in the ten aforementioned sectors leads to around 44 direct employment opportunities in the supplying sectors every year. The project opex also supports about 21 indirect jobs and 6 induced positions every year in the region, during the lifetime of the project. Additionally, a further 35 positions in the region can be attributed to the labour income from the mining operation.

Figure 4.10: Indirect and Induced Regional Employment Impact of Mining Operations



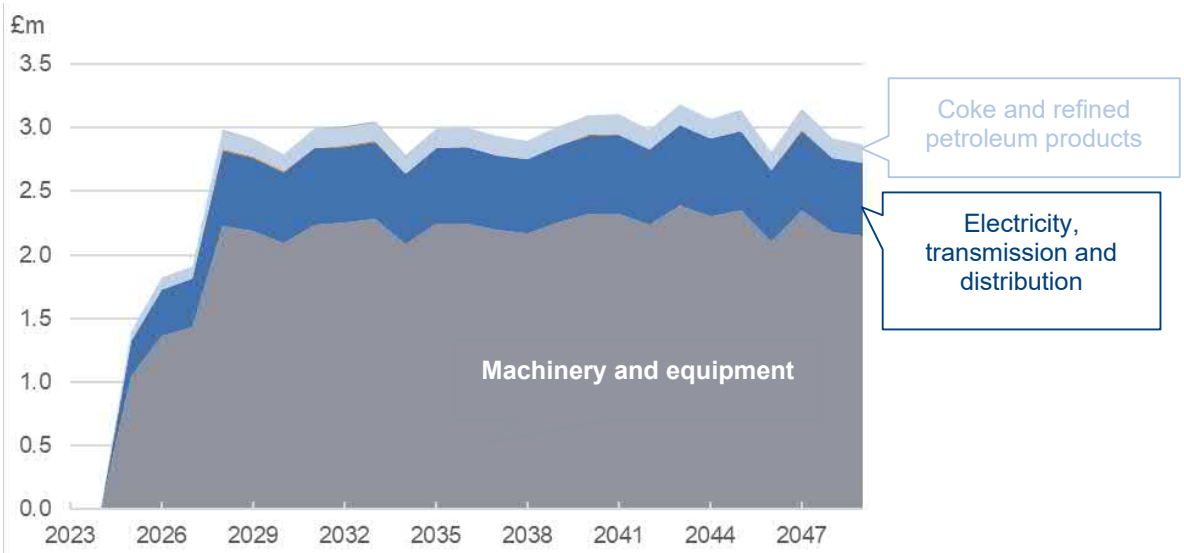
Source: West Cumbria Mining Financial Model, NERA Analysis.

4.3. Local Economic Impact from Mining Operations

4.3.1. Sectoral Breakdown of Local Opex Spending

Figure 4.11 shows that the local opex spending occurs mostly in three sectors - machinery and equipment, electricity and refined petroleum products. The total expenditure incurred locally is around £2.6 million each year.

Figure 4.11: Mining Opex Local Sectoral Breakdown

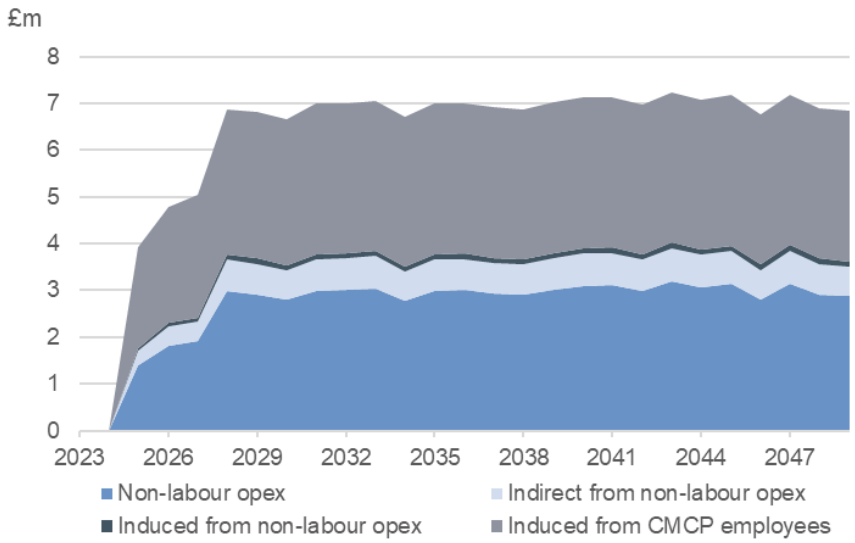


Source: West Cumbria Mining Financial Model, NERA Analysis.

4.3.2. Indirect and Induced Local Output Impact from CMCP Operation

Similar to the regional impact analysis, the local output impact from opex spending is the sum of all sectoral output impacts, which is obtained using the national multipliers adjusted to reflect the reduced local impact. We then add the induced impact from local CMCP labour income on top of the impact from local opex spending. As mentioned above, the direct operating expense spent locally is around £2.6 million on average (dark blue series in Figure 4.12). This local operating expenditure increases local output by around £6.2 million in total.

Figure 4.12: Mining Operations Local Output Impact

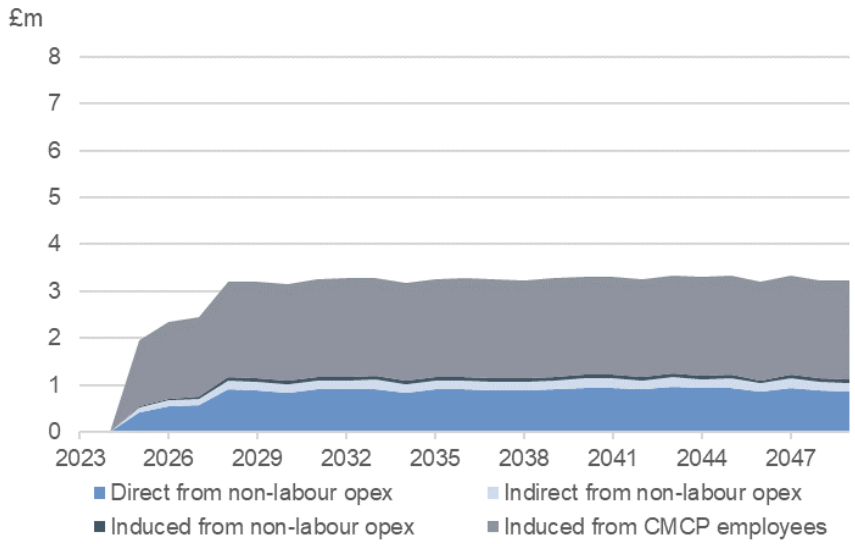


Source: West Cumbria Mining Financial Model, NERA Analysis.

4.3.3. Indirect and Induced Local GVA Impact from CMCP Operation

Using the same approach to calculate the regional GVA impact, but with a *local* discount applied to the GVA multipliers, we obtain the GVA impacts in the local area. The direct GVA created by the project opex in the input sectors in the Copeland area amounts to £0.8 million every year. The total indirect plus induced local GVA impact from the operation of the project is about £2.9 million in the local area.

Figure 4.13: Mining Operations Local GVA Impact

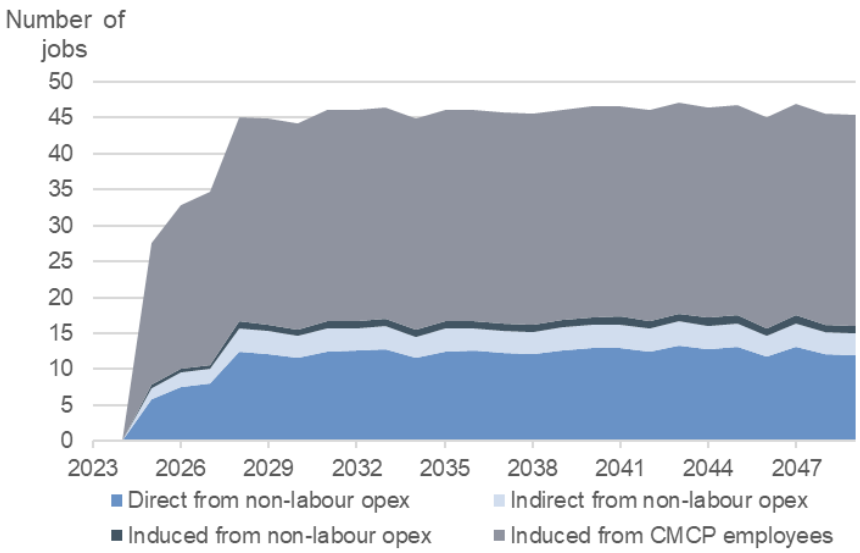


Source: West Cumbria Mining Financial Model, NERA Analysis.

4.3.4. Indirect and Induced Local Employment Impact from CMCP Operation

The local non-labour opex spending of the project on external suppliers supports about 11 local employment positions from 2028, and this spending in turn is estimated to support a further three "indirect" jobs and 27 induced jobs.

Figure 4.14: Mining Operations Local Employment Impact



Source: West Cumbria Mining Financial Model, NERA Analysis.

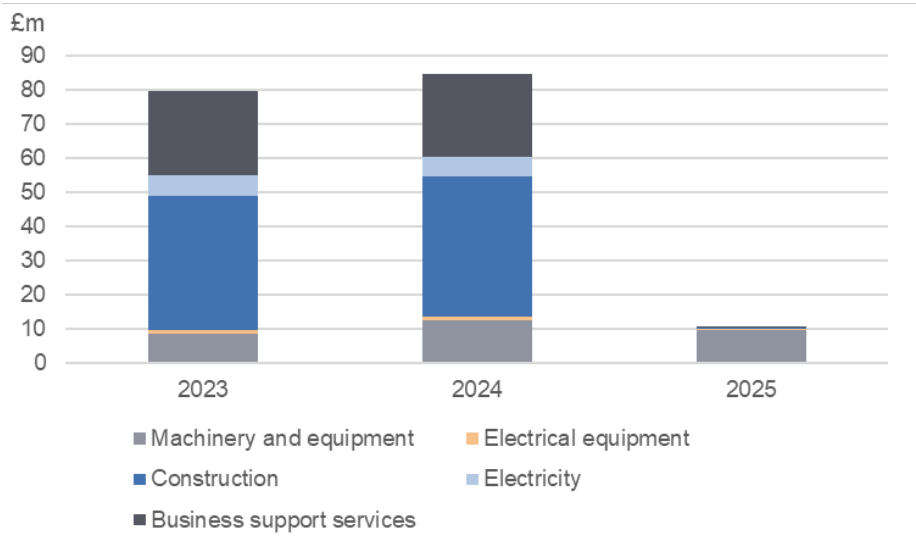
5. The Economic Impact of Mining Capex

5.1. National Economic Impact from Mining Capex

5.1.1. Sectoral Breakdown of Capex Spending

As most of the capex spending occurs in the first three years, we present below in Figure 5.1 the sectoral breakdown of capex during these first years. The capital expenditure in the first two years exceeds £80 million on average, and then falls to £10.5 million in 2025. The majority of the capex in 2023-2024 is spent in the construction sector, while the machinery and equipment sector supplies most of the capex in the third year. Similar to the impact of opex spending at regional level discussed in the previous chapter, we estimate the impact of capex spending by breaking it down into the impacts attributed to each of the supplying sectors.

Figure 5.1: Mining Capex Sectoral Breakdown



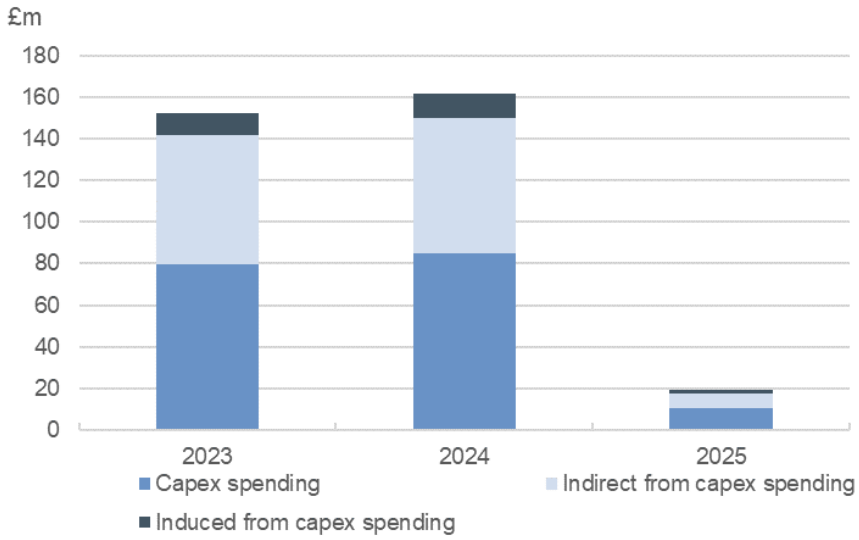
Source: West Cumbria Mining Financial Model, NERA Analysis.

5.1.2. National Output Impact from CMCP Capex

The dark blue area (i.e., direct impact of capex spending) in Figure 5.2 corresponds to the stacked bars in Figure 5.1 above. The indirect / induced output impact of the capex overall is the sum of individual sector indirect / induced output impacts. These in turn are the product of capex spending in the sector and the output multipliers of each respective sector.

The indirect output impact is more than £60 million annually in the first two years and around £7 million in 2025. The induced output effect from the capex amounts to £10-12 million in each of 2023 and 2024, and £1.6 million in 2022. The total annual impact on economic output from the capex is more than £156 million on average in the first two years.

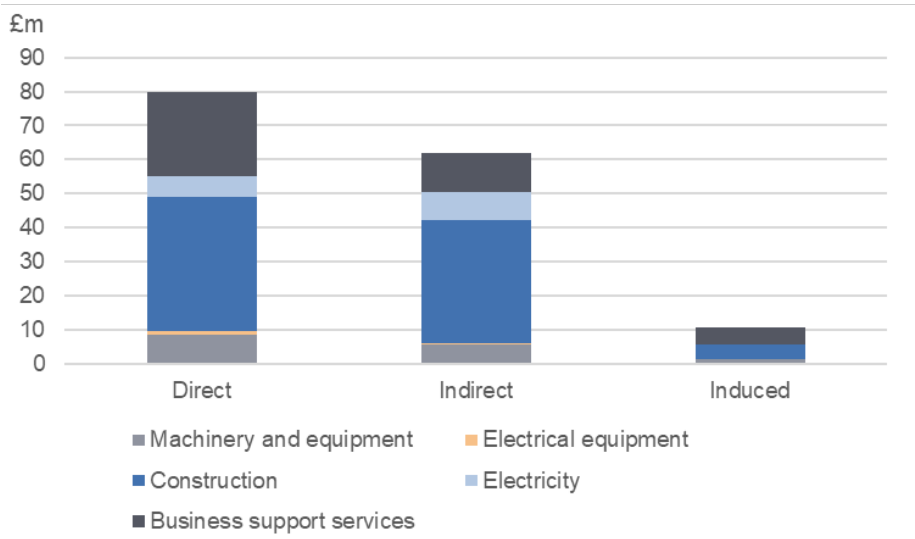
Figure 5.2: Mining Capex National Output Impact (2023-2025)



Source: West Cumbria Mining Financial Model, NERA Analysis.

Figure 5.3 below breaks down the direct, indirect and induced output effect of the mining capex in the first year to its constituent sectors. The stacked bar of the direct effect is the same as the first stacked bar (i.e., for 2023) in Figure 5.1 above. As construction is the biggest sector for capex spending in 2023, this sector has the most significant output effects, at direct and indirect levels. As business support services comes next in the direct capex spending, it is the second largest sector contributing to the direct and indirect effect, and even generates more induced effect than construction.

Figure 5.3: Mining Capex Output Effect Breakdown by Sector (2023)

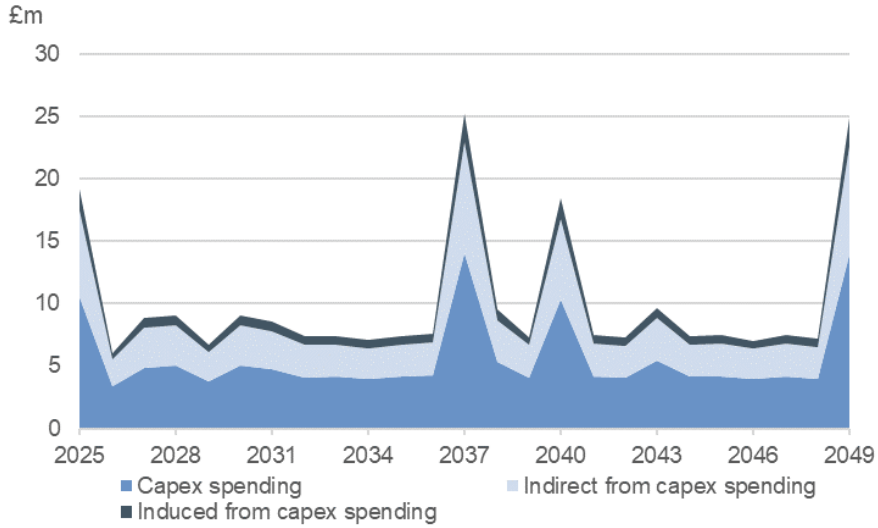


Source: West Cumbria Mining Financial Model, NERA Analysis.

Figure 5.4 presents the output impact of the capex for the rest of the project operation. Direct capex spending stays around £4 million during project operation, except for a few spikes due

to the increase in sustaining capex in some years. The average annual indirect and induced output impacts from the capex are around £3.5 million and £0.9 million respectively during the operation period.

Figure 5.4: Mining Capex National Output Impact (2025-2049)

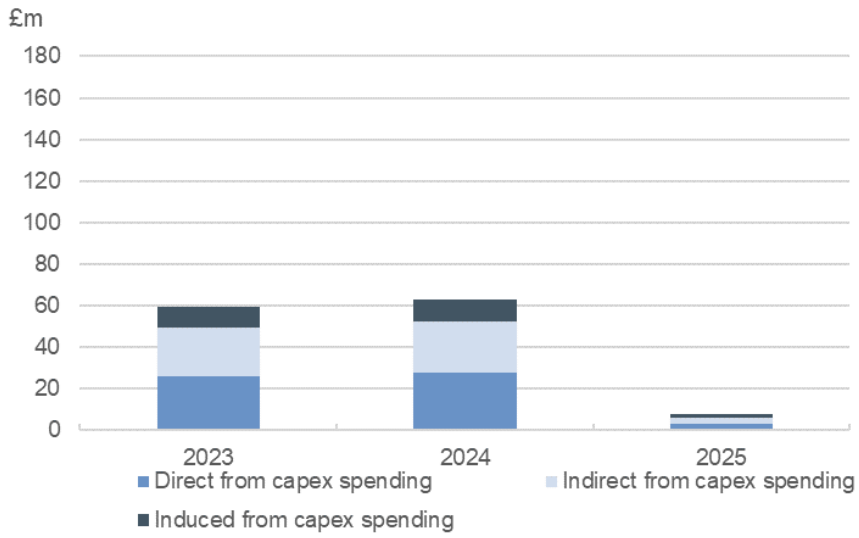


Source: West Cumbria Mining Financial Model, NERA Analysis.

5.1.3. National GVA Impact from CMCP Capex

Similar to the output impact, the GVA impact from capex is also presented separately in two charts (Figure 5.5 and Figure 5.7) below. The GVA impact is calculated by multiplying capex from each sector with the GVA-to-output ratios specific to the sectors. Figure 5.5 shows that the direct GVA associated with CMCP's suppliers for the capex is above £26 million in the first two years, falling to £3.4 million in the third year. The indirect GVA effect is about the same magnitude, while the annual induced GVA impact is £10 million for the first two years and £1.2 million in 2025. Overall, the total GVA impact on the national level reaches about £60 million each year in the first two years of the project.

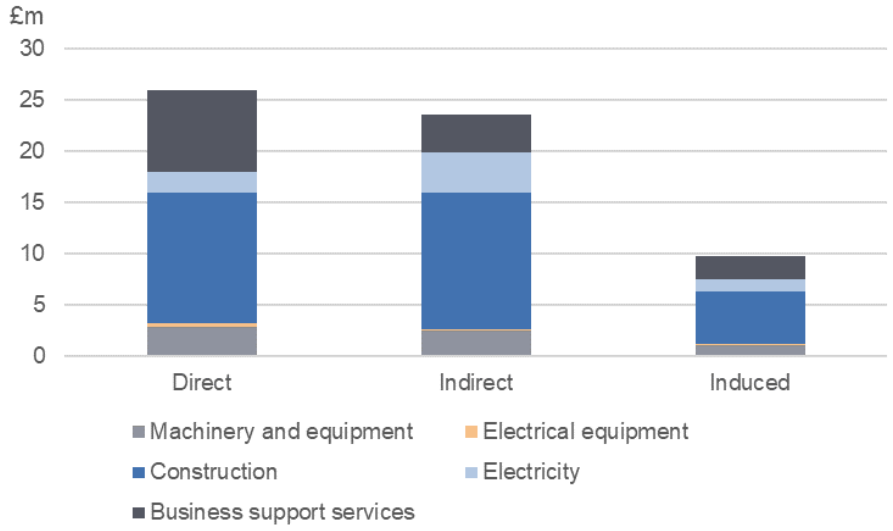
Figure 5.5: Mining Capex National GVA Impact (2023-2025)



Source: West Cumbria Mining Financial Model, NERA Analysis.

Figure 5.6 shows the breakdown of the three types of GVA effect in 2023 by sector. Construction is the largest sector contributing to the three types of GVA effect. Business support services is the second largest contributor to the direct and induced GVA effects at the level of CMCP's supplier, while capex on electricity generates more indirect GVA.

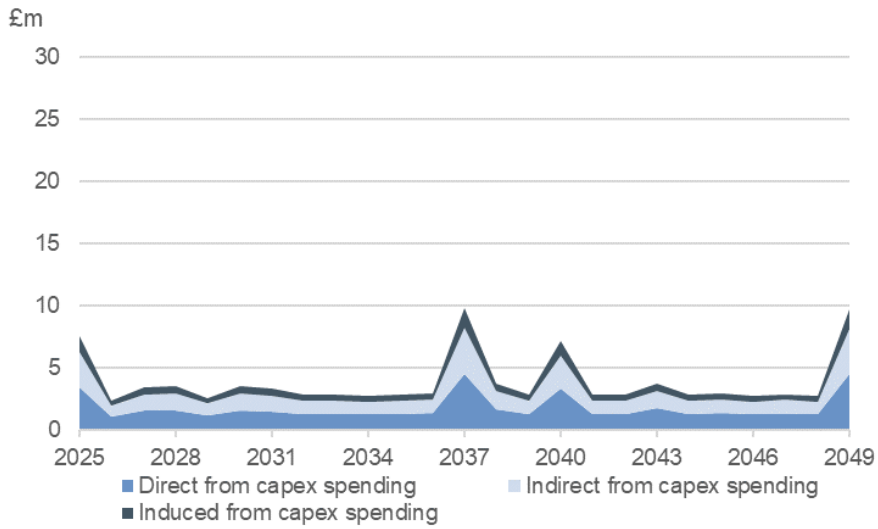
Figure 5.6: Mining Capex National GVA Impact Breakdown by Sector (2023)



Source: West Cumbria Mining Financial Model, NERA Analysis.

Figure 5.7 shows the GVA impact for the rest of the operating life of the project. Due to the lower level of capex in the operating stages of the project, direct GVA effect stays around £1.8 million after 2025, and the total GVA impact from the capex during operation is around £3.9 million every year.

Figure 5.7: Mining Capex National GVA Impact (2025-2049)

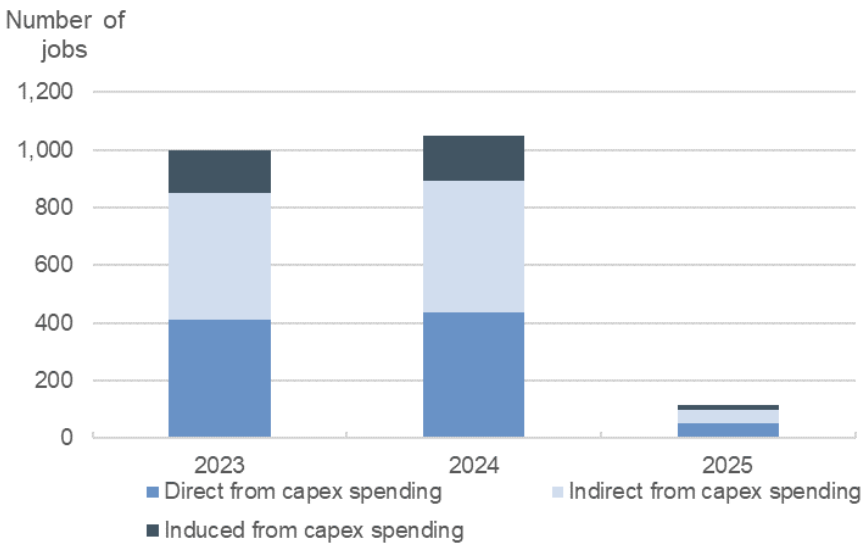


Source: West Cumbria Mining Financial Model, NERA Analysis.

5.1.4. National Employment Impact from CMCP Capex

As Figure 5.8 shows, the direct jobs attributable to capex spending are 410 and 435 in the first two years. The total employment supported by the capital investment of the project across the country is between 998 and 1050 every year during the two years of construction, including around 450 indirect job opportunities. In 2025, the number of jobs sustained by the project capex directly is 54, and there are 46 indirect jobs, plus 17 induced job positions.

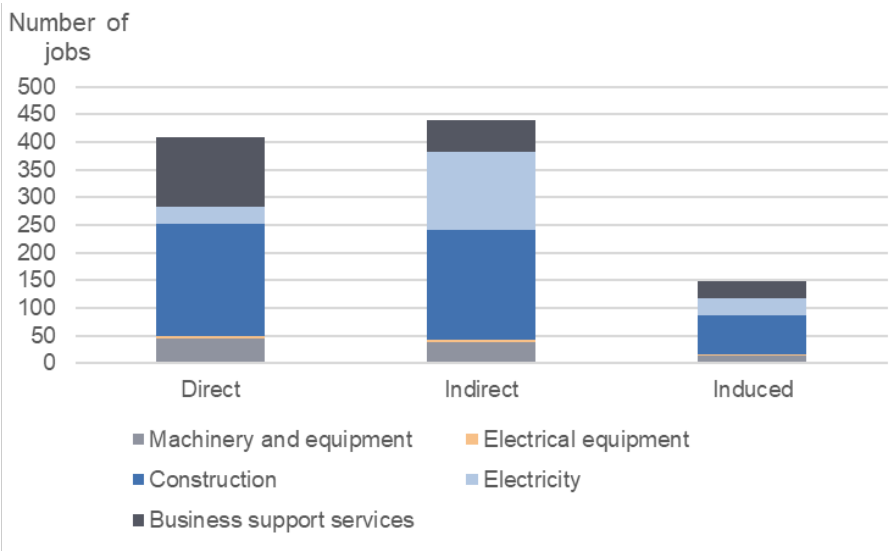
Figure 5.8: Mining Capex National Employment Impact (2023-2025)



Source: West Cumbria Mining Financial Model, NERA Analysis.

Sector breakdown of the three types of employment effect from capex in 2023 is presented in Figure 5.9. While capex spending in construction and business support services is associated with the most direct supply-chain jobs, a very large number of positions – slightly fewer than the number of jobs in the construction sector - are supported indirectly in the electricity sector due to the capex spending.

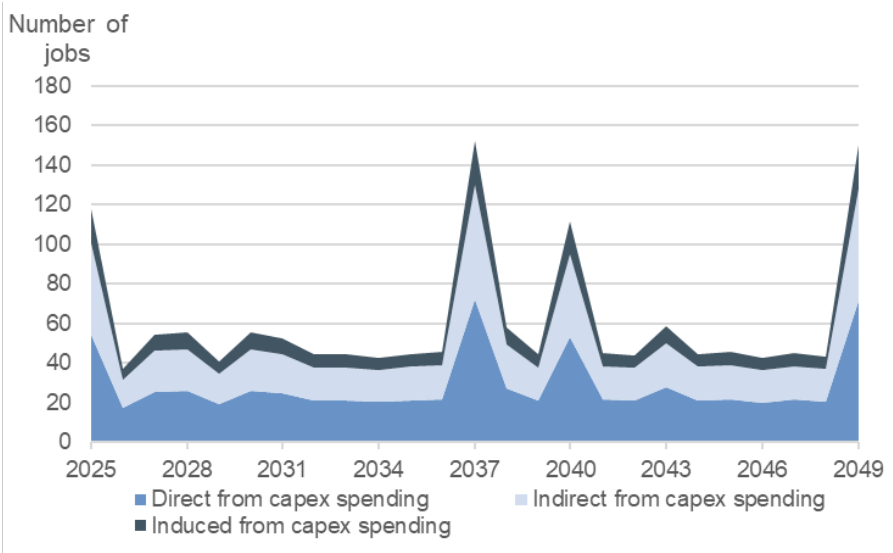
Figure 5.9: Mining Capex Employment Effect Breakdown by Sector (2023)



Source: West Cumbria Mining Financial Model, NERA Analysis.

Figure 5.10 shows that after 2025, the average number of direct jobs related to the project capex is 29, and the average total number of jobs sustained across the supply chain due to the project capex is around 61 in the country each year.

Figure 5.10: Mining Capex National Employment Impact (2025-2049)



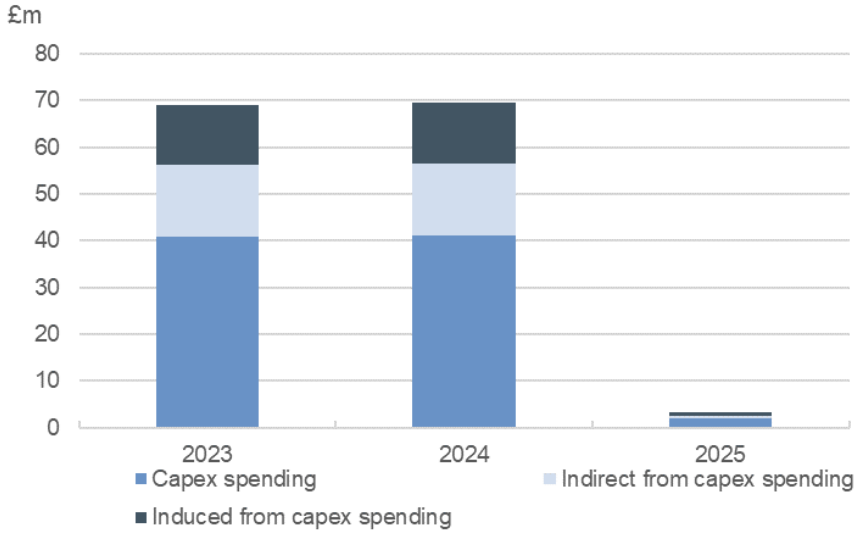
Source: West Cumbria Mining Financial Model, NERA Analysis.

5.2. Regional Economic Impact from Mining Capex

5.2.1. Regional indirect and induced output impact from CMCP capex

The direct capex spending in the region is around £41 million every year in the first two years, as shown in Figure 5.11 below. The regional output impact of the capex is calculated in the same way as the regional output impact of the opex spending. The total impact on economic output in the region from the capital investment of the project is around £69 million. This drops to £3.2 million in the third year due to the fall in capex spending.

Figure 5.11: Mining Capex Regional Indirect and Induced Output Impact (2023-2025)

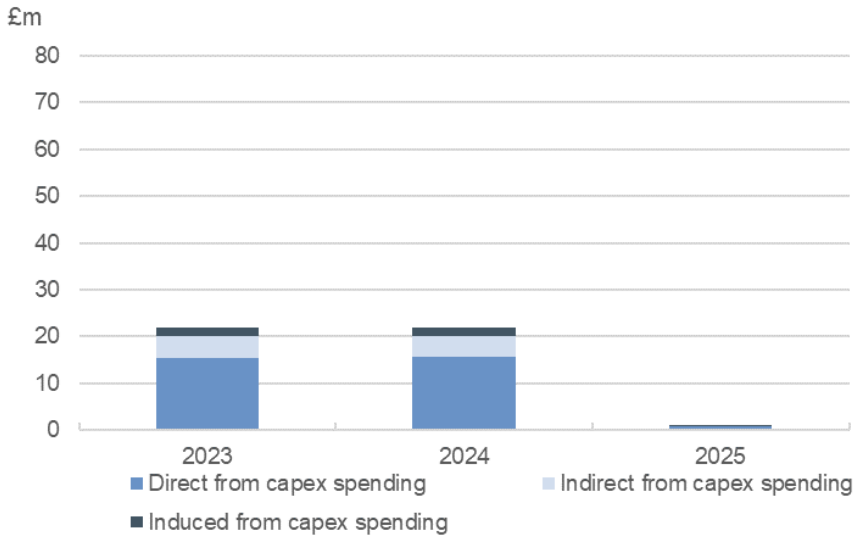


Source: West Cumbria Mining Financial Model, NERA Analysis.

5.2.2. Regional indirect and induced GVA impact from CMCP capex

Figure 5.12 presents the regional GVA impact of the project capex. Direct GVA generated by the capital expenditure in the region is £15.5 million every year for the first two years, falling to less than £1 million in 2025. Meanwhile, indirect and induced GVA impact sum up to £6.4 million at the beginning, and dropping to £0.3 million in the third year.

Figure 5.12: Mining Capex Regional Indirect and Induced GVA Impact (2023-2025)

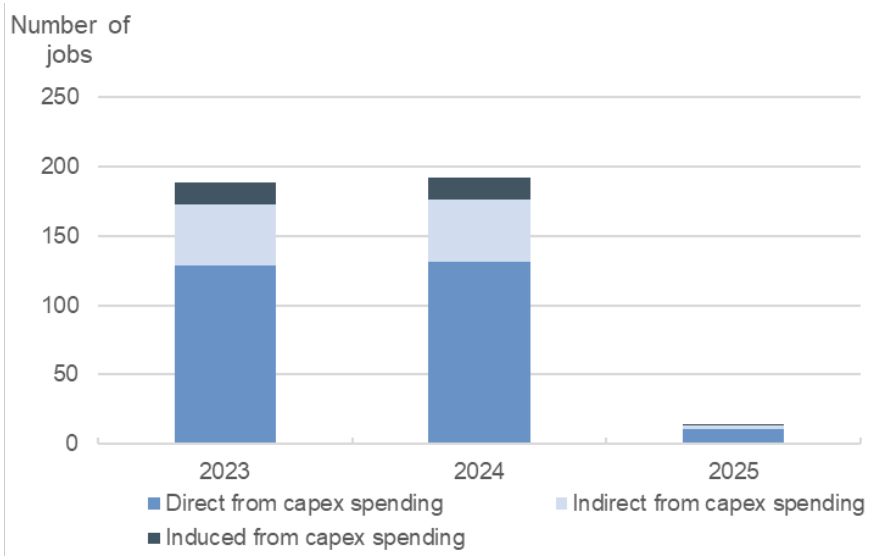


Source: West Cumbria Mining Financial Model, NERA Analysis.

5.2.3. Regional indirect and induced employment impact from CMCP capex

The capital spending at the beginning of the project supports 130 direct jobs every year in the region. The total number of jobs added to the supply chain in the region can reach 190 on average each year in 2023-2024. In 2025, the number of jobs attributed to the capital expenditure in the region drops to 14.

Figure 5.13: Mining Capex Regional Employment Impact (2023-2025)



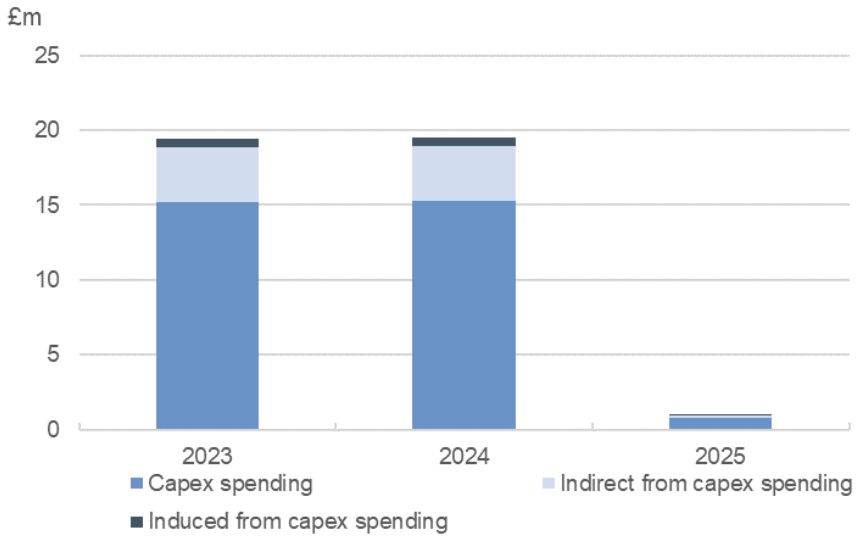
Source: West Cumbria Mining Financial Model, NERA Analysis.

5.3. Local Economic Impact from Mining Capex

5.3.1. Local indirect and induced output impact from CMCP capex

The capital investment spent locally, i.e., £15 million, is around 25% of the total capital expenditure in the first two years. This capital expenditure of the project increases the total output in the local area by £19 million in 2023-2024.

Figure 5.14: Mining Capex Local Indirect and Induced Output Impact (2023-2025)

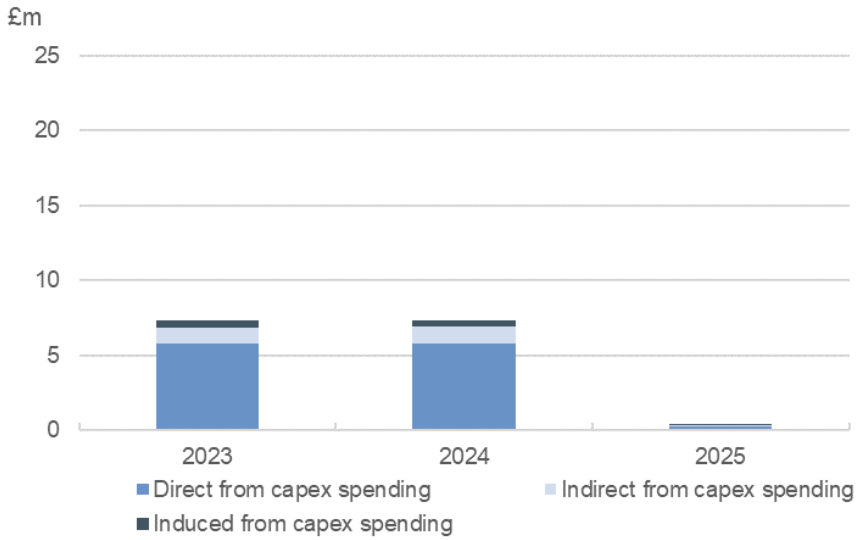


Source: West Cumbria Mining Financial Model, NERA Analysis.

5.3.2. Local indirect and induced GVA impact from CMCP capex

The direct GVA created by the project capex in the local region amounts to £5.8 million in 2023-2024. Total GVA added by the project capital expenditure to the local area is nearly £7.3 million every year during project construction.

Figure 5.15: Mining Capex Local GVA Impact (2023-2025)

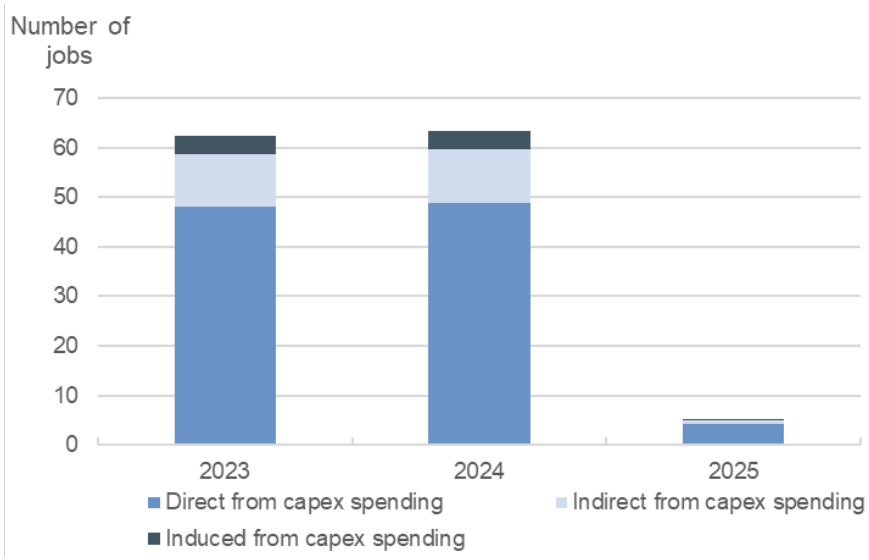


Source: West Cumbria Mining Financial Model, NERA Analysis.

5.3.3. Local indirect and induced employment impact from CMCP capex

The capital investment in the first two years creates nearly 50 local employment positions directly every year. In addition, 11 indirect job opportunities and 4 induced jobs will be supported by the project capex every year in the local area.

Figure 5.16: Mining Capex Local Indirect and Induced Employment Impact (2023-2025)



Source: West Cumbria Mining Financial Model, NERA Analysis.

6. Total Economic Impact of CMCP

6.1. National Total Economic Impact of CMCP

In this chapter, we combine the economic impacts from the project operation and capital investment, and assess the total impact of the project on the national level from the construction phase throughout to the end of the operational phase. Table 6.1 broadly tabulates how we construct the three types of effects from our earlier results.

Table 6.1: Components of the Total Impact

Total Impact	Impact of Mining Capex	Impact of Mining Operations
Direct impact	n/a	CMCP direct impact
Indirect impact	Tier 1 supplier direct impact + Tier 1 supplier indirect impact	CMCP indirect impact
Induced impact	Tier 1 supplier induced impact	CMCP induced impact

6.1.1. National Total Output Impact of CMCP

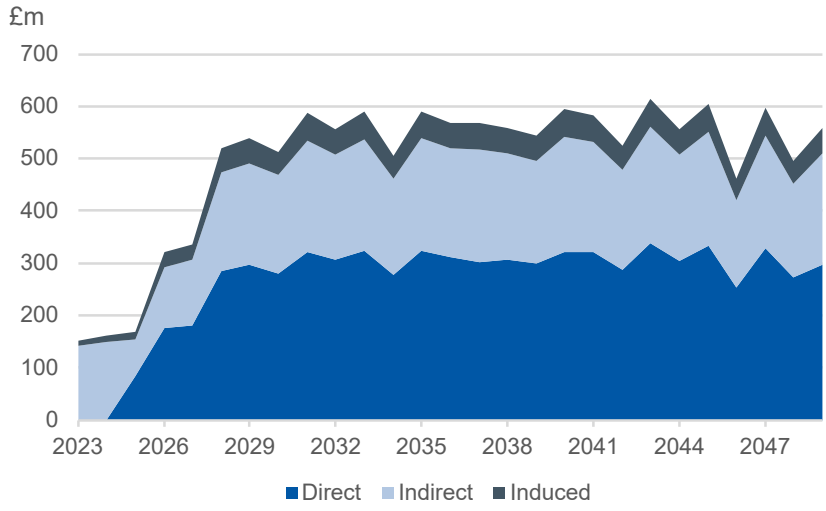
Figure 6.1 below shows the total impact on economic output of the project, and is essentially an aggregation of Figure 4.1, Figure 5.2 and Figure 5.4 above. Table 6.2 provides further detail on the components of each series in Figure 6.1.

Table 6.2: Components of the Total Impact on Economic Output

Total Impact	Impact of Mining Capex	Impact of Mining Operations
Direct impact	n/a	CMCP direct impact from Figure 4.1
Indirect impact	Tier 1 supplier direct impact from Figure 5.2 and Figure 5.4 + Tier 1 supplier indirect impact from Figure 5.2 and Figure 5.4	CMCP indirect impact from Figure 4.1
Induced impact	Tier 1 supplier induced impact from Figure 5.2 and Figure 5.4	CMCP induced impact from Figure 4.1

As expected, impacts in the first few years are primarily due to capex spending. The magnitude of the total impacts during operation is similar to the impact on economic output from mining operations shown in Chapter 4, because the capex spend is relatively low during operation.

Figure 6.1: Total National Output Impact

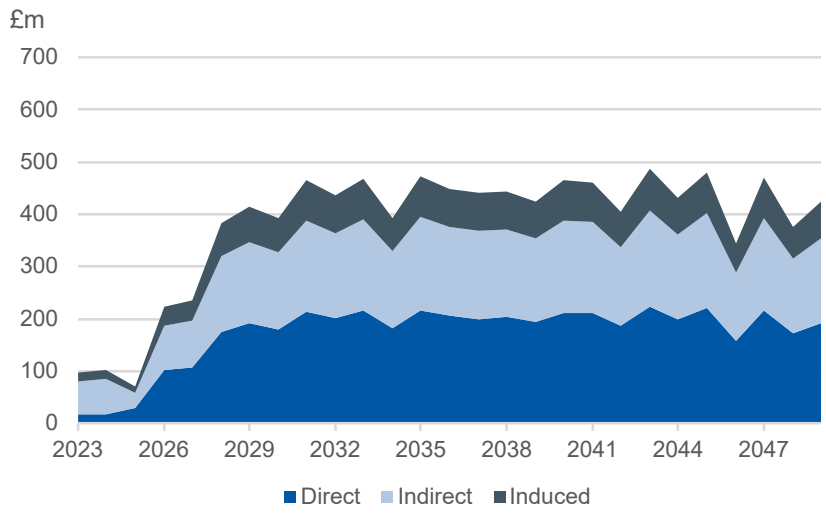


Source: West Cumbria Mining Financial Model, NERA Analysis.

6.1.2. National Total GVA Impact of CMCP

Figure 6.2 combines Figure 4.3, Figure 5.6 and Figure 5.7 in the same way as outlined in Table 6.2. Similar to the output impact, capital investment increases the total GVA impact during the construction phase (through indirect impact), and the total GVA impact during project operation (i.e., 2025-2049) is almost the same as the GVA impact from operating activities due to the low level of capex in this period.

Figure 6.2: Total National GVA Impact

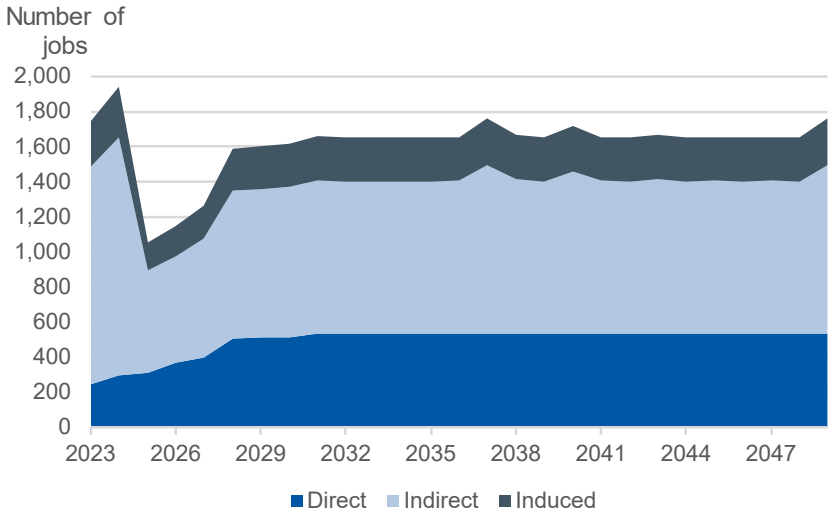


Source: West Cumbria Mining Financial Model, NERA Analysis.

6.1.3. National Total Employment Impact of CMCP

Figure 6.3 demonstrates the total employment impact of the project. During the two years of construction, the project supports 1,845 jobs on average each year. While the number of positions drops in the third year with the completion of construction, the total number of jobs increases gradually after 2025 as production ramps up, and stays around 1,650 during the operational phase of the project.

Figure 6.3: Total National Employment Impact



Source: West Cumbria Mining Financial Model, NERA Analysis.

7. Conclusions

Table 7.1 and Table 7.2 summarise the average annual impacts of CMCP from construction to 2049, on the national and regional level, respectively. These are the total impacts, from capital spending during construction and ongoing capex, as well as from operating expenditure during project operation. With an average annual revenue of £264 million, our analysis suggests that the project will increase national output by £495 million on average, annually. The average GVA of the project itself is around £172 million, and its average impact on GVA overall is £380 million annually. In terms of employment, the project itself will directly employ on average 491 employees annually, and it will sustain 1,618 employment opportunities in the country overall including indirect and induced effects.

Table 7.1: National Impacts of CMCP (Average per year, 2023-2049)

	Capex (construction and ongoing)	Opex	Total
Output (£m)	**20.9**	**474.5**	**495.4**
Direct		264.1	264.1
Indirect	19.2	168.4	187.6
Induced	1.6	42.0	43.7
GVA (£m)	**8.2**	**371.3**	**379.5**
Direct		171.9	171.9
Indirect	6.8	138.7	145.6
Induced	1.3	60.7	62.0
Employment (number of jobs)	**132**	**1,486**	**1,618**
Direct		491	491
Indirect	113	770	883
Induced	20	224	244

At regional level, the total impact from CMCP on annual regional output is £299 million. The project also adds £185 million of GVA and supports 637 positions in the region.

Table 7.2: Regional Impacts of CMCP (Average per year, 2023-2049)

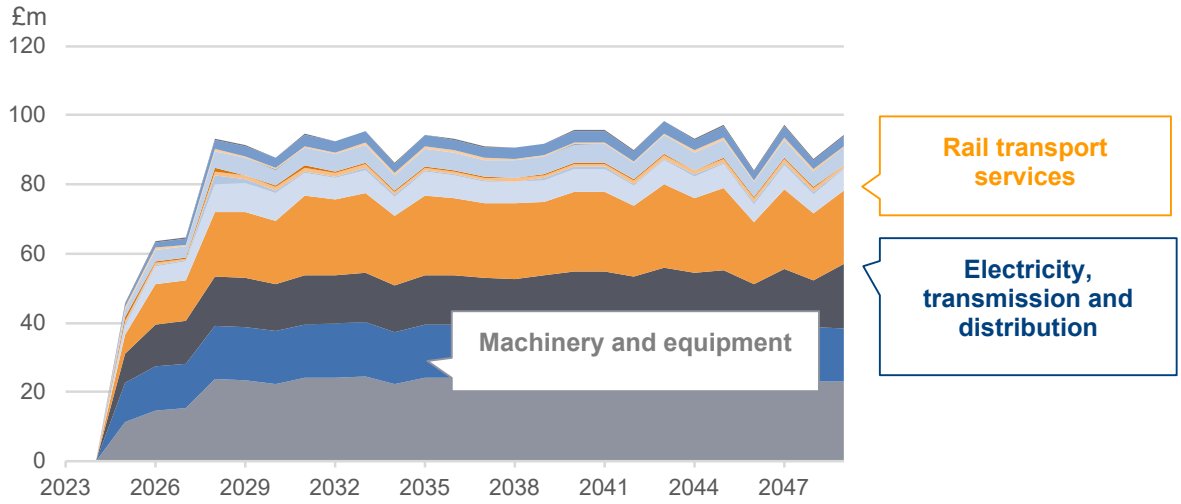
	Capex (construction and ongoing)	Opex	Total
Output (£m)	**10.2**	**289.2**	**299.3**
Direct		264.1	264.1
Indirect	8.3	20.1	28.5
Induced	1.8	4.9	6.7
GVA (£m)	**3.2**	**182.0**	**185.2**
Direct		171.9	171.9
Indirect	2.9	6.3	9.2
Induced	0.3	3.8	4.1
Employment (number of jobs)	**39**	**598**	**637**
Direct		491	491
Indirect	36	65	102
Induced	3	41	44

Appendix A. National Economic Impact of Mining Operation – Alternative Approach

A.1. Sectoral Breakdown of National Opex Spending

We show the breakdown of the national non-labour opex spending sourced within the UK in Figure A.1 below. Project operating expenditure is split across a total of 13 sectors; the four largest are machinery and equipment, rail transport services, electricity transmission and distribution, and business support services. These operating costs form the basis of the alternative approach to calculating the economic impact of the project's operation (based on the sectoral breakdown of opex), which is set out in this appendix.

Figure A.1: Mining Non-Labour UK Opex National Sectoral Breakdown

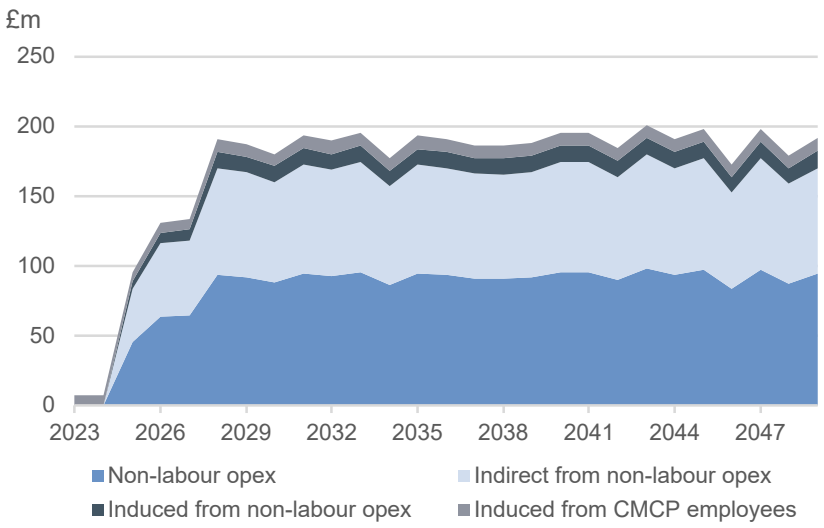


Source: West Cumbria Mining Financial Model, NERA Analysis.

A.2. National Output Impact from CMCP Operation

Under this alternative approach, we calculate the national output impact of the opex spending in the same way as the national output impact of capex spending: We multiply the sectoral opex spending by the respective sector multipliers to obtain the sectoral impacts, and add the individual impacts together with the induced impact from CMCP employee labour income to obtain the total national impact. The direct and indirect impacts from the opex spending (the bottom two series in Figure A.2) together are akin to the indirect impact of the national output impact presented in Figure 4.1 above, but the magnitude is slightly smaller – this is likely due to the median multiplier applied in Figure A.1 being above the weighted average output multiplier of the opex sectors.

Figure A.2: National Output Impact from Opex Spending

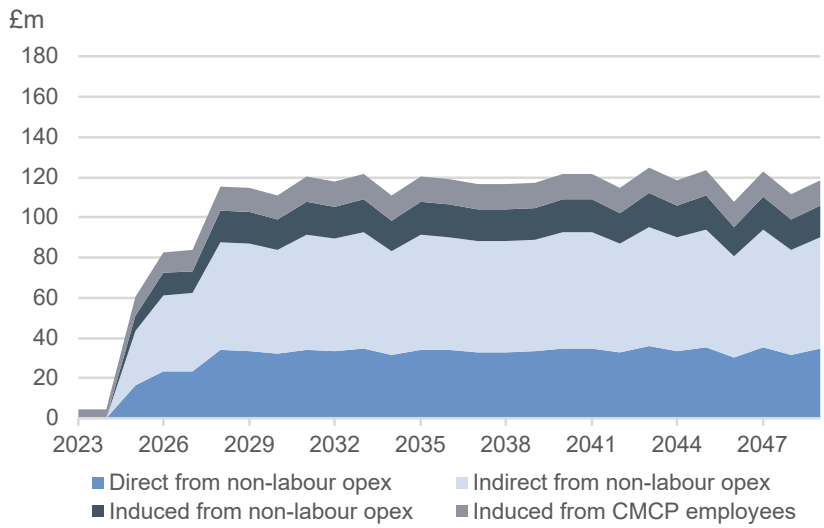


Source: West Cumbria Mining Financial Model, NERA Analysis.

A.3. National GVA Impacts from CMCP Operation

We calculate the GVA impact from opex spending based on the alternative approach by multiplying the sector-specific opex by each sector's GVA-to-output ratio, and then by the sector-specific GVA multiplier. The sum of the direct and indirect effects from the opex spending is just under £80 million per year, which is lower than the indirect GVA impact shown in Figure 4.3 above. This is likely due to the relatively higher GVA of CMCP, compared to the constructed GVA from the opex spending sectors.

Figure A.3: National GVA Impact from Opex Spending

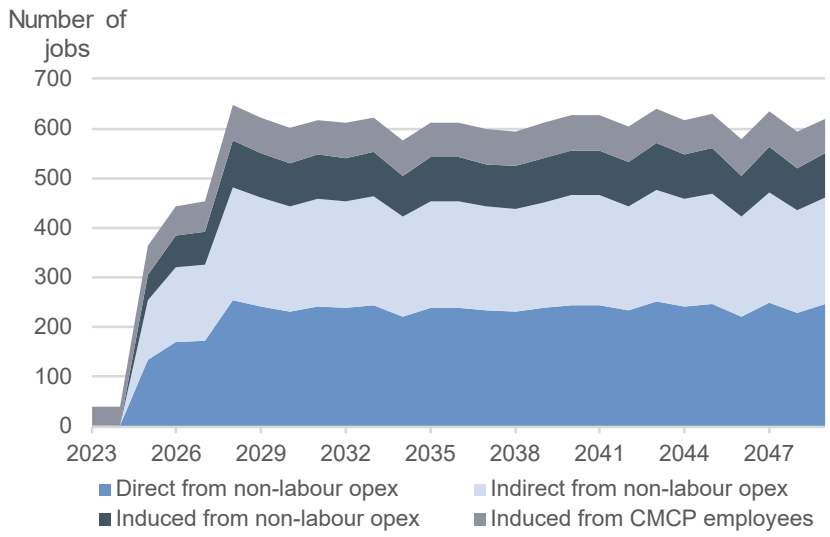


Source: West Cumbria Mining Financial Model, NERA Analysis.

A.4. National Employment Impact from CMCP Operation

Our analysis indicates that the non-labour opex spending supports about 403 direct and indirect jobs in supplying sectors. This is lower than the 770 indirect jobs presented in Figure A.4. This difference can likely be attributed to employment multipliers of the input sectors that are well below the employment multipliers for the six sectors that make up our list of relevant benchmarks for CMCP (see Table 3.2 in the main report).

Figure A.4: National Employment Impact from Opex Spending



Source: West Cumbria Mining Financial Model, NERA Analysis.

A.5. Comparison with the Base Case Results

Table A.1 compares the results from the alternative approach with the results in Chapter 4.1. Because this alternative method calculates the impacts at the level of suppliers to CMCP's project opex, it is most appropriate to compare the "direct and indirect impacts" from the non-labour opex spending shown in the charts above to the indirect impacts from the base case analysis. The table below compares the annual average of each type of impact. As suggested above, the magnitude of impacts calculated with the alternative approach is lower than the magnitude obtained in section 4.1. There are two potential reasons for this: (1) the median multiplier used in the main analysis may be higher than the weighted average multipliers of the sectors supplying CMCP's operation; (2) CMCP's GVA-to-output ratio and/or employment-to-output ratio may be higher than the ratios of the supplying sectors.

Table A.1: Comparison of Results in Annual Averages

	Base Case (Indirect Impact)	**Alternative Approach (Direct + Indirect from Opex)**
Output (£m)	168	149
GVA (£m)	139	79
Employment (number of jobs)	770	403

Appendix B. Regional Economic Impact of Mining Operations – Alternative Approach

B.1. Alternative Regional Output Impact from CMCP Operation

In this Appendix, we provide an alternative method to calculate the regional impact of the project, by using the multipliers published by the Scottish government as a proxy for regional multipliers. The Scottish multipliers are of a magnitude that could be appropriate to capture the economic impact on an area the size of the North West of England, due to the similarity in GVA and population between the two regions. In 2019, North West England generated £188 billion GVA, while Scotland produced £147 billion[27]. The population in North West England was 7.3 million in 2019[28], while Scotland had 5.5 million residents.[29] Similar to the approach adopted to calculate the national impact of the project, we use the median multiplier from a list of sectors that we deem to be similar to CMCP's activities. Due to the different sector classifications used by the Scottish government, there are a total of five sectors considered. Table B.1 tabulates the list of sectors and their respective multipliers, and the last row contains the median value of the multipliers used for this analysis.

Table B.1: Candidate Sectors and Corresponding Multipliers

	Output		**GVA**		**Employment**	
	Type I	Type II	Type I	Type II	Type I	Type II
Coal and Lignite	1.52	1.70	1.81	2.21	1.48	1.70
Mining support	1.40	1.65	1.41	1.72	1.45	1.76
Construction	1.53	1.75	1.58	1.88	1.55	1.75
Oil & gas extraction, metal ores and other	1.45	1.60	1.60	1.86	1.55	1.76
Coke and refined petroleum	1.33	1.47	1.50	1.77	1.98	2.52
Median	1.45	1.65	1.58	1.86	1.55	1.76

Source: Scottish Government (2017), NERA Analysis.

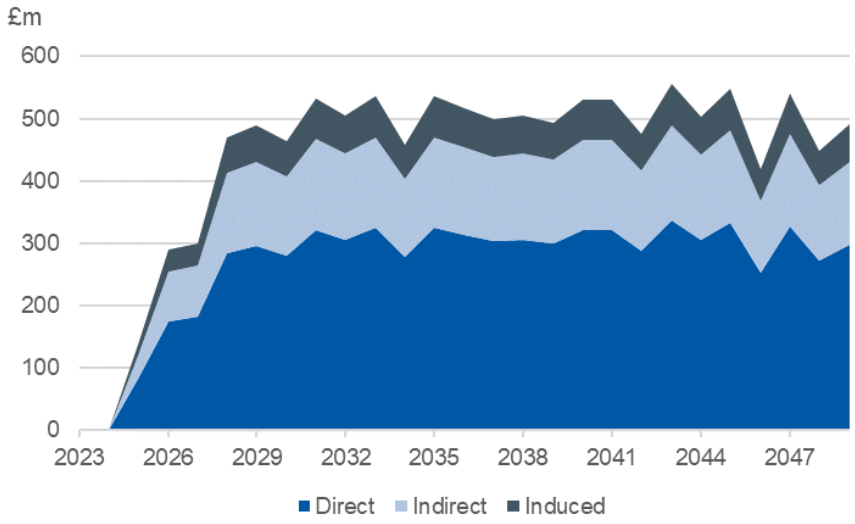
The output impact in Figure B.1 is calculated from the project revenue and the median output multipliers. The direct impact remains as the project output, which is around £264 million as discussed in Chapter 4.1.1. The indirect impact for the region is £119 million and the induced output impact in the region is £53 million.

[27] ONS (2021), Regional gross value added (balanced) by industry: all ITL regions.

[28] ONS (2020), Census Output Area population estimates.

[29] https://www.nrscotland.gov.uk/statistics-and-data/statistics/scotlands-facts/population-of-scotland

Figure B.1: Mining Operations Regional Output Impact

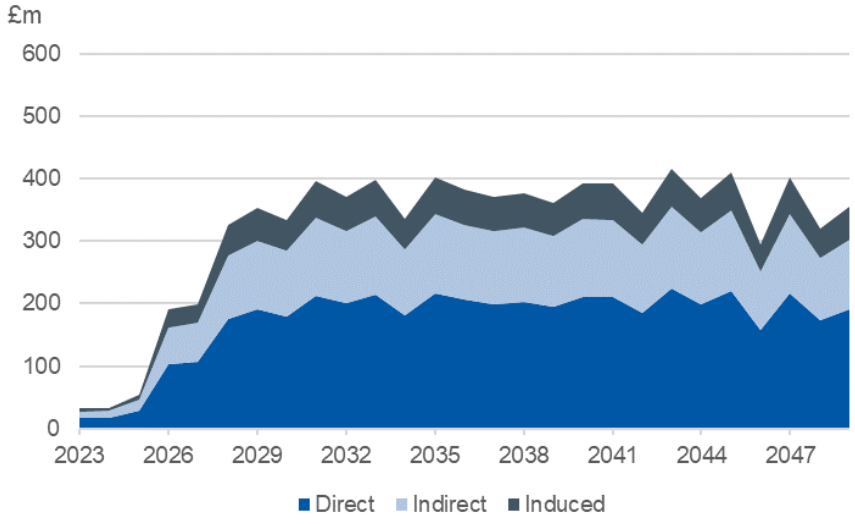


Source: West Cumbria Mining Financial Model, NERA Analysis.

B.2. Alternative Regional GVA Impact from CMCP Operation

The regional GVA impact calculated from the project GVA and the median multipliers is presented in Figure B.2 below. The project creates £100 million indirect GVA impact in the region, as well as £47 million induced GVA impact. The project increases the regional GVA by nearly £320 million per year on average during its operation.

Figure B.2: Mining Operations Regional GVA Impact



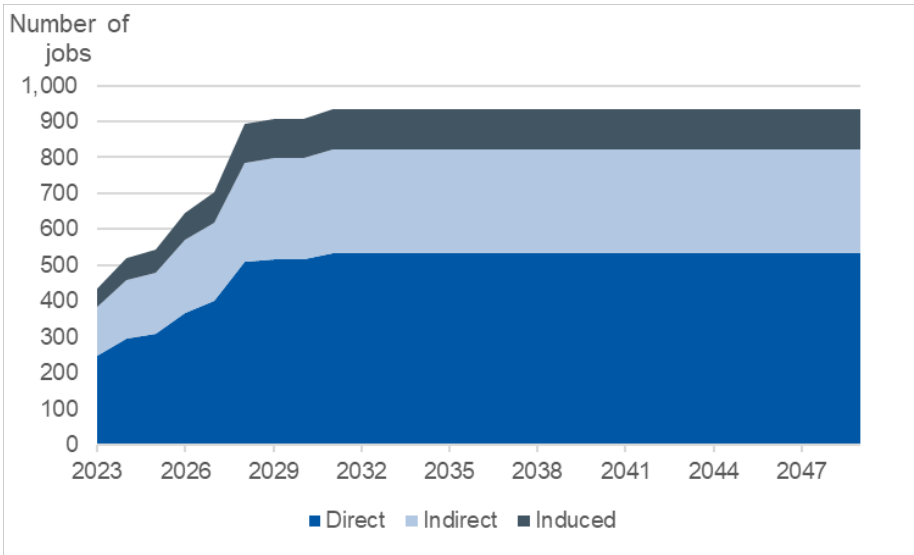
Source: West Cumbria Mining Financial Model, NERA Analysis.

B.3. Alternative Regional Employment Impact from CMCP Operation

Figure B.3 outlines the regional employment impact of the project. In addition to the 491 positions created directly by the project, about 269 indirect and 102 induced employment

opportunities arise in the region due to the project. The total number of jobs sustained in the region by the project on average each year is around 863.

Figure B.3: Mining Operations Regional Employment Impact



Source: West Cumbria Mining Financial Model, NERA Analysis.

Appendix C. Multiplier Regression Analyses

As we discuss in Section 3.4.2, ONS does not produce Type II multipliers. We have therefore relied on a statistical analysis, based on a simple linear regression of Scottish Type II to Type I multipliers, to derive UK-level Type II multipliers. We have undertaken similar analysis to derive UK-level effects multipliers.

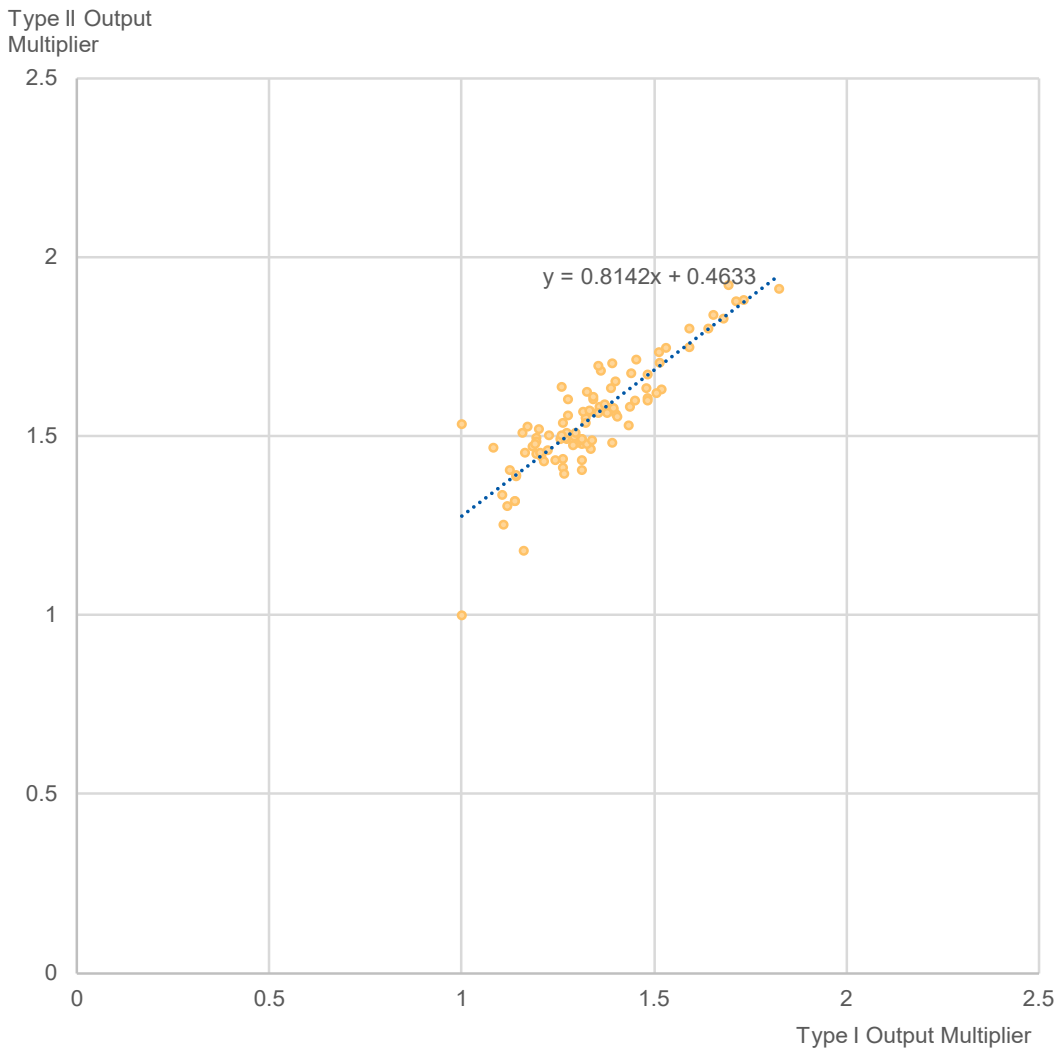
In what follows, we present the regression analyses for multipliers and effects multipliers along with a brief description of function of the multipliers.

C.1. Multiplier Regressions

Economic multipliers describe how output, GVA, or the number of jobs from an investment or a project ripple through the wider economy, supporting the project's supply chain and business downstream that depend on the income of the project's employees. These effects result in more output, GVA, and jobs in the region and UK overall than are the direct impact of the project on its own in isolation.

We present the scatter plots and regression analyses of the Scottish Type II to Type I multipliers below. We also provide a summary of all regressions results in Table C.1 and Table C.2 below.

Figure C.1: Scottish Type II to Type I Output Multiplier Regression Analysis

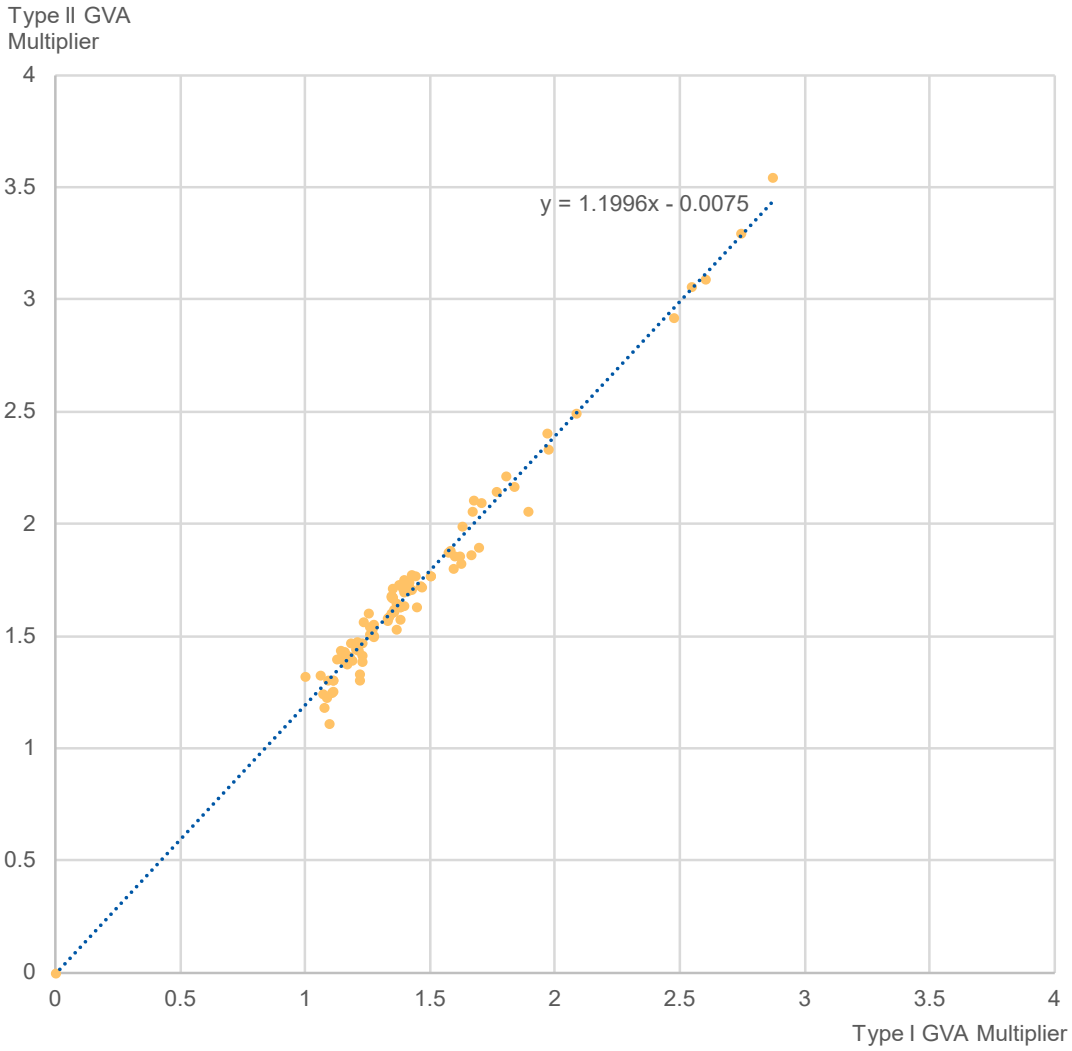


Source: Scottish Government, NERA Analysis

With one exception, Figure C.1 shows that Type II output multipliers for all sectors are greater than the corresponding Type I multiplier for that sector – as expected. (The exception shows the two multipliers as identical.) We use the coefficient and constant term shown in the equation above to calculate the UK-level Type II multipliers from the ONS-reported Type I multipliers.

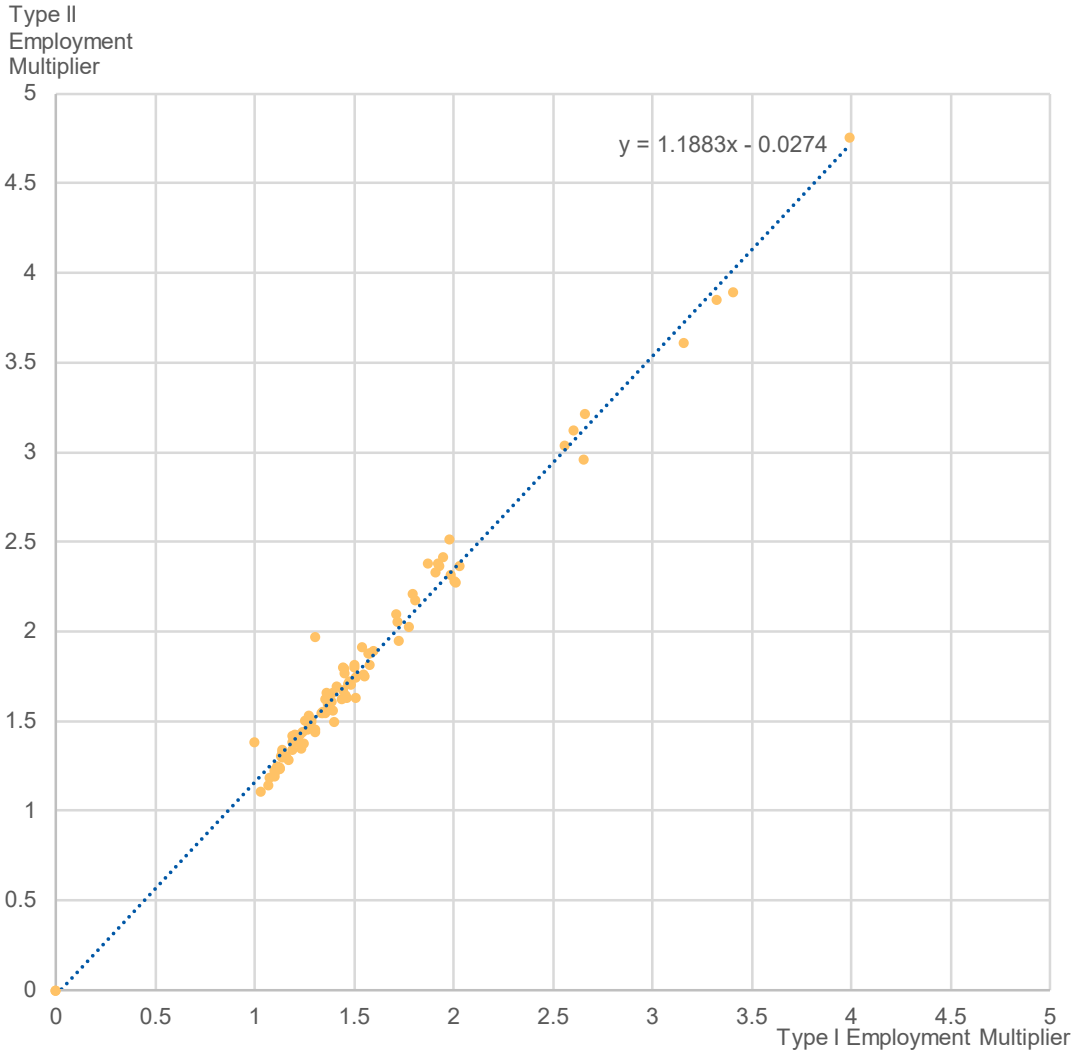
Figure C.2 shows a similar relationship between Type I and Type II GVA multipliers – the Type II values are typically 20% higher than their Type I counterparts.

Figure C.2: Scottish Type II to Type I GVA Multiplier Regression Analysis



Source: Scottish Government, NERA Analysis

Figure C.3: Scottish Type II to Type I Employment Multiplier Regression Analysis



Source: Scottish Government, NERA Analysis

Table C.1: Summary of Scottish Multiplier Regression Analyses

	Output	GVA	Employment
Intercept	0.46	-0.01	-0.03
Coefficient	0.81	1.20	1.19

Source: Scottish Government, NERA Analysis

To use these regressions results to derive Type II UK-based multipliers, we have proceeded as follows:

1. For each sector, we have obtained the specific Type I UK-based multiplier from ONS. For example, the Type I output multiplier for construction as published by the ONS is 1.915.
2. We have applied the specific regression equation to the Type I UK-based multipliers. For example, in the case of the output multiplier, we will use the equation displayed in Figure C.1 and described in Table C.1: Type II = 0.46 + 0.81 x Type I. In the case of the output multiplier for the UK construction sector, this yields a Type II multiplier of 2.011.
3. We have repeated this for all sectors and all multipliers to derive Type II UK-based output, employment, and GVA multipliers.

C.2. Effects Multiplier Regressions

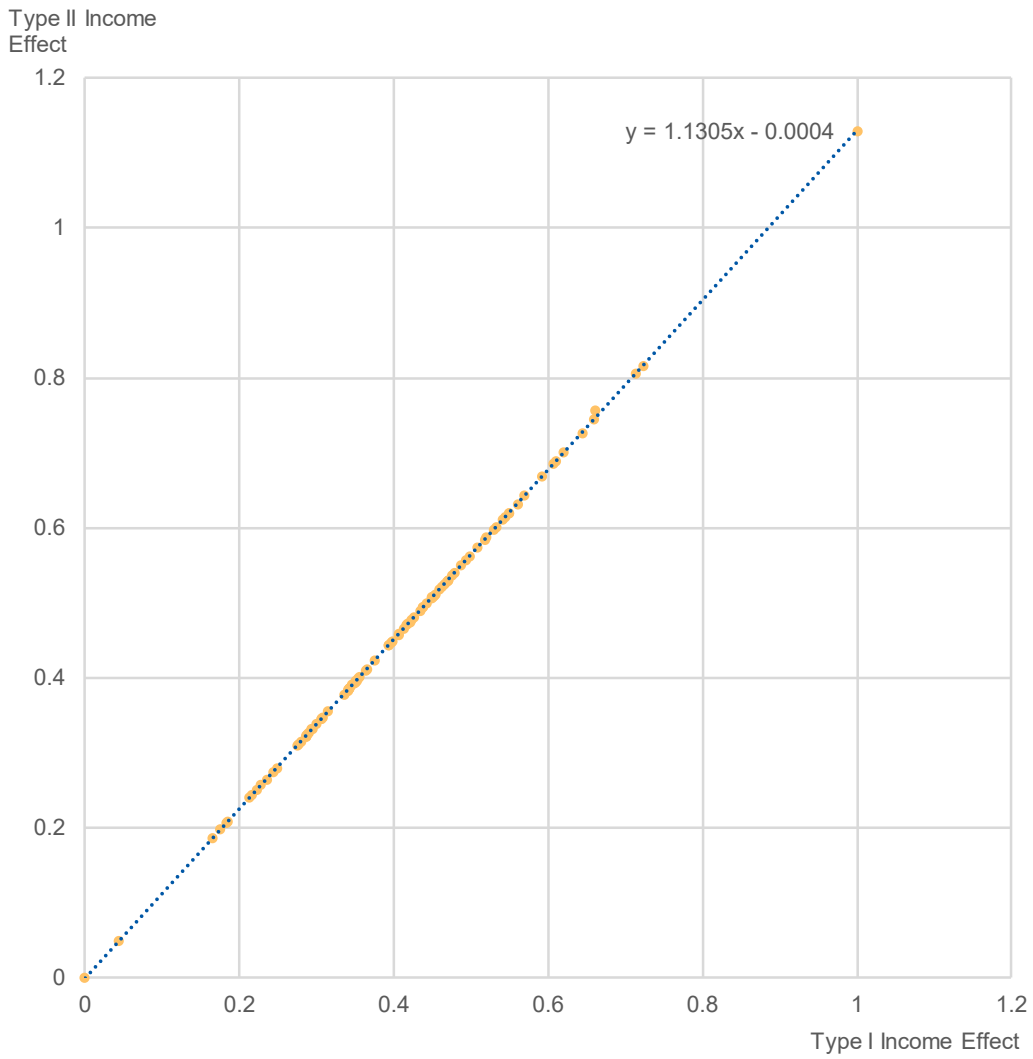
Effects multipliers differ slightly from the multipliers we describe above. Effects multipliers apply to *output*. They describe how much employment, GVA, or labour income will be created from every additional one million pounds of *output* from a particular sector of the economy. For example, the ONS Type I employment effects multiplier for Coal and Lignite is 10.01. This means that every 1 million pounds of output from the Coal and Lignite sector will sustain 10.01 jobs in the economy (including jobs directly in the Coal and Lignite sector, as well as "indirect jobs" in sectors supplying the Coal and Lignite sector).

We have used the labour income effects multipliers to estimate the induced output, GVA and employment impacts from CMCP employees' spending for the local and regional opex impact assessment (see Sections 6.2 and 6.3) as well as in the national sectoral opex impact assessment (see Appendix A). As already sketched above, to calculate the induced impact from CMCP employees, we have proceeded as follows:

1. Using the sectoral breakdown of CMCP's non-labour opex (which represents output for the various sectors in which the opex is spent), we have calculated the income impact for each input sector by multiplying the non-labour opex spent on each sector by the sector-specific Type II income effects multiplier. The Type II income effects multiplier reflects the impact of a change in output in a sector on employee wages paid in that sector and elsewhere in the economy (driven by both the indirect and the induced channels of impact discussed above). In what follows, we refer to the total Type II impact across all sectors as the "wage bill increase" attributable to CMCP's opex spending on its suppliers.
2. We then calculate the ratio of CMCP's own wage bill to the wage bill increase
3. Finally, we estimate the induced output, GVA, and employment impacts attributable to CMCP's employees by multiplying the induced expenditure, GVA, and employment impacts from CMCP's opex spending by this ratio.

We use the UK-based income effects multipliers to carry out this analysis. We present below the scatter plots and regression analyses of the Scottish Type II to Type I income effects multipliers which we have used to derive the UK-based Type II income effects multipliers. We also provide a summary table of the regression results in Table C.2 below.

Figure C.4: Scottish Type II to Type I Income Effects Multiplier Regression Analysis



Source: Scottish Government, NERA Analysis

Table C.2: Summary of Scottish Effects Multiplier Regression Analyses

	Labour Income Effect
Intercept	0.00
Coefficient	1.13

Source: Scottish Government, NERA Analysis

We have derived the Type II UK-based effects multipliers using the same method as we describe in Appendix C.1 to derive the Type II UK-based multipliers.

Qualifications, assumptions and limiting conditions

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Document No.2

This is document 2 referred to in the Appendix marked WCM/MAK/2 on the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442836v1

Mr Mark Kirkbride
West Cumbria Mining Limited,
Haig Mining Museum,
Solway Road,
Kells,
Whitehaven,
CA28 9BG.

Dear Mark,

Further to our discussions, we confirm that we have now submitted to you our finalised plant design and flow diagram. As requested, we have set out a summary of the process which was followed.

As you know this is a result of an extensive review of all of the datasets provided, following which we produced a design which is sufficiently flexible to accommodate changes in the raw coal feedstock as the mine develops and matures. We are aware (from historical sample data) that the coal further out to sea in the Cumbrian coalfield is observed to be of higher quality, and you have also indicated that a review of the planned phasing of mine workings is also likely to reduce specific raw coal parameters, including the ash and sulphur content.

We have investigated both the WCM and more historical Raw Coal analysis and can confirm that the design of plant that we have developed meets your defined client base requirements.

The enclosed drawing and design are issued for your approval; we shall of course continue to finalise the finer detailed design work and specific equipment selection.

The lab results from the Raw Coal analysis indicate that the target seams are metallurgical coal and we can confirm that this is suitable for the production of premium High Volatile 'A' Metallurgical Coal. We can confirm that the key output product coal parameters will meet the requirements of the proposed planning condition, which we understand to be in relation to sulphur in the final product and can confirm that the average sulphur content of the coal will not exceed 1.4% and that the maximum sulphur limit on plant output has been fixed at 1.6%.

Yours sincerely,

Adrian Parnaby & Mick Naylor

Adrian Parnaby and Michael Naylor

Document No.3

This is document 3 referred to in the Appendix marked WCM/MAK/2 on the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442851v1

WEST CUMBRIA MINING HIGH VOLATILE HARD COKING COAL INDICATIVE SPECIFICATION (Main Band) 2020

ISO STANDARDS

PROXIMATE ANALYSIS (air dried)	
Inherent Moisture	3.0%
Ash	<5%
Volatile Matter	32.0%
Fixed Carbon	>61%

S, P & HGI	
Total Sulphur (air dried)	<1.5%
Phosphorus (in coal)	<0.005%
Hardgrove Grindability Index	61

COKING PROPERTIES	
Ave. Free Swelling Index	8.1
Gieseler Fluidity	
Initial Softening Temp	407°C
Max Fluidity Temp	441°C
Solidification Temp	471°C
Plastic Range	64°C
Max Fluidity	30,000 ddpm
Audibert Arnu Dilatation	
Initial Softening Temp	362°C
Max Contraction Temp	399°C
Max Dilatation Temp	460°C
Max Contraction	24%
Max Dilatation	202%

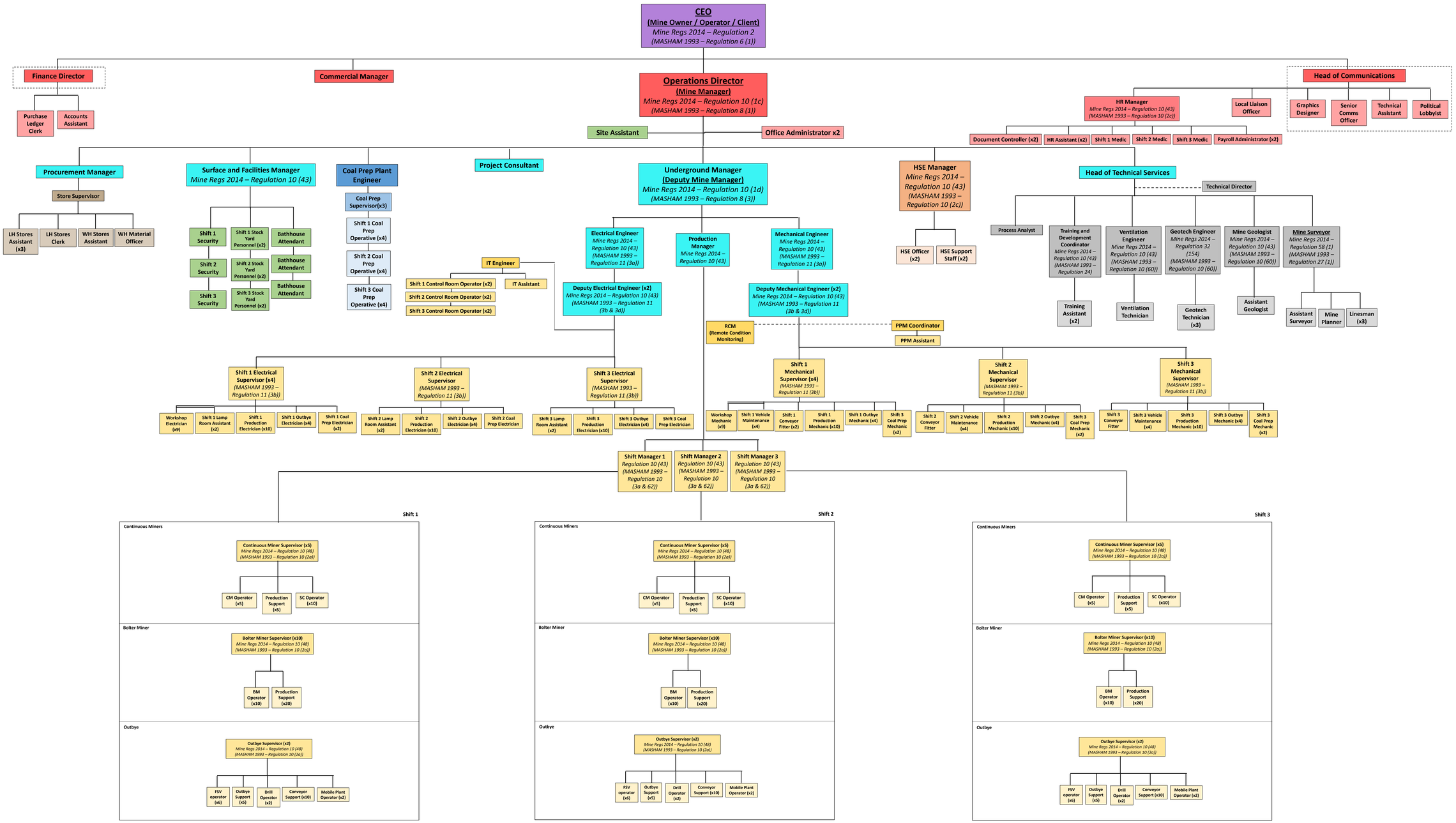
PETROGRAPHY	
Mean Max Vitrinite Reflectance	1.02%
Vitrinite	72%

ASH ANALYSIS (dry basis)	
SiO_2	36.15%
Al_2O_3	29.44%
Fe_2O_3	17.18%
CaO	6.52%
MgO	1.04%
Na_2O	1.14%
K_2O	0.56%
TiO_2	0.87%
Mn_3O_4	0.28%
SO_3	5.38%
P_2O_5	0.35%

Document No.4

This is document 4 referred to in the Appendix marked WCM/MAK/2 on the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442853v1



WEST CUMBRIA MINING

Total Numbers:
- Management – 95 (98)
- Underground – 313
- Surface – 117 (121)
- Total – 525 (532)

Day Worker Numbers:
- Management – 26 (29)
- Surface –59 (63)
- Total – 85 (92)

Crew 1 Numbers:
- Management – 27
- Underground – 105
- Surface – 20
- Total - 152

Crew 2 Numbers:
- Management – 21
- Underground – 104
- Surface – 19
- Total - 144

Crew 3 Numbers:
- Management – 21
- Underground – 104
- Surface – 19
- Total - 144

Symbol Definition:
- Day Shift Only
- Head Office Employee

06 MARCH 2021

Prepared	Approved
WCM - SZ	/
Training and Development Coordinator	/
/	/

WCM Operational Organogram

Document No.5

This is document 5 referred to in the Appendix marked WCM/MAK/2 on the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442839v1

Woodhouse Colliery Condensed Annual Cashflow

Condensed Annual Cashflow Model																														
			2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Year Counter (From Start of Model)	**Unit**	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Year Counter (From Start of Production)	**Unit**	**Total**				**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
ROM Coal (Air Dried Tonnes)	**mt**	**76.5**	**-**	**-**	**0.83**	**1.88**	**1.89**	**2.83**	**3.02**	**2.85**	**3.27**	**3.08**	**3.33**	**2.86**	**3.34**	**3.18**	**3.14**	**3.22**	**3.12**	**3.29**	**3.29**	**2.96**	**3.48**	**3.12**	**3.41**	**2.57**	**3.34**	**2.77**	**3.05**	**3.34**
HVA Coal Product (As-Received)	mt	67.7			0.78	1.64	1.67	2.58	2.69	2.55	2.92	2.78	2.94	2.52	2.94	2.84	2.75	2.78	2.71	2.91	2.91	2.61	3.06	2.77	3.01	2.30	2.97	2.47	2.69	2.94
HVA Coal Product (As-Received)	mt	54.2	-	-	0.6	1.3	1.3	2.1	2.2	2.0	2.3	2.2	2.4	2.0	2.4	2.3	2.2	2.2	2.2	2.3	2.3	2.1	2.4	2.2	2.4	1.8	2.4	2.0	2.2	2.4
HVB Coal Product (As-Received)	mt	13.5	-	-	0.2	0.3	0.3	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.6
Product Yield	%	75%			75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Coking Coal HVA Yield	**%**	60%	-	-	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*
Coking Coal HVB Yield	**%**	15%	-	-	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*
Revenue	**£m**	**7,455.6**	**-**	**-**	**83.1**	**175.6**	**181.8**	**284.4**	**296.4**	**280.9**	**322.1**	**306.0**	**324.2**	**277.9**	**324.5**	**312.6**	**302.7**	**306.1**	**299.2**	**320.9**	**320.8**	**288.2**	**336.9**	**305.2**	**332.3**	**253.2**	**327.8**	**271.7**	**297.0**	**324.0**
HVA	£m	6,339.0	-	-	70.1	148.5	154.3	241.9	252.0	238.9	273.9	260.2	275.8	236.3	276.0	265.8	257.5	260.3	254.5	272.9	272.8	245.1	286.6	259.6	282.6	215.3	278.7	231.1	252.6	275.6
HVB	£m	1,328.5	-	-	15.4	32.1	32.7	50.6	52.7	50.0	57.3	54.4	57.7	49.4	57.7	55.6	53.9	54.5	53.3	57.1	57.1	51.3	60.0	54.3	59.1	45.1	58.3	48.4	52.9	57.7
Operating Costs	**£m**	**(3,367.9)**	**(0.1)**	**(0.1)**	**(76.3)**	**(95.6)**	**(98.5)**	**(136.6)**	**(134.3)**	**(129.8)**	**(137.6)**	**(135.1)**	**(138.3)**	**(126.9)**	**(136.7)**	**(135.7)**	**(132.6)**	**(131.9)**	**(134.0)**	**(138.4)**	**(138.5)**	**(131.9)**	**(141.9)**	**(135.8)**	**(140.2)**	**(124.6)**	**(140.2)**	**(128.8)**	**(130.3)**	**(137.2)**
Operating Costs	£m	(3,533.5)	(0.1)	(0.1)	(77.4)	(100.3)	(103.4)	(143.5)	(141.0)	(136.3)	(144.5)	(141.9)	(145.2)	(133.2)	(143.5)	(142.5)	(139.2)	(138.5)	(140.7)	(145.3)	(145.4)	(138.5)	(149.0)	(142.5)	(147.2)	(130.8)	(147.2)	(135.2)	(136.8)	(144.0)
Sustaining CapEx	£m	(356.1)	-	-	(1.0)	(4.6)	(5.0)	(6.2)	(10.7)	(10.6)	(11.7)	(11.6)	(11.7)	(11.3)	(11.8)	(11.7)	(39.7)	(15.1)	(11.7)	(29.4)	(11.9)	(11.6)	(15.5)	(11.8)	(12.0)	(11.2)	(11.9)	(11.4)	(39.7)	(15.3)
Royalties (Land Use)	£m	(95.3)	(2.6)	(2.6)	(3.2)	(3.3)	(3.3)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.4)	(3.5)	(3.4)	(3.5)	(3.5)
Net WC Change	£m	(33.5)	0.0	-	(20.6)	(11.6)	(0.6)	(8.6)	(0.1)	(2.2)	3.5	10.6	(8.4)	10.2	(1.0)	3.7	(3.8)	(0.7)	8.9	(10.0)	(7.6)	18.7	(17.4)	8.1	(0.7)	14.1	(18.9)	10.2	4.8	(13.9)
Tax Payable	**£m**	**(597.6)**	**-**	**-**	**-**	**-**	**(4.9)**	**(17.7)**	**(22.6)**	**(20.3)**	**(26.1)**	**(23.3)**	**(25.8)**	**(19.0)**	**(30.3)**	**(28.6)**	**(23.3)**	**(26.2)**	**(26.5)**	**(27.1)**	**(30.4)**	**(25.5)**	**(32.1)**	**(28.0)**	**(32.2)**	**(20.5)**	**(31.4)**	**(23.1)**	**(23.6)**	**(29.2)**
Net Cashflow from Operating Activities	**£m**	**2,839.6**	**(2.7)**	**(2.7)**	**(19.1)**	**55.8**	**64.6**	**104.9**	**118.4**	**108.2**	**139.8**	**136.4**	**129.6**	**121.0**	**134.4**	**130.0**	**93.2**	**122.0**	**125.7**	**105.5**	**122.0**	**127.8**	**119.4**	**127.5**	**136.6**	**101.4**	**114.8**	**108.8**	**98.2**	**118.0**
Construction CAPEX up to Financial Completion	**£m**	**(241.7)**	**(94.7)**	**(111.5)**	**(35.5)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Site wide works	£m	(58.5)	(30.0)	(28.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mining Equipment	£m	(63.8)	(9.8)	(22.4)	(31.6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mine Construction	£m	(30.6)	(14.0)	(16.6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coal Prep Plant & Presses	£m	(23.9)	(11.7)	(12.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coal & Refuse Handling	£m	(24.4)	(11.9)	(12.5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Costs	£m	(15.8)	(7.8)	(7.6)	(0.3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Owner's CapEx Contingency @ 11.4%	£m	(24.8)	(9.7)	(11.5)	(3.6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Remaining Capex	**£m**	**(45.2)**	**-**	**-**	**(4.4)**	**(6.9)**	**(12.9)**	**(11.4)**	**-**	**(5.1)**	**(2.7)**	**(0.2)**	**-**	**-**	**-**	**(0.5)**	**(0.7)**	**(0.2)**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Rail Upgrade Capex (Scenario Analysis)	**£m**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**									
After Tax Free Cash Flow	**£m**	**2,513.1**	**(117.2)**	**(134.1)**	**(59.0)**	**48.5**	**52.2**	**93.4**	**118.4**	**103.1**	**137.0**	**136.1**	**129.6**	**121.0**	**134.4**	**129.5**	**92.5**	**121.8**	**125.7**	**105.5**	**122.0**	**127.8**	**119.4**	**127.5**	**136.6**	**101.4**	**114.8**	**108.8**	**98.2**	**118.0**
Cummulative	£m		(117.2)	(251.3)	(310.3)	(261.8)	(209.5)	(116.1)	2.2	105.4	242.4	378.5	508.1	629.2	763.6	893.1	985.5	1,107.4	1,233.1	1,338.6	1,460.5	1,588.3	1,707.7	1,835.2	1,971.9	2,073.3	2,188.1	2,296.9	2,395.0	2,513.1

Document No.6

This is document 6 referred to in the Appendix marked WCM/MAK/2 on the Proof of Evidence of Mark Kirkbride dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442837v1

10 August 2021

To Whom It May Concern,

Re: West Cumbria Mining

I, Peter Bradley, CEO of Javelin Commodities Ltd ("**Javelin**"), hereby confirm the following in terms of the working relationship implemented between Javelin and West Cumbria Mining Ltd ("**WCM**").

Introduction

For background, Javelin is a business which I co-founded in 2015. Javelin's management team consists of industry leading marketing, trading, operations and financing professionals. Combined with partners and shareholders in the mining, energy and steel sectors, Javelin has become one of the leading bulk and energy trading firms globally.

Javelin is a major trader of metallurgical coal, in particular US sourced metallurgical coal (including high volatile 'A' & 'B', medium and low volatile grades). We have extensive relationships with mining companies, steel companies, cokeries and logistic providers (e.g. rail, port, barge, truck, ocean freight) and work directly with almost all of the UK and European major steelmaking consumers.

Javelin – WCM Arrangement

In 2019, Javelin and WCM agreed to enter into an exclusive marketing and working capital arrangement. Javelin has a high level of confidence in a premium UK source of steelmaking coal and the long-term market demand for this sector critical product.

Under the proposed arrangement, Javelin will market 100% of WCM's production output to steelmaking customers in the UK and Europe, whilst also providing a significant multi-million-pound working capital facility to WCM which will significantly assist during the early years of the mine's production by reducing the payment time for coal deliveries from weeks to days.

Javelin has specialist skills in the shipping and transportation of bulk commodities to and from the UK and EU, plus expert capability in the assessment and trading of metallurgical coal – with intimate knowledge of the detailed technical specifications of such specialist coals.

Summary

Javelin remains fully supportive of the need for this project to proceed to construction and operation; there is a clear long term demand requirement and an alternative, local source of high volatile metallurgical coal would be strategically beneficial for the UK and EU steelmakers.

Yours faithfully,

Peter Bradley
Chief Executive Officer
Javelin Global Commodities (UK) Ltd

7 Howick Place, London, SW1P 1BB. Tel: +44 (0) 20 7123 5900
Company Number. 09489516

Former Marchon Site, Pow Beck Valley and area from Marchon Site to St Bees Coast, Whitehaven, Cumbria

Summary Proof of Evidence of Samuel Thistlethwaite

Prepared on Behalf of West Cumbria Mining Limited (Applicant)

Section 77 Public Inquiry following Call in direction from Secretary of State for Housing, Communities and Local Government

Cumbria County Council application reference: 4/17/9007

Application for development of a new underground metallurgical coal mine and associated development

Planning Inspectorate Reference: APP/H0900/V/21/3271069

10 August 2021

Former Marchon Site, Pow Beck Valley and area from Marchon Site to St Bees Coast, Whitehaven, Cumbria

Summary Proof of Evidence of Samuel Thistlethwaite

Prepared on Behalf of West Cumbria Mining Ltd (Applicant)

Barton Willmore LLP
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Ref: 32920/A5/ST
Date: 10 August 2021

Date of Inquiry	7th of September 2021
Venue:	Remote virtual
Inspector:	Stephen Normington
Planning Inspectorate Ref:	APP/H0900/V/21/3271069
Local Authority Ref:	4/17/9007

1.0 SUMMARY OF PROOF OF EVIDENCE

1.1 I am Samuel Thistlethwaite (BA Hons, MSc MRTPI), my proof of evidence directly addresses the following matters:

a) the extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change, flooding and coastal change in the NPPF (NPPF Chapter 14);

b) the extent to which the proposed development is consistent with Government policies for facilitating the sustainable use of minerals in the NPPF (NPPF Chapter 17);

c) the extent to which the proposed development is consistent with the development plan for the area.

The extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change, flooding and coastal change in the NPPF (NPPF Chapter 14);

1.2 Paragraph 152 of the NPPF is of most relevance to the WCM proposal at states that the planning system should support the transition to a low carbon future in a changing climate. Other relevant policies contained within the Chapter 14 of the NPPF are addressed in the main body of my proof of evidence.

1.3 In accepting the points that the demand for coking coal is likely to remain stable for the life of the application (to 2050), the focus of decision makers should be upon taking every viable step possible to transition towards reducing the carbon footprint of the critically essential coal that is needed.

1.4 The WCM proposals will do this, firstly, through the actions the applicant will take to minimise and offset emissions generated at the application site, so that there are no additional net Green House Gas emissions from the mine. These actions include the following:

a) A commitment to reduce and offset carbon emissions at the mine site down to net zero which is included in the proposed Section 106 Agreement.

b) State of the art modern mining facility operated predominantly by electrically powered mining equipment, supplied by renewable energy generation (via renewable energy tariff), secured through planning condition.

c) Inclusion of a methane capture system that will reduce methane emissions from the site by 95%, secured through planning condition.

d) Use of electrically powered underground conveyor to take coal from the Main Mine Site to the Rail Loading Facility avoiding the use of road transportation.

e) Use of rail infrastructure to transport the extracted coal, secured through planning condition.

f) 100% of all operational diesel equipment to be used will be fuelled by biodiesel with increasing transition to electrification powered through green energy tariff over the lifetime of the mine.

g) All company vehicles will be electric and be powered through green energy tariff from the start of the operational phase.

1.5 Secondly, through the supply of coal with a lower carbon footprint (measured as tonnes of CO2e emissions per tonne of saleable metallurgical coal) into the UK and European steel making markets compared to existing global sources of metallurgical coal (predominantly coming from the USA). The lower carbon footprint of the WCM coal will be because of the much-reduced transport route to the end user with significant savings in transportation carbon emissions. The WCM sourced coal will substitute the equivalent metallurgical coal currently being used in steel manufacturing processes in the UK and Europe.

1.6 Overall, the WCM proposals are consistent with the policy objectives of Chapter 14 of the NPPF.

The extent to which the proposed development is consistent with Government policies for facilitating the sustainable use of minerals in the NPPF (NPPF Chapter 17);

1.7 Paragraph 217 is the central policy test for coal extraction within Chapter 17 of the NPPF. The main body of my proof of evidence addresses the relevant remaining paragraphs from Chapter 17.

1.8 The policy test outlined in Paragraph 217 is a two-stage approach. Firstly, is the proposal environmentally acceptable or can be made so through the imposition of planning conditions or obligations.

1.9 Secondly, if in the view of the decision maker, the proposals cannot be made acceptable, then do the benefits the project creates clearly outweigh any residual environmental impacts that remain following mitigation.

1.10 It is my view, for reasons that are set out within the main body of my proof of evidence, that the proposed development can be made environmentally acceptable through the imposition of planning conditions and obligations contained within the S106 included within the SoCG. Therefore, the application complies with paragraph 217.

1.11 What constitutes what is and is not environmentally acceptable is not defined within the NPPF nor is there any guidance on the topic. In line with previous Planning Inspectors views on the matter [CD6.2], environmental acceptability is not no harm, nor is it no net harm, it is ultimately a matter of judgement from the decision maker based upon the information available to them.

1.12 Considering the scale and nature of the WCM proposals alongside the environmental effects relating to ecology, landscape, heritage and climate change, it is my view that the WCM proposals can be made environmentally acceptable through the imposition of planning conditions and obligations.

1.13 This position is further reinforced when considering that there are no standing objections from any of the statutory or local authority consultees.

1.14 The WCM proposals therefore comply with part a) of the policy test noted in paragraph 217 of the NPPF

1.15 However, if either the Inspector or the SoS reach a different conclusion in relation to part a) of paragraph 217 then the second limb part b) is enacted. If this is the view taken, then the following benefits apply to the proposal:

a) Significant employment benefits, including construction jobs, more than 500 direct jobs once the mine is fully operational, and over 1500 indirect jobs in the wider supply chain. I give substantial weight to this benefit.

b) Substantial investment into the local area, which suffers from high levels of deprivation and unemployment. I give substantial weight to this benefit.

c) Positive impact on the UK's balance of trade deficit and considerable additional tax revenues. I give substantial weight to this benefit.

d) The opportunity to reduce European reliance upon imported coking coal through product substitution, with all the associated environmental benefits. I give substantial weight to this benefit.

e) Securing the re-use, and ultimate restoration, of the former Marchon site. I give moderate weight to this benefit.

f) The completion of the restoration of Main Band colliery. I give moderate weight to this benefit.

g) The creation of additional footpath and cycleway improvements. I give slight weight to this benefit.

h) Contribution to improve local heritage assets. I give slight weight to this benefit.

i) Improvements to local habitats via the planting of trees within several areas of the red line boundary and the creation of new habitats on the main mine site, cumulatively creating biodiversity net gain. I have attached moderate weight to this benefit.

1.16 The benefits listed above clearly outweigh the scale of any potentially disputed environmental effects which are discussed earlier in this summary and in the main body of my proof of evidence. On the basis on this, the application proposals comply with the policy test outlined in paragraph 217 of the NPPF.

1.17 The WCM proposals also accords with the remaining policy objectives outlined in Chapter 17 of the NPPF.

The extent to which the proposed development is consistent with the development plan for the area.

1.18 The WCM proposals are consistent with the development plan for the site, which comprises both the Cumbria Minerals and Waste Local Plan (CMWLP) and the Copeland Local Plan (CLP) and its saved policies.

1.19 This position has been supported previously by Cumbria County Council (CCC) when it resolved on three separate occasions at planning committee to approve the WCM proposals.

1.20 No objections have been made to the proposals by any statutory, local planning or mineral planning consultees referring to any of the adopted or emerging local plan policies.

1.21 The application proposals are in accordance with the coal specific policy test within the CMWLP, Policy DC13.

1.22 The Preferred Options for the emerging CLP were issued on the basis that the WCM proposals had gained approval and as such the application proposals were listed as one of the main economic drivers for growth within the borough for the next plan period.

Conclusion

1.23 The application proposals comply with the relevant national and local level planning policies and will deliver significant benefits over the long term.

1.24 On this basis the application proposals should be allowed.

Signed: *Sam Thistlethwaite* Dated: 10/08/21

Former Marchon Site, Pow Beck Valley and area from Marchon Site to St Bees Coast, Whitehaven, Cumbria

Proof of Evidence of Samuel Thistlethwaite

Prepared on Behalf of West Cumbria Mining Limited (Applicant)

Section 77 Public Inquiry following Call in direction from Secretary of State for Housing, Communities and Local Government

Cumbria County Council application reference: 4/17/9007

Application for development of a new underground metallurgical coal mine and associated development

Planning Inspectorate Reference: APP/H0900/V/21/3271069

10 August 2021

Former Marchon Site, Pow Beck Valley and area from Marchon Site to St Bees Coast, Whitehaven, Cumbria

Proof of Evidence of Samuel Thistlethwaite

Prepared on Behalf of West Cumbria Mining Ltd (Applicant)

Barton Willmore LLP
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Ref: 32920/A5/ST
Date: 10 August 2021

Date of Inquiry	7th of September 2021
Venue:	Remote virtual
Inspector:	Stephen Normington
Planning Inspectorate Ref:	APP/H0900/V/21/3271069
Local Authority Ref:	4/17/9007

Contents

Appendices (Separately Bound)

- **Appendix 1 – Full assessment against remaining local plan policies and summary table**
- **Appendix 2 - The Headland Archaeology Scalegill Hall note**

1.0 EXPERIENCE, SCOPE AND QUALIFICATIONS

1.1 I am Samuel Thistlethwaite, Planning Associate of Barton Willmore LLP, based in the company's Newcastle upon Tyne offices. I have a degree in Geography and Town Planning and a Masters degree in Town Planning from Newcastle University. I have 16 years' relevant experience within the private sector, split between working as an in-house town planning advisor for a mining company and more latterly as an independent town planning consultant with Barton Willmore.

1.2 I have developed a specialism in working on large scale complicated energy, property, minerals and waste projects.

1.3 I began my career as an in-house planning advisor the Banks Group who are major developer of energy, property, waste and mineral projects. I led the production of multiple complex planning applications and Environmental Impact Assessments, which included several the large opencast coal sites, including the Highthorn proposals.

1.4 In 2016 I joined Wardell Armstrong where I continued to be involved in large scale mining and energy projects both in the UK and internationally.

1.5 I joined Barton Willmore in 2019 and in that time continued involvement in large-scale minerals and energy projects across the country. I am currently the lead minerals specialist with Barton Willmore.

1.6 I was the Regional Chair for the Royal Town Planning Institute (RTPI) in the North East in 2019. Up to 2020 a sat on the Regional Management Board, Regional Activities and Policy Committee. Up to earlier this year I was the Chair of the North East Regional Continuing Professional Development Committee.

1.7 I have provided several professional development seminars on behalf of the RTPI and the Royal Institute of Chartered Surveyors (RICS) in relation to mineral planning matters.

This Proof of Evidence

1.8 I have prepared this Proof of Evidence on behalf of the applicant West Cumbria Mining Ltd (WCM). The applicant controls the land and mineral rights for the land within the application boundary. In addition to this the applicant also controls (blue land) as shown on drawing 869/AP/001 Rev F - Location Plan & Planning Application Boundary [CD1.1].

Scope of Evidence

1.9 I will be presenting evidence in relation to all relevant planning policy matters and in particular planning matters raised by the Secretary of State and his appointed Planning Inspector in respect of WCM's application for its site in Whitehaven.

1.10 My evidence has full regard to the information submitted to date in relation to the application.

Statement of Truth

1.11 The evidence I shall provide to the Inquiry as contained in this Proof of Evidence has been prepared and is given in accordance with the guidance of the RTPI. The opinions expressed are my true and professional opinions. In providing expert evidence to the Inquiry I am fully aware that my duty is to the Inquiry and to provide my honestly held professional view, irrespective of by whom I am employed.

2.0 INTRODUCTION

2.1 This proof of evidence has been prepared on behalf of West Cumbria Mining in relation to Section 77 Public Inquiry appeal regarding its proposed site south of Whitehaven ('the Application Site'). The site is also referred to as the Woodhouse Colliery or the WCM proposals throughout this proof of evidence.

2.2 This evidence addresses Cumbria County Council planning application reference 4/17/9007.

Description of proposed development

2.3 The application subject of this call-in public inquiry seeks full planning permission for the following (October 2020 Cumbria County Council Planning Committee) [CD4.5].

> ***"A new underground metallurgical coal mine and associated development including the refurbishment of two existing drifts leading to two new underground drifts; coal storage and processing buildings; office and change building; access road, ventilation, power and water infrastructure; security fencing; lighting; outfall to the sea; surface water management system and landscaping at former Marchon site (High Road) Whitehaven;***
>
> ***A new coal loading facility and railway sidings linked to the Cumbrian Coast Railway Line with adjoining office / welfare facilities; extension of railway underpass; security fencing, lighting; landscaping; construction of temporary development compound, and associated permanent access on land off Mirehouse Road, Pow Beck Valley, south of Whitehaven;***
>
> ***A new underground coal conveyor to connect the coal processing buildings with the coal loading facility"***

Chronology of application determination

2.4 The applicant's Statement of Case [CD15.1] (paragraphs 22 to 63) provides a detailed summary of the application's chronology.

Summary of the key points raised in this proof

2.5 This Proof expands upon the relevant points and matters raised within the applicants Statement of Case [CD15.1], which include the following:

- The application complies with the key policy tests outlined paragraph 217 of the National Planning Policy Framework (NPPF) and Policy DC13 of the Cumbria Minerals and Waste Local Plan (CMWLP).
- The application site will not result in any unacceptable environmental impacts, notwithstanding this, the scale of the benefits created by the project will clearly outweigh any potentially disputed environmental impacts.
- The application proposals are wholly consistent with Chapters 14 and 17 of the NPPF.
- The application proposals are in accordance with the local development plan for the site.

2.6 Please note that all NPPF references refer to July 2021 update.

Structure of the Proof

2.7 My Proof of Evidence consists of this document and its appendices. I refer to the SoCG and Core Documents [CD].

2.8 The structure of my Proof is as follows:

- Section 3 - Matters on which the Secretary of State wishes to be informed.
- Section 4 – The extent to which the application is consistent with NPPF Chapter 14.
- Section 5 – The extent to which the application is consistent with NPPF Chapter 17.
- Section 6 – The extent to which the application is consistent with the development plan; and
- Section 7 – Planning Balance and Conclusions.

3.0 MATTERS ON WHICH THE SECRETARY OF STATE WISHES TO BE INFORMED

3.1 The application was recovered by the Secretary of State (SoS) for determination in a letter dated the 11 March 2021.

3.2 In setting out his justification for calling-in of the application, on the information available to him at that time, the SoS particularly wished to be informed about the following matters for the purposes of his consideration of the application:

a) the extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change, flooding and coastal change in the NPPF (NPPF Chapter 14).

b) the extent to which the proposed development is consistent with Government policies for facilitating the sustainable use of minerals in the NPPF (NPPF Chapter 17).

c) the extent to which the proposed development is consistent with the development plan for the area; and

d) any other matters that the Inspector considers relevant.

3.3 In relation to the point d), in his Pre-Conference Note, Planning Inspector Stephen Normington stated that other relevant matters may include:

- The effects of the proposed development on the character and appearance of the area.
- The effects of the proposed development on the local amenity and living conditions of nearby residents with regard to users of public rights of way.
- The effects of the proposed development on biodiversity.
- The effects of the proposed development on heritage assets.
- The effects of the proposed development on tourism and recreation.
- The need for the coal having regard to likely future demand for use in the steel industry and the supply of the mineral.
- The effects of the proposed development on employment and the local and national economy.
- Whether the proposed development would be environmentally acceptable or could be made so by planning conditions/obligations, and if not, whether national, local or community benefits would clearly outweigh the likely impacts.

3.4 These abovementioned other relevant matters remained unchanged following the Case Management Conference.

3.5 This proof of evidence addresses the following matters either originally set out by the SoS or subsequently outlined by the Inspector:

a) the extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change, flooding and coastal change in the NPPF (NPPF Chapter 14).
b) the extent to which the proposed development is consistent with Government policies for facilitating the sustainable use of minerals in the NPPF (NPPF Chapter 17).
c) the extent to which the proposed development is consistent with the development plan for the area.

3.6 In relation to other matters subsequently set out by the Inspector:

- Whether the proposed development would be environmentally acceptable or could be made so by planning conditions/obligations, and if not, whether national, local or community benefits would clearly outweigh the likely impacts.

3.7 The above matter is the same test that is described in paragraph 217 of the NPPF which is addressed in Section 5 of the proof onwards.

3.8 Detailed discussion of the other matters not directly addressed in this proof are provided in specialist evidence on these matters. The conclusions on these, alongside my own assessment, will be used to inform an overall planning balance on the project.

4.0 THE EXTENT TO WHICH THE APPLICATION IS CONSISTENT WITH NPPF CHAPTER 14

4.1 Chapter 14 of the NPPF – *Meeting the challenge of climate change, flooding and coastal change*, sets out a series of policy measures relevant to both the determination of planning applications and the formulation of local plan policies.

4.2 The chapter runs from paragraph 152 to paragraph 173 of the NPPF.

4.3 Paragraph 152 outlines that the planning system should support the transition to a low carbon future in changing climate, taking full account of flood risk and coastal change. This overarching policy is relevant to the WCM proposal and is expanded upon below.

4.4 Paragraphs 153 provides policy on how local plans should approach the inclusion of policies that mitigate and adapt to climate change and encourage the use and supply of renewable and low carbon energy and heat. These policies are not directly applicable to the WCM proposal.

4.5 Paragraph 154 sets out that new development should be planned in ways a) avoids increased vulnerability to the impacts of climate change and b) can help reduce greenhouse gas emissions. Part b) of this policy requirement is directly applicable to the WCM proposal.

4.6 Paragraph 155 sets out steps that local plans should take to encourage the use and supply of renewable and low carbon energy. The WCM proposals have committed to using a renewable energy tariff to supply the electricity it will use at the application site. This detail is contained within condition 101 of the signed Statement of Common Ground (SoCG).

4.7 Paragraph 156 sets out a policy that encourages local planning authorities to support community-led initiatives for renewable and low carbon energy schemes. This policy objective is not directly applicable to the WCM proposal.

4.8 Paragraph 157 states that local planning authorities should expect new development to comply with relevant development plan policies for decentralised energy supply. Paragraph 157 also states that planning authorities should consider layout and how building orientation, massing and landscaping can minimise energy consumption. This policy is relevant to the WCM proposals but is largely addressed in discussions regarding other paragraphs within Chapter 14, particularly paragraph 152.

4.9 Paragraph 158 provides a policy that planning authorities should follow when determining applications for renewable and low carbon energy. This policy is not directly applicable to the WCM proposal.

4.10 Paragraphs 159 to 169 address policy matters relating to planning and flood risk. These policy objectives are not directly applicable to the WCM proposal as the scheme is unaffected by flood risk [CD1.119 to CD1.121].

4.11 Paragraphs 170 to 173 address policy matters relating to coastal change. The WCM proposal will have no effect upon coastal change or erosion. This section of Chapter 14 of the NPPF is not directly applicable to the WCM proposals.

4.12 Based on the above, the policy objectives contained within paragraphs 152, 154 b), 157 and 158 of Chapter 14 of the NPPF are the most pertinent to the WCM proposals.

4.13 It is consistency with these most relevant policy requirements that the WCM proposal should be judged against when considering its consistency or otherwise with Chapter 14 of the NPPF.

Paragraph 152 of Chapter 14 the NPPF

4.14 Paragraph 152 of the NPPF is of most relevance to the WCM proposal which states:

> ***152. The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.***

4.15 The proof of evidence produced by Ms Leatherdale [WCM/CL/1] explains the effect of the WCM proposals upon climate change. In addition Mr Tonks [WCM/WLT/1], an expert in emissions from coal mining, outlines in more detail the measures to be employed on site to avoid, reduce and mitigate Green House Gas (GHG) emissions.

4.16 A key part of the policy wording in paragraph 152 is the reference to supporting the "transition" to a low carbon future. This approach does not expect a total removal of all carbon emissions, but rather the policy states that, where possible, developments that have the potential to lower carbon emissions from below their current levels should be supported.

4.17 The WCM proposal will do this in relation to the provision of metallurgical coal. As addressed in the proof of evidence of Mr Truman [WCM/JT/1] there are no commercially viable alternatives that can completely replace the use of metallurgical coal in the production of steel. Mr Truman notes that this is most likely to remain the case for the duration of the life of the WCM proposals, and possibly beyond.

4.18 Similarly, the evidence produced by Mr Truman demonstrates that demand for steel is likely to remain steady for the life of the WCM proposals. On this basis there is likely to continue to be a strong demand for metallurgical coal over the life of the WCM proposals [WCM/JT1].

4.19 The WCM proposals provide an opportunity to reduce materially the carbon footprint of the metallurgical coal being used by steel manufacturers in the UK and Europe in the future. This level of saving is quantified within the proofs of evidence of Ms Leatherdale [WCM/CL/1] and Mr Truman [WCM/JT/1].

4.20 This approach is wholly consistent with paragraph 152 as the WCM proposals will provide transitional arrangement, with a lower carbon footprint, to a point when other technologies, such as hydrogen, become a realistic replacement to the continued use of metallurgical coal, a point anticipated as being beyond the end the date of the WCM scheme in 2049.

4.21 The WCM proposals will reduce the carbon footprint of metallurgical coal at two different stages.

4.22 Firstly, through the actions the applicant will take to minimise and offset emissions at the application site, so that there are no additional net GHG emissions from the mine. These actions include the following:

a) A commitment to reduce and offset carbon emission at the mine site down to net zero which is included in the proposed Section 106 Agreement.

b) State of the art modern mining facility operated predominantly by electrically powered mining equipment, powered using renewable energy (via renewable energy tariff), secured through planning condition.

c) Inclusion of a methane capture system that will reduce methane emissions from the site by 95%, secured through planning condition.

d) Use of electrically powered underground conveyor to take coal from the MMS to the RLF avoiding the use of road transportation.

e) Use of rail infrastructure to transport the extracted coal, secured through planning condition.

f) 100% of all operation diesel equipment to be used to be fuelled by biodiesel with increasing transition to electrification powered through green energy tariff over the lifetime of the mine.

g) All company vehicles will be electric and be powered through green tariff from the start of the operational phase.

4.23 Secondly, through the supply of coal with a lower carbon footprint (measured as tonnes of CO2e emissions per tonne of saleable metallurgical coal) into the UK and European steel making markets compared to existing global sources of metallurgical coal (predominantly coming from the USA). The lower carbon footprint of the WCM coal will be because of the much-reduced transport route to the end user with significant savings in transportation carbon emissions. The WCM sourced coal will substitute the equivalent metallurgical coal currently being used in steel manufacturing processes in the UK and Europe.

4.24 In my judgement the WCM proposals are in full accordance with paragraph 152 of the NPPF. The above details also show how the WCM proposals are consistent with the requirements of paragraph 157 of the NPPF.

Paragraph 154 b) of Chapter 14 of the NPPF

4.25 Paragraph 154 of the NPPF states:

4.26 New development should be planned for in ways that:

a) 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; and

b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for

the sustainability of buildings should reflect the Government's policy for national technical standards.

4.27 On a largescale, WCM's location, within the UK, will reduce carbon emissions when compared to the continued use of metallurgical coal in the UK and Europe, which is currently sourced from further afield (predominantly the USA). This point is examined in more detail in the proof of Mr Truman [WCM/JT/1].

4.28 The design features and GHG mitigation listed in relation to paragraph 152 also highlight the how the design of the scheme will reduce GHG emissions.

4.29 The WCM proposals are in accordance with paragraph 154 of the NPPF.

Paragraph 158 of Chapter 14 of the NPPF

4.30 Paragraph 158 (a and b) of the NPPF states:

> ***In determining planning applications, local planning authorities should expect new development to:***
>
> ***a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and***
> ***b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.***

4.31 The WCM proposals will include an element of decentralised energy supply through the capture and use of the methane generated by the mine. This will be possible from year 4 of the mine's planned operational period. I refer to the proof of evidence of Mr Tonks [WCM/WLT/1] for further details of the methane capture proposals.

4.32 Overall, the WCM proposals are consistent with the objectives of Chapter 14 of the NPPF.

5.0 THE EXTENT TO WHICH THE APPLICATION IS CONSISTENT WITH NPPF CHAPTER 17

5.1 Chapter 17 of the NPPF titled "Facilitating the sustainable use of minerals" sets out policies that cover both the creation of minerals policies within relevant local plans and provide a framework for the determination of minerals planning applications.

5.2 The paragraphs of Chapter 17 of the NPFF that are of most relevant to the WCM proposal are:

a) Paragraph 209.
b) Paragraph 211 and it's sub paragraphs b), c), e).
c) Paragraph 209 and its sub paragraphs d), e), f); and
d) Paragraph 217.

5.3 The following section of this proof of evidence reviews the proposals against the policy objectives outlined in the abovementioned paragraphs of Chapter 17 of the NPPF.

Paragraph 209 of Chapter 17 of the NPPF

5.4 Paragraph 209 of the NPPF states:

> ***"It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation."***

5.5 Annex 2 of the NPPF defines both shallow and deep mined coal as being a mineral resource of local and national importance, necessary to meet society's needs. No distinction is made in policy or supporting planning guidance between thermal coal and metallurgical or coking coal.

5.6 The European Union (EU) has classed coking coal as critical raw material in 2020 [CD9.14]. Paragraph 209 refers to minerals being supplied to meet the Union's needs, however this declaration from the EU underlines the scarcity of viable coking coal mineral resources within the wider European context.

5.7 The UK is almost wholly dependent upon the importation of coking coal to support its steel making industry. In 2017 the UK produced 39,000 tonnes of coking coal out of the total 3,180,000 used within the UK Steel plants [CD4.1 para 6.407]. The UK government considers the UK steel industry to be "vital" to the country.

5.8 This is the equivalent to only 1.2% of the country's coking coal needs being met by minerals that are recovered from within the UK in 2017.

5.9 The UK is almost wholly dependent upon imports of coking coal to meet its steel manufacturing demand.

5.10 The international demand for coking coal has been outlined by Wood Mackenzie [CD1.73]. The report explains that global demand for coking coal is likely to remain broadly stable during the life of the site (to 2050). The proof of evidence of Mr Truman [w provides further information in respect of the future market forecasting of the demand of coking coal in the steel making process.

5.11 The report splits demand for coking coal into two different types; Hard Coking Coal (HCC) and Semi-Soft Coking Coal (SSCC). More details on the difference between these coal types is provided in the Wood Mackenzie report [CD1.73]. The application site will only produce HCC.

5.12 The report explains that over the life of the site, whilst demand for HCC in both Europe and the UK will fall gradually, there will still be a significant demand in both areas by 2050. This demand is predicted to be 85.1 million tonnes per annum by 2050. Of this volume, demand in the UK is predicted to be 1.2 million tonnes per annum.

5.13 The HCC recovered from the application site will be supplied into the UK and European steel making markets, meeting the above-mentioned demand for the life of the proposed site.

5.14 In the absence of the application scheme, the UK will continue to be unable to provide a supply of minerals to support the steel making industry in this country. For a detailed explanation of the current and predicted need and demand for coking coal in the UK and Europe, please see the proof of evidence of Mr Truman [WCM/JT/A].

5.15 Allowing this situation to remain the case is fundamentally contrary to the policy objectives outlined in paragraph 209 as there will not be a sufficient supply of the coking coal mineral resource to meet the country's needs.

5.16 The application site will provide approximately 180,000 tonnes annually over the life of the site to the existing steel manufacturing plants in the UK. This volume will meet a significant portion of the UK's coking coal needs.

5.17 Due to the nature of blending and requirements for different coal types and the accessible geology deposits across the UK, this is close to the maximum volume of coking coal that could be supplied into the UK market by the project.

5.18 There are no other projects elsewhere that I am aware of within the UK that are in the planning system that will provide further sources of coking coal. Therefore, the application site is the only opportunity to ensure that the policy objective (ensuring sufficient supply of minerals for the nation's needs) outlined in Paragraph 209 can be achieved in relation to coking coal and steel production.

5.19 The demand for steel is discussed further in Mr Truman's proof of evidence however it is clear that steel is an essential element of many different infrastructure, building and energy projects as well as being a key component in the manufacture of many essential goods and products.

5.20 The second sentence of Paragraph 209 refers to the "best use" being made of the mineral resources. This is included to ensure that mineral resources extracted are used for their best intended use and any unnecessary extraction is avoided.

5.21 The need for coking coal that the application site will provide has been demonstrated as being acute and critical [CD9.14]. There are no other uses for coking coal aside from being used in the steel making process. It therefore follows that the best use of the coal extracted from the application site is to be used as part of the steel making process. This "best use" of the coal extracted from the site is secured through a draft condition (Condition 4 of the planning conditions listed in SoCG), which states that only coal suitable for use as High Vol A Coal suitable for use in steel manufacturing can be extracted from the site.

5.22 The application proposal is wholly in accordance with paragraph 209 of Chapter 17 of the NPPF.

5.23 The project will supply a mineral resource that is of local and national importance, meeting a demand which is currently being unmet by indigenous sources.

5.24 The best use of the coking coal extracted from the site is within the steel making process, where demand for the mineral resource both within the UK and Europe is critical and undersupplied [CD9.14].

Paragraph 211 of Chapter 17 of the NPPF

5.25 Paragraph 211 of the NPPF states:

> ***When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy[71]. In considering proposals for mineral extraction, minerals planning authorities should:***
>
> ***a) as far as is practical, provide for the maintenance of landbanks of non-energy minerals from outside National Parks, the Broads, Areas of Outstanding Natural Beauty and World Heritage Sites, scheduled monuments and conservation areas;***
>
> ***b) 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;***
>
> ***c) ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties;***
>
> ***d) not grant planning permission for peat extraction from new or extended sites;***
>
> ***e) provide for restoration and aftercare at the earliest opportunity, to be carried out to high environmental standards, through the application of appropriate conditions. Bonds or other financial guarantees to underpin planning conditions should only be sought in exceptional circumstances;***
>
> ***f) consider how to meet any demand for small-scale extraction of building stone at, or close to, relic quarries needed for the repair of heritage assets, taking account of the need to protect designated sites; and***

g) recognise the small-scale nature and impact of building and roofing stone quarries, and the need for a flexible approach to the duration of planning permissions reflecting the intermittent or low rate of working at many sites. (underlining added).

5.26 Footnote 71 of the NPPF states that great weight should be given to the benefits of mineral extraction, including to the economy:

"Except in relation to the extraction of coal, where policy at paragraph 217 of this Framework applies"

5.27 The policy approach outlined in paragraph 217 of the NPPF and the interpretation of footnote 71 are discussed later in this section of the proof. It is worth noting at this stage that the footnote does not preclude great weight being given, it simply means that there is no automatic policy presumption, i.e., in respect of coal, each case must be assessed on its own merits. This position of interpretation of footnote 71 is shared by the CCC as set out in paragraph 36 of the signed Statement of Common Ground (SoCG) between the applicant and the MPA.

5.28 Sub paragraph a) of paragraph 211 relates to the maintenance of landbanks for non-energy minerals and is not relevant to the WCM proposal.

5.29 Sub paragraph d) of paragraph 211 of the NPPF provides a clear restriction upon the granting of planning permission for new or extensions to existing peat extraction sites and is not applicable to the WCM proposal.

5.30 In relation to peat extraction, a clear policy decision has been made in the NPPF to restrict the development of further peat extraction proposals and effectively create a moratorium against that activity from occurring in the future.

5.31 This demonstrates that where it is deemed necessary to do so by government policy makers, the NPPF can be used as tool to prohibit an activity, in this case, peat extraction.

5.32 This prohibitive approach has not been applied to the extraction of coal, the extraction of which is specifically addressed paragraph 217 of the NPPF.

5.33 Sub paragraphs f) and g) of paragraph 211 relate to the specific policy considerations associated with the extraction of building stone. These sub paragraphs are not relevant to the WCM proposal.

5.34 Sub paragraphs b), c) and e) of paragraph 211 are of most relevance to the WCM proposal, the requirements of each are discussed below:

Sub paragraph b) of paragraph 211 – natural and historic environment, human health, aviation and cumulative effects

5.35 Sub paragraph b) of the paragraph 211 states that local planning authorities should, in considering planning applications, ensure that there are no adverse impacts upon the natural and historic environment, human health and aviation safety.

5.36 The effect of the WCM proposals on the natural environment and ecology are comprehensively addressed in the proof of evidence produced by Dr Shepherd [WCM/PS/1] who concludes that the WCM will not result in any unacceptable adverse impact upon the natural environment.

5.37 Similarly, the proof prepared by Mr Flannery [WCM/JF/1] has considered the visual impact and the effects of the scheme upon nearby receptors and has concluded that the WCM proposal will not result in any unacceptable adverse landscape or visual effects.

5.38 In relation to impacts of the application upon human health, no objections have been raised against the proposals by Copeland Borough Council Environmental Health Department (CBC EHD) or by the Environment Agency on human health grounds. At no point during the multiple consultation stages undertaken on the project have either organisation objected to the proposals on human health impact grounds.

5.39 The CBC EHD responses outlined a series of conditions that were to be included within any planning consent to minimise the effect of the proposal upon human health. These have been included within the list of conditions contained within the signed SoCG.

5.40 Hitherto neither Rule 6 party have included the direct impact of the proposals upon human health within their statements of case [CD15.3 and CD15.4]. At this stage it is reasonable to conclude that this is not a point of dispute between the parties.

5.41 Based on the above, taking account of the independent consideration from the statutory consultees responsible for assessing a developments effect upon human health, the WCM proposals will have no unacceptable impacts upon public health.

5.42 Unacceptable aviation impacts associated with mineral developments normally arise in relation to the development of open water bodies, usually at restoration, which may present a risk increased likelihood of bird strike on low flying aircraft. The matter of aviation safety is not applicable to the WCM proposals.

5.43 Through the consultation process of the application four developments had been highlighted which may have had the potential to create cumulative impacts. These developments are outlined by CCC [CD4.5 paragraph 7.227].

5.44 The issue of cumulative effect in relation to Landscape is addressed by Mr Flannery. His proof of evidence confirms that the proposal will not have any unacceptable cumulative visual impacts.

5.45 The cumulative effect upon the highway network is also being re-assessed to take account of the passage of time and changes to the previously considered schemes, in particular the Nu Gen proposals which have now been removed. At the time of writing, this modelling is still being undertaken and the results will be included within the forthcoming Regulation 22 submission.

5.46 Based on the above the WCM proposal complies with the policy objectives of sub paragraph b) of paragraph 211 of the NPPF.

5.47 This position is shared by CCC which agreed that the cumulative effects of the WCM proposal were acceptable (paragraph 66 of the SoCG).

Sub paragraph c) of paragraph 211 – noise, dust and vibration

5.48 Sub paragraph c) of paragraph 211 of the NPPF states that local planning authorities should ensure that an unavoidable noise, dust and blasting induced vibrations are controlled, mitigated or removed at source.

5.49 The fundamental point within this part of the policy is that the mitigation should be undertaken at the source of the potential noise, dust and vibration emissions. This is opposed to mitigating at the receptor (e.g., a residential premises) or failing to mitigate any emissions at all.

5.50 Unlike typical mining activities that take place at the surface, such as sand and gravel or hard rock quarries, the entire extraction, processing and mineral haulage process at the WCM site is enclosed (either underground or within the proposed buildings at the surface of the MMS).

5.51 This is a principal design feature of the WCM proposal which comprehensively mitigates noise and dust emissions as close as possible to the source.

5.52 Footnote 72 refers to National Mineral Planning Guidance, which sets out how this policy should be approached.

Noise

5.53 Paragraph 019 (Reference ID: 27-019-20140306) of the National Mineral Planning Guidance sets out the steps that should be taken to control or mitigate noise emissions. This process has been followed in the noise assessment section of the Environmental Statement [CD1.127].

5.54 Noise mitigation measures have been split between those that apply to the initial construction phase and those that apply to the longer-term operational phase. The mitigation measures proposed are outlined in the relevant sections of the Planning application and ES [CD1.127], as well as in the planning committee reports [CD4.1 CD4.5].

5.55 Paragraph 021 (Reference ID: 27-021-20140306) of the National Mineral Planning Guidance states that:

> ***Minerals planning authorities should establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90, 1h) by more than 10dB during normal working hours.***

5.56 The guidance goes further and states that this 10dbA increase should not exceed background levels by 10dBA between evening hours (1900 – 2200) with an upper limit of 55dBA. For night time working the (2200 to 0700) the levels should be set as low as possible with an upper limit of 42dBA.

5.57 The Noise Assessment submitted as part of the ES [CD1.127] has measured the existing background noise levels at a series of representative locations surrounding the site. Based on these existing background noise levels a 10dBA increase was applied and a series of noise

limits for daytime and night-time operations were proposed for the nearest properties (Table 14.20 of CD1.127).

5.58 The Noise and Vibration assessment of the Environment Statement considered seven construction scenarios (Para 14.7.4 of CD1.127) that will take place over the 14-month construction period.

5.59 Paragraph 022 (Reference ID: 27-022-20140306) provides guidance in relation to the management of short-term activities and advises on the noise limits which may be appropriate for such construction activities. The guidance states the following:

> ***Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to 8 weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.***

5.60 In accordance with the above guidance, none of the predicted noise levels associated with the short-term construction activities are predicted to exceed the upper 70 dBA limit at any of the assessed properties.

5.61 The guidance from paragraph 22 has been used to form a draft condition (Condition 55 of the list of conditions contained within the SoCG), which restricts noise associated with construction activity to only occurring over 8 weeks in a year.

5.62 No objection to the methodology used to calculate the proposed operational or construction noise limits, or to the resultant noise limit values has been made by the CBC EHD.

5.63 The proposed noise limits have therefore been carried forward and incorporated in the draft conditions (Conditions 78 and with 55 within the signed SoCG).

5.64 Based on the process outlined above, undertaken in accordance with the relevant Mineral Planning Guidance, appropriate noise limits have been proposed.

5.65 The WCM proposals comply with the noise aspect of sub paragraph c) of paragraph 211 of the NPPF.

5.66 CCC have also previously agreed that subject to the imposition of planning conditions that there will be no significant impacts from noise as a result of the WCM proposals (paragraph 53 of the SoCG).

Dust

5.67 Paragraph: 023 Reference ID: 27-023-20140306 of the National Mineral Planning Guidance sets out the five key stages to undertaken in relation to the production of dust assessment. This process has been followed in the production of air quality sections of the Environmental Statement [CD1.131].

5.68 All the potential dust generating activity associated with the operation of the Proposal will be undertaken within an enclosed environment that is subject to negative pressure [CD1.131].

5.69 This includes the working of minerals within the mine and the processing of worked material within the processing facility, as well as the handling and storage of worked and processed material within enclosed conveyors and storage structures.

5.70 The air from within these enclosed environments will be filtered as it is extracted and emitted to air via controlled point sources on the roofs of the main buildings at the process facility.

5.71 The coal will be washed following extraction within the buildings on the MMS. The washing process will leave the coal damp when it is loaded on to the conveyor and subsequently on to trains within the building at the RLF, further reducing the potential for dust emissions.

5.72 The inclusion of the RLF within the WCM proposals will also significantly reduce the number of vehicle movements on the public road network that would otherwise have been required to distribute the processed material across the region.

5.73 For the construction phase, Condition 6 (see signed SoCG with CCC) requires the submission of a Construction Environmental Management Plan (CEMP) which includes a scheme for the management of air quality and dust emissions.

5.74 No objections have been raised by the CBC EHD in relation to methodology used or the conclusions formed by the air quality assessment included with the EIA.

5.75 Neither Rule 6 Party within their statements of case [CD15.3 and C15.4] have raised dust as a matter that they wish to contest at the inquiry.

5.76 The WCM proposals comply with the dust aspect of sub paragraph c) of paragraph 211 NPPF.

5.77 CCC have also previously agreed that the WCM proposals will not result in a significant degradation of air quality or demonstrable dust impacts (paragraph 54 of the SoCG).

Blasting induced vibration

5.78 No blasting is proposed in any part of the WCM proposal. All mineral resources can be removed using electrically or biodiesel powered plant complement.

5.79 The WCM proposals comply with the blasting vibration aspect of sub paragraph c) of paragraph 211 NPPF.

5.80 Based on the above, the WCM proposal complies with the policy objectives of sub paragraph c) of paragraph 211 of the NPPF.

Sub paragraph e) of paragraph 211 – Restoration and bonds

5.81 Sub paragraph e) of paragraph 211 of the NPPF states that restoration should be undertaken to the highest environmental standards at the earliest opportunity. The policy states that this is to be achieved through the application of appropriate conditions.

5.82 Due to the nature of the WCM proposals, the MMS and the RLF will accommodate structures associated with the mineral processing for the majority of the site's life span. Opportunities to undertake regular progressive restoration throughout the WCM project's development are limited as a result.

5.83 The landscaping mounds which will be formed initially to screen the MMS from properties to the northeast on High Road will be retained as part of final site's restoration. This initial restoration phase will remediate part of the current brownfield former Marchon works creating a publicly accessible (with new recreational routes), new landform for local residents by the commencement of operations.

5.84 This provides some of the benefits of the site restoration early in the life of the project, meeting one of the key objectives of sub paragraph e) of paragraph 211 of the NPPF.

5.85 Once the mining operations have been completed at the MMS, the site will be restored to a mainly ecological and recreational led use with some of the office buildings being potentially retained for re-use.

5.86 The submitted restoration plan [CD2.36] sets out the broad strategy for the MMS. This broad restoration strategy will be refined through the submission of a Decommissioning and Restoration scheme which will be submitted towards the end of the life of the site (see condition 93 contained within the SoCG).

5.87 Other conditions require the submission of separate restoration plans for any works undertaken as part of the Preliminary Phase (Condition 13 SoCG) and the Construction Phase of the development (Condition 48 SoCG). These would only be implemented in the event that the project ceased operations at these stages.

5.88 The route of the conveyor will be excavated over the initial 2 years of the site operation, following which the majority of the route will be restored permanently. The two access shafts will remain until the conveyor has been decommissioned at the end of the extraction phase. The excavated material from conveyor route will be used to create the early restoration and form the landscaping mounds at the MMS.

5.89 The RLF will also be restored to predominantly grassland use with all rail infrastructure associated with the WCM proposals being removed [CD2.56].

5.90 The WCM proposals also include S.106 commitment to complete the restoration of the Main Band Colliery (MBC) site. The MBC site remains unrestored following its abandonment over 10 years ago, despite being subject to an extant planning permission (CCC planning ref 4/88/0064).

5.91 The MBC site currently comprises concrete hardstanding, soil mounds, a concrete settlement tank containing a pond and areas of self-seeded vegetation and scrub. Access to the RLF will be through the former MBC site and following the completion of the RLFs construction the restoration of the MBC will be completed by the applicant.

5.92 The restoration works to the MBC will be secured through a condition (condition 27 SoCG) and an obligation within the proposed Section 106 Agreement.

5.93 The WCM proposals provide for restoration at the earliest possible opportunity at the MMS with the creation of the landscaped mounds and through the completion of the restoration of

the MBC following the construction of the RLF. For the remainder of the site, appropriately worded conditions have been included to ensure that under a number of circumstances, restoration can be achieved.

5.94 A 10-year aftercare period has been agreed by the applicant through the draft S106 (appended to the signed SoCG) this is longer than the usual minimum 5-year aftercare period specified in the Mineral Planning Guidance (Paragraph: 052 Reference ID: 27-052-20140306). This approach will ensure that the landscape, recreation and ecological benefits proposed through restoration plans are monitored and maintained until they are well established and that high environmental standards are achieved.

5.95 No objections were raised by any statutory or local council consultees on the application in respect of the restoration proposals for the site. CCC have agreed through paragraph 57 of the SOCG that the suitable restoration of the scheme can be secured through planning conditions and a section 106 agreement.

5.96 Paragraph 048 (Reference ID: 27-048-20140306) of Mineral Planning Guidance states that a financial guarantee or bond to cover the restoration and aftercare costs will normally be justified in exceptional cases. The guidance notes that long term projects where progressive restoration isn't practicable is one such example where a financial guarantee can be justified. Aside from the offshore elements of the WCM proposals, this definition can fairly be applied to the application site.

5.97 Based on the above, the MPA have requested, and the applicant has agreed, to enter into the provision of a security Bond to cover the restoration and aftercare following the occurrence of a default event (see the agreed S106 within the SoCG for agreed triggers).

5.98 The value of the financial security will vary throughout the life of the project to ensure an adequate bond amount is available at all times. The financial security amount has been agreed by independent specialist minerals valuers Wardell Armstrong.

5.99 The provision of a financial security by the WCM proposals is in full accordance with sub paragraph e) of paragraph 211 of the NPPF.

5.100 No objections to the proposed restoration scheme or the provision of financial security have been raised by any of the statutory or council consultees responding to the application. Paragraph 57 of the SoCG confirms that CCC agree that bond provision secured through the S106 agreement are suitable and in compliance with the relevant local plan policies.

5.101 Neither Rule 6 Party within their statement of case [CD15.3 and CD15.4] have raised the issue of the restoration proposals or the provision of a restoration security.

Overall assessment against Paragraph 211 of the NPPF

5.102 The WCM scheme complies with the policy requirement of the relevant sub paragraphs b), c) and e) of Paragraph 211 of the NPPF

Paragraph 215 of Chapter 17 of the NPPF

5.103 Paragraph 215 of the NPPF provides a policy framework for minerals planning authorities to follow when considering oil, gas and coal exploration and extraction proposals. The policy states:

> ***Minerals planning authorities should:***
>
> ***a) when planning for on-shore oil and gas development, clearly distinguish between, and plan positively for, the three phases of development (exploration, appraisal and production), whilst ensuring appropriate monitoring and site restoration is provided for;***
>
> ***b) encourage underground gas and carbon storage and associated infrastructure if local geological circumstances indicate its feasibility;***
>
> ***c) indicate any areas where coal extraction and the disposal of colliery spoil may be acceptable;***
>
> ***d) encourage the capture and use of methane from coal mines in active and abandoned coalfield areas; and***
>
> ***e) provide for coal producers to extract separately, and if necessary stockpile, fireclay so that it remains available for use.***

5.104 Sub paragraphs c) d) and e) of paragraph 215 are of most relevance to the WCM proposal.

<u>Sub paragraph c) of paragraph 215 – Areas where coal extraction may be acceptable</u>

5.105 The NPPF states at Paragraph 215 (d) that minerals planning authorities should indicate any areas where coal extraction and the disposal of colliery spoil may be acceptable. The Cumbria

Minerals and Waste Local Plan (CWMLP) refers to the WCM proposals and identifies coal as an important strategic resource which requires safeguarding.

5.106 The plan states that rather than making a strategic allocation policy defining "acceptable areas" for coal extraction, the planning authority considers such developments would be best considered on their own merits using relevant development plan policies.

Sub paragraph d) of paragraph 215 – Methane Capture

5.107 The WCM proposals include a commitment to capture 95% of the methane generated by the mining activities. This is addressed in more detail within the proof of Mr Tonks. The methane capture will be secured through planning condition (Condition 65 SoCG) and through an obligation within the S106 (Appendix B of the SoCG).

Sub para e) of paragraph 215 – Fireclay

5.108 Fireclay generally occurs above and below some coal measures and can be used in brick manufacturing. Fireclay is commonly encountered and recovered from open cast coal sites where the fireclay itself must be removed to access the coal resource. The extraction of fireclay is normally undertaken incidental to the coal recovery.

5.109 As the WCM proposals will be working through the coal measures horizontally it's unlikely that fireclay will be encountered in the same way that it would on an open cast site. As a result, no allowance has been made for the recovery of fireclay within the proposals.

5.110 Furthermore, because of condition 4 (see SoCG), extraction is restricted to the recovery High Vol A Coking Coal suitable for use in steel manufacture. The extraction of fireclay would be contrary to this agreed planning condition.

Overall assessment against paragraph 215 of the NPPF

5.111 The WCM proposal will comply with the relevant policy requirements of paragraph 215, specifically in relation to the provision of methane capture and use on site.

Paragraph 217 of Chapter 17 of the NPPF

5.112 Paragraph 217 is the central policy from the NPPF against which the WCM will be assessed.

5.113 Paragraph 217 of the NPPF states:

> ***Planning permission should not be granted for the extraction of coal unless:***
>
> ***a) the proposal is environmentally acceptable, or can be made so by planning conditions or obligations; or***
>
> ***b) if it is not environmentally acceptable, then it provides national, local or community benefits which clearly outweigh its likely impacts (taking all relevant matters into account, including any residual environmental impacts).***

5.114 The policy test is a two-stage approach. Firstly, is the proposal environmentally acceptable or can be made so through the imposition of planning conditions or obligations.

5.115 Secondly, if in the view of the decision maker, the proposals cannot be made acceptable, then do the benefits the project creates clearly outweigh any residual environmental impacts that remain following mitigation.

5.116 What constitutes what is, and is not, environmentally acceptable is not defined within the NPPF nor is there any guidance on the matter. The interpretation of this policy was most recently undertaken the Planning Inspector who assessed the Highthorn proposals [CD6.2]. In summarising his approach to the consideration of what was and was not environmentally acceptable he noted (paragraph C125 – C126) that a broad judgement should be undertaken of the project as a whole. In adopting this approach, the Inspector concluded (paragraph C126 CD6.2) that:

> ***an environmentally acceptable proposal need not necessarily result in no harm, or even no 'net' harm. An unfavourable outcome (for the proposal) to the balancing of its environmental benefits against its environmental disadvantages, need not inevitably rule out a finding that the proposal was, nonetheless, environmentally acceptable. It is the overall judgement about the adequacy of the proposal, whether it***

would satisfy expectations or needs, and could be endured with forbearance, that would be determinative.

5.117 I agree with this approach. In summary, environmental acceptability is not no harm, nor is it no net harm, it is ultimately a matter of judgement from the decision maker based upon the information available to them.

5.118 In my view, consideration of the extent to which a project accords with relevant environmental policies in with the Local Plan provides a useful framework for carrying out this exercise.

5.119 These environmental effects are discussed in more detail in Section 6 and Appendix 1 as well as within other relevant proofs of evidence.

5.120 It is my view, for reasons that are set out below and later in this proof, that the proposed development can be made environmentally acceptable through the imposition of planning conditions and obligations contained within the S106 agreement contained within the SoCG. Therefore, the application complies with paragraph 217.

5.121 Notwithstanding this, I will also go on to outline the benefits that will be provided by the project that would clearly outweigh any likely impacts that other parties may view cannot be made acceptable through the imposition of planning obligations and conditions.

Can the proposal be made environmentally acceptable through the imposition of planning conditions or obligations?

5.122 No statutory consultees have outstanding objections against the WCM proposals in relation to the environmental effects of the project.

5.123 Appendix 1 of this proof includes a table which notes if the WCM proposal are consistent, in my view, with the relevant development plan policies, if there are any outstanding objections against policies from statutory consultees and if conditions have been set aside to control any associated environmental effects relevant to the topic of that policy. The table also includes a note to confirm if the policy and the associated environmental effect have been subject to the agreement within the signed SoCG between CCC and the applicant.

5.124 In relation the MPAs assessment of the site environmental effects, the committee reports [CD4.1 and CD4.5] note that the following environmental effects were deemed as being unacceptable:

- Ecology
- Landscape
- Historic environment

5.125 This proof will review these the above-mentioned impacts and draw conclusions cross referring to the specific proofs that have been prepared to address those points.

5.126 The remaining environmental effects outside of the three listed above are considered as acceptable or can be made so through the imposition of conditions, these are discussed in more detail in Appendix 1 of this proof of evidence.

5.127 Ecology matters are addressed in the proof of evidence of Dr Shepherd [WCM/PS/1] The key ecological concern raised by the Council when it previously considered this issue related to the effect of the conveyor routing upon two separate parcels ancient woodland (Roska Park and Bell House Wood).

5.128 During the determination of the application, the effects of the construction of the conveyor upon the two ancient woodlands was assessed as needing exceptional circumstances in order to justify any loss or deterioration to the trees (as per paragraph 180 c of the NPPF). This was because earlier proposals for the installation of the conveyor involved the felling of some trees within these woodlands and compensatory tree planting post construction.

5.129 It is now proposed that pipejacking is undertaken to effectively tunnel beneath the affected woodland areas, avoiding the previous need to remove any trees from within the ancient woodlands. As noted in Dr Shepherds Proof [WCM/PS/1] this reduces the effect of the conveyor routing on the ancient woodland to a negligible impact that will not result in any loss or harm to the habitat.

5.130 The other potential ecological effects and the mitigation that has been provided to make the WCM proposals acceptable are provided in Sections 5, 6 of Dr Shepherds proof of evidence.

5.131 The methodology for the pipejacking can be supplied under the details required under planning condition (Condition 28 f) SoCG). On this basis the proposals can be made environmentally acceptable from an ecological perspective, as the level of harm is now classed as negligible.

5.132 In relation to heritage impacts the October 2020 planning committee report noted that the effect upon Scalegill Hall was "moderate adverse" [CD4.5 Paragraph 7.309].

5.133 The applicant instructed Headland Archaeology to carry out a review of the Heritage Chapter of the ES [CD1.138] to ensure that its conclusions remained up-to-date and robust. As part of this review, it was identified that the significance of the identified impact on Scalegill Hall may be less than the "Moderate adverse at most" impact that had previously been identified in the ES.

5.134 The Heritage note included in Appendix 2 of this proof of evidence has been completed following a visit to Scalegill Hall by representatives of Headland Archaeology. The report notes that the setting makes a minor contribution towards the heritage significance of the hall. The hall is located within a modern farming landscape containing historic features in the forms of field boundaries, pockets of woodland, dispersed settlement and farmhouses and tracks. It is dominated by the adjacent A595 which effectively cuts it off from the landscape to the west within which the proposed development (the RLF being the closest element of the proposals) will be situated.

5.135 As is noted in the attached report, the WCM proposals, including the RLF and MMS will not intrude into any of the views of the hall from within the complex, adjacent to it or from longer distances. The note concludes that the WCM proposals will not have an impact on the components or values which constitute the heritage significance of Scalegill Hall during enabling, construction, use or completed use of the proposed scheme.

5.136 In light of the above it is my view, that the effect of the WCM proposals upon the Grade II Listed Scalegill Hall have been incorrectly classed as moderate adverse and that the application proposals will have no impact upon this listed heritage asset.

5.137 The landscape and visual effects of the proposals have been assessed by Mr Flannery in his proof [WCM/JF/1]. Mr Flannery recognises that there would be a number of harmful landscape and visual effects, as you would expect from a proposal of this size. However, he nonetheless considers that the proposals are compliant with the relevant landscape policies within both the CMWLP and CBC LP. Mr Flannery also explains that the proposals comply with the various landscape character assessments. Based on Mr Flannery's proof, I consider that the proposals will not have an unacceptable environmental effect from a landscape and visual impact assessment perspective.

5.138 The effect of the proposals in relation to GHG emissions is addressed in the proof of Ms Leatherdale [WCM/CL/1]. The first point to note is that, as a result of the GHG mitigation strategy, the proposed development will not generate any net additional GHG emissions. On this basis, it complies with all relevant emissions reduction policies and carbon budgets.

5.139 Although a matter of legal submission it is my understanding that as is set out in the judgement of *R (Finch) v Surrey Country Council* [2020] EWHC 3559 (QB), per Holgate J. at [126]) [CD7.1], there is no requirement to assess the environmental effects associated with the subsequent use of a product through the EIA process since those effects are not effects of the development for which planning permission is sought[1]. That decision was concerned with the onward combustion of oil, but it is equally applicable to the subsequent use of coke produced from coking coal extracted from this development. Accordingly, the GHG Assessment does not consider any emissions that may arise from the subsequent use of coke in steel production.

5.140 Notwithstanding the position regarding the requirements of the EIA process, as I am advised I recognise that these downstream emissions may nevertheless be *capable* of being a material consideration in the determination of the planning application provided that they are fairly and reasonably related to the permitted development. That is not to say that they are a material consideration – simply that they may be depending on the facts of the case. In order to determine whether or not those emissions should be regarded as a material consideration, it is necessary to consider whether those emissions would occur in any event. In other words, but for the development taking place, would the GHG emissions from coke-making and steel-making facilities be the same.

5.141 In the present case, the evidence produced by Mr Truman and Wood Mackenzie [WCM/JT/1] indicates that demand for metallurgical coal is driven by the demand for steel and not the production / availability of more coal. This evidence also indicates that it is likely that coking coal produced by WCM will replace coking coal that is currently imported from the USA. In this regard, the emissions associated with the use of coke sourced from the WCM proposals will effectively replace GHG emissions of coke which would have been sourced from alternative mines. Since there would be no additional emissions at the coke and steel-making facilities as a result of the proposed development, these emissions are not a material consideration in the present case. This position can be contrasted with the GHG emissions of the extraction and transportation of that alternative coking coal. As Mr Truman demonstrates, but for the proposed development, the GHG emissions of the alternative coal that is being replaced by WCM coal would be considerably higher. Therefore, the comparative reduction in these emissions can be taken into account as a material consideration.

[1] am aware that this judgment is currently subject to an appeal to the Court of Appeal and consider that this issue is ultimately a matter of legal submissions

5.142 In the alternative that GHG emissions from the coke-making and steel-making facilities are found to be a material consideration in the present case, it is my view that these emissions should, in any event, be given little or no weight in the determination of this application for the following reasons.

5.143 First, as above, the coal to be produced by the WCM proposals will substitute coal currently being supplied by existing mines, predominantly located within the USA.

5.144 Second, the steel work facilities in which the metallurgical coal sourced from the WCM site will be used are already subject to comprehensive and separate permitting, monitoring and control regimes, which include strict Emissions Trading Schemes. As a result of these existing controls, it cannot be said that the use of the coal sourced from the WCM will fall between the cracks in terms of emission monitoring and accounting. Because the steel works will be identified as contributors to relevant carbon emission levels, either locally, regionally nationally and internationally, their continued operation will be included within any relevant targets for carbon emission reduction (and proposed mitigation schemes) within the jurisdictions that they operate within. Accordingly, the use of coal sourced from WCM does not have a material effect upon the wider obligations for carbon reduction. The emissions from the facilities using the WCM sourced coal will have been factored into any carbon emission reduction plans.

5.145 Third, it would result in considerable double-counting if these effects were all taken into account at each stage of the production process.

5.146 The proposal will therefore not give rise to any additional GHG impacts. Moreover, as Ms Leatherdale [WCM/CL/1] explains, the proposal has the potential to provide considerable environmental benefits by supporting the transition towards net zero. Accordingly, the GHG impacts of the proposal are environmentally acceptable.

Summary of environmental acceptability

5.147 To summarise, in relation to the environmental effects noted above, the ecological effects are considered to be acceptable now that the use of pipe jacking beneath the ancient woodlands avoids any loss or harm to these irreplaceable habitats. In respect of landscape, the proposal accords with the relevant local plan policy and landscape classification policy and guidance. In relation to heritage, following a more detailed review of the impact on the setting of Scalegill Hall, it is considered that there will be no harm to the significance of this designated heritage asset. Finally, the GHG emissions and climate change impacts of the proposal are acceptable

because the GHG mitigation strategy ensures that the proposal will not cause any net additional GHG emissions, and it also provides the opportunity to support the transition towards net zero by reducing the carbon footprint of coking coal that is required to make coke for use in the steel-making industry in the UK and Europe.

5.148 Going back the approach noted early in this proof of evidence, environmental acceptability should be considered within the overall context of the proposal. The WCM scheme includes significant large scale mineral extraction alongside the development of associated equally complex infrastructure (conveyor route and RLF).

5.149 Despite this scale of development, the WCM proposals have a very limited list of potentially adverse environmental effects (this is further demonstrated through the SoCG). It is particularly unusual for any mineral development of this scale to have such a modest list of potentially adverse environmental effects.

5.150 Considering the scale and nature of the WCM proposals alongside the environmental effects noted above, it is my view that the WCM proposals can be made environmentally acceptable through the imposition of planning conditions and obligations.

5.151 This position is further reinforced when considering that there are no standing objections from any of the statutory or local authority consultees.

5.152 The WCM proposals therefore comply with part a) of the policy test noted in paragraph 217 of the NPPF

National, local and community benefits

5.153 It is not my contention that WCM proposals cannot meet part a) of paragraph 217. As noted above the proposal can be made to be environmentally acceptable through the use of planning conditions and obligations.

5.154 However, if either the Inspector or the SoS reach a different conclusion in relation to part a) of paragraph 217 then the second limb part b) is engaged.

5.155 Before considering the benefits, which apply to the proposal and need to be taken into account, it is important to explain why I do not consider that footnote 71 of the NPPF precludes great weight being given to any of these benefits.

Interpretation of Footnote 71 of paragraph 211 of the NPPF

5.156 As noted earlier in this proof, paragraph 211 of the NPPF states:

> ***When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy[71].***

5.157 Footnote 71 of the NPPF states:

> ***Except in relation to the extraction of coal, where the policy at paragraph 217 of this Framework applies***

5.158 The interpretation of paragraph 211 alongside footnote 71 is that for all non-coal mineral proposals, great weight should be given to the benefits provided. Paragraph 211 clarifies that any of the benefits to the economy should also be included when considering the overall benefits package.

5.159 In relation to coal extraction proposals the footnote does not say that great weight cannot be given to the benefits associated with coal extraction. The footnote simply directs decision makers to paragraph 217 where the specific policy test is set out for assessing coal extraction proposals.

5.160 The weighting (either positive or negative), great, substantial, moderate, slight, minor or negligible can be applied on a site-by-site basis by the decision maker to the benefits proposed by each project. This is an approach that has been agreed with CCC through the SoCG (paragraph 31)

5.161 The interpretation of footnote 71 was recently tested at the examination into the Northumberland Local Plan.

5.162 The Northumberland Local Plan, Publication Draft (Regulation 19) [CD10.6] included policy MIN 2 "Criteria for assessing the benefits of minerals proposals" which stated:

> ***When determining proposals for minerals extraction, great weight will be given to the benefits of minerals extraction except where the proposal relates to the coal extraction.***

5.163 Policy MIN 9 of the Regulation 19 Northumberland Plan specifically addresses coal. Part a) of the policy MIN 9 is similar to the first limb of Paragraph 217 of the NPPF. Part b) is of Policy MIN 9 is identical to the second limb of paragraph 217 of the NPPF. Materially Part a) of policy MIN 9 is identical to Paragraph 217 of the NPPF.

5.164 In setting out his decision on the Highthorn surface Coal mine [CD6.1 paragraph 23], the Secretary of State (SoS) also agreed that the wording within Policy MIN 9 as it was drafted in the Regulation 19 submission of the Northumberland Local Plan reflected the wording within NPPF paragraph 217.

5.165 Policy MIN 2 and MIN 9 are supplemented by the supporting text contained within paragraph 13.32 the Regulation 19 plan which states:

> ***All proposals for coal extraction in Northumberland will be assessed against the overarching policy test for coal extraction, which is set out in Policy MIN 9. The criteria in Policy MIN 1 (Environmental criteria for assessing minerals proposals) will be used to assess environmental acceptability of the proposals and Policy MIN 2 identifies the benefits arising from the proposals that will be given consideration.***

5.166 In June 2021 following the Examination In Public (EIP) of the Regulation 19 Northumberland Local Plan, a schedule of Main Modifications [CD10.7] have been proposed by the Planning Inspectors who are examining the Local Plan. These changes are deemed necessary by the Inspectors to ensure that the plan is sound.

5.167 The Inspector reviewing the minerals policies of the draft Northumberland Local Plan has requested that the following amendments (underlined) are made to the supporting text of Policies MIN 2 and MIN 9 contained within paragraph 13.32:

> ***13.32 All proposals for coal extraction in Northumberland will be assessed against the overarching policy test for coal extraction, which is set out in Policy MIN 9. The criteria in Policy MIN 1 (Environmental criteria for assessing minerals proposals) will be used to assess environmental acceptability of the proposals. <u>If it is determined that the proposal is not environmentally acceptable, consideration will be given as to whether there are any national, local or community benefits that clearly outweigh the impacts of the proposal</u>. Policy MIN***

2 identifies the benefits arising from the proposals that will be given consideration. <u>The weight to be attached to any potential benefits will be determined on a case-by-case basis in the context Policy MIN 9.</u>

5.168 The proposed changes requested by the Inspector clarify the two-stage approach to implementing Policy MIN 9, and by extension implementing Paragraph 217 of the NPPF, as the policies they are materially identical.

5.169 The changes proposed by the Inspector also confirm that the weight to be attached to the benefits considered as part of the consideration of Policy MIN 9 will be determined on a case-by-case basis. No restriction on the level of weight to be afforded to each benefit is mentioned.

5.170 Footnote 71 (previously footnote 65) was added in the July 2018 update to the NPPF. The only decision that has been made by an Inspector or the Secretary of State (SoS) that related to coal extraction since July 2018 incorporating the policy implications of Footnote 71 has been the Highthorn Surface Coal mine (Appeal ref: APP/P2935/V/16/3158266).

5.171 The original Highthorn Inspectors report [CD6.2] which recommended approval for the surface coal mine was completed on the 20 November 2017 and therefore was based on the previous version of the NPPF which did not include a version of Footnote 71.

5.172 The original SoS's decision which went against the Inspector's recommendation was quashed following legal challenge, and second revised SoS decision dismissing the application was issued on the 8 September 2020.

5.173 It is the SoS's decision letter [CD6.1] alone that provides specific commentary and interpretation in relation to the role that Footnote 71 plays in the weighting attached to benefits associated with coal extraction proposals.

5.174 Re-iterating an earlier point that the benefits of coal extraction have to be judged on a site-by-site, in paragraph 81 of the SoS letter states that:

"The 'great weight' which previously applied to the benefits of mineral extraction therefore no longer automatically applies and the Secretary of State has proceeded on the basis of a consideration of the benefits of this specific proposal, in the light of the evidence before him in this case."

5.175 As set out by the SoS, Footnote 71 removes the automatic application of great weight to the benefits of mineral extraction, it does not say that great weight cannot be applied to specific proposals

The benefits of the WCM proposals

5.176 The benefits to be delivered by the WCM comprise the following:

a) Significant employment benefits, including construction jobs, more than 500 direct jobs once the mine is fully operational, and over 1500 indirect jobs in the wider supply chain.

5.177 The WCM proposals will deliver significant employment benefits through the creation of up to 532 permanent staff positions for the life of the project. Of these roles, 50 will be offered as apprenticeships working in collaboration with local education providers such as The Lakes College at Lillyhall.

5.178 The 1500 wider indirect supply chain jobs will be created through the procurement of ongoing supply of material and services required to support the mine through its operational period.

5.179 Please see the proof prepared by Mr Kirkbride [WCM/MK/1] which provides further information in relation to the employment benefits to be delivered by the project. Mr Kirkbride's proof of evidence provides further information in respect of the substantially above UK average salary wage that will be provided to the roles created by the WCM proposals.

5.180 In the context of any balancing exercise undertaken in relation to paragraph 217 of the NPPF, due to the scale of the employment to be created by the project, **substantial weight** should be attached to this benefit.

b) Substantial investment into the local area, which suffers from high levels of deprivation and unemployment.

5.181 There are only 5 large companies currently within Copeland that employ 250 employees or more [WCM/MK/1]. The WCM project will be one of the largest private sector employers outside of the nuclear industry within Copeland if approved.

5.182 Unemployment amongst young adults is 5.1% well above the national average of 3.5% [WCM/MK/1]. The wards of Sandwith, Mirehouse, and Harbour, which are close to the MMS are within the bottom 10% most deprived areas in England. Further information in relation to the local economic context of the WCM proposal sin provided within Mr Kirkbride's Proof and its supporting appendices.

5.183 The creation of the employment opportunities associated with the WCM project within this local context amplifies the economic benefits being delivered by the scheme.

5.184 The potential for the scheme to drive change in long term economic trends is recognised in the emerging preferred options for the Copeland Local Plan [CD5.10] which is discussed in more detail in Section 6 of this proof of evidence. This draft of the emerging plan was based on the WCM proposals having planning consent from CCC.

5.185 In the view of Copeland Borough Council, the emerging plan stated that the WCM scheme would be become one of the major key drivers for growth and economic change within the borough for the life of the local plan period.

5.186 Taking account of the local economic context and the WCM proposals potential to be a major driver for economic growth within the wider Copeland local plan area, **substantial weight** should be attached to the benefits associated with the level of investment the scheme will create. This weight should be applied in the context of any balancing exercise undertaken in relation to paragraph 217 of the NPPF.

c) Positive impact on the UK's balance of trade deficit and considerable additional tax revenues.

5.187 Mr Kirkbride's proof of evidence provides a detailed explanation of the effect the operation of the WCM proposals will have up the UK trade deficit balance and the tax revenues anticipated to be generated.

5.188 In summary, the information provided states that once fully operational (years 6 to 26) the WCM proposals have the potential to improve the UK balance of trade deficit by 1.8 % through the exportation of metallurgical coal into the European Union. Over the life of the mine (up to 2049) the total exports would be circa £6.5 billion.

5.189 In addition, the anticipated level of corporation tax paid to HM Treasury would be more than £800 million.

5.190 In the context of any balancing exercise undertaken in relation to paragraph 217 of the NPPF, **substantial weight** is attached to the positive impact the WCM proposals will have upon the UK's balance of trade deficit and the level of tax income to be generated.

d) The opportunity to reduce European reliance upon imported coking coal through product substitution, with all the associated environmental benefits.

5.191 There will continue to be a need for metallurgical coal within the UK and EU throughout the life of the WCM proposals [WCM/JT/1]. Currently most of this coal is sourced from the USA.

5.192 The WCM will provide a supply of metallurgical coal closer to the steel manufacturers in the UK and the EU. The coal produced by the WCM proposals will be extracted with the lowest carbon footprint of any equivalent operation in the world (Ms Leatherdale's Proof of evidence WCM/CL/1).

5.193 The coal extracted at the Woodhouse Colliery will have a lower transportation carbon footprint than the equivalent coal measures transported from existing sources [WCM/CL/1] and will therefore assist in supporting the transition towards net zero and a low carbon future.

5.194 The WCM proposals provide an opportunity to lower the carbon footprint of European and UK steel production process below its current levels. In the context of paragraph 217 of the NPPF **substantial weight** is attached to this benefit.

e) Securing the re-use, and ultimate restoration, of the former Marchon site.

5.195 The Marchon site is a prominent brownfield site which has been vacant since 2005. The site has benefited from favourable planning designation since 2001 [CD5.11] and despite this no development proposals have progressed as far as the WCM proposals through the planning process.

5.196 It is anticipated that there will be levels of contamination present on site that will need to be removed [CD1.123].

5.197 The WCM proposals will remediate the site during the life of the operational period proposed scheme. After this remediation part of the site will be opened for formal public access alongside the operational period of MMS. Once operations are complete the majority of the site will be restored.

5.198 Beyond the environmental benefits of the redevelopment and remediation of the Marchon site are the associated effects of clearing a prominent derelict site, which in its current state detracts for the adjacent properties and businesses and wider Whitehaven. See the proof of evidence Mr Flannery [WCM/JF/1] for further commentary on this matter). This was the view shared by CCC in its consideration the application in October 2020 [CD4.5 paragraph 7.331].

5.199 The remediation of the Marchon site, given its size, prominent location and length of time that it has been vacant mean that **moderate weight** is attached to this benefit in the context of paragraph 217 of the NPPF.

5.200 This is the same weighting that was applied to this benefit by CCC in its October 2020 committee report [CD4.5 paragraph 7.331]. This benefit is referred to in paragraph 55 of the signed SoCG.

f) The completion of the restoration of Main Band colliery.

5.201 The restoration of the Main Band colliery has not been completed by the previous mineral operator (Mainband Colliery Co. Ltd). The applicant, alongside CCC as the other landowner for the site, will complete the restoration works following the completion of the construction phase of the RLF. The detail of the restoration works proposals are included in the agreed S106 agreement that forms part of the SoCG.

5.202 In the context of paragraph 217 of the NPPF this benefit should be afforded **moderate weight**. This is the same weighting that was applied to this benefit by CCC in its October 2020 committee report [CD4.5 paragraph 7.297].

g) The creation of additional footpath and cycleway improvements.

5.203 The section 106 agreement, contained within the Statement of Common Gound, includes multiple obligations in relation to the creation of new footpaths and cycleway in the vicinity of the application site.

5.204 Plan 3 of the S106 shows the improvement to be made to the wider public footpath network, all or some of these improvements to be funded by the public rights of way contribution fund, which totals £94,235. The works proposed include improved route alignment, surface and drainage works, signs, gates and boundary treatment and better route definition on specific footpaths.

5.205 In addition to the above contribution, £72,000 will be used towards the provision of a St Bees to Mirehouse Road Cycle path. This new route is understood to be supported by St Bees Parish Council.

5.206 The proposed contribution will provide improvements to existing public right of way and will help facilitate the creation of a new cycle route. On this basis I attach **slight weight** to these benefits.

h) Contribution to improve local heritage assets.

5.207 The S106 agreement included within the signed statement of common ground includes an obligation to provide a contribution of £5,000 per annum for 10 years to promote the industrial heritage assets close to the site. These assets include Barrowmouth Gypsum and Alabaster Mine, Saltom Coal Pit and Haig Colliery.

5.208 The works that the funding can be used for including any of the following actions restoration and enhancement of the condition of those assets and their setting, the erection of interpretation boards, the laying out of heritage trails, activities that enhance public understanding of the heritage assets (through survey, other fieldwork and research) and activities that promote public appreciation of the assets through outreach projects.

5.209 Whitehaven has a rich industrial heritage and forms a key part of the tourist attraction of the town. The proposed financial contribution will improve the tourism offer and will help increase any financial and tourism benefits which come from it. Given the scale of the contribution I would attach **slight weight** to this benefit.

i) Improvements to local habitats via the planting of trees within several areas of the red line boundary and the creation of new habitats on the main mine site, cumulatively creating biodiversity net gain.

5.210 As detailed within the proof of evidence of Dr Shepherd [WCM/PS/1], the application proposals will have the ability to achieve net gain for biodiversity. It is demonstrated that using the latest DEFRA Metric 3.0 that the proposed development will deliver a net gain of approximately 16% of the lifetime of the project above the current baseline value.

5.211 This is a significant improvement above the 10% net gain which is noted within the emerging Environment Bill and the Copeland Borough Council Preferred Options Local Plan draft [CD5.10]. On that basis I attach **moderate weight** to this benefit.

Weighting of benefits

5.212 I consider that my assessment of the weighting that should be given to the benefits of the scheme in the present case can be supported by a comparison with the weight that was attached to the benefits in the recent Highthorn appeal decision, which provide a helpful benchmark on this issue.

5.213 However, before doing so, it is important to note that there are a number of fundamental differences between the WCM application site and the Highthorn scheme, which reinforce my conclusion that greater weight should be given to the benefits in the in the present case.

5.214 The Highthorn project comprised the following:

- 250ha green field site.
- Two prominent overburden storage mounds at 25m and 27m high.
- Open air extraction of overburden and coal.
- Open air processing of coal.
- No capture of methane from coal exposed to the atmosphere.
- No carbon offsetting proposed.
- Transport of coal via HGVs from site.
- Entirely diesel-powered plant complement.
- 100 jobs on site.

5.215 As a comparison the WCM proposals consist of:

- Surface site area of 30.5ha of which 75% is brownfield.
- The tallest structure at RLF site will be the RLF building at 15m high, the tallest building at the MMS will be 34m high, set behind screening mounds.
- Overburden extraction is minimised through horizontal working along the coal seam level.
- All coal extraction and processing undertaken within an enclosed environment.
- 95% of methane emissions from the site will be captured at source.
- Proposal to be net-zero compliant from day 1.
- All coal transport will be undertaken via rail.

- Over 500 jobs on site.

5.216 The two schemes are clearly fundamentally very different in terms of the amount and type of coal proposed for extraction, the working methods, how the mineral is transported, project lifespan and number of jobs created amongst other elements.

5.217 The main similarity between the projects is simply that they both involve the extraction of coal. As a result, an assessment against Paragraph 217 was, and is, required for both schemes.

5.218 The weighting applied by the SoS in relation to his judgment against paragraph 217 and the benefits proposed by the Highthorn scheme should be understood to help inform and provide a context for the judgment and potential weighting that should be applied to the WCM proposals.

5.219 The weighting of the benefits undertaken by the SoS in relation to those proposed by the Highthorn scheme, he stated the following in paragraph 85 of his letter [CD6.1]:

> ***Weighing in favour of the proposal, the Secretary of State gives moderate weight to the economic benefits which will flow from the proposal, moderate weight to the biodiversity benefits and no more than moderate weight to the need for coal. He also attaches slight weight to the fifth obligation, to establish and procure permissive bridleways.***

5.220 For context, further details are supplied below in relation to the benefits listed above that were assigned moderate weight.

5.221 The economic benefits associated with the Highthorn project included the creation of 100 jobs on site for 6 years and the associated wages and spending at suppliers including an apprenticeship scheme.

5.222 For comparison, the WCM proposals will employ over 500 people directly on site up to 2050. The scale of economic benefit, which are detailed further within Mr Kirkbride's proof of evidence, and the report carried out by NERA Economic Consulting [WCM/MK/1/1], to be delivered by the WCM proposals far exceeds by several order of magnitude the economic benefits that would have been delivered by the Highthorn scheme. On that basis substantial weight as minimum should be given to the economic benefits to be delivered by the WCM proposals.

5.223 In relation to the need for coal benefit, by the time of the SoS decision letter only 10% of the coal proposed for extraction would be supplied to thermal power generators, a significant reduction from when the Inspector first assessed the site in 2017. The remainder was to be supplied into industrial users (e.g., operations which use heat generated by coal on site in boilers to generate steam).

5.224 SoS stated the following in relation to the updated need for coal argument in paragraphs 55 and 56 of his letter [CD6.1] and stated:

> ***The Secretary of State agrees that Highthorn coal would be suitable for some industrial purposes, <u>but notes that the 'steam' coal produced at Highthorn would not be appropriate for metallurgical uses.</u> However, because the Inspector approached this application on the basis that Highthorn coal would be used for electricity generation and not for industrial use, he did not make any findings of fact on whether there was a future need for coal from Highthorn for industrial use and if so, to what extent. The Secretary of State has, therefore, carefully considered the information provided from the applicant and other parties as to the likely need for coal for industrial use in the future.***
>
> ***The Secretary of State has noted that the applicant has referred to inquiries received from, and relationships it has built with industry along with letters of support from industry. <u>However, the Secretary of State considers that this evidence is very general in nature and also notes that the applicant has not entered into any contracts for the sale of Highthorn coal.</u> The Secretary of State has also noted that the applicant contends that there is likely to be a strong continuing domestic need for coal for industrial purposes which Highthorn could satisfy. However, <u>he considers that there is little objective evidence to demonstrate that previous use of coal for industrial uses is a reliable guide to future need.</u> For example, he considers that some of the evidence provided by the applicant indicates that the annual demand for coal for industrial uses was considerably lower in 2017 and 2018 than in the period 2005 to 2016. As such, he concludes that there is only limited evidence before him of the on-going need for coal from Highthorn for these purposes. He further considers that there is little evidence to enable him to conclude that demand for coal for***

industrial uses will remain at current levels, and therefore gives only limited weight to the evidence on contracts relating to existing sites.

5.225 Taking account of the evidence discussed above and the supply of 10% of the coal going to electricity generators and the remainder going to industrial users based on weak evidence of demand, nonetheless moderate weight was applied to the need benefits of the coal extracted at Highthorn.

5.226 As is noted in Mr Kirkbride's proof of evidence [WCM/MK/1], WCM have entered into an agreement with Javelin Resources who will purchase and market all of the coal produced by the proposals. This is strong indication regarding the market need that will be met by the WCM scheme, adding substantially more weight to these benefits. Furthermore, the continued need for metallurgical coal of the specification provided by this development is supported by detailed objective analysis that has been carried out by Wood Mackenzie that is appended to Mr Truman's [WCM/JT/1] proof of evidence.

5.227 The abovementioned benefits provide a benchmark for what can be assessed as a moderate benefit, in the view of the SoS.

5.228 It is clear that the scale of the economic benefits and the need benefits that the WCM proposals will achieve are significantly greater than those presented by the Highthorn scheme. As a result, I consider that the weighting attached to these benefits alone cannot be anything other than substantial, as I have set out above.

Overall assessment of benefits in the context of paragraph 217

5.229 The benefits listed above clearly outweigh the scale of any potentially disputed environmental effects which are discussed earlier in this proof of evidence. On the basis on this, the application proposals comply with the policy test outlined in paragraph 217 of the NPPF.

5.230 It is my position that the application proposals are environmentally sound and can be made so by planning conditions or obligations. As a result, the application therefore complies with the first limb of the policy test paragraph 217 of the NPPF.

5.231 However, if either the Inspector or SoS chose to disagree with this position and agree that the effects listed earlier in this section of this proof cannot be made environmentally acceptable through the imposition of conditions or obligations then the second limb of the policy is

enacted. In relation to this second part of the policy test, the benefits of the proposal clearly outweigh, by several order of magnitude, the identified environmental effects.

5.232 Based upon the above the WCM application proposals are wholly consistent with both stages of policy test outlined in paragraph 217 of the NPPF.

Overall assessment against Chapter 17 of the NPPF

5.233 The application proposals are consistent with the policy objectives outlined in Chapter 17 of the NPPF.

6.0 THE EXTENT TO WHICH THE PROPOSED DEVELOPMENT IS CONSISTENT WITH THE DEVELOPMENT PLAN FOR THE AREA

6.1 As is set out in paragraph 21 of the SoCG, the development plan for the application site is:

- The Cumbria Minerals and Waste Local Plan 2015 - 2030 (CMWLP) – [CD5.12]
- The Copeland Local Plan 2013-2028 – Core Strategy and Development Management Policies DPD (adopted December 2013) (CLP) – [CD5.8].
- The Copeland Local Plan 2013 – Proposals Map and Copeland Local Plan 2001-2016 'Saved Policies' (June 2015) – [CD5.11]

6.2 In addition to the documents listed above, consideration should also be given to whether any weight should also be given to the following unadopted development plan documents as a material consideration:

- The West Whitehaven Supplementary Planning Document (SPD) issues and options consultation report, Copeland Borough Council, November 2012 [CD5.13]
- Copeland Local Plan 2017-2035, Preferred options Draft, September 2020 – [CD5.10]

6.3 Due to the age of the West Whitehaven SPD and the early stage of its development, little to no weight can be applied to the policies outlined within that document. This approach has been agreed with CCC through the SoCG (paragraph 40).

Cumbria Minerals and Waste Local Plan (2015-2030)

6.4 The SoCG with CCC has agreed that the following are the principal relevant policies of the Cumbria Minerals and Waste Local Plan (CMWLP):

- SP1 Presumption in favour of sustainable development
- SP13 Climate Change
- SP14 Economic benefits
- SP15 Environmental Assets
- SP16 Restoration and aftercare
- DC1 Traffic and transport
- DC2 General Criteria
- DC3 Noise
- DC5 Dust
- DC6 Cumulative environmental impacts

- DC13 Criteria for energy minerals
- DC15 Minerals safeguarding
- DC16 Biodiversity and geodiversity
- DC17 Historic Environment
- DC18 Landscape and visual
- DC19 Flood risk
- DC20 The water environment
- DC21 Protection of soil resources, and
- DC22 Restoration and aftercare

6.5 Appendix 1 of this proof contains a full assessment of WCM proposals against each of the policies noted above.

6.6 The following section will focus upon those policies which relate to matters that have raised potential conflicts within the committee reports produced by CCC [CD4.1 and CD4.5] or have been raised by the Rule 6 parties in either of their original statements of case [CD15.3 and CD15.4].

6.7 These matters comprise the following topics and corresponding policies of the CMWLP:

- Climate Change (SP13).
- Ecology (SP15, DC16).
- Heritage (DC17); and
- Landscape (DC18, DC22).

6.8 In addition to the policies listed above, an assessment against Policy DC13, which directly addresses the extraction of coal is also included in this section of the proof rather than being included in Appendix 2.

SP13 Climate change mitigation and adaptation

6.9 SP13 sets out six criteria against which proposals for minerals and waste management development should demonstrate compliance with. The policy states that proposals for minerals and waste developments should demonstrate that energy management, carbon reduction and resource efficiency have been determining design factors in the development. The policy also states that water use and the requirement for wastewater treatment should be minimised, and the location of the development should minimise the "minerals and waste miles" involved in supplying the minerals.

6.10 Section 4 of this proof of evidence, which discussed the relationship between the WCM proposals and Chapter 14 of the NPPF, lists all the measures being undertaken by the WCM to reduce its carbon emissions and impact upon climate change. The measures are discussed in further detail within the proof of evidence of Ms Leatherdale [WCM/CL/1].

6.11 Taking account of the previously noted measures, the WCM proposals are consistent with Policy SP13. This position was previously supported by CCC in paragraph 6.64 of the March 2019 committee report [CD4.1].

6.12 No further commentary was provided within the October 2020 Committee report [CD4.5] in respect of this policy, so it can reasonably conclude that the WCM proposals remained in accordance with policy SP13 from the council's perspective at that time.

SP15 Environmental assets

6.13 Policy SP15 sets out 6 criteria against which the overall acceptability of a proposal will be assessed.

6.14 From a landscape assessment perspective, this policy is addressed in the proof of Mr Flannery [WCM/JF/1] who concludes that the development of the currently derelict MMS would enhance the local landscape and the visual amenity for a large number of residential receptors over the longer term.

6.15 Accessibility across the MMS would improve following the construction of footpaths connecting High Road to the local footpath network. In terms of the effect upon the local landscape character, Mr Flannery finds that the proposals comply with the Cumbria Landscape Character guidance and Tool Kit. The landscape and visual impacts upon the Lake District National Park were assessed and no significant effects were identified.

6.16 The proof of evidence prepared by Dr Shepherd [WCM/PS/1] confirms that the development of the site will deliver biodiversity net gain, through the implementation of new green infrastructure, further meeting the objectives of policy SP15.

6.17 Based on the above, the proposals are consistent with policy SP15.

DC13 Criteria for energy minerals

6.18 Policy DC13 is the key local policy test for the WCM proposals. The policy test is similar to paragraph 217 of the NPPF. The only material difference between these national and local policies is that the first limb of the policy test within the CMWLP refers to "unacceptable social impacts" alongside a consideration if a proposal is environmentally acceptable. The remainder of Policy DC13 test is consistent with paragraph 217. This is a view shared by CCC as confirmed in paragraph 24 of the signed SoCG.

6.19 The inclusion of an assessment of the social impacts further strengthens the WCM case. WCM scheme has committed to maximising the local economic and social benefits of the proposals through awarding contracts locally wherever possible. These social benefits are discussed in more detail in Section 5 of this proof of evidence and are expanded upon in greater detail within the proof of evidence of Mr Kirkbride and its appendices [WCM/MK/1].

6.20 Given the similarities between policy DC13 and the policy test contained within paragraph 217 of the NPPF please refer to Section 5 of this proof of evidence to view my conclusions in respect of paragraph 217. Those finding are equally applicable to the policy test outlined in DC13, notwithstanding the inclusion of the consideration of social effects, which for the WCM are positive.

6.21 The WCM proposals are therefore consistent with policy DC13. Whilst the method in which the MPA reached its decision was different, CCC nonetheless concluded that the WCM proposals were also in compliance with policy DC13 (paragraph 7.334 of the October 2020 planning committee report CD4.5).

6.22 It should be noted that in reaching this view on DC13, CCC only considered the GHG saving benefit from substituting coal from other sources. The application proposals have now evolved to include significant GHG savings through the operation of the site itself which are detailed in relation to Chapter 14 of the NPPF. This evolution in the WCM proposals further strengthen CCC's previous decision in relation to compliance with Policy DC13.

DC16 Biodiversity and Geodiversity

6.23 The proof of evidence prepared by Dr Shepherd [WCM/PS/1] has assessed the WCM, proposal against policy DC16. In reviewing several facets of the WCM proposal, from a site assessment as well as Habitat Regulations Assessment (HRA) perspective he demonstrates that the application accords with the policy objectives of DC16.

DC17 Historic Environment

6.24 The impact upon the local heritage environment is considered to be positive. The S106 agreement attached to the SoCG includes obligations to make financial contributions towards local heritage assets.

6.25 The report included in Appendix 2 of this proof of evidence has reviewed the effect of the proposals upon the Grade II listed Scalegill Hall and concludes that the WCM proposals will have no impact upon it. In light of the above and the S106 contributions the proposal is in accordance with Policy DC17.

DC18 Landscape and visual impact

6.26 Policy DC18 is addressed in the proof of evidence of Mr Flannery [WCM/JF/1]. The policy advises on the avoidance of significant landscape and visual effects and advocates the use of the Cumbria Landscape Character Guidance and Toolkit. Whilst Mr Flannery's proof recognises that there will be some significant impacts, particularly in relation to the Pow Beck Valley, it also notes that these have been minimised by directing mineral development to the less sensitive locations. The originally submitted Design and Access Statement (DAS) [CD1.66] explained that the Pow Beck Valley was initially selected for the site of the main mine. However, the Marchon site was eventually selected as it would have had less of a visual impact in that location amongst other advantages such as its size, brownfield status, and its allocation for employment within the local plan [CD5.11].

6.27 It has been agreed with CCC through the SoCG (paragraph 56) that the designs of the proposed structures were acceptable, subject to the imposition of agreed planning conditions, and that the WCM proposals in is this respect were in accordance with Policy DC18.

DC22 Restoration and aftercare

6.28 Policy DC22 seeks the submission of proposals "with sufficient detail to clearly demonstrate that the overall objectives of the scheme are practically achievable, including a vision for overall restoration of the site, and to include proposals for appropriate after-use and the means to achieve it".

6.29 The policy sets out requirements for proposals for different after-uses. For proposals for nature conservation and amenity after-use (as is proposed in the WCM application), an "aftercare

management programme" is required "of at least 5 years, but longer where required to ensure that the restoration scheme is established". The proposals must be "appropriate for the landscape character and wildlife interest of the area", practical, of a high quality appropriate to the area, compatible with neighbouring land uses, completed within a reasonable timescale and progressively as far as practicable.

6.30 The WCM proposals will include a 10-year aftercare period (as set out in the s106 agreement included in the SoCG), exceeding the requirements of this policy.

6.31 The restoration of the site from an ecological perspective is discussed in detail within the proof of evidence of Dr Shepherd [WCM/PS/1]. Within that document he notes that the restoration proposals will deliver a net positive biodiversity end use which accords with the policy objectives of DC22.

6.32 Mr Flannery also discusses policy DC22 within his proof [WCM/JF/1] and finds that from a landscape perspective the WCM proposals accord with Policy DC22.

6.33 Paragraph 57 of the SoCG between the applicant and CCC, state that the restoration proposals for the site are in accordance with Policy DC22.

Overall assessment against the policies of the CMWLP

6.34 Based upon the details presented within this proof of evidence and its appendices, alongside the proofs of evidence prepared by others on behalf of the applicant, the WCM proposals are consistent with the policy requirements of the CMWLP.

Copeland Local Plan (2013 – 2028) Core Strategy and Development Management Policies DPD

6.35 The SoCG (paragraph 32) with CCC has agreed that the following are the principal relevant policies of the Copeland Local Plan (CLP):

- ST1 Strategic Development Principles
- ST2 Spatial Development Strategy
- ST3 Strategic Development Priorities
- ST4 Providing infrastructure
- ER10 Renaissance through Tourism
- ER11 Developing Enterprise and Skills

- ENV1 Flood Risk and Risk Management
- ENV2 Coastal Management
- ENV3 Biodiversity and Geodiversity
- ENV4 Heritage Assets
- ENV5 Protecting and Enhancing the Borough's Landscapes
- ENV6 Access to the Countryside
- DM3 Safeguarding Employment Areas
- DM8 Tourism development in rural areas
- DM9 Visitor Accommodation
- DM10 Achieving Quality of Space
- DM11 Sustainable Development Standards
- DM22 Accessible developments
- DM24 Development Proposals and Flood Risk
- DM25 Protecting Nature Conservation sites, Habitats and Species
- DM26 Landscaping
- DM27 Built Heritage and Archaeology
- DM28 Protection of Trees

6.36 As with the policies noted in the CMWLP, this section of the proof addresses the following specific policies of the Copeland Local Plan.

- Climate Change (DM11)
- Ecology (ENV3, DM25)
- Heritage (ENV4, DM27); and
- Landscape (ENV5, DM26)

6.37 The remaining policies are addressed in Appendix 1 of this proof of evidence.

Climate Change

DM11 Sustainable Development Standards

6.38 As was noted in relation to Policy SP13 of the CMWLP, the measures being undertaken by the WCM proposal to ensure the project is as sustainably designed as possible are set out in Section 4 of this proof of evidence. The measures outlined demonstrate that the application proposals are consistent with the policy objectives of DM11.

Ecology

ENV3 Biodiversity and Geodiversity

6.39 Policy ENV3 sets out a series of measures that will be implemented to support the implementation of the UK and Cumbria Biodiversity Action Plan. The proof of evidence prepared by Dr Shepherd [WCM/PS/1] provides a detailed commentary in relation to the WCM proposals and has assessed the scheme against the objectives set out in Policy ENV3.

6.40 The evidence presented by Dr Shepherd demonstrates that the WCM proposals are consistent with the objectives of policy ENV3.

DM25 Protecting Nature Conservation Sites, Habitats and Species

6.41 Policy DM25 of the Copeland Local Plan states that development proposals should protect biodiversity value and minimise fragmentation of habitats as well as maximising opportunities for conservation, restoration, enhancement and connection of habitats. The policy also confirms that any likely significant effects on internationally important sites within the Borough and a 20km radius of the Borough boundary must be taken into account, as well as those sites are hydrologically linked to the development plan area.

6.42 As is noted in Dr Shepherd's proof of evidence, the application proposals, through the undertaking of Shadow Habitat Regulation Assessment, have demonstrated that the WCM proposals will not result in any likely significant adverse effects upon internationally designated nature sites.

6.43 The loss of open mosaic habitat from the operational site will also be compensated through the creation of a mosaic of habitats as part of the landscape and Ecology Management Plan for the landscape mounds that will fringe the eastern and northern boundaries of the site and post decommissioning the restoration of the whole site to a green space with semi-natural habitat. This approach to is consistent with the policy objectives of DM25.

6.44 Dr Shepherd's proof provides a comprehensive assessment of all the effects from an ecological perspective and demonstrate that the WCM proposals are consistent with Policy DM25.

Heritage

ENV4 Heritage Assets

6.45 Policy ENV4 outlines a series of policy measures that seek to maximise the value Borough's heritage assets. The S106 agreement included within the signed SoCG includes a financial obligation to improve local heritage assets close to the site.

6.46 In relation the effect of the proposals upon the Grade II listed Scalegill Hall, the report included in Appendix 2 of this proof of evidence demonstrates that the proposals will have no impact upon this heritage asset.

6.47 The WCM proposals are consistent with the objectives of policy ENV4.

DM27 Built Heritage and Archaeology

6.48 Policy DM27 sets out that development which affects listed buildings will only be permitted where it does not have a significant effect on the setting or important views of the building.

6.49 The Grade II Listed Scalegill Hall is the nearest listed building to the site. The heritage note included in Appendix 2 of this proof of evidence demonstrates that the WCM proposals will have no impact upon this heritage asset.

6.50 The WCM proposals are consistent with the policy objectives of DM27.

Landscape

ENV5 Protecting and Enhancing the Borough's Landscapes

6.51 Policy ENV5 provides a series of measure associated with protecting natural landscapes within the Borough. The RLF and part of the conveyor route are located within an area designated as being of County level landscape importance.

6.52 As is noted within the submitted DAS, the MMS was moved from the Pow Beck Valley to the Marchon site, to reduce the impact of the proposal upon landscape character.

6.53 The remaining element, the RLF, which can only be attached to the rail line which already runs through the Pow Beck Valley, has been designed to reduce the level of significant effects upon the landscape and visual receptor within the Pow Beck. Measures to reduce the visual effect of the RLF have included:

- Tree planting on the eastern side of the railway line to screen the rail sidings, access road and low-level activity from the east.
- A 15m coal loading facility, significantly lower than the standard 25m high loading facilities.
- The entire process of loading will be undertaken in an enclosed environment at the RLF.
- A lower profile storage bunker has been included.
- Different finishes have been considered including rubble stone plinths, timber cladding and composite deck roofing toe break up the mass of the building and to create an agricultural type of appearance.

6.54 It is also concluded within the proof of Mr Flannery that both the operational phase and the after use of the Marchon site can be considered an enhancement of a derelict site within the Borough.

6.55 The WCM proposals are consistent with the objectives of policy ENV5.

DM26 Landscaping

6.56 Policy DM26 sets out that all proposals will be assessed in terms of their potential impact upon the landscape. The policy also directs applicants to review the Cumbria landscape character assessment [CD10.3] and Cumbria Historic Landscape Characterisation [CD10.4] documents.

6.57 The policy also states that areas designated as Landscape of County Importance on the proposals Map (which includes the RLF and part of the Conveyor Route of the WCM proposals) will be protected from inappropriate change. The policy also states that landscaping schemes are to be maintained for a minimum of 5 years.

6.58 This policy is comprehensively addressed within the proof of evidence of Mr Flannery [WCM/JF/1], drawing upon some of the points noted above where relevant in relation to Policy ENV5. Policy DM26 highlights the importance of using the latest character assessment which has been referred to in the assessment undertaken by Mr Flannery. The proposed aftercare period of 10 years as outlined in the S106 included within the SoCG exceeds the policy requirements of DM26.

6.59 The evidence prepared by Mr Flannery confirms that the WCM proposals are consistent with the policy objectives of DM26.

The Copeland Local Plan 2013-2028 – proposals Map and Copeland Local Plan 2001-2016 'Saved' Policies (June 2015)

6.60 The following 'Saved' Policy is most relevant to the WCM proposals:

- Policy EMP 3: Employment opportunity Sites

6.61 The former Marchon site is designated as an employment opportunity site on the Copeland Local Plan 2013-2028 Proposals Map, to which saved policy EMP 3 applies. The site has been unused since 2005 and has been allocated for an employment use under policy EMP3 since 2001.

6.62 The Marchon site was one of three sites identified under policy EMP 3, the other two sites were within the Pow Beck Valley in Whitehaven and at the Leconfield Industrial Estate in Cleator Moor. All three sites remain largely undeveloped despite the EMP3 allocation.

6.63 Within the introductory text to the EMP3 policy (Paragraph 5.2.16 of CD5.11), it states that the sites that have been identified within the policy are suitable for a wide range of employment uses but also may be suitable for non-employment uses.

6.64 In relation to the Marchon site, the policy notes the site history and former uses, and that the EA is responsible for the inspection and remediation of contamination on site. The supporting text also refers to the development of subsequent documents which will consider how best to develop the detailed proposals for the site alongside the production of design guidance. These were due to be produced as part of the wider Local Development framework however none were produced.

6.65 Policy EMP3 provides broad support for the redevelopment and reuse of the Marchon site. Its primary focus is the reuse of the site for employment use however within the policy it also does not prohibit non-employment uses.

6.66 Despite the policy support, the site has failed to be developed to support any employment use over the 20 years since it was initially allocated. The policy also refers to the known contamination issues which are detailed within the submitted ES.

6.67 The WCM proposals are fundamentally consistent with Policy EMP 3. The application scheme will deliver 500 jobs using the site and support further 1500 within the supply chain. The

remaining areas of contamination will be investigated and remediated, in accordance with planning conditions included in the SoCG.

6.68 The WCM proposals are consistent with the saved policy EMP3 of the 2001 -2016 Copeland Local Plan.

Other draft or emerging development plan documents

6.69 The following emerging or draft development plan documents are relevant:

- The West Whitehaven Supplementary Planning Document (SPD) issues and options consultation report, Copeland Borough Council, November 2012 [CD5.13]
- Copeland Local Plan 2017-2035, Preferred options Draft, September 2020 – [CD5.10]

West Whitehaven SPD – Issues and Options – 2012

6.70 The West Whitehaven issues and options SPD identifies a number of potential uses for the Marchon site, which forms a part of the southern extent of the SPD area. A series of options for the use of the site are outlined comprising wildlife and natural environment enhancements, tourism and leisure facilities, mixed use and temporary accommodation to support the construction of the proposed Moorside nuclear power station (now stalled).

6.71 The SPD has not progressed since the issues and options consultation in November 2012. The consultation feedback on the issues and options raised is unavailable and a note on the Copeland Borough Council website under the heading of the West Whitehaven SPD states that *"Representations received during the consultation process are currently being considered."*

6.72 The draft SPD provides little in terms meaningful policy direction due to the early stage in its development. The Marchon site is a prominent brownfield site and aside from the option that considered a nature conservation use, all other options proposed the site for redevelopment.

6.73 As was noted in the committee report (paragraph 6.23 CD4.5) the West Whitehaven SPD is a material consideration but as it has not progressed further since 2012 it should carry very little weight when considering the WCM proposals. This is further supported by the agreed SoCG between CCC and the applicant in which it was agreed that the SPD should carry little or no weight (paragraph 40 of the SoCG).

6.74 I agree with this approach, due to age and the lack of feedback in relation to the issues and options version of the SPD, it should be given little to no weight in the consideration of the application proposals.

Copeland Local Plan 2017-2035, Preferred Options Draft, September 2020

6.75 The preferred options draft of the new Copeland Local Plan which covers 2017 to 2035 was issued for consultation between the 20 September and 30 November 2020. The preferred options are drafted on the basis that the WCM proposals have planning consent.

6.76 The WCM proposals are listed as one of 13 key drivers for economic change in the Borough, responsible for creating a period of change and transformation that brings *"new opportunities, placing the Borough in a key position to provide organisations, companies and home workers with the right environment to operate from"* [CD5.10 paragraph 21.1.1).

6.77 The site is listed as one of eight physical locations within the Borough that will be drivers of growth. These comprise the following sites (CD5.1 paragraph 21.1.1):

- Sellafield.
- **A new metallurgical coal mine to the south of Whitehaven.**
- West Lakes Science and Technology Park.
- West Cumberland Hospital and Medical School in Whitehaven and the UCLAN Centre for excellence in rural medicine.
- New link road and growth corridor to the east of Whitehaven.
- The North Shore Development; and
- Whitehaven Harbour.

6.78 The preferred options underline the large scale of the economic asset [page 74 CD5.1] that the WCM proposals will become within the context of the wider Copeland Borough.

6.79 The central role that the WCM proposals will be anticipated to play in being an economic driver for the Borough supports the view that the economic benefits delivered by the project will be significant at the local authority level. This supports substantial weight being attached to these economic benefits of the WCM proposals.

6.80 However, notwithstanding this due to the early stage of the emerging local plan, only minor weight should be attached to the policies contained within it, this approach is in accordance with paragraph 48 of the NPPF.

6.81 Nevertheless, the document does provide a clear indication of the large scale of benefit that the WCM proposals will deliver within the context of Copeland Borough for the duration of the next local plan period.

The extent to which the proposed development is consistent with the development plan for the area

6.82 No objections have been made to the proposals by any statutory of local or mineral planning consultees referring to any of the adopted or emerging local plan policies.

6.83 The local plan consists of the CMWLP and the CLP including its saved policies. The details contained within this proof and that of other relevant witnesses appearing on behalf of the applicant demonstrate that the WCM proposals are consistent with both elements the local plan.

7.0 PLANNING BALANCE AND CONCLUSIONS

7.1 The application proposals seek permission for one of the lowest impact mineral extraction projects in the world, committing through a legally binding mechanism (S106 agreement) to ensure that the project will be a net zero mining scheme.

7.2 The WCM proposals are consistent with the development plan for the site, which comprises both the Cumbria Minerals and Waste Local Plan and the Copeland Local plan.

7.3 This position has been supported previously by CCC when it is resolved on three separate occasions at planning committee to approve the WCM proposals.

7.4 Little weight should be attached to the policies outlined within the emerging preferred option Copeland Local Plan. Notwithstanding this the preferred options were issued on the basis that the WCM proposals had gained approval and as such were listed as one of the main economic drivers for growth within the borough for the next plan period.

7.5 In respect of Chapters 14 and 17 of the NPPF, this proof of evidence has demonstrated that the WCM proposals are consistent with the policy objectives required for meeting the challenge of climate change whilst also facilitating the sustainable use of minerals.

7.6 The WCM proposals meet the coal specific policies in both the NPPF (paragraph 217) and the CMWLP (Policy DC13). My proof of evidence has demonstrated that the WCM application proposals are both environmentally and socially acceptable, and that planning conditions and obligations can be used to provide safeguards to the Mineral Planning Authority that can be ensure this remains the case through the site's operation.

7.7 If the Inspector or the SoS decides separately that the WCM proposal is not environmentally acceptable then the significant benefits of the proposal will clearly outweigh the impact of any known potentially disputed effects. If this were to be the case, the WCM proposal would still be in accordance with the coal specific policies of the NPPF and the CMWLP.

7.8 There is no moratorium on coal extraction, unlike peat extraction which the NPPF prohibits the granting of permission for new or extended sites (paragraph 211 d).

7.9 The Government considers that existing planning policy and legislation sets a clear expectation that climate change will be taken into account alongside the potential that coal extraction can take place in the correct circumstances (as outlined in paragraph 217 of the NPPF).

7.10 The Government has not varied or qualified its planning guidance in relation to coal extraction, as it has done for wind turbines for example. With the July 2021 update to the NPPF the government had opportunity to do so, but did not, meaning that the approach noted above to coal extraction remains a fully up to date policy position.

7.11 Coal is listed in the NPPF as a mineral resource of national importance. Furthermore, metallurgical coal, which the application proposals will produce is recognised by the EU as being a resource of critical importance [CD9.14].

7.12 Demand for metallurgical coal in steel production is likely to remain steady for the life of the application proposals (as per the proof of evidence produced by Mr Truman WCM/JT/1).

7.13 Alternatives to the use of metallurgical coal in steel production, such as hydrogen are unlikely to be commercially available during the life of the application site so as to reduce the need for metallurgical coal (see proof of evidence of Mr Truman WCM/JT/1).

7.14 It is set against this context that metallurgical coal will remain a critical part of modern society's needs for the proposed life of the application site to 2049.

7.15 In accepting the two above points the focus now switches onto transitioning, as required in paragraph 152 of the NPPF, to a lower carbon future. However, the continued need for metallurgical coal is an inescapable part of that future for at least the next 30 years. That means taking every viable step possible to reduce the carbon footprint of the critically essential coal that is needed.

7.16 Primarily, this reduction will be achieved through two means. Firstly, the application proposal by virtue of its location will be closer to end user of metallurgical coal in the UK and Europe and as such will have a much lower transportation carbon footprint than the same coal transported predominantly from the USA. The coal extracted from the WCM proposals will substitute imported coal, removing that transportation carbon from the overall carbon footprint of the steel to be produced.

7.17 Secondly, the extraction of the coal itself will be carbon net zero through the implementation of the measures to reduce carbon emissions directly on site and through the acquisition of suitability accredited carbon offsetting measure for the remaining emissions. This is a legally binding commitment that is enshrined within the s106 (see signed SoCG).

7.18 Based on the above, the proposed development accords with the development plan and there are no material considerations which indicate that it would be appropriate to depart from the development plan. Accordingly, the application proposals should be allowed.

Signed: Sam Thistlethwaite **Dated: 10/08/21**

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/ST/2

This is the Appendix marked WCM/ST/2 referred to in the Proof of Evidence of Samuel Thistlethwaite dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Document No.

Document No.1

This is document 1 referred to in the Appendix marked WCM/ST/2 on the Proof of Evidence of Samuel Thistlethwaite dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442664v1

Cumbria Minerals and Waste Local Plan 2015 - 2030

SP1 Presumption in favour of Sustainable development

1.1 This policy largely reflects one of the central themes of the NPPF which supports sustainable development. The policy sets out a broad approach for the determination of planning applications in line with rest of the plan and other local plan documents (such as neighbourhood plans where relevant). The policy also sets out a policy test for proposals which are brought forward that do not have specific policy relating to them.

1.2 The WCM proposals are consistent with Policy SP1. Proposals for coal extraction are directly addressed through policy DC13 of the CMWLP which is discussed in the main body of my proof of evidence.

1.3 The details outlined in relation to Chapter 14 of the NPPF demonstrate that the WCM proposals constitute sustainable development.

SP14 Economic benefits

1.4 Policy SP14 states that proposals for new minerals developments should demonstrate how they would realise their potential to provide economic benefit, including measures such as the jobs to be created and the support given to other industries and developments. Relevant adverse impacts should be weighed against the overall economic benefit.

1.5 The WCM proposals will create 500 long term jobs for the life of the site, of these 50 will be apprenticeships. This is a significant long term economic benefit alongside the other economic benefits associated with the project. The economic benefits of the proposals are discussed in greater detail within the proof of evidence of Mr Kirkbride [WCM/MK/1] and its associated appendices.

1.6 The proposals are consistent with policy SP14.

SP16 Restoration and aftercare

1.7 Policy SP16 states that restoration and aftercare schemes for mineral working should demonstrate that best practicable measures have been taken. This could include consideration of a range of factors such as biodiversity, landscape enhancement, flood risk mitigation, water quality and ameliorating contaminated land.

1.8 The WCM proposals will delivery restoration benefits including biodiversity and landscape enhancements particularly across the MMS and the former Main Band Colliery site. The restoration of both locations will also involve the amelioration of known contaminated land.

1.9 Paragraph 57 of the signed SoCG confirms that CCC and the applicant agree that the application proposals accord with policy SP16.

DC2 – General Criteria

1.10 Policy DC2 sets out general criteria that minerals and waste sites must demonstrate, where appropriate, that they have been addressed. The criteria relates to the provision of appropriate assessments in relation to impacts upon the natural historic environment as well as human health and that proposals are designed to address impacts on these receptors. This the general approach that the submitted EIA has undertaken.

1.11 The policy states that the proposals should not give rise to adverse impacts upon air quality, particularly with Air Quality Management Areas (AQMA). The submitted EIA [CD1.131] alongside the no objection from the CDC EHD confirm that the WCM will not have an adverse effect upon air quality. This position was agreed with CCC through the signed SoCG (Paragraph 54).

1.12 The section of the main body of this proof of evidence that addresses Chapter 14 of the NPPF outlines the measures to be undertaken to reduce the GHG emissions of the application proposals. These measures satisfy the policy requirements of DC2.

1.13 The final criteria relates to ground stability. Responses to the application from The Coal Authority, Environment Agency, the Health and Safety Executive and CBC EHD have raised no objections to the proposals on the grounds of subsidence.

1.14 The WCM proposals are consistent with policy DC2.

DC3 - Noise

1.15 Policy DC3 requires that proposals for minerals developments shall not exceed background noise levels LAeq 1 hour (free field) by more than 10dB(A) at noise sensitive properties. Different maximum limits are then imposed depending on the day of the week and the time of day. The submitted noise assessment included in the EIA [CD1.127] confirms that this is achievable and corresponding noise limits have been included in draft Conditions within the SoCG. No objections have been raised by CDC EHD in relation to the noise impacts of the proposals.

1.16 The WCM proposals are consistent with policy DC3. Paragraph 53 of the SoCG confirms that CCC agreed with the applicant that the application proposals accorded with Policy DC3.

DC5 - Dust

1.17 Policy DC5 requires applicants to show that there will be no demonstrable impacts with regard to dust emissions. The submitted EIA alongside the no objection from the CBC EHD confirm WCM proposals will not have a demonstrable impact in relation to dust emissions. This position has been agreed between CCC and the applicant in paragraph 54 of the SoCG.

1.18 The WCM proposals are consistent with policy DC5.

DC6 – Cumulative environmental impacts

1.19 Policy DC6 requires that the cumulative impacts of minerals and waste developments should be assessed in the light of other land-uses in the area. These include impacts on local communities and the environment, impacts from plant, vehicles, the wider economy and local amenity, community health and recreation.

1.20 The cumulative environmental effects have been discussed in response to Paragraph 217 sub para b) on the NPPF in the main body of this proof of evidence. Based on this the cumulative impacts associated with the development of the WCM alongside the other assessed sites is considered as being acceptable. This was a view shared by the CCC in its October 2020 planning committee report (paragraph 66 of the SoCG).

1.21 The WCM proposals are consistent with policy DC6.

DC1 – Traffic and transport

1.22 Policy DC1 requires that mineral developments should be located where they have potential of rail transport and minimise operational "minerals and waste road miles"

1.23 Overall, the development is acceptable in highways terms and will use of the rail network for the transportation of products to markets. Mine waste will be managed on site, being returned into the mine using the conveyor. The extensive use of rail is highly sustainable in transportation terms, and effectively eliminates "minerals and waste road miles".

1.24 The use of rail transportation means that the development accords with Policy DC1. This is a position that has been agreed between the applicant and CCC in paragraph 49 of the SoCG.

1.25 The WCM proposal is consistent with policy DC1.

DC15 – Mineral safeguarding

1.26 Policy DC15 seeks to safeguard mineral resources that are shown on the Policies Map. The base of the Pow Beck Valley is safeguarded for the extraction of sand and gravel for aggregate production, this is the only surface element of the proposals (The RLF) that overlaps with the CMWLP Policy Map Part 2 Minerals safeguarding areas [CD5.12].

1.27 Proposals for non-mineral development within the Mineral Safeguarding Areas that do not allow for the prior extraction of minerals will only be permitted where, amongst other factors, the development would not prevent minerals extraction taking place in the future. The use of the RLF site is temporary for the life of the WCM proposals after which it will be restored [CD2.4]. Once restored any safeguarded sand and gravel resources can be accessed for any future extraction.

1.28 The below ground extraction area overlaps with the same safeguarding designation south of Sandwith, however due to the depth of the excavation below ground this would not sterilise any sand and gravel resources as they could be extracted at the surface level above.

1.29 The WCM proposals are consistent with policy DC15.

DC19 Flood risk

1.30 Policy DC19 states that development proposals should not be considered without a site-specific Flood Risk Assessment appropriate to the scale, nature and location of the development. It states also that developments should incorporate sustainable drainage systems unless they can be demonstrated to be inappropriate.

1.31 A flood risk assessment was included in the application [CD1.119] and was assessed by the Lead Local Flood Authority and the Environment Agency who raised no objections against the proposals on flood management grounds subject to the imposition of conditions.

1.32 The MPA, when taking in to account the imposition of relevant conditions, considered that the proposals were in accordance with the requirements of policy DC19. This position has been reflected in paragraph 51 of the signed SoCG.

1.33 The WCM proposals are consistent with policy DC19.

DC20 The water environment

1.34 Policy DC20 states that developments should demonstrate that they would have no unacceptable quantitative or qualitative adverse effects on the water environment, both within the application site and its surroundings. This includes coastal waters and groundwater resources.

1.35 The effects of the proposals upon the surrounding water environment have been assessed by the Lead Local Flood Authority the Environment Agency and the Marine Management Organisation who raised no objections against the proposals for managing water on site subject to the imposition of conditions.

1.36 The MPA considered the WCM proposal accorded with Policy DC20 this position has been reflected in paragraph 52 of the signed SoCG.

1.37 The WCM proposals are consistent with policy DC20.

DC21 Protection of Soil resources

1.38 Policy DC21 sets out a series of measures that are to be complied with to preserve soil resources. The only relevant section of this policy to the WCM proposal is that the soil resources are to be conserved and maintained in a viable condition to be used at the restoration of the site.

1.39 The MMS is brownfield largely covered by a concrete hardstanding and has a limited soil resource. The soils disturbed as part of the construction of the conveyor will be handled in accordance with best practice which will be conditioned (Condition 87, 88 SoCG). Soils disturbed at the RLF will be stored in longer term mounds suitably profiled to ensure their viability before being used at restoration.

1.40 No objection was raised to the soil handling proposals by any statutory consultees and a series of conditions have been imposed to ensure that all relevant soil resources are handled correctly.

1.41 The WCM proposals are consistent with policy DC21.

Copeland Local Plan (2013 – 2028) Core Strategy and Development Management Policies DPD

ST1 Strategic Development Principles

1.42 Policy ST1 sets out broad strategic principles that underpin the boroughs planning policies. Central to the economic and social sustainability objectives is the creation of new jobs alongside support schemes which create a diversity in the job market. The WCM proposals will create 500 jobs on site within a new industry, therefore complying with these objectives.

1.43 The environmental sustainability policy aims supports projects that minimise carbon emissions and maximise energy efficiency. The reuse of previously developed land particularly within the main towns of the borough such as Whitehaven is encouraged alongside the use of sustainable transport infrastructure. The MMS is a prominent brownfield site within Whitehaven and the project will utilise rail infrastructure to transport all the extracted coal resource from the site.

1.44 The measures to be employed on site to reduce GHG emissions, as outlined in Section 4 of the main body of this proof of evidence, are also in accordance with policy ST1.

1.45 The protection, enhancement and restoration of the boroughs valued assets form a further set of principles. The WCM proposals will protect the valued landscape and ecological assets within the site and provide opportunities for enhancement at restoration and through the life of the project. The WCM proposals will also deliver the restoration of the derelict Main Band Colliery alongside the reclamation of the derelict former Marchon works.

1.46 The WCM proposals are consistent with the broad range of spatial development principles outlined in policy ST1.

ST2 Spatial Development Strategy

1.47 Policy ST2 provides a policy approach to the preferred distribution of development throughout the borough. The policy specifically focusses large-scale development towards Whitehaven, which the WCM proposals comply with.

1.48 Criteria c) of policy ST2 contains a provision to allow essential infrastructure in locations outside of the settlement limits. The RLF is located outside of the settlement limits however this is essential infrastructure for the wider development which will remove road miles of the mineral extracted (as per Policy DC1 of the CMWLP). This was a view shared by CCC in paragraph 6.84 March 2019 committee report [CD4.1].

1.49 The WCM proposals are consistent with the objectives of policy ST2.

ST3 Strategic Development priorities

1.50 Policy ST3 identifies a series of sites across Copeland that will be prioritised for development to support wider regeneration objectives of the borough. The Marchon site is noted as being one location that will have a significant potential role to play in creating employment opportunities to support the wider economic regeneration objectives.

1.51 The supporting text (Paragraph 3.6.3 of CD5.8) notes that further detail on this objective in relation the Marchon site will be supplied in the emerging West Whitehaven Supplementary Planning Document (SPD). The draft SPD is discussed in more detail in the main body of this proof of evidence.

1.52 The WCM proposals will bring the former derelict Marchon site back into use proving employment for over 500 people directly whilst creating a further 1500 jobs in the wider local economy.

1.53 The WCM proposal are consistent with Policy ST3.

ST4 Providing Infrastructure

1.54 Policy ST4 seeks to ensure that where there is infrastructure demand created by a proposal that it can either be met by existing facilities or through other mechanisms to ensure that it is created where it is needed.

1.55 The main additional infrastructure demand to be created will be the use of the rail to transport coal from the site. The project includes an underground conveyor from the MMS a new rail loading facility including a new siding. Significant investment is proposed by the applicant to ensure that the most appropriate infrastructure to support the proposals is provided [See WCM/MK/1 for more details].

1.56 The WCM proposals are consistent with Policy ST4.

ER10 Renaissance through Tourism

1.57 Policy ER10 states that the council will maximise the potential of tourism in the borough, particularly outside the Lake District National Park Boundaries. The policy provides specific guidance for new tourism accommodation and more broadly support new tourism development.

1.58 Mr Flannery [WCM/JF/1] notes that many of the significant visual effects are associated with the proximity of the Coast-to-Coast path to the RLF. However, it is acknowledged that this is transitory, and the level of visual effect would reduce as distance from the RLF increases assisted by the screening and filtering of views by existing hedgerows and hedgerow trees. It is my opinion that this visual impact will not materially undermine the wider tourism offer with Copeland, nor dissuade people from using the coast-to-coast walking route within Copeland.

1.59 The WCM proposals are consistent with policy ER10.

ER11 Developing Enterprise and Skills

1.60 Policy ER11 supports inward investment and diversification of the Borough's economy and ensuring that the benefits of regeneration provide a catalyst for change in the communities living nearby, by improving connectivity, including transport links and securing training and employment agreements.

1.61 The WCM will create 500 jobs on site of which 50 will be apprenticeships. The applicants have also made a commitment to ensure that 80% of those to be employed on site will be from with 20 miles [WCM/MK/1]. A further 1500 indirect jobs are likely to be created through the supply chain.

1.62 The jobs to be created on site will help diversify and dilute the wider reliance within Copeland upon employment within the nuclear sector, a key objective of Policy ER11.

1.63 The WCM proposals are consistent with the objectives of policy ER11.

ENV1 Flood risk and risk management

1.64 Policy ENV1 sets out a policy approach in relation to managing flood risk for new developments. The WCM proposals are unaffected by flood risk, and no objections have been raised against the proposals by the EA or the LLFA.

1.65 The WCM proposals are consistent with the objectives of policy ENV1.

ENV6 Access to the Countryside

1.66 Policy ENV6 requires proposals to ensure access to the countryside by investigating opportunities for reclaiming contaminated and derelict land for recreational purposes. The re-development of the Marchon site meets several of these criteria outlined in policy ENV6.

1.67 CCC in its October 2020 committee report stated that the WCM proposals accorded with policy ENV6. This is reflected in the signed SoCG (paragraph 55) in which the CCC and the applicant

agree that the proposals accorded with policy 55 and furthermore that this is a benefit of the scheme.

1.68 The WCM proposals are consistent with policy ENV6.

DM3 Safeguarding employment sites

1.69 The MMS is located within the former Marchon site which has been allocated through policy EMP 3 of the Copeland Local Plan 2013-2028 – proposals Map and Copeland Local Plan 2001-2016 'Saved' Policies (June 2015).

1.70 Policy DM3 sets out criteria for the development of employment sites for non-employment uses. The WCM proposal will provide a high level of employment on site, fully complying with the objectives of this policy and the saved EMP3 policy.

1.71 The WCM proposals are consistent with policy DM3.

DM8 Tourism Development in Rural Areas

1.72 Policy DM8 relates to the development of new tourism facilities across the borough providing criteria for applications to adhere to if they are located outside of identified Tourism Sites.

1.73 The WCM proposals do not propose any tourism related development, as such the proposals are consistent with Policy DM8.

1.74 This policy was not included within the list of principal relevant policies within any of the CCC planning committee reports [CD4.1 and CD4.5] for the WCM proposals.

DM9 Visitor Accommodation

1.75 Policy DM9 provides specific policy guidance for the creation of new or improved visitor accommodation. The policy provides criteria for the development of new rural holiday homes, caravans, chalets, camping sites and beach chalets.

1.76 The WCM proposals do not include any element of visitor accommodation and as a result the proposal is consistent with policy DM9.

1.77 This policy was not included within the list of principal relevant policies within any of the CCC planning committee reports [CD4.1 and CD4.5] for the WCM proposals.

DM10 Achieving Quality of place

1.78 This policy sets out broad design objectives that all forms of development should adopt. There is limited scope for a project of the scale and type of WCM scheme to apply the design requirements fully, however elements of the MMS will be set within a new landform which has been designed to soften its effect upon the nearby built-up areas.

1.79 The design of the RLF, using a sympathetic material palette as noted in Mr Flannery's proof of evidence [WCM/JF/1] that reflect typical agricultural buildings in the area is another example where the principle of policy DM10 have been applied where possible.

1.80 The WCM proposals are consistent with policy DM10.

DM22 Accessible Developments

1.81 Policy DM22 sets out urban design criteria objectives relating to accessibility, parking, travel demand and travel planning. No objections have been raised against the proposals in relation to policy DM22 by any statutory consultees. Furthermore, the proposals comply with the other relevant highways policy within the CMWLP, namely Policy DC1.

1.82 The WCM proposals are consistent with policy DM22.

1.83 This policy was not included within the list of principal relevant policies within any of the CCC planning committee reports [CD4.1 and CD4.5] for the WCM proposals.

DM24 Development Proposals and Flood Risk

1.84 Policy DM24 sets out a policy approach in relation to assessing flood risk for new developments. A drainage and flood risk assessment was submitted with the application [CD1.119] and demonstrated that the site lies within Flood Zone 1 and is unaffected by and flood risk. No objections have been raised against the proposals by the EA or the LLFA in relation to flooding.

1.85 The WCM proposals are consistent with the objectives of policy DM24.

DM28 Protection of Trees

1.86 Policy DM28 provide policy objectives in relation to assessing the effects of development proposals upon trees, Tree Preservation Orders, veteran trees and Ancient Woodland. The application was accompanied by a tree survey. The effect of the proposals upon the Ancient Woodland at Roska Park and Bell House Wood is comprehensively addressed within the proof of evidence of Dr Shepherd [WCM/PS/1]. In line with Dr Shepherd's proof of evidence, the WCM proposals are consistent with Policy DM28.

1.87 This policy was not included within the list of principal relevant policies within any of the CCC planning committee reports [CD4.1 and CD4.5] for the WCM proposals.

Summary Table

1.88 The following table summarises the relationship between the WCM proposals and the local plan. The condition refences provided relate to the conditions listed within the signed SoCG between CCC and the applicant.

Development Plan Policy	Consistent or not consistent
Cumbria Minerals and Waste Local Plan (2015-2030)	
ST1 Strategic Development Principles	Consistent No standing objections from statutory consultees
SP13 Climate change mitigation and adaptation	Consistent CCC agreed in March 2019 Committee proposals accorded with SP13 (para 6.64) No standing objections from statutory consultees
SP14 Economic benefits	Consistent CCC agreed in October 2020 Committee proposals accorded with SP14 (para 7.250) No standing objections from statutory consultees
SP15 Environmental assets	Consistent Conditions imposed in relation to policy (28, 29, 30) No standing objections from statutory consultees
SP16 – Restoration and aftercare	Consistent CCC agree in SoCG (para 57) that proposals accord with policy SP16 Conditions imposed in relation to policy (13, 25, 26, 48) No standing objections from statutory consultees
DC1 – Traffic and Transport	Consistent CCC agree in SoCG (para 49) that proposals accord with policy DC1 Conditions imposed in relation to policy (16, 23, 54, 61, 79, 80, 81, 83) No standing objections from statutory consultees

Development Plan Policy	Consistent or not consistent
DC2 – General criteria	Consistent CCC agree in SoCG (para 54) that proposals accord with policy DC2 Conditions imposed in relation to policy (24, 38, 89) No standing objections from statutory consultees
DC3 – Noise	Consistent CCC agree in SoCG (para 53) that proposals accord with policy DC3 Conditions imposed in relation to policy (53, 55, 56, 64, 73, 74, 75, 78, 81, 82, 89, 90) No standing objections from statutory consultees
DC5 – Dust	Consistent CCC agree in SoCG (para 54) that proposals accord with policy DC5 Conditions imposed in relation to policy (63, 89) No standing objections from statutory consultees
DC6 – Cumulative Environmental Impact	Consistent CCC agree in SoCG (para 66) that proposals accord with policy DC6 Conditions imposed in relation to policy (6, 62) No standing objections from statutory consultees
DC13 Criteria for Energy minerals	Consistent CCC agreed in October 2020 Committee proposals accorded with DC13 (para 7.334) Conditions imposed in relation to policy (42, 65, 66, 67, 68, 69, 70, 71) No standing objections from statutory consultees
DC15 Mineral safeguarding	Consistent No standing objections from statutory consultees
DC16 Ecology and Geodiversity	Consistent CCC agreed in March 2019 Committee proposals accorded with DC16 (para 6.139) Conditions imposed in relation to policy (8, 21, 35, 86, 90) No standing objections from statutory consultees
DC17 Historic Environment	Consistent CCC agreed in March 2019 Committee proposals accorded with DC17 (para 6.388) Conditions imposed in relation to policy (45, 57) No standing objections from statutory consultees
DC18 Landscape and visual impact	Consistent CCC agree in SoCG (para 56) that proposals accord with policy DC18 Conditions imposed in relation to policy (9, 35, 52, 60) No standing objections from statutory consultees
DC19 Flood Risk	Consistent CCC agree in SoCG (para 51) that proposals accord with policy DC18 Conditions imposed in relation to policy (19, 20) No standing objections from statutory consultees
DC21 Protection of soil resources	Consistent Conditions imposed in relation to policy (87, 88) No standing objections from statutory consultees

Development Plan Policy	Consistent or not consistent
DC22 Restoration and aftercare	Consistent CCC agree in SoCG (para 57) that proposals accord with policy DC22 Conditions imposed in relation to policy (5, 13, 25, 26, 48, 87, 88, 91, 93, 94, 96) No standing objections from statutory consultees
Copeland Local plan (2013 – 2028) Core Strategy and Development Management Policies DPD	
ST1 Strategic Development Principles	Consistent No standing objection from Copeland Borough Council
ST2 Spatial Development Strategy	Consistent No standing objection from Copeland Borough Council
ST3 Strategic Development priorities	Consistent No standing objection from Copeland Borough Council
ST4 Providing infrastructure	Consistent No standing objection from Copeland Borough Council
ER10 Renaissance through tourism	Consistent No standing objection from Copeland Borough Council
ER11 Developing Enterprise and Skills	Consistent No standing objection from Copeland Borough Council
ENV3 Biodiversity and Geodiversity	Consistent No standing objection from Copeland Borough Council CCC agreed in March 2019 Committee proposals accorded with ENV3 (para 6.139)
ENV4 Heritage Assets	Consistent No standing objection from Copeland Borough Council CCC agreed in October 2020 Committee proposals accorded with ENV4 (para 7.312)
ENV5 Protecting and enhancing the Borough's Landscapes	Consistent No standing objection from Copeland Borough Council
ENV6 Access to the Countryside	Consistent No standing objection from Copeland Borough Council CCC agree in SoCG (para 55) that proposals accord with policy ENV6
DM3 Safeguarding Employment Area	Consistent No standing objection from Copeland Borough Council
DM8 Tourism Development in Rural Areas	Consistent No standing objection from Copeland Borough Council
DM9 Visitor Accommodation	Consistent No standing objection from Copeland Borough Council
DM10 Achieving Quality of place	Consistent No standing objection from Copeland Borough Council
DM11 Sustainable development standards	Consistent No standing objection from Copeland Borough Council

Development Plan Policy	Consistent or not consistent
DM22 Accessible Developments	Consistent No standing objection from Copeland Borough Council
DM24 Development Proposals and Flood Risk	Consistent No standing objections from LLFA or EA or from Copeland Borough Council
DM25 Protecting Nature Conservation Sites, Habitats and Species	Consistent No standing objection from Copeland Borough Council CCC agreed in March 2019 Committee proposals accorded with DM24 (para 6.139)
DM26 Landscaping	Consistent No standing objection from Copeland Borough Council
DM27 Built Heritage and archaeology	Consistent No standing objection from Copeland Borough Council CCC agreed in October 2020 Committee proposals accorded with DM27 (para 7.312)
DM28 Protection of Trees	Consistent No standing objection from Copeland Borough Council
The Copeland Local Plan 2013-2028 – proposals Map and Copeland Local Plan 2001-2016 'Saved' Policies (June 2015)	
Policy EMP 3: Employment opportunity Sites	Consistent No objection from Copeland Borough Council

wh32442615v1

Document No.2

This is document 2 referred to in the Appendix marked WCM/ST/2 on the Proof of Evidence of Samuel Thistlethwaite dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442622v1

1.0 HISTORIC ENVIRONMENT

1.1.1 This is a review of the historic environment chapter of an ES submitted in support of a planning application for a coal mine south of Whitehaven (Ref 4/17/9007) which was approved by Cumbria County Council in March 2019 but has subsequently been called in for review by central government. This review document has been prepared by Headland Archaeology Ltd in advance of hearings before a planning inspector.

1.1.2 The Historic Environment assessment is presented as Chapter 16 of the ES, supported by a subsequent Written Scheme of Investigation (WSI) describing an initial programme of archaeological geophysical survey and trial trench investigations.

1.1.3 The ES chapter was submitted to the planning authority in 2018 and WSI prepared in response to planning conditions in 2019 (Headland Archaeology Ltd). The baseline data collection for the ES took place in 2016.

Policies, Guidance, Legislation and Standards

1.1.4 The guidance, legislation and policy context is presented in the ES Chapter (section 16.3). The list is comprehensive and appropriate to the assessment.

Consultations

1.1.5 The planning authority historic environment officer, Historic England regional inspector and National Trust planning officer were consulted during the preparation of the ES. The respective exchanges are noted, and the local authority historic environment officer is recorded as having approved that the ES baseline data reporting and mitigation strategy was satisfactory (memorandum from Jeremy Parsons dated 16th June 2017).

1.1.6 Given that the local planning authority subsequently approved the scheme, incorporating the recommendations of the historic environment officer, it is assumed that the respective consultees did not raise objections in relation to the content, methodology and conclusions of the historic environment chapter. It would be a more powerful affirmation of the client's case if the consultees' respective approvals of content, methodology and impact assessment were confirmed, recorded and asserted in the ES or supplementary documentation, however the consultation responses are available in the public domain.

1.1.7 Two archaeological planning conditions were placed on the scheme by Cumbria County Council. This demonstrates engagement with the historic environment ES submission and confirmation that the assessment is sufficient to both determine the application and inform the development of appropriate mitigation measures.

1.1.8 It is understood that the Written Scheme of Investigation prepared to meet the requirements of the planning conditions (9 and 56) has not been formally submitted for approval to the planning authority, pending grant of planning permission.

1.1.9 Seeking consultees confirmation that they concur with the original ES submission and subsequent WSI would be useful, however it is noted that further seeking further discussion or agreement with CCC is likely to difficult in light the LPA's neutral stance at the inquiry. It should be noted that Jeremy Parsons is no longer the LPA archaeological advisor, and this role is now performed by Mark Brennand at Cumbria CC.

Assessment Methodology and Significance Criteria

1.1.10 Relevant sources are cited. An initial study area of 1.5 km for non-designated assets, 2 km for grade II listed buildings and 5 km for scheduled monuments, and grade I and I* listed buildings has been used to inform the baseline data collection. The non-designated asset search area only was reduced to 500 m for impact assessment. The baseline data collection was considered appropriate by the local planning authority historic environment advisor.

1.1.11 A standard matrix-led approach to EIA is presented in the ES Chapter. This methodology is appropriate and in line with good practice and industry guidance.

Baseline Conditions

1.1.12 The chapter identifies that there are no relevant nationally designated historic environment assets within 500 m of the site centre. There is a comprehensive list of designated heritage assets within the wider search areas (62 within 5 km of the site).

1.1.13 Within 1.5 km of the site centre there are 156 non-designated heritage assets dating from the Mesolithic through to the industrial era.

1.1.14 The chronological narrative describing heritage assets within and without the site boundary and study areas is well written and comprehensive. Sites are cross referenced to tables and asset mapping (Figures 16.1- 16.3). The historic mapping extracts (Plate 7 and 8) do not show the same site boundary as the asset mapping figures which makes it more difficult for the reader to understand the scheme in relation to features shown on the earlier mapping. The inclusion of only two historic map extracts is less comprehensive than it might otherwise be, and therefore the changes in the landscape are not well illustrated. This is pertinent to understanding that most of the heritage assets within and immediately adjacent to the site are industrial-era agricultural and mineral extraction features. Many of which are no longer extant.

1.1.15 As part of this review a fresh search of local authority historic environment record data and historical mapping was undertaken (July 2021). No new assets or recent discoveries have been made which changes the original baseline data in the ES. A detailed review of one asset (Benhow Wood and Lime Kiln) suggests that the lime kiln will lie outside the site boundary. The position shown on the 1865 1:2500 Ordnance Survey mapping for the lime kiln indicates it lies north east of the site boundary. The baseline data can be regarded as robust and suitable for consideration in 2021.

Assessment of Effects

Enabling and Construction

1.1.16 The assessment of impacts during the construction phase of the scheme is measured and proportionate, if brief. The significance of impacts (before mitigation) is considered by Headland Archaeology Ltd to be robust.

1.1.17 It has not been possible to access or assess the condition of buried mine workings which will be impacted by the scheme. Mitigation of such impacts is proposed.

Completed Development

1.1.18 The potential for operational impacts over and above those considered for the construction phase is dismissed. This might be flawed in relation to any visual impact arising from the scheme which will be of longer duration during the operational phase than the construction of the scheme. The assessment of this impact (on Scalegill Hall grade II listed, 3.1 km away) is not supported by a detailed description of the asset, a clear understanding of its heritage significance or how setting contributes to heritage significance. A quick review of the likely visual impact on the setting of Scalegill Hall based on mapping, description of the scheme, and street-level photography suggests that there will not be any impact on the contribution the setting makes to the heritage significance of this asset. The significance of impact in may be less than the “moderate adverse” stated in the ES, but in the absence of a more detailed baseline data in connection to this asset it is not possible to comment further.

1.1.19 Distinguishing visual impacts upon the settings of heritage assets from direct physical impacts is not easy in the assessment section, but the information is present.

Cumulative Effects

1.1.20 Cumulative effects are considered, although information is noted as limited on other schemes in the area and assessed not to be significant. If more information is now available on housing schemes in the area this might be revisited if considered necessary.

Mitigation Measures

1.1.21 The Applicant proposes a series of mitigation measures- geophysical survey, targeted archaeological trial trenching (and detailed excavation) and recording of mine workings and associated structures. These are appropriate.

1.1.22 The WSI (Headland 2019) defines a methodology to undertake the geophysical survey and archaeological trial trenching in line with the proposed mitigation. However, the WSI does not specify or note the need for the other activities, including the Historic England level II building recording, survey of mine workings or the possibility for further excavations depending upon the results of the trial trenching. This might usefully be reiterated to ensure that it is not overlooked, or WSI amended to include reference to all the proposed mitigation measures, even though it might not yet be possible to know the

detail of what is appropriate until the evaluation work is completed and arrangements to access underground workings have been made.

Residual Effects

1.1.23 The residual effects after mitigation measures have been implemented is considered, and where no mitigation measures proposed the assessed impact is carried through. This is agreed.

Commentary on the Conclusions of the ES

1.1.24 The residual effects, summary and conclusions are presented together: this might have been better presented as distinct sections and is not coherent. There isn't a clear overview and the conclusions are not stated beyond an asset by asset assertion of the residual effects. However, consideration of the ES chapter indicates that impacts on the historic environment as a whole should not represent a significant constraint for this scheme. The baseline data is robust, the heritage assets identified which will be directly impacted are not of the highest order of heritage importance (or sensitivity in EIA terms), and the magnitude and significance of impact is no greater than minor adverse for direct physical impacts and up to moderate adverse on the setting of a single heritage asset 3.1 km away.

1.1.25 The local planning authority historic environment consultee was satisfied with the original ES submission and was able to make a judgement on the application integrating the proposed mitigation measures into a planning condition.

Addendum: assessment of impacts on Scalegill Hall (grade II listed building)

1.1.26 In light of the review above, West Cumbria Mining commissioned a site visit and impact assessment on the likely impacts of the scheme on Scalegill Hall (asset 184).

1.1.27 The site visit was undertaken on 09.08.21 in dry weather with good visibility.

1.1.28 The Historic England listing description of the asset is:

> *Large house. C17 (ruined outbuildings said to be dated 1615) with later additions and alterations. Rendered rubble. Graduated slate roof; stone copings and kneelers, rendered stepped chimneys (one end, one mid). Outshuts to rear. 'T' plan. 2 storeys. Changes in wall surface to left of farmyard front suggest that 3 bays were refronted and roof raised. These bays have symmetrical elevation with central plank door in decoratively carved lugged and corniced architrave; single sash in stone surround to either side. Two 1st floor sashes in architraves (originally mullioned and transomed) with moulded oval frame between, probably for datestone, now rendered over. 2 bays to right have window inserted in former door; 2-light mullioned window on left has sash in stone surround above. Present door in lower range linking house to barn has steps up to loft door on right. All sashes with glazing bars. Ground floor room to right of refronted section has large, moulded, semicircular arch to former kitchen fire-recess. Barn adjoining at right angles, coursed rubble with quoins under C20 concrete-tiled roof. Central wagon door, with added cheeks, has 2 rows of vent slits to either side with C20 plank door and window on right; blocked, mullioned window to rear.* (https://historicengland.org.uk/listing/the-list/list-entry/1086715) Also see figure 16.2 of the ES, asset number 184 for the location)

1.1.29 The building is located immediately to the east of the A595 Egremont Road at the junction with Scalegill Road which forms the southern boundary of the farm. It is part of a complex of boarded-up and disused farm buildings extending eastwards towards a modern active farm located off Scalegill Road. An unmetalled farm track and public footpath is located on the opposite side of the A595 extending westwards towards the proposed site.

1.1.30 The listed components of the farm complex consist of a farmhouse and adjacent barn enclosed within stone wall enclosures. An additional (unlisted) disused stone barn lies to the west closer to the modern farm buildings. The farmhouse is separated from the footpath adjacent to the A595 by a modern stone wall similar in style to the earlier wall enclosing the farmhouse and barn to the south and east of the buildings. The enclosures around the farm are currently locked and access to the building and inner courtyard was not possible.

1.1.31 Review of historic mapping (1865 Ordnance Survey 1:2500) suggests that the alignment of the current western boundary wall is further to the east than the current position, presumably associated with widening of the A595 and the need to build a substantial retaining wall to separate the hall from the road. It is approximately 3 m high.

1.1.32 The hall is located on high ground which continues to the west of the A595. The road is located within a cutting formed by the erosion of a long-established route which has been incorporated into the upgraded modern road. This is flanked on the western side by a mature hedge which obscures views of the hall from the west and from the hall to the west.

1.1.33 The heritage significance of the asset is derived from its architectural attributes, as set out in the listing description reproduced above. Although the setting is not cited as one of the key attributes of the asset in the listing description, all heritage assets have a setting- although each setting may contribute more or less to the overall heritage significance of an asset.

1.1.34 The setting of Scalegill Hall is composed of several distinct zones. Most immediately the farm complex itself forms a setting in which the farmhouse, outbuildings, walled enclosures and adjacent barns constitute a single entity. It should be noted that the principal façade of the farmhouse faces to the east, away from the A595. This façade cannot be observed from Scalegill Road or publicly accessible areas on the A595.

1.1.35 The next level of setting is the landscape immediately surrounding the hall. This consists of the A595, Scalegill Road, modern farm, adjacent farmland and foot paths. The two modern roads are busy with traffic.

1.1.36 Beyond the hall there is extensive undulating agricultural landscape punctuated by farms and small settlements, with Whitehaven to the north west. The proposed development site is separated from Scalegill Hall by the A595, rolling landscape and railway line.

1.1.37 The setting makes a minor contribution towards the heritage significance of the hall- it is located within a modern farming landscape containing historic features in the forms of field boundaries, pockets of woodland, dispersed settlement and farmhouses and tracks. It is dominated by the adjacent A595 which effectively cuts it off from the landscape to the west within which the proposed development will be situated.

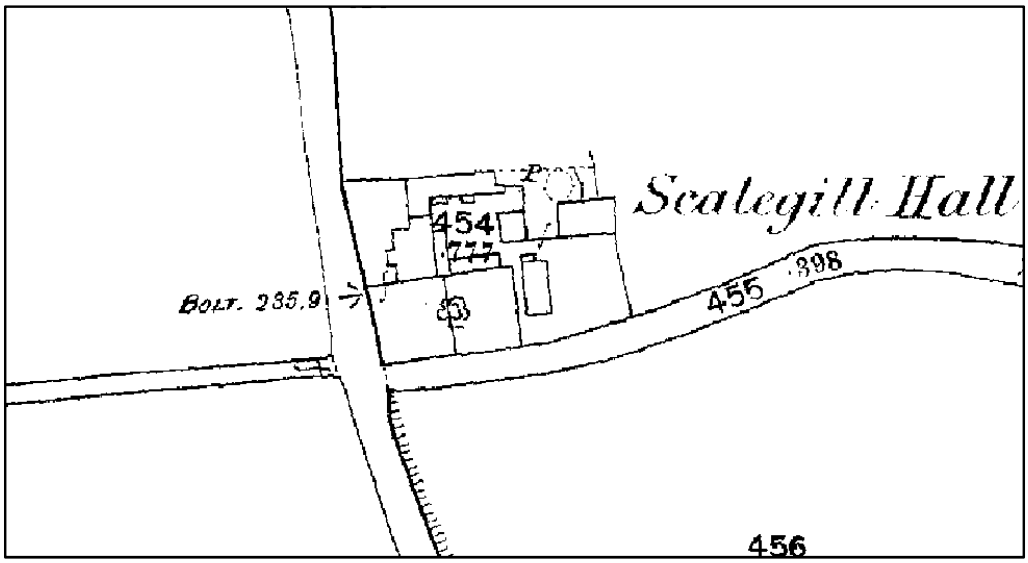
1.1.38 Scalegill Hall is primarily experienced by drivers using the A595- as a derelict farmhouse briefly glimpsed to the east whilst using the road. A bus stop opposite the farmhouse allows waiting passengers to view the rear of the building, largely obscured by the high wall separating it from the A595.

1.1.39 Walkers using the public footpath which passes along the track opposite the hall and continuing along Scalegill Road are able to partially view the complex of buildings and enclosing walls.

1.1.40 The proposed development, including the rail loading facility and main site will not intrude into any of the views of the hall from within the complex, adjacent or longer distance.

1.1.41 The development will not inhibit the public's capacity to experience or enjoy Scalegill Hall as pedestrians, walkers, drivers or passengers at either close or long range.

1.1.42 The proposed development will not have an impact on the components or values which constitute the heritage significance of Scalegill Hall during enabling, construction, use or completed use of the proposed scheme.



Extract from 1865 OS mapping showing Scalegill Hall farm complex. Note the modern curved wall replaced the one shown here

View to west of Scalegill Hall from A595

View to north west of Scalegill Hall from track and public footpath

View to west from footpath adjacent to Scalegill Hall towards proposed development area

View to West from Scalegill Hall across A595 and bus stop towards development area

View to east along track and public footpath towards Scalegill Hall. Note it is partially obscured by both vegetation and land form.

TOWN AND COUNTRY PLANNING ACT 1990

TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015/595

TOWN AND COUNTRY PLANNING APPEALS (DETERMINATION BY INSPECTORS) (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000/1624

PLANNING INQUIRY UNDER SECTION 77 OF THE TOWN AND COUNTRY PLANNING ACT 1990 IN RELATION TO THE PLANNING APPLICATION REFERENCE 4/17/9007 FOR APPLICATION FOR DEVELOPMENT OF A NEW UNDERGROUND METALLURGICAL COAL MINE AND ASSOCIATED DEVELOPMENT TO BE LOCATED AT
FORMER MARCHON SITE, POW BECK VALLEY AND AREA FROM MARCHON SITE TO ST BEES COAST, WHITEHAVEN, CUMBRIA

PINS REFERENCE: APP/H0900/V/21/3271069

Proof of Evidence of CAROLINE LEATHERDALE on matters relating to the extent to which development for a metallurgical coal mine in Cumbria is consistent with Government policies for meeting climate change targets

Contents

0. Summary

0.1 I am Caroline Leatherdale, consultant to West Cumbria Mining Ltd. I have been commissioned by West Cumbria Mining to provide evidence to the Inquiry on the extent to which the proposed development for a metallurgical coal mine in Cumbria is consistent with Government policies for meeting climate change targets.

0.2 I was first instructed by West Cumbria Mining (WCM) in 2015 to prepare the planning application and Environmental Statement for Woodhouse Colliery. Since then I have been closely involved with the design of the project such that it relates to minimising its environmental impacts, including targeting the reduction of greenhouse gas (GHG) emissions from the mine to reduce its climate impacts.

0.3 My evidence addresses the following matters:

- 0.3.1 Compliance with applicable international, national & local policies, statutory duties and consideration of their relevance to the determination of the application.
- 0.3.2 Room for additional resource extraction within the Carbon Budgets.
- 0.3.3 The total emissions from the construction, operation and decommissioning of the mine.
- 0.3.4 The relevance of end use and other emissions.
- 0.3.5 The effectiveness of GHG mitigation secured by planning conditions and planning obligations.

0.4 There are a number of international and national agreements relating to climate change that require the UK to meet specified GHG emissions limits and targets. These include the Paris Agreement and the Climate Change Act (2008). My evidence reviews these, and the various strategy documents which the Government have published in order to identify how the GHG emissions limits and targets will be met. I find that the proposed development is

consistent with Government obligations to meet its legally binding GHG emissions budgets and targets.

0.5 The Committee on Climate Change is an independent statutory body formed under Section 32 of the Climate Change Act (2008). The Committee advises government on matters relating to climate change, including advice on emissions reductions to meet government targets and statutory requirements. In December 2020, the Committee published its sixth carbon budget, which covers the 5 year period from 2033 - 2037. Accompanying the sixth carbon budget is a series of documents setting out various scenarios which illustrate how the UK might meet its GHG emissions limits target. My evidence shows, by way of reference to an updated GHG Assessment undertaken in July 2021 by Ecolyse (Appendix WCM/CL/2) that the residual likely effects of the proposed development will be neutral, and not significant.

0.6 The updated GHG Assessment by Ecolyse followed analysis of the methods and findings of a GHG assessment undertaken by AECOM in 2020 which was submitted to Cumbria County Council for formal consultation ahead of the meeting of the Council's Development Control & Regulatory Committee in October 2020. The Ecolyse analysis of the AECOM GHG Assessment showed that an updated assessment should be undertaken for the following reasons:

0.6.1 The proposed operational life of the mine has been significantly reduced since the AECOM assessment. The original application proposed an operational life of 50 years; however in October 2020, the Council sought to impose a planning condition that set an end date of operations of 2049 - i.e. an approximate 50% reduction in the operational life of the mine.

0.6.2 WCM has advanced the design of the methane capture and treatment system, which had originally been the subject of a planning condition. Since methane emissions from the mine are the most significant source of GHG emissions, the updated design work has enabled Ecolyse to adopt a likely mitigated emissions scenario which provides a realistic and accurate projection of emissions over the lifespan of the

development covering the construction, operation and decommissioning phases of the mine. This has had a significant impact upon the GHG calculations.

0.6.3 The design of the methane capture and treatment system, and its residual emissions calculations, have enabled WCM to calculate residual CO_{2e} emissions and to develop an emissions offsetting strategy that means the mine will be net zero emissions from the first day of work on site - from the commencement of site enabling works to the completion of decommissioning works. This net zero for the <u>whole life of the mine</u> commitment is secured through legal agreement and is, I believe, a world-first.

0.6.4 Since the publication of the AECOM 2020 report there have also been changes to the government published emission factors relied upon by the AECOM analysis, as well as new information that enables the analysis to reflect the effects of economy wide measures to decarbonise sectors such as electricity generation and transport over time to meet the UK's 2050 net zero target.

0.6.5 The Sixth Carbon Budget was published in December 2020, after the earlier AECOM Assessment. This has enabled Ecolyse to project the percentage contribution of the proposed development to the carbon budget in the years 2033 - 2037.

0.7 My proof of evidence, and the supporting evidence, does not consider emissions arising from the use of the mined product because this cannot properly be regarded as an effect of the development for which planning permission is sought. Although this is a matter for legal submissions, it is my understanding that this approach is consistent with the approach that was taken by the High Court in R *Finch v Surrey County Council* [2020] EWHC 3566 (Admin). In that case, the Court explained at paragraph 101 of the judgement that the fact that the environmental effects of consuming an end product will flow inevitably from the use of a raw material in making that product does not mean that those effects can be properly treated as effects of the development on the site where the raw material will be extracted.

0.8 To include an assessment of the emissions of the end use of the product would go beyond assessing the effects of the development and in practical terms it would be entirely unworkable given the number of processes that the metallurgical coal goes through and the variation between facilities in which it is used. It is also inconsistent with the way in which other environmental effects are commonly assessed. In the present case the use of coke in steelworks in the UK and Europe, is in fact, subject to very stringent regulation through environmental permitting and emissions trading schemes. Therefore, there is a much stronger case for not assessing those emissions in the present case than there was for the disputed emissions that were alleged to have been left out of account in *Finch*.

0.9 Even if it were to be permissible (as a matter of principle) to take into account GHG emissions arising from the use of coke in steel works when assessing the environmental effects of this development, the analysis undertaken by Wood Mackenzie demonstrates that it is likely that the metallurgical coal from this development would replace coal that is already being used from other coal mines - many of which would have a significantly greater carbon footprint.

0.10 WCM has proposed, by way of legally-binding S106 agreement, to ensure that the whole life of the mine (including preliminary, construction, operational and decommissioning phases) is net zero compliant - i.e. any GHG emissions arising from all phases of the mine's life will be reduced and where they cannot be eliminated at source they will be offset via the purchase of Gold Standard accredited carbon offsets.

0.11 Accordingly, I find that the proposed development does not compromise the ability of the UK to meet the objectives of the sixth carbon budget, nor the cap on emissions under the Carbon Budget Order 2021, and that the ability of Government to meets its international emission obligations is not compromised.

1. Qualifications and Experience

1.1. I am Caroline Leatherdale and throughout my 20-year career I have developed expertise in environmental and sustainability management and associated legislation, such as it relates to civil engineering, construction, mining and quarrying in England and Scotland.

1.2. During my career I have become an environmental auditor, a qualified assessor for the Civil Engineering Environmental and Quality Assessment (CEEQUAL) tool, and have worked on a number of the UK's largest construction and engineering schemes, including Nuclear New Build at Hinkley Point (Somerset), the Olympic Park as part of London 2012, Crossrail, Glensanda Quarry, and a number of other large civil engineering projects.

1.3. I have worked in the role of environmental and sustainability manager on over 70 UK civil engineering projects in marine, urban and rural environments. I was Head of Environment for Skanska Civil Engineering UK in the late 2000s, managing a team of over 20 environmental and sustainability professionals on a range of projects in the water, power and transport sectors. I implemented Skanska Global's plan to 'Deep Green', an industry-leading initiative to significantly reduce environmental impacts and improve environmental and sustainability performance in the industry.

1.4. During my career I have been aware of the growing body of scientific evidence in relation to anthropogenic impacts upon the global climate, notably as a result of emissions of so-called 'greenhouse gases', including carbon dioxide. For the last 15 years, I have been involved in developing and implementing carbon footprinting tools for several dozen of the projects that I have worked upon. I have used the output from these tools (which themselves relied upon publicly available carbon footprint data from sources including the Environment Agency, University of Bath and DEFRA), to assess and report upon a projects' environmental performance to clients and asset owners, including the Highways Agency, water companies, Network Rail, and others.

1.5. I hold the following qualifications:

1.5.1. BSc (Hons) in Environmental Science, from the University of Sussex;

1.5.2. MSc Science and Technology Policy, from the University of Sussex;

1.5.3. MSc Applied Ecology and Conservation, from the University of East Anglia;

1.5.4. CEEQUAL Assessor;

1.5.5. Lead Environmental Auditor (BSI).

1.6. I understand my duty to the Inquiry to help the Inspector on matters within my expertise and that this duty overrides any obligation to the person from whom I have received instructions or by whom I am paid. I confirm that my fees are not conditional upon the outcome of the Inquiry. I have complied, and will continue to comply, with that duty. I confirm that this evidence identifies all facts which I regard as being relevant to the opinion that I have expressed and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion. I believe that the facts stated within this proof are true and that the opinions expressed are correct.

Statement of Truth

1.7. The evidence which I have prepared and provide for this planning inquiry (PINS Reference APP/H0900/V/21/3271069) in this Proof of Evidence is to the best of my knowledge and belief true and I confirm that the opinions expressed are my true and professional opinions.

2. Scope and Structure of Evidence

2.1. My evidence will cover matters relating to greenhouse gas (GHG) emissions and climate change, including the revised GHG Assessment that has been prepared by Ecolyse [WCM/CL/2] and compliance with relevant legislation and policy.

2.2. I am providing this evidence because I have been involved in the project since 2015, when I was first instructed to assist with the preparation of the Environmental Statement, and am best placed to provide an overview of the

various matters that are relevant to the assessment of GHG emissions of the project, how the design of the project has been influenced by the need to reduce GHG emissions, and any climate change implications arising from them. I have been closely involved with developing the location and design of the surface and underground elements of the mine, tasked with ensuring that environmental impacts are avoided or reduced, and have been the primary point of liaison between West Cumbria Mining and statutory bodies including Natural England and the Environment Agency in relation to the development of the proposals. Where necessary, I draw upon the relevant technical evidence of others to assist in the conclusions that I have reached, such as the GHG assessment prepared by Ecolyse Ltd who specialise in GHG assessments for purposes of EIA, or the work that has been undertaken by Wood Mackenzie in considering and benchmarking the comparative emissions of this proposal against other metallurgical coal mines. I set out and consider planning policies insofar as they are relevant to GHG emissions, but planning judgements relating to the overall compliance with relevant development plan policies and the environmental acceptability of the proposal are covered by Sam Thistlethwaite in the planning proof of evidence.

2.3. Any documents which are appended to this Proof of Evidence are contained as part of the Appendix referenced WCM/CL/2.

2.4. My evidence is confined to matters which I think are relevant to the Inquiry and which are within my area of expertise.

2.5. My evidence builds upon previous submissions to the planning authority by West Cumbria Mining and their appointed consultants and advisors, including legal advisors, in relation to the matters covered by my evidence in support of the project.

2.6. Of the relevant issues identified by the Secretary of State and the Inspector, my evidence principally deals with one main issue, namely, the extent to which the proposed development is consistent with Government policies for meeting the challenge of climate change.

2.7. In addition, my evidence will also address the following issues that have been raised by the Rule 6 Parties in their Statements of Case:

a. Compliance with applicable international, national & local policies, statutory duties and consideration of their relevance to the determination of the application.
b. Room for additional resource extraction within the Carbon Budgets.
c. The total emissions from the construction, operation and decommissioning of the mine.
d. The relevance of end use and other emissions.
e. The effectiveness of GHG mitigation secured by planning conditions and planning obligations.

3. Relevant legislation, policy and guidance

3.1. The following section summarises relevant international treaties, domestic legislation, policy and guidance.

The Paris Agreement

3.2. The Paris Agreement is an international treaty on climate change, and was adopted by 196 Parties (or countries) at the Conference of Parties (COP) 21 in Paris on 12 December 2015. It entered into force on 4 November 2016.

3.3. The central aim of the Paris Agreement is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit temperature increase even further to 1.5 degrees Celsius.

3.4. The Paris Agreement requires that all Parties put forward “nationally determined contributions” (NDCs), which set out the post-2020 climate actions taken by each Party. Considered together, the NDCs determine whether the world achieves the long term goals of the Paris Agreement.

3.5. The UK put forward its second NDC in 2020. It described delivery measures including a range of policies and measures already in place, as well as those that would be developed in the future. These include the UK Prime Minister's Ten Point Plan for a green industrial revolution; the 6th Carbon Budget (which sets out a pathway to achieve net zero by 2050); as well as reference to the Climate Change Act 2008.

The Climate Change Act 2008

3.6. Parliament has decided to give effect to its international climate change commitments through the enactment of the Climate Change Act 2008 ("the 2008 Act"). Section 1 of the 2008 Act confers a duty on the Secretary of State to ensure that carbon reduction targets are met.

3.7. To ensure compliance with the carbon emissions target, section 4 of the 2008 Act requires the Secretary of State to set an amount for the net UK carbon account ("the carbon budget", an emissions cap for successive five-year periods) and ensure that the net UK carbon account for any period does not exceed that budget. Again, the obligation is on the Secretary of State. Section 8(2) of the 2008 Act provides that the carbon budget must be set with a view to meeting and complying with the European and international obligations of the United Kingdom. When setting carbon budgets the Secretary of State must also take into account the advice of the Committee on Climate Change (per s. 9 of the 2008 Act).

3.8. Section 10 of the 2008 Act sets out the matters which the Secretary of State must take into account when setting carbon budgets. These include a number of issues, such as consideration of economic, fiscal, and social circumstances, which can only be carried out at a national level.

3.9. Again, although it will be a matter of legal submissions it is my understanding that the English courts have recognised that whilst the statutory and policy requirements from the 2008 Act are designed to provide a clear strategy for

meeting carbon budgets and achieving the target of net zero emissions, they leave the Government a good deal of latitude in deciding what action it takes to attain those objectives as part of an economy-wide transition (see e.g. *R (Packham) v Secretary of State for Transport* [2020] EWCA Civ. 1004 at [87]).

3.10. If the steps that have been taken by the Government subsequently turn out to be inadequate, the Government can address that through the introduction of stricter policy or legislative requirements.

The Sixth Carbon Budget and the Carbon Budget Order 2021

3.11. The UK Committee on Climate Change (CCC) is an independent statutory body formed under Section 32 of the 2008 Act. The CCC advises the UK government on matters relating to climate change, including advice on UK emissions reductions to meet government targets and statutory requirements.

3.12. The CCC advises the government on the quantum of each 5-year carbon budget, and the CCC's advice on the sixth carbon budget (which covers the years 2033 - 2037) was published in December 2020. The quantum of the sixth carbon budget that was recommended by the CCC for the UK government to adopt represented a 78% reduction on 1990 levels. The budget recommendations were accompanied by a series of sector-specific reports and analysis which proposed a series of alternative pathways for the reductions to be achieved.

3.13. The CCC's Sixth Carbon Budget report[1] sets out a balanced net zero pathway to meeting the UK's net zero target by 2050. It takes a sector-by-sector approach to project emissions and identifies abatement options to achieve the net zero target.

3.14. In taking a sectoral approach, the CCC's objective has been to identify realistic cost-effective sectoral pathways that in combination could achieve the UK's economy wide net zero target. Whilst each sector is assumed to achieve

[1] Committee on Climate Change (December 2020) *The Sixth Carbon Budget - The UK's path to net zero[CD8.10]*

a certain level of emissions by 2050, the purpose of the scenarios is not to set any sectoral targets but to set out plausible sectoral pathways. Notwithstanding, it is instructive to compare WCM's emissions to the CCC's view on mining emissions consistent with its net zero pathway.

3.15. The CCC has classified mining emissions (from open and closed mines) as forming part of the fuel supply sector which also includes direct emissions from oil refining, oil and gas production, oil and gas processing terminals, gas transmission and distribution networks.

3.16. The CCC's analysis forecasts[2] 400,000 tonnes of direct CO_2e emissions (e.g. Scope 1) from open and closed mines by 2050. This compares to circa 52,000[3] tonnes in the final year of production from the WCM mine (prior to off-setting), which will fall to zero in 2050 when the site is decommissioned.

3.17. Taking into account WCM's whole life net zero commitment and that the emissions, even before any offsetting, will be zero by 2050 demonstrates that there is broad consistency between assumptions underlying the CCC's net zero pathway for the mining sector and the projected emission from the WCM mine by 2050.

Ten Point Plan

3.18. The Ten Point Plan for a Green Industrial Revolution (hereinafter referred to as "The Plan"), published by the UK Prime Minister in November 2020, describes how, in particular in relation to the economic recovery after the Coronavirus pandemic, the UK will repair the economic damage and "build back better."

3.19. In the Plan, the Prime Minister commits to establishing a Task Force Net Zero to take forward the legal obligation to achieve net zero carbon emissions

[2] See for example p150 Committee on Climate Change, The Sixth Carbon Budget The UK's path to Net Zero, December 2020[CD8.10]
[3] Scope 1 emissions for WCM

by 2050. The Plan states that investment will be made in clean technologies, including carbon capture; stating that a new British industry dedicated to the capture and return of carbon to under the North Sea will be pioneered.

Department for Business, Energy and Industrial Strategy (BEIS) Industrial Decarbonisation Strategy [CD8.14]

3.20. The Department for Business, Energy and Industrial Strategy (BEIS) has a leading role in the government's plans for achieving emissions reductions so as to meet the carbon budgets set out in the 2008 Act.

3.21. In March 2021, BEIS published the Industrial Decarbonisation Strategy (hereinafter referred to as "the Strategy"[4], [CD8.14], which sets out a series of actions to accelerate the green transformation in industry, expecting that emissions will need to fall by around two thirds by 2035 whilst protecting broader competitiveness.

3.22. The Strategy describes the aspiration over the coming decade to deploying key technologies such as carbon capture, usage and storage, and switching away from fossil fuel combustion to low carbon alternatives such as hydrogen and electrification. Thus, the government recognise that there are a range of measures which need to be implemented to ensure emissions are reduced.

3.23. The Strategy (page 53) makes specific mention of coking coal use in steel manufacturing, as follows: *"Coking coal is currently essential for primary steel manufacturing using the basic oxygen furnace route, which produces the highest quality steel and is the dominant technology in Europe. This strategy takes a technology-neutral approach and so does not rule out the use of coking coal in an integrated steel making process together with CCUS as a net zero compliant option going forward. Any mining of the coal itself need to be net*

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/970149/6.7279_BEIS_CP399_Industrial_Decarbonisation_Strategy_FINAL_PRINT_FULL_NO_BLEED.pdf

zero compliant in the future. The mining sector needs to plan for this in partnership with government, in line with the principles set out in this strategy."

3.24. The Strategy therefore supports net zero mining of coking coal in the UK for use in steel making that itself employs Carbon Capture Utilisation and Storage (CCUS) in the UK as a net zero compliant option in the future.

3.25. Annex 4 of the Strategy describes emissions from the iron and steel sector in the UK being dominated by two industrial sites in Scunthorpe and Port Talbot in South Wales, which produced around 15% of total industrial emissions in the UK in 2017. There are two major decarbonisation route options for these sites which are first, the deployment of CCUS and second, Electric Arc Furnaces (EAF) with hydrogen replacing conventional feedstocks for use in the direct reduced iron process.

3.26. The comparative merits of the two decarbonisation route options are assessed in the Strategy, with the comments that EAF requires relatively high electricity use with impacts on electricity connection requirements. Regarding the hydrogen route, the source of hydrogen needs to be low carbon and will depend on the infrastructure built in South Wales and Humberside.

3.27. Challenges to the implementation of CCUS are described in the strategy, notably the cost of retrofitting the CCUS units and that not all emissions will be fully decarbonised, and for the Port Talbot site there is no access to a carbon transport and storage network, therefore CO_2 would have to be shipped to the north west carbon cluster.

3.28. It is therefore implicit within the Strategy that there is a future for the steel industry in the UK, which represents approximately 13% of WCM's projected mining output.

3.29. The Strategy sets a 'direction of travel' for decarbonising the UK industry, with clear advice on the mining of coking coal for use in steel making. The Strategy suggests that BEIS will take action in the 2020s to focus on

aligning existing policy with net zero and implementing new incentives to fill policy gaps, creating clear incentives for industry to decarbonise.

3.30. On 30 June 2021, BEIS announced that the UK government had brought forward its date to remove unabated coal from the UK's energy mix to 2024, a year ahead of the previous 2025 target. As part of the announcement, BEIS stated, "*This policy only applies to coal used to generate electricity. It does not apply to other coal consumers such as the steel industry, nor to domestic coal mines*" (source: https://www.gov.uk/government/news/end-to-coal-power-brought-forward-to-october-2024), attached to Appendix WCM/CL/2 page 44.

3.31. The Strategy covers the full range of UK industry sectors, including metals and minerals, and shows how the UK can have a thriving industrial sector aligned with the net zero target without pushing emissions and business abroad.

Planning policy

National Policy

3.32. Paragraph 8 of the National Planning Policy Framework (NPPF) (July 2021, Ministry of Housing, Communities & Local Government) describes the three overarching (economic, social, and environmental) objectives of sustainable development. The environmental objective includes mitigating and adapting to climate change.

3.33. Chapter 14 of the NPPF deals with meeting the challenge of climate change, flooding and coastal change. Paragraph 152 at the start of this chapter states that:

> *"The planning system should support the transition to a low carbon future in a changing climate…"*

Cumbria Minerals and Waste Local Plan 2015 - 2030 (published 2017)

3.34. Box 2.3 of the Cumbria Minerals and Waste Local Plan sets out the strategic objectives for the Plan. Objective 1 states that "*minerals and waste*

management developments will take due account of the issues of climate change, in particular through energy use and transport".

3.35. Policy SP13 then deals with Climate change mitigation and adaptation. Insofar as is relevant, it states that minerals development should demonstrate that:

- *"proportionate to the scale and type of development, energy management, carbon reduction and resource efficiency have been determining design factors for the development; and*
- *water use and the requirement for wastewater treatment have been minimised; and*
- *their location will minimise, as far as is practicable, the "minerals or waste road miles" involved in supplying the minerals or managing the wastes, unless other environmental/sustainability and, for minerals, geological considerations override this aim"*

3.36. Table 6.1 then identifies other measures included within the Plan which support the measures in Policy SP13 and make a positive contribution towards reducing GHG emissions. These include Policy DC1, which encourages minerals developments to locate optimally in relation to their source/markets. This states that development to be located where it has the potential for rail or waterborne transport and sustainable travel to work and can minimise operational minerals road miles where practicable.

3.37. Policy DC13, which sets out the criteria for proposals for the extraction of coal, notes that for underground coal mining, potential impacts to be considered and mitigated include monitoring and preventative measures for potential gas emissions and Coal Mine Methane capture and utilisation.

Copeland Local Development Plan

3.38. Policy ST1 of the Copeland Local Plan 2013-2028 contains a series of Strategic Development Principles that undermine the Borough's planning policies. One of these, which relates to Environmental Sustainability, seeks to:

"*Encourage development that minimises carbon emissions, maximises energy efficiency and help us to adapt to the effects of climate change*."

3.39. Policy DM11(E) seeks to ensure that development proposals reach high standards of sustainability by "*Encouraging construction material to be sourced, where possible, from local and sustainable sources of production".*

Cumbria County Council's Climate Change Statement and Strategy Policy

3.40. On 11 September 2019 the Full Council of Cumbria County Council unanimously supported a Climate Change motion which said,

"*Cumbria County Council has long recognised the importance of tackling Climate Change. This Council remains fully committed as we seek to reduce our own carbon emissions. To date this Council has:-*

- *Reduced emissions through our waste contract and reducing waste to landfill*
- *Introduced low energy schemes in many of our buildings*
- *Introduced the use of low emission fleet vehicles and pool cars*
- *Installed LED street lighting*

However this Council cannot tackle climate change in isolation and we will collaborate with our 6 district authorities and our national parks colleagues as indicated in the Cumbria Joint Public Health Strategy - "To become a "carbon neutral County and to mitigate the likely impact of existing climate change."
This Council therefore welcomes the recent decision by Parliament to declare a Climate Change Emergency in the UK, including Cumbria. We now call upon the Government to produce a clear plan of action, backed up by sufficient resources, to address this existential threat."

3.41. Cumbria County Council's Cabinet unanimously agreed the Council's first Carbon Management Strategy in November 2020, which sets out how they will respond to the international, national and regional aspirations to achieve a low/net zero carbon economy by 2050 (attached at Appendix WCM/CL/2 page 50).

3.42. Cumbria County Council adopted the Cumbria Joint Public Health Strategy in April 2019. This Strategy includes the aim for Cumbria "*to become a carbon neutral*" county and to mitigate the likely impact of existing climate change.

3.43. The Council suggests that in order to meet this strategic aim, it will have a clear framework to ensure its operational and policy development supports sustainability in all its forms.

3.44. The Council's strategy does not state that all development within Cumbria will be assessed for its carbon neutrality or otherwise - indeed, the Strategy is described further at the same source as "*decarbonisation of the Council's corporate estate*".

4. The GHG Assessment

4.1. The GHG Assessment carried out by Ecolyse [Appendix WCM/CL/2] quantifies the relevant emissions from the proposed development under different scenarios (designed to illustrate the effect of WCM's mitigation) and identifies relevant mitigation measures to avoid, reduce and lastly offset those emissions.

Scope of relevant emissions

4.2. The GHG Assessment focuses on the enabling and construction, operation and decommissioning of the mine. It does not assess the GHG emissions of the end use of the coking coal that will be mined at the development because this cannot properly be regarded as an effect of the development for which planning permission is sought.[5]

4.3. The Rule 6 Parties' Statements of Case challenge this approach and argue that it should be taken into account. However, the approach that has been adopted is consistent with the approach that was subsequently taken by the High Court in *R (Finch) v Surrey County Council* [2020] EWHC 3566 (Admin)[6]

[5] See paras. 2.11 – 2.13 of the GHG Assessment.

[6] I recognise that this judgment is currently subject to an Appeal to the Court of Appeal and the approach that should be taken is ultimately a matter of legal submissions. However, I have set out my understanding of the

[CD7.1]. In that case, the Court explained at paragraph 101 of the judgment that the fact that the environmental effects of consuming an end product will flow inevitably from the use of a raw material in making that product does not mean that those effects can properly be treated as effects of the development on the site where the raw material will be extracted.[7]

4.4. The approach advocated by the Rule 6 Parties would go beyond assessing the effects of the development itself. It would be entirely unworkable given the number of processes that the metallurgical coal goes through and the variation between facilities in which it is used. It is also inconsistent with the way in which other environmental effects are commonly assessed. More generally, it is not consistent with the approach adopted more widely by planning authorities when considering other types of planning applications (e.g. for factories or supermarkets).

4.5. The judgment in *Finch* also explained that the range of policy measures being pursued by the Government in order to meet its carbon budgets and targets in the 2008 Act meant that emissions from the combustion of oil products in motor vehicles (one of the key issues in that case) were not left out of account.[8] Whilst I would agree with that analysis, I also note that in the present case the use of coke in steelworks in the UK and Europe is in fact subject to very stringent regulation through environmental permitting and emissions trading schemes (as well as town and country planning regimes and their equivalent in various EU countries) and is also the consideration of the Industrial Decarbonisation Strategy described earlier. Therefore, there is a much stronger case for not

rationale in that judgment to assist in explaining the approach that has been taken in the GHG Assessment and responding to the arguments raised in the Rule 6 Parties' Statements of Case.

[7] *"101. In my judgment, the fact that the environmental effects of consuming an end product will flow "inevitably" from the use of a raw material in making that product does not provide a legal test for deciding whether they can properly be treated as effects "of the development" on the site where the raw material will be produced for the purposes of exercising planning or land use control over that development. The extraction of a mineral from a site may have environmental consequences remote from that development but which are nevertheless inevitable. Instead, the true legal test is whether an effect on the environment is an effect of the development for which planning permission is sought. An inevitable consequence may occur after a raw material extracted on the relevant site has passed through one or more developments elsewhere which are not the subject of the application for planning permission and which do not form part of the same "project".*

[8] See para. 105.

assessing those emissions in the present case than there was for the disputed emissions that were alleged to have been left out of account in *Finch*.

4.6. Finally, even if it was permissible (as a matter of principle) to take into account GHG emissions arising from the use of coke in steel works when assessing the environmental effects of this development, the analysis undertaken by Wood Mackenzie (presented by Jim Truman) demonstrates that it is highly likely that the metallurgical coal from this development will replace coal that is already being used from other coal mines, many if not most, with a significantly greater carbon footprint.

4.7. Accordingly, for all the reasons set out above, the GHG Assessment focuses on identifying the emissions from the enabling and construction, operation and decommissioning of the mine and securing appropriate mitigation to avoid, reduce and offset those emissions.

Findings of the GHG Assessment

4.8. The GHG assessment completed by Ecolyse has reviewed and updated the GHG assessment produced by AECOM in 2020. The analysis has been updated to ensure consistency with best available information on the operation of the mine, mitigation committed to by WCM, and likely decarbonisation of the economy consistent with UK net zero targets and advice from the CCC on the 6th Carbon Budget.

4.9. Where assumptions have been made these have been conservative to ensure a reasonable worst-case assessment is presented. This is consistent with the precautionary principle, as recommended by IEMA guidance[9]. The assessment has been presented as three scenarios to provide full transparency on the effects of assumptions adopted.

4.10. The first scenario, the worst-case scenario reflects no future mitigation. It assumes no future decarbonisation of the grid, no improvements in road and

[9] IEMA (2017) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance.

rail efficiencies and fuel switching and no mitigation of emissions by WCM. This scenario is not considered likely and represents a baseline from which a likely unmitigated scenario has been developed.

4.11. The second scenario, the likely unmitigated scenario adopts conservative assumptions on a precautionary basis, reflecting sectoral decarbonisation strategies produced by government and the CCC.

4.12. The third scenario, the likely mitigated scenario, includes the effects of mitigation committed to by WCM. As such this scenario represents the likely emissions from the Proposed Development prior to offsetting.

4.13. The assessment shows that the whole life GHG emissions (covering the enabling and construction phase, 25-year operational life of the mine, and decommissioning phase) for the likely mitigated scenario are *circa* 1.5MT CO_2e. This represents an 80% reduction compared to the likely unmitigated scenario and demonstrates the effectiveness of the mitigation adopted by WCM to avoid and reduce its emissions.

4.14. WCM has committed that the whole life emissions from the Proposed Development including the emissions it can control and influence (see paragraph 7.7 of the Ecolyse GHG Assessment [WCM/CL/2/page 21]) will be net zero.

4.15. This commitment and WCM's performance will be monitored and managed through a Section 106 commitment which will ensure that GHG emissions and offsets to reach net zero are validated on an annual basis with a requirement for actions to mitigate GHG emissions at source where practicable.

4.16. Additionally, there will also be a 5-year update of the GHG emissions forecast to 2050 to ensure consistency with best practice reporting and forecasting of GHG emissions. The Section 106 GHG monitoring and management commitment is considered by Ecolyse to be best practice and

will provide certainty and transparency on the delivery of the net zero commitment.

4.17. Taking into account the mitigation (avoidance, reduction and compensation through offsetting) secured for the Proposed Development the assessment finds the residual likely effects of the Proposed Development to be neutral from construction, operational and decommissioning period.

5. Compliance with relevant legislative and policy targets

5.1. As is set out in the GHG Assessment, once all of the identified mitigation has been taken into account, the development by West Cumbria Mining will not produce any net additional GHG emissions. In short, this means that granting permission for the proposed development would not adversely impact on compliance with any carbon budgets or reduction targets, whether local, national or international, and would not conflict with any policy measures seeking to reduce carbon emissions. However, for completeness, this is explained in more detail below by reference to the key targets and policy measures.

5.2. As is explained above, the 2008 Act is the mechanism under which the UK Government has established a framework to give effect to its international commitments under the Paris Agreement. That framework therefore provides the most appropriate basis upon which to assess the impact of this development and there is no need to give separate consideration to the Paris Agreement as a freestanding consideration (see *R (Friends of the Earth Ltd) v Heathrow Airport Ltd* [2020] UKSC 52 at [122] – CD7.2). Nevertheless, even if this consideration was taken into account, for the reasons set out in more detail below, the grant of planning permission for this development is capable of assisting with meeting the targets in the Paris Agreement by reducing the carbon footprint of the production and transportation of metallurgical coal when compared with existing sources of metallurgical coal.

5.3. I have examined the sector-specific reports for the sixth carbon budget and can conclude that the West Cumbria Mining project does not compromise the ability of the UK to meet the objectives of the sixth carbon budget.

5.4. Nor does the project compromise the ability of the UK to meet the cap on emissions under the Carbon Budget Order 2021 [CD5.6].

5.5. As explained above, the primary reason for this conclusion is that the WCM project has committed to being net zero carbon for its entire construction, operational and decommissioning period - i.e. throughout its whole life. This means that all whole mine life emissions, (including methane from coal mining where not captured and reduced or reused) will be reduced as far as possible and then residual emissions will be offset with an equivalent or greater amount than those emissions. Therefore, the concerns raised by the Rule 6 Parties regarding the room for additional mineral extraction within the Carbon Budgets do not arise.

5.6. The use of offsetting (including by afforestation) is acknowledged as a valid approach by the CCC to achieving net zero in the sixth carbon budget.[10] It is further acknowledged that net zero emissions in 2050 will require any residual emissions to be offset by the UK land use sink and greenhouse gas removals.

5.7. WCM is proposing a combination of several approaches: emissions reductions, emissions capture and conversion to reduce or eliminate the emissions, and offsetting. The design of the surface buildings and the coal handling and processing plant, which I have been involved in developing to ensure minimal environmental impacts in relation to noise, dust and other emissions, also ensures that methane emissions can be captured as close to source as possible, and directed to the methane capture and treatment system. Accordingly, the proposal accords with the requirements of Policies SP13 and DC13 of the Cumbria Minerals and Waste Local Plan and Policy

[10] Committee on Climate Change (2020) The Sixth Carbon Budget: The UK's Path to Net Zero, p 38 [CD8.10].

ST1 of the Copeland Local Plan, regarding the use of mitigation measures to reduce carbon emissions. Carbon reduction and resource efficiency have been determining design factors for the development, and have led to the adoption of methane capture and utilisation, which will secure significant emissions reductions.

5.8. If left unabated, in the likely unmitigated scenario as calculated by Ecolyse, emissions from the operational phase of the mine that falls within the sixth carbon budget period would represent 0.161% of the UK's emissions.

5.9. It is also important to note that the mitigation strategy adopted by the proposal to secure net-zero compliance from day 1 does so on the basis of an established mitigation hierarchy that seeks to avoid and reduce GHG emissions as far as possible, and only relies upon offsetting as a last resort to compensate for the residual emissions which cannot be avoided through any alternative means.[11] Given the importance of this approach to mitigation, it has been drafted into the GHG Mechanism in the section 106 agreement to ensure that it continues to be applied in future GHG assessments and can be enforced by the minerals planning authority.

5.10. The proposed development also directly addresses and complies with the statement in the Decarbonisation Strategy that the mining of coking coal will need to be net-zero compliant in the future. Moreover, it does so from the very outset of the development rather than relying upon being required to phase in reductions over the life-time of the development.

5.11. Although Cumbria County Council's Carbon Neutral Plan does not apply beyond Council assets, and therefore is not strictly relevant, the net zero emissions limit secured through the section 106 agreement will ensure that the proposed development is entirely consistent with the Council's overall objective for its own estate / emissions.

[11] See para. 5.7 of the GHG Assessment [WCM/CL/2].

Supporting transition to a low carbon future

5.12. Climate change policy is not simply about securing emissions reductions. Whilst radical emissions reductions remain a critical element of relevant policy and legislation, policy also recognises that it is necessary to put appropriate infrastructure in place to support the transition to a low carbon future. This is something which the UK Government is seeking to take a lead on, as described in its Industrial Decarbonisation Strategy.

5.13. This broader role of supporting the transition to a low carbon future, which is emphasised in paragraph 152 of the NPPF, should not be overlooked when considering the impact of the development and its policy compliance.

5.14. The first point to note in respect of this issue is that it is recognised that there will continue to be a need for metallurgical coal in steel production until at least 2050.

5.15. This is recognised in the CCC's balanced pathway to net zero, which relies upon Carbon Capture and Storage (CCS) for the abatement of a large proportion of emissions from steel works. In the chapter on Manufacturing and Construction, Figure 3.3.d shows that the CCC are projecting a range of mitigation measures for the iron and steel sector. These are detailed in their sector excel sheet,[12] data from which is illustrated further below in Table 1 for ease of reference.

Table 1: Abatement measures anticipated to meet net zero for Steel sector

Source	Iron and steel Baseline/remaining	Saving in 2050 (MT CO2e)
Baseline	**11.5**	
CCS		3.3
Electrification		3.7
Hydrogen		0.6
BECCS		0.0
Biofuels		0.0
Energy efficiency		0.7
Resource efficiency		2.2

[12] See p. 130 of The UK's Path to Net Zero at CD8.10

Material substitution		0.0
Other		0.3
Remaining emissions	**0.6**	

Reference to Table 1 above shows that a range of measures will be adopted by the steel making sector the most significant of which will be carbon capture and storage (CCS) as well as electrification. Hydrogen is anticipated to play a minor role by 2050.

5.16. From this analysis it follows therefore that the CCC anticipates an ongoing use of metallurgical coal in steel production in the UK with the Steel sector relying on CCS to ensure its residual emissions are minimised to 0.6MT by 2050.

5.17. The continued need for metallurgical coal for UK and European steel production up until 2049 is also supported by the analysis carried out by Wood Mackenzie. As Mr Truman explains in his evidence, despite efforts being made to decarbonise the steel industry, European metallurgical coal demand is forecast to remain between 50-55 Mtpa in the 2021-2049 period.[13]

5.18. The BEIS Industrial Decarbonisation Strategy [CD8.14] has also examined GHG abatement within the steel making sector out to 2050. This has examined alternative abatement scenarios including the use of carbon capture and storage and electrification of furnaces with use of hydrogen. The assessment is technology neutral and does not conclude on a preferred pathway, however it is likely that there will remain ongoing demand for metallurgical coal in the UK.

5.19. Given the ongoing need for metallurgical coal by the steel sector the objective must therefore be to meet this demand, both in the UK and further afield, through the most carbon efficient way possible. The Government has said it is committed to supporting and securing a future for UK steel which it

[13] See section 4 of Mr Truman's Proof of Evidence [WCM/JT/1] and the associated report on the need for coking coal [WCM/JT/2].

describes as a "vital" industry.[14] The government has taken a series of steps to support the UK steel industry. Steel is also an important part of a low-carbon economy, being needed to make wind turbines, electric vehicles, energy efficient products and infrastructure and thereby help secure the objective of achieving net zero. The government also recognises the importance of the steel industry to national security[15]. At the same time it recognises that the steel industry is a significant contributor to greenhouse gas emissions.

5.20. In the Industrial Decarbonisation Strategy the Government stated it would work in collaboration with the Steel Council to "consider the implications of the recommendation" of the Climate Change Committee to set targets for ore-based steelmaking to reach near-zero emissions by 2035. In that document the Government says that more detail will be provided in the Net Zero Strategy to be published later this year. The Strategy included modelling of options for steel industry decarbonisation (see its Technical Annex, page 153), presenting two possible options for the decarbonisation of the iron and steel industry:

• Retain coking coal in steelmaking with Carbon Capture Utilisation and Storage (CCUS) to sequester emissions.
• Use of electric arc furnaces with hydrogen replacing coal for use in direct reduced iron processes.

5.21. This document highlights the importance of the role that this proposed development could play in the transition period in achieving the government target particularly given limitations of achieving "green" hydrogen (see e.g. section 1 of the Wood McKenzie report [WCM/JT/2] presented by Jim Truman [WCM/JT/1].

[14] https://commonslibrary.parliament.uk/research-briefings/cbp-7317/#:~:text=Government%20policy%20on%20steel%20The%20Government%20has%20said,support%20the%20steel%20sector%20in%20recent%20years%20include%3A
[15] See e.g. the reason given for the recent nationalisation of steel producer Sheffield Forgemasters International Limited (SFIL) https://www.janes.com/defence-news/news-detail/uk-to-nationalise-naval-steel-firm-sheffield-forgemasters

5.22. The sixth carbon budget makes it clear that, *"reducing emissions in the UK should not be at the expense of shipping jobs and emissions overseas".* If the WCM project does not go ahead, it is clear that coke makers will continue to source coking coal from abroad, effectively shipping jobs and emissions overseas. Therefore, to not permit the WCM project goes against the CCC advice in this respect. Furthermore, the development of this metallurgical coal mine closer to the UK and European Market which it is intended to serve would also be consistent with the objectives of Policy DC1 in the Minerals and Waste Local Plan which, as I have set out above, encourages minerals developments to locate optimally in relation to their source/markets.

5.23. Evidence presented to the Inquiry by Jim Truman of Wood Mackenzie [WCM/JT/1 and WCM/JT/2] shows that, based on publicly available emissions information, the proposed Woodhouse Colliery outperforms most/all other global coal mines in terms of emissions intensity per tonne of coal mined.[16]

5.24. Accordingly, the proposed development will support the transition to a low carbon economy by:

a. Providing what I believe is the first whole life net-zero compliant metallurgical coal mine and therefore significantly reducing the carbon footprint of the coal that is displaced from other existing mines; and
b. Significantly reducing the transportation distances of that coal by providing a source of High-Volatile A Hard Coking Coal that is considerably closer to the European Market than its existing suppliers.

6. Conclusion and summary

6.1. I consider that the proposed development is consistent with Government policies for meeting climate change targets and associated GHG emissions budgets.

6.2. As set out above, I have based my conclusions upon a review of the relevant policies, obligations and legislation at international, national and local levels, and considered the requirements drawn from these against the findings of a

[16] See section 8 of Mr Truman's proof of evidence [WCM/JT/1].

detailed GHG Assessment undertaken by Ecolyse, who are technical experts in the calculation and assessment of GHG emissions.

6.3. The proposed development sets what I believe is a unique precedent in the UK, and possibly globally, of a net zero emissions mine throughout the whole life of the mine. If the world is to meet the challenge of reducing emissions whilst maintaining supply of essential raw materials (in this case, coking coal for steel manufacture), the responsible way to achieve this transition is through ensuring that the production of those raw materials is achieved with the minimum possible environmental impact.

6.4. My evidence, and the detailed GHG Assessment upon which it is based, demonstrate that the proposed development, in the likely mitigation scenario, concludes that the residual likely effects on the climate of the proposed development will be neutral, and not significant.

Signed: *Caroline Leatherdale* Dated: 10/08/21

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/CL/2

This is the Appendix marked WCM/CL/2 referred to in the Proof of Evidence of Caroline Leatherdale dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Document No.

Document No.1

This is document 1 referred to in the Appendix marked WCM/CL/2 on the Proof of Evidence of Caroline Leatherdale dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442513v1

Greenhouse Gas Assessment for the Woodhouse Colliery, West Cumbria Mine

10th August 2021

In Partnership with Air Quality Consultants

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1 Introduction

1.1 Following the announcement that the planning application had been "Called-in" by the Secretary of State, West Cumbria Mining (WCM) commissioned Ecolyse to carry out an independent review and update of the Greenhouse Gas (GHG) assessment prepared by AECOM dated 6th May 2020[1] (from here on referred to as the AECOM 2020 report) and submitted in support of planning Application 4/17/9007.

1.2 As part of that process, Ecolyse has reviewed the numerical calculation of GHG emissions carried out by AECOM, and the sources of those emissions, to ensure that it was robust and represented a reasonable worst-case assessment of likely emissions. Ecolyse has agreed with the overall conclusions reached by AECOM at the time of their assessment and assuming no mitigation measures by WCM. In so doing, Ecolyse has used its own data to demonstrate how it has reached these conclusions.

1.3 Since the publication of the AECOM 2020 report there have been changes to the government published emission factors relied upon by the AECOM analysis, some changes to the methane content relevant to the Proposed Development, as well as new information that enables the analysis to reflect the effects of economy wide measures to decarbonise sectors such as electricity generation and transport over time to meet the UK's 2050 net zero target. The GHG assessment has therefore been updated to reflect these changes.

1.4 In addition, during the course of the review by Ecolyse, the Planning Inspectorate indicated that it had also identified a number of matters relating to the GHG assessment that would need to be updated to account for changes in circumstances that had arisen following its initial preparation.

1.5 These included:

i) The publication of the Sixth Carbon Budget by the Climate Change Committee;
ii) The changes to the operational life of the Proposed Development; and
iii) An updated description of the measures envisaged to prevent, reduce or offset any significant adverse effects on the environment.

1.6 A formal request for this information was issued under regulation 22 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 on 30 June 2021.

1.7 Following receipt of the Regulation 22 Request, and mindful of the importance of avoiding a so-called "paper chase" through various documents and the need to ensure that an environmental statement is easy to understand (*Berkley v Secretary of State for the Environment* [2001] 2 AC 603, per Lord Hoffmann at p. 617), it was decided to present all of the updates to the GHG Assessment as one composite document prepared by Ecolyse.

1.8 Accordingly, the Ecolyse Assessment should be read as a stand-alone document that updates and replaces the previous work carried out by AECOM in its entirety thereby allowing all the matters identified above to be addressed in a single document. Ecolyse agrees with the conclusions in the AECOM 2020 report at the point when it was issued, however, given that the AECOM work has now been effectively superseded by recent changes and events, West Cumbria Mining (WCM) will

[1] AECOM, Cumbria Metallurgical Coal Project GHG Assessment, May 2020. Report forms Appendix 2 of Chapter 19 Greenhouse Gas Emissions of the Woodhouse Colliery Environmental Statement 2020.

rely solely upon the updated position as set out in the Ecolyse Assessment for the purposes of demonstrating the likely climate change effects of the Proposed Development.

Structure of this report

1.9 This report has also been structured to respond directly to the requirements of the Regulation 22 request, and in so doing to update the assessment to reflect best available information at the time of preparation. The main text of this report therefore focuses on reassessing the whole life GHG emissions from the Proposed Development and examining their consistency with UK climate change policy.

1.10 Additionally, and to ensure the assessment complies with the requirements of Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) Regulations 2011 (as amended) ("the 2011 Regulations"), additional detail is provided by way of Appendices, most notably Appendix A.

1.11 The assessment was led by Dr Graham Earl (PhD, BEng, MIMechE), Director at Ecolyse Ltd. and supported by Laurence Caird (MEarthSci, CSci, MIES, MIAQM), Associate Director at Air Quality Consultants Ltd (AQC).

1.12 Dr Earl has over 25 years' experience in the fields of climate change, environment and asset management. Since the formation of Ecolyse six years ago, Dr Earl has developed approaches to assessing GHG emissions and climate change for EIA and has specialised in the assessment of climate change, and preparation of GHG inventories and climate resilience assessments for the purposes of EIAs for numerous light industrial, mixed used housing developments, as well as major infrastructure projects.

1.13 Mr Caird has over 15 years' experience in the fields of air quality and greenhouse gas emissions. He has helped shape a methodology for the assessment of greenhouse gas emissions within EIA to satisfy the requirements of the 2017 EIA Regulations and has produced carbon footprints and greenhouse gas assessments for numerous projects requiring EIAs including major residential, commercial and mixed-use developments and major infrastructure projects.

2 Scope

2.1 This assessment covers the whole life of the mine as assessed by the AECOM 2020 report and therefore covers the enabling and construction, operational and decommissioning phases of the Proposed Development.

2.2 Whilst the methodology followed is consistent with the AECOM 2020 report there have been changes to input data relevant to the calculation of GHG emissions as detailed above. This means GHG emissions from the operational and decommissioning phase have been recalculated and supersede those in the AECOM 2020 report.

2.3 The enabling and construction related emissions have not been reviewed in detail and have been adopted unchanged based on the AECOM 2020 report. This is not necessary because they are unaffected by emission factors relating to the future decarbonisations of the economy, and the GHG emissions from the enabling and construction phase represent less than 5% of the whole life GHG emissions from the Proposed Development. IEMA guidance[2] advises that activities that do not significantly change the result of the quantification of a GHG footprint may be excluded as long as these are justified by the practitioner. In this case there is no intention to exclude enabling and construction emissions from the footprint, but simply to include those based on the AECOM 2020 report and not update them in relation to recent updates in GHG emissions factors etc. This is because as any such changes would be immaterial to the GHG footprint.

2.4 Consistent with the AECOM 2020 report, all GHG emissions are represented as CO_2 equivalent (CO_2e). This ensures that all seven recognised types of direct and indirect GHG emissions[3] resulting from the Proposed Development are considered.

2.5 The scope of emissions addressed through this assessment includes direct, indirect and secondary GHG emissions resulting from the Proposed Development and has followed guidance set out within Appendix A, with specific reference to IEMA guidance[2].

2.6 Direct GHG emissions are those emissions generated at the Development Site during the lifetime of the development (i.e. its construction, operation and decommissioning).

2.7 Indirect GHG emissions are those generated (or avoided) away from the Development Site as a result of the Development, such as the generation of electricity and the manufacture of materials (embedded emissions) used by the Proposed Development, transportation associated with the Proposed Development, and the disposal of waste.

2.8 Additionally, to help with determining the ability of WCM to mitigate these emissions, the GHG Protocol[4] has been considered. This provides a method of establishing GHG emissions that are within the control of WCM and is relevant for consideration of mitigation. It also avoids double counting between different reporting bodies. For the avoidance of doubt, the GHG Protocol has not been used as the basis of setting the scope of emissions relevant to this analysis and has only been used to allow the differentiation of the emissions WCM controls and influences to aid the

[2] IEMA (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance.
[3] GHG include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF_3)
[4] Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, World Resource Institute, Revised Edition

design and application of mitigation. The scope of the emissions included therefore relates to the likely direct and indirect emissions resulting from the Proposed Development.

2.9 The GHG Protocol defines emissions based on the following three scopes:

i) **Scope 1[5]:** These include CO_2e emissions from assets owned or controlled by WCM that release GHG emissions into the atmosphere. These are direct emissions that can be controlled by WCM;
ii) **Scope 2[5]:** These include CO_2e emissions released into the atmosphere associated with WCM's consumption of purchased electricity. These are indirect emissions that are a consequence of the facility's activities. WCM does not directly emit these emissions but can control them through management of its electricity consumption and purchasing;
iii) **Scope 3[6]:** These are CO_2e emissions that are associated with WCM but arise from sources which are not owned or controlled by WCM and are not classed as Scope 2 emissions. WCM can influence these emissions but not control them.

2.10 The emission sources and GHG protocol scopes considered within this updated assessment of the Proposed Development are summarised in Table 2-1 below and represent emissions that directly or indirectly result as a consequence the Proposed Development for the purposes of environmental assessment. These sources apply across the whole life of the project, namely enabling and construction, operation, and decommissioning unless otherwise stated.

Table 2-1: Emission Sources by Scope

Emission Source	Notes	Scope
Fuel use on site from mining related equipment	Emissions from combustion of diesel to power mine related equipment, such as onsite backup generators, plant and machinery.	Scope 1[5]
Fugitive emissions from mining operations	Fugitive emissions of methane resulting from excavating coal underground, preliminary underground crushing prior to processing and final crushing and processing of coal in the processing plant above ground.	
Land use	Sequestered emissions from trees and vegetation planted as part of the Project.	
Electricity consumption	Indirect emissions from the purchase of grid electricity for mining operations.	Scope 2[5]
Upstream distribution	Emissions from delivery vehicles supplying goods and materials to the site.	Scope 3[6]
Rail distribution	Emissions from rail distribution of coal to Redcar, Scunthorpe and Port Talbot.	
Purchased Goods and Services[7]	Emissions that are embodied in construction materials.	
Waste	Emissions from offsite processing and disposal of general waste generated by WCM (any underground mining related waste will be stored underground and is not included in this category).	
Staff travel	Emissions from WCM staff commuting to and from the site.	

[5] Referred to as "Controlled GHG Emissions" for the purposes of the proposed planning obligation
[6] Referred to as " Sphere of Influence GHG Emissions " for the purposes of the proposed planning obligation
[7] Applies only to enabling and construction, and decommissioning life cycle stages.

2.11 As previously found in the AECOM 2020 report, GHG emissions from the use of coal in steel making and its onward distribution from Redcar are not considered to be direct or indirect effects of the Proposed Development for the purpose of establishing the likely significant GHG effects of the Proposed Development under the EIA Directive and applicable Regulations.

2.12 The applicant's approach to this matter has been summarised in its Statement of Case and although it is a matter of legal submission it is understood that the recent judgment in *R (Finch) v Surrey CC* [2020] EWHC 3566 (Admin) relating to the GHG effects of a crude extraction facility[8] ("Finch") supports the approach the applicant has adopted. In that case the court confirms that the GHG effects from the use of the product, in that case crude oil, was not a direct or indirect effect of the development for which planning permission was sought and therefore did not need to be considered in the EIA assessment.

2.13 Consequently, this assessment has taken that the same principle applies to the end and intermediate use of the coal from the Proposed Development, and the judgment in *Finch* therefore reaffirms the appropriateness of excluding any GHG emissions from the downstream use of the coal (e.g. production of coke and smelting of steel) for the purposes of assessing the likely significant effects from the Proposed Development.

2.14 The lifecycle stages of the Proposed underground Development are assumed to be as follows:

i) Enabling and Construction Phase: Starting in 2023 and completed by the end of 2024;
ii) Operational Phase: Opening year 2025 with operations increasing each year to maximum capacity in 2029. Mine closure end of 2049; and
iii) Decommissioning Phase: Starting and completing during 2050.

2.15 The assumed operational capacity of the mine is shown in Table 2-2 below.

Table 2-2: Ramp up in Coal Production to Full Operational Capacity

Year	Coal production (Million tonnes coal per annum)
2025 (opening year)	0.48
2026	0.90
2027	1.60
2028	2.36
2029 (first full year of maximum production)	2.78
2030 to 2049	2.78

[8] https://www.judiciary.uk/wp-content/uploads/2020/12/R-Finch-v-Surrey-County-Council-Judgment.pdf

3 Methodology

3.1 The methodology to establish the GHG emissions from the Proposed Development follows the same approach as in the AECOM 2020 report and is detailed in Appendix A. It relies on the establishment of the GHG activities associated with the Proposed Development and their emission rates per unit activity (typically referred to as emission factors). In general, this relationship is expressed as follows:

Annual GHG emissions = Annual activity x Emissions factor (expressed as kg CO_2e per unit activity)

3.2 Updates to the operational phase activity data for the Proposed Development have been provided by WCM and reflect the likely operational capacity in the opening year (2025), in the period to full production (assumed to be 5 years 2025-2029) and until mine closure by the end of 2049. Emissions factors are sourced from latest Government published sources[9] [10] [11].

3.3 Appendix B provides further details on activity and GHG emissions assumptions adopted by this assessment, including data that has not been changed from the AECOM 2020 report.

Assessment scenarios

3.4 In order to reflect changes to the operational life of the Proposed Development, new information on likely decarbonisation of the grid and transport system in the period to 2050 (reflecting the 6th carbon budget) as well as mitigation proposed by WCM, the assessment is presented through three separate scenarios described below:

i) **Worst case scenario**: This reflects the scenario adopted by the AECOM 2020 report and assumes no decarbonisation of the grid or transport system, and no mitigation provided by WCM. The enabling and construction and decommissioning GHG emissions remain the same as for the AECOM 2020 report. Operational GHG emissions have been updated to reflect changes in Government published emission factors and the revised operational lifetime of the Proposed Development and changes to assumed methane content of mined coal. This scenario is provided in this update to allow comparison to the AECOM 2020 report. It is not used by this assessment to determine the likely effects of the Proposed Development and is not considered to be likely, even when adopting a precautionary approach.

ii) **Likely unmitigated scenario**: This scenario accounts for the year-on-year decarbonisation of the economy including of the national grid and transportation sector consistent with Committee on Climate Change (CCC) and Government published emissions projections. The construction phase emissions remain unaffected as this will have been completed before any significant economy wide decarbonisation.

iii) **Likely mitigated scenario**: The likely mitigated scenario is consistent in scope with the likely unmitigated scenario, but also includes the effects of mitigation committed to by WCM that apply to all lifecycle stages of the project. This scenario therefore demonstrates the incremental effect of WCM mitigation relative to the likely unmitigated scenario.

[9] BEIS (2021) Greenhouse gas reporting: conversion factors 2021: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021
[10] DfT (2021) TAG data book: https://www.gov.uk/government/publications/tag-data-book
[11] BEIS (2020) Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal

3.5 The GHG emissions from each scenario are compared to those in a do-nothing scenario as they are in the AECOM 2020 report. Since there are no current activities on the site, for the purposes of determining the likely effects the emissions in the do-nothing scenario are zero.

3.6 The underlying assumptions adopted through each scenario are detailed further in Appendix B.

Assessment of Significance

3.7 The methodology for assessing the significance of emissions from this assessment is consistent with the method used in the AECOM 2020 report and detailed further in Appendix A. For these particular purposes and applying a highly precautionary approach, as recommended by IEMA guidance[2], any net increase in GHG emissions is treated as having a likely significant effect.

Assessment of Consistency with Policy

3.8 Additionally, and separately to the assessment of significance, this update considers the net change in GHG emissions resulting from the Proposed Development in terms of consistency with the UK Climate Change Act 2008[12] (and 2019 Amendment[13]) and associated carbon budgets, including the 6th carbon budget[14]. It also considers the project's consistency with the UK's Industrial Decarbonisation Strategy[15], the CCC's net zero balanced pathway scenario[16] to meeting the UK's net zero target by 2050, the National Planning Policy Framework (NPPF)[17] and Cumbria County Council's Climate Change Statement[18] and Strategy[19].

[12] Her Majesty's Stationery Office, 2008. Climate Change Act 2008.
[13] Her Majesty's Stationery Office, 2019. The Climate Change Act 2008 (2050 Target Amendment) Order 2019
[14] Statutory Instruments 2021 No. 750 Climate Change. The Carbon Budget Order 2021, entered into force 24th June 2021, see https://www.legislation.gov.uk/uksi/2021/750/introduction/made
[15] HM Government, Industrial Decarbonisation Strategy, May 2021
[16] Committee on Climate Change, The Sixth Carbon Budget: The UK's path to Net Zero, December 2020
[17] Ministry of Housing, Communities and Local Government (2021), National Planning Policy Framework.
[18] Cumbria County Council (2019). Meeting Minutes (online). Available at: https://councilportal.cumbria.gov.uk/documents/g11145/Printed%20minutes%2011th-Sep-2019%2010.00%20County%20Council.pdf?T=1 [Accessed 5 August 2021]
[19] Cumbrian Carbon Strategy (2020) (online). Available at: https://cumbria.gov.uk/elibrary/Content/Internet/536/6181/44147113255.pdf [Accessed 5 August 2021]

4 GHG emissions without WCM mitigation

4.1 The GHG emissions from the operational and decommissioning phase have been updated in the worst case and likely unmitigated scenarios as described above in Section 3 and detailed further in Appendix B. Enabling and construction phase emissions remain unchanged to those presented in the AECOM 2020 report in both these scenarios and details of the emission calculations for this phase are also provided in Appendix B.

4.2 Table 4-1 below details the net change in GHG emissions for the worst-case scenario by scope of emissions. Emissions are shown for:

i) the enabling and construction phase (2023-2024);
ii) in the opening year (2025);
iii) the first full year of full operations (2029);
iv) for the period of the 5th (2028-2032) and the 6th carbon budgets (2033-2037);
v) in the last year of operation (2049);
vi) in the year of decommissioning (2050); and
vii) cumulatively over the lifespan of the project (2023 to 2050).

Table 4-1: Worst Case Scenario Results

Emissions Scope	Whole life GHG emissions in tonnes CO_2e							
	Enabling & Construction	Operation					Decommissioning	Cumulatively
	2023 to 2024	1st year of operation 2025	1st year of full operation 2029	5th Carbon Budget (2028-2032)[20]	6th Carbon Budget (2033-2037)[20]	Last Year 2049	2050	2023 to 2050
Scope 1	2,906	23,077	192,785	1,017,273	1,443,381	384,568	-948	7,145,162
Scope 2	31,330	16,154	16,154	80,770	80,770	16,154	15,665	450,846
Scope 3	50,865	19,464	19,464	97,321	97,321	19,464	3,189	540,660
Total	85,101	58,696	228,403	1,195,365	1,621,472	420,186	17,906	8,136,668

4.3 Table 4-2 below details the net change in GHG emissions for the likely unmitigated scenario by scope of emissions following the same breakdown of emissions as above.

Table 4-2: Likely Unmitigated Scenario Results

Emissions Scope	Whole life GHG emissions in tonnes CO_2e							
	Enabling & Construction	Operation					Decommissioning	Cumulatively
	2023 to 2024	1st year of operation 2025	1st year of full operation 2029	5th carbon Budget (2028-2032)[20]	6th carbon Budget (2033-2037)[20]	Last year 2049	2050	2023 to 2050
Scope 1	2,906	22,226	192,782	1,017,102	1,443,351	384,557	-959	7,142,852
Scope 2	31,330	2,789	10,865	46,411	26,607	2,086	2,023	154,059
Scope 3	50,865	3,361	19,267	92,131	86,377	6,766	2,890	392,971
Total	85,101	28,375	222,915	1,155,644	1,556,336	393,409	3,954	7,689,881

[20] This figure is the total emissions over the 5-year carbon budget to allow comparison to UK carbon budgets. It is therefore not directly comparable to annual figures presented in this table.

4.4 Reference to Table 4-1 and Table 4-2 shows that scope 1 emissions remain broadly unchanged between the worst case and likely unmitigated scenario whilst scope 2 and 3 emissions fall by 66% and 28% respectively.

4.5 The fall in scope 2 and 3 emissions reflects the decarbonisation of the UK's electricity grid and transport system consistent with government assumptions reflecting pathways to net zero by 2050. Scope 1 emissions are dominated by methane emissions released from the mine which are not affected by national decarbonisation measures.

4.6 Detailed assumptions regarding activity and emissions factor data are provided in Appendix B. Appendix C provides full tabulation of GHG emissions by activity and year.

Assessment of Significance

4.7 The net whole life change in GHG emissions for the worst case is 8.1 Mt CO_2e and 7.7 Mt CO_2e in the likely unmitigated scenario.

4.8 Following IEMA guidance[2] any net increase in GHG emissions is considered significant and therefore the likely GHG effects of the Proposed Development are considered to be significant adverse without any further mitigation by WCM.

5 GHG emissions with WCM mitigation

5.1 A number of design and operational mitigation measures have been identified and committed to by WCM. These are summarised in Table 5-1 below, which includes an assessment of their potential to reduce emissions. In general, the mitigation relates equally to activities during the enabling and construction, operational and decommissioning phases as appropriate.

Table 5-1: WCM Proposed Mitigation

Emission Source	Scope	Proposed Mitigation	Assumed effect (relative to likely unmitigated scenario)
Fuel use on site from mining related equipment	1	100% of operational diesel will be biodiesel with increasing transition to electrification powered through green tariff over the lifetime of the mine.	100% reduction
Fugitive emissions from mining operations	1	The mine is designed to include two forms of methane capture that will be in operation from the fourth year of operation (2028). The first relates to methane gas released from coal pillars. This gas will be drained and used to power a gas turbine that will generate electricity. The second will take the form of ventilation air methane (VAM) capture technology which is widely used in the mining sector to capture methane in ventilation air of the mine from the cutting, transportation, handling and crushing of the coal. The methane capture technology requires a minimum threshold of methane to be effective, which has been calculated to coincide with production volumes in the fourth year of operation. Both the gas turbine and VAM will combust the methane, resulting in residual CO_2 emissions; however, given the much lower Global Warming Potential (GWP) of CO_2 compared to methane, this results in a substantial reduction to total GHG emissions (as CO_2e). There is a small residual proportion of the methane from met coal (5%) that will not be captured and is assumed to be released. Full details of the modelling of methane capture mitigation are provided in Appendix B, which has been supplied by Mr Tonks.	95% methane capture, See Appendix B for further details.
Company owned vehicles	1	All company vehicles will be electric and be powered through green tariff from the start of the operational phase.	100% reduction
Land use	1	On site land management to ensure ongoing health of trees planted within the application site red line boundary. All tree planting to be completed by 2025.	n/a
Electricity consumption	2	A renewable tariff will be employed from day 1 of construction with an energy reduction programme targeting annual efficiency improvements monitored and reported at board level.	100% reduction

Upstream distribution	3	Suppliers will be required to demonstrate commitment to low carbon transport and provided with financial incentives to adopt low carbon transport vehicles. This will help to accelerate the decarbonisation of the fleet beyond that assumed through government incentives and policies.	To be conservative no reduction benefit has been modelled for these measures as they are not fully in WCM's control. A carbon reduction management plan will be developed to track and monitor effectiveness with monthly reports to the management board.
Rail distribution	3	WCM will work with the rail providers to improve efficiency of rail operations including exploring feasibility of early adoption of biodiesel/electrification locally. This may include for example potential pilot projects supporting Network Rail's national decarbonisation strategy[21].	
Waste	3	WCM will develop and implement a waste minimisation program to reduce onsite waste generation (e.g. within offices/above ground, as opposed to all mining waste (reject material) which is returned underground) and increase % of waste recycled or reused.	
Staff travel	3	WCM will produce a staff travel plan that will aim to raise awareness of low carbon travel options and provide incentives for cycling, car sharing and use of local bus services including provision of free use of Electric Vehicle charging points for staff use.	
Purchased goods and services	3	The detailed design, construction and procurement functions will include requirements for minimising the embodied carbon in construction materials and use of low carbon materials where feasible.	

5.2 The effects of the mitigation have been modelled and presented in Table 5-2 below.

5.3 As before, the table presents the net change in GHG emissions by scope over the enabling and construction phase (2023-2024), in the opening year (2025), the first full year of maximum operations (2029), across the period of the 5th (2028-2032), the 6th carbon budgets (2033-2037), in the last year of operation (2049), in the year of decommissioning (2050) and cumulatively over the whole life span of the project.

Table 5-2: Likely Mitigated Scenario Results

Emissions Scope	Whole life GHG emissions in tonnes CO_2e							
	Enabling & Construction	Operation					Decommissioning	Cumulatively
	2023 to 2024	1st year of operation 2025	1st year of full operation 2029	5th carbon Budget (2028-2032)[20]	6th carbon Budget (2033-2037)[20]	Last year 2049	2050	2023 to 2050
Scope 1	0	22,048	25,968	137,070	194,828	51,963	-3,004	1,099,997
Scope 2	0	0	0	0	0	0	0	0
Scope 3	50,865	3,361	19,267	92,131	86,377	6,766	0	390,081
Total	50,865	25,408	45,235	229,201	281,205	58,730	-3,004	1,490,078

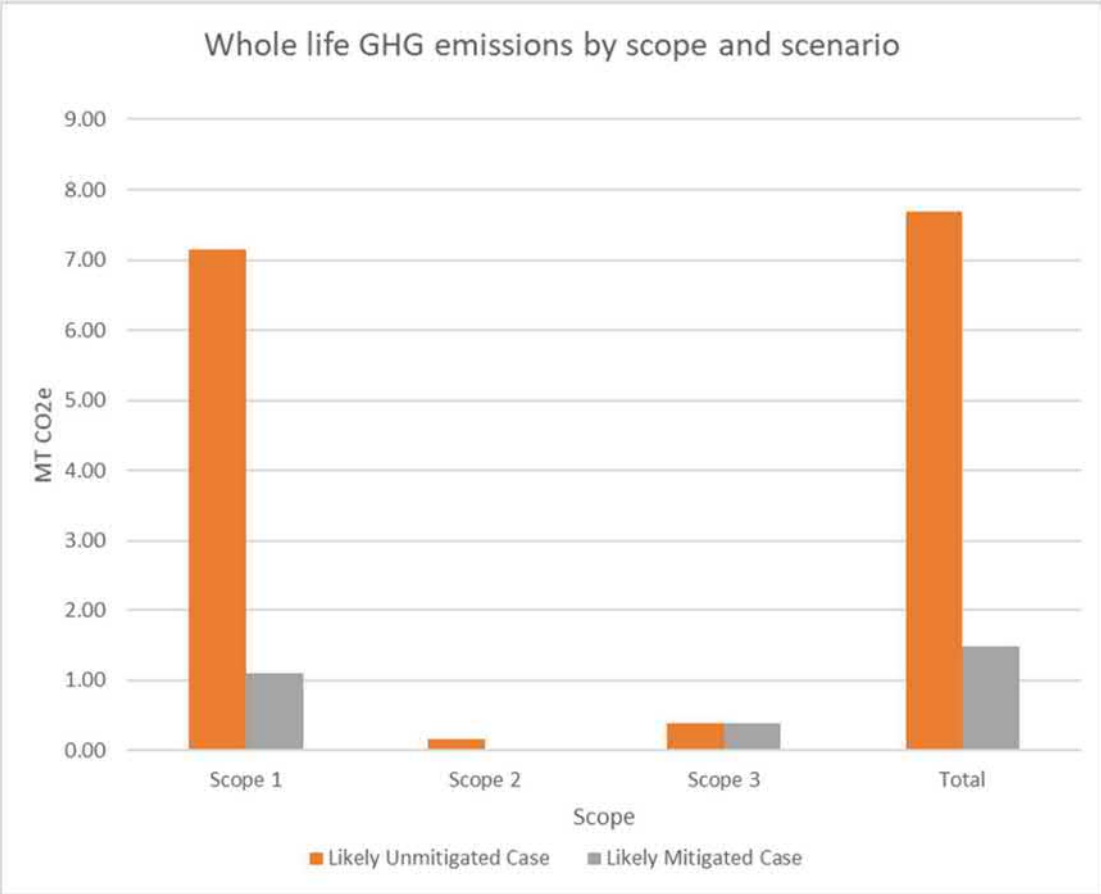
Assessment of Significance with WCM Mitigation

5.4 Reference to Table 5-2 shows that with WCM mitigation the likely whole life change in GHG emissions resulting from the Proposed Development will be an increase of *circa* 1.5Mt CO_2e.

[21] See https://www.networkrail.co.uk/wp-content/uploads/2020/09/Traction-Decarbonisation-Network-Strategy-Interim-Programme-Business-Case.pdf

5.5 The reduction in emissions in the likely mitigated scenario relative to the likely unmitigated scenario is also presented in Figure 5-1 below.

Figure 5-1: Summary of whole life GHG emissions by scope and scenario



5.6 WCM are also committing for the Proposed Development to be net zero from the first day of the construction phase until its decommissioning in 2050. In other words, the Proposed Development will be a net zero whole life project.

5.7 This means that GHG emissions from all the sources considered by this analysis (see Table 2-1) will in the first instance be minimised through avoidance and reduction measures as far as is practicable and in line with the mitigation strategy presented in Table 5-1, and any residual emissions remaining will be offset through the purchasing of recognised Gold Standard offsets (Further details on Gold Standard offsets is provided in the box below).

Gold Standard Offsets

The Gold Standard was formed by the World Wildlife Fund and a number of other NGOs in 2003 and is administered by a non-profit organisation called *The Gold Standard Foundation*, which is now supported by a wide network of global NGOs.

The carbon offsetting and sustainability funds it offers are all robustly audited to ensure that carbon savings from these schemes are not double counted (e.g. used as offsets via another scheme or national policy) and are not achieved via 'business as usual' activities (i.e. ensuring the carbon reductions would not happen naturally without Gold Standard investment).

The Gold Standard is also independently accredited by the ISEAL code of good practice which is a globally recognised framework that defines practices for effective and credible sustainability systems and also has a broad global NGO support network.

5.8 The residual effect of the Proposed Development after mitigation (avoidance, reduction and compensation through offsetting) will therefore be neutral, and not significant.

Managing and Monitoring Effects

5.9 A Section 106 commitment has been proposed[22] to manage and monitor the GHG emissions from the Proposed Development.

5.10 This will require WCM to produce an annual GHG performance report ("the Emissions Monitoring Report") quantifying the GHG emissions (as defined in Table 2.1) over the previous 12 months and to describe actions it has taken to mitigate them. The annual report to be approved or otherwise by the Council will set out the GHG mitigation to include evidence of the purchase of Gold Standard offsets to show the development was net zero over the past 12 months.

5.11 Additionally, WCM will be required to produce a GHG update report ("a Proposed GHG Report") for approval by the Council every 5 years that provides an updated long-term forecast of future GHG emissions based on latest information and guidance.

[22] See draft section 106 deed uploaded to Cumbria County Council's website on 3 August 2021

6 Consistency with Policy

6.1 This section examines the consistency of the project with UK climate change policy and the UK's legally binding commitment to reach net zero by 2050. Specifically, it examines consistency with:

i) The UK carbon budgets of which the 5th and 6th carbon budget[14] coincide with the lifespan of the Proposed Development;
ii) The UK's Industrial Decarbonisation Strategy[15] which sets out specific requirements for the coke mining and steel making sector;
iii) The CCC's modelled pathways for meeting the UK net zero target[16]; and
iv) The National Planning Policy Framework (NPPF)[17] and Cumbria County Council's Climate Change Statement[18] and Strategy[19].

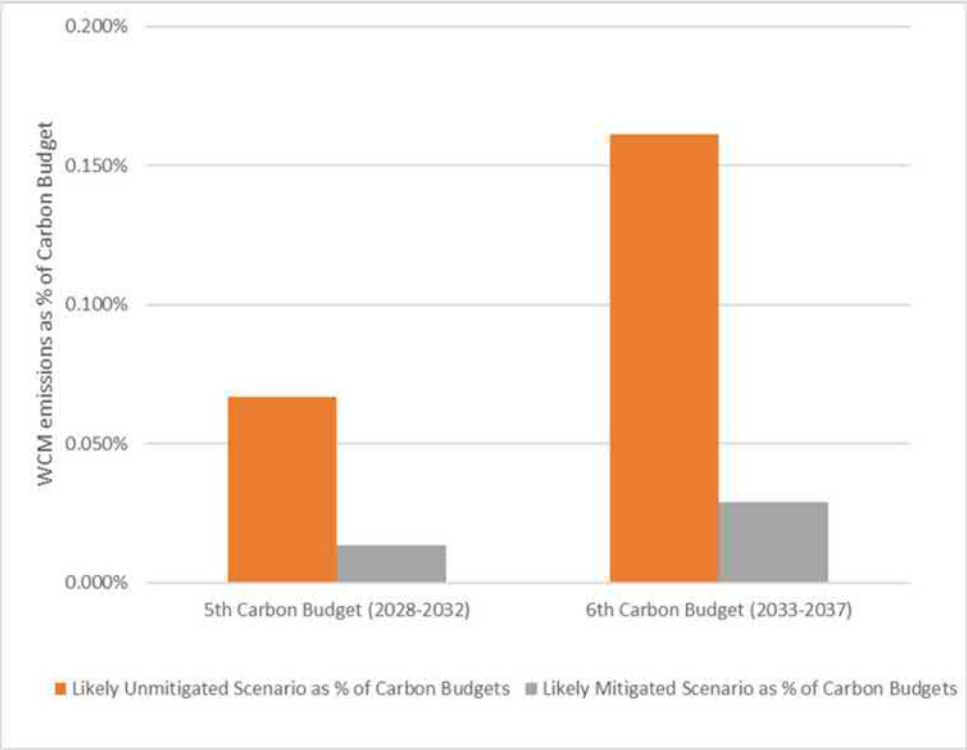
Consistency with Carbon Budgets

6.2 Table 6-1 below details the % of the carbon budgets that would be taken up by the Proposed Development prior to any offsets. The data is presented in graphical form as Figure 6-1.

Table 6-1: Proposed Development GHG emissions as % of carbon Budgets by scenario (prior to offsetting)

Scenario	5th Carbon Budget (2028-2032)	6th carbon Budget (2033-2037)
Likely Unmitigated Scenario as % of Carbon Budgets	0.067%	0.161%
Likely Mitigated Scenario as % of Carbon Budgets	0.013%	0.029%

Figure 6-1: Proposed Development GHG emissions as % of carbon Budgets by scenario (excluding any offsetting)



6.3 Reference to Table 6-1 shows that the project's contribution to carbon budgets are small ranging from 0.067% of the 5th carbon budget and 0.16% of the 6th carbon budget without mitigation to 0.013% of the 5th carbon budget and 0.029% of the 6th carbon budget with mitigation.

6.4 In all cases the % contribution is small as would be expected of a single project when comparing to national budget totals. Importantly, the analysis also demonstrates the significant effect of WCM's mitigation to reduce and avoid GHG emissions, and thus its contribution to carbon budgets is significantly reduced and is supportive of a pathway towards net zero.

6.5 Furthermore, WCM has committed by way of a legal S106 obligation that the project will be net zero over its whole life span. Taking this commitment into account on a net basis the Proposed Development would represent zero percent of national carbon budgets.

Consistency with Industrial Decarbonisation Strategy

6.6 The Industrial Decarbonisation Strategy[15] covers the full range of UK industry sectors including the mining sector. It aims to show how the UK can have a thriving industrial sector aligned with the net zero target, without pushing emissions and business abroad, and how government will act to support this.

6.7 In terms of the UK's mining sector it finds that (see page 53):

> *Coking coal is currently essential for primary steel manufacturing using the basic oxygen furnace route, which produces the highest quality steel and is the dominant technology in Europe. This strategy takes a technology-neutral approach and so does not rule out the use of coking coal in an integrated steel making process together with CCUS as a net zero compliant option going forward. Any mining of the coal itself needs to be net zero compliant in the future. The mining sector needs to plan for this in partnership with government, in line with the principles set out in this strategy.*

6.8 The commitment by WCM to be net zero over the life time of the Proposed Development is therefore consistent with the approach proposed by the Industrial Decarbonisation Strategy.

Consistency with Net Zero Balanced Pathway

6.9 The CCC's Sixth Carbon Budget report[16] sets out a balanced net zero pathway to meeting the UK's net zero target by 2050. It takes a sector-by-sector approach to project emissions and identifies abatement options to achieve the net zero target.

6.10 In taking a sectoral approach, the CCC's objective has been to identify realistic cost-effective sectoral pathways that in combination could achieve the UK's economy wide net zero target. Whilst each sector is assumed to achieve a certain level of emissions by 2050, the purpose of the scenarios is not to set any sectoral targets but to set out plausible sectoral pathways. Notwithstanding, it is instructive to compare WCM's emissions to the CCC's view on mining emissions consistent with its net zero pathway.

6.11 The CCC have classified mining emissions (from open and closed mines) as forming part of the fuel supply sector which also includes direct emissions from oil refining, oil and gas production, oil and gas processing terminals, gas transmission and distribution networks.

6.12 The CCC's analysis forecasts[23] 400,000 tonnes of direct CO_2e emissions (e.g. Scope 1) from open and closed mines by 2050. This compares to circa 52,000[24] tonnes in the final year of production from the WCM mine, which will fall to zero in 2050 when the site is decommissioned.

6.13 Taking into account WCM's whole life net zero commitment and that the emissions, even before any offsetting, will be zero by 2050 demonstrates that there is broad consistency between assumptions underlying the CCC's net zero pathway for the mining sector and the projected emission from the WCM mine by 2050.

Consistency with the National Planning Policy Framework (NPPF) and Cumbria County Council's Climate Change Statement and Carbon Strategy

6.14 Paragraph 152 of the NPPF[17] is of most relevance to the Proposed Development:

152. The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

6.15 The Proposed Development is consistent with this requirement on the basis of the comprehensive mitigation that will be adopted and whole life net zero commitment that will be secured by way of Section 106 agreement. As such the Proposed Development will support the transition to a low carbon future. The use of metallurgical coal produced by the Proposed Development is not relevant for this GHG assessment as detailed in Section 2 earlier and therefore not considered in the context of the NPPF.

6.16 Cumbria County Council declared "a climate emergency" in September 2019[18] and committed to working with the six district councils (including Copeland) to become carbon neutral. This has resulted in the formation of the Zero Carbon Cumbria Partnership which is working towards the shared aim of making Cumbria the first carbon neutral county in the UK, by 2037. The Council has also published a Carbon Strategy[19] examining how it can reduce its own corporate emissions.

6.17 The Proposed Development will be net zero over its whole life and is therefore consistent with the Council's climate emergency declaration and Carbon Strategy.

[23] See for example p150 Committee on Climate Change, The Sixth Carbon Budget. The UK's path to Net Zero, December 2020

[24] Scope 1 emissions for the Proposed Development

7 Conclusions

7.1 This assessment has reviewed and updated the GHG assessment produced by AECOM in 2020. The analysis has been updated to ensure consistency with best available information on the operation of the mine, mitigation committed to by WCM, and likely decarbonisation of the economy consistent with UK net zero targets and advice from the CCC on the 6th Carbon Budget[16].

7.2 Where assumptions have been made these have been conservative to ensure a reasonable worst-case assessment is presented. The assessment has been presented as three scenarios to provide full transparency on the effects of assumptions adopted.

7.3 The first scenario, the worst-case scenario reflects no future mitigation. It assumes no future decarbonisation of the grid, no improvements in road and rail efficiencies and fuel switching and no mitigation of emissions by WCM. This scenario is not considered likely and represents a baseline from which a likely unmitigated scenario has been developed.

7.4 The second scenario, the likely unmitigated scenario adopts conservative assumptions on a precautionary basis, reflecting national sectoral decarbonisation strategies produced by government and the CCC.

7.5 The third scenario, the likely mitigated scenario, includes the effects of mitigation committed to by WCM. As such this scenario represents the likely emissions from the Proposed Development prior to offsetting.

7.6 The assessment shows that the whole life GHG emissions (covering the enabling and construction phase, 25-year operational life of the mine, and decommissioning phase) for the likely mitigated scenario are circa 1.5MT CO_2e. This represents an 80% reduction compared to the likely unmitigated scenario and demonstrates the effectiveness of the mitigation adopted by WCM to avoid and reduce its emissions.

7.7 WCM have committed that the whole life emissions from the Proposed Development including the emissions it can control and influence (see Table 2-1 for scope of emissions included) will be net zero.

7.8 This commitment and WCM's performance will be monitored and managed through a Section 106 commitment which will ensure that GHG emissions and offsets to reach net zero are validated on an annual basis with a requirement for actions to mitigate GHG emissions at source where practicable.

7.9 Additionally, there will also be a 5-year update of the GHG emissions forecast to 2050 to ensure consistency with best practice reporting and forecasting of GHG emissions. The Section 106 GHG monitoring and management commitment is considered to be best practice and will provide certainty and transparency on the delivery of the net zero commitment.

7.10 Taking into account all the mitigation (avoidance, reduction and compensation through offsetting) secured for the Proposed Development the assessment finds the residual likely effects of the Proposed Development to be neutral, and not significant.

7.11 The assessment has also examined the consistency of the GHG emissions from the Proposed Development with UK climate change policies, specifically the 5th and 6th carbon budgets[14], the UK's Industrial Decarbonisation Strategy[15] and the CCC net zero pathway[16] to meeting the 2050 net zero target. Conclusions reached include:

i) The GHG emissions from the Proposed Development are forecast to be 0.013% of the 5th carbon budget and 0.029% of the 6th carbon budget with mitigation, compared to 0.067% of the 5th carbon budget and 0.16% of the 6th carbon budget without mitigation. This demonstrates the effectiveness of WCM's mitigation and ensures the projects is supportive of the pathway towards net zero. Furthermore, WCM has committed by way of a legal Section 106 obligation that the project will be net zero over its whole life span. Taking this commitment into account on a net basis the Proposed Development would represent zero percent of national carbon budgets.

ii) The Industrial Decarbonisation Strategy confirms that it is the government's intention that any mining of the coal itself needs to be net zero compliant in the future, and that the mining sector needs to plan for this in partnership with government. The commitment by WCM to be net zero over the whole life time of the Proposed Development is therefore consistent with the approach proposed by the Industrial Decarbonisation Strategy.

iii) The CCC's balanced net zero pathway analysis forecasts 400,000 tonnes of direct CO_2e emissions from open and closed mines by 2050. This compares to 52,000 tonnes of direct CO_2e emissions in the final year of production, which will fall to zero in 2050 when the site is decommissioned. Taking into account WCM's net zero commitment and that the emissions before any offsetting will be zero by 2050 demonstrates that there is broad consistency between assumptions underlying the CCC's net zero pathway for the mining sector and the projected emissions from the mine by 2050.

7.12 The assessment also considered consistency of the Proposed Development with relevant aspects of the NPPF and Cumbria County Council's climate change policies, and finds that the Proposed Development is consistent and supportive on the basis of its commitment to net zero whole life emissions.

7.13 Overall, this assessment finds that the residual effects of the Proposed Development as neutral, (taking into account mitigation to avoid, reduce and compensate (offset) emissions), not significant and consistent with the UK's net zero target, UK carbon budgets and strategies, the NPPF and local climate change policy. The legal Section 106 requirements to monitor, validate and report GHG emissions will ensure transparency and ongoing consistency with such policies and the 5-year GHG emissions forecast update will ensure that any future changes in policy can be reflected and adopted as required.

Appendix A: Policy and EIA Methodology

This appendix provides additional information related to the requirements of the Environmental Impact Assessment regulations and which form the basis of the GHG assessment provided in the main text of this document. It includes information on:

1. Legislation, Policy and Guidance followed by the assessment;
2. GHG assessment methodology; and
3. The baseline environment.

A1: Legislation, Policy and Guidance

This Section identifies and briefly describes the legislation, policy, and guidance of relevance to the assessment of potential climate impacts associated with the construction, operation and eventual decommissioning of the Proposed Development.

Legislation, policy and other relevant guidance has been considered on an international, national and local level. The following is relevant to the GHG assessment as it has either influenced the sensitivity of receptors and requirements for mitigation or the scope and/or methodology of the assessment.

International Law

Paris Agreement

The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC)[25] dealing with greenhouse gas emissions mitigation, adaptation and finance starting in the year 2020. It requires all signatories to strengthen their climate change mitigation efforts to keep global warming to below 2°C this century.

National Legislation

The Climate Change Act

The Climate Change Act 2008[12](hereafter referred to as the '2008 Act') provides a framework to meet its GHG emission reduction goals through legally binding national carbon emission caps within five-year periods. The 2008 Act was amended in 2019[13] to revise the existing 80% reduction target and legislate for a net zero emissions by 2050. The UK has declared its 5th carbon budget up until 2032 and 6th Carbon Budget[14].

The 2008 Act defines 'net zero' carbon as "the amount of net UK emissions of targeted greenhouse gases for a period adjusted by the amount of carbon united, credited or debited for the year 2050". This means that by 2050 emissions will have to be avoided completely or offset by removal from the atmosphere and/or traded in carbon units.

EIA Regulations

The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 and Town and Country Planning Environmental Impact Assessment) Regulations 2017.

These regulations transpose the EIA Directives (Directive 2011/92/EU amended by Directive 2014/92/EU) into domestic legislation. This application is governed by 2011 Regulations in accordance with the transitional provisions set out in regulation 76 of the 2017 Regulations.

[25] UNFCCC (2016). Conference of the Parties, Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. FCCC/CP/2015/10.Add.1 (online). Available at: https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf [Accessed 5 August 2021]

National Policy

The National Planning Policy Framework

The National Planning Policy Framework (NPPF)[26] sets out the Government's planning policies for England. Policies of relevance to climate change and sustainability assessment as presented therein include those achieving sustainable development and meeting the challenge of climate change.

Local Policy

Climate Emergency Declaration

Cumbria County Council declared a climate emergency in September 2019 and committed to working with the six district councils (including Copeland) to become carbon neutral[27]. This has resulted in the formation of the Zero Carbon Cumbria Partnership which is working towards the shared aim of making Cumbria the first carbon neutral county in the UK, by 2037.

Cumbrian Carbon Management Strategy

The Cumbrian Carbon Strategy[28] objectives are to a) Identify baseline CO_2e emissions for the corporate estate buildings, b) Identify phased CO_2e reduction targets based on specific resource and investment scenarios, c) Develop a phased delivery plan outlining the measures, resources and actions required to meet targets (set out by CCC and identified in the Cumbria Local Energy Plan and draft Cumbria Carbon Baseline Report, and d) High level assessment of capital and revenue costs to include a programme for delivery.

Guidance and Information Sources- International and National Guidance

European Commission

Guidance for the Calculation of Land Carbon Stocks[29] provides a calculation methodology for calculating carbon stocks from land use.

Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report[30].

Department for Business, Energy and Industrial Strategy

Department for Business, Energy and Industrial Strategy (BEIS) provide GHG emission factors for UK-based organisations[31].

[26] Ministry of Housing, Communities and Local Government (2021), National Planning Policy Framework.
[27] Cumbria County Council (2019). Meeting Minutes (online). Available at: https://councilportal.cumbria.gov.uk/documents/g11145/Printed%20minutes%2011th-Sep-2019%2010.00%20County%20Council.pdf?T=1 [Accessed 5 August 2021]
[28] Cumbrian Carbon Strategy (2020) (online). Available at: https://cumbria.gov.uk/elibrary/Content/Internet/536/6181/44147113255.pdf [Accessed 5 August 2021]
[29] European Commission (2010). Commission Decision of 10 June 2010 on Guidelines for the Calculation of Land Carbon Stocks for the Purpose of Annex V to Directive 2009/28/EC (online). Available at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:151:0019:0041:EN:PDF [Accessed 5 August 2021]
[30] European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017). Available at: https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf
[31] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

British Standards

The British Standards Institution (BSI) BS EN ISO 14064-1:2019[32] and 14064-2:2019[33] provide specifications for organisational-level and project-level guidance for the quantification and reporting of GHG emissions and removals.

Guidance and Information Sources - Professional Bodies

Institute for Environmental Management and Assessment

In the absence of any widely accepted guidance on assessing the significance of the impact effect of GHG emissions, EIA Guidance published by IEMA in 2017[2] has been taken into account. This provides a framework for the consideration of greenhouse gas emissions in the EIA process, in line with the 2017 EIA Regulations. Amongst other things, the guidance sets out how to:

- identify the greenhouse gas emissions baseline in terms of GHG current and future emissions;
- identify key contributing GHG sources and establish the scope and methodology of the assessment;
- assess the impact of potential GHG emissions and evaluate their significance; and
- consider mitigation in accordance with the hierarchy for managing project related GHG emissions (avoid, reduce, substitute, and compensate).

British Standards Institute

Publicly Available Specification (PAS) 2080[34] (2016): Carbon Management in Infrastructure provides specific guidance on measuring and managing GHGs from infrastructure.

University of Bath

The Inventory of Carbon & Energy (ICE) Database[35] has been used to source appropriate carbon factors to estimate the embodied carbon of materials used for construction of the Proposed Development. ICE uses some material property data from the Chartered Institution of Building Services Engineers[36] (CIBSE).

A2: GHG Assessment Methodology

Overview

The GHG assessment has identified the likely effects, identified whether there are likely to be any additional effects as a result of the Proposed Development, and assessed their significance over its lifetime.

Determination of Assessment Scenarios

The GHG assessment of the Proposed Development has identified the likely effects of the Proposed Development through the use of a baseline scenario; and a likely mitigated scenario. A worst case and likely unmitigated scenario are provided as additional context.

The baseline scenario is a 'Do Nothing' scenario where the Proposed Development does not go ahead. The baseline comprises existing carbon stock and sources of GHGs within the boundary of the existing Site. The alternative is a 'Do Something' scenario associated with the delivery of the Proposed

[32] British Standards Institution (2019a). BS EN ISO 14064-1:2019. Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
[33] British Standards Institution (2019b). BS EN ISO 14064-2:2019. Greenhouse gases. Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.
[34] British Standards Institution (2016). PAS 2080:2016. Carbon Management in Infrastructure.
[35] ICE Database (2019), University of Bath
[36] CIBSE (2008). Energy Benchmarks. TM46:2008.

Development, which includes the construction, operation and decommissioning paired with activities that will reduce or no longer occur because of the Proposed Development. The 'Do Something' assessment examines whether, and to what degree, it would result in additional effects by way of GHG emissions over and above the baseline scenario of do nothing.

Study Area

The GHG study area considers all direct GHG emissions that arise as a result of the Proposed Development including construction, operation and decommissioning from within the red line boundary area. It also considers indirect emissions arising as a result of the Proposed Development from off-site activities such as transport of materials, waste disposal and embedded carbon in construction materials and products.

The scope and boundary for the assessment has been determined taking into account the principles of PAS 2080: Carbon Management in Infrastructure[34] and IEMA[2].

Sensitive Receptors

The identified receptor for GHG emissions is the global climate. As the effects of GHGs are not geographically constrained, all GHG emissions have the potential to result in a cumulative effect in the atmosphere.

GHG Calculation Methodology

In line with British Standard ISO14064 and principles of the GHG Protocol[4], the GHG emissions have been calculated by multiplying activity data by its relevant emission factor:

Activity data x GHG emissions factor = mass of GHG emissions

Further information on emissions factors and activity data in provided in Appendix B.

A whole life approach has been used to calculate the GHGs associated with the Proposed Development. This approach considers specific timescales and direct and indirect emissions from different life stages of the development, such as product and material manufacture, site enabling and construction, operations and decommissioning.

Only indirect emissions arising as a result of the Proposed Development are considered. Emissions arising from the combustion of the coal from the Proposed Development in steelworks are not considered to be indirect emissions as a result of the Proposed Development for the purpose of this assessment. Activities to be included in the GHG assessment have been scoped on the basis of their presence and materiality, and in line the requirements of the PAS 2080[34] and IEMA[2].

GHG Significance Criteria

IEMA[2] guidance states that there are currently no agreed methods to evaluate levels of GHG significance and that professional judgement is required to contextualise the project's emission impacts.

In GHG accounting, it is considered good practice to contextualise emissions against pre-determined carbon budgets[2]. In the absence of sector-based or local emissions budgets, the UK Carbon Budgets can be used to contextualise the level of significance.

There is currently no published standard definition for receptor sensitivity of GHG emissions. All GHG emissions are classed as being capable of being significant on the basis that all emissions contribute to climate change (IEMA guidance[2]).

The global climate has been identified as the receptor for the purposes of the GHG assessment. The sensitivity of the climate to GHG emissions is considered to be 'high'.

General Limitations and Assumptions

The GHG assessment presented in this document has been based on currently available data that can be reasonably obtained. As a result, some data is not available to provide a fully quantified assessment of

the GHGs from the construction, operation and decommissioning of the Proposed Development. Specific inclusions and exclusions of data, and scenario assumptions are discussed in Appendix B.

Where appropriate estimates and approximations have been required these have been taken to ensure they remain conservative to ensure a reasonable worst case.

A3: Baseline Environment

The baseline environment assesses the 'Do Nothing' scenario where the Proposed Development does not go ahead.

The Site is currently an unoccupied brownfield industry site of a former coal mine, anhydrite mine and chemical works for the manufacture of detergents. The 23-hectare (ha) Site consists of approximately 14 ha 'rank grassland and limited scrub regeneration', and 9 ha of disused concrete footings and hardstanding. There are no current activities at the proposed Site.

The baseline emissions are therefore assumed to be zero for the purposes of this assessment.

Appendix B: GHG Footprint Activity Data, Emissions Factors and Assumptions

This Appendix provides further detail on the activity data, emissions factors and assumptions adopted in modelling GHG emissions under the three scenarios considered, including data from the AECOM 2020 report for the enabling and construction phase.

B1: Operational Phase Activity Data

Table B-1 below sets out the key activity data used for the calculation of the operational GHG footprint.

Table B-1: Activity data used in the operational phase GHG assessment

Scope	Source	Activity Data
Scope 1	Fuel use on site from mining related equipment	375,000 litres of diesel per year from site machinery plus 113 litres per year for emergency generator testing.
	Fugitive emissions from mining operations	Detailed activity data and assumptions provided in the "Fugitive Emissions from Mining Operations" section of this Appendix.
	Company owned vehicles	12 no. company vehicles with average mileage of 10,000 km per year per vehicle.
	Land Use[37]	Revegetation including 1.5 ha of broadleaved plantation forest less than 20 years old' and 9.5 ha of 'improved grassland'.
Scope 2	Electricity consumption	Sitewide electricity consumption of 63,850,000 kWh per year.
Scope 3	Upstream distribution	An average of 6 HGV deliveries per day with average travel distance of 84 km per vehicle.
	Rail distribution	Coal distributed by rail to Redcar (86.8%), Scunthorpe (6.6%) and Port Talbot (6.6%). Distribution distances 215 km (Redcar), 300 km (Scunthorpe), 550 km (Port Talbot).
	Waste	Estimated 203 tonnes of waste generated per year.
	Staff travel	518 site staff per day with an average travel to work distance of 20 miles.

B2: Operational Phase Assumptions

Table B-2 below sets out the activity data sources and assumptions used for the calculation of the operational GHG footprint.

[37] Calculation unchanged from the AECOM 2020 report.

Table B-2: Main assumptions and data sources used in the operational phase GHG assessment

Source	Data Source	Assumptions
Fuel use on site from mining related equipment	Fuel data provided by WCM	Assumed annual fuel consumption is constant for the lifetime of the project. Assumed use of mineral diesel in the worst and likely case scenarios and 100% biodiesel in the mitigated scenario.
Fugitive emissions from mining operations	Detailed activity data and assumptions provided in the "Fugitive Emissions from Mining Operations" section of this Appendix.	
Company owned vehicles	Activity data provided by WCM.	Assumed each company vehicle is a diesel 4x4 vehicle in the worst and likely case scenarios and battery electric vehicles in the mitigated scenario.
Land Use	Calculation from AECOM 2020 report	Assumes revegetation including 1.5 ha of broadleaved plantation forest less than 20 years old' and 9.5 ha of 'improved grassland'.
Electricity consumption	Consumption data provided by WCM.	Assumed standard grid electricity supply in the worst and likely case scenarios, and green energy tariff electricity in the mitigated scenario.
Upstream distribution	Activity data provided by WCM.	Assumed all vehicles are HGVs. Assumed a laden arrival (delivery) and an unladen return journey for each HGV.
Rail distribution	Coal distribution data from WCM.	Rail distribution distances estimated from rail maps.
Waste	ONS data on per capita waste generation in the UK.	ONS data combined with number of site staff to estimate annual waste volume for the project. Waste is assumed to be sent to landfill disposal. Annual waste volumes assumed to be constant throughout lifetime of project.
Staff travel	Activity data provided by WCM.	WCM committed to ensure 80% of staff live within 20 miles, so this has been used as an estimate of the average distance for all staff. All staff assumed to travel in a private car.

B3: Emissions Factors

Table B-3 below sets out the GHG emissions factors used for the calculation of the operational GHG footprint.

Table B-3: GHG emissions factors used in the operational phase GHG assessment

Source	Opening Year Emissions Factors			Future Year Emissions Factors		
	Worst Case	Likely Scenario	Likely Mitigated Scenario	Worst Scenario	Likely Scenario	Likely Mitigated Scenario
Fuel use on site from mining related equipment	2.68 $kgCO_2e/l$		0 $kgCO_2e/l$ (100% biofuel)	Fixed to opening year	Fixed to opening year	0 $kgCO_2e/l$ (100% biofuel)
Fugitive emissions from mining operations	Detailed data and assumptions are provided in the "Fugitive Emissions from Mining Operations" section of this Appendix.					
Company owned vehicles	0.20376 $kgCO_2e/km$		0 $kgCO_2e/l$ (electric vehicles recharged with green tariff)	Fixed to opening year	Future Emissions profile for cars, see Table B.4	0 $kgCO_2e/l$ (electric vehicles recharged with green tariff)
Land Use	These data are unchanged from the AECOM 2020 report. Calculation follows European Commission Guidelines[38].					
Electricity consumption	0.253 $kgCO_2e/kWh$		0 $kgCO_2e/kWh$ (green energy tariff)	Fixed to opening year	Future Emissions profile for electricity, see Table B.4	0 $kgCO_2e/kWh$ (green energy tariff)
Upstream distribution	0.91549 $kgCO_2e/km$ (laden HGV) 0.66604 $kgCO_2e/km$ (unladen HGV)			Fixed to opening year	Future Emissions profile for HGV, see Table B.4	Future Emissions profile for HGV, see Table B.4
Rail distribution	0.02556 $kgCO_2e/Tcoal/km$			Fixed to opening year	Future Emissions profile for rail, see Table B.4	Future Emissions profile for rail, see Table B.4
Waste	446 $kgCO_2e/Twaste$			Fixed to opening year	Fixed to opening year	Fixed to opening year
Staff travel	0.1514 $kgCO_2e/km$			Fixed to opening year	Future Emissions profile for cars, see Table B.4	Future Emissions profile for cars, see Table B.4

B4: Decarbonisation Profiles

In order to account for future decarbonisation of key GHG emissions sources included in the assessment, a set of decarbonisation profiles have been produced for emissions associated with grid electricity consumption, road vehicles and rail freight. The decarbonisation profiles are a set of factors which are

[38] European Commission (2010), Commission Decision of 10 June 2010 on Guidelines for the Calculation of Land Carbon Stocks for the Purpose of Annex V to Directive 2009/28/EC.

adjusted to the 2025 (opening year) emissions factors described in Table B-3 and are based on anticipated decarbonisation profiles up to 2049 (year of mine closure) for these sources.

The decarbonisation profile for grid electricity is obtained from BEIS Green Book supplementary guidance on the valuation of energy use and greenhouse gas emissions for appraisal[39]. Specifically, the long-run marginal consumption-based factors for commercial grid electricity in Table 1 of the data tables set that accompany the guidance have been used. The factors do not reflect latest strategies for decarbonising the power sector and therefore are conservative.

For road traffic, decarbonisation profiles for cars have been developed based on Department for Transport WebTAG data[40]. The WebTAG datasets include future profiles for improvements in vehicle fuel economy and uptake of electric vehicles into the UK vehicle fleet. These data have been combined to create the decarbonisation profile for cars. For HGVs, analysis in the DfT's Freight Carbon Review[41] has been used to build a decarbonisation profile. The DfT review estimates fuel efficiency savings for road freight of around 0.5% per annum, with hydrogen fuel cell technology likely to be adopted in the future, with an estimated 40% of road freight mileage using hydrogen vehicles by 2050. The HGV decarbonisation profile therefore assumes a 0.5% per year fuel efficiency improvement from 2025 to 2040, and then a phased introduction of hydrogen freight up to 40% by 2050. This is considered consistent with, and likely to be conservative in relation to, the DfT's Decarbonising Transport report[42] which aims to end sales of non-zero emission HGVs below 26 tonnes by 2035 and end sales of non-zero emission HGVs above 26 tonnes by 2040, with a view to be net zero by 2050.

Rail freight decarbonisation is less certain, with work underway by the DfT and RSSB on decarbonisation strategies for the sector. Currently, Network Rail estimates that 90% of UK rail freight will be electric by 2050, although decarbonisation of rail freight may incorporate alternatives such as hydrogen. A decarbonisation profile for rail freight has therefore been estimated, which assumes no change up to 2030 (i.e. all diesel rail-freight) and then assumes a 2% per year reduction in rail freight emissions up to 2039 and then a 5% reduction per annum to 2049 to account for expected decarbonisation of the network over this period. This is considered consistent with, and likely to be conservative in relation to, the DfT's Decarbonising Transport report which aims to remove all diesel-only locomotives by 2040 with use of diesel-electric and hydrogen rail to achieve net zero rail freight by 2050.

Table B-4 below sets out the decarbonisation profiles used in the operational GHG footprint. These have only been used in the likely unmitigated scenario, and the mitigated scenario as indicated in Table B-3.

[39] BEIS (2019) Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal, data table 1.
[40] DfT (2021) Transport Analysis Guidance (WebTAG) datasets: https://www.gov.uk/government/publications/tag-data-book
[41] DfT (2017) Freight Carbon Review.
[42] DfT (2021) Decarbonising Transport. A Better, Greener Britain.

Table B-4: Decarbonisation profiles used in the assessment

Year	Grid Electricity	Road Vehicles		Rail
		Cars	HGVs	
2025	1.000	1.000	1.000	1.000
2026	0.925	0.975	0.995	1.000
2027	0.845	0.946	0.990	1.000
2028	0.761	0.921	0.985	1.000
2029	0.673	0.896	0.980	1.000
2030	0.579	0.867	0.975	1.000
2031	0.516	0.843	0.970	0.980
2032	0.460	0.820	0.965	0.960
2033	0.409	0.796	0.960	0.940
2034	0.365	0.775	0.955	0.920
2035	0.325	0.756	0.950	0.900
2036	0.290	0.734	0.945	0.880
2037	0.258	0.717	0.940	0.860
2038	0.230	0.700	0.935	0.840
2039	0.205	0.681	0.930	0.820
2040	0.183	0.665	0.890	0.770
2041	0.177	0.651	0.850	0.720
2042	0.171	0.634	0.810	0.670
2043	0.165	0.620	0.770	0.620
2044	0.159	0.607	0.730	0.570
2045	0.153	0.593	0.690	0.520
2046	0.147	0.582	0.650	0.470
2047	0.141	0.570	0.610	0.420
2048	0.135	0.557	0.570	0.370
2049	0.129	0.545	0.530	0.320

B5: Project Ramp Up

Mining operations are currently expected to begin in 2025, but the mine would not reach full capacity until 2029. To account for this 5-year ramp up of mining activity, GHG emissions in the period 2025-2029 have been prorated to account for reduced activity and reduced emissions in these years. In the ramp up period emissions have been adjusted using the expected annual output of coal, as presented in Table 2-2 of this report.

B6: Fugitive Emissions from Mining Operations

Fugitive emissions from coal mining are associated with methane gas stored in the coal which is released during mining and processing. Methane emissions will occur within the underground mine from mining activities and pre-crushing of met coal, as well as from the slow “drainage” of methane from pillar coal left in the mine to provide structural support. Some methane may also be released from processing of the coal in the processing plant prior to export.

Methane released within the mine will be captured, removed to the surface and treated. There are two routes of methane capture and extraction that will be used; the first is drainage methane from pillar coal, which is at high concentration so can be combusted in gas engines to create electricity; the second is Ventilation Air Methane (VAM), which is a low concentration, but can be oxidised in a VAM unit at the surface. The VAM is mainly met coal methane released in mining and pre-crushing, but will also contain a

small amount of the pillar coal methane released during mining around the pillars. Methane released during final crushing of met coal above ground within the processing plant will also be captured and treated in a VAM unit. There will be a small residual amount of methane released from the met coal during processing that cannot be captured when released from the coal.

The key inputs and assumptions for the fugitive methane calculations are shown in Table B-5. All inputs have been provided by WCM in consultation with their mine gas expert, Mr Tonks.

Table B-5: Main assumptions in the calculation of fugitive methane emissions from mining operations

Parameter	Value	Unit	Description
% Pillar coal methane in VAM	15	%	Percentage of methane released from pillar coal that escapes into mine and therefore combines with ventilation air methane and treated in VAM units.
% Pillar coal methane in drainage	35	%	Percentage of methane released from pillar coal that is drained from mine and extracted above ground to be used in a gas engine.
% Pillar coal methane trapped in mine	50	%	Percentage of methane in pillar coal that will be trapped in mine and never released.
% Met coal methane released in mine by mining and cutting	60	%	The percentage of methane released during activities within the underground mine including mining and initial cutting of the coal. This methane will be extracted above ground and treated in VAM units.
% Met coal methane released by pre crushing in mine	25	%	Additional underground methane released by using primary crushers underground before extraction of coal to the processing plant. This methane will be extracted above ground and treated in VAM units.
% Met coal methane released by crushing in processing plant	10	%	The percentage of methane released from the coal during final crushing above ground in the processing plant. This methane will be captured and treated in the VAM units.
% Methane released in processing plant	5	%	The percentage of methane released during processing of coal in the processing plant, which will not be captured.
Density of Methane	0.68	kg/m3	Based on coal methane measurements normalised to 15 degrees C and 1 bar pressure.
GWP of Methane	28	-	The GWP of methane has been based on advice within the IPCC AR5 Fifth Assessment Report[43] which has been followed by the Committee on Climate Change in establishing the 6th carbon budget and pathways to net zero. This represents a conservative position relative to existing BEIS guidance[44] to use a GWP of 25 for methane based on previous IPCC report (AR4).
First year drainage CH4 mitigation	4	-	Year from which drainage methane will be captured and burned in gas engines.
First year VAM CH4 mitigation	4	-	Year from which VAM methane will be captured and oxidised in a VAM unit.

[43] IPCC (2014) *Fifth Assessment Report* (AR5)
[44] See: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/420269/List_of_GWPs.xlsx

Borehole sampling of the mine shows a variable coal methane content across the coal seam ranging from 2 m^3/T to 6 m^3/T. This has been modelled by Mr Tonks across the life of the mine and used to calculate the annual emissions for each year of operation. T*he calculations are based on methane released from both metallurgical coal extracted from the mine for processing and export, as well as coal left in situ within the mine known as 'pillar coal', which is left to provide structural support to the mine.*

The data on coal volumes and coal methane content is presented in Table B-6.

Table B-6: Coal Volumes and Methane Content Assumptions used in GHG Assessment

Year	Volume of Coal Mined (T)		CH_4 Content of Coal (m^3/T)
	Met Coal	Pillar Coal	
2025	480,000	199,440	2
2026	900,000	373,950	2.25
2027	1,600,000	664,800	2.5
2028	2,360,000	980,580	2.75
2029	2,780,000	1,155,090	3
2030	2,780,000	1,155,090	3.25
2031	2,780,000	1,155,090	3.5
2032	2,780,000	1,155,090	3.75
2033	2,780,000	1,155,090	4
2034	2,780,000	1,155,090	4.25
2035	2,780,000	1,155,090	4.5
2036	2,780,000	1,155,090	4.75
2037	2,780,000	1,155,090	5
2038	2,780,000	1,155,090	5.25
2039	2,780,000	1,155,090	5.5
2040	2,780,000	1,155,090	5.75
2041	2,780,000	1,155,090	6
2042	2,780,000	1,155,090	6
2043	2,780,000	1,155,090	6
2044	2,780,000	1,155,090	6
2045	2,780,000	1,155,090	6
2046	2,780,000	1,155,090	6
2047	2,780,000	1,155,090	6
2048	2,780,000	1,155,090	6
2049	2,780,000	1,155,090	6

B7: Enabling and Construction Phase

GHG emissions associated with the enabling and construction phase of the WCM project have been obtained from the AECOM 2020 report and are unchanged from those presented in the report.

A summary of the key data and assumptions used in the calculation of emissions from enabling and construction are presented in Table B-7.

Table B-7: Data and assumptions used in the enabling and construction phase GHG assessment

Scope	Source	Activity Data
Scope 1	Fuel use on site from enabling and construction equipment	Fuel usage onsite has been based on the plant and machinery list detailed in the Noise and Vibration Assessment of the Environmental Statement. Power ratings for these items these equipment items are based upon published construction equipment suppliers. All plant and machinery are assumed to use diesel.
	Company owned vehicles	12 company-owned vehicles are expected to be active over the course of the construction period.
Scope 2	Electricity consumption	Uses of grid electricity are likely to include workshops and welfare facilities. Usage has been conservatively estimated on continuous use during construction hours using CIBSE Energy Benchmarks (2008)[45] and includes that for the main site and at the materials depot. However, in reality electricity use is likely to be intermittent.
Scope 3	Purchase of Goods and Services	A bill of quantities for the construction materials is not available. Estimates of materials have been made of the buildings, rail line, the concrete culvert and concrete hardstanding, the water tank and the car park. These estimates have been based on dimensions detailed within the Project Description of the Environmental Statement.
	Upstream distribution	An average 57 daily HGV trips to and from Site are expected, of which 50 are assumed to be incoming materials and the remainder for outgoing wastes.
	Waste	Waste volumes are based upon current project estimates and include the disposal or treatment of potentially contaminated soil, wastewater, municipal waste and estimates of construction waste. Suitable waste receiving facilities have been assumed to be available on average of 84 km from the Site. This distance is the average from Carlisle and Lancaster where HGVs are expected to be travelling to and from. UK per person averages have been used for mains water usage[46] and municipal waste creation[47]. Mains water will only be used to meet human welfare requirements.
	Staff travel	At peak construction 310 staff will work at the main mine site. Daily construction staff averages for each month of construction are in line with that described in the Project Description of the Environmental Statement. Staff commute in single occupancy vehicles, from destinations in accordance with the Road Transport Assessment of the Environmental Statement. All commutes include a return trip.

As emissions from enabling and construction works will occur in the near future, no account is made for decarbonisation of any of the sources included in the footprint in either of the worst-case, likely unmitigated or likely mitigated scenarios.

[45] CIBSE (2008) Energy Benchmarks TM46:2008.
[46] Discover Water (2019) Amount We Use (online): https://discoverwater.co.uk/amount-we-use
[47] European Commission (2019) Municipal Waste Statistics (online): https://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics

B8: Decommissioning Phase

For the worst-case scenario, emissions from project decommissioning are unchanged from those presented in the AECOM 2020 report.

A summary of the key data and assumptions used in the calculation of emissions from the decommissioning phase are presented in Table B-8.

Table B-8: Data and assumptions used in the decommissioning phase GHG assessment

Scope	Source	Activity Data
Scope 1	Fuel use on site from enabling and construction equipment	Fuel usage onsite has been based on the plant and machinery list detailed in the Noise and Vibration Assessment of the Environmental Statement. Power ratings for these items these equipment items are based upon published construction equipment suppliers. All plant and machinery are assumed to use diesel.
	Company owned vehicles	12 company-owned vehicles are expected to be active over the course of the decommissioning period.
	Land Use	Vegetation including 1.5 ha of 'broadleaved plantation forest more than 20 years old' and 21.5 ha of 'improved grassland'.
Scope 2	Electricity consumption	Uses of grid electricity are likely to include workshops and welfare facilities. Usage has been conservatively estimated on continuous use during construction hours using CIBSE Energy Benchmarks (2008)[45] and includes that for the main site and at the materials depot. The estimate has not included grid decarbonisation over the 50-year period or any potential carbon displacements and therefore represents worst-case emissions estimate from electricity usage.
Scope 3	Purchase of Goods and Services	Minimal goods and services are anticipated to be required during the decommissioning phase.
	Upstream distribution	An average 57 daily HGV trips to and from Site are expected.
	Waste	Waste volumes are based upon current project estimates that have been marked up and additional volumes added. Suitable waste receiving facilities have been assumed to be available on average of 84 km from the Site. This distance is the average from Carlisle and Lancaster where HGVs are expected to be travelling to and from. UK per person averages have been used for mains water usage[46] and municipal waste creation[47]. Mains water will only be used to meet human welfare requirements.
	Staff travel	Staff commute in single occupancy vehicles, from destinations in accordance with the Road Transport Assessment of the Environmental Statement. All commutes include a return trip.

In the likely unmitigated scenario emissions from vehicles (company vehicles and staff commuting) and electricity consumption have been recalculated using the 2049 decarbonisation factors presented in Table B-4 to account for decarbonisation of energy and road transport. Emissions from other sources such as waste and fuel use remain unchanged compared to the worst-case scenario.

In the likely mitigated scenario, emissions from all sources are assumed to be zero (with the exception of the land use change carbon offset which is retained). This assumption is based on the UK Government achieving a 2050 net zero target and therefore all of the emissions associated with decommissioning (which will occur in 2050) being net zero.

Appendix C: Detailed GHG Assessment Results

Table C.1 to C.3 below detail the GHG by lifecycle phase, and activity for each scenario. Table C.4 to C.6 detail the GHG emissions year by year throughout the project lifecycle for each scenario.

Table C-1: Detailed breakdown of GHG emissions by activity: Worst Case Scenario

Scope	Source	Life cycle phase (Tonnes CO_2e)							
		Construction	Operation					Decommissioning	Cumulative
		2023 to 2024	1st year of operation 2025	1st year of full operation 2029	5th carbon Budget (2028-2032)	6th carbon Budget (2033-2037)	Last year 2049	2050	2023 to 2050
Scope 1	Fuel use on site from mining related equipment	2,857	1,005	1,005	5,027	5,027	1,005	2,032	30,022
	Fugitive emissions from mining operations	0	22,076	191,783	1,012,265	1,438,372	383,566	0	7,118,161
	Company owned vehicles	49	24	24	122	122	24	24	684
	Land Use	0	-28	-28	-140	-140	-28	-3,004	-3,704
Scope 2	Electricity consumption	31,330	16,154	16,154	80,770	80,770	16,154	15,665	450,846
Scope 3	Upstream distribution	3,314	291	291	1,455	1,455	291	0	10,587
	Rail distribution	0	17,241	17,241	86,207	86,207	17,241	0	431,037
	Waste	917	91	91	453	453	91	2,529	5,711
	Staff travel	1,316	1,841	1,841	9,206	9,206	1,841	658	48,003
	Purchased goods and services	45,318	0	0	0	0	0	2	45,320
Total		85,101	58,696	228,403	1,195,365	1,621,472	420,186	17,906	8,136,668

Table C-2: Detailed breakdown of GHG emissions by activity: Likely Unmitigated Scenario

Scope	Source	Life cycle phase (Tonnes CO_2e)							
		Construction	Operation					Decommissioning	Cumulative
		2023 to 2024	1st year of operation 2025	1st year of full operation 2029	5th carbon Budget (2028-2032)	6th carbon Budget (2033-2037)	Last year 2049	2050	2023 to 2050
Scope 1	Fuel use on site from mining related equipment	2,857	174	1,005	4,875	5,027	1,005	2,032	27,931
	Fugitive emissions from mining operations	0	22,076	191,783	1,012,265	1,438,372	383,566	0	7,118,161
	Company owned vehicles	49	4	22	103	92	13	13	464
	Land Use	0	-28	-28	-140	-140	-28	-3,004	-3,704
Scope 2	Electricity consumption	31,330	2,789	10,865	46,411	26,607	2,086	2,023	154,059
Scope 3	Upstream distribution	3,314	50	285	1,375	1,382	154	0	8,989
	Rail distribution	0	2,977	17,241	82,568	77,587	5,517	0	301,224
	Waste	917	16	91	439	453	91	2,529	5,523
	Staff travel	1,316	318	1,650	7,749	6,956	1,004	359	31,915
	Purchased goods and services	45,318	0	0	0	0	0	2	45,320
Total		85,101	28,375	222,915	1,155,644	1,556,336	393,409	3,954	7,689,881

Table C-3: Detailed breakdown of GHG emissions by activity: Likely Mitigated Scenario

Scope	Source	Life cycle phase (Tonnes CO_2e)							
		Construction	Operation					Decommissioning	Cumulative
		2023 to 2024	1st year of operation 2025	1st year of full operation 2029	5th carbon Budget (2028-2032)	6th carbon Budget (2033-2037)	Last year 2049	2050	2023 to 2050
Scope 1	Fuel use on site from mining related equipment	0	0	0	0	0	0	0	0
	Fugitive emissions from mining operations	0	22,076	25,996	137,210	194,968	51,991	0	1,103,701
	Company owned vehicles	0	0	0	0	0	0	0	0
	Land Use	0	-28	-28	-140	-140	-28	-3,004	-3,704
Scope 2	Electricity consumption	0	0	0	0	0	0	0	0
Scope 3	Upstream distribution	3,314	50	285	1,375	1,382	154	0	8,989
	Rail distribution	0	2,977	17,241	82,568	77,587	5,517	0	301,224
	Waste	917	16	91	439	453	91	0	2,994
	Staff travel	1,316	318	1,650	7,749	6,956	1,004	0	31,556
	Purchased goods and services	45,318	0	0	0	0	0	0	45,318
Total		50,865	25,408	45,235	229,201	281,205	58,730	-3,004	1,490,078

Table C-4: Year by Year Operational Phase GHG Emissions: Worst Case Scenario

Year	Scope 1				Scope 2	Scope 3				TOTAL
	Fuel use on site	Fugitive emissions from mining	Company vehicles	Land use	Electricity consumption	Upstream distribution	Rail distribution	Waste	Staff travel	
2025	1,005	22,076	24	-28	16,154	291	17,241	91	1,841	58,696
2026	1,005	46,566	24	-28	16,154	291	17,241	91	1,841	83,186
2027	1,005	91,982	24	-28	16,154	291	17,241	91	1,841	128,602
2028	1,005	149,241	24	-28	16,154	291	17,241	91	1,841	185,861
2029	1,005	191,783	24	-28	16,154	291	17,241	91	1,841	228,403
2030	1,005	207,765	24	-28	16,154	291	17,241	91	1,841	244,385
2031	1,005	223,747	24	-28	16,154	291	17,241	91	1,841	260,367
2032	1,005	239,729	24	-28	16,154	291	17,241	91	1,841	276,349
2033	1,005	255,711	24	-28	16,154	291	17,241	91	1,841	292,331
2034	1,005	271,693	24	-28	16,154	291	17,241	91	1,841	308,313
2035	1,005	287,674	24	-28	16,154	291	17,241	91	1,841	324,294
2036	1,005	303,656	24	-28	16,154	291	17,241	91	1,841	340,276
2037	1,005	319,638	24	-28	16,154	291	17,241	91	1,841	356,258
2038	1,005	335,620	24	-28	16,154	291	17,241	91	1,841	372,240
2039	1,005	351,602	24	-28	16,154	291	17,241	91	1,841	388,222
2040	1,005	367,584	24	-28	16,154	291	17,241	91	1,841	404,204
2041	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2042	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2043	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2044	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2045	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2046	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2047	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2048	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
2049	1,005	383,566	24	-28	16,154	291	17,241	91	1,841	420,186
Cumulative	25,133	7,118,161	611	-700	403,851	7,273	431,037	2,265	46,029	8,033,661

Table C-5: Year by Year Operational Phase GHG Emissions: Likely Unmitigated Scenario

Year	Scope 1				Scope 2	Scope 3				TOTAL
	Fuel use on site	Fugitive emissions from mining	Company vehicles	Land use	Electricity consumption	Upstream distribution	Rail distribution	Waste	Staff travel	
2025	174	22,076	4	-28	2,789	50	2,977	16	318	28,375
2026	325	46,566	8	-28	4,836	94	5,582	29	581	57,994
2027	579	91,982	13	-28	7,859	166	9,923	52	1,003	111,549
2028	853	149,241	19	-28	10,441	243	14,637	77	1,440	176,923
2029	1,005	191,783	22	-28	10,865	285	17,241	91	1,650	222,915
2030	1,005	207,765	21	-28	9,350	284	17,241	91	1,596	237,326
2031	1,005	223,747	21	-28	8,331	282	16,897	91	1,552	251,898
2032	1,005	239,729	20	-28	7,423	281	16,552	91	1,510	266,583
2033	1,005	255,711	19	-28	6,614	279	16,207	91	1,465	281,364
2034	1,005	271,693	19	-28	5,894	278	15,862	91	1,427	296,240
2035	1,005	287,674	18	-28	5,251	276	15,517	91	1,392	311,198
2036	1,005	303,656	18	-28	4,679	275	15,173	91	1,352	326,221
2037	1,005	319,638	18	-28	4,169	273	14,828	91	1,319	341,313
2038	1,005	335,620	17	-28	3,715	272	14,483	91	1,288	356,463
2039	1,005	351,602	17	-28	3,310	271	14,138	91	1,253	371,659
2040	1,005	367,584	16	-28	2,949	259	13,276	91	1,225	386,378
2041	1,005	383,566	16	-28	2,853	247	12,414	91	1,198	401,362
2042	1,005	383,566	15	-28	2,757	236	11,552	91	1,167	400,361
2043	1,005	383,566	15	-28	2,662	224	10,690	91	1,142	399,367
2044	1,005	383,566	15	-28	2,566	212	9,828	91	1,119	398,373
2045	1,005	383,566	14	-28	2,470	201	8,966	91	1,092	397,376
2046	1,005	383,566	14	-28	2,374	189	8,104	91	1,071	396,385
2047	1,005	383,566	14	-28	2,278	177	7,241	91	1,050	395,395
2048	1,005	383,566	14	-28	2,182	166	6,379	91	1,025	394,400
2049	1,005	383,566	13	-28	2,086	154	5,517	91	1,004	393,409
Cumulative	23,042	7,118,161	402	-700	120,706	5,675	301,224	2,077	30,240	7,600,826

Table C-6: Year by Year Operational Phase GHG Emissions: Likely Mitigated Scenario

Year	Scope 1				Scope 2	Scope 3				TOTAL
	Fuel use on site	Fugitive emissions from mining	Company vehicles	Land use	Electricity consumption	Upstream distribution	Rail distribution	Waste	Staff travel	
2025	0	22,076	0	-28	0	50	2,977	16	318	25,408
2026	0	46,566	0	-28	0	94	5,582	29	581	52,824
2027	0	91,982	0	-28	0	166	9,923	52	1,003	103,098
2028	0	20,229	0	-28	0	243	14,637	77	1,440	36,598
2029	0	25,996	0	-28	0	285	17,241	91	1,650	45,235
2030	0	28,162	0	-28	0	284	17,241	91	1,596	47,346
2031	0	30,328	0	-28	0	282	16,897	91	1,552	49,122
2032	0	32,495	0	-28	0	281	16,552	91	1,510	50,900
2033	0	34,661	0	-28	0	279	16,207	91	1,465	52,675
2034	0	36,827	0	-28	0	278	15,862	91	1,427	54,457
2035	0	38,994	0	-28	0	276	15,517	91	1,392	56,242
2036	0	41,160	0	-28	0	275	15,173	91	1,352	58,022
2037	0	43,326	0	-28	0	273	14,828	91	1,319	59,809
2038	0	45,493	0	-28	0	272	14,483	91	1,288	61,598
2039	0	47,659	0	-28	0	271	14,138	91	1,253	63,383
2040	0	49,825	0	-28	0	259	13,276	91	1,225	64,648
2041	0	51,991	0	-28	0	247	12,414	91	1,198	65,913
2042	0	51,991	0	-28	0	236	11,552	91	1,167	65,008
2043	0	51,991	0	-28	0	224	10,690	91	1,142	64,110
2044	0	51,991	0	-28	0	212	9,828	91	1,119	63,213
2045	0	51,991	0	-28	0	201	8,966	91	1,092	62,312
2046	0	51,991	0	-28	0	189	8,104	91	1,071	61,417
2047	0	51,991	0	-28	0	177	7,241	91	1,050	60,523
2048	0	51,991	0	-28	0	166	6,379	91	1,025	59,625
2049	0	51,991	0	-28	0	154	5,517	91	1,004	58,730
Cumulative	0	1,103,701	0	-700	0	5,675	301,224	2,077	30,240	1,442,217

Document No.2

This is document 2 referred to in the Appendix marked WCM/CL/2 on the Proof of Evidence of Caroline Leatherdale dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442512v1

Press release

End to coal power brought forward to October 2024

The deadline to phase out coal from Great Britain's energy system has been brought forward by a whole year, highlighting the UK's leadership to go further in driving down emissions and tackling climate change.

From:
Department for Business, Energy & Industrial Strategy, The Rt Hon Anne-Marie Trevelyan MP, and The Rt Hon Alok Sharma MP
Published
30 June 2021

- UK government brings forward the date to remove unabated coal from the UK's energy mix by a whole year to 2024
- key step in UK government's plans to decarbonise the power sector and eliminate the UK's contribution to climate change by 2050
- move means that within just 10 years Great Britain will have reduced its reliance on coal for electricity from around a third to zero, helping the country build back greener

From 1 October 2024 Great Britain will no longer use coal to generate electricity, a year earlier than planned, Energy and Climate Change Minister Anne-Marie Trevelyan announced today (Wednesday 30 June 2021).

The move is part of ambitious government commitments to transition away from fossil fuels and decarbonise the power sector in order to

eliminate contributions to climate change by 2050. Today's announcement confirms the intention set out by the Prime Minister last year to bring forward the deadline to end unabated coal-fired electricity generation.

This brings forward the deadline to phase out coal from Great Britain's energy system by a whole year, highlighting the UK's leadership to go further and faster in driving down emissions and lead by example in tackling climate change ahead of hosting the 2021 United Nations Climate Change Conference (COP26) summit in Glasgow this November. The UK is similarly calling on all nations to accelerate the phase out of coal power.

The UK government will introduce new legislation to do this at the earliest opportunity.

Coal is one of the most carbon intensive fossil fuels and responsible for harmful air pollution. By eliminating its use in electricity generation, the UK can make sure it plays a critical role in limiting global temperature rise to 1.5 degrees – a key aim of its COP26 presidency.

The UK has made huge progress in reducing the use of coal across the power sector, with coal accounting for only 1.8% of the UK's electricity mix in 2020, compared with 40% almost decade ago.

The announcement comes ahead of Energy and Climate Change Minister Anne-Marie Trevelyan speaking at the Powering Past Coal Alliance (PPCA) Europe Roundtable today on the importance of countries phasing out coal, and new members of the Alliance, as part of London Climate Action Week. The UK government has already ended its support for the fossil fuel energy sector overseas earlier this year.

Energy and Climate Change Minister Anne-Marie Trevelyan said:

Coal powered the industrial revolution 200 years ago, but now is the time for radical action to completely eliminate this dirty fuel from our energy system.

Today we're sending a clear signal around the world that the UK is leading the way in consigning coal power to the history books and that

we’re serious about decarbonising our power system so we can meet our ambitious, world-leading climate targets.

The UK’s net zero future will be powered by renewables, and it is this technology that will drive the green industrial revolution and create new jobs across the country.

The UK went 5,000 hours without coal-fired electricity in 2020, and earlier this year broke a new wind power record, with just over a third of the country’s energy coming from wind. The rise in the use of renewables thanks to competition, free enterprise and government incentives to kick start new technologies has in turn helped to drive down the cost of green energy, with coal power now more expensive in most countries.

As one of the first countries to commit to ending coal power combined with its significant success in driving up renewables, the UK is leading the world in moving away from fossil fuels and significantly decarbonising its energy system.

Through its COP26 presidency, the UK government is urging nations to follow its example and abandon coal power for good. In May, under the UK’s leadership, G7 Climate and Environment Ministers agreed to end all new finance for coal power by the end of 2021 and to accelerate the transition away from unabated coal capacity and to an overwhelmingly decarbonised power system in the 2030s.

COP26 President-Designate, Alok Sharma, said:

The next decade will be make, or break, for our planet and the most powerful way we can make a difference is to end our reliance on coal.

Ahead of COP26, I hope the UK’s decisive step towards a cleaner, greener future sends a clear signal to friends around the world that clean power is the way forward. The impact of this step will be far greater if we can bring the world with us, and so our desire to support a clean and just energy transition is central to my discussions on the road to COP26.

A top priority of the UK COP26 Presidency is to accelerate the global transition from coal to clean energy. The UK government is asking governments to set coal phase out dates and end overseas coal

investments, and has set up the Energy Transition Council to bring together partners to ensure that clean power is the most attractive option for developing countries and to support just transitions.

Additional information

Read the Impact Assessment published alongside the government's consultation on bringing forward the date to end coal generated electricity. The assessment examined potential indirect impacts on coal mines from the phasing out of coal for electricity generation. The analysis indicated that setting a closure date of either 2025 or 2024 is unlikely to have a significant impact on the UK coal mining sector. This is predominantly due to the fact that coal mining in the UK has already been in decline in recent years, reflecting a competitive global market and falling domestic demand

On 18 September 2017, following a consultation in November 2016, the government confirmed that it would proceed with action to regulate the closure of unabated coal power generation units in Great Britain by 1 October 2025.

On 4 February 2020, the Prime Minister announced an intention to bring forward the deadline for phasing out unabated coal generation to 1 October 2024. The government ran a consultation from 14 December 2020 to 26 February 2021 seeking views on proposals to achieve this objective.

For the first time ever, in March this year coal-fired power plants did not participate in the four-year ahead Capacity Market auction, which secures the electricity capacity Great Britain needs to cope with peaks in demand in 2024 to 2025 at a low cost to consumers. Going forward, coal power plants will not be able participate in any future Capacity Market auctions due to the introduction of Emissions Limits to the Capacity Market.

This policy only applies to coal used to generate electricity. It does not apply to other coal consumers such as the steel industry, nor to domestic coal mines.

In 2020, the UK generated 43.1% of its electricity from renewable sources, including wind (24.2%), bioenergy (12.6%), solar (4.2%), and

hydro (2.2%). Coal only consisted of 1.8 % of the year's electricity generation, and nuclear generation made up a further 16.1%.

In 2012, coal accounted for 40% of the UK's power generation, dropping dramatically to only 1.8% in 2020. Ending unabated coal generation in 2024 will mean that we will have reduced it from almost a third of our electricity supply to zero in the space of just 10 years.

Document No.3

This is document 3 referred to in the Appendix marked WCM/CL/2 on the Proof of Evidence of Caroline Leatherdale dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442508v1

Cumbria County Council

Carbon Management **Strategy** (Corporate Estate) 2020-2025

cumbria.gov.uk

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ASHP	Air source heat pump
AQMA	Air Quality Management Area
CCC	Cumbria County Council
CO_2e	Equivalent carbon dioxide
DEC	Display Energy Certificate
DHW	Domestic hot water
EA	Environment Agency
FCU	Fan coil unit
GIS	Geographic Information System
GSHP	Ground source heat pump
LEP	Local Enterprise Partnership
LIS	Local Industrial Strategy
LTHW	Low temperature hot water
MVHR	Mechanical ventilation with heat recovery
MWSHP	Mine water source heat pump
PV	Photovoltaics
RHI	Renewable heat incentive
WSHP	Water source heat pump

Glossary

CO_2e
A quantity that measures the global warming potential (GWP) of any mixture of greenhouse gases using the equivalent amount or concentration of carbon dioxide.

District heating
The provision of heat to a group of buildings, district or whole city usually in the form of piped hot water from one or more centralised heat source.

Electricity export
Electricity generated by CHP that is not utilised in via private wire arrangements is exported to the national grid, usually at a lower tariff.

Energy centre
The building or room housing the heat and / or power generation technologies, network distribution pumps and all ancillary items.

Energy demand
The heat / electricity / cooling demand of a building or site, usually shown as an annual figure in megawatt hours (MWh) or kilowatt hours (kWh).

Energy hierarchy
A ranking of emissions reduction measures in terms of importance of implementation.

Heat pump
A technology that transfers heat from a heat source to heat sink using electricity (heat sources can include air, water, ground, waste heat, mine water).

Hurdle rate
The minimum internal rate or return that is required for a network to be deemed financially viable, based on Cumbria County Council's borrowing costs.

Mechanical ventilation with heat recovery
Mechanical ventilation that provides fresh air to a building whilst retaining the heat energy already used in heating the air within the building.

Private wire
Electricity generated by a CHP that is supplied to network connections as part of private wire arrangements where underground cables connect the buildings to the energy centre.

Renewable technologies
Technologies that produce energy from resources which are naturally replenished such as sunlight, wind, geothermal heat, or water source heat.

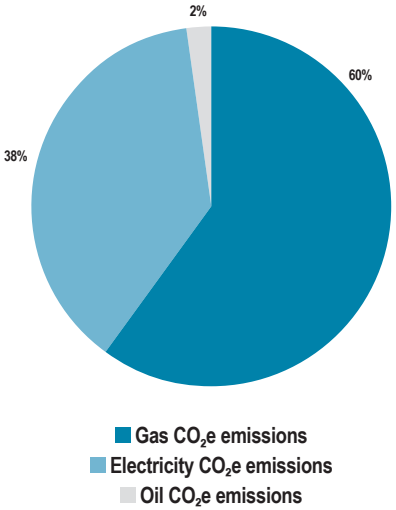
Social IRR
Internal rate of return on investment taking into account long term benefits to society, eg improvements in air quality/public health.

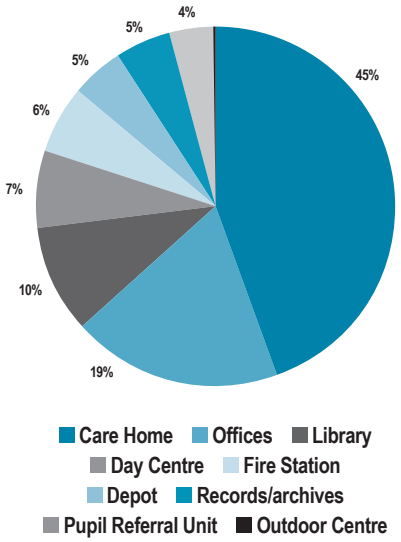
Executive Summary

Cumbria County Council (CCC) is well placed to play a significant role in achieving the national goal of developing a zero-carbon economy, with the added benefit of making significant savings on expenditure and achieving long term security.

The scope of the strategy included:

- Identifying baseline CO_2e emissions for the corporate estate buildings.
- Identifying phased CO_2e reduction targets based on specific resource and investment scenarios.
- Developing a phased delivery plan outlining the measures, resources and actions required to meet targets (set out by CCC and identified in the Cumbria Local Energy Plan and draft Cumbria Carbon Baseline Report.
- High level assessment of capital and revenue costs to include a programme for delivery.





Baseline CO_2e Emissions

CCC corporate estate operations result in 5,392 tCO_2e annually. The majority of emissions are attributed to the combustion of natural gas for heating and hot water and electricity for lighting, cooling and ICT functions (see breakdown of CO_2e emissions by fuel / energy type (2020) adjacent). CO_2e emissions from natural gas account for over 60% of overall emissions and this proportion will increase as the national grid continues to decarbonise (primarily due to increased deployment of wind and solar photovoltaic (PV) generation technologies).

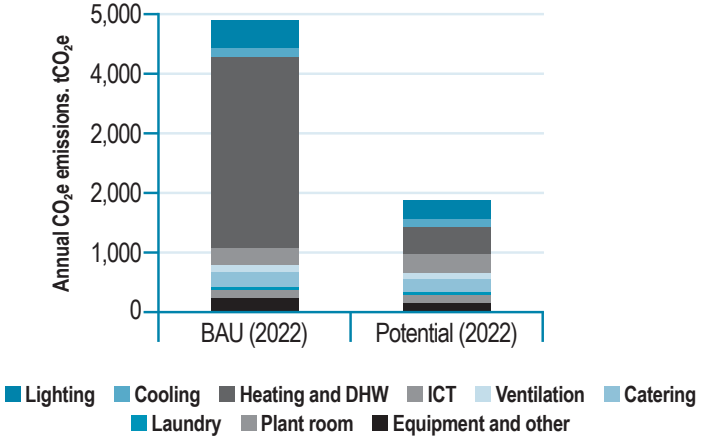
The largest emitters of CO_2e are care homes due to their consumption of gas for heating and hot water. The second largest are the offices as they are significant electricity users. Combined, these produce nearly two thirds of the corporate estate's CO_2e emissions (see adjacent).

Building CO_2e Reduction

Building CO_2e emissions should be reduced in line with the energy hierarchy where the priority is to reduce a building's energy demand followed by improving efficiency and then integrating renewable energy sources. Any remaining building related CO_2e emissions can then be offset by offsite renewable energy generation.

Measures identified to reduce building CO_2e emissions include improving building fabric, installing heat recovery plant, installing heat pumps, replacing / upgrading equipment and improving general housekeeping measures. The greatest reductions are made through

reducing CO_2e associated with heating and domestic hot water (DHW) and the largest contributor to these savings is the installation of heat pumps. Considerable CO_2e savings can also be made through the installation of LEDs. The adjacent chart shows the theoretical first year CO_2e savings achievable through implementing the identified carbon reduction measures.

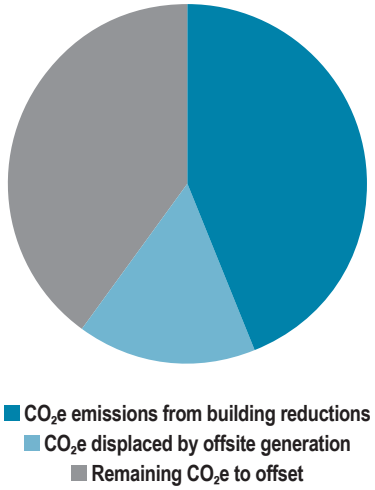


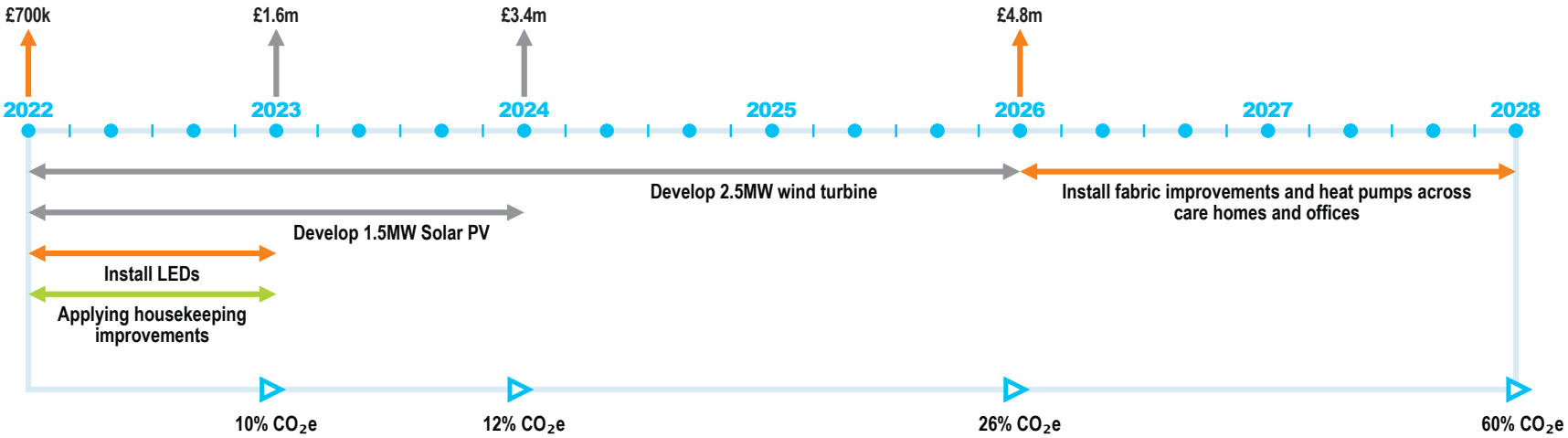
Offsite Renewable Energy Generation

CCC owned sites were assessed as potential locations for offsite renewable energy generation. Of the sixty sites assessed, five were taken forward for further investigation. The technologies identified for large scale offsite electricity generation were solar PV and wind. Offsite generation provides a means of offsetting CCC's CO_2e emissions however, as stated, energy consumption should be reduced as far as possible prior to generating from renewable sources. This is reflected in the proposed carbon management strategy. The CO_2e emissions that could be offset by the installation of approximately 1.5 MW of solar PV and a 2.5 MW wind turbine total 623 tCO_2e or 16%.

Prioritised CO_2e management strategy

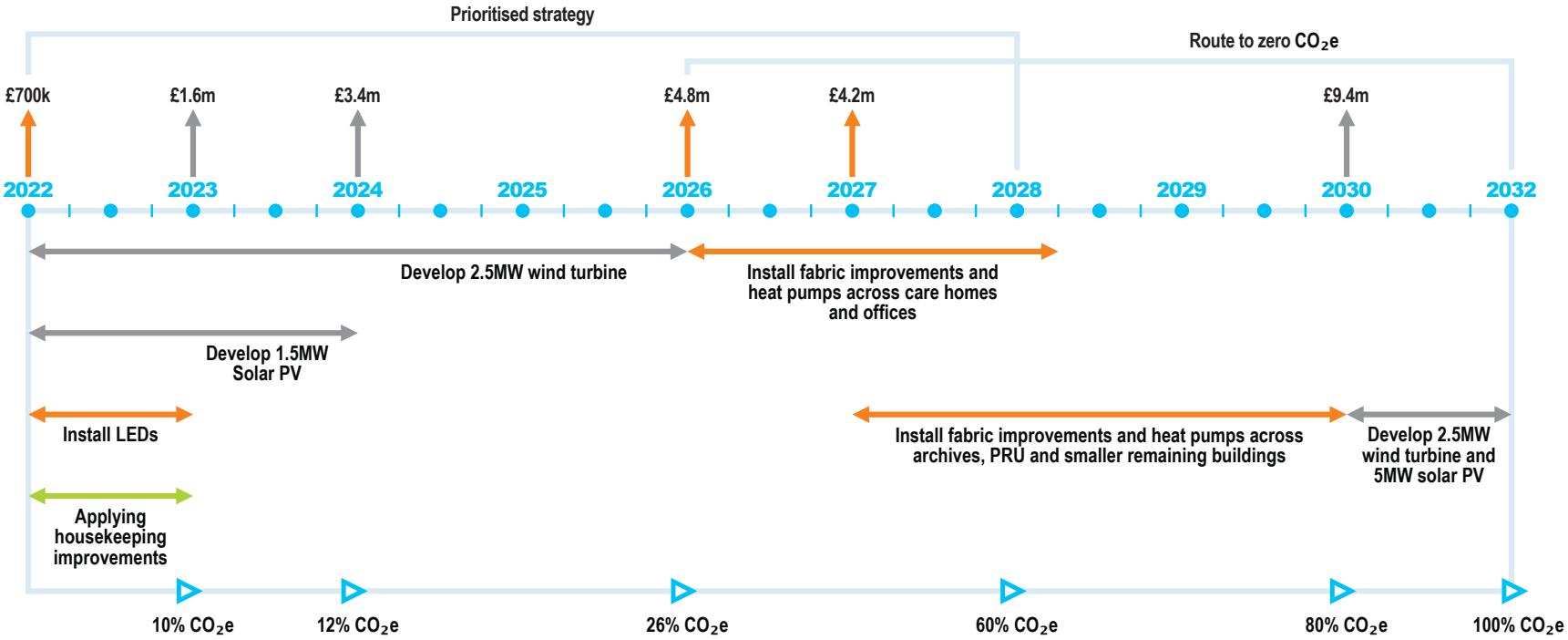
The prioritised strategy (that meets the CCC hurdle rate) involves installing LEDs and making housekeeping improvements across all buildings and upgrading fabric and installing heat pumps in all offices and care homes. To further offset CO_2e emissions a 1.5 MW solar PV farm and 2.5 MW wind turbine are required. Over 25 years, the strategy is projected to reduce CO_2e emissions by 2,338 tCO_2e or 60% of total BAU emissions. The 25 year return on the capital investment of £10.5million will exceed the 8% IRR hurdle rate and will payback within 14 years.




£700k
£1.6m
£3.4m
£4.8m
2022
2023
2024
2025
2026
2027
2028
Develop 2.5MW wind turbine
Install fabric improvements and heat pumps across care homes and offices
Develop 1.5MW Solar PV
Install LEDs
Applying housekeeping improvements
10% CO_2e
12% CO_2e
26% CO_2e
60% CO_2e

Route to Zero CO2e

A potential longer term strategy to achieve 100% CO_2e emission reductions has also been assessed. The additional measures required to achieve 100% reduction include additional heat pump installations in buildings, installing an additional 2.5 MW wind turbine and 5 MW of solar PV. The net zero strategy is currently economically unviable and does not meet CCC's hurdle rate of 8% IRR.



Key Risks

The carbon reduction strategy relies on the future decarbonisation of the national grid at the rate currently predicted. A slow down of this rate will reduce the amount of CO_2e savings made by the installation of heat pumps, though will increase the amount of CO_2e offset by solar PV and wind. Current emission projections end at 2035 but it is likely that the National Grid will further decarbonise after this date.

Cost savings, revenue generation and economics and social value are impacted to changes in electricity and natural gas prices. An increase in natural gas price will increase potential savings and improve the economic case for fossil fuel reduction. An increase in the projected electricity price will negatively affect the economics of installing heat pumps. Offsite generation will benefit from an increase in the price of wholesale electricity and achieve a shorter payback period on initial capital investment.

Capital investment will increase and decrease with project complexity; issues include planning restrictions and required building alterations. Although identified issues and risks have been considered during high level project costing, there will be specific risks associated with each individual project.

Corporate Considerations

The CO2e reduction strategy will deliver against a number of key CCC corporate priorities. It contributes to the Cumbria Local Energy Plan and Cumbria's Local Industrial Strategy (LIS) in driving sustainable economic growth, helping to capitalise on existing energy credentials and further developing Cumbria's green energy infrastructure. Of the six priorities identified by the LEP (ideas, people, infrastructure, business environment, places and green growth), it potentially contributes to all.

If CCC were to declare a Climate Emergency, then a net zero target of say 2030 cannot be met under the proposed plan. While the study identifies a route to net zero over a 10 year period this option is currently uneconomic by CCC, on a simple hurdle rate of 8%. Currently a 60% CO_2e reduction is viable as a phase 1 approach to the CCC Carbon management strategy for corporate buildings.

Next Steps

Next steps include:

- Further surveys for key buildings and sites and development of building specific reports addressing priority measures identified within the strategy.
- Completion of measure-specific studies to further assess feasibility and develop specifications for implementation of building improvement measures such as LED lighting and offsite renewable energy schemes (including discussions with planning team over suitability of offsite generation locations).
- Development of building user behavioural change strategies to contribute to improved housekeeping measures.
- Identification and allocation of budgets to complete short term measures identified in the strategy.
- Accruing feasibility studies for heat pump installation in main offices and care homes.
- Increase resource allocation to include creation of an Energy Manager role to support delivery, monitoring and benefits realisation of CC carbon management strategy.

This strategy will be reviewed on a regular basis, the next review will be no later than 2023. All figures and estimates used in economic assessment are subject to verification and market testing.

1 Introduction

1.1 General

Local authorities consume over 26 billion kWh[1] of energy per year, resulting in annual CO_2e emissions of more than 6.9 MtCO2e[1]. Energy use is a major expenditure for local authorities at a total cost of around £750 million1. Local authorities are therefore well placed to play a significant part in achieving the national goal of developing a low/zero-carbon economy, with the added benefit of making significant savings on expenditure and achieving long term security.

1.2 Project Scope

The project scope included the following elements:

- Identify baseline CO_2e emissions arising from corporate estate buildings.
- Review policy framework.
- Identify key drivers for change.
- Identify phased CO_2e reduction targets based on specific resource and investment scenarios.
- Develop a phased and clearly prioritised delivery plan outlining the measures, resources and actions required to meet agreed targets.
- High level assessment of capital and revenue costs to include a programme for delivery and revenue savings and income generation opportunities.
- Outline key risks and opportunities.
- Consider short, medium and long term finance and budgets to include invest to save funds, interest free loans, prudential borrowing and third party offers.
- Recommendations to address management and reporting, roles and responsibilities and carbon management governance.

1.3 Policy

1.3.1 Cumbria Local Energy Plan

The Cumbria Local Energy Plan is one the documents underpinning Cumbria's Local Industrial Strategy (LIS) which aims to drive sustainable economic growth and make Cumbria one of the fastest growing economies in the UK. The plan aims to capitalise on existing energy credentials and further develop Cumbria's green energy infrastructure, whilst improving energy efficiency across businesses. The Local Enterprise Partnership (LEP) have identified six priorities, reflecting the LIS and Green Grand Energy Challenge:

- Ideas - identifying or adopting new innovations creating a step change towards a low-carbon economy.
- People - creating safe and warm homes.
- Infrastructure - designing in low-carbon solutions.
- Business environment - driving energy efficiency to increase profitability and productivity.
- Places - low-carbon energy generation.
- Green growth - nuclear development.

The LEP has an influential role and works collaboratively with key stakeholders to advance the low-carbon ambitions in the areas and to ensure objectives are met. This report applies most prominently to the 'Business Environment' and 'Places' priorities through the improvement of energy efficiency across businesses and promote the uptake of low-carbon technologies. In addition to the immediate benefits of reducing total CO_2e output, the report highlights other advantages, such as the provision of additional jobs.

[1]Carbon Trust: Local authorities, saving energy in local authority buildings (2012).

1.3.2 Cumbria Local Plans

All six District Councils and two National Park Authorities produce individual local plans for all types of development (besides mineral and waste). Each Local Plan sets out a strategy of how the Council will encourage development throughout the District Borough. The Plans describe the planning policy including what types of development and where, and how the developments should be implemented. A common refrain through each document is the attitude towards climate change and emissions, with a consensus to reduce CO_2e emissions through better energy efficiency and adoption of low-carbon technology.

1.3.3 Cumbria Wind Energy Supplementary Planning Guidance (SPD) (2007)

The Cumbria Wind Energy SPD (July 2007) is a local plan that offers guidance towards the development of wind farms across the County. It has been prepared to assist developers in delivering wind energy developments by addressing the environmental, social and economic effects of such schemes. It also provides technical guidance on landscape capacity, landscape and visual effects and carrying out landscape and visual impact assessments.

Resources provided as part of the guidance include a wind speed map of the County and a summary of operational, approved and refused wind energy development sites.

Cumbria has good wind potential and the greatest resource is on west facing upland slopes and along the coast. Policies have been put in place to protect the landscape value and settings of some of the windiest areas of the County which fall within national landscape designations. These areas include the Lake District National Park, Yorkshire Dales National Park, Arnside and Silverdale, North Pennines and Solway Coast Areas of Outstanding Natural Beauty.

1.3.4 Cumbria Renewable Energy Capacity and Deployment Study (2011)

The Cumbria Renewable Energy Capacity and Deployment Study (August 2011) was produced to provide an evidence base to support the implementation of renewable energy with regards to local development framework. The study found that the total onshore potential capacity in Cumbria was 4.5 GW whilst the existing and planned capacity at time of writing was just over 295 MW. Deployment projections forecasted that 606 MW of renewable energy could realistically be deployed within the county by 2030, with commercial wind making up half of this. The potential annual generation figure of 1,861 GWh would supply between 10% and 13% of the expected annual energy demand of 14,000 to 18,000 GWh in 2030. The report also highlights the need for renewable energy development whilst paying consideration to the potential impact to the particularly sensitive landscape.

1.3.5 Corporate Plan

The Cumbria Council Plan 2018-2022 sets out changes to be made in the four-year period between 2018 and 2022 to improve the lives of the people of Cumbria. Continuing improvements to be made include sustainable growth in the local economy, developing infrastructure and advancing schools and community care and services.

1.3.6 Cumbria Carbon Baseline Report (2019 draft)

In April 2019, Cumbria County Council, all six District Councils and the Lake District National Park Authority formally adopted the Cumbria Joint Public Health Strategy. Incorporated within this strategy is the following aim: ‘To become a “carbon neutral” County and to mitigate the likely impact of existing climate change.’

The Cumbria Climate Change Working Group came together to take this work forward. The group would:

- Propose a shared definition of “carbon neutral”.

- Propose a target date by which this is to be achieved (that is in line with a maximum warming of 1.5C).
- Commission an independent baseline carbon audit for the County and agree ongoing monitoring mechanisms.
- Identify leadership for developing action across key topics + sectors.
- Establish a programme of action by key partners.
- Lead joint campaigning to encourage wider public awareness and action.
- Propose a target and pathway to achieve net zero carbon in Cumbria.

The Carbon Baseline Study is now complete and has recommended an ambitious but achievable target of 2037 to reach a net zero carbon position for Cumbria. The report states that achieving Net Zero Carbon by 2037 is the most feasible target and one that works within the requirements laid down by the Intergovernmental Panel on Climate Change (IPCC) for “limiting warming to 1.5 degrees or below” to curb current global warming trends.

A sector led approach to reducing carbon will now follow to allow clear targets to be set at an achievable and deliverable scale across the key carbon emitting areas. The approach will be based around these 3 stages:

1 Understanding sector carbon footprints - understanding of sector footprints and options for carbon reduction in each sector

2 Develop Sector Roadmaps and Work streams – set targets by reviewing and updating baseline assumptions and where possible including timing for delivering action. This will then form a high level sector ‘roadmap’.

3 Current Policy Framework and Funding landscape – what can be achieved within the current local and national policy framework. Identify where shifts in policy/strategy will be required to reach the targets and implement the assumptions.

1.4 Project Drivers

The drivers for this work include:

- Climate emergency - in addition to the need for reduction of energy use and investment in renewable energy highlighted in the individual Local Plans, four out of six District Councils in Cumbria[2] have declared a climate emergency, stating that attention is needed to combating climate change above that of which is currently suggested by the government.[3]
- Improve energy security - decreasing energy use and developing self-supply to decrease the reliance on purchasing energy from third-party sources.
- Investing in the local economy - investing in renewable energy not only provides business to local companies and creates new jobs but also develops new and existing local infrastructure (eg biomass fuel supply chains).
- Improving quality of life for local residents - cutting CO_2e and NOx emissions will improve the air quality in the local area and reduce ailments related to bad air quality, potentially leading to reduced cost of related health care.
- Saving money - savings can be made to the Council budget through reduced energy usage, cheaper energy supply, incentives and grants, and energy sales.
- Lead in delivering good practice - effective implementation of a challenging carbon management strategy will enhance organisational image and provide reputational benefits.

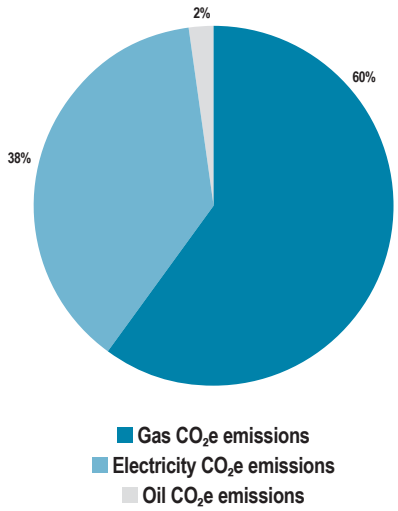
[2]The four District Councils who have declared a climate change emergency at the time of writing this report are Barrow Borough Council, Carlisle City Council, Eden District Council and South Lakeland District Council.
[3]The Climate Change Act (2008) set out the UK’s approach to the legally binding target of reducing greenhouse gas emissions by at least 80% by 2050, relative to 1990 levels.

2 Baseline CO_2e emissions

The baseline CO_2e emission were established from the latest available energy consumption data.[4]

2.1 CCC Building Energy Usage

Figure 1: Breakdown of CO_2e emissions by fuel / energy type (2020).



The Cumbria County Council (CCC) corporate estate consumes 17,887 MWh of fossil fuel annually. 426 MWh (approximately 2% of consumption) is currently gas oil and the rest is natural gas for heating and hot water. Fossil fuel consumption results in 3,320 tCO_2e[5] annually.

Electricity consumption for the corporate estate totals 8,186 MWh a year. The largest proportion of electricity is used by offices, closely followed by care homes. Annual CO_2e emissions from electricity is 2,073 tCO_2e.

Figure 1 shows the current proportion of CO_2e emissions from natural gas, gas oil and grid electricity across the CCC corporate estate. CO_2e emissions from natural gas accounts for over 60% of the total and this proportion will increase annually with national grid decarbonisation projections (outlined in Appendix 6 - Assumptions).

2.1.1 Energy Consumption and Emissions by Building Type

Figure 2 shows the proportion of fossil fuel consumption by building type.[6] Over half of fossil fuel consumption arises from the operation of care homes.

Figure 3 shows the proportion of electricity consumed by different building types. The largest users of electricity are offices, followed closely by care homes; combined these make up nearly two thirds of electricity demand.

Figure 4 shows the proportion of CO_2e across the corporate estate by different building types. The largest emitters of CO_2e are care homes due to their fossil fuel (gas) usage. The second largest emitters of CO_2e are the offices as they are the largest electricity users. Combined, these produce nearly two thirds of the corporate estate's CO_2e emissions.

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Figure 2: Breakdown of fossil fuel consumption by building type (2020).

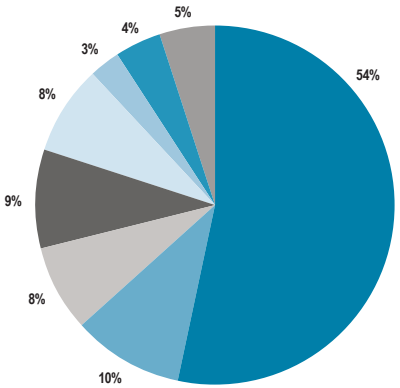


Figure 3: Breakdown of electricity consumption by building type (2020).

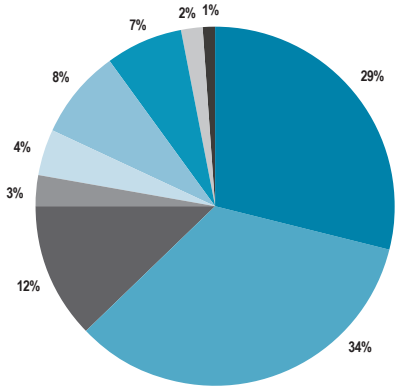
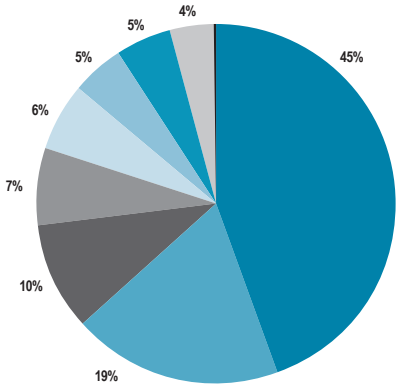


Figure 4: Breakdown of CO_2e emission by building type (2020).

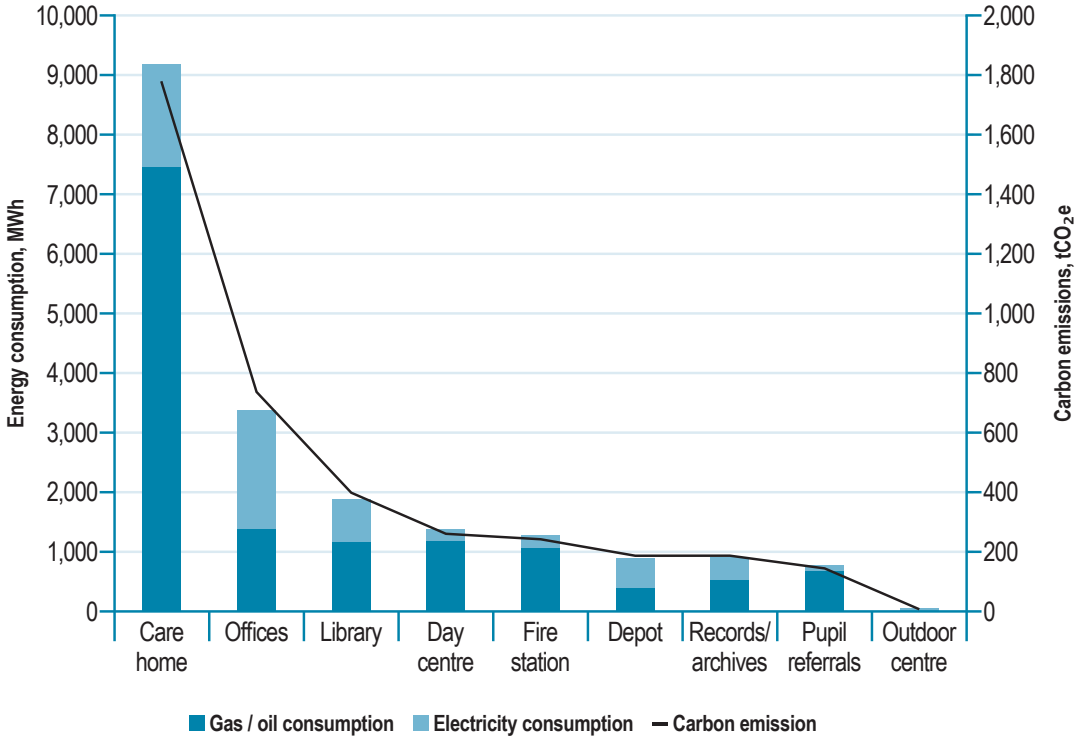


Care Home Offices Library Day Centre Fire Station Depot Records/archives Pupil Referral Unit Outdoor Centre

[4]2018/19.
[5]Based on 2020 BEIS carbon intensity values, all values used in calculations are shown in Appendix 6 - Assumptions.
[6]Energy usage breakdown is based on categorisation of the top 50 energy users in the corporate estate which make up over 74% of CCC's overall energy demand.

Figure 5 compares energy usage with CO_2e emissions across different building types (for the top 50 CO2e emitting buildings[7]). Care homes consume the most fossil fuels, and this is reflected in the associated CO2e emissions. Offices have high associated CO2e emissions due to the high proportion of electricity use. Grid electricity in the UK currently has a higher CO_2e emissivity value than natural gas, although, as seen in Appendix 6 - Assumptions, the grid is decarbonising and projections forecast that grid electricity will have a lower value than that of natural gas by the year 2023.

Figure 5: Breakdown of fuel consumption, electricity consumption and CO_2e emission across top 50 energy users (2020).



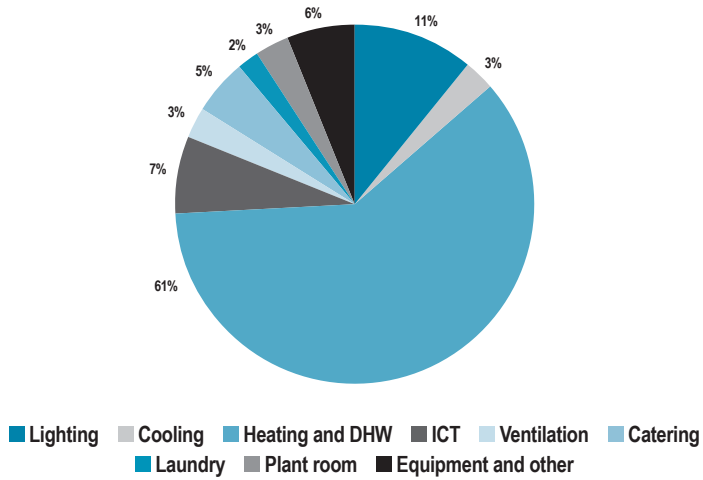
[7]The top 50 CO2e emitting buildings contribute 74% of overall CO2e emissions.

2.1.2 CO_2e by Building Requirement

Site surveys were conducted to determine energy requirements and usage types for different building types, and the proportion of CO2e emissions resulting from specific building requirements were used to inform potential savings.

Figure 6 shows that the majority of CO2e emissions from the corporate estate buildings are derived from space heating and domestic hot water usage. Most of the heating and hot water across the estate is provided by gas and so heating and hot water will result in an increasing proportion of building CO_2e emissions as the national grid decarbonises (in line with the projections shown in Appendix 6 - Assumptions).

Figure 6: CO_2e emissions by building requirement (2020).



2.2 Benchmarking and Prioritisation

The sections above describe the amount of energy used and CO_2e emitted by different building types and requirements but do not provide a comparison of building performance. As stated, the operation of care homes results in the greatest CO2e emissions but they also have the largest combined floor area. Offices have the highest electricity usage and, in most cases, have a greater internal floor area than other buildings within the estate.

The following section details the energy use and CO_2e emissions for each building type by normalising specific buildings by floor area. This allows the identification of key buildings and building types that should be prioritised by CCC to reduce energy demands and CO_2e emissions.

2.2.1 Benchmarking

Figure 7 shows that fire stations and care homes have the highest CO2e per m², with emissions of roughly 90 $kgCO_2e/m^2$ and 70 $kgCO_2e/m^2$ respectively (overall median value of 55 $kgCO_2e/m^2$). The building type with the lowest CO2e emissions per internal floor area are the offices at approximately 30 $kgCO_2e/m^2$.

The CO_2e emission values displayed in Figure 7 are the median values for each building type; the red line is the median value across all buildings in the corporate estate. A comparison of individual buildings within each building type is shown in Appendix 5 - CO2e Benchmarking.

Figure 7: Median CO_2e emissions by building area.

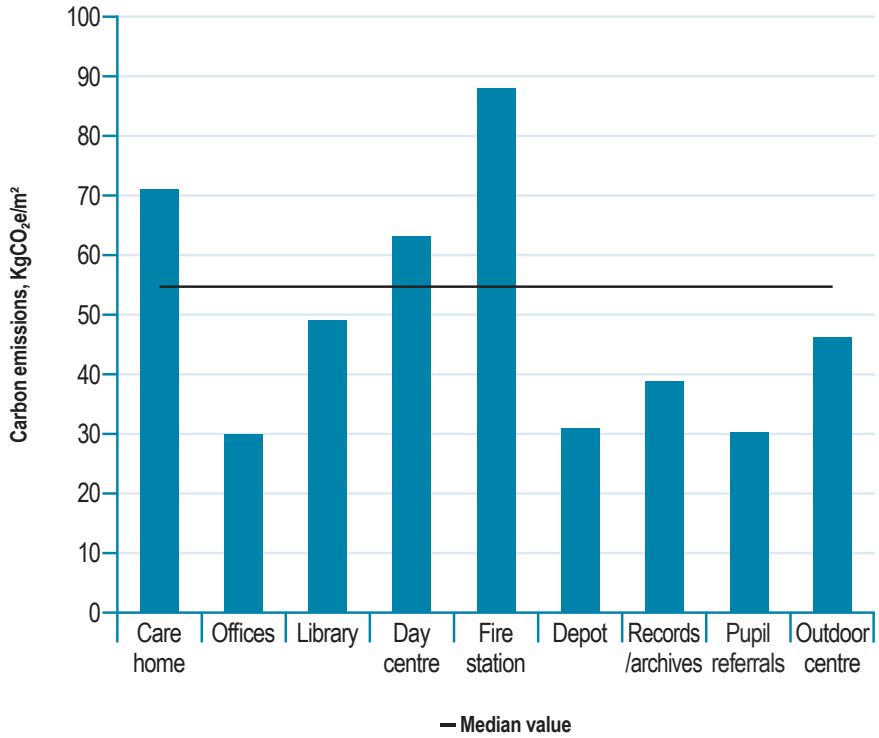
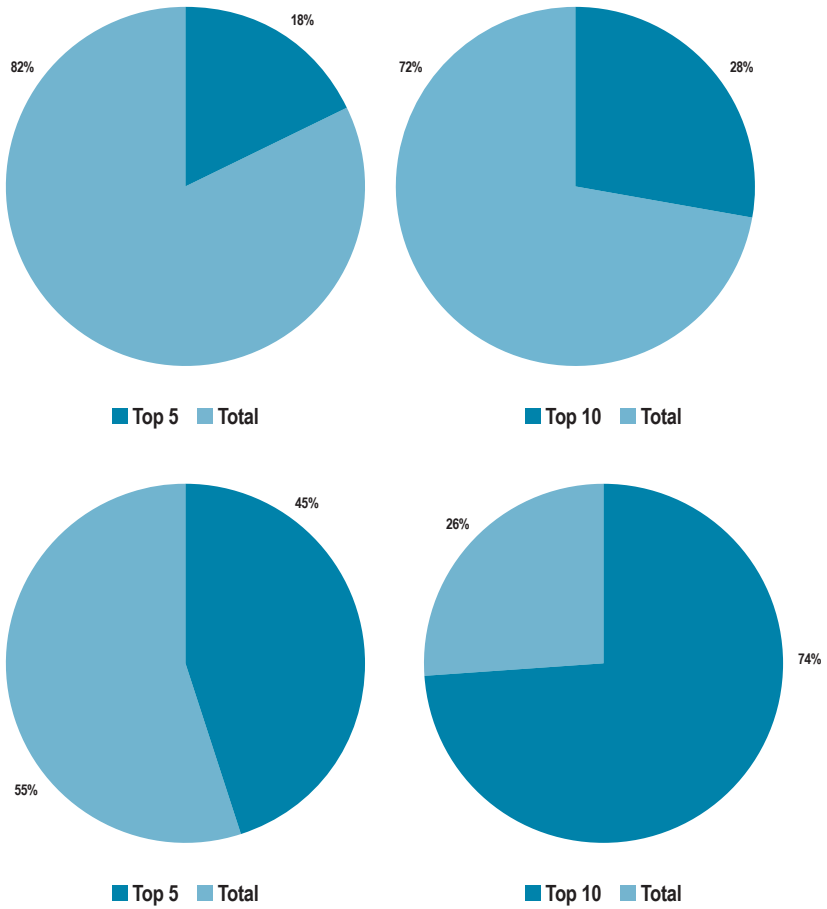


Figure 8: Proportion of top 5, 10, 20 and 50 CO_2e emitting building to total CO_2e emissions (2020)



2.2.2 Prioritisation

The top 50 buildings make up 74% of overall CCC CO2e emissions. The top 20 CO2e emitting buildings make up 45% of overall CO2e emissions and the top 5 CO2e emitting buildings make up 18% of overall CO2e emissions (see Figure 8).

Figure 9 lists the top ten CO_2e emitting buildings in the CCC corporate estate. Five of the top ten CO_2e emitting buildings are care homes, this is primarily due to their large average internal area and significant heating requirements.

Cumbria House is the largest CO2e emitter; although one of the newer buildings in the portfolio, the building is also the largest and has very high utilisation. In addition to all ICT and facilities provided to occupants and visitors, the building also houses the CCC servers[8]. A comparison of Cumbria House with other CCC offices is shown in Figure 10. Cumbria House has a higher CO_2e per floor area than the median, though performs better than the worst performing office building, Parkhouse.

The assessment summarised in Figure 7 and Figure 9 was used to inform the prioritisation and the overall CO_2e management strategy. Care homes should be prioritised as they:

- Make up the largest proportion of CO2e emissions
- Have the second highest CO2e emissions per m²
- Comprise five of the top ten CO2e emitting buildings

The largest offices should also be prioritised as:

- Although, overall, offices have one of the lowest CO2e per m² per building type, the top two CO_2e emitting buildings are offices
- Collectively they make up the second largest cumulative CO2e emission by building type

Fire stations are also a priority for potential improvement as they have the greatest CO2e emission per m².

Prioritisation of buildings within each building type should be informed through assessment of figures in Appendix 5 - CO2e Benchmarking.

Figure 9: Top ten CO_2e emitting buildings (2020).

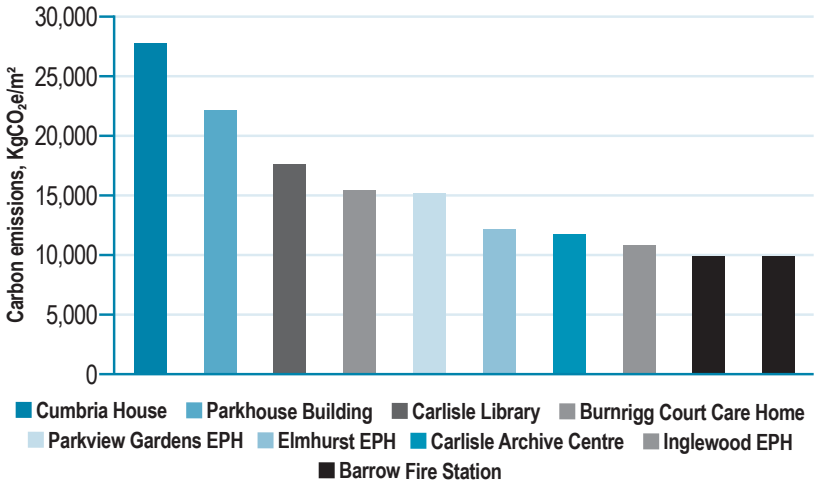
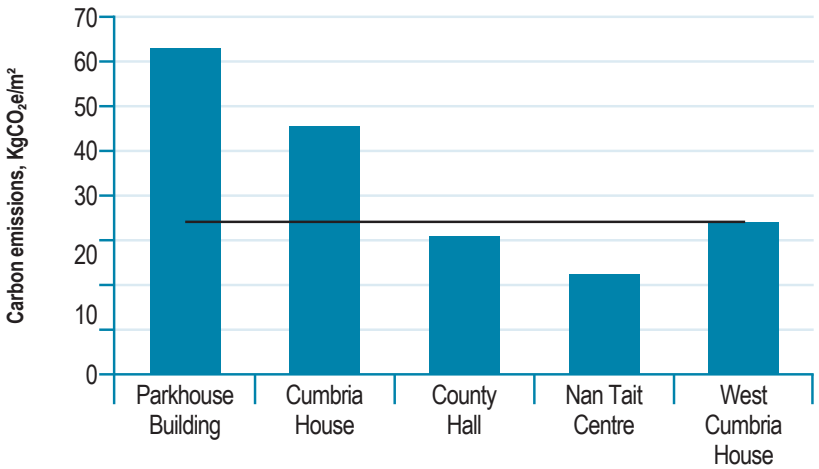


Figure 10: CO_2e emissions of main CCC offices (2020).

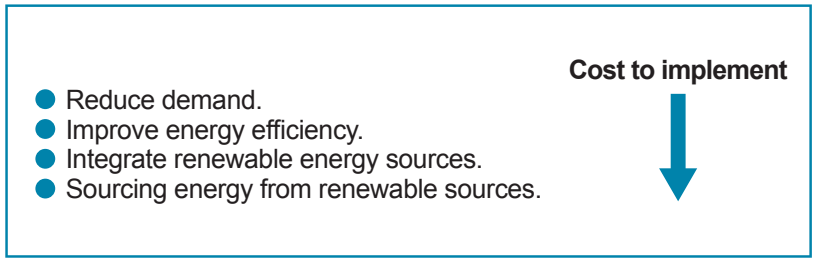


[8]First CCC servers are not sub-metered and so building electricity consumption without server demands was not assessed.

3 Carbon Management in Buildings

Building energy (and associated CO_2e emissions) should be reduced in line with the energy hierarchy; the priority is to reduce a building's energy demand followed by improving efficiency, and integrating renewable energy sources, once the first two areas have been addressed. Any remaining building related CO_2e emissions should then be offset by offsite renewable energy generation (see Figure 11).

Figure 11: Energy hierarchy.

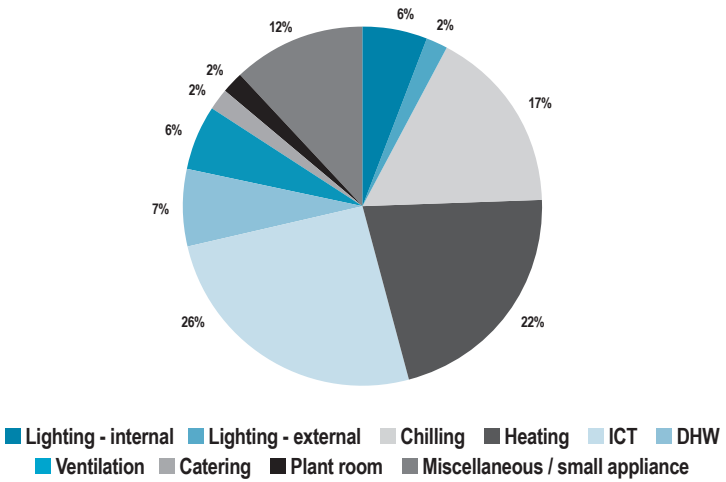


3.1 Building Surveys

Visits were made to ten buildings to identify energy usage requirements and potential CO_2e reduction measures across the corporate estate. The ten buildings represented a range of building types and ages (Appendix 4 - Building Surveys details the sites visited and data gathered).

Figure 12 is included as an example and shows the energy usage requirements for Cumbria House. The largest requirement is for ICT, this is reflected in the large electricity usage for the building.

Figure 12: Energy usage requirements for Cumbria House.



3.2 CO_2e Reduction Measures

Measures to reduce building CO_2e emissions were identified in Table 1 below. Publications relevant to the measures are identified in APPENDIX 8 - Relevant Publications.

Table 1: CO_2e emissions reduction measures

Reduction measure	Comments	Economic payback term
Installing LEDs	Replacing existing lamps with LEDs is a cost-effective way to make significant savings on a buildings' electricity usage. Building alterations and downtime are avoided as LED lighting can often use existing light fittings and fixtures. LEDs are more efficient than other lighting such as fluorescent tubes and require less power to produce the same amount of luminosity. LEDs also last a longer than other lighting, do not contain environmentally harmful materials such as mercury and are usually recyclable at end of life.	Short
Converting gas catering to electric	Although there will be limited energy reductions, due to the decarbonisation of the electricity grid, long term CO_2e emissions will be reduced by moving to electricity for catering.	Long
Converting gas laundry to electric	See converting gas catering to electric.	Long
Replacing / upgrading equipment	This involves upgrading or replacing equipment that is not operating efficiently. Examples include replacing single speed pumps in a plant room with new variable speed pumps or replacing individual kettles in a large office with centralised provision of boiling water.	Medium
Upgrading building fabric	As shown in section 2, space heating results in the largest proportion of building CO2e emissions. Building fabric with low insulation values allows heat to escape and the heating plant produces more heat to meet building comfort levels. Building fabric improvement measures include adding or upgrading insulation to roofs and walls and installing triple-glazed windows. It is important that this is completed (as far as possible) prior to operation of heat pump systems.	Medium / long
Installing heat recovery	Heat loss through ventilation results in a significant proportion of space heating demand. Ventilation heat losses occur when heated air is replaced by fresh air, this can be in part to natural leakage through building fabric or mechanical ventilation required to ensure a fresh air supply. Mechanical ventilation heat recovery (MVHR) can provide fresh circulated air to a building whilst recovering up to 60-85% of the heat contained within the replaced air. MVHR can be installed throughout a building but is most effective installed in large open areas or on existing air handling systems.	Medium / long

Reduction measure	Comments	Economic payback term
Installing heat pumps	Heat pumps can provide a building's space heating and hot water without the need for gas and with a lower energy input. Heat is extracted from the environment (ambient air, ground or water) and transferred to buildings via a vapour compression cycle. The required input power is a quarter to a third of the output power. In most cases, the least expensive to install is an air source heat pump (ASHP), although the operating efficiency, or coefficient of performance (CoP), with this type of heat pump varies throughout the year as air temperature changes. Therefore, the seasonal performance will usually be lower than that of a system using the ground or ground water as a heat source. Open loop ground source heat pumps (GSHP) commonly use boreholes (up to several hundred metres deep) to abstract ground water from an aquifer. This water will be significantly warmer than ambient surface temperatures, increasing with depth, and will not fluctuate with air temperature. High source temperatures require less input energy to reach output temperatures and result in a greater CoP. Abstraction boreholes, however, result in increased initial capital costs and operational costs for abstracting ground water, both of which increase with depth. Closed loop heat pumps circulate brine around pipes installed underground, either vertically (in boreholes) or horizontally (in coiled pipe arrays). Vertical arrays take up considerably less space but produce additional cost and engineering requirements. Large closed loop systems typically require more space for a borefield than large open loop systems. For an example of a heat pump feasibility study see Appendix 7 - Cumbria House Feasibility Study.	Short
General housekeeping improvements	CO2e emissions can be reduced by improving the way buildings are operated on a day to day basis. Housekeeping measures can be applied across all energy uses in a building, for both building occupants and building management personnel. For example, occupants can be instructed to turn off computers outside of working hours or leave doors closed to avoid unnecessary heat loss. Better control of a building's heating system can reduce energy use by not heating unoccupied spaces and avoiding occupants using plug in electric heaters.	Long

3.3 Building CO_2e Reduction

Building survey findings were assessed and extrapolated to estimate CO2e savings from implementing energy reduction measures across the portfolio. Figure 13 shows that 56% CO_2e savings could be made (against 2020 CO_2e intensity figures).

The greatest savings are made from reducing CO_2e associated with heating and DHW. The largest contributor to these savings is the installation of heat pumps. Considerable CO_2e savings can be made by addressing lighting energy requirements, through the installation of LEDs. CO_2e savings from catering and laundry are not apparent when using first year CO_2e intensity values (as used in Figure 13) but become much more significant in later years as the national electricity grid decarbonises and less CO_2e is emitted per kWh of electricity consumed.

Figure 14 shows the first year CO_2e savings achievable through implementing the carbon reduction measures identified for Cumbria House. The largest savings are achieved through the installation of a ground source heat pump system at the site. No savings are identified from lighting improvements as the building has LED lights installed. Proportionately the savings are not as high as for some other sites as many of CCC's core activities are undertaken at this office (including operation of the council servers). As with Figure 13, CO_2e savings will increase as the electricity grid decarbonises (see Appendix 6 - Assumptions).

Figure 13: CO_2e reduction through implementation of all carbon management options.

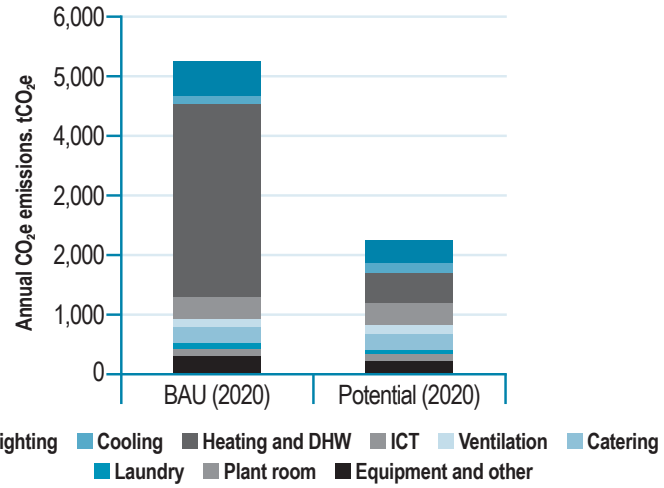
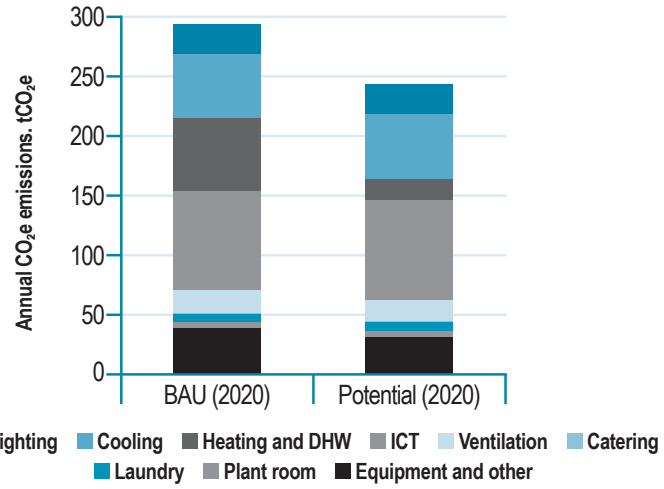


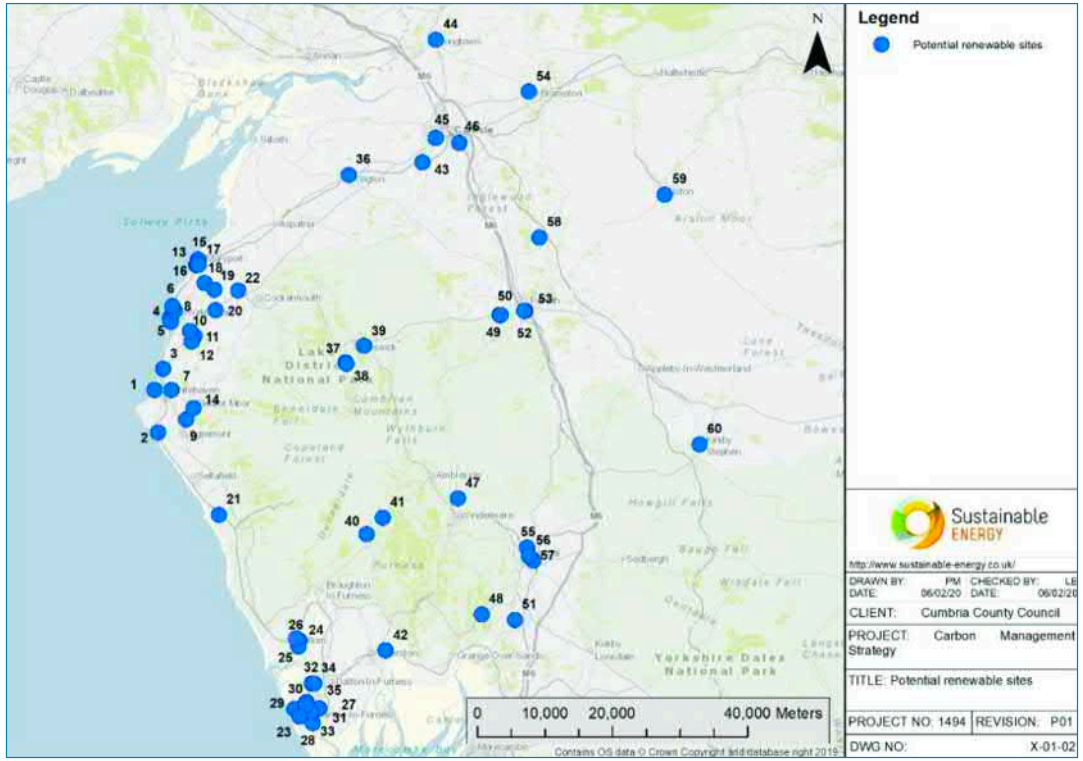
Figure 14: Cumbria House CO_2e emissions reduction.



4 Offsite Renewable Energy Generation

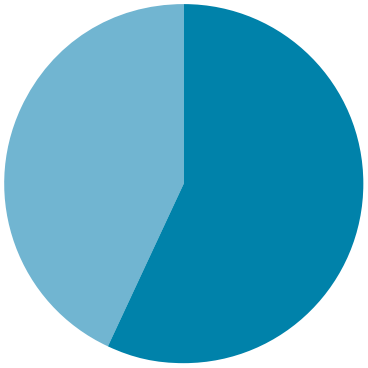
CCC owned sites were assessed as potential locations for offsite renewable energy generation. Of the sixty sites assessed, five were taken forward for further investigation. The sites that were assessed are included in Appendix 3 - Potential Offsite Generation. These sites were used to inform the potential for offsite generation across the county.

Figure 15: Sites investigated for renewable energy generation.



The technologies identified for large scale offsite electricity generation in Cumbria were solar PV and wind. Offsite generation provides a means of offsetting CCC's CO_2e emissions however, as stated, energy consumption should be reduced as far as possible prior to generating from renewable sources. This is reflected in the proposed carbon management strategy.

Figure 16: CO_2e offsetting from offsite renewable energy generation.[9]



CO_2e displaced by offsite generation, tCO_2e **Remaining CO_2e, to offset, tCO_2e**

Figure 16 shows the corporate estate CO_2e emissions that could be offset through the installation of approximately 7 MW of solar PV and a 2.5 MW wind turbine. The potential savings total 3,102 tCO_2e or 58%. (see Appendix 3 - Potential Offsite Generation).

7MW of solar PV would require an area of approximately 90,000m². This could be accommodated at sites such as Barrow Waterfront. A 2.5 MW wind turbine could potentially be located at Skirsgill Depot.

[9]First year CO_2e offsetting against BAU 2020 values.

5 Carbon Reduction Strategy and Targets

Potential CO_2e reduction strategies were assessed against the five critical success factors summarised in Table 2 below. The primary factor is the level of reduction in CO_2e emissions but annual cost savings, CAPEX requirements, economics and social value are also important to the success of the strategy.

Four investment options were short listed and assessed and are presented in Table 3. The four scenarios are presented to demonstrate different approaches and can be summarised as follows:

1 Maximum return on investment or best economics.
2 Maximum CO_2e savings whilst meeting 8% hurdle rate.
3 A phased option similar to 2a but with additional measures to achieve 100% CO_2e reduction.
4 Maximum offsite generation meeting 8% hurdle rate.

Table 2: Critical success factors for carbon reduction strategy.

CSF	Benefit description	How it will be measured?
1	CO_2e savings	Calculation of savings against BAU scenario
2	Cost savings	Calculation of savings against BAU scenario
3	Revenue generation	Measured in economic metrics[10]
4	Social value	Calculation of savings against BAU scenario
5	CAPEX	Implementation cost based on previous project experience and soft market testing

Table 3: Assessed carbon reduction strategy options

Short listed scenario	Summary of measures	Results (25 year)		Risks	Benefits
1) Maximum IRR	• Install LEDs in all buildings • Improve housekeeping measures	CO_2e savings	10%	• Lowest CO_2e savings • Low cost savings compared to other options • None	• Highest ROI • Highest social IRR • Lowest investment cost
		Cost savings	£5,829,686		
		Revenue generation	-		
		IRR	47%		
		Social IRR	63%		
		CAPEX	£698,396		
2a) 8% IRR	• Install LEDs in all buildings • Improve housekeeping measures • Install heat pumps and fabric improvements in care homes and offices • 2.5MW wind turbine • 1.5MW solar PV	CO_2e savings	60%	• Does not reach net zero CO_2e • Significant cost savings • Significant revenue generation opportunity	• High cost savings • Meets CCC hurdle rate • High social IRR • Medium CAPEX requirements
		Cost savings	£10,609,757		
		Revenue generation	£10,479,133		
		IRR	9%		
		Social IRR	14%		
		CAPEX	£10,491,062		
2b) 100% CO_2e reduction	• Install LEDs in all buildings • Improve housekeeping measures • Install heat pumps and fabric improvements in care homes, offices, record/archives, pupil referral units and remaining smaller buildings • 2.5MW wind turbine • 1.5MW solar PV • Additional 2.5MW wind turbine • Additional 5 MW solar PV	CO_2e savings	100%	• Low return on investment • High investment cost	• Full CO_2e savings • High cost savings • Energy security • Significant social IRR
		Cost savings	£11,897,212		
		Revenue generation	£19,490,980		
		IRR	3%		
		Social IRR	9%		
		CAPEX	£24,111,377		
3) 8% with maximum offsite renewables	• Install LEDs in all buildings • Improve housekeeping measures • 2no. 2.5MW wind turbine, 4.5MW of solar PV	CO_2e savings	43%	• Low CO_2e savings compared to other options • Low cost savings compared to other options	• Energy security • Meets CCC hurdle rate • Above CCC hurdle rate • Medium CAPEX requirements
		Cost savings	£5,829,686		
		Revenue generation	£21,134,395		
		IRR	8%		
		Social IRR	12%		
		CAPEX	£12,894,396		

The four scenarios have been assessed for each critical success factor and given a score. The option with the highest overall score was taken forward for more detailed assessment and timing/phasing assessment. A higher score indicates a more beneficial outcome (eg a lower CAPEX or higher IRR).

Table 4: Assessment of CO_2e reduction strategies.

Short list option	High level 25 year assessment						
	CO_2e savings	Cost savings	Revenue generation	IRR	Social IRR	CAPEX	Rank total
1) LEDs and housekeeping improvements	10%	£5,829,686	£-	47%	63%	£698,396	15
	Score						
	1	1	1	4	4	4	
2a) 8% CCC hurdle rate	43%	£5,829,686	£21,134,395	8%	12%	£12,894,396	17
	Score						
	3	3	2	3	3	3	
2b) 100% CO_2e reduction	100%	£11,897,212	£19,490,980	3%	9%	£24,111,377	14
	Score						
	4	4	3	1	1	1	
3) CCC hurdle rate with offsite generation	43%	£5,829,686	£21,134,395	8%	12%	£12,894,396	14
	Score						
	2	2	4	2	2	2	

[10]Future energy price changes based on BEIS price projections - central scenario; all values used in calculations are shown in Appendix 6 - Assumptions.

5.1 Prioritised Option

Option 2a has been selected as the prioritised option based on its scoring against the 5 critical success factors. This option achieves high CO_2e savings whilst meeting the 8% hurdle rate. It also has a strong score across all assessment parameters.

5.1.1 Potential Phasing

Table 5 shows the potential phasing of the carbon management options of option 2a, alongside associated capital cost per option. Figure 17 shows the 25 year cumulative cash flow for the prioritised option; the scheme has a simple payback of 14 years. The timeline is summarised in Figure 25 further on in this section.
Table 5: Potential phasing of option 2a.

Table 5: Potential phasing of option 2a

Year	Carbon management measures	Cost	Annual CO_2e savings, tonnes[11]
2022	Install LEDs in all buildings and make housekeeping improvements	£698,396	385
2023	Install offsite 1.5 MW solar PV installation	£1,595,000	96
2024	Install offsite 2.5 MW wind turbine	£3,350,000	528
2026	Improve building fabric and install heat pumps in offices and care homes	£4,846,667	1,419

[11]Based on projected emissions intensity figures in 2047 compared to BAU CO_2e in 2020.

Figure 17: Prioritised cumulative cash flow.

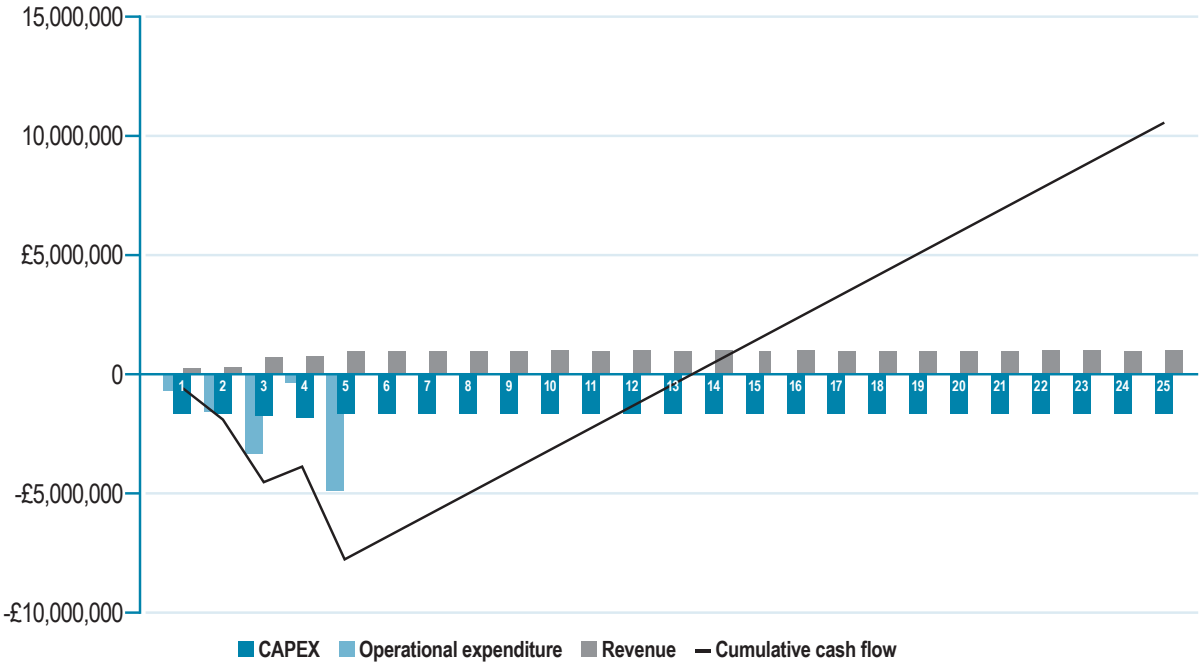
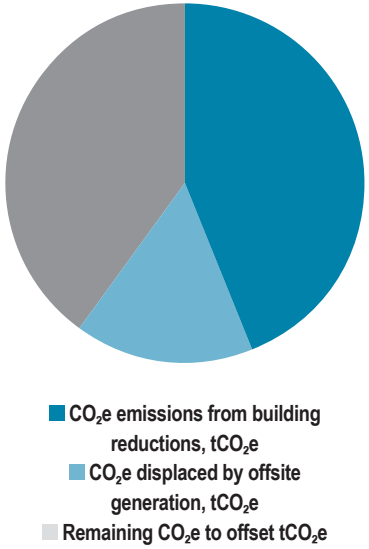


Figure 18: Prioritised option CO_2e savings proportion.

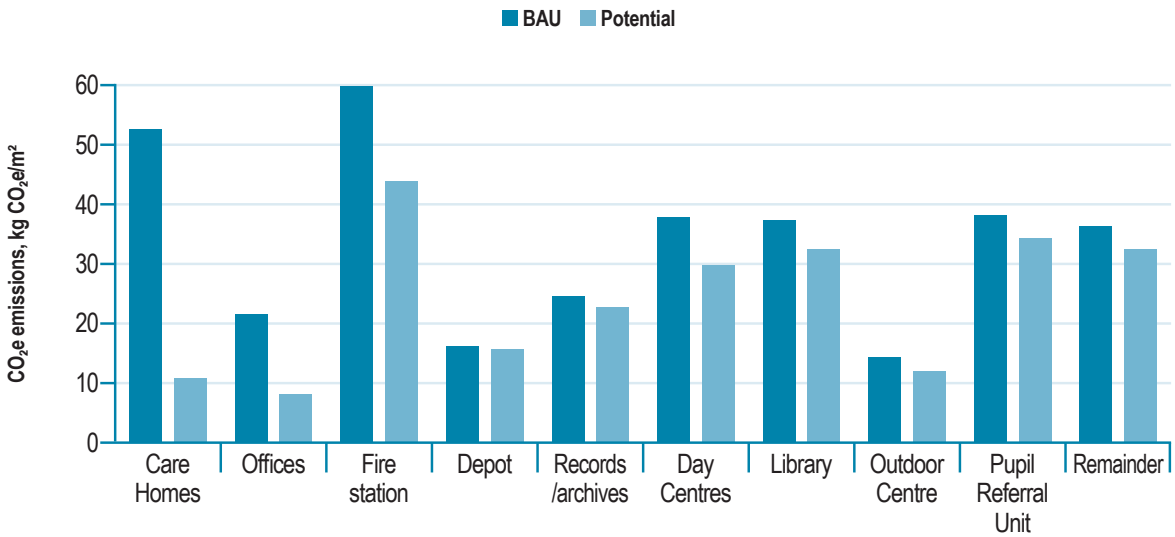


5.1.2 Projected CO_2e savings

Figure 18 shows that the majority of CO_2e savings are made by reducing building emissions[12]. Figure 20 summarises these savings. 36% of total emission savings arise from improving building fabric and installing heat pumps within the offices and care homes. An additional 10% of CO_2e savings result from installing LEDs and improving housekeeping measures across all buildings. 16% of CO_2e emissions are displaced by offsite generation. With all measures applied, approximately 40% of total current CO_2e emissions remain.

Figure 19 shows building CO_2e savings by building type. The largest savings against BAU are made by the care homes, followed by offices. The implementation of heat pumps in care homes results in significantly reduced overall fossil fuel usage. Housekeeping improvements have a proportionally large impact on CO_2e emissions of fire stations. The smallest impact from the installation of LEDs and housekeeping measures is in the depots. This is due to their smaller heat demand and significant electricity requirements that cannot easily be reduced by simple housekeeping improvements.

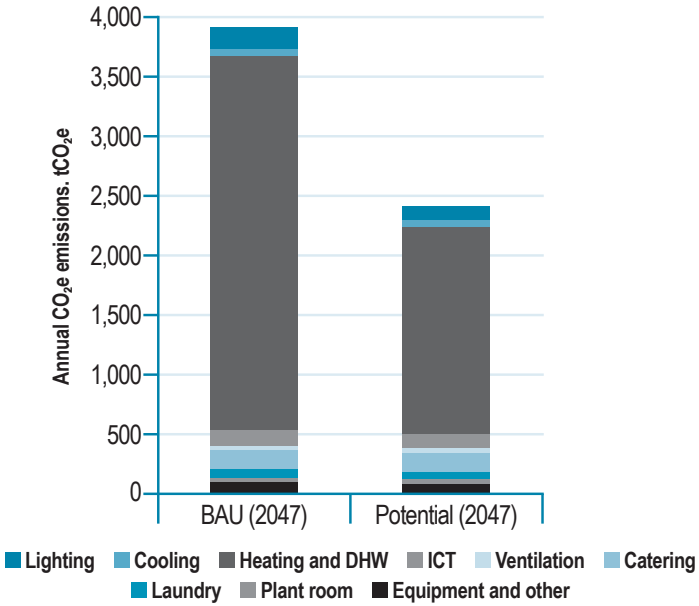
Figure 19: CO_2e savings by building type.



[12]Based on projected emissions intensity figures in 2047 compared to BAU CO_2e in 2020.

Most of the BAU CO_2e emissions arise from heating (see Figure 20). Reducing fossil fuel usage though effective housekeeping improvements and installing renewable heating will greatly reduce CO_2e emissions.

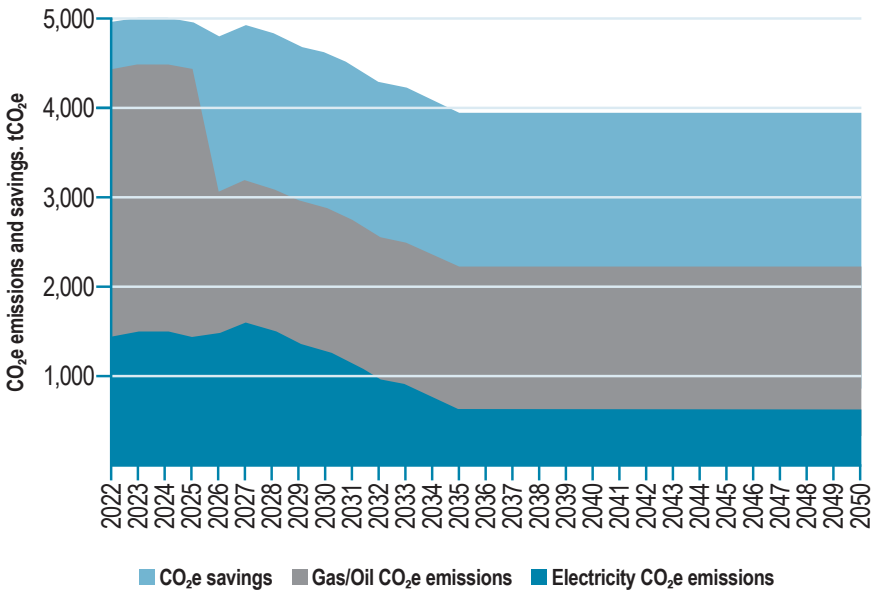
Figure 20: CO_2e savings by carbon management option.[13]



[13]BAU to potential CO_2e emissions calculated using projected emissions intensity figures for year 2047 to illustrate end of 25 year economic case.

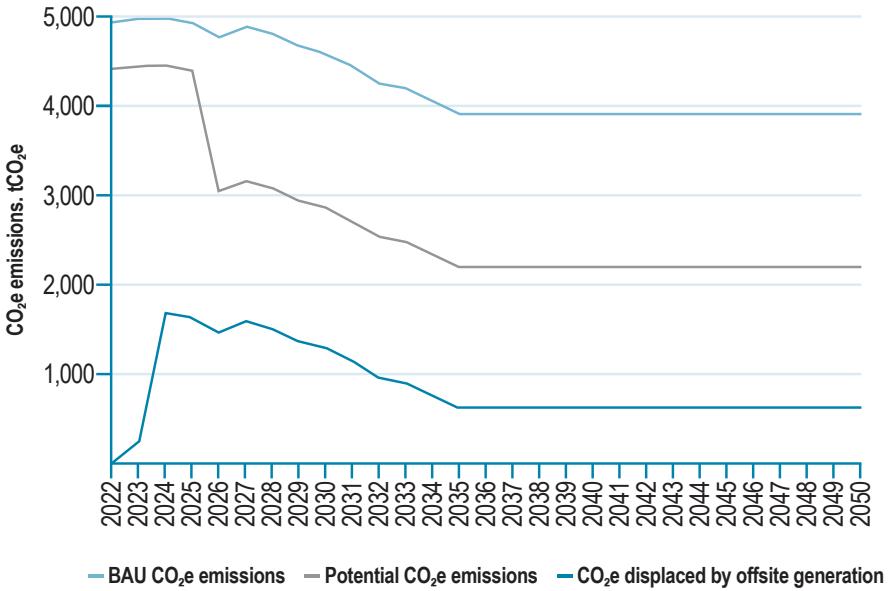
As the grid decarbonises, the CO_2e emissions associated with electricity reduce (see Figure 21). Therefore, the proportion of heat supplied by heat pumps will increase the projected long term CO_2e emissions savings, countering the initial increase in CO_2e emissions that result from the switch to heat pumps. Once all fossil fuel reduction measures are implemented, the annual CO_2e emissions from fossil fuels remain proportionally constant,[14] as shown in Figure 22.

Figure 21: CO_2e savings and emissions projections for prioritised option.



[14]Natural gas CO_2e intensity is assumed to remain constant; an increase in grid methane injection will cause CO_2e intensity to fall, whereas a greater reliance on LNG will cause CO_2e intensity to rise - at the time of writing, there are no formal CO_2e emissions intensity projection data for the gas grid.

Figure 22: CO_2e projected emissions and displacement for prioritised option.



5.1.3 Route to 100% CO_2e reduction

Option 2a results in approximately 60% reduction in CO_2e emissions by 2035. Once these measures have been implemented, additional measures can be undertaken to achieve a 100% reduction in CO_2e emissions. As shown in Table 4, option 2b (which achieved net zero) has less favourable economics and does not currently meet the CCC hurdle rate of 8%. The additional measures applied through the option of 2b include making fabric improvements to records/archives buildings and pupil referral buildings and installing an additional 2.5 MW wind turbine and 5 MW solar PV by 2030.

As parameters and priorities change, the additional CO_2e reduction measures proposed in option 2b may become economic. The workplace is a constantly changing landscape, for example the current Covid-19 pandemic has had a profound effect on the working environment and is possible to have a lasting impact on the size and operation of the corporate estate. Regular review of the strategy will identify opportunities for further CO_2e savings as conditions change.

Figure 23: Increase CO_2e projected reduction with addition of option 2b measures.

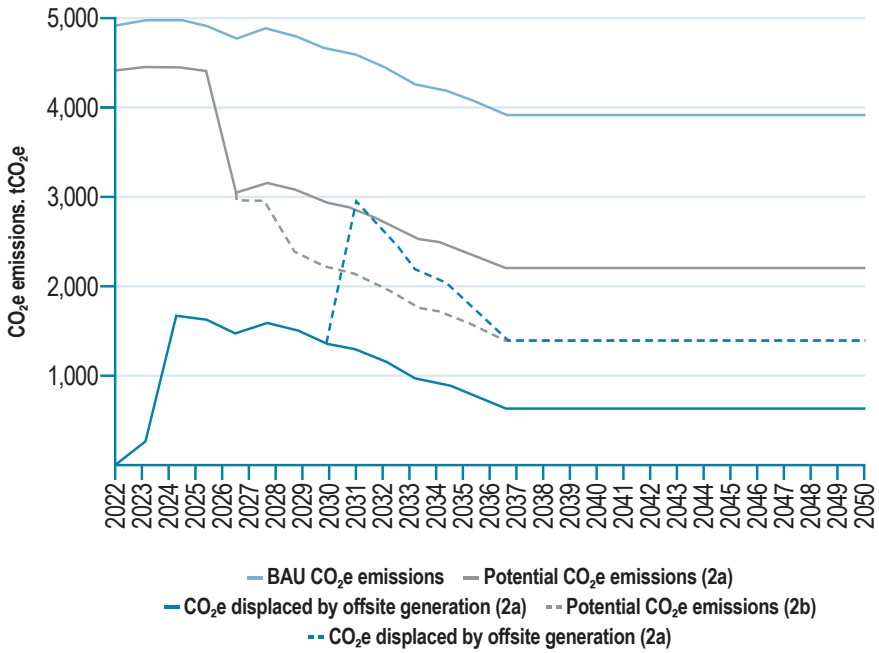
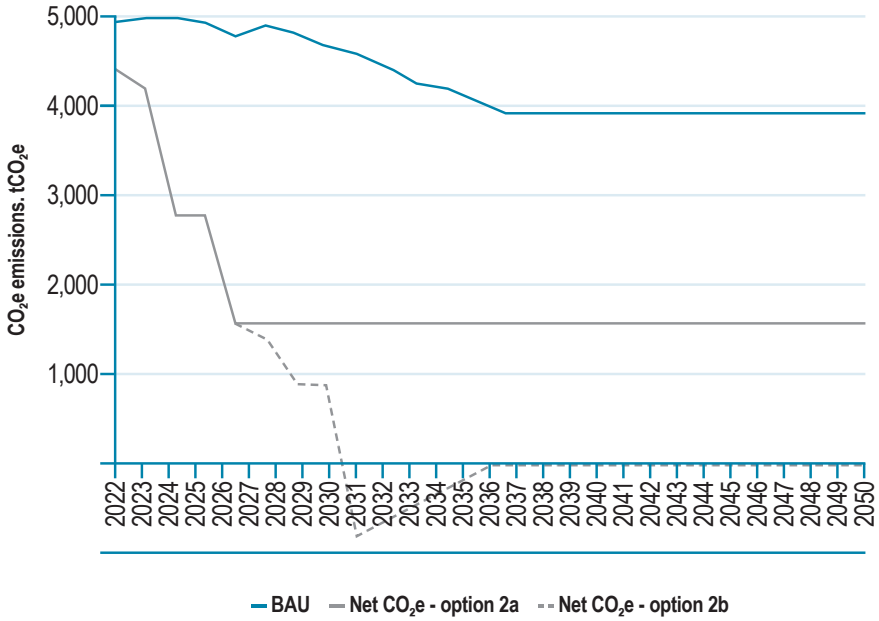


Figure 23 shows the projected CO_2e emissions and CO_2e displacement by generation by the blue and grey lines respectively. The solid lines depict the prioritised CO_2e reduction strategy whereas the dotted line shows the projection of the zero CO_2e strategy. The spike and then decline of the CO_2e displaced by offsite generation in option 2b is caused by the decarbonisation of the National Grid reducing the amount of CO_2e displaced per kWh generated.

Figure 24 illustrates the net CO_2e emissions under the proposed option 2a and the additional phases in 2b. Option 2b will continue to make increased net CO_2e savings until all measures are in place by 2030. Similar to what's seen in Figure 23, net CO_2e emissions are seen to increase after 2030 as the National Grid continues to decarbonise and the effectiveness of building energy CO_2e emissions displacement from offsite generation decreases. As the emissions intensity of National Grid electricity reduces, renewable electricity generation displaces less CO_2e per unit of electricity produced.

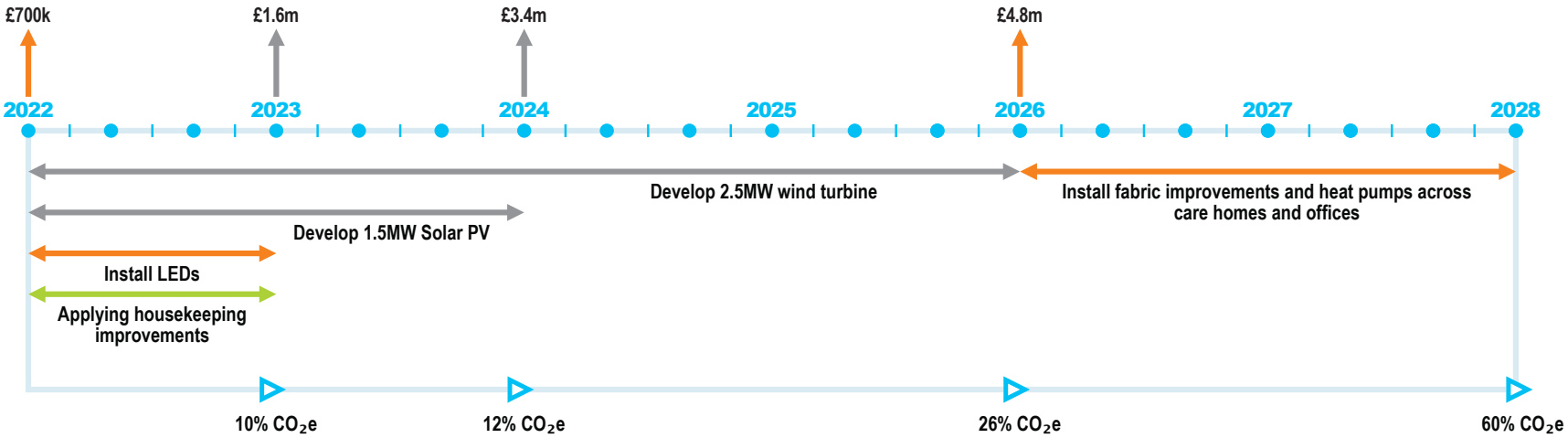
Figure 24: Potential net CO_2e emissions.



5.2 Summary

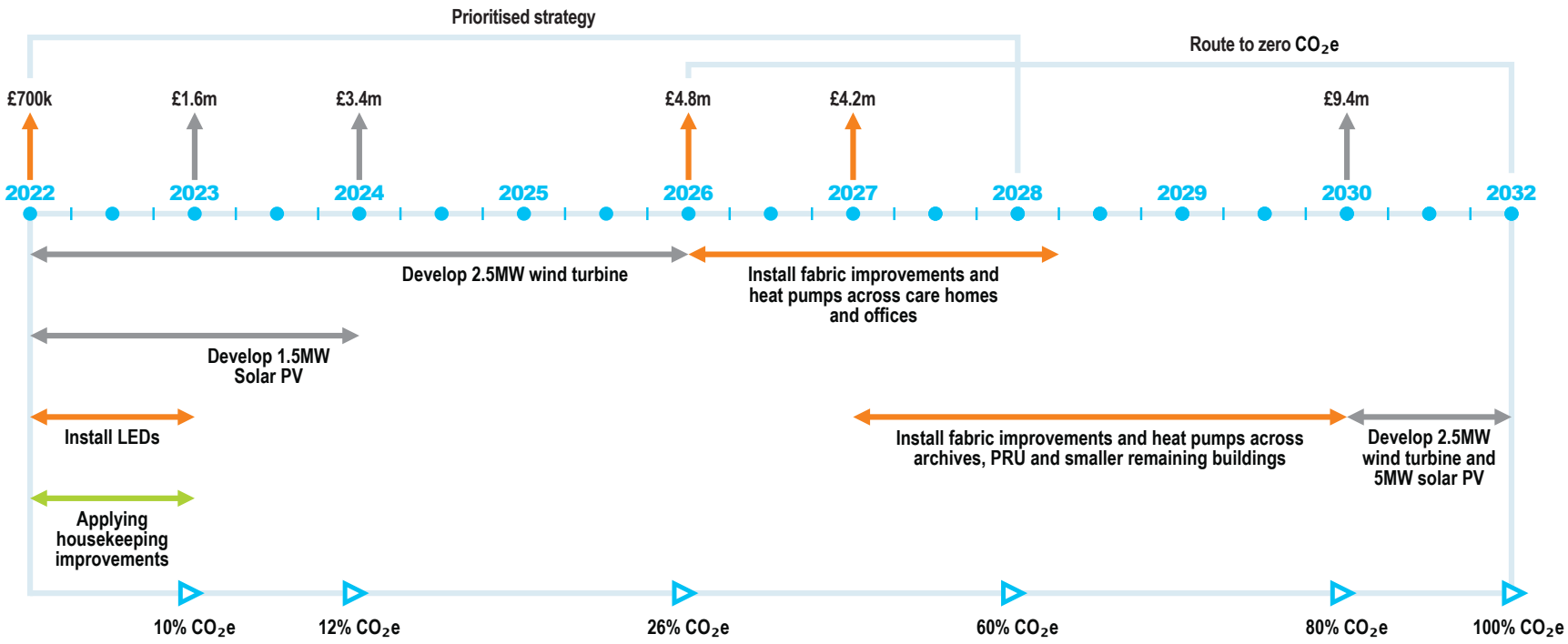
Figure 25 summarises prioritised CO_2e reduction strategy (that meets the CCC hurdle rate), with associated costs and CO_2e savings. The orange arrows show building improvement measures, grey offsite generation and green demand reduction measures.

Figure 25: Prioritised CO_2e reduction strategy timeline.[15]



[15] CO_2e savings based on projected emissions intensity figures in 2047 compared to BAU CO_2e in 2020.

Figure 26 shows the combined timeline of the prioritised CO_2e reduction strategy and the potential route to zero CO_2e.[16]



[16] CO_2e savings based on projected emissions intensity figures in 2047 compared to BAU CO_2e in 2020.

6 Conclusions

The conclusions of the Cumbria County Council Carbon Management Strategy Report are outlined below.

Baseline CO_2e Emissions

CCC corporate estate produces 5,392 tCO_2e annually, the majority of which arises from natural gas for heating and hot water and electricity for lighting, cooling and ICT functions (see breakdown of CO_2e emissions by fuel / energy type (2020) adjacent). CO_2e emissions from natural gas accounts for over 60% and this proportion will increase annually as the national grid decarbonises primarily due to increased deployment of wind and solar photovoltaic (PV) generation technologies.

The largest emitters of CO_2e are care homes due to their consumption of gas for heating and hot water. The second largest emitters of CO_2e are the offices as they are the largest electricity users. Combined, these produce nearly two thirds of the corporate estate's CO_2e emissions.

Building CO_2e Reduction

Measures identified to reduce building CO_2e emissions include replacing / upgrading equipment, improving building fabric, installing heat recovery plant, installing heat pumps and improving general housekeeping measures. The greatest savings are made from reducing CO_2e associated with heating and domestic hot water (DHW) and the largest contributor to these savings is the installation of heat pumps. Considerable CO_2e savings can be made through the installation of LEDs. Publications relevant to the carbon reduction measures are identified in APPENDIX 8 - Relevant Publications.

Energy Hierarchy

As stated, building energy (and associated CO_2e emissions) should be reduced in line with the energy hierarchy; the priority is to reduce a building's energy demand followed by improving efficiency, and integrating renewable energy sources, once the first two areas have been addressed. Any remaining building related CO_2e emissions should then be offset by offsite renewable energy generation.

Table 6 categorises the carbon reduction actions in line with the energy hierarchy.

Table 6: Energy hierarchy and related carbon reduction actions.

Energy hierarchy	Carbon reduction actions
1 Reduce demand	Apply housekeeping improvements Install fabric improvements
2 Improve energy efficiency	Install LEDs
3 Integrate renewable energy sources	Install heat pumps
4 Source energy from renewable sources	Develop 1.5 MW solar PV and 2.5 MW wind turbine

Offsite Renewable Energy Generation

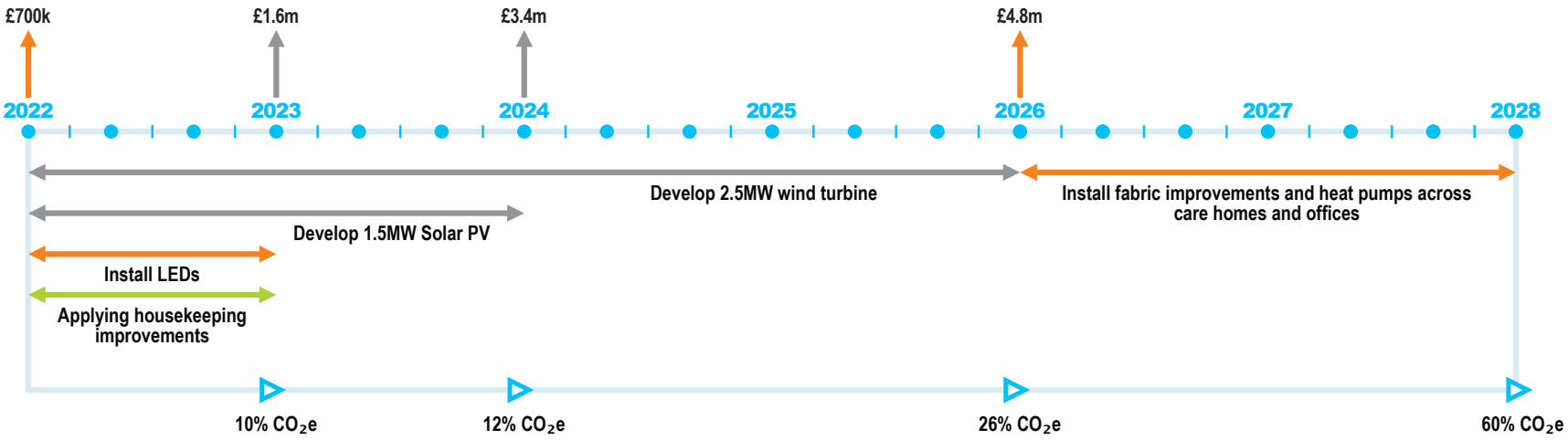
CCC owned sites were assessed as potential locations for offsite renewable energy generation. Of the sixty sites assessed, five were taken forward for further investigation. The technologies identified for large scale offsite electricity generation were solar PV and wind. Offsite generation provides a means of offsetting CCC's CO_2e emissions however, as stated, energy consumption should be reduced as far as possible prior to generating from renewable sources. This is reflected in the proposed carbon management strategy. The CO_2e

emissions that could be offset by the installation of approximately 1.5 MW of solar PV and a 2.5 MW wind turbine total 623 tCO_2e or 16%.

Prioritised CO_2e reduction strategy

The prioritised strategy (that meets the CCC hurdle rate) involves installing LEDs and making housekeeping improvements across all buildings and upgrading fabric and installing heat pumps in all offices and care homes. To further offset CO_2e emissions a 1.5 MW solar PV farm and 2.5 MW wind turbine are required. Over 25 years, the strategy is projected to reduce CO_2e emissions by 2,338 tCO_2e or 60% of total BAU emissions. The 25 year return on the capital investment of £10.5million will exceed the 8% IRR hurdle rate and will payback within 14 years.

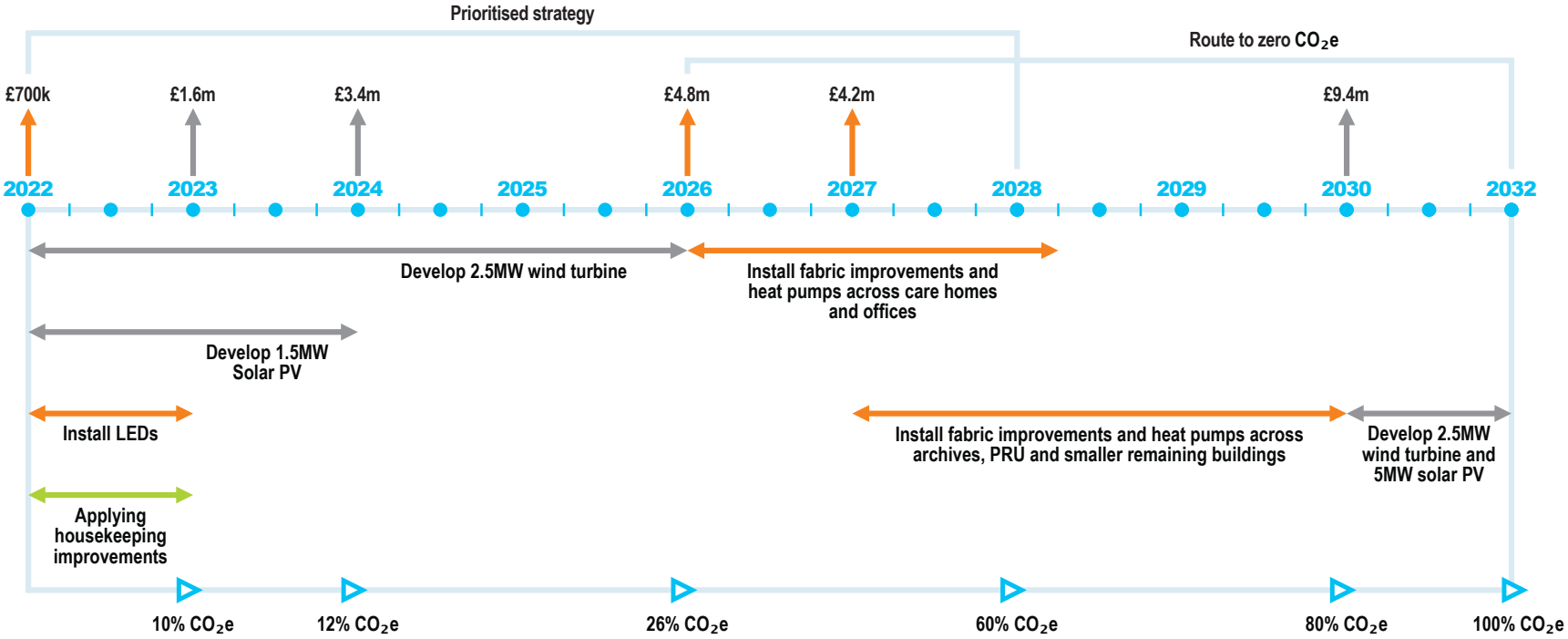
Figure 27: Timeline of prioritised CO_2e reduction strategy.



Route to Zero CO2e

A potential longer term strategy to achieve 100% CO_2e emission reductions has also been assessed. The additional measures required to achieve 100% reduction include additional heat pump installations in buildings, installing an additional 2.5 MW wind turbine and 5 MW of solar PV. The net zero strategy does not currently meet CCC's hurdle rate of 8% IRR.

Figure 28: Timeline for route to zero CO_2e



Key Risks

The carbon reduction strategy relies on the future decarbonisation of the national grid at the rate currently predicted. A slow down of this rate will reduce the amount of CO_2e savings made by the installation of heat pumps, though will increase the amount of CO_2e offset by solar PV and wind. Current emission projections end at 2035 but it is likely that the National Grid will further decarbonise after this date.

Cost savings, revenue generation and economics and social value are impacted to changes in electricity and natural gas prices. An increase in natural gas price will increase potential savings and improve the economic case for fossil fuel reduction. An increase in the projected electricity price will negatively affect the economics of installing heat pumps. Offsite generation will benefit from an increase in the price of wholesale electricity and achieve a shorter payback period on initial capital investment.

Capital investment will increase and decrease with project complexity; issues include planning restrictions and required building alterations. Although identified issues and risks have been considered during high level project costing, there will specific risks associated with each individual project.

Corporate Considerations

The CO2e reduction strategy will deliver against a number of key CCC corporate priorities. It contributes to the Cumbria Local Energy Plan and Cumbria's Local Industrial Strategy (LIS) in driving sustainable economic growth, heling to capitalise on existing energy credentials and further developing Cumbria's green energy infrastructure. Of the six priorities identified by the LEP (ideas, people, infrastructure, business environment, places and green growth), it potentially contributes to all.

The CO2e reduction strategy can contribute to the objectives of the Cumbria Council Plan 2018-2022 in providing sustainable growth in the local economy, saving money through reduced energy usage and cheaper energy supply, incentives and grants, improving energy security, providing investment in the local economy, improving air quality by cutting CO_2e and NOx emissions, leading in delivering good practice and providing reputational benefits. However, as the CO2e reduction strategy is due to start as this plan ends in 2022, the strategy should be considered during the development of the next plan.

If CCC were to declare a Climate Emergency, then a net zero target of say 2030 cannot be met under the proposed plan. While the study identifies a route to net zero over a 10 year period this option is currently uneconomic by CCC, on a simple hurdle rate of 8%. Currently a 60% CO_2e reduction is viable as a phase 1 approach to the CCC Carbon management strategy for corporate buildings.

Recommendations and Next Steps

Next steps include:

- Further surveys for key buildings and sites and development of building specific reports addressing priority measures identified the strategy.
- Completion of measure-specific studies to further assess feasibility and develop specifications for implementation of building improvement measures such as LED lighting and offsite renewable energy schemes (including discussions with planning team over suitability of offsite generation locations).
- Development of building user behavioural change strategies to contribute to improved housekeeping measures.
- Identification and allocation of budgets to complete short term measures identified in the strategy.
- Developing feasibility studies for heat pump installation in main offices and care homes.
- Employing a carbon reduction/energy manager to drive and oversee improvement actions across the corporate estate (25 years estimated housekeeping savings of £2,760,000 (8,300 tCO_2e) can be achieved and the role of a carbon reduction manager can be partly justified against these savings).

Table 7 summarises the timing of specific actions required to implement the carbon reduction strategy.

Table 7: Carbon reduction strategy timeframe and timing of reduction actions

Timeframe	Timeframe	Actions
Short term 2022-2024	Appoint dedicated carbon reduction/energy manager.	• Specify role • Secure budget • Recruit appropriate candidate
	Install LEDs across all buildings.	• Conduct further building surveys • Develop specifications • Engage with contractors • Procure equipment and services
	Implement housekeeping measures across all buildings.	• Employ carbon reduction manager • Develop housekeeping strategy to include staff engagement, behavioural change and improved energy management and controls
	Design, procurement and installation of 1.5 MW solar PV.	• Discussions with planning team over suitability of sites • Liaison with DNO • Detailed feasibility studies for selected sites • Planning application • Develop specifications • Engage with contractors • Procure scheme
	Design and planning of 2.5 MW wind turbine.	• Discussions with planning team over suitability of sites • Liaison with DNO • Detailed feasibility studies for selected sites • Planning application
Medium term 2024-2026	Procurement and construction of 2.5 MW wind turbine.	• Develop specifications • Engage with contractors • Procure scheme
Long term 2026-2028	Install fabric improvements and heat pumps across care homes and offices.	• Detailed feasibility studies for care homes and offices • Develop specifications • Engage with contractors • Procure schemes

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Land at Woodhouse Colliery, Cumbria

Summary of Proof of Evidence

on

Methane Emissions and Mitigation Measures to be Adopted at West Cumbria Mining's Woodhouse Colliery

William Lawrence Tonks

Pins Reference: APP/H0900/V/21/3271069

Application Reference: 4/17/9007

Prepared on behalf of West Cumbria Mining Ltd

10 August 2021

Contents

1. Introduction and Scope of Evidence

1.1. My name is William Lawrence Tonks I am a fellow of The Institute of Materials, Minerals and Mining (IOM3).

1.2. Since 2007 I have been the founder and Director of Bill Tonks Ventilation Services Ltd ("The Company"). The Company specialises in ventilation modelling in mines and methane emission prediction and methane utilisation. The Company advises mining companies on all aspects of underground environmental control (coal, metals and minerals). Also, new designs and / or optimisation of existing systems. It has provided the specification of ventilation and gas pumping systems and machinery and is an advisor / agent for Zitron Fans in Gijon, Spain. The company also carried out resource assessment and mitigation of coal mine methane in working mines and continued to provide consultancy to AMM operators in the UK regarding abandoned mine Methane (AMM) with regard to utilisation and mitigation.

1.3. My evidence will cover methane emission predictions, methane capture predictions, methane mitigation and methane utilisation feasibility at the WCM Woodhouse Colliery, related primarily to information provided in Chapter 5 and Chapter 19 of the 2018 Woodhouse Colliery Planning Application Environmental Statement i.e. Project Description and Greenhouse Gas Emissions.

2. Sources and Release of Methane in Woodhouse Colliery

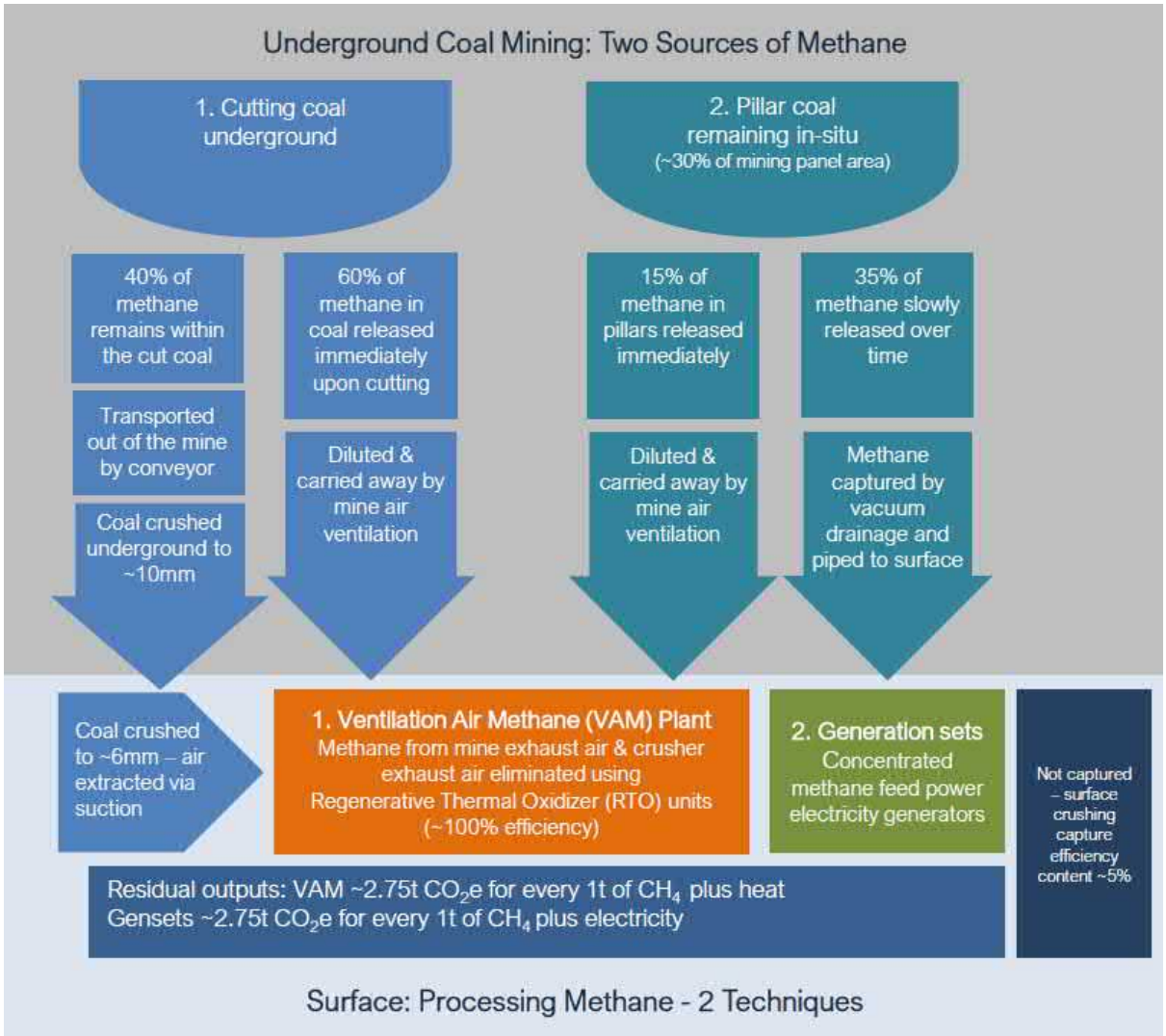
2.1. Methane is released in coalmines when mining occurs. The mined coal has an inherent methane gas content which can be measured, catalogued, mapped, interpolated and hence can be predicted as the mining progresses.

2.2. Until recently, essentially there has been two methods of underground mining of coal in the UK in the 21st Century: Longwall mining; and Room and Pillar mining, A recent hybrid has since been adopted around the world, where the advantages of both are merged and disadvantages are reduced, which is called "Run-Out and Pocket mining". West Cumbria Mining Ltd intend to adopt this method in Woodhouse Colliery.

2.3. In summary Longwall mining will liberate a greater volume of methane per ton of coal mined than Room and Pillar or Run out and Pocket but is more cost effective. Run out and Pocket will leave pillars of coal in the same way as Room and Pillar, additionally the method improves the efficiency of the underground ventilation.

3. Capture of Methane in Woodhouse Colliery

3.1. The methane released in Woodhouse Colliery during mining with be either let into the mine ventilation air methane (VAM) or captured in the methane drainage system, this is called “coal mine methane” (CMM). Both these systems will bring methane towards the surface methane mitigation infrastructure, as shown in the following diagram.



3.2. In summary a total of 95% of the cut coal methane would be captured as VAM in the ventilation air, whilst an additional 15% of the pillar coal’s (rapid release) original gas content would also be captured as VAM in the ventilation air.

3.3. CMM captured by the methane drainage system i.e. slow-release methane emitted from pillar coal behind sealed off panels would be captured within a pipe by creating negative pressures behind sealed off panel walls. This ensures that gas cannot leak out into the

mine air, enhancing safety in the production areas, particularly if they were sealed off alongside any future intake airways where gas could then otherwise migrate towards production (a common problem solved in the NCB days, where this practice of draining sealed off panels was first adopted). As stated above, it is envisaged that 35% of the original pillar coal gas content would be available for capture.

4. Mitigation and Utilisation of Methane at Woodhouse Colliery Site.

4.1. Woodhouse Colliery will contain a number of Regenerative Thermal Oxidizers (RTOs) operating in parallel which will mitigate 100% of any methane passed through them. It is estimated that VAM mitigation will be able to begin from production year 4 onwards when 0.2% CH4 concentration is first reached, as prior to this, in the first 3 years of production, the VAM concentration will not have reached 0.2% CH4 and hence will not be viable to inject into the RTOs.

4.2. Woodhouse Colliery will direct the CMM captured in the methane plant to an on-site 1MWe genset also sited on the surface. These gensets are quite flexible and can run at much reduced loads when gas flow is insufficient for full load. They also mitigate 100% of any methane delivered to them. This means that Woodhouse Colliery can purchase a genset sized to suit the whole project (1MWe) but still be able to make an early start in mitigating the CMM captured from sealed off panels, initially operating at a mere 0.26MWe from production year 4 onwards.

4.3. These devices combust methane in air and produce carbon dioxide and water vapour. Using the GWP for methane of x28 that of carbon dioxide (The GWP of methane has been based on advice within the IPCC AR5 Fifth Assessment Report which has been followed by the Committee on Climate Change in establishing the 6th carbon budget and pathways to net zero.), then although some carbon dioxide is produced during the process, the net greenhouse gas mitigation is 90%.

5. Monitoring of Gases in Coalmines

5.1. Fixed “mine environment” monitors can be deployed around coalmines at strategic points and their readings can be delivered to the surface control room computer in real time, the

data can be stored indefinitely, can be used in internal algorithms and be displayed in a real time sensible format.

5.2. The surface control room computer will be programmed to use the surface fan airflow and VAM methane concentration to calculate, display and record a flow rate of pure methane equivalent (p.m.e).

5.3. The surface control room computer will be programmed to use the methane plant pipe flow and the methane concentration of the gas/air mixture (CMM) to calculate, display and record a flow rate of pure methane equivalent (p.m.e).

5.4. The total of the sum of VAM p.m.e flow and the CMM p.m.e flow would illustrate the entire methane emission from the mine at any point in time.

5.5. Once the methane mitigation infrastructure (i.e. VAM RTO's and the CMM generator) is in operation, the records can then be accurately used to determine hourly, daily, weekly, monthly and yearly mitigation of methane emitted from the mine.

6. Conclusion

6.1. Methane management in UK coal mines is not a new concept, it has been in place for well over a century, in order to maintain a safe operating environment underground for the workforce and protect the mine itself. Initially the capturing and utilising the methane was viewed as a financial benefit for the mine operators, by directly heating water for the baths or generating electricity for use in the mine. In more recent times the utilisation of methane has now been considered a fundamental requirement to reduce carbon emissions The emerging requirement to achieve net zero operations across the UK industrial base provides the impetus to build on and improve the techniques of the past.

6.2. Woodhouse Colliery is a new mine, as such has the opportunity to design methane capture and utilisation system to dramatically reduce the fugitive methane from the mining operations. The techniques described here are achievable, indeed using existing proven technology rather than having to rely on any emerging technologies. As a result, WCM has been able to achieve a net zero operation from the beginning of the development.

Signed: *Bill Tonks* Dated: 10/08/21

TOWN AND COUNTRY PLANNING ACT 1990

TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015/595

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000/1624

PLANNING INQUIRY UNDER SECTION 77 OF THE TOWN AND COUNTRY PLANNING ACT 1990 IN RELATION TO THE PLANNING APPLICATION REFERENCE 4/17/9007 FOR APPLICATION FOR DEVELOPMENT OF A NEW UNDERGROUND METALLURGICAL COAL MINE AND ASSOCIATED DEVELOPMENT TO BE LOCATED AT
FORMER MARCHON SITE, POW BECK VALLEY AND AREA FROM MARCHON SITE TO ST BEES COAST, WHITEHAVEN, CUMBRIA

PINS REFERENCE: APP/H0900/V/21/3271069

Proof of Evidence on matters relating to Methane Emissions and Mitigation Measures to be Adopted at West Cumbria Mining's Woodhouse Colliery

William Lawrence Tonks
On behalf of West Cumbria Mining Ltd

Contents

Appendices (Separately Bound)

- *Appendix A – Methane calculations*
- *Appendix B – Methane Mitigation and utilisation*

My name is William Lawrence Tonks.

1. Qualifications and Experience

1.1. Qualifications

I have obtained the following relevant qualifications

2012 Awarded Fellowship in The Institute of Materials, Minerals and Mining (IOM3) 1997 Awarded Registration as Chartered Engineer by Engineering Council
1996 Nebosh General Safety Certificate (Distinction)
1989 – to present Open University 4 Credits to date S102, S271 & S280 Sciences; T102 Technology; U206 Environment
1985 – 1987 Mine Environmental Engineering, Nottingham Trent (day-release)
1984 – 1985 City and Guilds Dust Control in Mines (Distinction)
1983 – 1984 City and Guilds Mine Ventilation Officer (Distinction)
1979 – 1980 City & Guilds Ceramic Technology (Distinction)
1976 – 1978 ONC Sciences
1970 – 1975 O levels in Mathematics, English, Biology, Chemistry & Physics

1.2. Experience

Since 2007 I have been the founder and the Director of Bill Tonks Ventilation Services Ltd ("The Company"). The Company specialises in ventilation modelling in mines and methane emission prediction and methane utilisation. The Company advises mining companies on all aspects of underground environmental control (coal, metals and minerals). Also, new designs and / or optimisation of existing systems. It has provided the specification of ventilation and gas pumping systems and machinery and is an advisor / agent for Zitron Fans in Gijon, Spain. The company also carried out resource assessment and mitigation of coal mine methane in working mines and continued to provide

consultancy to AMM operators in the UK regarding abandoned mine Methane (AMM) with regard to utilisation and mitigation.

I was also a lecturer to mining students at Leeds University in 2009 and 2010 regarding underground environments / ventilation / methane / gases.
I also carried out demonstrations / “teach –ins” at Camborne School of Mines in 2016 and 2018.

Between 2008 and 2011 I was the Senior Technical Specialist for Harworth Energy East Ltd (HEL), acting as the coal mine ventilation and methane expert. I have worked with HEL’s clients to optimise methane drainage systems, utilisation plant VAM mitigation designs and roll-outs and Carbon Trading opportunities.

Between 2007 and 2008 I was the Chief Mine Methane Engineer for Camco Global. Again, I was the methane expert working with clients involved with Carbon Trading Schemes.

Between 1997 and 2007 I was the Gas Resource Manager for Alkane Energy. I advised Alkane on AMM emissions, resource evaluation, gas extraction and utilisation. Innovations included design of gas extraction systems and control systems. Research into AMM release mechanisms and utilisation of gas has been successful in that since 1999 to the present (2021), capture and utilisation of well over 1 billion m^3 of pure methane equivalent from abandoned mines has been achieved in the UK.

Between 1987 and 1994 I was the Ventilation Engineer for British Coal. I modelled and planned mine ventilation and methane drainage throughout the Midlands Coalfield. Part of my responsibilities extended to the compilation of legal reports to Her Majesty’s Inspectorate with reference to underground safety procedures and installation of ventilation machinery. I was the Project Engineer for a major ventilation reorganisation scheme: Commissioning of a 2.5MW surface fan; securing the methane gas resource for an 18 MWe

combined cycle methane-to-power project; and working with mine personnel regarding safety and training (C&G examiner).

Between 1985 and 1987 I worked as the Methane Drainage Officer for British Coal. I was responsible for the management of methane drainage systems and statutory data and the deployment of methane drainage operatives, ensuring strict adherence to legal requirements and local codes of practice. Experience gained in cross measures drilling / drainage and gas capture from abandoned longwall panels.

Between 1981 and 1985 I worked as a Ventilation / Methane Drainage Technician and operative. I gained practical experience in underground drilling, drainage measurement, borehole / system management, ventilation measurement, statutory data collection and recording and safety and legislation.

Between 1976 and 1981 I was a Laboratory Technician in the Refractories Industry. I carried out research, development; quality control and obtained experience in high temperature insulation.

2. Statement of Truth

2.1. I understand my duty to the Inquiry to help the Inspector on matters within my expertise and that this duty overrides any obligation to the person from whom I have received instructions or by whom I am paid. I confirm that my fees are not conditional upon the outcome of the Inquiry. I have complied, and will continue to comply, with that duty. I confirm that this evidence identifies all facts which I regard as being relevant to the opinion that I have expressed, and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion. I believe that the facts stated within this proof are true and that the opinions expressed are correct.

2.2. The evidence which I have prepared and provide for this planning inquiry (PINS Reference APP/H0900/V/21/3271069) in this Proof of Evidence is to the best of my knowledge and belief true and I confirm that the opinions expressed are my true and professional opinions.

3. Scope and Structure of Evidence

3.1. My evidence will cover methane emission predictions, methane capture predictions, methane mitigation and methane utilisation feasibility at the WCM Woodhouse Colliery, related primarily to information provided in Chapter 5 and Chapter 19 of the 2018 Woodhouse Colliery Planning Application Environmental Statement i.e. Project Description and Greenhouse Gas Emissions.

3.2. Any documents which are appended to this Proof of Evidence are referred to as Appendix A – Methane Calculations, and Appendix B - Methane Mitigation and utilisation.

3.3. My evidence is confined to matters which I consider are relevant to the Inquiry and which are within my area of expertise.

4. Sources and Release of Methane in Woodhouse Colliery

4.1. Methane is released in coalmines when mining occurs. The mined coal has an inherent methane gas content which can be measured, catalogued, mapped, interpolated and hence can be predicted as the mining progresses.

Core drilling has been carried out since 2014 in the Woodhouse Colliery proposed footprint. The drilling has brought to the surface stratigraphic cores of rock and coal. The coal content has been analysed regarding its *in-situ* gas content using the desorption method, by which recovered coal is analysed in a laboratory to arrive at a “gas content” of cubic metres of methane per tonne of coal (m^3 /t). The shallow onshore drilling carried out indicated the target seam (Main Band) with a gas content of $2m^3$/t whilst the deeper offshore drilling

documentation indicated a target seam with a gas content of 6m3/t. These figures are within the norm of the UK gas contents where there is a range between less than 1m^3/t up to as high as over 22m^3/t. These figures are reflected in the spreadsheet at Appendix A.

Until recently, essentially there has been two methods of underground mining of coal in the UK in the 21st Century: Longwall mining; and Room and Pillar mining. Put shortly:

4.1.1. Longwall mining is the total extraction of the targeted seam contained within the boundaries of a panel.

4.1.2. Room and Pillar mining is where a chequered pattern is created, taking coal in roadways (rooms) and leaving square pillars of coal.

4.2. A recent hybrid has since been adopted around the world, where the advantages of both are merged and disadvantages are reduced, which is called "Run-Out and Pocket mining". West Cumbria Mining Ltd intend to adopt this method in Woodhouse Colliery.

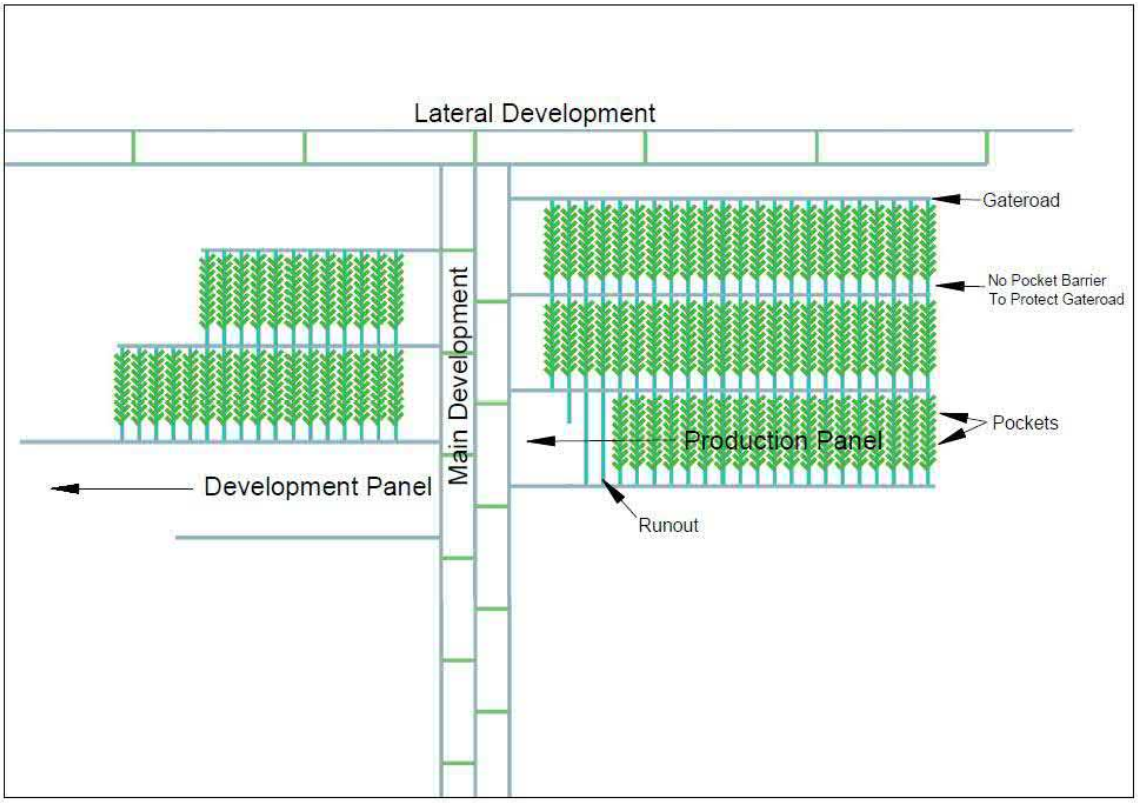
4.3. The advantages of Longwall mining are that all of the target seam coal within the panel is extracted, thereby offering an advantage when related to outlay for machinery and operating costs. The disadvantages are that the total extraction involves destressing of the strata above and below the panel. Zones 150m above and 40m below the target seam will most likely contain other coal seams which are not targeted. Any destressed coals within these zones will release considerable proportions of their methane content into mining related fissures which eventually finds its way into the longwall panel ventilation air. There are strict safety regulations in place limiting the concentration of methane in air in UK mines and so longwalls, as well as requiring ventilation for rapid target seam mining methane release, may (invariably) also need much higher ventilation levels because of methane emissions from seams above and below. Indeed, above certain coal methane content levels, the panel may also require capture

of gas from these seams using methane drainage drilling methods, because the mine infrastructure cannot in many cases then supply enough extra air required to dilute the methane in the ventilation air to safe levels.

4.4. The advantages of room and pillar mining are that there is little to no destressing of surrounding strata upwards or downwards. In addition, the roof is stabilized and is cheap and easy to control with simple roof bolts, due to the presence of the supporting coal pillars. Preventing destressing means there is no methane released from other seams in these zones above or below, so the other advantage is that ventilation is only required to dilute the methane released from the target seam and conventional methane drainage drilling is not required. Disadvantages are that at least 25% of the target seam is left unmined as pillars (and also, larger pillars are generally required as seams go deeper to maintain stable roof conditions) and advancing room and pillar workings incur air leakage across previously mined areas between roadways designated as intakes and returns, which means more air has to be put into an area to ensure sufficient delivery to working places.

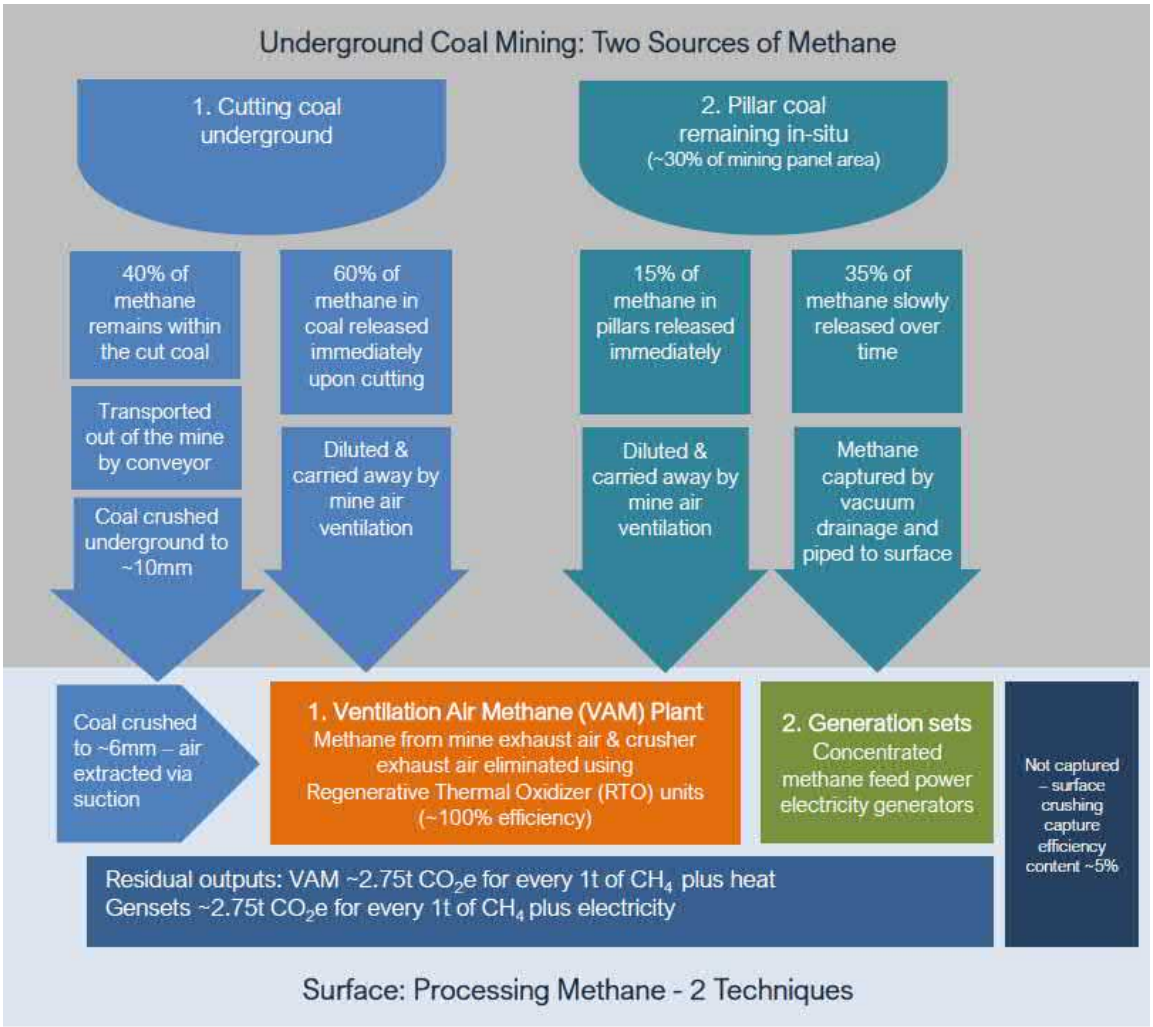
4.5. The advantages of run-out and pocket are many. As with the room and pillar method, there is little to no destressing of surrounding strata, so methane is only released from the coal seam that is being worked. The workings are arranged in panels that are pre-driven. The connecting run-out air circuit roadways where the pockets are later driven from, are systematically driven ahead of the retreating pocketing process. The roof support in this method is more cost effective as the pockets are not required to be bolted. The multiple narrow pillars created in a chevron cutting pattern will continue to support the roof as the machinery retreats and in particular will be supported by the injection of paste, which will help prevent the pillar sides from spalling (where the pillar sides could otherwise fall away and start to resemble an apple core shape). Due to the retreating method of mining, little to no air leakage is predicted, meaning all the air is delivered to the working places. Importantly, another advantage is that although conventional methane drainage drilling is not required, simple methane drainage from sealed off panels can be employed

enabling any slow-release methane from pillar coal to be gathered. 30% of the target seam is left unmined and this acts as pillars in Woodhouse Colliery's design.



5. Capture of Methane in Woodhouse Colliery (Appendix A)

5.1. The methane released in Woodhouse Colliery during mining will be either let into the mine ventilation air methane (VAM) or be captured in the methane drainage system, this is called "coal mine methane" (CMM). Both these systems will bring methane towards the surface methane mitigation infrastructure, as shown in the following diagram and explained in more detail below.



5.2. VAM is expected initially to be primed with 60% of the cut-coal's methane content due to the cutting, being released immediately - due to the destressing and pulverizing of the coal - and by handling, both during the initial drivages or cutting-out in the pockets (the 60% is an NCB figure derived from measurements in headings which is fundamentally the same method of cutting coal as planned in Woodhouse Colliery). In addition, also escaping into the VAM would be 15% of the pillar coal methane content deemed as rapid release methane. Once the cut coal reaches the main drift conveyor, it is proposed to crush the coal to -40mm, for ease and safety of conveying uphill. This crushing would further release methane from the coal, both immediately in the crusher and on its journey up the drift. The conveyors in Woodhouse Colliery are designed to be in the return airway (homotropal) which would have 3 main benefits.

- Any methane released from coal on the conveyor system in the return would not be allowed to get back into the mine where production was taking place.
- Any heat generated from the conveying system and cut-coal being transported would not be allowed to get back into the mine either.
- The direction of travel of the coal conveyor system and the direction of the airflow in the return airway(s) are the same, so the apparent velocity between air and coal is greatly lowered compared to conveyors in intakes (antitropal), hence reducing dust release.

Finally, before passing through a rotary airlock to emit the coal to the surface, a final crusher would reduce the coal to -10mm which would release a final purge of methane from coal whilst still within the mine, hence this methane contributing further to the VAM concentration before being exhausted through the main fan leading towards the methane mitigation infrastructure. It is estimated that of the cut-coal gas content, the crushing – conveying and crushing process would most likely emit a further 25% of the cut coal original content whilst being transported and processed within the mine. In addition, as the coal is crushed further on the surface to -6mm to -8mm, just before being processed, it has been proposed that a methane capture shroud will be installed over the crusher and it is considered that a further 10% of the initial gas content of the coal would be captured at this point as it is released during the final crushing and it would be led back into the ventilation air to mix with the VAM generated within the mine, hence simply and effectively ensuring the levelling up all VAM sources to an equal concentration before being led to the methane mitigation infrastructure.

5.3. As a result, a total of 95% of the cut coal methane would be captured as VAM in the ventilation air, whilst an additional 15% of the pillar coal's (rapid release) original gas content would also be captured as VAM in the ventilation air.

5.4. CMM captured by the methane drainage system i.e. slow-release methane emitted from pillar coal behind sealed off panels would be captured within a pipe by creating negative pressures behind sealed off panel's walls. This ensures that gas cannot leak out into the mine air, enhancing safety in the production areas, particularly if they were sealed off alongside any future intake airways where gas could then otherwise migrate towards production (a common problem solved in the NCB days, where this practice of draining sealed off panels was first adopted). As stated above, it is envisaged that 35% of the original pillar coal gas content would be available for capture.

5.5. This methane would be drawn out of the mine in a system of interconnected pipes leading to the surface (the main drift methane pipe will be installed in return roadway as a fundamental safety measure). The pipe would lead the CMM into methane pumps in the methane plant on the surface, which creates a negative pressure and handles the volumetric flow of methane through the plant. The pumps create a positive pressure in the outlet pipe, leading the gas to an on-site methane fuelled 1MWe electrical generation set.

6. Mitigation and Utilisation of Methane at Woodhouse Colliery Site.(Appendix B)

6.1. Woodhouse Colliery will install a number of Regenerative Thermal Oxidizers (RTOs) operating in parallel. These devices are powered by individual fans and a series of dampers which capture the emitting VAM from the mouth of the main mine fan and pass it through insulated containers which hold heat retaining medium (e.g. Lantec USA) above the auto ignition temperature of methane in air. This process will mitigate 100% of the methane being passed through the RTOs. They are self-sufficient in heat input for oxidisation providing the methane content in VAM is 0.2% CH4 or greater. These devices can thermally export useful heat above 0.3% CH4 whilst still being self-sustaining (before reaching a maximum of around 1.0% CH4). Woodhouse Colliery VAM concentration however is not expected to ever reach 0.3% CH4. It is estimated that VAM mitigation will be able to begin from production year 4 onwards when 0.2% CH4 is first reached, as prior to this, in the first 3 years of

production, the VAM concentration will not have reached 0.2% CH4 and hence will not be viable to inject into the RTOs.

6.2. These RTO devices combust methane in air and produce carbon dioxide and water vapour. Using the accepted global warming potential for methane of x28 that of carbon dioxide (The GWP of methane has been based on advice within the IPCC AR5 Fifth Assessment Report[1] which has been followed by the Committee on Climate Change in establishing the 6th carbon budget and pathways to net zero.), whilst some carbon dioxide is produced during the process, the net greenhouse gas mitigation is calculated to be 90%.

6.3. Woodhouse Colliery will pipe the CMM captured in the methane plant to an on-site 1MWe genset (a spark ignition 4 stroke gas fuelled engine linked to a generator) also sited on the surface. These gensets are quite flexible and can run at much reduced loads when gas flow is insufficient for full load. They mitigate 100% of any methane delivered to them. This means that Woodhouse Colliery can purchase a genset sized to suit the project over the entire mine's life (1MWe) but still be able to make an early start in mitigating the CMM captured from sealed off panels, initially operating at a mere 0.26MWe from production year 4 onwards.

6.4. These devices combust methane in air and produce carbon dioxide and water vapour. Using the accepted global warming potential for methane of x28 that of carbon dioxide (The GWP of methane has been based on advice within the IPCC AR5 Fifth Assessment Report[2] which has been followed by the Committee on Climate Change in establishing the 6th carbon budget and pathways to net zero.), then although some carbon dioxide is produced during the process, the net greenhouse gas mitigation is 90%.

7. Monitoring of Gases in Coalmines

[1] IPCC (2014) *Fifth Assessment Report* (AR5
[2] IPCC (2014) *Fifth Assessment Report* (AR5

7.1. The following section describes how the methane will be monitored during the operation of the mine.

7.2. Now that fixed “mine environment” monitors can be deployed around coalmines at strategic points and their readings can be delivered to the surface control room computer in real time, the data can be stored indefinitely, can be used in internal algorithms and be displayed in a real time sensible format.

7.3. In addition, to draw attention to certain areas where levels may be approaching dangerous / legal limits, the algorithms in the computer can raise alarms by audible / visible means, where the readings could e.g. change from “green” to “amber” to “red” and/or trigger an alarm sound.

7.4. Gases that are analysed using these fixed devices are as follows:

7.4.1. Methane CH4 % (vol/vol) (see below)

7.4.2. Oxygen O2 % (vol/vol) (for the safety of the workforce)

7.4.3. Carbon Monoxide CO parts per million ppm (vol/vol) (to give early warning of fire)

7.5. Methane concentration is generally measured in the ventilation air “general body” of airways at the outbye end of panels to ensure that the ventilation is correctly and efficiently diluting and carrying away the methane released during coal cutting. Methane is also measured in the main surface fan inlet ventilation air “general body” to show the concentration of methane in air entering the fan (this directly relates to the term “VAM concentration”).

7.6. Methane concentration is generally measured in methane drainage pipes leading from panels and at strategic junctions where districts meet pipes in main return roadways. Methane is also measured at the methane plant, showing the concentration of methane in the total flow of gas/air mixture leading from the mine and passing through the pumps in the plant (known as coal mine methane CMM).

7.7. Other parameters that are measured are:

7.7.1. Airway velocity m/s (which when related to the roadway cross sectional area (c.s.a) which can be input, can then show airflow in m3/s in any particular airway.

7.7.2. Methane pipe flow in litres/s (often derived from orifice differential pressure algorithms).

7.7.3. Intake and return airway separating door pressures in pascals (at strategic points where may be deemed relevant e.g. panel doors and particularly main fan bulkhead pressures which are always measured).

7.7.4. Methane pipe vacuum pressures in kPa (often measured at methane drainage pipes leading from panels and particularly always measured at the methane plant to indicate the plant and pipe network performance).

7.8. The surface control room computer will be programmed to use the surface fan airflow and VAM methane concentration to calculate, display and record a flow rate of pure methane equivalent (p.m.e) in e.g. litres/second.

7.9. The surface control room computer will be programmed to use the methane plant pipe flow and the methane concentration of the gas/air mixture (CMM) to calculate, display and record a flow rate of pure methane equivalent (p.m.e) in e.g. litres/second.

7.10. The total of the sum of VAM p.m.e flow and the CMM p.m.e flow would illustrate the entire methane emission from the mine at any point in time.

7.11. Once the methane mitigation infrastructure (i.e. VAM RTO's and the CMM genset) is in operation, the records can then be accurately used to determine hourly, daily, weekly, monthly and yearly mitigation of methane emitted from the mine.

8. Conclusion

8.1. Methane management in UK coal mines is not a new concept, it has been in place for well over a century, in order to maintain a safe operating environment

underground for the workforce and protect the mine itself. Initially the capturing and utilising the methane was viewed as a financial benefit for the mine operators, by directly heating water for the baths or generating electricity for use in the mine. In more recent times the utilisation of methane has now been considered a fundamental requirement to reduce carbon emissions The emerging requirement to achieve net zero operations across the UK industrial base provides the impetus to build on and improve the techniques of the past.

8.2. Woodhouse Colliery is a new mine, as such has the opportunity to design a methane capture and utilisation system to dramatically reduce the fugitive methane from the mining operations. The techniques described here are achievable, indeed using existing proven technology rather than having to rely on any emerging technologies. As a result, WCM has been able to achieve a net zero operation from the beginning of the development.

Signed: *Bill Tonks* Dated: 10/08/21

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/WLT/2

This is the Appendix marked WCM/WLT/2 referred to in the Proof of Evidence of William Lawrence Tonks dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Document No.

Document No.1

This is document 1 referred to in the Appendix marked WCM/WLT/2 on the Proof of Evidence of William Lawrence Tonks dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32439865v1

BASELINE INPUTS						METHANE REUTILISED INTO MINE AIRSTREAM (VAM)					METHANE CAPTURED AT SURFACE PLANT CRUSHER VENT (VAM)		TOTAL METHANE INTO VAM UNITS		VAM UNIT ANALYSIS			VAM MITIGATION AND CARBON CREDITS						METHANE DRAINAGE SYSTEM HIGH CONCENTRATION METHANE BROUGHT TO SURFACE IN A PIPE (CMM)												CMM MITIGATION AND CARBON CREDITS					
Project Year	Date	Status	Mined met coal (t p.a.)	P15 "project update brochure sketch" factor estimating coal left as pillars (t p.a.)	Estimated mined coal seam CH4 content m3/t	Mined met coal gas released in 40mm crushing process, conveyor & pre rotary airlock 10mm crusher's combined factor	Mined met coal gas released in 40mm crushing process, conveyor & pre rotary airlock 10mm crusher's combined factor	TOTAL mined met coal gas release underground into airstream CH4 m3 p.a.	Pillar coal gas rapid release underground estimated factor	Pillar coal gas release underground into airstream CH4 m3 p.a.	Capture factor of methane from Mined Met Coal passing through the final 6mm to 8mm crusher encapsulated with a ventilation air extraction system (a design of 6-m3/s extraction would keep the methane in air concentration safely below 1.2% over the whole project life coal tonnages and gas contents).	CH4 captured by crusher ventilation air extraction system m3 p.a.	Total coal gas release into VAM unit fixed CH4 m3 p.a.	Yearly levelled CH4 release into VAM fixed m3/second	CH4 Total VAM feed litres/second (swamined CMM being added from 3 years of production in the green cells)	Main fan duty fixed at 90 m3/s to 2027 & 100 m3/s in 2028 then incremental increase in mine ventilation airflow m3/s to keep at 0.2% CH4 in VAM from 2028 onwards (90m3/s estimated min req for mine ventilation) THEN FIXED AT 200 m3/s FROM 2037 to fix at "low" ventilation power costs following VAM to rise.	CH4% in VAM (0.2% is the minimum to keep an oxidizer auto thermal i.e. self-sustainable for heat). NOTE if inject early CMM still NOT begin until yr 4 WHEN ALSO NO INJECTION IS THEN REQUIRED. Note: Green cells show it is ineffective to try to add low CMM levels in first 3 years.	First VAM commences year 4 of production (4 units). Electrical VAM unit fan power consumed to convert each CH4 to CO2 (if each VAM unit handles 25 m3/s for 120 kW fan power)/kW	VAM electrical power cost per tonne of coal mined based on £50/MWh plus £7.75/MWh climate change levy (£/tonne)	tonnes of VAM CH4 mitigated per year based on 0.68kg/m3 mass normalised to 15 degC & 101.3kPa)	tonnes equivalent of CO2 mitigated by VAM oxidation when using a GWP 100 year figure of x28 for CH4	tonnes of CO2 produced per year by mitigating VAM CH4	net tonnes per year of CO2 mitigation i.e. Carbon Credits "earned" per year from VAM	Likely value if confirmed by carbon trading using 2021 UK spot reserve of £22/tonne from VAM	https://www.edie.net/news/4/UK-ETS--Post-Brexit-carbon-market-opens-for-first-time-with-carbon-price-topping-50-per-tonne--45/	Pillar coal gas slow release underground estimated factor (mitigated due to vents injection)	CMM Methane drained from sealed off panels CH4 m3 p.a.	Yearly levelled CMM CH4 captured in methane drainage m3/second	CMM CH4 in methane drainage litres/second first 3 years of production investigate VAM injection	Calorific Value of CH4 (MJ/m3 Normalised to 15 degC & 101.3 kPa)	"Chemical energy" flow contained in CMM sent to a CMM genset MJ/s	"Typical genset partial and approaching full load efficiency % (based on HHV value)	Methane drainage and power generation begins at year 4 of production (once lead can exceed typically around 35% in e.g. a 1MWe genset). Potential electrical energy generated from captured methane kW. Suggest install a 1MWe genset	Electrical Energy (based on an estimated 97.5% availability to account for pump and genset servicing) MWh/year	tonnes of CMM CH4 mitigated per year based on 0.68kg/m3 mass (t p.a.)	tonnes equivalent of CO2 mitigated when using a GWP 100 year figure of x28 for CH4 (t p.a.)	tonnes of CO2 produced per year by mitigating CMM CH4 (t p.a.)	net tonnes per year of CO2 mitigation i.e. Carbon Credits "earned" per year from CMM (t p.a.)	Likely annual value if confirmed by carbon trading using 2021 UK spot reserve of £22/tonne from CMM (£ p.a.)	https://www.edie.net/news/4/UK-ETS--Post-Brexit-carbon-market-opens-for-first-time-with-carbon-price-topping-50-per-tonne--45/
1	2019	Construction	0	0	2	60%	25%	0	15%	0	10%	0	0	0.000	0	90	0.00	0	0	0																						
2	2020	Construction	0	0	2	60%	25%	0	15%	0	10%	0	0	0.000	0	90	0.00	0	0	0																						
3	2021	Production	480,000	199,440	2	60%	25%	816,000	15%	59,832	10%	96,000	971832	0.031	25	90	0.00	0	0	0																						
4	2022	Production	900,000	373,993	2.25	60%	25%	1,721,250	15%	126,269	10%	252,500	2049994	0.065	54	90	0.00	0	0	0																						
5	2023	Production	1,600,000	664,800	2.5	60%	25%	3,400,000	15%	249,360	10%	400,000	4049360	0.128	185	90	0.00	0	0	0																						
6	2024	Production	2,360,000	980,880	2.75	60%	25%	5,510,500	15%	404,489	10%	643,000	6569489	0.208	268	100	0.12	0.10	4,468	125,055	12,246	112,807	2,481,749	5,640,339	35%	1,212,845	0.018	38	37.75	1456	26%	377	322	825	23,093	2,268	20,825	454,140	1,041,227	362	893	25,017	2,457	22,560	496,318	1,137,996
7	2025	Production	2,780,000	1,155,080	3	60%	25%	7,079,750	15%	563,100	10%	953,500	9194350	0.292	268	145	0.25	0.25	6,220	174,147	17,104	157,043	3,454,945	7,852,147	35%	1,313,915	0.042	43	37.75	1572	27%	424	362	893	25,017	2,457	22,560	496,318	1,137,996							
8	2026	Production	2,780,000	1,155,080	3.5	60%	25%	8,270,500	15%	606,422	10%	973,000	9844922	0.312	315	150	0.25	0.25	6,698	187,543	18,416	169,123	3,720,162	8,456,158	35%	1,414,985	0.045	45	37.75	1692	28%	458	404	961	26,941	2,646	24,295	534,497	1,214,765							
9	2027	Production	2,780,000	1,155,080	4	60%	25%	8,801,250	15%	645,758	10%	1,042,500	10551448	0.335	331	167	0.25	0.25	7,176	200,939	19,729	181,209	3,986,475	9,060,375	35%	1,516,054	0.048	48	37.75	1812	30%	544	464	1,055	28,836	2,835	26,031	572,375	1,301,544							
10	2028	Production	2,780,000	1,155,080	4	60%	25%	9,452,000	15%	693,054	10%	1,112,000	11257502	0.357	353	178	0.25	0.25	7,655	214,334	21,051	193,284	4,252,240	9,664,182	35%	1,617,126	0.051	51	37.75	1934	33%	638	549	1,169	32,730	3,024	27,768	610,853	1,388,303							
11	2029	Production	2,780,000	1,155,080	4.25	60%	25%	10,041,750	15%	736,370	10%	1,181,500	11960622	0.379	374	188	0.25	0.25	8,133	227,730	22,368	205,364	4,518,035	10,268,193	35%	1,718,196	0.054	54	37.75	2055	33%	678	579	1,268	35,714	3,213	29,501	649,051	1,475,072							
12	2030	Production	2,780,000	1,155,080	4.5	60%	25%	10,631,500	15%	779,686	10%	1,251,000	12664108	0.401	400	200	0.25	0.25	8,612	241,126	23,687	217,444	4,783,570	10,872,203	35%	1,819,267	0.058	58	37.75	2175	33%	718	613	1,237	34,639	3,402	31,237	687,210	1,561,841							
13	2031	Production	2,780,000	1,155,080	4.75	60%	25%	11,221,250	15%	823,022	10%	1,320,500	13367710	0.424	424	212	0.25	0.25	9,090	254,523	24,998	229,524	5,048,904	11,476,213	35%	1,920,337	0.061	61	37.75	2296	33%	758	647	1,306	36,563	3,591	32,972	725,388	1,648,608							
14	2032	Production	2,780,000	1,155,080	5	60%	25%	11,811,000	15%	866,358	10%	1,390,000	14071358	0.446	447	223	0.25	0.25	9,568	267,918	26,313	241,605	5,313,240	12,080,224	35%	2,021,408	0.064	64	37.75	2417	33%	798	681	1,375	38,488	3,780	34,708	763,566	1,735,378							
15	2033	Production	2,780,000	1,155,080	5.25	60%	25%	12,401,750	15%	909,693	10%	1,459,500	14774893	0.469	469	234	0.25	0.25	10,047	281,314	27,629	253,685	5,581,064	12,684,237	35%	2,122,479	0.067	67	37.75	2538	33%	838	715	1,443	40,412	3,969	36,443	801,745	1,822,147							
16	2034	Production	2,780,000	1,155,080	5.5	60%	25%	12,991,500	15%	952,949	10%	1,529,000	15478949	0.493	492	200	0.25	0.25	10,525	294,710	28,945	265,765	5,846,839	13,288,249	35%	2,223,548	0.071	71	37.75	2659	33%	877	749	1,512	42,336	4,158	38,178	839,921	1,908,916							
17	2035	Production	2,780,000	1,155,080	5.75	60%	25%	13,581,250	15%	996,205	10%	1,598,500	16018355	0.510	518	200	0.25	0.25	11,004	308,106	30,260	277,845	6,112,584	13,892,260	35%	2,324,619	0.074	74	37.75	2780	33%	917	783	1,581	44,261	4,347	39,914	878,101	1,995,685							
18	2036	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
19	2037	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
20	2038	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
21	2039	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
22	2040	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
23	2041	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
24	2042	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
25	2043	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
26	2044	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
27	2045	Production	2,780,000	1,155,080	6	60%	25%	14,170,000	15%	1,039,581	10%	1,668,000	16687355	0.530	539	200	0.25	0.25	11,482	321,501	31,576	289,925	6,378,359	14,496,271	35%	2,425,689	0.077	77	37.75	2900	33%	957	817	1,649	46,185	4,536	41,649	916,280	2,082,454							
																																									144,475	Total MWh generated 2028 to 2049

Document No.2

This is document 2 referred to in the Appendix marked WCM/WLT/2 on the Proof of Evidence of William Lawrence Tonks dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32439877v1

What is VAM?

Ventilation Air Methane (VAM)

As a greenhouse gas, (GHG) methane (CH_4) is 25 times more potent than Carbon Dioxide (CO_2). These GHG emissions can be significantly reduced by capturing and oxidizing the methane.

Each tonne of methane oxidized results in a net GHG emission reduction of 22.25 tCO_2e.

VAM utilises Regenerative Thermal Oxidizers (RTO's) to oxidize airflow containing low concentrations of methane.

In a RTO system, the contaminated air to be treated is sucked in by the main fan. The fan pushes the air to be treated through the first ceramic tower. In this first tower, the air is heated along with the ceramic media. When the air has passed through the ceramic bed, it reaches the combustion chamber, where the oxidation takes place. The temperature needs to be around 1,100ºC in order to ensure full oxidation.

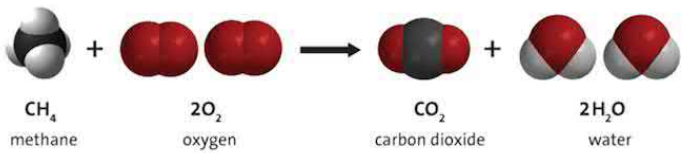
At the same time, as air to be treated enters the first chamber, the now-oxidised air is passed through the second ceramic tower, in order to transfer its heat to the ceramic media. This cools the gas and heats the ceramic bed. After passing through the second tower, the air – now free from pollutants – is sent up the flue. A series of switching valves are used to switch the airflow between the two chambers to ensure regulation of the media and combustion process.

With a CH4 concentration of 0.2% or greater, once started, the oxidizer combustion will be self-sustained without any additional fuel.

A series of RTO's are combined to suit the required airflow. A total maximum airflow of 175m^3/s will be exhausted from the mine, plus input airflow from the surface crusher capture system.

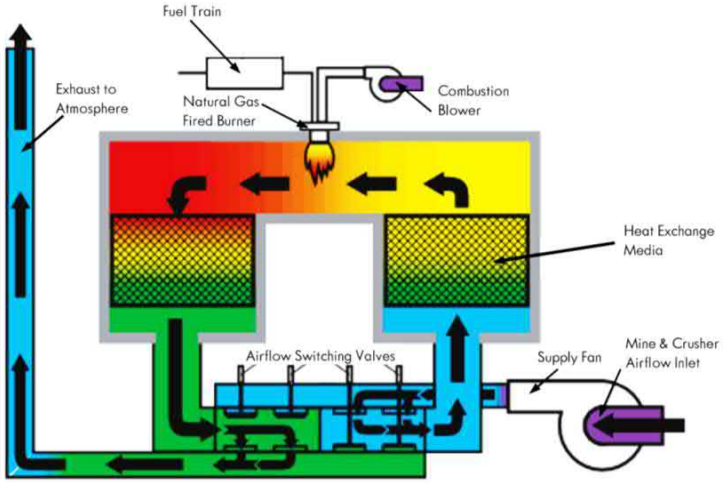
A total 200m^3/s capacity is proposed for Woodhouse Colliery.

Oxidization of Methane – chemical reaction



1t of CH_4 (25 t CO_2e) → 2.75 t CO_2e

Regenerative Thermal Oxidizer Airflow Diagram



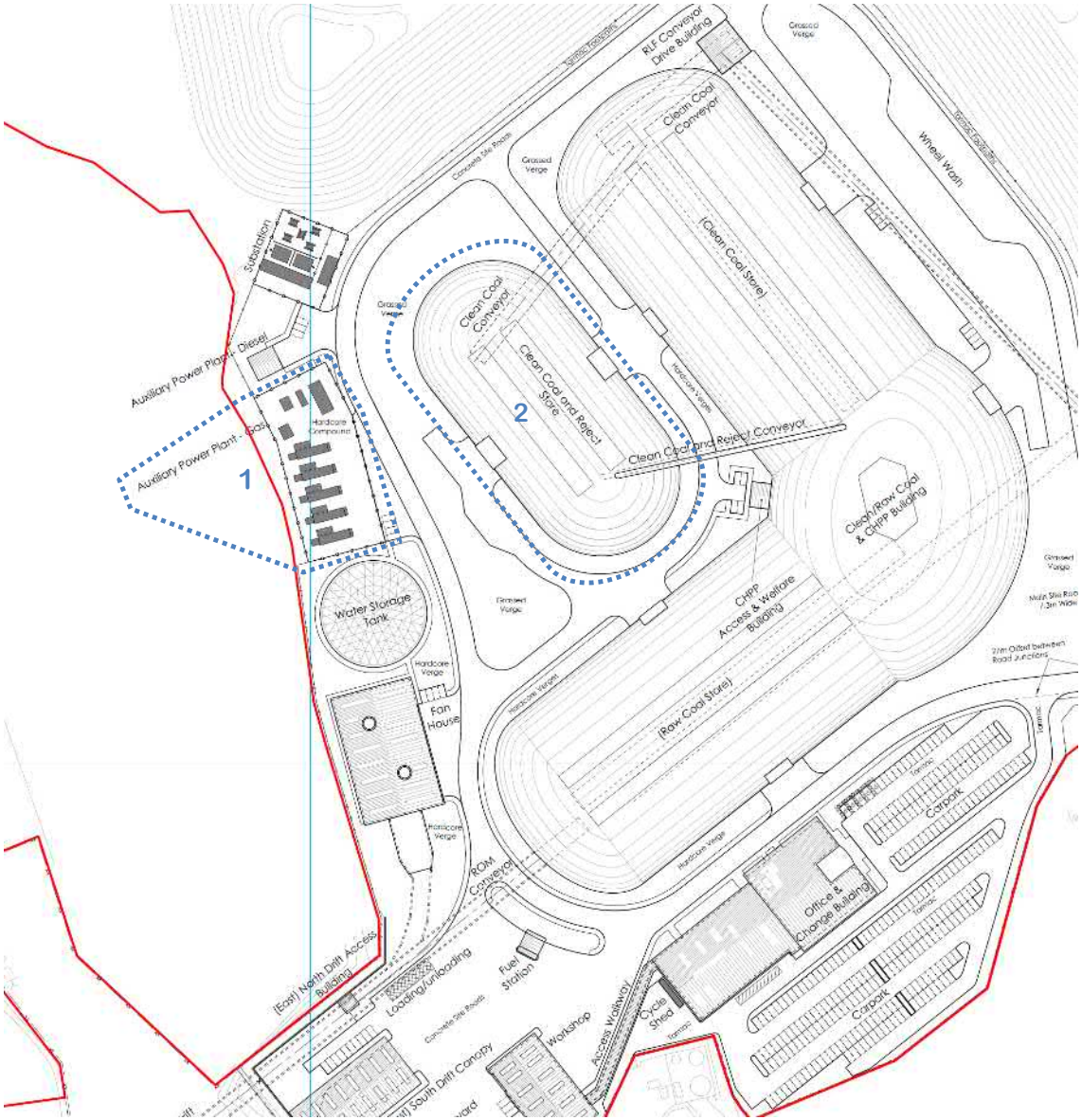
Extract from WCM Drawing

Cumbrian Metallurgical Coal Project					
869/AM/002 Main Mine Site Proposed Plan					
Date APRIL 2020	By RM	Paper A1	Scale 1:1250	QA TEO	Rev E

Note the following exist on this drawing, which formed part of WCM's planning application:

1. Existing provision for auxiliary power plant – 5x generation sets

2. Existing clean coal and reject store structure



Generator Set (Gas Engine)

40ft standard containerised units

Max. 4 No units required for full methane utilisation

(WCM plans include for 5 units)

Type-3 Engine Benefits

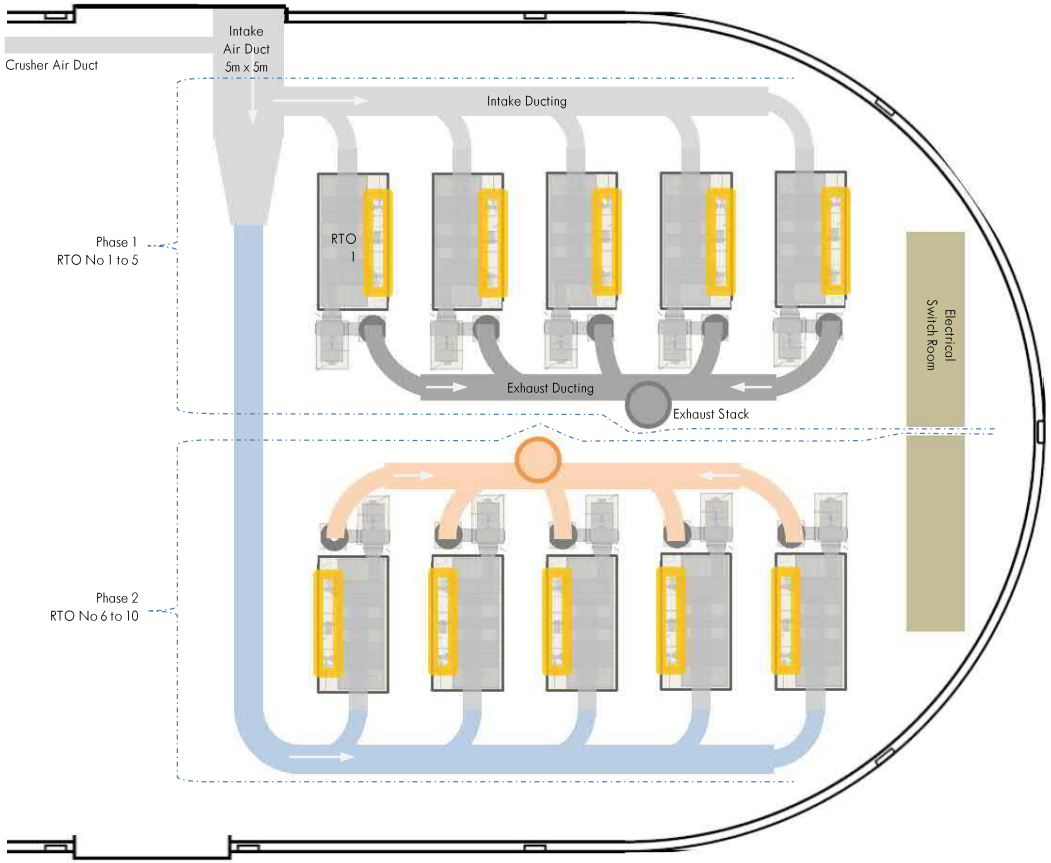
- High electrical and thermal efficiency for maximum return on investment.
- Robust, flexible design with high reliability on difficult gases.
- Available as containerised 'plug and play' units for quick installation.

Type-3 Engine Features

- Supercharger ensures homogenous mixture at low gas pressures.
- High flexibility due to two-stage mixture cooling.
- Turbocharger bypass evens out extreme operating conditions.
- High-performance long-life spark plug for reliable operation.
- LEANOX® lean burn control ensures minimal emissions.
- Compact construction allows installation in 40-foot container.

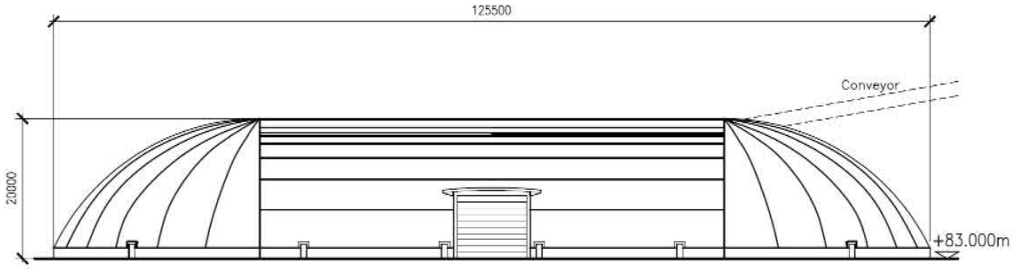
Technical Specifications J312 GS	Technical Specifications J316 GS	Technical Specifications J320 GS
Electrical Output	**Electrical Output**	**Electrical Output**
500 - 637 kWe	**735 - 835 kWe**	**1067 kWe**
No. of Cylinders /arrangement: 12 / V 70°	**No. of Cylinders /arrangement:** 16/ V 70°	**No. of Cylinders /arrangement:** 20 / V 70°
Combustion: Lean burn principle	**Combustion:** Lean burn principle	**Combustion:** Lean burn principle
Bore: 135mm (5.31 inch)	**Bore:** 135mm (5.31 inch)	**Bore:** 135mm (5.31 inch)
Stroke: 170mm (6.69 inch)	**Stroke:** 170mm (6.69 inch)	**Stroke:** 170mm (6.69 inch)
Speed: 1,500 rpm (50Hz) 1,200/1,800 (60Hz)	**Speed:** 1,500 rpm (50Hz) 1,200/1,800 (60Hz)	**Speed:** 1,500 rpm (50Hz) 1,200/1,800 (60Hz)
Dimensions: 4,700mm (length) x 1,800mm (width) x 2,300mm (height)	**Dimensions:** 5,200mm (length) x 1,800mm (width) x 2,300mm (height)	**Dimensions:** 5,700mm (length) x 1,800mm (width) x 2,300mm (height)
Gen-set Weight: 8,000 kg	**Gen-set Weight:** 8,800 kg	**Gen-set Weight:** 10,500 kg

VAM plant layout within existing structure



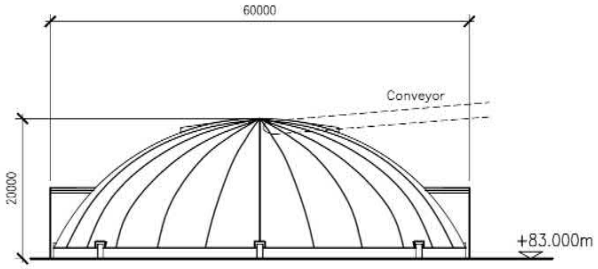
- Each RTO rated at 25m^3/s airflow
- Phase 1 – up to 100m^3/s
- Phase 2 – additional 100m^3/s
- Total 200m^3/s airflow
- Exhaust via vertical stack to structure height – no additional height requirement

Clean Coal/Reject Structure (as per planning submission)



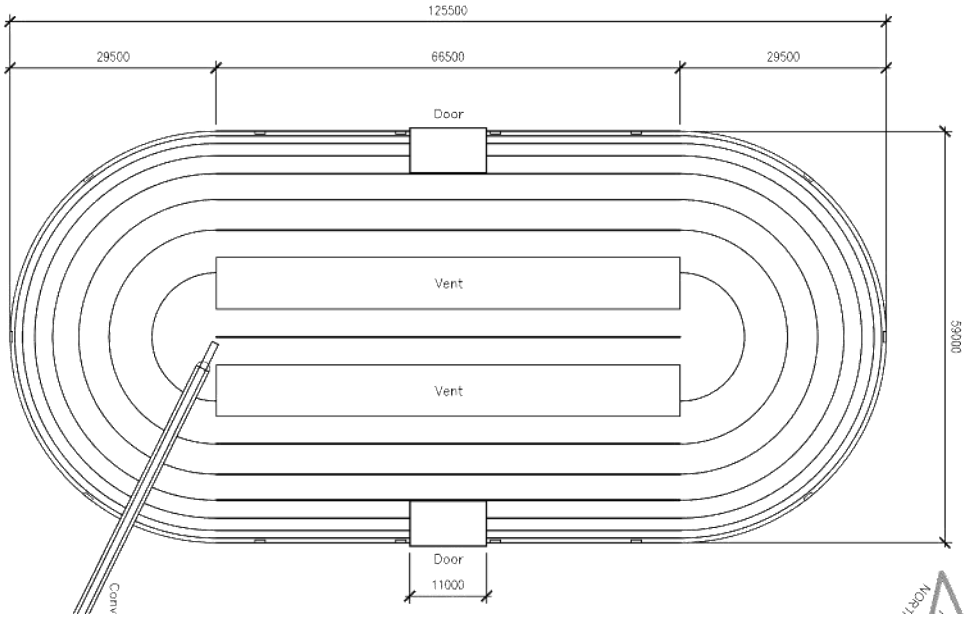
South West Elevation

Scale 1:500

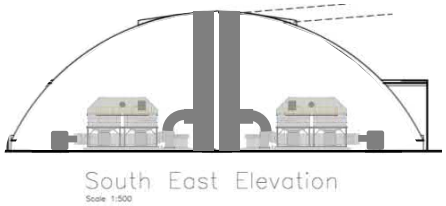


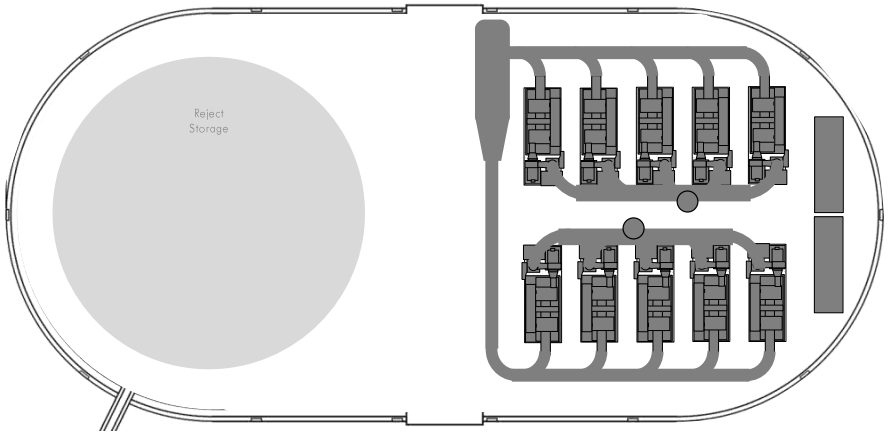
South East Elevation

Scale 1:500



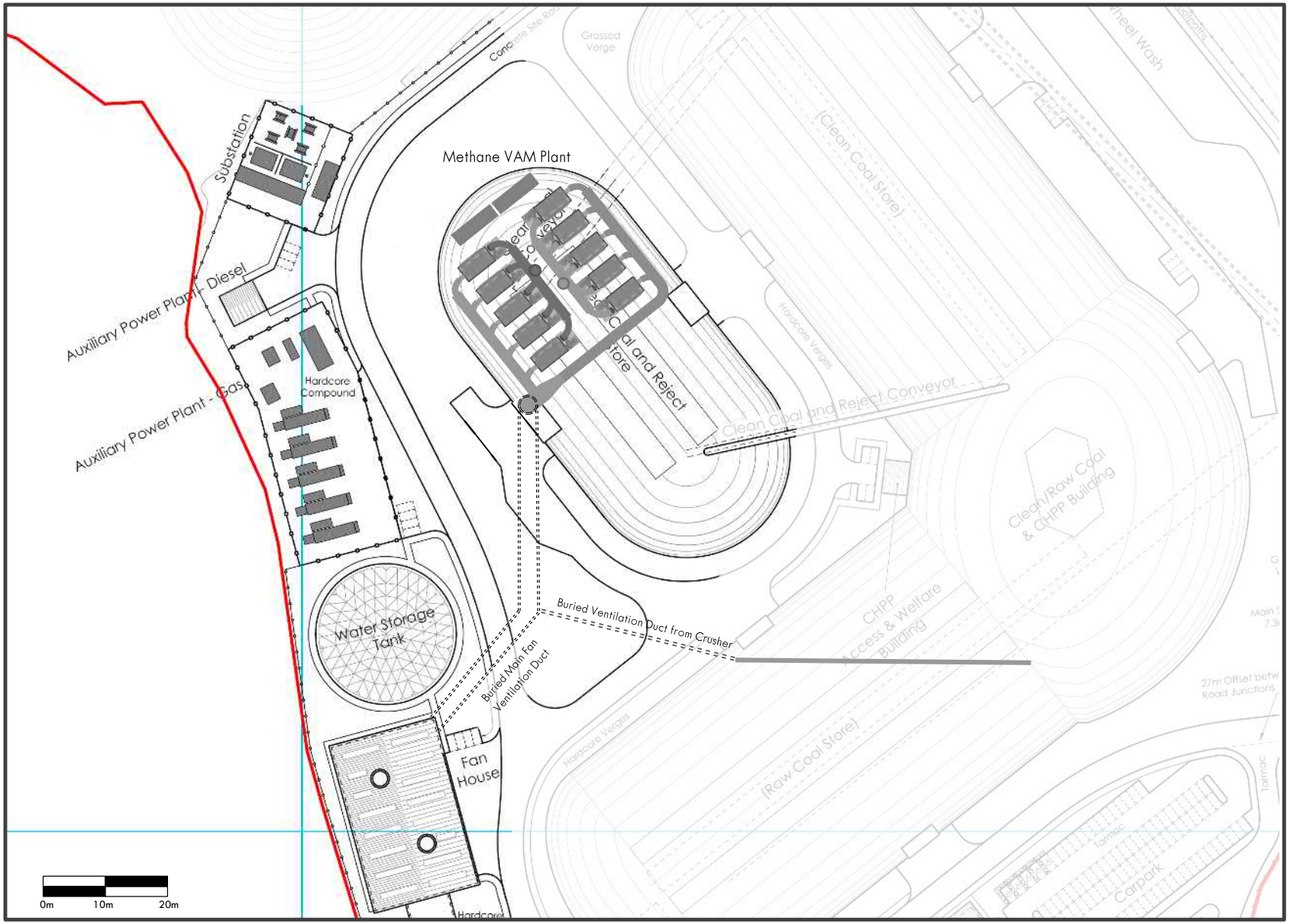
Clean Coal/Reject Structure with VAM plant & reject storage





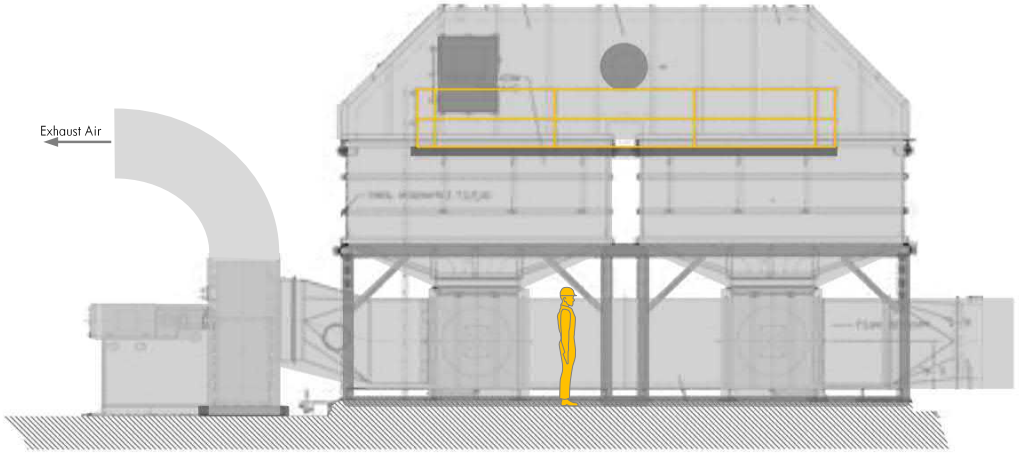
Plan View

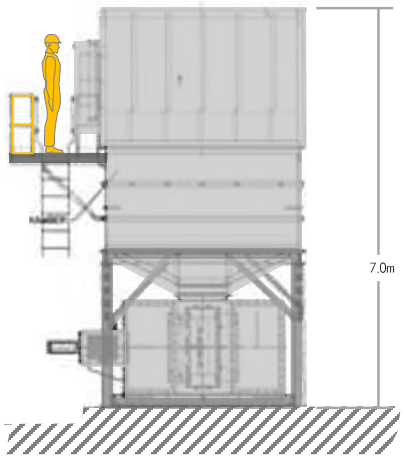
Ventilation Air Methane (VAM) Plant Layout

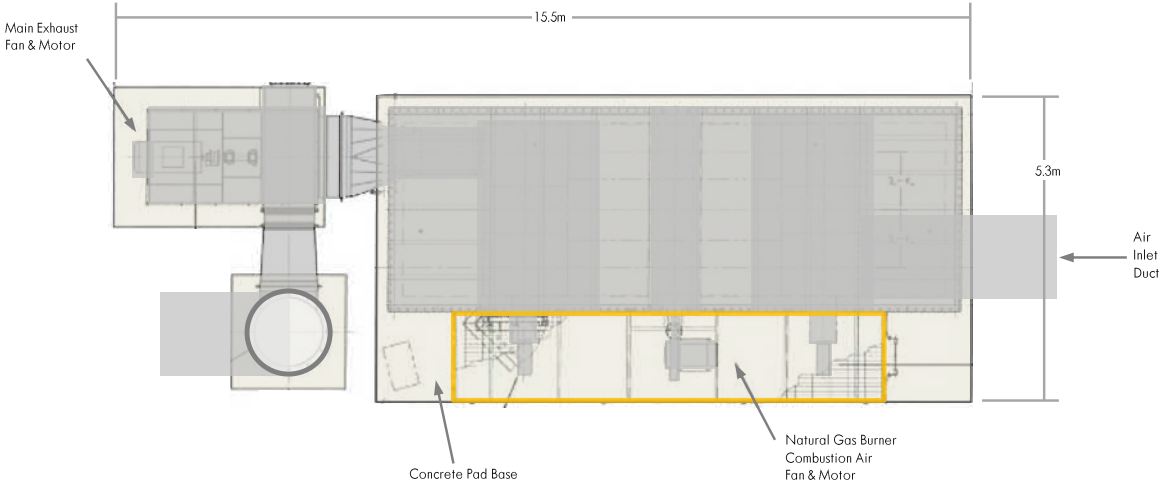


20m³/s Regenerative Thermal Oxidizer (RTO)

Dual-Chamber Unit Dimensions







VAM Example
McElroy Coal Mine in West Virginia

The Verdeo McElroy VAM Abatement Project commenced operation at the Marshall County Mine in West Virginia in May 2012. The project, developed by Sindicatum Sustainable Resources (subsequently owned by NextEra Energy Marketing) generated heat as the methane was destroyed. The project closed in 2018 when the mine was mothballed.

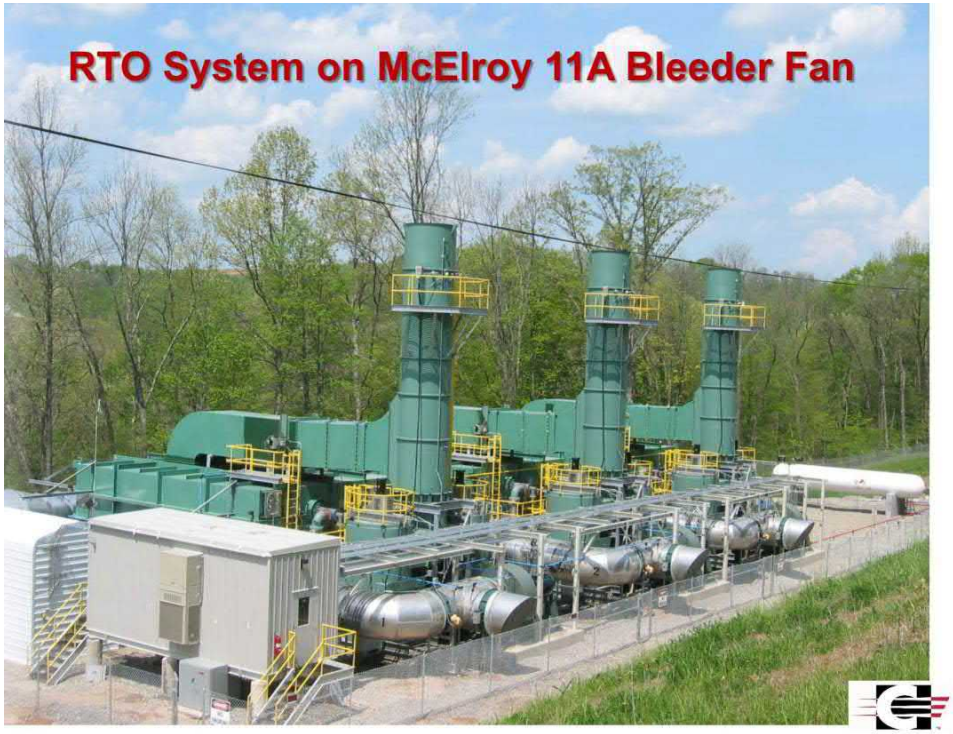
RTO (Regenerative Thermal Oxidizers)

The project consisted of 3 RTO's manufactured by Dürr Systems. Each RTO had a capacity of 53,330 standard cubic feet per minute (scfm) for a total plant throughput capacity of 160,000 cfm (75 normal cubic meter per second [Nm^3/s]), which is 80 percent of the shaft flow.

As of December 31, 2017, the project had registered 1,045,923 tCO2e in emission reductions.
In the USA carbon credits were generated – these were the driver for the project, and not a need for methane abatement.

Consol's overall investment was ~$5m.

Very limited records. The ventilation shaft evasèe (green structure to the far left) directed mine airflow into the grey ducting feeding the RTO's.



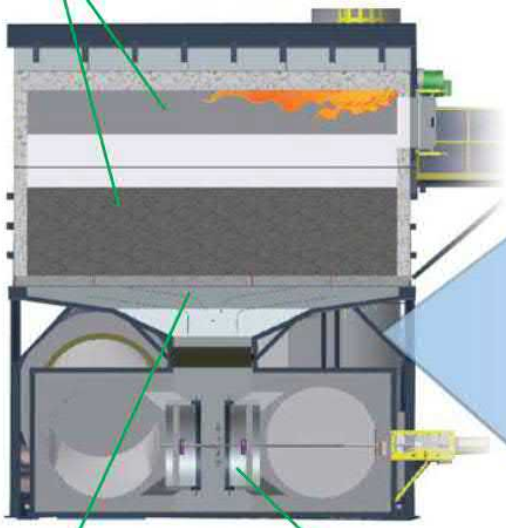
RTO Example:
A single ~20m^3/s unit

RTO Examples: ~25m^3/s unit sizes

Regenerative Thermal Oxidizers

Innovative Design Features

Multiple heat recovery media beds made of high quality ceramic material recover thermal energy from the combustion process for reuse, reducing energy costs.



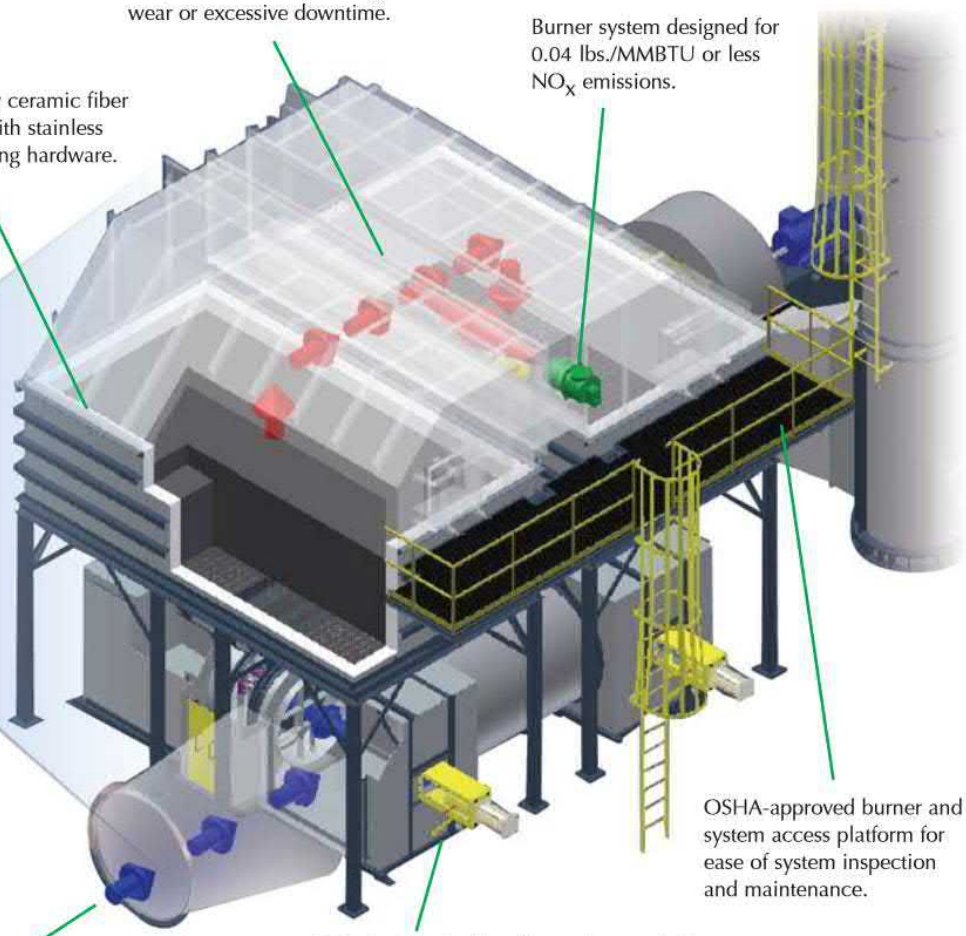
Optimally designed cold face plenum effectively distributes air across heat recovery media, reducing the non-destroyed process air ("puff") that exits during valve switching.

Fast acting valve switching minimizes leakage with only one valve per chamber making it simple to operate and easy to maintain.

Combustion chamber is designed for one-second retention at temperatures up to 2,000°F without showing mechanical wear or excessive downtime.

High density ceramic fiber insulation with stainless steel mounting hardware.

Burner system designed for 0.04 lbs./MMBTU or less NO_X emissions.



OSHA-approved burner and system access platform for ease of system inspection and maintenance.

Multiple process connection points allow for flexible installation where space is limited.

RTO designed to handle moderate to high gas flow rates up to 200,000 scfm, VOC loading up to 100% LEL and particulate concentrations of 0.02 gr/dscf.

TOWN AND COUNTRY PLANNING ACT 1990

TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015/595

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000/1624

PLANNING INQUIRY UNDER SECTION 77 OF THE TOWN AND COUNTRY PLANNING ACT 1990 IN RELATION TO THE PLANNING APPLICATION REFERENCE 4/17/9007 FOR APPLICATION FOR DEVELOPMENT OF A NEW UNDERGROUND METALLURGICAL COAL MINE AND ASSOCIATED DEVELOPMENT TO BE LOCATED AT
FORMER MARCHON SITE, POW BECK VALLEY AND AREA FROM MARCHON SITE TO ST BEES COAST, WHITEHAVEN, CUMBRIA

PINS REFERENCE: APP/H0900/V/21/3271069

Proof of Evidence on matters relating to the international steel and coal markets

Jim Truman
On behalf of West Cumbria Mining Ltd

Table of Contents

Appendix (Separately Bound)

- *WCM/JT/2* - "Steel and Metallurgical Coal Expert Report Prepared for West Cumbria Mining", Wood Mackenzie (9 August 2021)

1. Qualifications and Experience

1.1. I have over 40 years of experience in the coal and oil & gas industries. I have been with Wood Mackenzie for over 30 years, and have worked as the lead analyst and primary author of the US Appalachian Basin Coal Supply Service and other reports related to US metallurgical coal. In 2010, I became Research Director – Global Metallurgical Coal Markets.

1.2. I have acted as a coal SME on numerous consulting engagements. Projects I have been involved in have included IPOs for coal companies, M&A target analyses, lenders' market reports, investment appraisal studies and competitive benchmarking analyses.

1.3. Early in my career, I worked as an exploration geologist for a number of coal companies including CONSOL Energy, Utah International (which later became BHP), Rocky Mountain Energy, as well as a number of consulting companies.

1.4. I received a BSc in Geology from West Virginia University in 1974 and an MSc in Coal Geology from the University of South Carolina in 1981.

1.5. I understand my duty to the Inquiry to help the Inspector on matters within my expertise and that his duty overrides any obligation to the person from whom I have received instructions or by whom I am paid. I confirm that my fees are not conditional upon the outcome of the Inquiry. I have complied, and will continue to comply, with that duty. I confirm that this evidence identifies all facts which I regard as being relevant to the opinion that I have expressed and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion. I believe that the facts stated within this proof are true and that the opinions expressed are correct.

Statement of Truth

1.6. The evidence which I have prepared and provide for this planning inquiry (PINS Reference APP/H0900/V/21/3271069) in this Proof of Evidence is to the best of my knowledge and belief true and I confirm that the opinions expressed are my true and professional opinions.

2. Scope and Structure of Evidence

2.1. My evidence will cover:

2.1.1. The outlook for BF-BOF steelmaking in Europe in the next 30 years
2.1.2. Analysis of West Cumbria Mining's coal quality and marketability
2.1.3. Analysis of the cost-competitiveness of Woodhouse in the global metallurgical coal market
2.1.4. Assessment of whether development of Woodhouse will slow down the transition to EAF and other low-carbon steel technologies in Europe
2.1.5. Analysis of the GHG emissions at Woodhouse relative to existing suppliers to the European market and the mine development's expected impact on global GHG emissions

2.2. There is appended to this Proof of Evidence marked "WCM/JT/2" a document by Wood Mackenzie entitled "Steel and Metallurgical Coal Expert Report Prepared for West Cumbria Mining" dated 9 August 2021. I together with colleagues at Wood Mackenzie co-authored this report which sets out the metallurgical coal demand outlook, the competitive position of the Woodhouse mine and the comparative GHG emissions of the mine against competing international metallurgical coal producers. The report was carefully compiled on the basis of robust data sources and methodologies and forms the basis of many of the findings in my proof.

2.3. My evidence is confined to matters which I think are relevant to the Inquiry and which are within my area of expertise.

3. Summary

3.1. Wood Mackenzie expects European steel production will grow gradually in the future and that BF-BOF steelmaking will still have a significant presence in the region in the next 30 years. Therefore, Europe will remain a large metallurgical coal market.

3.2. The West Cumbria Mining coal is comparable to US High-Vol A quality and is expected to be highly marketable in the European market.

3.3. Woodhouse is expected to be located at the low end of the seaborne metallurgical coal cost curve. As a result, West Cumbria Mining is expected to take market share from high-cost US HV HCC producers that currently supply the region.

3.4. Development of the Woodhouse mine will have a negligible impact on European BOF producers' operating costs and, therefore, would not slow down the transition towards EAF or other low-carbon steel technologies in Europe.

3.5. West Cumbria Mining's GHG emissions are expected to be lower than the emissions associated with importing metallurgical coal to the UK. Furthermore, the development of the Woodhouse mine will displace US mines with higher emissions and, therefore, is expected to lead to a reduction in global GHG emissions.

4. The outlook for BF-BOF steelmaking in Europe in the next 30 years

4.1. BF-BOF steelmaking will still have a significant presence in Europe in the next 30 years and, therefore, the region will remain a large metallurgical coal market

4.2. Global finished steel demand is forecast to continue to rise to 2049, albeit at a slower rate than historical levels, as Chinese consumption peaks. China accounts for over half of global steel consumption and its economy is shifting from being driven by investment and industrial production to being led by consumption and services. However, in India, urbanisation and electrification

for a large and growing population will result in steel demand increasing by more than fourfold by 2049. Europe is a mature steel consuming region and demand is expected to grow at a more modest pace in the next 20 to 30 years. Finished steel consumption in Europe is forecast to increase at a Compound Average Growth Rate (CAGR) of 0.5% in the 2021-2049 period.

4.3. Global steel production will grow steadily in the long term, in line with finished steel demand. Chinese crude steel production is forecast to start a gradual decline from 2022, highly leveraged by retreating property sector demand. The contraction in China will be offset by growth elsewhere, including in India and Southeast Asia. Steel production in Europe is forecast to grow gradually in the future. European crude steel production is forecast to increase at a CAGR of 0.5% in the 2021-2049 period.

4.4. At a global level, BF-BOF-based steel production will remain the dominant production process, but its share is forecast to fall from 73% in 2020 to 62% in 2049. In China, despite higher preference for EAF production in capacity additions, lower cost-competitiveness of the BF-BOF route will maintain dominance in the country. In India, the BF-BOF route will remain dominant in the long term, because the country's plentiful iron ore reserves, the cost-competitiveness of the BF-BOF route, and domestic scrap availability issues will remain key in deterring the growth of EAF technology. In the rest of the world, carbon emission reduction targets, set publicly by a growing number of countries, will mean that the steel industry will be required to decarbonise. Higher scrap use, operational efficiencies and switching to EAFs will be a focus of company strategies.

4.5. In Europe, EAF production accounts for a high proportion of the region's steel production at 47% in 2020, which is significantly higher than the global average of 27%. EAF production in the region is forecast to rise over time, as steelmakers replace BF-BOF-based capacity with EAFs to reduce emissions. While there is a drive to replaces blast furnaces in Europe with EAFs, there are a number of constraints to increasing EAF production, including scrap availability, steel product quality requirements, high capital costs and the higher operating costs of EAF steelmaking relative to BOF production in most countries. By 2049, EAF steel production is forecast to account for 60% of European crude steel production. Despite the increased penetration of EAF production in Europe, BF-BOF steel production is forecast to decline only marginally in the long term, from 99 Mt in 2021 to 88 Mt in 2049.

4.6. As steelmakers attempt to decarbonise, hydrogen-based steel offers the most attractive long-term solution that might eventually lead to widespread replacement of coal and coke in steelmaking. Currently, the only large-scale, commercial, non-blast furnace, iron-making route is DRI, which is produced by reducing iron ore in a shaft furnace using natural gas or coal. Hydrogen-based DRI is the most likely source of future 'green' virgin iron. Hydrogen is already used to reduce iron ore in the DRI process: methane is typically split into its carbon and hydrogen constituents, which then directly reduce the iron ore. Green hydrogen refers to the process of using renewable energy in electrolysis to split the hydrogen and oxygen atoms from water. Using hydrogen DRI in

combination with green energy to power the electric arc furnaces would result in emission-free steel production. At present, there are only a handful of hydrogen DRI projects in Europe, all of which are small-scale, and most of these will not even be operational within the next ten years. There are numerous hurdles to overcome to make widespread green hydrogen use a reality, including significant investment in electrolysers, decarbonised electricity grids and green hydrogen infrastructure. Given the scalability and cost challenges, long project lead times and the lack of projects in development, our assessment that the impact of "green steel" is likely to be limited and cautious approach should be taken is both robust and realistic. Therefore, in our base case forecast, we consider there to only be a modest role for hydrogen in steelmaking in the 2021-2049 timeframe.

4.7. Carbon capture and storage (CCS) will play a key role in countries' decarbonisation efforts. The concept of CCS has been understood for a long time, but hitherto it has not been significantly developed primarily because it is very expensive. As well as costs, there are some technical restraints regarding CCS in steelmaking, while a further challenge is having a feasible carbon storage location. Major steelmakers including Tata Steel and ArcelorMittal have announced plans to invest in CCS, although its use in steelmaking is negligible at present. Nonetheless, CCS is a proven technology that has been in existence for decades. Costs are expected to decline going forward, which will support a large increase in its use in steelmaking in the future. Steelmakers will continue to invest in CCS, which will support the continuation of BF-BOF steel production in Europe. Wood Mackenzie's base case forecast assumes that CCS is applied to between 30-40% of UK steel production by 2035, which is lower than the level of 50% assumed in the UK's Sixth Carbon Budget Report.

4.8. Decarbonisation of the steel industry is complex and European steelmakers are exploring several options. Ultimately, we expect the majors to adopt a hybrid-style set-up, with DRI, EAF, BF and BOF facilities on the same site, and the ability to switch the steelmaking route between the lowest cost option, taking into account the cost of carbon, scrap, iron ore, coke and others at any given time. CCS will play a role in the coming years. BF-BOF production in Europe will decline in the next 20-30 years, albeit marginally, and the region will remain a significant metallurgical coal market. European metallurgical coal demand is forecast to remain between 50-55 Mtpa in the 2021-2049 period, which provides a large target market for West Cumbia Mining's product.

5. Analysis of West Cumbria Mining's coal quality and marketability

5.1. The West Cumbria Mining coal is comparable to US High-Vol A quality and is expected to be highly marketable in the European market

5.2. Coking coals sold globally into the seaborne market have a broad range of qualities. It is rare for steelmakers and coke producers to charge a single coking coal into a coke oven. Most companies blend high-volatile coals with

low-volatile coals and target a blend volatile matter (VM) in the mid-20s%. A single coal will not possess all of the properties required to produce coke suitable to meet blast furnace specifications for properties.

5.3. The West Cumbria Mining product coal quality presents a high-volatile coking coal, which is a well-established product in seaborne trade. High-volatile hard coking coals are mainly produced and exported from the Appalachian basin in the eastern US. The products are typified by coal rank around 1.0, with VM between 29 and 38%. The further categorisation of US high-volatile coal into premium HVA and lower-quality HVB is based on maximum reflectance values. Key parameters that denote attractiveness for pricing are extremely high fluidity and usually low ash content. The high fluidity allows the coal to liquefy and act as a binder in a coke blend. The high VM content lowers the yield of solid coke, but provides output gas and liquids, which are captured or processed onsite for sale or recycled at the mill.

5.4. West Cumbria Mining's coking coal exhibits almost all of the key parameters used to designate HVA quality. We view the expected sulphur content of West Cumbria Mining's product at <1.5% to be marketable to European steel mills. We believe the typical sulphur spec for steel mills in the region are to be <1.0%. Therefore, the company would be required to pay a penalty for exceeding that mark. Using this coal in the blend would require adjusting the overall sulphur content by including other coals with lower sulphur levels. Most companies use a significant amount of Australian coal in their blends, which have sulphur contents ranging between 0.5% and 0.6%. So, cokemakers should be able to maintain an acceptable overall sulphur level in their blend to produce good-quality coke. The penalty on sulphur would be balanced somewhat by a premium for having extremely low ash and phosphorus content.

5.5. Accordingly, the West Cumbria Mining coal is expected to be a highly marketable product within the European steel market. The main market for West Cumbria Mining coal consists of the integrated steel mills in Northern, Western, Southern Europe and Turkey. These countries are selected on the basis that they include the major steel mills, are reliant on imports, and the US is a known supplier of HV hard coking coal (HCC).

6. Analysis of the cost-competitiveness of Woodhouse in the global metallurgical coal market

6.1. The Woodhouse mine is expected to be located at the low end of the seaborne metallurgical coal cost curve

6.2. Operating cash costs are used to assess the cost-competitiveness of mines located in different regions around the world. Operating cash costs include mining, coal preparation, product coal transport, port and demurrage charges, overheads and any other charges. The Woodhouse mine's total cash costs are estimated by West Cumbria Mining at US$69.6/t in 2029. When benchmarked against other metallurgical coal mines on a cost curve, Woodhouse is expected

to occupy a position in the first quartile of global seaborne metallurgical production, among low-cost producers in Russia and Australia.

6.3. Given the comparable coal qualities, US producers of HV HCC will be the main competitors for West Cumbria Mining. The Woodhouse mine compares favourably amongst competing suppliers of HV HCC, sitting at the low end of Wood Mackenzie's estimates for all US production, which ranges between ~US$75/t and up to US$165/t. US mining costs are generally high as a result of mining thin seams, with productivity impacted by a high degree of safety and environmental auditing. US transport costs to Europe are also higher than the Woodhouse mine.

6.4. In summary, the Woodhouse mine is expected to be highly cost-competitive in the European market. As a result, West Cumbria Mining is expected to take market share from high-cost US HV HCC producers that currently supply the region.

7. Assessment of whether development of Woodhouse will slow down the transition to EAF and other low-carbon steel technologies in Europe

7.1. Development of the Woodhouse mine will not slow down the transition towards EAF or other low-carbon steel technologies in Europe

7.2. Low-volatile coal is considered the most important component of coking coal blends, due to its ability to provide strength to the coke. Furthermore, low-volatile coal has a higher carbon content than high-volatile coal and, therefore, produces more coke per tonne of feedstock. As a result, the price for low-volatile coal sets the international price benchmark for traded coking coal. The primary benchmark is the FOB Australia premium, low-volatile hard coking (PLV HCC) spot price. All other coking coal types are priced at differentials relative to the benchmark PLV HCC price.

7.3. Between March 2018 and September 2020, HVA price was discounted to the Australian PLV HCC price by 3% (US$7/t) on average. Since October 2020, China has banned imports of Australian coal, and, given the resulting change in trade flows, the relativity has reversed with US HVA selling at a premium to Australian PLV HCC price. While the timing is uncertain, we expect China will recommence imports of high-quality coking coals from Australia over time, which will result in a return of the Australian PLV HCC premium over the US HVA price.

7.4. The commissioning of the Woodhouse mine, which will produce HVA-quality coal, is expected to have minimal impact on the PLV HCC spot price. However, development of the mine would increase supply of low-cost HVA coal into the European market, which could lead to a larger HVA discount to the PLV HCC price. Historically, the maximum discount of the US HVA price to the PLV HCC price has been valued at ~15%, outside of times of serious supply disruption (e.g. Australian cyclones). To assess the potential change in European BF-BOF steelmakers' costs as a result of the development of Woodhouse, we

have assumed that the US HVA price could be discounted to the PLV HCC price by 15%, while the US HVB price could be discounted by 20%. While this is not Wood Mackenzie's base case forecast, the assumption is used to quantify the maximum impact on steelmakers' costs. The assumed discounts can be interpreted as a low-case scenario for US HVA and HVB prices relative to Wood Mackenzie's base case PLV HCC price forecast.

7.5. In terms of the pricing of the West Cumbria Mining's coal, Wood Mackenzie estimates that the product will achieve a net penalty of US$3.7/t relative to the US HVA price – the West Cumbria coal is expected to achieve a premium of US$4.0/t over US HVA for the low ash content, but would incur a penalty on the high sulphur content of US$7.7/t.

7.6. Wood Mackenzie has assessed the change in procurement costs for a steelmaker using a range of coking coal blends with different proportions of West Cumbria Mining coal.

7.6.1. The first coking coal blend comprises US HVA, US HVB, US low-vol, Australian tier-2 HCC, Australian low-vol coals and semi-soft/semi-hard coking coals. The Woodhouse mine is not included in the coking coal blend. The average price of the coking coals purchased is US$140.5/t in 2029.

7.6.2. The second blend includes 5% West Cumbria Mining coal and a lower proportion of US HVA coal. The proportions of all other coal types are the same as in the previous blend. In this scenario, coking coal production at Woodhouse leads to a reduction of the US HVA and HVB prices. As a result, the average price of the coking coals purchased is US$137.4/t, representing a fall of US$3.1/t, compared to the coking coal blend excluding West Cumbria Mining coal.

7.6.3. The third coking coal blend uses 20% West Cumbria Mining coal and no US HVA or HVB coal. The same price assumptions for West Cumbria Mining coal, US HVA and US HVB are used as in the 5% West Cumbria Mining blend. For this blend, the average price of the coking coals purchased is US$136.8/t, representing a fall of US$3.7/t from the coking coal blend excluding West Cumbria Mining coal.

7.7. The analysis indicates that following the development of Woodhouse European steelmakers would achieve a maximum cost saving of between ~US$3-4/t on the average procurement cost of coking coal depending on the proportion of West Cumbria Mining coal purchased. Steelmakers use approximately 0.6 tonnes of coking coal per tonne of steel produced and, therefore, the maximum cost saving per tonne of steel would be between US$1.6-2.4/t. As a result, the annual cost reduction tor a steel mill with 1.0 Mtpa capacity would be small, at US$1.6 M p.a. to US$2.4 M p.a. That level of cost saving alone is not significant enough to impact a steelmaker's decision to switch from BF-BOF steel production to another process. As a comparison, the capital expenditure to replace a BF-BOF steel mill with a hydrogen-based DRI with EAF capacity is ~US$1 Bn for 1 Mtpa capacity.

7.8. In summary, the cost reduction following the development of the Woodhouse mine would be negligible and likely to have no impact on the cost-competitiveness of BF-BOF steel production in Europe. Therefore, development of the mine will not slow down the transition towards EAF production or other low-carbon steel production processes in Europe in the future.

8. Analysis of the GHG emissions at Woodhouse relative to existing suppliers to the European market and the mine development's expected impact on global GHG emissions

8.1 West Cumbria Mining's GHG emissions are expected to be lower than the emissions associated with importing metallurgical coal to the UK. Furthermore, the development of the Woodhouse mine will displace US mines with higher emissions and, therefore, is expected to lead to a reduction in global GHG emissions

8.2 West Cumbria Mining has provided two main scenarios for GHG emissions at Woodhouse – 'Likely Mitigated' and 'Worst' cases. The *Likely Mitigated* case has an emissions intensity of 16.27 kgCO_2e/t, approximately 80% lower than the *Worst* case. In the *Likely Mitigated* case, emissions from mining operations and electricity consumption are significantly lower.

8.3 Wood Mackenzie has assessed the position of the Woodhouse mine on the global seaborne metallurgical coal Scope 1+2 emissions curve in 2029 on a delivered Europe basis. For the majority of seaborne metallurgical coal mines, we have calculated the transport emissions for delivery to Europe (Rotterdam), which includes trains, truck, barge and ocean freight. The estimates have been used to compare the difference in GHG emissions of producing metallurgical coal in the UK to supply the continental market with importing metallurgical coal from overseas. Under the two scenarios for Woodhouse, emissions associated with coal transportation by rail and ocean freight to Rotterdam have been estimated.

8.4 Under both scenarios, the Woodhouse mine is located in the first quartile of the emissions curve, primarily due to low mine-site emissions, but also due to relatively low coal transportation emissions. The UK currently imports metallurgical coal, primarily from the US, Russia and Australia, and, therefore, the emissions associated with producing metallurgical coal in the UK to supply the domestic market are expected to be much lower than importing coal from overseas.

8.5 Wood Mackenzie's competitive analysis indicates that West Cumbria Mining is expected to take market share from high-cost US HVA HCC producers, which are currently suppling the European market. In both scenarios, West Cumbria Mining's GHG emissions intensities are significantly lower than the average for US HVA production. As a result, Wood Mackenzie's analysis indicates that the development of the Woodhouse mine would lead to a global reduction in GHG

emissions of between 587-770 kt CO_2e per annum due to the displacement of higher GHG emitting US coking coal production.

Signed: Jim Truman Dated: 10/08/21

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/JT/2

This is the Appendix marked WCM/JT/2 referred to in the Proof of Evidence of Jim Truman dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Wood Mackenzie
A Verisk Business

10 August 2021

Steel and Metallurgical Coal Expert Report

Prepared for West Cumbria Mining

List of Figures

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1. Metallurgical Coal Demand Outlook

1.1. The objective of this chapter of the report is to provide detailed analysis of the methodologies used and assumptions applied to derive Wood Mackenzie's long-term global and European coking coal demand forecasts. The section provides an outlook for BF-BOF-based and EAF steel production globally and in Europe to 2049 and assesses the impact of EAF steel production and new low-carbon steelmaking technologies on coking coal demand. The section also provides a downside scenario for coking demand in Europe, highlighting the implications for West Cumbria Mining.

Methodology

Wood Mackenzie Metals & Mining Research Overview

1.2. Wood Mackenzie produces commodity market reports, which provide in-depth analysis and forecasts of global and regional metals market fundamentals. The primary deliverables are:

- Short-term monthly reports
- Long-term quarterly or bi-annual outlooks, including up to 30 years of supply, demand and price forecasts
- Monthly updates, covering a two-year period
- Web-based data tools with detailed information

1.3. Wood Mackenzie employs several different data sources and methodologies to produce its markets forecasts. These outlooks are created using proprietary supply data, which are built up by asset and include future projects. We also use our own demand research, coupled with detailed trade data, to complete our country balances and stock build-up or draw-down. From this point, we assess the global market balance and derive price forecasts based on the expected market surplus or deficit.

1.4. Wood Mackenzie's research analysts conduct extensive and detailed research into their respective focus areas.

Internal data sources: We use several internal data sources to compile our views on commodity markets, including.

- **Macroeconomics** – Wood Mackenzie has a global team of economists which provides our base view on GDP, IP, inflation and foreign exchange rates. They also produce datasets on other macro drivers, such as automotive and housing construction. These views are shared with all teams in Wood Mackenzie to ensure a consistent view across commodities.
- **Supply** – We provide a robust view of existing and future commodity production, including mines, smelters and refineries.
- **Energy** - Where relevant, our metals markets team exchange forecasts and data with Wood Mackenzie's various energy teams to form a consistent view on overlapping issues. Examples of this could be energy intensive smelting projects, power projects to fuel these smelters or other demand issues affecting both energy and metal markets.
- **Costs** – Our research uses our propriety databases and costing models which have been developed over many years of industry research and analysis.

External data sources: The primary external data sources used by Wood Mackenzie to compile metals and mining asset reports are shown below.

- **General and industry-specific media and databases –** Our analysts regularly review general media and a wide variety of industry-specific publications and databases including the World Steel Association (WSA), Platts, the Argus Media group, GTT and Clarkson Research Services.

- **Interviews with metals & mining companies and other industry contacts –** We interact with industry participants in all regions and countries. Meetings are also held with contacts in the relevant government and regulatory organisations.
- **Company annual reports and other company documents –** We regularly review key company annual reports, investor presentations and SEC or other stock exchange (e.g. ASX, SEDAR) filings

Steel Demand Modelling

1.5. Our steel analysis uses a combination of bottom-up and top-down approaches to form our view on demand. The forecasts are supported by Wood Mackenzie's key macroeconomic assumptions, including GDP and IP, as well as discussion of our assumptions on key demand drivers such as automotive production, housing construction and other relevant macro factors.

1.6. We use the bottom-up approach for the key areas of global steel demand, namely the US, Europe, Japan, Brazil, Russia, India and China. For these regions, we developed sector-by-sector steel demand models. We divide steel demand into three sectors – construction, automotive and other. For the US, India and China we further model machinery, household appliances and shipbuilding. Growth for each sector is forecast using sector drivers. For example, for the automotive sector, we estimate average vehicle weight and steel intensity. We make assumptions on expected changes to weight and material preferences. We combine these estimates with our internal automotive production forecasts to derive end-use steel consumption.

1.7. Alternatively, for locations where statistics are scarce, we may use an econometric model on certain steel consuming sectors or sub-sectors and use a growth driver of best fit to determine the forecast. For example, we have found a strong relationship between household appliances growth and residential, commercial and agriculture energy demand (available from Wood Mackenzie's energy markets team). For smaller steel consuming countries, we use a top-down approach, where we utilise steel intensity to GDP and per capita steel consumption models.

Steel Supply Modelling

1.8. Our steel supply analysis is based on our historical production and capacity data. We also develop steel capacity forecasts by plant. We derive crude steel production from our steel demand forecasts plus or minus steel trade (adjusted for yield loss). We estimate steel production by blast furnace, electric arc furnace or open-hearth furnace, based on our detailed steel plant capacity database, capacity utilisation assumptions and historical data. We make assumptions on how preferred production routes will change, taking into account cost competitiveness, scrap availability, environmental legislation and evolution of technologies, among other factors.

1.9. Consumption of steelmaking raw materials (iron ore, coke, metallurgical coal) are derived from our steel production forecasts. For example, using our proprietary assumptions on coke rates, pulverised coal (PCI) rates, and coal share by quality type (hard coking, semi-soft, and PCI coal), we develop a long-term forecast of metallurgical coal demand by quality type.

Steelmaking Overview

1.10. Steel is produced via two main routes: the blast furnace-basic oxygen furnace (BF-BOF) route and electric arc furnace (EAF) route. Variations and combinations of production routes also exist.

Blast Furnace-Basic Oxygen Furnace

1.11. Coking coal is used to make metallurgical coke, which is a key raw material in steelmaking through the BF-BOF route. Coking coal is most often charged into the top of a coke oven and heated at around 1,100°C for 18 hours. This carbonisation process removes impurities, like coal tar and coal gas, to produce coke. The red-hot coke is pushed from the side of each oven and quenched with either water or inert gas, before being transferred by conveyor to the blast furnaces.

1.12. Coke, iron ore and limestone are fed (or charged) into the top of a blast furnace. A hot air blast of temperatures ~1,000°C is injected at the bottom of the furnace through nozzles called tuyeres. As the coke burns, temperatures higher than 2,000°C are reached and this heat creates molten metal (iron). The molten

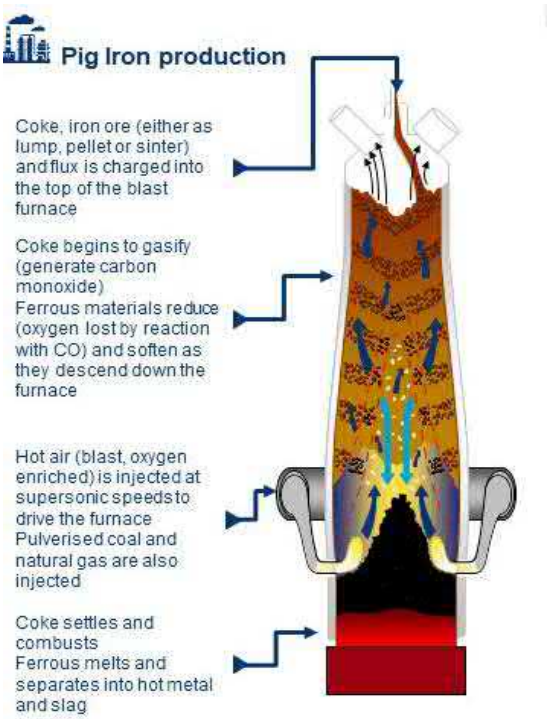
metal collects at the bottom of the furnace and the limestone combines with impurities to form slag. As the slag is less dense than molten metal, it floats on top of the metal and can be removed.

1.13. In the basic oxygen furnace, hot metal is poured into refractory-lined charging ladles, where unwanted elements such as sulphur are removed. Scrap metal is charged into steelmaking vessels and the liquid iron is then added to the vessel. Using a water-cooled lance, high purity oxygen is blown onto the surface of the liquid iron at very high pressure. Lime is added to the process, which forms a slag and removes the unwanted elements from the liquid steel.

1.14. When the oxygen blowing process is complete, the steel is tapped into ladles, where the desired steel chemistry is achieved through careful addition of alloying elements and close control of the deoxidation process to ensure a high level of steel purity.

1.15. BF-BOF-based production accounted for 73% of global steel production in 2020.

Figure 1.1: Blast furnace steel production process



Source: Wood Mackenzie

Electric Arc Furnace (EAF)

1.16. Electric arc furnaces (EAFs) produce molten steel using electrical currents to melt scrap, direct reduced iron (DRI) (or sponge iron), hot briquetted iron (HBI) and cooled hot metal, which is known as pig iron. DRI is produced from the direct reduction of iron ore using reduced gas, usually from natural gas or coal. Fed with iron ore pellets or lump, the DRI furnace is heated to just below iron's melting point to reduce iron ore in a solid state. Feedstock is restricted to high-grade pellets and lump because the DRI furnace does not reach hot enough smelting temperatures to remove additional impurities.

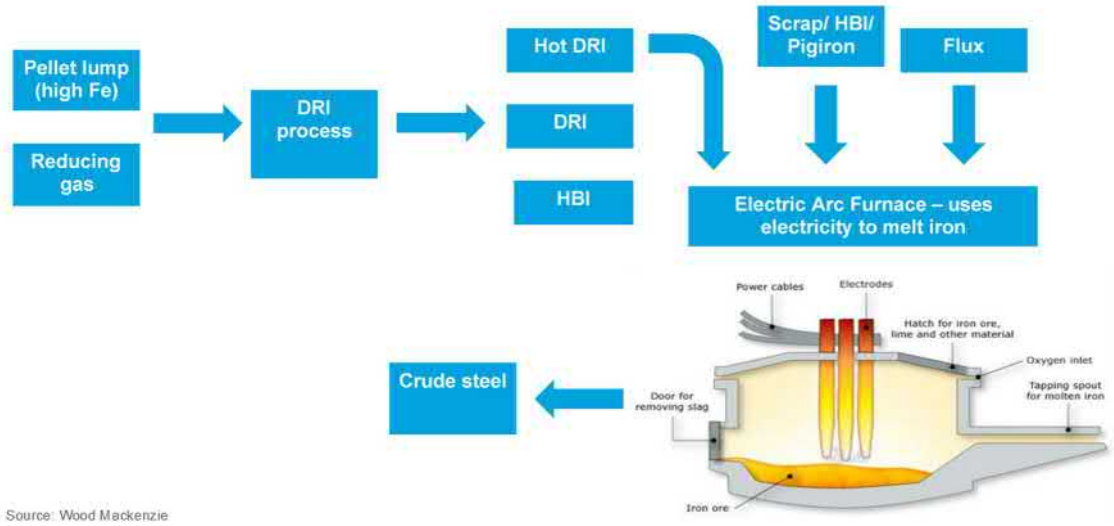
1.17. In the steelmaking process, the EAF consists of a circular bath with a movable roof, through which graphite electrodes can be raised or lowered. At the start of the process, the electrodes are withdrawn and the roof swung clear. The steel metallics are charged into the furnace from a large steel basket. When charging is complete, the roof is swung back into position and the electrodes lowered into the furnace. When the electric current is passed through the charge, an arc is created, and the heat generated melts the metallic feed. Lime and fluorspar are added as fluxes and oxygen is blown into the melt. As a result, impurities in the metal combine to form a liquid slag. Samples of the steel are analysed for quality and then the furnace is tapped rapidly into a ladle. Final adjustments to precise customer specification can be made by adding alloys during tapping or, subsequently, in a secondary steel making unit.

1.18. EAFs use a very small amount of coal in the process – 12 kg/t of steel. European EAFs currently produce

about 63 Mt of crude steel; coal needed for this process would represent about 0.8 Mtpa. Coal used in EAFs does not require coking properties, therefore thermal coal can be used.

1.19. EAFs are generally smaller in scale than blast furnaces, however, their carbon emissions are approximately one-fourth as much. EAF production accounted for 27% of global steel production in 2020.

Figure 1.2: Overview of electric arc furnace (EAF) steel production



Global and European Metallurgical Coal Demand Outlook

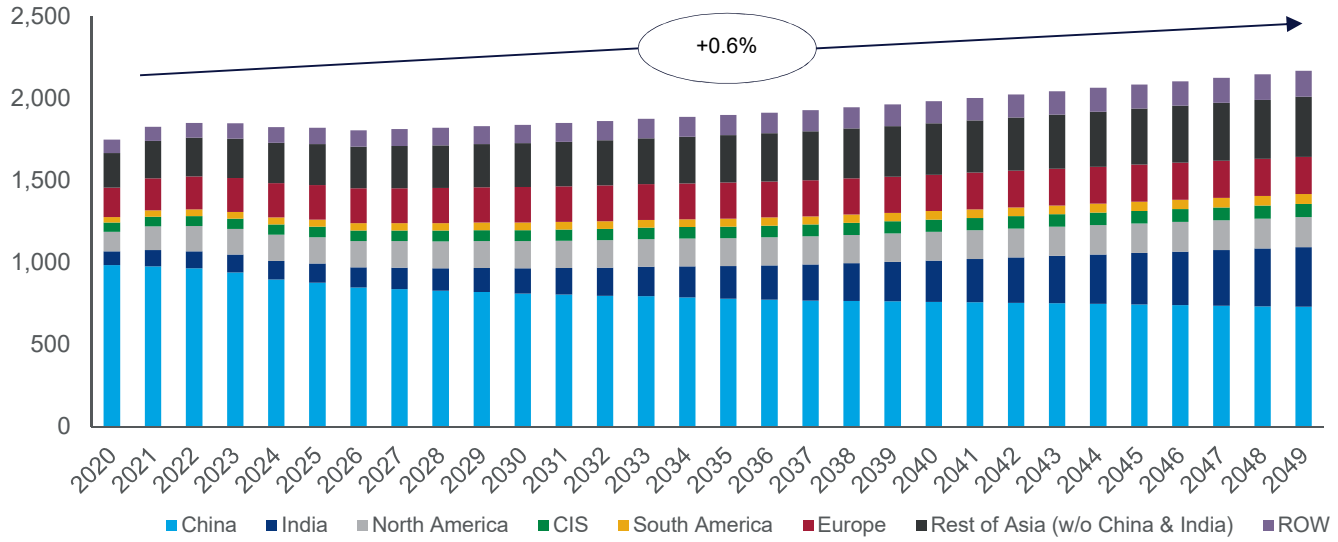
1.20. The following section outlines the key assumptions underpinning Wood Mackenzie's global and European metallurgical coal demand forecasts, including the outlook for steel demand, crude steel production and displacement of BF-BOF-based steel production for EAF steel production. All forecasts are shown to 2049, which will be the final year of production for West Cumbria Mining.

1.21. The chart below (Figure 1.3) shows forecast global steel demand to 2049. Global finished steel demand is forecast to continue to rise over the next 20-30 years, albeit at a slower rate than historical levels, as Chinese consumption peaks. China accounts for over half of global steel consumption and its economy is shifting from being driven by investment and industrial production to being led by consumption and services. A slowdown in urbanisation, an ageing population and declining total population will contribute to a long-term contraction in Chinese steel demand. Consumption in the property sector will decline the most, followed by infrastructure, while auto sector consumption will grow in the 2020-2049 period.

1.22. The vast growth aspirations of the Indian economy are central to the global steel demand outlook in the next 20-30 years. Urbanisation and electrification for a massive and growing population will result in steel demand increasing by more than fourfold, to over 360 Mt by 2049. In the Rest of Asia, steel demand growth is forecast to increase at a Compound Annual Growth Rate (CAGR) of 1.9% to 2049. Southeast Asia, in particular, is focusing on infrastructure development for improving connectivity to propel investments and manufacturing competitiveness. Additionally, rising income levels and a majority working-age middle-class population will support the demand for low-cost housing, automobiles and consumer durables.

1.23. Europe is a mature steel consuming region and demand is expected to grow at a more modest pace in the next 20 to 30 years. Finished steel consumption in Europe is forecast to increase from 195 Mt in 2021 to 227 Mt in 2049, equivalent to a CAGR of 0.5%.

Figure 1.3: Global apparent finished steel demand, 2020-2049 (Mt)



Source: Wood Mackenzie

1.24. Wood Mackenzie derives country crude steel production from our steel demand forecasts by adjusting for country-level net steel trade (adjusted for yield loss). The following chart (Figure 1.4) shows forecast global crude steel production to 2049. Global steel production will grow steadily in the long term, in line with finished steel demand.

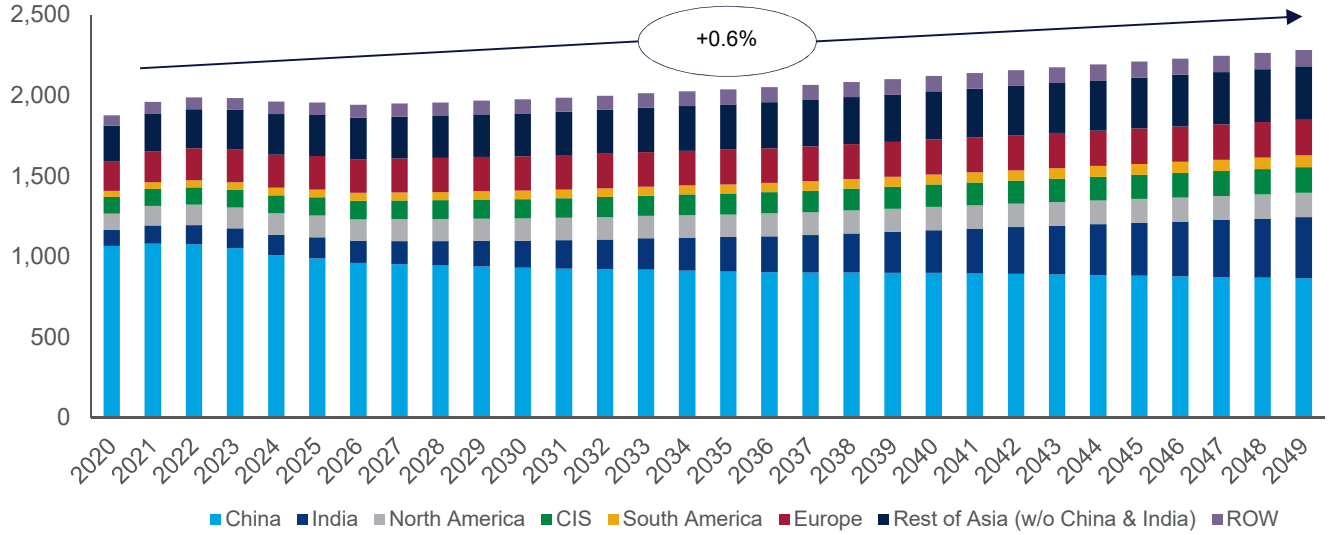
1.25. China's domestic steel demand was robust in the first half of the year, indicating that 2021 will be another growth year for Chinese steel production. Nonetheless, we believe that Chinese crude steel production is peaking. We expect it to start a gradual decline from 2022, highly leveraged by retreating property sector demand.

1.26. Indian crude steel production is expected to grow at a healthy average of 6% p.a. to 2025 and 5% p.a. thereafter, reaching 379 Mt by 2049. In the medium term, we expect significant capacity additions by integrated steelmakers. Additions totaling 18 Mtpa are expected to come onstream by 2025. Downside risks to our forecast manifest from India's ability to reach these significant goals, historically marred by political stagnation, land availability and economic slowdowns.

1.27. Southeast Asia (e.g. Malaysia, Philippines, Thailand, Vietnam) has exhibited continued steel production growth amid increasing demand. However, crude steel production is still sub-optimal, with 58% utilisation and finished steel imports catering to more than half of steel demand. The government has started levying safeguard duties to support domestic production and reduce import dependence. Despite the overcapacity, we expect nearly 40 Mt of capacity additions by 2030.

1.28. Steel production in Europe is forecast to grow gradually in the future, in line with finished steel demand. European crude steel production is forecast to increase at a CAGR of 0.5% in the 2021-2049 period, reaching 220 Mt. Italy is forecast to account for a large proportion of the region's growth, increasing by almost 8 Mt over the period. In the UK, crude steel production is forecast to remain broadly flat at 7.0-7.5 Mtpa.

Figure 1.4: Global crude steel production, 2020-2049 (Mt)



Source: Wood Mackenzie

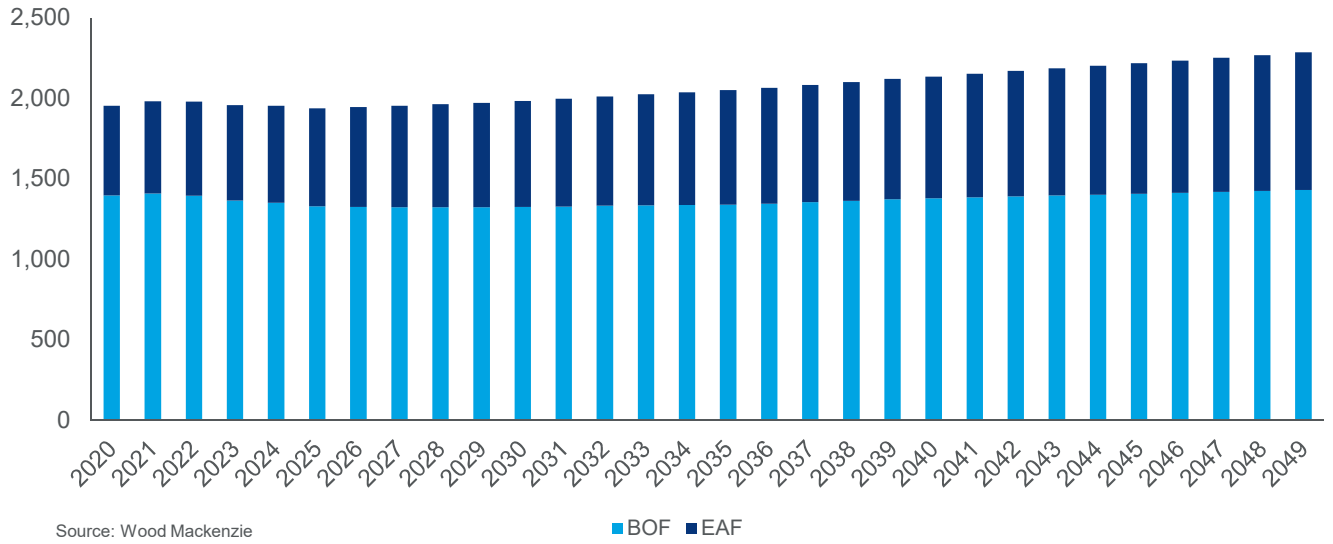
1.29. The following chart (Figure 1.5) shows global crude steel production by process to 2049. At a global level, BF-BOF-based steel production will remain the dominant production process, but its share is forecast to fall from 73% in 2020 to 62% in 2049.

1.30. In China, following the trend of steel demand, we expect BF-BOF production to peak in 2022 and gradually fall thereafter. By 2049, BOF crude steel and hot metal will have fallen to 702 Mt and 684 Mt, respectively, which is around 74% of their 2020 levels. However, despite higher preference for EAF production in capacity additions, scrap availability and lower cost-competitiveness of the BF-BOF route will maintain dominance in China with a share of 81% in 2049, down from the current share of 89%.

1.31. In India, the BF-BOF route will remain dominant in the long term, because the country's plentiful iron ore reserves, the cost-competitiveness of the BF-BOF route, and domestic scrap availability issues will remain key in deterring the growth of EAF technology. With the global shift to cleaner steelmaking technologies, major Indian steelmakers are now slowly considering investing in new EAF-based steel capacity. However, we believe that BF-BOF-based steel production will remain the dominant process in the future, increasing to 72% in 2049 from current levels of 47%.

1.32. In the rest of the world, carbon emission reduction targets, set publicly by a growing number of countries, dictate that hard-to-abate industries cannot hide behind the extra efforts and costs to decarbonise. Higher scrap use, operational efficiencies and switching to EAFs will be a focus of company strategies.

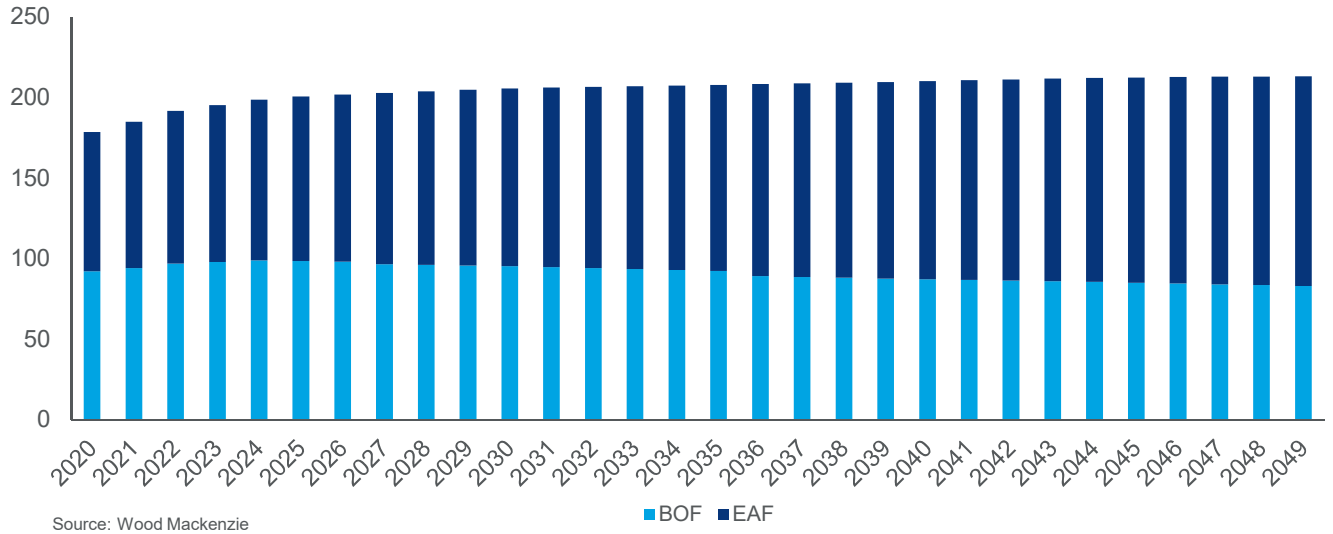
Figure 1.5: Global crude steel production by process, 2020-2049 (Mt)



Source: Wood Mackenzie

1.33. The following chart (Figure 1.6) shows European crude steel production by process to 2049. In Europe, EAF production accounts for a significantly higher proportion of the region's steel production than the global average at 47% in 2020. EAF production in the region is forecast to rise over time, as steelmakers replace BF-BOF-based capacity with EAFs to reduce emissions. By 2049, EAF steel production is forecast to account for 60% of European crude steel production. Despite the increased penetration of EAF production in Europe, BF-BOF steel production is forecast to decline only marginally in the long term, from 99 Mt in 2021 to 88 Mt in 2049. The "Decarbonisation of the European Steel Industry" section below provides more detailed analysis around the long-term outlook for the European steel industry.

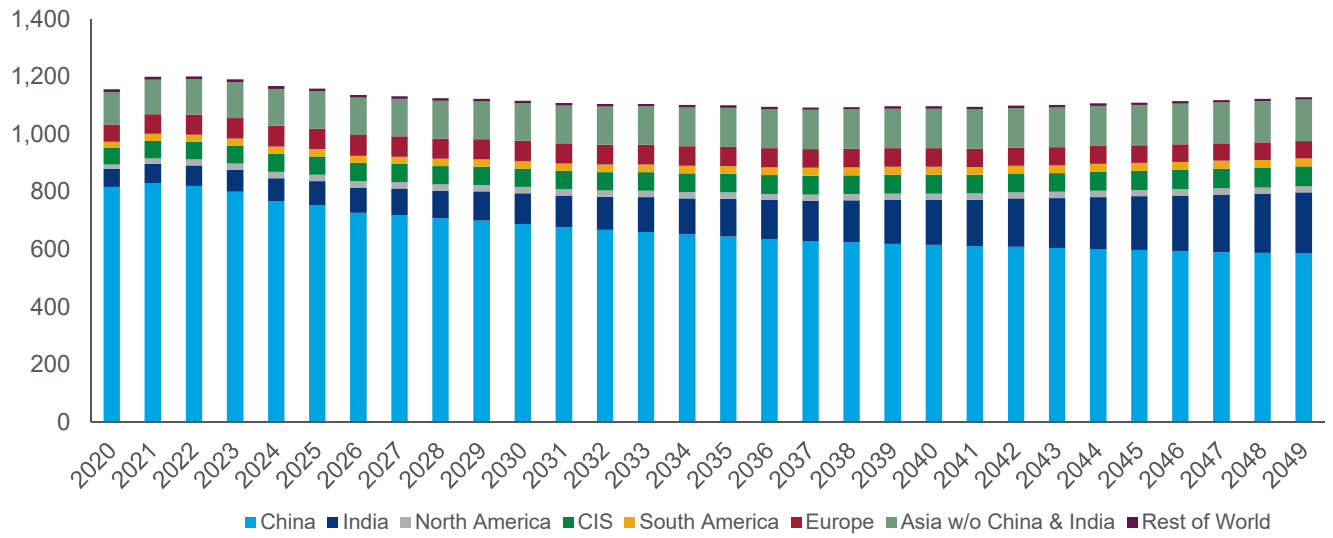
Figure 1.6: European crude steel production by process, 2020-2049 (Mt)



Source: Wood Mackenzie
N.B. Europe includes EU27, UK, Bosnia & Herzegovina, Serrbia and Turkey

1.34. The following chart (Figure 1.7) shows global metallurgical coal demand to 2049, which has been derived from our BF-BOF steel production forecasts. Global metallurgical coal demand is forecast to decline steadily due to the structural fall in Chinese hot metal production, as well as declining coke rates. In search of low-cost emissions reduction options, we expect steel mills will seek blast furnace efficiencies by maximising raw materials quality. The use of high-quality iron ore (high Fe and low gangue contents) can reduce the coke requirements of the blast furnace, allowing lower fuel rates and emissions. Fuel rate reductions, including coke rate improvements, are assumed to occur in all regions over the forecast period, as mills strive to use less coke and injection coals in BF production. Global metallurgical coal demand will peak at 1.201 bn t in 2022 and decline to 1.129 bn t in 2049.

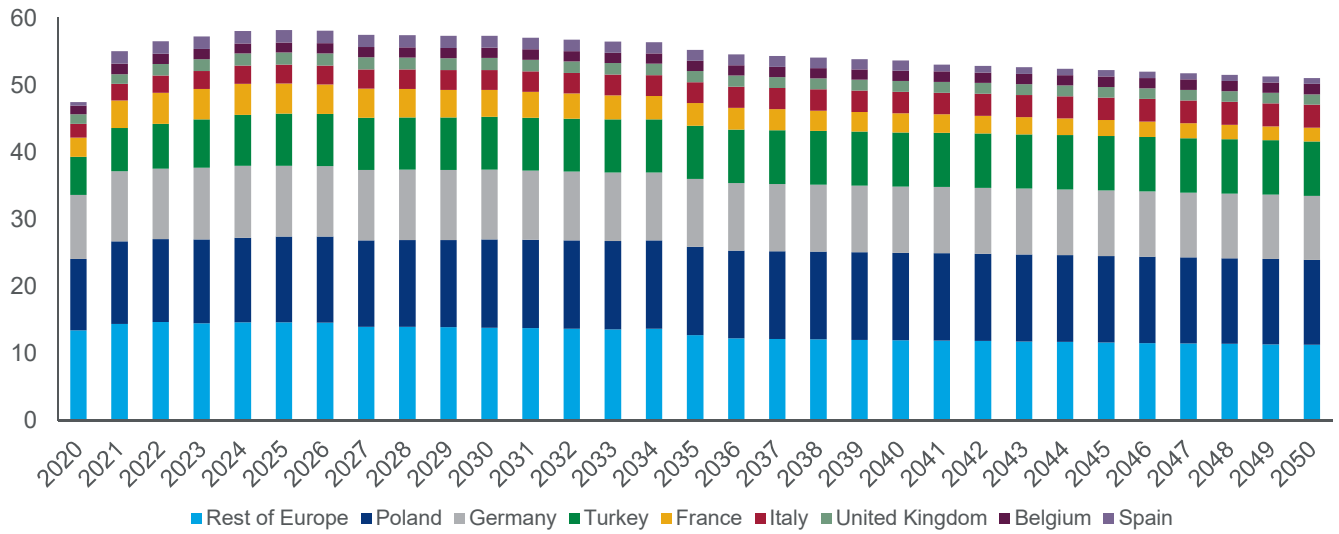
Figure 1.7: Global metallurgical coal demand, 2020-2049 (Mt)



Source: Wood Mackenzie

1.35. The following chart (Figure 1.8) shows forecast European metallurgical coal demand to 2049. While BF-BOF production in Europe is forecast to decline marginally in the next 20-30 years, the region will remain a significant metallurgical coal market. European metallurgical coal demand is forecast to remain between 50-55 Mtpa in the 2021-2049 period. In the UK, metallurgical coal demand is forecast to hold at ~1.5 Mtpa, as BF-BOF-based steel production flat-lines over the period.

Figure 1.8: European metallurgical coal demand, 2020-2049 (Mt)



Source: Wood Mackenzie

Decarbonisation of the European Steel Industry

1.36. Net zero emissions targets by 2050 have been set publicly by a growing number of countries, including the European Union and the United Kingdom, and, as a result, hard-to-abate industries cannot hide behind the extra efforts and costs to decarbonise. In Europe, steelmakers' CO2 costs are expected to rise over the coming decades, due to increased regulation on emissions. Furthermore, investors have become increasingly interested in reducing CO2 exposure across their portfolios. As a result, European steelmakers have come under increased pressure to show willingness to bring down CO2 emissions, often with limited cost considerations.

1.37. This section assesses the future impact of increasing EAF steel production, new low-carbon steelmaking technologies and carbon capture and storage on European coking coal demand.

Conventional EAF production

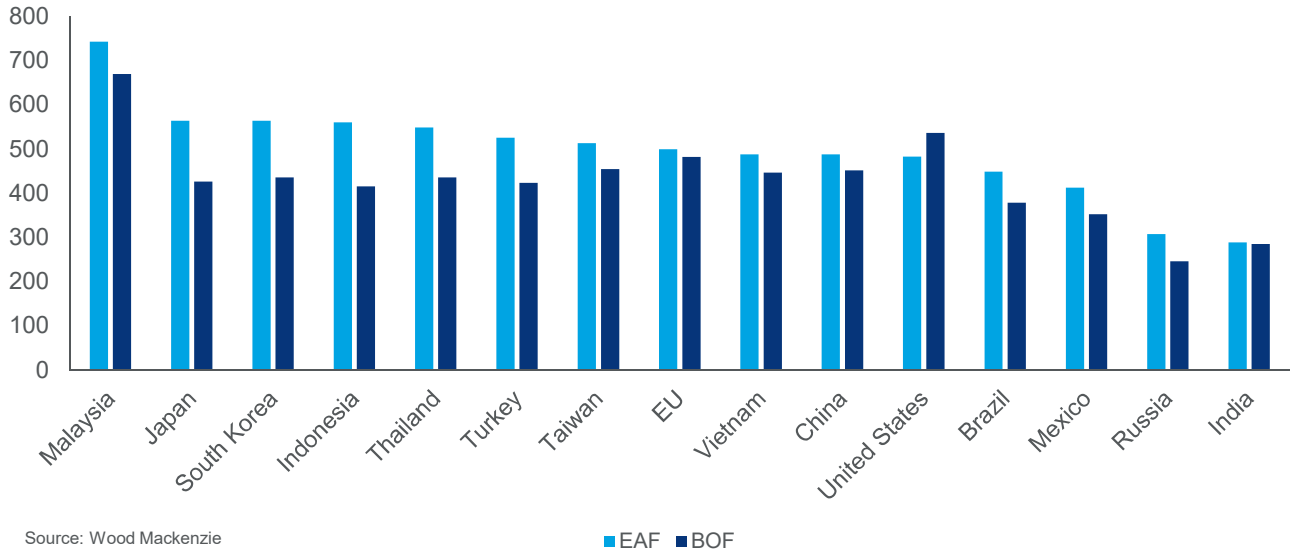
1.38. The main competing route of BF-BOF-based steel production is via scrap or DRI-fed EAFs. The GHG emissions levels associated with EAF production are significantly lower than for BF-BOF-based production. While the typical emissions intensity of BF-BOF-based production is ~2 t CO2e per tonne of hot metal (thm), a typical EAF emissions intensity is currently about 0.5 t CO2e /thm and in some places (such as Brazil which has access to cheap renewable energy) the level is as low as 0.1 t CO2e /thm. While there is a drive to replaces blast furnaces in Europe with EAFs, there are a number of constraints to increasing EAF production:

1. **Scrap availability**: Scrap will play an important role in supporting the increase in EAF steel production. In Europe, there is limited scope for steel scrap availability to grow. Even at the highest rates of collection and recycling, scrap availability would still be well short of supplying all the steel industry's Fe metallics needs . The reason scrap cannot be the sole metallic are two-fold. Firstly, scrap is a function of historic demand – as European steel demand will continue to grow from now until 2049, future, higher levels of demand cannot be replaced by scrap from past, lower levels of demand. A one-to-one replacement is not possible. Secondly, recycling and collection rates are unlikely to exceed 90% even in mature

economies in Europe.

2. **Product quality**: It is very difficult, but not impossible, to produce high-quality steel from scrap instead of virgin iron ore (DRI or pig iron). Although steel is theoretically infinitely recyclable, in practice, impurities or residuals in the scrap build up with each reuse and must be controlled or removed during the steelmaking process. For instance, copper can easily be mixed in with steel scrap – the two metals are often found in construction and automotive applications. High levels of copper can make steel unworkable. The operational knowledge and ability to use scrap to produce high-end steel must be learned quickly. Lower-quality steel is often used in the construction sector rather than high-end sectors such as automotive or consumer durable goods.
3. **High capital costs**: The capital costs of replacing BF-BOF capacity with new EAF steel making facilities are very high. The typical capital intensity of a new EAF is US$500/t of capacity. Therefore, a 1 Mtpa capacity steel plant would require US$500 M of investment.
4. **Cost-competitiveness**: Historically, BOF production costs have been lower than EAF costs, but this gap has narrowed recently, primarily due to relatively low scrap prices (ex-China) and high iron ore prices. As seaborne iron ore prices decline in the coming years (as the majors increase supply and Chinese demand eases) and scrap prices moderate, we forecast the spread between EAF and BOF costs will widen again and maintain this gap on a long-term basis. When comparing 2021 crude steel production costs by country, EAF is higher cost than traditional BOFs, on average in most countries.

Figure 1.9: EAF vs BOF production costs, 2021 (US$/t)



Source: Wood Mackenzie

1.39. There is no doubt that EAF steel capacity will replace some BF-BOF capacity in Europe in the next 20-30 years. However, a number of constraints will limit EAF growth. Therefore, BF-BOF production in the region will only decline marginally over time. EAF steel production in Europe is forecast to increase at a CAGR of 1.3% in the 2021-2049 period and its share of crude steel production will grow from 47% in 2020 to 60% in 2049.

Emerging Low-Carbon Steel Technologies

1.40. As steelmakers decarbonise, higher scrap use, operational efficiencies and switching to EAFs will be a focus of company strategies, but will only take the transition so far. Hydrogen-based steel offers the most compelling long-term solution that could eventually lead to widespread replacement of coal and coke in steelmaking.

1.41. Currently, the only large-scale, commercial, non-blast furnace, iron-making route is DRI, which is produced by reducing iron ore in a shaft furnace using natural gas or coal. The iron ore is not melted, as in a blast furnace, so DRI is a solid iron product (often called sponge iron) with a higher gangue content than hot metal. Because of the higher level of impurities, DRI is most often made using higher-quality iron ore pellets, then combined with scrap in an EAF to produce liquid steel. As the conventional DRI process uses carbon

monoxide and hydrogen from coal (around 800 kg to 1,000 kg of non-coking coal) or natural gas as the reducing agent on the iron ore, CO2 and H2O are released as by-products once the oxygen molecules are removed from the iron oxide.

1.42. Hydrogen-based DRI is the most likely source of future 'green' virgin iron. Hydrogen is already used to reduce iron ore in the DRI process: methane is typically split into its carbon and hydrogen constituents, which then directly reduce the iron ore. Green hydrogen refers to the process of using renewable energy in electrolysis to split the hydrogen and oxygen atoms from water. Using hydrogen DRI in combination with green energy to power the electric arc furnaces would result in emission-free steel production. The hydrogen-based DRI technology is the subject of experiments by a range of European steelmakers, most notably the Hybrit project in Sweden, led by a consortium including SSAB, Vattenfall and LKAB.

1.43. At present, there are only a handful of hydrogen DRI projects in Europe, all of which are small-scale, and most of these will not be operational within the next ten years:

- **Hybrit (JV of SSAB, LKAB and Vattenfall)**: The Hybrit joint venture was formed in 2016. In June 2018, construction of the pilot plant started in Luleå, Sweden. The plant has a proposed 2.3 Mtpa of DRI capacity and Wood Mackenzie expects it to be operational by 2027.
- **ArcelorMittal (Spain)**: The company is investing ~ €1bn in green steel projects in northern Spain, with support from the Spanish government. As part of this investment, development of a hydrogen DRI unit is planned at their Gijon plant by 2025. The unit has planned capacity of 2.3 Mtpa of DRI which is planned for use across ArcelorMittal's Gijon and Sestao works.
- **ArcelorMittal (Germany)**: The company's hydrogen DRI projects are planned to be located in Bremen, Hamburg and Eisenhüttenstadt in Germany. Wood Mackenzie expects the Bremen site to be operational by 2026, with capacity of 2.1 Mtpa of DRI. The Eisenhüttenstadt plant is expected to be operational by 2030, with capacity of 1.4 Mtpa of DRI.
- **Salzgitter**: The company's SALCOS project has planned capacity of 1.5 Mtpa of DRI in Germany. The green hydrogen will come from their project in partnership with Avacon (a subsidiary of E.ON) and Linde – WindH2 and Spitfires GrInHy2.0 project. The plant is expected to be in operation around 2025.
- **H2 Green Steel**: The project is the largest hydrogen DRI project in development, with a planned capacity of 5.0 Mtpa. As with Hybrit the proposed location is in Luleå. Financing and permitting is not yet in place and as such Wood Mackenzie does not currently include this project in our base case. Should the project proceed a startup date of 2030 is more likely than the company proposed date of 2024.

1.44. Wood Mackenzie expects 9.1 Mt of H-DRI capacity in the EU prior to 2030. At 80% utilisation and a 10% yield loss from metallics to crude steel production, that represents 6.5 Mt of crude steel produced using H-DRI. Production of 6.5 Mt is 4% of total EU crude steel production in 2029.

1.45. While technically feasible, there are numerous hurdles to overcome to make widespread green hydrogen use a reality. Green hydrogen must be produced using electrolysers, which split distilled water into hydrogen and oxygen. To produce a sufficient quantity of green hydrogen to decarbonise the steel sector would require hundreds of gigawatts of electrolyser capacity. At the end of 2020, there were only about 250 MW of electrolysers in existence globally, meaning over a 1,000-fold expansion would be required, specifically dedicated to steel production. Announced growth in electrolyser capacity is very significant – a 2025 pipeline of around 6 GW to 11 GW exists today, with a total pipeline of 84 GW – but, the enormous scalability challenge will take time to overcome.

1.46. Additionally, to allow decarbonisation, the electrolysers must be powered using green electricity. Standalone power units are possible, but ultimately, the energy transition will need to be much more mature – including decarbonised electricity grids – to guarantee the widespread availability of cheap green hydrogen, wherever needed. A massive increase in hydrogen production will also need a transformation of transport infrastructure, whether in gaseous form or as ammonia.

1.47. We believe that hydrogen will be critical in the energy transition for steel, but deployment of green hydrogen infrastructure will be a slow process. Also, the steel sector will have to compete with other sectors for use of hydrogen, such as transport, other industrial processes, and power generation.

1.48. The development timeframe for hydrogen DRI projects is long at approximately 10 years from project scoping to commercial production given the significant technical challenges faced. Therefore, a large number of projects would need to be in development today in order for hydrogen DRI to have a material impact on European BF-BOF production within the next 20 years.

1.49. As a result, in our base case, we consider there to only be a modest role for hydrogen in steelmaking in the 2021-2049 timeframe. We have included the Hybrit project's likely impact on demand in Sweden and

Finland, and the ArcelorMittal project in Spain, but these are the only countries where specific projects have been included.

1.50. Another new technology that has captured some interest in the steel industry is Molten Oxide Electrolysis (MOE). The MOE process involves electrolytic reduction of molten iron ore, heated to over 1,500°C. The process is being developed by Boston Metals, a pre-production company that was founded in 2012. The technology currently remains unproven outside of a laboratory setting and is many years from commercial production. As a result, we do not include the integration of the technology in our base case steel production forecasts.

Carbon Capture and Storage (CCS)

1.51. Achieving a low-carbon future requires not just carbon avoidance, but also carbon removal, especially through carbon capture and storage (CCS). The world has been experimenting with CCS for many decades, yet the roll-out has been very slow. In 2019, the world emitted around 33 gigatonnes (Gt) of CO_2. The current CCS projects in operation are capturing just a fraction of that, about 40 Mt of CO_2 annually. This low presence is due to both technical barriers and a lack of commercial incentive. CCS can be applied in power generation, natural-gas processing, refining, cement, hydrogen reforming, chemicals and metals smelting, as well as other industries.

1.52. There are three main processes relevant to the steel industry, each with their own complexities:

1. **Pre-combustion**: A gas mix of hydrogen and carbon monoxide (CO) is processed converting the CO into CO_2. The CO_2 is then removed using solvents.
2. **Post-combustion**: Sulphur and nitrogen-based gases and any trace metals need to be removed. The residual flue gas is then heated and treated with solvents, releasing CO_2.
3. **Oxy-combustion**: Enriching the fuel-burning process with oxygen gives a higher concentration of CO_2 in the flue gas.

1.53. The carbon is stored in the many depleted oil and gas fields, with the CO_2 transported by pipeline. The Global CCS Institute believes that there is almost 400 years' worth of storage capacity at today's level of annual emissions – more than enough to meet the Paris climate targets. Geological stability is critical among the environmental criteria for carbon storage to work. There are also long-shot contenders for storage – such as low-grade coal seams and saline reservoirs.

1.54. The concept of CCS has been understood for a long time, but has not been significantly developed primarily because it is very expensive. Wood Mackenzie believes that 68 CCS projects have started and terminated, primarily because of the high costs. Costs vary significantly, because no project is the same, and much of the technology is proprietary. Instead, we look at 'cost of CO_2 avoided' – the carbon price that makes a project economic. We estimate that a minimum carbon price of US$100/t is needed for most applications in the steel industry, about two times today's traded price in Europe. It is clear that costs need to come down for development to accelerate. R&D will help, as will, in time, scale and a modular, standardised approach. But CCS also needs fiscal support – as with tax credits in the US recently – and it also needs access to low-cost financing, so investors can generate an adequate return on equity.

1.55. As well as costs, there are some technical restraints regarding CCS in steelmaking. An integrated iron and steel mill has multiple flue gas stacks (hot blast stove, lime kiln, cogeneration plant) as well as units producing combustible gases (coke oven, blast furnace, basic oxygen furnace). These streams contain different concentrations of CO_2 and therefore a decision needs to be made from which location/s to directly capture the CO2.

1.56. At present, such a high level of capture efficiency is not considered to be practically possible. BF gas emissions are "dirty". The carbon is mixed with other gasses and is very difficult to separate. ArcelorMittal thinks it can reduce emissions by 30% via its Smart Carbon project. Smart Carbon is a project where a carbalyst® plant captures carbon from blast furnace top gas and converts it to ethanol for use as a biofuel. Smart Carbon is expensive – adding about 30% to current steel production costs. As capture rates increase, the cost rises exponentially with climbing difficulty.

1.57. A further challenge is having a feasible carbon storage location. A proven storage method is the use of sedimentary basins (old oil and gas fields); but these are not always situated close to steel production sites, so transportation becomes an issue. Other options for carbon storage are to use unminable coal seams (which are logistically complex) and saline reservoirs (the use of which is relatively unproven).

1.58. While major steelmakers including Tata Steel and ArcelorMittal have announced plans to invest in CCS, its use in steelmaking is negligible at present. Nonetheless, CCS is a proven technology that has been in

existence for decades. Costs are expected to decline going forward, which will support a large increase in its use in steelmaking in the future.

1.59. We expect that steelmakers will continue to invest in CCS, which will support the continuation of BF-BOF steel production in Europe.

Assumptions Comparison to the UK's Sixth Carbon Budget

1.60. Wood Mackenzie has reviewed the assumptions underpinning the decarbonisation pathway of the UK steel industry in the UK's Sixth Carbon Budget and compared them to our own assumptions to forecast UK steel production in the next 20-30 years.

1.61. On page 128, the UK's Sixth Carbon Budget Report states that "CCS is applied to… half of the UK's integrated steelwork capacity." (by 2035). Wood Mackenzie's base case forecast assumes that CCS is applied to between 30-40% of UK steel production by 2035.

1.62. The main assumptions underpinning Wood Mackenzie's base case forecast are:

- Steel mills in the UK are able to reduce carbon emissions through efficiency improvements (without the use of hydrogen) by 6% over the 2021-2035 period.
- Without the use of CCS, UK blast furnaces emit 8.6 Mt CO_2e in 2035, while EAFs emit 0.6 Mt CO_2e.
- The use of CCS reduces emissions by 2.8-3.7 Mt CO_2e in 2035, equivalent to 30-40% of steel emissions.
- UK BF-BOF-based steel production remains broadly stable at ~5 Mtpa in the 2021-2035 period.

1.63. The Report also states that "*CCS (carbon capture and storage) reduces manufacturing emissions in the Balanced Net Zero pathway by 6MtCO_2e per year in 2035, increasing to 9MtCO_2e by 2045*". Wood Mackenzie assumes that CCS reduces steelmaking emissions by between 2.8-3.7 Mt CO_2e in 2035 and between 2.5-3.3 Mt CO_2e in 2045.

1.64. Wood Mackenzie's assumptions around CCS usage in UK steelmaking are more conservative than those used in the Sixth Carbon Policy Report. Indeed, even assuming a lower usage of CCS in steelmaking, BF-BOF production in the UK is forecast to remain broadly stable over the long term.

Conclusions

1.65. The period to 2049 will see enormous progress on global decarbonisation and the steel sector will not be immune to this change. However, the reliance on high-temperature smelting to provide most of the iron used to make steel means it is a hard-to abate sector that will rely on new technologies for deep decarbonisation. Given the scalability and cost challenges, long project lead times and the lack of projects in development, our assessment that the impact of "green steel" is likely to be limited and cautious approach should be taken is both robust and realistic. Accordingly, we have directly limited the impact on coking coal from hydrogen DRI to a few European countries in the period to 2049. We also expect the availability of inexpensive and ample green hydrogen will have a more widespread impact on PCI coal usage, as hydrogen co-firing grows globally, post 2035. PCI coals are not coking coals but are used by steelmakers as a coke replacement in BF production to provide energy and lower costs.

1.66. The key assumptions regarding decarbonisation routes in our base case steel production forecast are as follows:

• Co-injection of H2 with PCI occurs in all major steelmaking countries from in the mid to late 2030s, gaining momentum into the 2040s. Injection swaps in Europe begin in the late 2020s to early 2030s. Depending on green hydrogen availability, hydrogen injection shares range from 10% to 100% by 2049.

1.67. We consider hydrogen replacement of PCI is likely to occur at a faster pace than hydrogen DRI. Capex to inject hydrogen is much lower and can still provide tangible emissions savings. A project to replace PCI with grey hydrogen (hydrogen derived from methane) and ultimately green hydrogen is making headway at

Duisburg, Germany and we expect its technical feasibility will be confirmed in 2022 under a full-tuyere injection testing phase. Using the current EU carbon prices of around US$50/t as an incentive to swap using grey hydrogen – which have been seen in Europe this year – we consider the use of green hydrogen to be uncompetitive. Prices for green hydrogen need to drop to the US$1/kg range and carbon prices rise over US$100/t to incentivise a switch from a pure economics standpoint. We expect green hydrogen prices to continue to decline over the decade in Europe, as the market develops in Germany specifically. It suggests that some PCI replacement is likely in Europe this decade and into the early 2030s.

• Greater scrap availability globally will allow EAFs to cover most of the net new steel demand to 2049. This is the primary decarbonisation strategy employed.

1.68. Scrap will play an increasing role in steel production under our base case. Given the lower energy intensity of scrap, its greater use in BF-BOF and EAF steelmaking is inevitable. However, its use will be constrained by a lack of availability, as well as quality restrictions. In our base case, global scrap use grows from 636 Mt in 2021 to 778 Mt by 2040 and over 900 Mt in 2049. Despite the growth in scrap rates, we expect scrap to provide only 36% of metallics demand in the steel sector by 2049, up from 29% in 2021. Steel demand and metallics (Fe) demand will reach 2.3 Bt and 2.5 Bt respectively by 2049. This means that virgin iron will be required to meet over 1.6 Btpa by 2049, slightly up on the 1.5 Bt produced today. There is potential for scrap availability to be higher, but there are significant challenges to increase recycling and collection rates, which are unlikely to exceed 90% even in mature economies in Europe. In addition, there are technical limits to the use of scrap in the production of high-quality steel products, which cannot tolerate feedstock impurities (e.g. for use in the automotive sector).

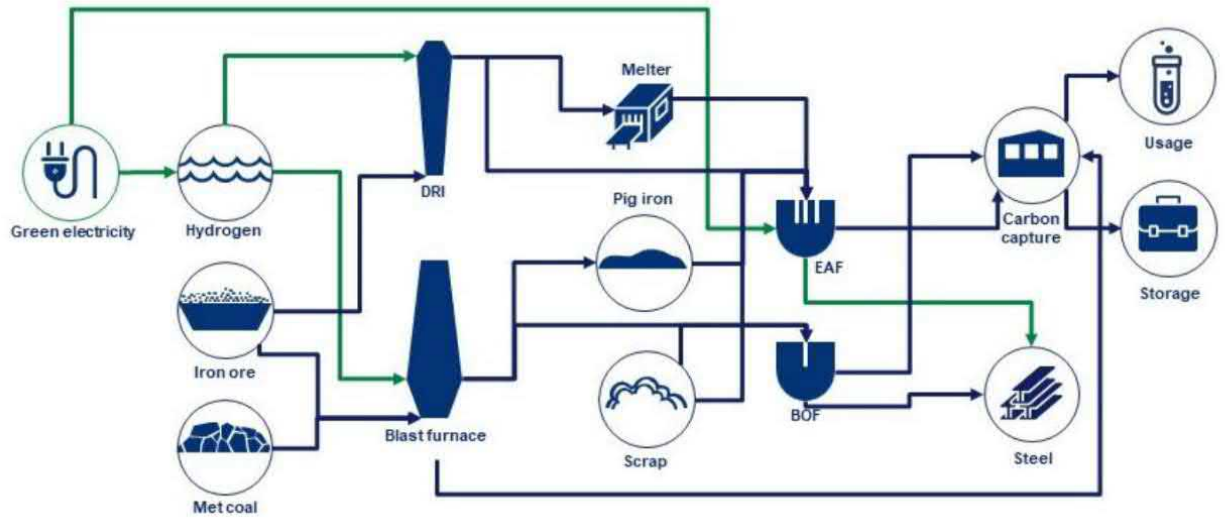
• Hydrogen-based DRI production is limited to specific projects in three EU countries in our base case.

1.69. While technically feasible, there are numerous hurdles to overcome to make widespread green hydrogen use a reality. Green hydrogen must be produced using electrolysers which split distilled water into hydrogen and oxygen. To produce a sufficient quantity of green hydrogen to decarbonise the steel sector would require hundreds of gigawatts of electrolyser capacity. At the end of 2020, there was only about 250 MW of electrolyser in existence, meaning over a 1,000-fold expansion would be required, specifically dedicated to steel production.

1.70. Despite the calls to decarbonise, the global steel industry's response remains slow in its approach to net zero carbon emissions. Decarbonisation of the broader electricity system, proper carbon pricing incentives, favourable government policy, electrolyser scalability and cost challenges are a few of the hurdles which need to be cleared to make this option a reality. These constraints along with the huge investment required to build DRI and EAF facilities, scrap availability and hydrogen transport infrastructure weigh heavily on any shift away from fossil fuel derived steel. Europe leads all current efforts in the move towards green steel and the advancement of green hydrogen markets, but tangible results are unlikely within the next 20-30 years, beyond PCI replacement.

1.71. There is no holy grail for emission-free steelmaking and European steelmakers are exploring several options. Ultimately, we expect the majors to adopt a hybrid-style set-up, with DRI, EAF, BF and BOF facilities on the same site, and the ability to switch the steelmaking route between the lowest cost option, taking into account the cost of carbon, scrap, iron ore, coke and others at any given time. CCS will play a role in the coming years. BF-BOF production in Europe will decline in the next 20-30 years, albeit marginally, and the region will remain a significant coking coal market. European metallurgical coal demand is forecast to remain between 50-55 Mtpa in the 2021-2049 period, which provides a large target market for West Cumbia Mining's product.

Figure 1.10: Idealised hybrid steelmaking process



Source: Wood Mackenzie

Metallurgical Coal Demand Scenario Analysis

1.72. In this section, we explore an alternative scenario, beyond our base case, whereby the steel industry successfully follows a two-degree warming pathway – called the Wood Mackenzie Accelerated Energy Transition 2.0 scenario (AET 2.0).

1.73. We have explored the varying options to BF-BOF steel production as well as the new technologies slowly being adopted by the steel industry. In our base case we have the underlying assumption that scrap use, incorporation of EAFs and operational efficiencies will form the bulk of decarbonisation strategies at most mills during the period to 2040.

1.74. In the AET2.0 scenario, steel demand remains unchanged from the base case view. However, it is assumed that carbon emissions from the steel sector must fall by 47% by 2040. For this to happen, steel production methods must change in the following ways:

- **Scrap use in steelmaking needs to nearly double**
- **Direct Reduced Iron production and use must double**
- **Global average Electric Arc Furnace emissions intensity must fall by 40%**
- **BF-BOF emissions intensity needs to fall by 15%**
- **30% of the residual carbon emissions must be captured and stored or used (around 325 Mtpa)**

1.75. The following charts (Figures 1.11 and 1.12) illustrate the outlook for global hot metal production and metallurgical coal demand to 2040 under this scenario.

Figure 1.11: Global hot metal production, 2021-2040 (Mt)

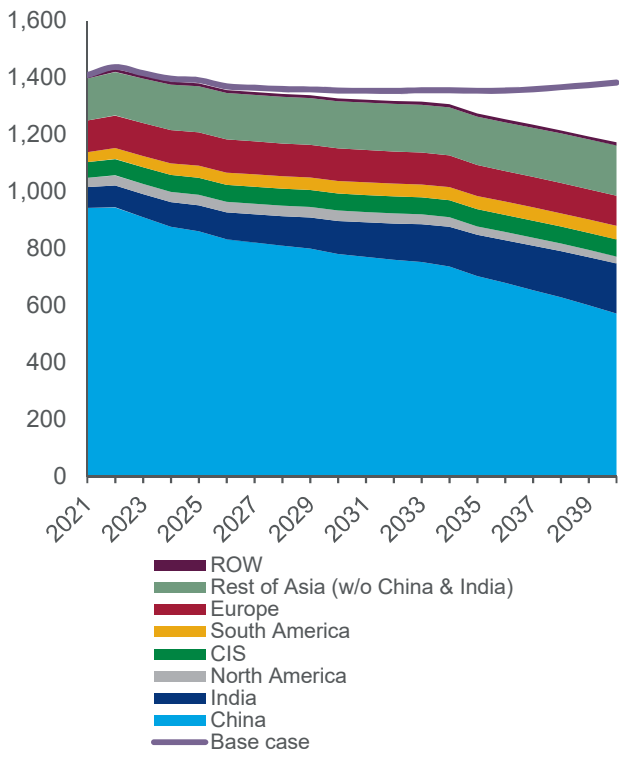
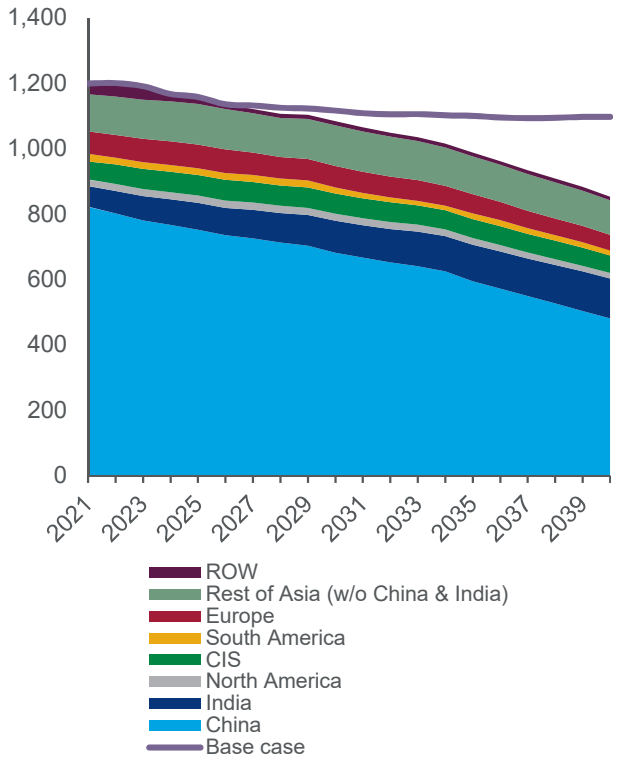


Figure 1.12: Global met. coal demand, 2021-2040 (Mt)



Source: Wood Mackenzie

1.76. The steel industry achieving a two-degree warming pathway has would have significant implications for metallurgical coal demand.

- Overall global hot metal production would be 286 Mt lower than our base case by 2040 as significant scrap-based EAF and hydrogen DRI-EAF production displaces BF-BOF production.
- Total metallurgical coal demand would be 245 Mtpa lower in 2040 compared with our base case. Most of the demand decline occurs from the late 2030's onwards.
- In Europe, total metallurgical coal demand would fall from 85 Mt in 2021 to 60 Mt in 2040, a fall of ~30%. Most of the decline fall occurs between 2030 and 2040.

1.77. Under the AET 2.0 scenario, the reduction in European metallurgical coal demand is significant at ~25 Mt. However, even under this extreme scenario, Europe remains a large metallurgical coal market by 2040 at 60 Mt; therefore, there would still be a large target market for West Cumbria Mining's coal.

1.78. It is important to emphasise that the AET 2.0 scenario diverges a long way from our base case outlook. The challenges to successfully decarbonise are immense and overcoming them will entail huge capital outlay, technical collaboration and development. Furthermore, steel will be heavily reliant on external factors – most significantly the decarbonisation of the power grid.

2. Competitive Analysis

2.1. The objective of this chapter is to assess the competitive position of the Woodhouse mine. We provide analysis of the quality of the coking coal that will be produced by West Cumbria Mining and compare the operating costs of the mine to competing suppliers in the global seaborne metallurgical coal market. We assess the extent to which production of coking coal at Woodhouse will displace supply from existing international suppliers and analyse whether the development of the mine could potentially delay the penetration of EAF steel production and other emerging steelmaking technologies in Europe.

Coal Quality Analysis

Key Coking Coal Quality Parameters

2.2. In the international coal market, metallurgical coals are typically categorised by their coking properties, in particular, the strength of the coke the coals produce. Only a limited range of coals – specifically bituminous coals that exhibit plasticity and swelling – produce good quality cokes.

2.3. The common metallurgical coal classifications in the international market are:

- **Hard Coking Coals (HCC)** are essential for the production of a strong coke when using coke ovens and generally have the ability to make a strong (or hard) coke when coked on their own. These coals are often classified based on volatile matter content (high, medium, and low) and are typically blended with a number of other coking coals to produce high-quality coke. HCC are the highest priced coals on the market, given their relative scarcity and prized value-in-use[1] .

- **Semi-Soft Coking Coals (SSCC)** do not produce a strong coke when coked alone. They have weak coking properties and are commonly added to the coke oven blend to reduce the overall cost of the coke. There is a limit to the proportion of semi-soft coking coal that can be added without coal pre-treatment prior to coking.

- **Pulverized Coal Injection (PCI) Coals** are used for direct injection into the blast furnace. They fall into two categories: 1. High volatile matter (HV), low rank bituminous coals (including semi-soft coking coals) and 2. semi-anthracite. Higher rank coals such as semi-anthracites, with high energy and high fixed carbon contents, are the most efficient in this application and have significantly increased their share of the PCI market.

2.4. The following diagram and table (Figure/Table 2.1) outlines the key quality parameters of metallurgical coal. Globally, seaborne coals have broad quality ranges. Some parameters such as sulphur have fixed maximum percentages, while phosphorous (a contaminant) is accepted in Chinese mills at higher levels than by Japanese steelmakers. Product usage is determined chiefly by the customers' plant parameters and the other coals being used in the blend. In addition to the CSN and CSR tests, a wide number of other standardised tests are undertaken on coking coals and coke.

2.5. It is rare for steelmakers and coke producers to charge a single coking coal into a coke oven. Most companies blend high-volatile coals with low-volatile coals and target a blend volatile matter in the mid 20s%. A single coal will not possess all of the properties required to produce coke suitable to meet blast furnace specifications for properties, including ash, sulphur, phosphorus, CSR, etc. Low-volatile coals provide most of the coke strength, while high-volatile coals allow good blending and porosity to the coke.

[1] Different types and qualities of metallurgical coal will be priced depending on their characteristics. That is, depending on how the coal performs in a blast furnace in terms of its impact on productivity, energy consumption and the quality of steel produced. The discounts or premiums received for metallurgical coal products are referred to as "value-in-use" adjustments.

Characterising the coal quality of coking coal is an important step in understanding marketability and pricing

Key Parameters in Production of Coking Coal

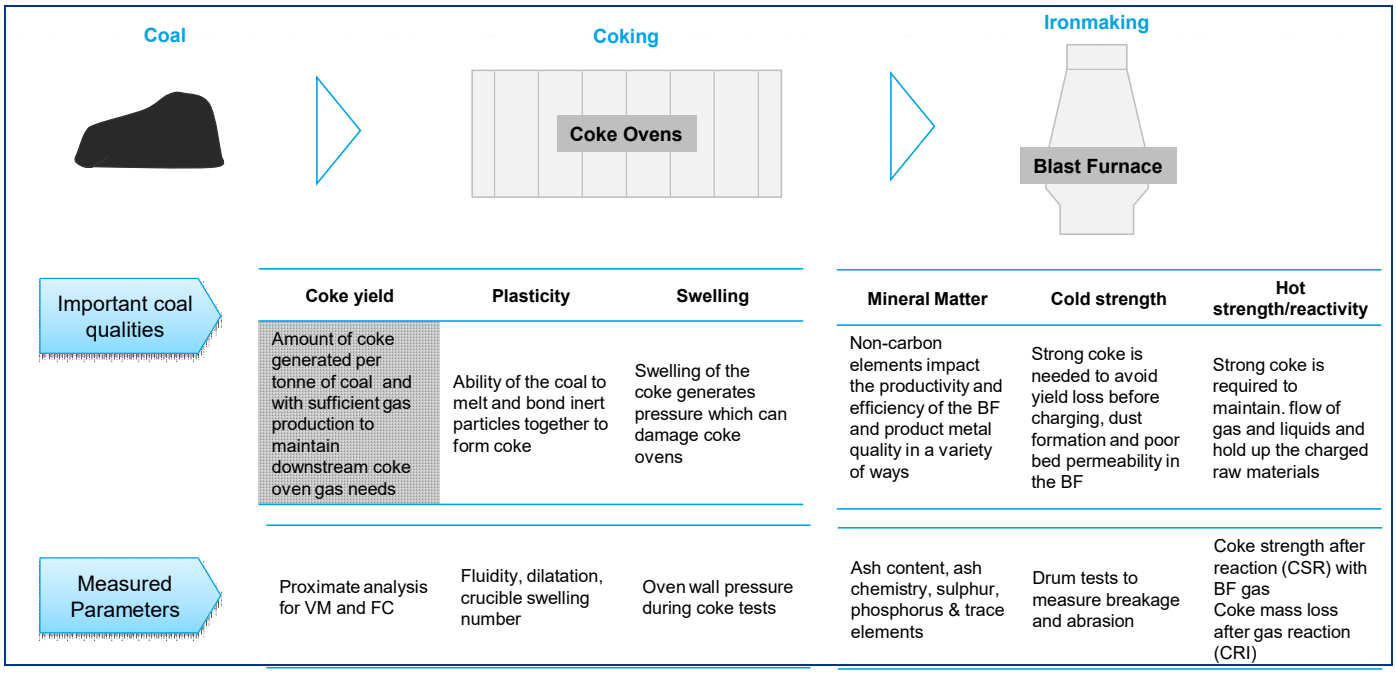


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Table 2.1: Key metallurgical coal quality parameters

Parameter	Definition	Significance
Total (TM) and inherent (IM) moisture	TM is the moisture in the coal as sampled and removable under standard conditions and comprises both inherent and free moisture; IM is the moisture bound within the coal pores or chemically attached to the organic coal matter.	Moisture is a costly dilutant, as it consumes heat from the furnace during combustion, and increases freight costs; high moisture levels often results in handling problems.
Volatile matter (VM)	VM is the gaseous component of the coal (excluding moisture) that is released when the coal is heated; it is mainly comprised of methane and other light hydrocarbons.	Volatile content divisions comprise the most fundamental market groups in coking coal. Volatile content indicates the rank of a coal, which varies from peat to anthracite.
Ash	Ash is the inorganic residue remaining after coal has been combusted. Ash is comprised of mineral matter either bound within the coal matrix or of insufficient thickness to economically extract during the mining process. Ash can be removed by washing the coal and lowering the mining yield, however washing high-ash coals significantly adds to costs.	Coals with a low ash content are preferred. The typical seaborne coals have ash contents between 9% and 10%. US coals are lower in ash, usually in the 7% to 8% range, than Australian coals.
Fixed carbon (FC)	FC is the solid residue (excluding ash) remaining after the volatile matter has been released.	FC content gives a rough estimate of coke yield.
Total sulphur (TS)	TS comprises both an organic component that is part of the carbonaceous material, and an inorganic component that is part of the mineral matter; forms sulphur oxides during coal combustion.	Sulphur is an unwanted contaminant, which makes steel brittle. Sulphur in coke should not exceed 0.7%, However, it can be removed in the hot metal side of the blast furnace.
Phosphorous (P)	Phosphorous is contained in ash usually in the form of P_2O_5.	Phosphorous is a contaminant that can causes steel to weaken. It is very difficult to remove.
Hardgrove Grindability Index (HGI)	HGI is a measure of hardness that indicates a coal's relative grindability or ease of pulverization.	Low HGI (hard) coals are more difficult to grind, increasing milling costs. High HGI (soft) coals usually generate excess fines, resulting in handling and higher moisture.
Crucible swell number (CSN)	The CSN is a measure of the coal's ability to swell when heated and is measured as a number between 0 and 9 with 9 being the most reactive.	CSN indicates the reactivity of the coal and its ability to form coke. Hard coking coals have CSN greater than or equal to 7.
Coke strength after reaction (CSR)	The CSR test measures the physical strength of the coke.	CSR is a widely utilised test for seaborne metallurgical coals.
Petrography and reflectance	Petrography is the study of the maceral content of a coal sample. Reflectance is a measurement of the ability of vitrinite to reflect light.	Petrographic analysis is the quantification of the original plant material of the coal. Vitrinite reflectance is a more precise measurement of rank than volatile matter.

Source: Wood Mackenzie

Product Review

2.6. The quality specifications of the coking coal product has been provided by West Cumbria Mining and the key values detailed below (Table 2.2). The product coal quality presents a high-volatile coking coal, which is a well-established product in seaborne trade, especially in the Atlantic market.

Table 2.2: West Cumbria Mining coal quality versus US HV HCC

Specification	Parameter (unit of measurement)	WCM	HVA	HVB
Proximate analysis	Ash (%)	<5	6-10	6-10
	VM (%)	32.0	29-34	34-38
	FC (%)	>61	-	-
	Sulphur (%)	<1.5	0.6-1.3	0.6-1.4
	Phos (%)	<0.005	0.04-0.05	-
Coking & coke properties	CSN	8	7-9	7-9
	Fluidity	30,000	30,000	25,000
	CSR	30-40	50-55	40-50
Rank	Ro. Max (%)	1.02	1.0-1.12	0.90-0.99
Ash analysis	SiO_2	36	49-54	
	Al_2O_3	29	24-29	
	Fe_2O_3	17	6-17	
	CaO	6.5	1.5-1.3	

Source: West Cumbria Mining, Wood Mackenzie

2.7. High-volatile hard coking coals are mainly produced and exported from the Appalachian basin in the eastern US. The products are typified by coal rank around 1.0, with VM between 29 and 38%. Key parameters that denote attractiveness for pricing are extremely high fluidity and usually low ash content (below the typical level of 9-10% for seaborne-traded coking coals). The high fluidity allows the coal to liquefy and act as a binder in a coke blend. The high VM content lowers the yield of solid coke, but provides output gas and liquids, which are captured or processed onsite for sale or recycled at the mill.

2.8. The further categorisation of US high-volatile coal into premium HVA and lower quality HVB is based on maximum reflectance values. High-volatile coals with reflectance values of 1.0 or higher are A coals, while those between 0.90 and 1.0 are B coals. Most coals with reflectance under 0.90 are considered thermal coals, although the exact lower limit varies and can sometimes be as low as 0.85. High Vol A (i.e. high fluidity, low ash and good ash chemistry) are occasionally priced at parity, or even at a premium, to the benchmark Australian LV HCC on an FOB basis.

2.9. Other high-volatile coals in several countries (notably from the Kuzbass and South Yakutiya basins in the Central and Far East of Russia) mostly have lower fluidity and higher ash content, or are only available in small tonnages (such as New Zealand). These coals are largely marketed in Asia. One of the leading traded HV HCC brands in the Asian market is Kestrel, from Queensland, Australia, with sales focused on Japan, South Korea and India. The Gregory brand is sold by Sojitz (34% VM, fluidity of ~7,500 ddpm).

2.10. West Cumbria Mining's coking coal exhibits almost all of the key parameters used to designate HVA quality. Key observations of the coal quality include:

- **Coal type**: The West Cumbria Mining product is equivalent and appropriately benchmarked to US HVA.
- **Ash**: The West Cumbria ash content is below 5%, which is about half of the typical ash content of seaborne traded coals and well under the typical ash content of US HVA coals.
- **Volatile matter**: The VM content of 32% is within the expected range for a high volatile A coal. Volatile matter is an indication of rank.
- **Fluidity**: At 30,000 ddpm, the maximum fluidity is comparable to US HVA coking coals. This is one of the most important quality characteristics of the West Cumbria product. High-volatile coals with strong fluidity in the blend allows steel companies greater flexibility to select other coals to include. It allows the coals to blend better into a good coke. The most common

equipment used to measure fluidity are only able to measure up to 30,000 ddpm (i.e. it is at the top of the range).

- **CSN**: The CSN is the most basic test to determine a coal's ability to form coke. The test values range between 0 and 10, with hard coking coals having values between 7 and 10. West Cumbria has a CSN at 8, which is a good value for hard coking coals.
- **CSR**: CSR is coke strength after reaction and higher numbers indicate the coal would make a strong coke. The CSR of West Cumbria Mining's coal is estimated to be in the range of 30 to 40..
- **Sulphur:** At <1.5%, the sulphur content is higher than the normal spec at coke plants. Using this coal in the blend would require adjusting the overall sulphur content by including other coals with lower sulphur levels. Since most European mills use a portion of Australian coals, which average 0.5% to 0.6% sulphur in the blend, we believe these mills can use West Cumbria Coal in their blends.
- **Phosphorus**: The phosphorus is extremely low, which will help offset the higher sulphur in marketing and price discussions.
- **Ash chemistry**: This is acceptable, with low elements which contribute to coke degradation (Fe_2O_3, and CaO,).

2.11. The West Cumbria Mining coking coal can be benchmarked against US HV hard coking coal. Currently these coals only represent approximately 26 Mt (approximately 9%) of the seaborne export market, but are well known within the logical European target market for West Cumbria Mining. The coking coal produced by West Cumbria Mining is expected to be a highly marketable product within the European steel market.

2.12. We view the expected sulphur content of West Cumbria Mining's product at <1.5% to be marketable to European steel mills. We believe the typical sulphur spec for steel mills in the region are <1.0%. Therefore, the company would be required to pay a penalty for exceeding that mark. However, most companies use a significant amount of Australian coal in their blends, which have sulphur contents ranging between 0.5% and 0.6%. So, cokemakers should be able to maintain an acceptable overall sulphur level in their blend to produce good-quality coke. The penalty on sulphur would be somewhat balanced by a premium for having extremely low ash and phosphorus content.

Operating Cost Analysis

2.13. This section benchmarks the Woodhouse mine's cash costs relative to competing seaborne metallurgical coal producers. Cash cost curves have been prepared using technical mining cost data provided by West Cumbria Mining combined with Wood Mackenzie's estimates for the other seaborne coal producers.

Costs Methodology

2.14. Wood Mackenzie's *Coal Supply Service* delivers in-depth, independent commercial research and analysis on the global coal industry. We develop capital and operating cash expenditure forecasts associated with our view of reserves and production for an asset or group of assets:

- Capital Costs: These include, exploration and acquisition costs, mining development works, mining equipment, coal handling facilities, coal preparation plants, general infrastructure, transport infrastructure, sustaining capex, any 'other' capital costs, and closure or final rehabilitation costs.
- Operating Cash Costs: These include, mining, coal preparation, product coal transport, port and demurrage charges, overheads and any 'other' charges. Additionally, they include any tariffs paid to other assets for transportation and/or processing production.
- Royalties and levies: These include, coal royalties and leases, export levies, mine safety levies, health levies, environmental taxes, industry research levies.

2.15. The combination of operating cash costs plus royalty & levies is termed the Total Cash Cost. For

seaborne exports, the total cash costs are estimated on a Free on Board (FOB Port) basis, the normal point of sale. Costs are modelled based on local currencies.

2.16. The Total Cash Costs have been estimated in current-year terms, using public domain information including; geological reports, reported statistics on production, labour and input costs, and company reports (see 'Research Sources" section). The estimates have been validated, when possible, with visits to operations, and discussions with industry participants.

2.17. The estimates are internally comparable, in that the methodology utilised to produce them is consistent for all operations. However, because the estimates are based only on public information and our analysis, and do not represent private knowledge of an operation's actual costs, there may be deviations from actual costs. In instances where confidential information is held by Wood Mackenzie, it has not been used to produce the published estimates.

Cash Costs Benchmarking

2.18. The following table shows the expected cash cost components for the Woodhouse mine, as provided by West Cumbria Mining. The year 2029 has been selected for the cost benchmarking, which is the first year that the Woodhouse mine will be operating at full production. The mine's direct cash costs at the mine (C1 cash costs) are estimated at US$67.4/t in 2029, while total cash costs are estimated at US$69.6/t (Table 2.3).

Table 2.3: Woodhouse Cash Costs, nominal, 2029 (US$/t)

Component	Value
Mining	40.7
Coal Preparation	5.8
Transport	10.1
Port	4.5
Overheads	6.2
C1 Cash Cost	**67.4**
Royalties	2.2
Total cash cost	**69.6**

Source: Wood Mackenzie

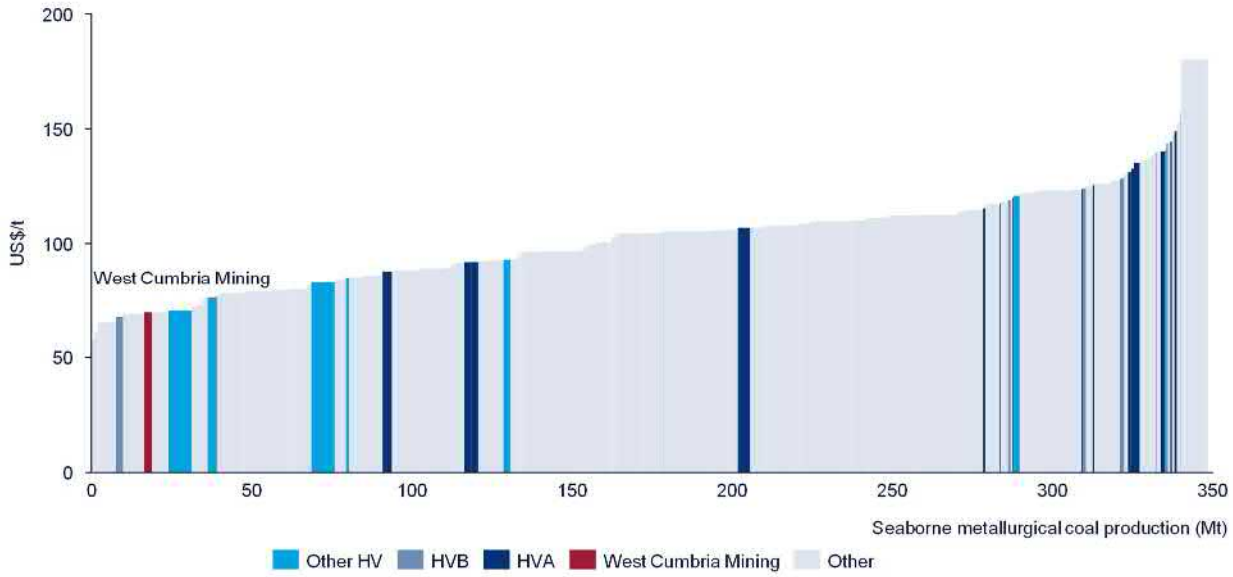
2.19. Wood Mackenzie's 2029 total cash costs (mining, coal preparation, transport, port charges, overheads, royalties) for export metallurgical coal production are shown in the figure below (Figure 2.2). Based on total cash costs of $69.6/t, the mine would occupy a position in the first quartile of global metallurgical production among low-cost producers in Russia and Australia.

2.20. Russia generally has low mining costs, but bears high cost of inland rail transportation. Russian third-party port charges can be high at Far East ports, given the recent focus on Asian markets. However, overall Russian costs have benefited from the weakened rouble against the USD.

2.21. Large open pit mines in Australia are also low cost, as can be highly productive underground longwall operations. Transport charges vary depending on infrastructure ownership and whether new facilities are being used.

2.22. US mining costs are generally high as a result of mining thin seams, with productivity impacted by a high degree of safety and environmental auditing. US transport costs are also generally high as well.

Figure 2.2: Global seaborne metallurgical coal total cash costs curve, FOB, nominal, 2029 (US$/t)



Source: Wood Mackenzie Dataset May 2021, West Cumbria Mining

2.23. The following chart (Figure 2.3) shows the 2029 global seaborne metallurgical coal cost curve on a CIF ARA basis (cost, insurance and freight at Amsterdam- Rotterdam- Antwerp), to assess West Cumbria Mining's cost-competitiveness to European customers. The West Cumbria Mining coal is assumed to be exported from the Redcar Bulk Terminal (RBT) port and shipped to the Netherlands at a freight charge of US$6.29/t. The mine is favourably located at the low end of the CIF ARA cost curve.

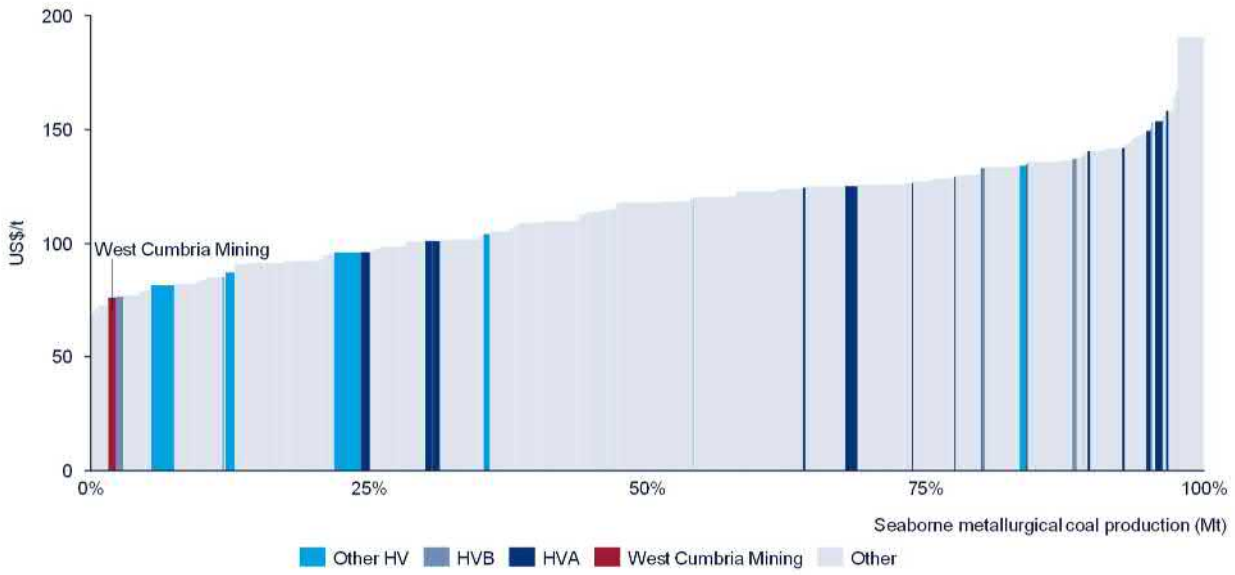
2.24. We also provide the same cost estimates for HV HCC and equivalent mines only, on a CIF ARA basis (Figure 2.4). Given the comparable coal qualities, US producers of HV HCC will be the main competitors for West Cumbria Mining.

2.25. US HV HCC producers are fragmented and generally fall within the third and fourth quartiles on the total seaborne metallurgical cost curve. Arch's Leer mine is the lowest-cost US HV producer, with significant export tonnage (approximately 2.9 Mt at an FOB operating cost of US$75/t).

2.26. Other HV HCC producers outside US, notably Russia and Australia, are lower cost.

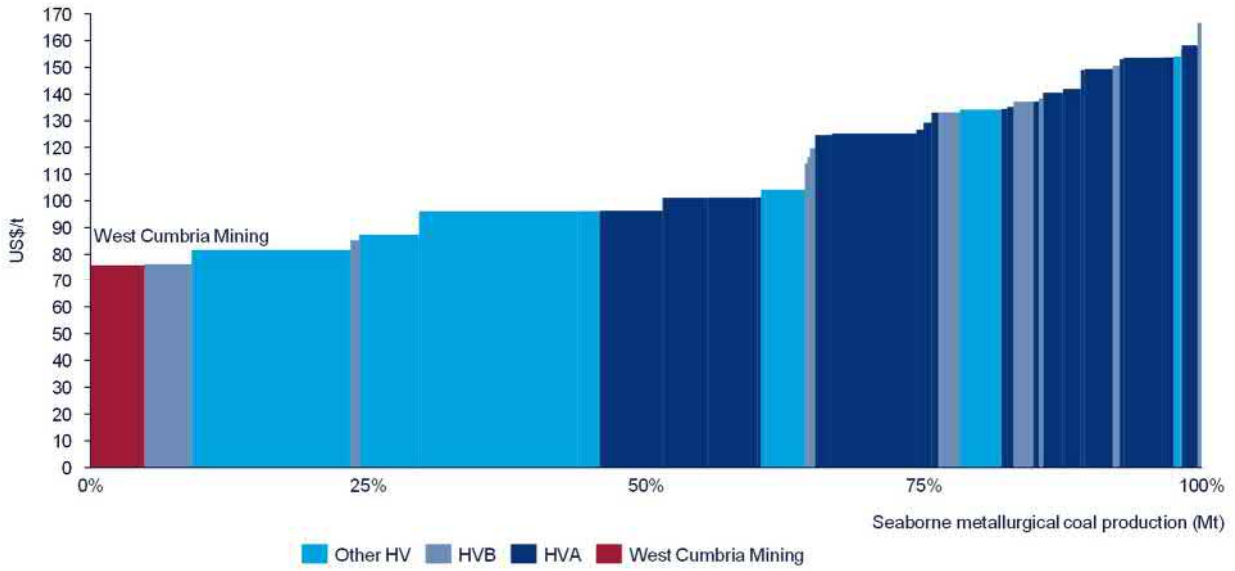
2.27. West Cumbria Mining compares favourably amongst competing suppliers of HV HCC, sitting at the low end of Wood Mackenzie's estimates for all US production, which ranges between ~US$75/t and up to US$165/t.

Figure 2.3: Global seaborne metallurgical coal total cash costs curve, CIF ARA, nominal, 2029 (US$/t)



Source: Wood Mackenzie Dataset May 2021, West Cumbria Mining

Figure 2.4: High volatile hard coking coal total cash costs curve, CIF ARA, nominal, 2029 (US$/t)



Source: Wood Mackenzie Dataset May 2021, West Cumbria Mining

Target Markets and Potential for Substitution

2.28. The main market for West Cumbria Mining coal consists of the integrated (BF-BOF) steel mills in Northern, Western, Southern Europe and Turkey. These countries are selected on the basis that they include the major steel mills, are reliant on imports, and the US is a known supplier of HV HCC. Some of the mills in the addressable markets have dedicated terminals for receiving cargoes, while others, e.g. within Germany, Belgium or Austria, rely more on vessels discharging at the Amsterdam, Rotterdam, and Antwerp (ARA) ports and then river barging to the mill. Key customers within this addressable market include Arcelor Mittal, with plants in France, Belgium, Spain and Germany and Tata Europe, with the mills at Port Talbot in the UK, and

Ijmuiden in the Netherlands.

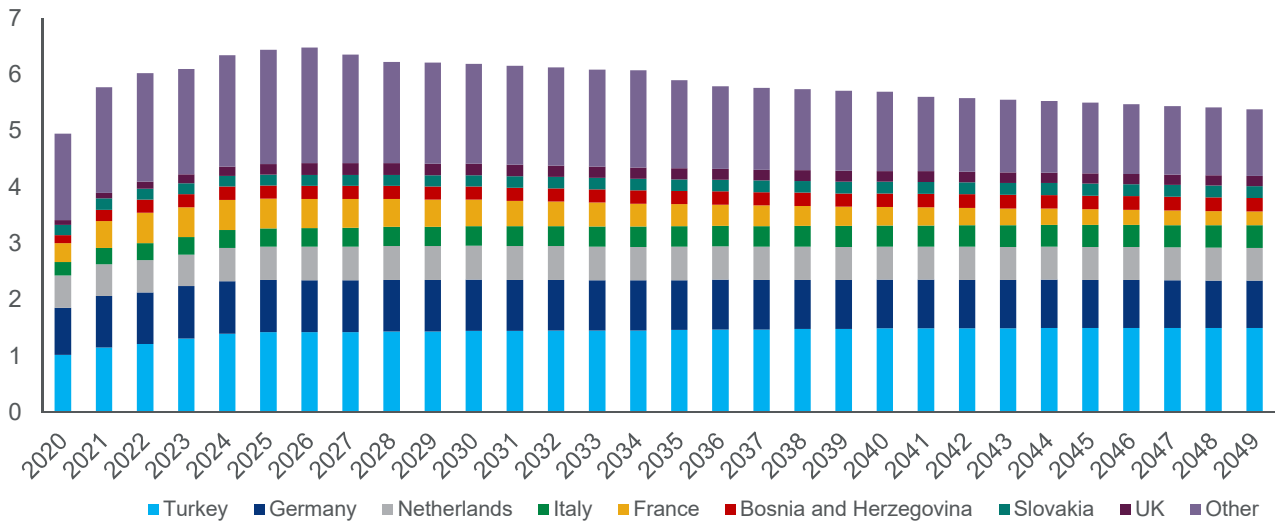
2.29. Steel mills in several other countries are considered as secondary targets, including Hungary, Czech Republic, Slovakia and Bosnia and Herzegovina. These countries are relatively small consumers/individual mills, with nearby domestic coking coal production (Czech Republic) and less accessible to the seaborne market. We expect coking coal production from the Czech Republic will end in 2023. However, offtake potential may still exist, if particular coal types offer value to the customer blend compared to their domestic or landborne options.

2.30. There are also other opportunities for West Cumbria Mining coal, including as feedstock into the specialist ferro-alloy market.

2.31. In order to refine the addressable market size for West Cumbria Mining, Wood Mackenzie has compiled estimates of the HV coking coal contribution in the addressable market countries, compiled primarily using trade statistics. The observed average is around 20%, however individual plant blend references are believed to range from zero to 25%. TKS and Salzgitter, with mills in Germany, have a very low volatile percentage blend and do not typically use high-volatile coals.

2.32. Wood Mackenzie estimates the HVA coking coal addressable market to be between 5-6 Mtpa over the 2021-2049 period. This is a competitive market, but given that most, if not all, of the current supply is coming from US producers, we consider that West Cumbria Mining is in a good strategic location to capture market share to allocate all of its saleable coal within the addressable market. Figure 2.5 shows Wood Mackenzie's estimate of the HVA demand for Europe, by country.

Figure 2.5: West Cumbria Mining's HVA coking coal addressable market, 2020-2049 (Mt)



Source: Wood Mackenzie

2.33. West Cumbria Mining's coal is expected to be marketable in Europe, given that there is significant demand for HVA HCC in the region. The likely role of the coal (as with all coking coal) is as a blend component and, therefore, West Cumbria Mining's coal would displace a proportion of the overall coking coal required by each steelmaker.

2.34. The Woodhouse mine is expected to be cost-competitive in the European market, benefiting from relatively low freight charges. As a result, West Cumbria Mining is expected to take market share from high-cost US HV HCC producers that currently supply the region. European seaborne coking coal demand is forecast at 53.9 Mt in 2029. Once at full production of 2.7 Mtpa, West Cumbria Mining is expected to obtain a 5% share of the European seaborne coking coal market.

Impact of the Woodhouse Mine on the European Steel Industry

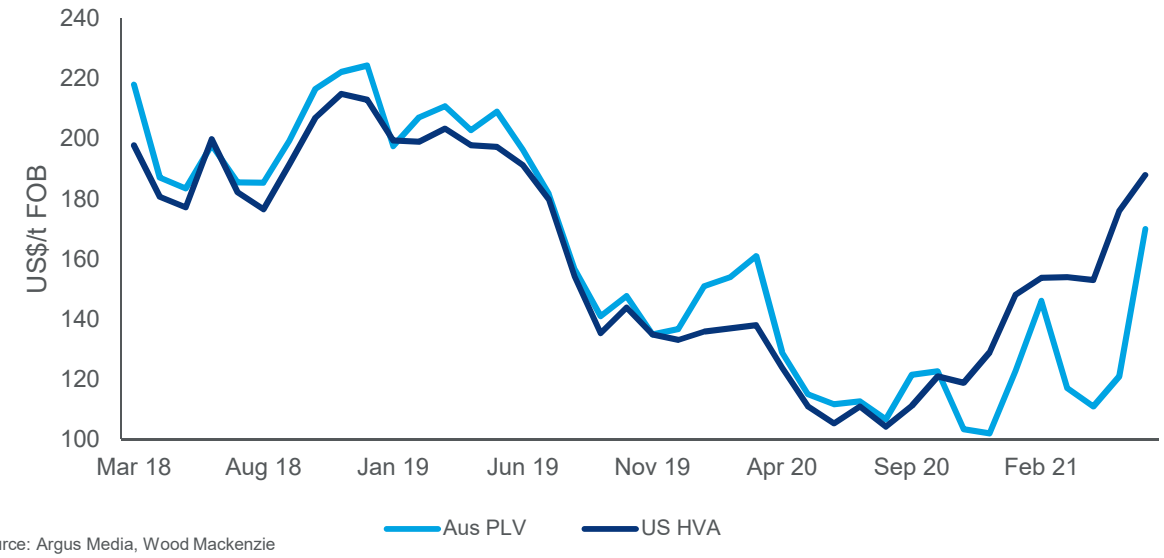
2.35. In this section, we analyse the potential impact of the Woodhouse mine development on the European steel industry, in particular, whether production of coking coal in the UK will slow down the transition towards a greater level of EAF steel production or other low-carbon steel production processes. The analysis focuses on

the likelihood of Woodhouse significantly reducing coking coal procurement costs for European BF-BOF steelmakers and, therefore, increasing the cost-competitiveness of BF-BOF production relative to EAF production and other processes.

2.36. Low-volatile coal is considered the most important component of coking coal blends, due to its ability to provide strength to the coke. Furthermore, low-volatile coal has a higher carbon content than high-volatile coal and, therefore, produces more coke per tonne of feedstock. As a result, the price for low-volatile coal sets the international benchmark for traded coking coal. The primary benchmark is the FOB Australia premium, low-volatile hard coking (PLV HCC) spot price. All other coking coal types are priced at differentials relative to the benchmark PLV HCC price.

2.37. The following chart (Figure 2.6) shows the trend in the Australian PLV HCC and US HVA prices in the last few years. Between March 2018 and September 2020, the HVA price was discounted to the Australian PLV HCC price by 3% (US$7/t) on average. Since October 2020, China has banned imports of Australian coal, and, given the resulting change in trade flows, the relativity has reversed with US HVA selling at a premium to Australian PLV HCC price. While the timing is uncertain, we expect China will recommence imports of high-quality coking coals from Australia over time, which will result in a return of the Australian PLV HCC premium over the US HVA price.

Figure 2.6: Australian premium, low-vol hard coking coal and US High Vol A coking coal prices, FOB, 2018-2021 (US$/t)



Source: Argus Media, Wood Mackenzie

2.38. The commissioning of the Woodhouse mine, which will produce HVA-quality coal, is expected to have minimal impact on the PLV HCC spot price. However, development of the mine would increase supply of low-cost HVA coal into the European market, which could lead to a larger HVA discount to the PLV HCC price.

2.39. Historically, the maximum discount of the US HVA price to the PLV HCC price has been valued at ~15%, outside of times of serious supply disruption (e.g. Australian cyclones). To assess the potential change in European BF-BOF steelmakers' costs as a result of the development of Woodhouse, we have assumed that the US HVA price would be discounted to the PLV HCC price by 15%, while the US HVB price would be discounted by 20%. While this is not Wood Mackenzie's base case forecast, the assumption is used to quantify the maximum impact on steelmakers' costs. The assumed discounts can be interpreted as a low-case scenario for US HVA and HVB prices relative to Wood Mackenzie's base case PLV HCC price forecast.

2.40. In terms of the pricing of the West Cumbria Mining's coal, Wood Mackenzie estimates that the product will achieve a net penalty of US$3.7/t relative to the US HVA price – the West Cumbria coal is expected to achieve a premium of US$4.0/t over US HVA for the low ash content, but would incur a penalty on the high sulphur content of US$7.7/t.

2.41. The following table (Table 2.4) shows a hypothetical coking coal blend for a European steelmaker. It's important to note that blends vary significantly between plants due to different blast furnace targets, while blends also change due to market conditions and coal availability. The coking coal blend shown comprises US HVA, US HVB, US low-vol, Australian tier-2 HCC, Australian low-vol coals and semi-soft/semi-hard coking coals. In this first case, the Woodhouse mine is not included in the coking coal blend. The table includes Wood Mackenzie's price forecasts for the coals in 2029 shown in Real terms, on an FOB and CIF ARA basis. The

average price of the coking coals purchased is US$140.5/t.

Table 2.4: Hypothetical European steelmaker coking coal blend, excluding West Cumbria Mining coal

Coal type	Coal blend %	WM FOB price forecast, 2029 (US$/t)	Vessel charge (US$/t)	WM CIF Europe price forecast, 2029 (US$/t)
US HVA	14	136.0	9.0	145.0
US HVB	6	116.0	9.0	125.0
Australian Tier 2 HCC	25	120.0	12.8	132.8
US LV	15	138.0	9.0	147.0
Australian PLV/PMV	30	139.0	12.8	151.8
Other (Semi-soft, semi-hard)	10	107.0	12.8	119.8
Average coal price (US$/t)				**140.5**

Source: Wood Mackenzie

2.42. The following table (Table 2.5) shows a different coking coal blend, which includes 5% West Cumbria Mining coal and a lower proportion of US HVA coal at 9%. The proportions of all other coal types are the same as in the previous blend. In this scenario, coking coal production at Woodhouse results in a maximum reduction of the US HVA price from US$136/t to US$118/t and a maximum reduction in the US HVB price from US$116/t to US$111/t. As a result, the average price of the coking coals purchased is US$137.4/t, representing a fall of US$3.1/t, compared to the coking coal blend excluding West Cumbria Mining coal.

Table 2.5: Hypothetical European steelmaker coking coal blend with 5% West Cumbria Mining coal

Coal type	Coal blend %	WM FOB price forecast, 2029 (US$/t)	Vessel charge (US$/t)	WM CIF Europe price forecast, 2029 (US$/t)
US HVA	9	118.2	9.0	127.1
US HVB	6	111.2	9.0	120.2
WCM HV	***5***	***114.5***	***6.3***	***120.7***
Australian Tier 2 HCC	25	120.0	12.8	132.8
US LV	15	138.0	9.0	147.0
Australian PLV/PMV	30	139.0	12.8	151.8
Other (Semi-soft, semi-hard)	10	107.0	12.8	119.8
Average coal price (US$/t)				**137.4**

Source: Wood Mackenzie

n.b. The price of the West Cumbria Mining coal reflects a US$3.7/t discount to the HVA price. The HVA and HVB prices are assumed to be discounted to the PLC HCC price by 15% and 20% respectively following the development of the Woodhouse mine.

2.43. The following table (Table 2.6) shows an alternative coking coal blend that uses 20% West Cumbria Mining coal and no US HVA or HVB coal. The same price assumptions for West Cumbria Mining coal, US HVA and US HVB are used as in the 5% West Cumbria Mining blend. For this blend, the average price of the coking coals purchased is US$136.8/t, representing a fall of US$3.7/t from the coking coal blend excluding West Cumbria Mining coal.

Table 2.6: Hypothetical European steelmaker coking coal blend with 20% West Cumbria Mining coal

Coal type	Coal blend %	WM FOB price forecast, 2029 (US$/t)	Vessel charge (US$/t)	WM CIF Europe price forecast, 2029 (US$/t)
US HVA	0	118.2	9.0	127.1
US HVB	0	111.2	9.0	120.2
WCM HV	***20***	***114.5***	***6.3***	***120.7***
Australian Tier 2 HCC	25	120.0	12.8	132.8
US LV	15	138.0	9.0	147.0
Australian PLV/PMV	30	139.0	12.8	151.8
Other (Semi-soft, semi-hard)	10	107.0	12.8	119.8
Average coal price (US$/t)				**136.8**

Source: Wood Mackenzie

n.b. The price of the West Cumbria Mining coal reflects a US$3.7/t discount to the HVA price. The HVA and HVB prices are assumed to be discounted to the PLC HCC price by 15% and 20% respectively following the development of the Woodhouse mine.

2.44. The analysis above indicates that following the development of Woodhouse European steelmakers would achieve a maximum cost saving of between ~US$3-4/t on the average procurement cost of coking coal depending on the proportion of West Cumbria Mining coal purchased. Steelmakers use approximately 0.6 tonnes of coking coal per tonne of steel produced and, therefore, the maximum cost saving per tonne of steel would be between US$1.6-2.4/t.

2.45. As a result, the annual cost reduction tor a steel mill with 1.0 Mtpa capacity would be small, at US$1.6 M p.a. to US$2.4 M p.a. That level of cost saving alone is not significant enough to impact a steelmaker's decision to switch from BF-BOF steel production to another process. As a comparison, the capital expenditure to replace a BF-BOF steel mill with a hydrogen-based DRI with EAF capacity is ~US$1 Bn for 1 Mtpa capacity.

2.46. In summary, the cost reduction following the development of the Woodhouse mine would be negligible and likely to have no impact on the cost-competitiveness of BF-BOF steel production in Europe. Therefore, development of the mine will not slow down the transition towards EAF production or other low-carbon steel production processes in Europe in the future.

3. GHG Emissions Analysis

3.1. The objective of this chapter is to benchmark the greenhouse gas (GHG) emissions of West Cumbria Mining's Woodhouse mine against competing international metallurgical coal producers. GHG emissions are benchmarked on a mine site basis, as well as on a delivered Europe basis, to assess the difference in GHG emissions from producing metallurgical coal in the UK compared to importing from international suppliers (e.g. from the US, Russia or Australia). The change in global GHG emissions following the development of the Woodhouse mine is also assessed.

West Cumbria Mining Emissions

3.2. GHG emissions are defined as the seven greenhouse gases covered by the UNFCCC (United Nations Framework Convention on Climate Change) — carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6), and nitrogen triflouride (NF3). All values in this report are presented in carbon dioxide equivalent (CO_2-e), which is a metric used to compare the emissions of the different greenhouse gases based upon their global warming potential (GWP). Global warming potential (GWP) factors are used to convert greenhouse gases to carbon dioxide equivalent

3.3. Emissions are classified in line with the Greenhouse Gas Protocol's Corporate Standard. This standard defines the three Scopes of emissions, as outlined in the table below.

Table 3.1: Emissions classification by scope

Scope	Name	Description
Scope 1	Direct GHG emissions	Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, mining equipment, etc.; emissions from chemical production in owned or controlled process equipment.
Scope 2	Electricity indirect GHG emissions	Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.
Scope 3	Other indirect GHG emissions	Scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; transportation of products to end-users; and use of sold products and services.

Source: Greenhouse Gas Protocol's Corporate Standard

3.4. The mining, processing and transport of coal are highly mechanised, using fossil fuels in the form of direct combustion and indirectly through electricity consumption, predominately produced off site. The transportation of coal from mines to ports and end-users is dominated by fossil fuel combustion via trains, truck, and barge methods. Transport using electricity comes from rail and conveyor systems.

3.5. The largest emissions component from the coal emissions value chain arises from the liberation of methane during mining. Methane is vented or escapes into the atmosphere, when it is not captured for power generation or sold to third parties. The largest emitters of methane are generally underground mines. Deep seams retain their methane within the deposit; while shallower coal seams at surface mines have generally released most of their methane prior to mining. Methane content is variable between coal mining regions across the globe.

3.6. The choice of mining equipment drives where the scope of emissions resides. Surface mines can use electricity, diesel or a combination of the two to power major earthmoving equipment including shovels and draglines. Underground mines are dominated by electricity to power equipment. The energy mix in a country's electricity grid plays an important role in determining emissions from a mine. In general, the most energy intensive component of surface mining is prime earth or waste movement. The most energy intensive components of underground mines are longwalls/continuous miners along with ventilation and pumps.

3.7. The following table (Table 3.2) shows the emissions data provided by West Cumbria Mining for 2029, which is the first year that the Woodhouse mine will be operating at full production. Emissions are broken down into

Scope 1, Scope 2 and Scope 3 and two scenarios are shown – '*Likely Mitigated'* and '*Worst*' cases. Emissions are shown on an absolute basis (tonnes of CO_2e), as well as on an intensity basis (tonnes of CO_2e divided by tonnes of washed coal production). It's important to note that the emissions data provided by West Cumbria Mining has not been independently validated by Wood Mackenzie.

3.8. The *Likely Mitigated* case has an emissions intensity of 16.27 $kgCO_2e/t$, approximately 80% lower than the Worst case. In the *Likely Mitigated* case, emissions from mining operations and electricity consumption are significantly lower.

Table 3.2: West Cumbria Mining emissions estimates for Woodhouse, 2029

Scenario	Scope	Activity	Absolute Emissions (tonnes CO_2e)	Emissions Intensity ($kgCO_2e/t$)
Likely Mitigated Case	Scope 1	Fuel use on site from mining related equipment	0	0
		Capturable fugitive emissions from mining operations	25,996	9.35
		Company owned vehicles	0	0
		Land Use	-28	-0.01
	Scope 2	Electricity consumption	0	0.00
	Scope 3	Upstream distribution	285	0.10
		Rail distribution	17,241	6.20
		Waste	91	0.03
		Staff travel	1,650	0.59
		Purchased goods and services	0	0.00
	Total		**45,235**	**16.27**
Scenario	**Scope**	**Activity**	**Absolute Emissions (tonnes CO_2e)**	**Emissions Intensity ($kgCO_2e/t$)**
Worst Case	Scope 1	Fuel use on site from mining related equipment	1,005	0.36
		Capturable fugitive emissions from mining operations	191,783	68.99
		Company owned vehicles	24	0.01
		Land Use	-28	-0.01
	Scope 2	Electricity consumption	16,154	5.81
	Scope 3	Upstream distribution	291	0.10
		Rail distribution	17,241	6.20
		Waste	91	0.03
		Staff travel	1,841	0.66
		Purchased goods and services	0	0.00
	Total		**228,403**	**82.16**

Source: West Cumbria Mining

GHG Emissions Benchmarking

3.9. The Woodhouse mine's GHG emissions have been assessed relative to other global metallurgical coal mines using Wood Mackenzie's *Emissions Benchmarking Tool (EBT)*. The objective of the assessments presented in the EBT is to calculate the GHG emissions related to metallurgical coal operations, in line with the Greenhouse Gas Protocol. Wood Mackenzie employed a consistent methodology in the assessment of GHG emissions to enable the comparison of assets, companies, countries and regions on a like-for-like basis.

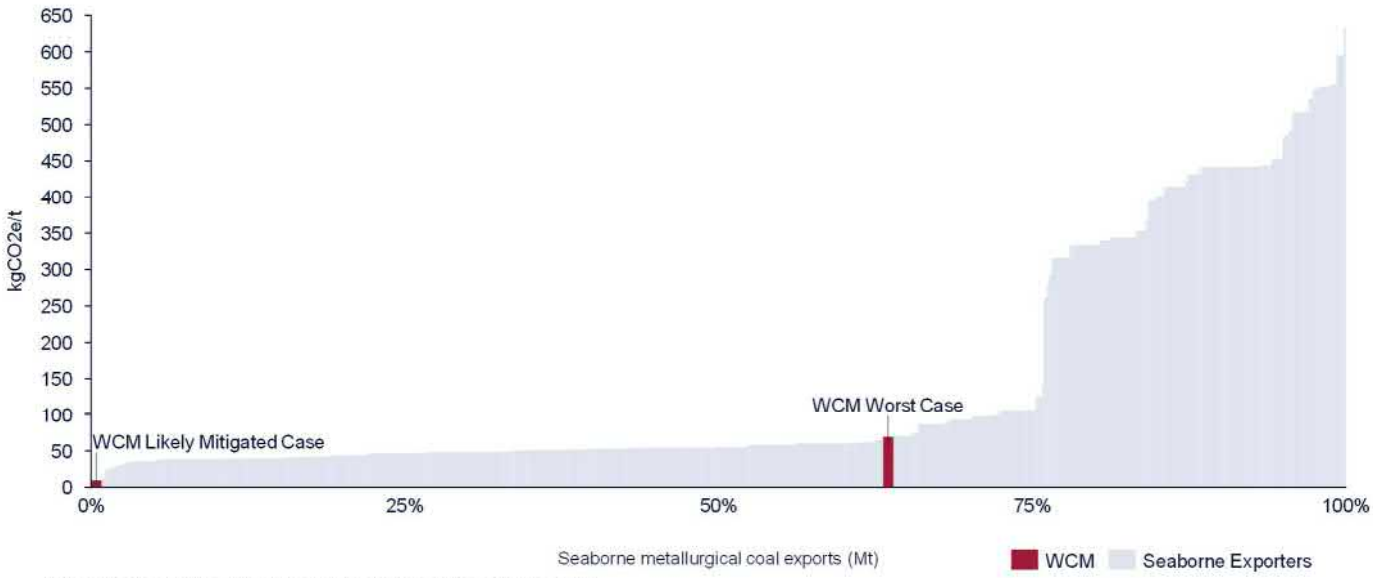
3.10. All companies' emissions assessments are undertaken at the asset level, using ownership and location to combine company- and country-level emissions. All mines' GHG emissions are shown on an unmitigated basis. A three-stage process is employed in the assessment of emissions, as outlined below.

Figure 3.1: Wood Mackenzie's emissions assessment process

1. Definition & Planning	2. Execution	3.Reconciliation
Map Emissions: Identify the main emissions sources for each section of the value chain **Identify Drivers**: Identify drivers of emissions for each section of value chain (e.g. fuel consumption, power consumption) **Map Data**: Highlight data sources in existing models and gaps **Formulate**: Put together formula to calculate emissions	**Research:** undertake bespoke research for populate data gaps and populate, retaining Scope notation **Compile**: Combine bespoke data with existing data and common factors to be used across commodities **Model Emissions**: Apply standardised assessment formulae to full dataset	**Reconcile:** compare results with company sustainability reports **Liaise**: contact with key companies regarding emissions assessment to understand where differences arise **Revise**: Integrate revisions to underlying drivers into input data

3.11. The following chart (Figure 3.2) shows Woodhouse's position on the global seaborne metallurgical coal Scope 1 emissions curve in 2029, which is shown on a CO_2e per tonne of washed coal basis (t CO2e/t). The X-axis shows the seaborne metallurgical coal production volume (on a percentage basis) and the Y-axis shows each mine's emissions intensities. The position of West Cumbria Mining's two emissions scenarios are highlighted. Under the *Likely Mitigated* case, the Woodhouse mine is located at the low end of the Scope 1 emissions curve. Woodhouse is located in the third quartile of the Scope 1 emissions curve in the *Worst* case. However, the emissions intensity is significantly lower than the group of underground mines at the top of the curve, which exhibit Scope 1 emissions intensities of between 300 and 630 $kgCO_2e/t$.

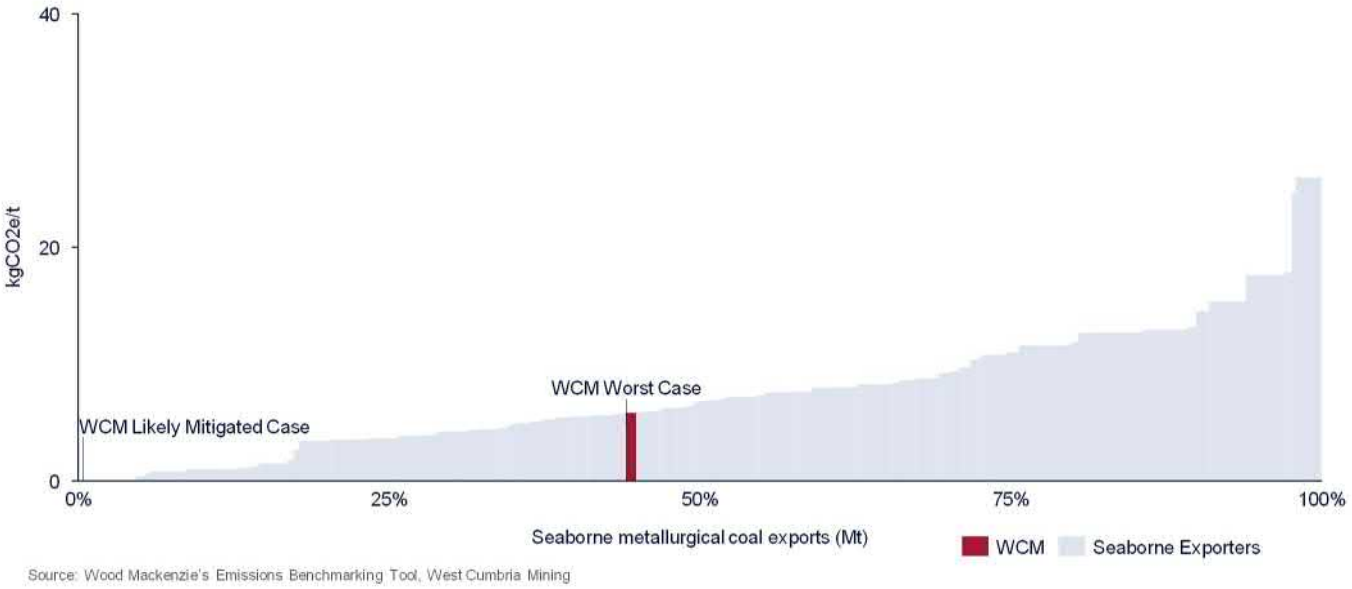
Figure 3.2: Global seaborne metallurgical coal Scope 1 emissions, 2029 (kg CO2e /t)



Source: Wood Mackenzie's Emissions Benchmarking Tool, West Cumbria Mining

3.12. The following chart (Figure 3.3) shows Woodhouse's position on the global seaborne metallurgical coal Scope 2 emissions curve in 2029. Under the Worst Case Scenario, Woodhouse is located favourably in the second quartile of the emissions curve. Under the *Likely Mitigated* case, the Woodhouse mine's Scope 2 emissions are zero. In this scenario, West Cumbria Mining assumes that all purchased electricity will be bought using a green tariff to ensure that they are from zero-emission renewable energy sources such as wind and solar.

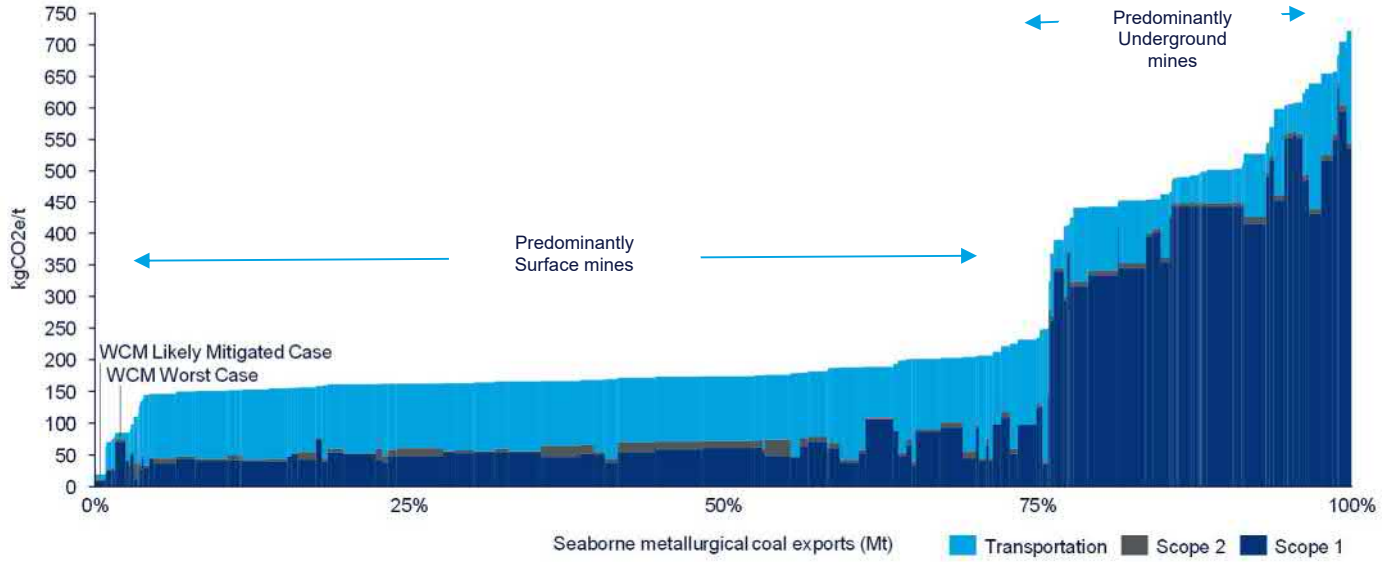
Figure 3.3: Global seaborne metallurgical coal Scope 2 emissions, 2029 (kg CO2e /t)



3.13. The following chart (Figure 3.4) shows the global seaborne metallurgical coal Scope 1+2 + transportation emissions curve in 2029 on a delivered Europe basis. For all seaborne metallurgical coal producers, we calculated the transport emissions for delivery to Europe (Rotterdam), which includes trains, truck, barge and ocean freight. Ocean freight emissions were calculated for each mine taking into account the shipping distance and utilizing assumptions on bunker fuel consumption and vessel size. The purpose of this chart is to compare the difference in GHG emissions of producing metallurgical coal in the UK to supply the continental market with importing metallurgical coal from overseas. Under the two scenarios for the Woodhouse mine, emissions associated with coal transportation by rail and ocean freight to Rotterdam have been estimated. The rail emissions have been provided by West Cumbria Mining, while Wood Mackenzie has estimated ocean freight emissions following the same methodology used for all other mines. Woodhouse's total transportation emissions intensity is estimated at 9.78 kg CO_2e / t, including 6.20 kg CO_2e / t for rail to Redcar and 3.58 kg CO_2e / t for ocean freight to Rotterdam.

3.14. The chart shows that there are significant emissions associated with the transportation of coal from international suppliers through ocean freight. Under both scenarios, the Woodhouse mine is located at the low end of the emissions curve, supported by the low emissions from coal transportation. The UK currently imports metallurgical coal, primarily from the US, Russia and Australia, and the emissions associated with importing from these countries would be significantly higher than producing coal in the UK for the local market.

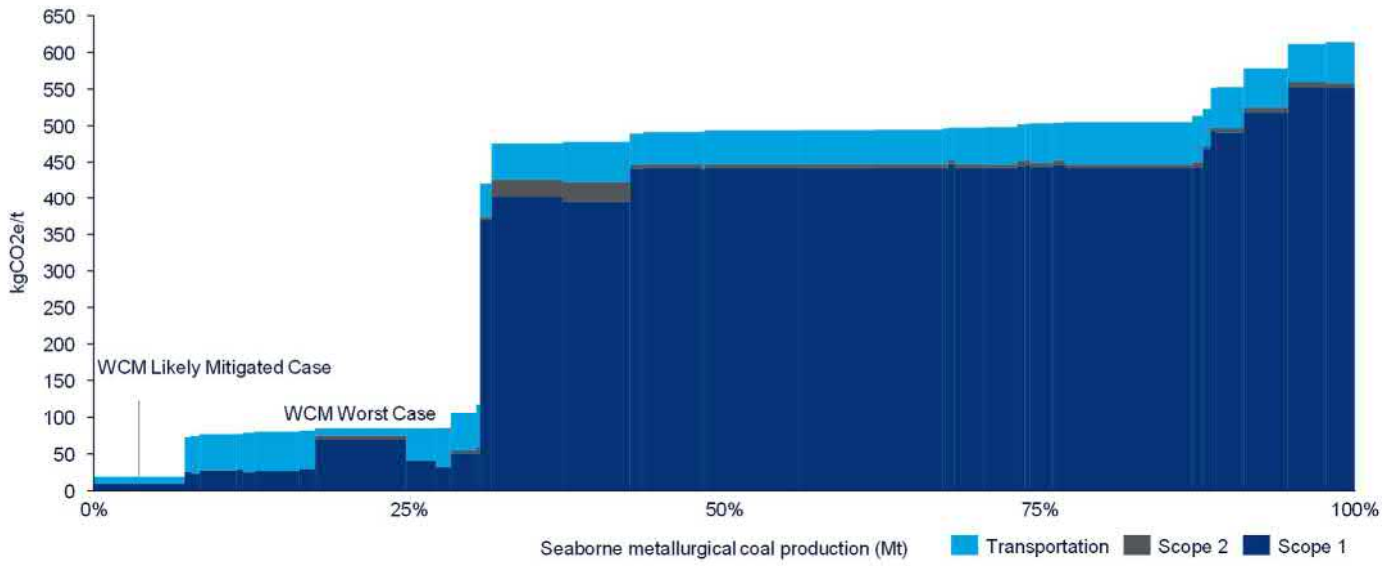
Figure 3.4: Global seaborne metallurgical coal Scope 1+2 + transportation emissions, delivered Europe, 2029 (kg CO_2e /t)



Source: Wood Mackenzie's Emissions Benchmarking Tool, West Cumbria Mining

3.15. As outlined in Chapter 2, the main competitors for West Cumbria Mining will be US producers of HVA coking coal, given their comparable coal qualities. The following chart (Figure 3.5) shows the Scope 1+2 + transportation emissions delivered to Europe for US HVA coal producers relative to West Cumbria Mining. Under both scenarios, Woodhouse's emissions intensities are significantly lower than HVA coking coal imported from the US.

Figure 3.5: US Producers of High-Vol A coking coal Scope 1+2 + transportation emissions, delivered Europe, 2029 (kg CO_2e /t)

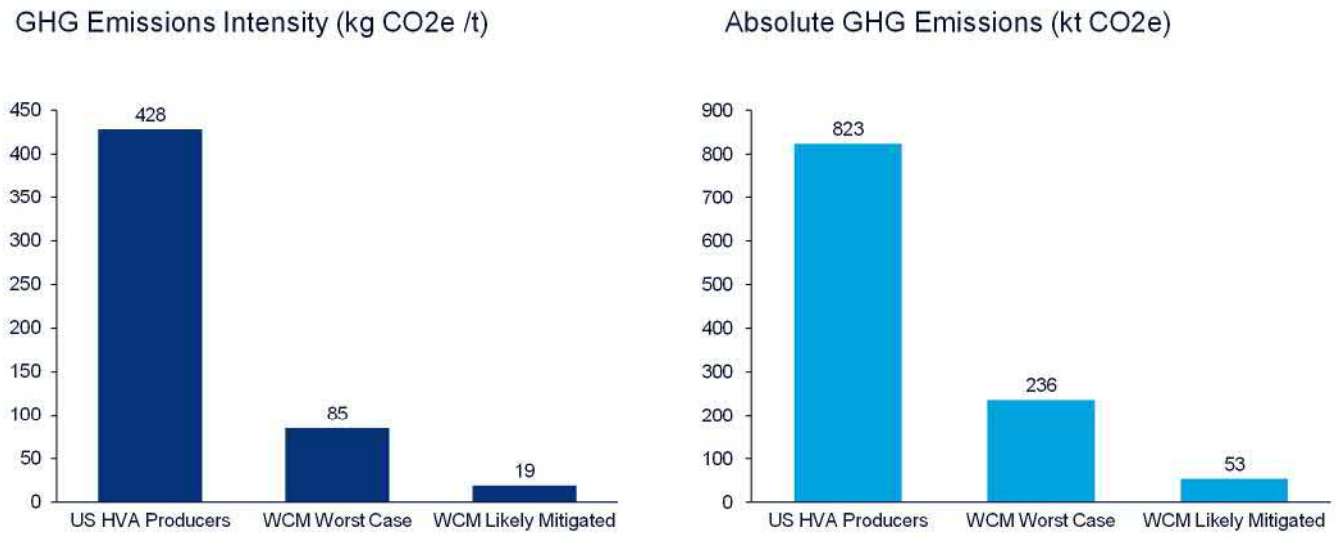


Source: Wood Mackenzie's Emissions Benchmarking Tool, West Cumbria Mining

3.16. Our competitive analysis above indicated that West Cumbria Mining is expected to take market share from high-cost US HVA HCC producers, currently suppling the European market. The following chart (Figure 3.6) compares the emissions intensities and absolute emissions of West Cumbria Mining and the US HVA production that the Woodhouse mine is expected to displace. The emissions shown for US operations are a weighted average of all US mines producing HVA quality coal.

3.17. The West Cumbria Mining *Likely Mitigated* and *Worst* cases (on a delivered Europe basis) have GHG emissions intensities in 2029 at 19 kg CO_2e / t and 85 kg CO_2e / t, respectively, which is significantly lower than average US HVA production at 428 kg CO_2e / t. Similarly, West Cumbria Mining's absolute emissions are much lower at 53 kt CO_2e in the *Likely Mitigated* case and 236 kt CO_2e in the *Worst* case, compared to 823 kt CO_2e for average US HVA production. The analysis indicates that the development of the Woodhouse mine would displace a volume of higher GHG emitting US coking coal production, therefore, leading to a global reduction in GHG emissions of between 587-770 kt CO_2e per annum.

Figure 3.6: Comparison of West Cumbria Mining Scope 1+2 + transportation emissions versus average US High vol A production, delivered Europe, 2029 (kg CO_2e /t)



Source: Wood Mackenzie's Emissions Benchmarking Tool, West Cumbria Mining

3.18. Under the two scenarios for the Woodhouse mine provided by West Cumbria Mining, the emissions intensities are very low, on a mine-site basis, relative to competing seaborne metallurgical coal suppliers. On a delivered Europe basis, there are also significant emissions associated with the transportation of coal from international suppliers, in particular through ocean freight. As a result, the emissions associated with producing metallurgical coal in the UK to supply the domestic market are expected to be much lower than importing coal from overseas, including US producers of HVA coal, the main competitors of West Cumbria Mining. Furthermore, development of the Woodhouse mine will displace high-cost US producers of HVA coal, which have much higher emissions than West Cumbria Mining. Therefore, the development of the mine is expected to lead to a reduction in global GHG emissions of between 587-770 kt CO_2e per annum.

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Land at Woodhouse Colliery, Cumbria

Proof of Evidence

on

Landscape and Visual Matters by John M Flannery BA, DipLA, FLI

Pins Reference: APP/H0900/V/21/3271069

Application Reference: 4/17/9007

Prepared on behalf of West Cumbria Mining Ltd

10 August 2021

Contents

Appendices (separately bound)

Summary of Proof of Evidence

1. Introduction and Scope of Evidence

1.1. My name is John Flannery and I have operated as a sole practitioner since 2017 specialising in landscape and visual impact assessment. Prior to 2017, I was a Technical Director at SLR for 2 years and UK Head of Landscape at ERM from 2006 to 2015, both international environmental practices.

1.2. I hold a Bachelor of Arts Degree and Postgraduate Diploma in Landscape Architecture from Leeds Metropolitan University. I am a Fellow of the Landscape institute and a Chartered Landscape Architect. I am also an Examiner for the Landscape Institute with regards to the Pathway to Chartership.

1.3. I have almost 40 years post qualification experience in landscape planning, design and environmental matters. I have provided professional advice on landscape, townscape and visual impact assessment including detailed design for a wide range of developments in the UK, Ireland and internationally. I am currently leading the technical review of the landscape and visual assessments for the Birmingham to Manchester section of HS2. At SLR, I led the team that carried out the landscape and visual assessment of the North West Coast Connection for National Grid, which was routed from Carlisle to Morecambe Bay.

Background

1.4. An application for a full planning permission was originally submitted in May 2017 (Ref 4/17/9007 on land at Woodhouse Colliery, Cumbria (the 'Appeal Site'). The description of development is as follows:

"The development of:

- *a new underground metallurgical coal mine and associated development including: the refurbishment of two existing drifts leading to two new underground drifts; coal storage and processing buildings; office and change building; access road; ventilation, power and water infrastructure; security fencing; lighting; outfall to sea; surface water management system and landscaping at the former Marchon site (High Road) Whitehaven;*

- *a new coal loading facility and railway sidings linked to the Cumbrian Coast Railway Line with adjoining office / welfare facilities; extension of railway underpass; security fencing;*

- *a new underground coal conveyor to connect the coal processing buildings with the coal loading facility."*

1.5. This is referred to as the 'Proposed Development' throughout my evidence.

1.6. The application was accompanied by a Landscape and Visual Impact Assessment (LVIA) produced by Chartered Landscape Architects at Stephenson Halliday.

1.7. The Secretary of State called in the application for full planning permission in March 2021.

1.8. The delegated Committee Report from March 2019, paragraph 5.9 states that specialist advice was sought from technical consultee White Young Green (WYG), now Tetra Tech. The report also states that WYG did not object to the planning application subject to the conditions of the application.

1.9. I was instructed by West Cumbria Mining Ltd (the 'Appellant') in June 2021 to carry out an independent review of the work undertaken take review and to give my expert opinion at the forthcoming planning inquiry as a landscape and visual expert witness. I have undertaken a technical review of the landscape and visual impact assessment chapter submitted within the Environmental Statement and will provide my opinion as to its content and suitability. I will also provide evidence collected during my own site visit, including the collection of up to date viewpoint photography, a review of the committee report with regard to the landscape and visual impact assessment and any other issues raised during the preparation of this proof.

2. Review of submitted Landscape and Visual Impact Assessment

Scope of the assessment

2.1. It is my opinion that the LVIA was scoped in accordance with the requirements of CCC. This included methodology, referencing the appropriate guidance documents and the extent of the study area. Evidence of the approval by CCC 'Comments on WCM LVIA Methodology & Baseline' compiled by WYG on behalf of Cumbria County Council. (A088848-13/06 April 2017) is included in my appendix.

Summary of Assessment Methodology and Significance Criteria

2.2. The LVIA in section 10.3.1 explains that the methodology is based upon the best practice guidance GLVIA3, and this is expanded upon from 10.3.5 to 11. The methodology is set out in full in Appendix 10c of the chapter. It explains the difference between landscape and visual receptors, how judgments regarding susceptibility, value and sensitivity are determined as well as magnitude of change, and how magnitude and sensitivity combine to indicate levels of effect. The appendix also includes the methodology for reporting on the future baseline and cumulative effects. Having reviewed the appendix, I consider the methodology is appropriate for this type of project and meets the requirements of the scoping opinion.

Legislation & Policy Context

2.3. The relevant legislation and policies relevant at the time of writing the LVIA were included. Relevant updates have been reviewed during the writing of this proof.

Baseline Conditions

2.4. An appropriate landscape and visual baseline was included to take account of the main mine site, the conveyor site and the Rail Loading Facility (RLF) site and the value, susceptibility and sensitivities of landscape and visual receptors were assessed using the relevant guidance. Updates to the landscape and visual baseline have been addressed in my proof in terms of viewpoint photography and the publication of the Copeland Settlement Landscape Character Assessment 2020.

2.5. A ZTV was produced based on a dome height of 34m and a RLF height of 15m which was used to inform scoping and the assessment of effect.

Assessment of Landscape and Visual Effects

2.6. Following my review of all relevant documents and plans and a site visit, I concur with the majority of the judgments regarding the level of landscape and visual effects arising from the development. I do not support the assessment of the landscape effect on the Pow Beck Valley during operation as being not significant. It appears that using the landscape character assessment available at the time which included a broader area, led to this under estimate. Carrying out my own assessment and using the more appropriate Copeland Settlement Landscape Character Assessment 2020, I judged the level of effect as moderate adverse, the same as reported in the LVIA, but significant.

Viewpoint photography and Photomontages

2.7. Viewpoint photography has been updated in line with good practice as the baseline has changed since writing the LVIA. Any errors noted during the review, in terms of locations of viewpoint photography, have been addressed.

2.8. I have reviewed the photomontage methodology against the LI TN 06/19 and classify the visualisation as Type 3. I consider that the photomontages have been prepared accordingly and are appropriate for the intended purpose and anticipated users of the visualisations, the stage in the planning application process at the time of preparation and the likely levels of effect. The error in labelling with regard to cylindrical as opposed to planar has been addressed and has no consequence on the accuracy of the photomontages.

3. The Committee Report

3.1. The committee report stated that the LVIA was comprehensively reviewed by WYG (Now Tetra Tech), on behalf of CCC and was found to be robust and the conclusions drawn entirely reasonable. I bring to the attention of the Inquiry that the report was reviewed within WYG by Mary O Connor, a highly respected and knowledgeable individual in the field of LVIA who was a member of the GLVIA3 advisory panel.

3.2. Under conclusions in paras 6.249, the committee report considers that the judgment of moderate adverse and not significant on the landscape of the Pow Beck valley is an

under estimate. The reasoning for this aligns with my opinion in terms of judging the level of effect based on the overall landscape character type which is larger than the Powe Beck Valley. The committee report concludes a significant landscape effect is more likely to arise despite the mitigation measures. Otherwise, the report considers the conclusions of the assessment to be reasonable.

4. Policy Compliance / Compliance with Landscape Character Guidelines

4.1. I consider that the development complies with the relevant policies with regard to landscape and visual and accords with the guidance included in the latest landscape character assessment applicable to the study area.

Proof of Evidence

1. Introduction and Scope of Evidence

1.1. My name is John Flannery and I have operated as a sole practitioner since 2017 specialising in landscape and visual impact assessment. Prior to 2017, I was a Technical Director at SLR for 2 years and UK Head of Landscape at ERM from 2006 to 2015, both international environmental practices.

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- *a new coal loading facility and railway sidings linked to the Cumbrian Coast Railway Line with adjoining office / welfare facilities; extension of railway underpass; security fencing; lighting; landscaping; construction of a temporary development compound, and associated permanent access on land off Mirehouse Road, Pow Beck Valley, south of Whitehaven;*

- *a new underground coal conveyor to connect the coal processing buildings with the coal loading facility."*

1.5. This is referred to as the 'Proposed Development' throughout my evidence.

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1.7. The Secretary of State called in the application for full planning permission in March 2021.

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1.9. I was instructed by West Cumbria Mining Ltd (the 'Appellant') in June 2021 to carry out an independent review of the work undertaken take review and to give my expert opinion at the forthcoming planning inquiry as a landscape and visual expert witness. I have undertaken a technical review of the landscape and visual impact assessment chapter submitted within the Environmental Statement and will provide my opinion as to its content and suitability. I will also provide evidence collected during my own site visit, including the collection of up to date viewpoint photography, a review of the committee report with regard to the landscape and visual impact assessment and any other issues raised during the preparation of this proof.

Scope and Proof of Evidence

1.10. I am familiar with the Appeal Site and its surroundings. I have undertaken a site visit in July 2021 and I have examined the relevant plans and document for the purposes of this Inquiry.

1.11. The evidence which I have prepared and provide for this Inquiry in this Proof of Evidence is given in accordance with the guidance of my professional institution and I confirm that the opinions expressed are my true professional opinions.

1.12. My Proof of Evidence should be read in conjunction with my plans and photographs, included within my appendix: Section A – Plans and Drawings, Section B – Photographic Material and Section C – Other supporting material.

2. Review of submitted Landscape and Visual Impact Assessment

2.1. This is a review of the LVIA chapter dated November 2018 and follows the order of sections as noted at 10.1.2 of that chapter. I will also review the supporting appendices.

Scope of the assessment

2.2. The scope of the LVIA was agreed in the Scoping Opinion dated 1 June 2016 by Cumbria County Council. In the section titled Landscape and Visual, the following requirements were included of relevance to this review.

3.31 The LVIA must be undertaken in accordance with the methodology set out in 'Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3). This should include an assessment of the operational and residual impacts of the continued working of the site upon visual receptors and the site and surrounding landscape.

3.32 Consideration should be given to the guidelines set out in the Landscape Character Guidance and Toolkit (Cumbria Council: March 2011)…..and the following documents should also be considered:

- *West Whitehaven Supplementary Planning Document (Issues and Options)*
- *West Whitehaven Views Analysis;*
- *South Whitehaven Supplementary Planning Document (adopted March 2013)*
- *Landscape Character Assessment of the South Whitehaven Coast (prepared by Friends of the Lake District for the National Trust in May 2006) – this is set out within the West Whitehaven Supplementary Planning Documents (Issues and Options).*

3.33 The scope and visual effects assessment should focus on the visual experience of people viewing the landscape, informed by examination of an agreed selection of representative viewpoints. A study area up to 10km is proposed with a local study area of 5km. The Scoping Report indicates the proposed development is not within any protected landscape area, but is near to residential settlement, public access routes and an area of public access and St Bees Head Heritage Coast, and the wider study area for visual effects assessment may include parts of the Lake District National Park (LDNP).

3.34 It is considered that the LVIA should consider the following:

- *All potential effects upon the landscape and visual receptors;*
- *Effects associated with accommodating mining waste;*
- *Effects during construction, operation, decommissioning and post restoration; and*
- *Planting over the 50 years, setting out landscape parameters for decommissioning and landscape restoration, and identifying related landscape and visual effects.*

3.35 It is advisable to agree the baseline for the assessment of potential landscape and visual effects, the study area for these effects, the Zone of Theoretical Visibility, representative viewpoints, and the scope of assessment and methodology with Cumbria County Council prior to preparing the ES.

3.34 Consideration will need to be given in the Environmental Statement to the potential cumulative and in-combination landscape and visual effects of this proposal in addition to other developments in the vicinity of the site. The detailed comments made by Historic England and Natural England regarding St. Bees Head Heritage

Coast and on general landscape matters and cumulative impacts (Appendix A of their response) should be taken into account. The comments on landscape matters made by the National Trust, the Colourful Coast Partnership, and Friends of the Lake District should also be taken into account.

Summary of Assessment Methodology and Significance Criteria

2.3. The LVIA in section 10.3.1 explains that the methodology is based upon the best practice guidance GLVIA3, and this is expanded upon from 10.3.5 to 11. The methodology is set out in full in Appendix 10c of the chapter. It explains the difference between landscape and visual receptors, how judgments regarding susceptibility, value and sensitivity are determined as well as magnitude of change, and how magnitude and sensitivity combine to indicate levels of effect. The appendix also includes the methodology for reporting on the future baseline and cumulative effects. Having reviewed the appendix, I consider the methodology is appropriate for this type of project and meets the requirements of the scoping opinion.

2.4. The LVIA in sections 10.3.2 & 3 includes a list of the relevant adopted and non-adopted documents and further guidance, as required in the scoping opinion.

2.5. Section 10.2 describes the spatial scope of the LVIA as 10km from the main Marchon site [being the site of the largest and most prominent development] and as agreed with the Cumbria County Council (CCC) and their consultants, WYG. Evidence of this agreement is included in the document 'Comments on WCM LVIA Methodology & Baseline' compiled by WYG on behalf of Cumbria County Council. (A088848-13/06 April 2017). This document includes general and specific comments regarding assessment methodology, baseline description and proposed viewpoint locations and confirms their agreement. A copy of this document is included in my appendix Section C.

Legislation & Policy Context

2.6. Sections 10.4.3 to 10.4.13 include extracts from the then current version National Planning Policy Framework (NPPF) and Planning Practice Guidance of relevance to the LVIA such as those which reference the Heritage Coast, National Park, mineral development including design, restoration and aftercare as well as lighting pollution. The Cumbria Minerals & Waste Local Plan and Copeland Local Plan 2013-2028 are described with policies most relevant to LVIA included under 10.4.12 and 10.4.13.

2.7. It is my opinion that the relevant policies and guidance, current at that time, were referenced in the LVIA as requested in the scoping opinion.

2.8. Since the LVIA was written, the NPPF has been revised in February 2019 and then again in July 2021.

2.9. The NPPF states that *"the purpose of the planning system is to contribute to the achievement of sustainable development"*, with paragraph 8 going on to state that to achieve this the planning system has three overarching objectives: economic, social and environmental.

2.10. The environmental objective is described as: *"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".*

2.11. Paragraph 120 of the NPPF states that planning policies and decisions should: "a) *encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains – such as developments that would enable new habitat creation or improve public access to the countryside; and b) recognise that some undeveloped land can perform many functions such as for wildlife, recreation, flood risk management, cooling shading. carbon storage or food production and c) give substantial weight to the value of using brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land "*

2.12. Paragraphs 126-136 focus on achieving well-designed places and promote good design of the built environment. This approach is enshrined in Paragraph 127, which states:

"Planning policies and decisions should ensure that developments:

- *Will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;*
- *Are visually attractive as a result of good architecture, layout and appropriate and effective landscaping;*
- *Are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities);*
- *Establish or maintain a strong sense of place, using the arrangement of streets, spaces, building types and materials to create attractive, welcoming and distinctive places to live, work and visit;*
- *Optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (including green and other public space) and support local facilities and transport networks; and*
- *Create places that are safe, inclusive and accessible and which promote health and well- being with a high standard of amenity for existing and future users and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience".*

2.13. Section 15 of the NPPF relates to the conservation and enhancement of the natural environment, with Paragraph 174 setting out that planning policies and decisions should look to achieve the above by *"protecting and enhancing valued landscapes…."* and *"recognising the intrinsic character and beauty of the countryside…".*

2.14. Paragraph 185 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

2.15. Similarly, the Cumbria Minerals and Waste Local Plan now covers the period 2015 – 2030 (as opposed to 2028) and was revised in 2017. From a review of the revision, it appears that the updates are not additional topic matters which need to be considered further in my evidence.

Baseline Conditions

Main mine site

2.16. The LVIA includes Figures 10.1 – 10.8 to support the descriptions of baseline conditions relating to existing landscape character, local landscape elements and features, landscape planning designations and visual receptors. I have reviewed these plans and find them comprehensive and helpful in understanding the baseline. They variously describe the location and extent of landscape designations and landscape character types and how these relate to the 10km study area and the 5km detailed study area. Each figure also includes the location of all 14 representative viewpoints.

2.17. Figures 10.4 – 10.8 show the Zone of Theoretical Visibility of the Coal Handling and Process Plant (CHPP) as well as the Rail Loading Facility (RLF) in relation to landscape designations, landscape character, recreational receptors and representative viewpoints.

2.18. As noted on Figure 10.4, the ZTV has been calculated using the following parameters:

- *Dome 34m height*
- *RFL 15m height*
- *Viewer's height 2m above ground level*
- *OS Terrain 50 (50m grid)*
- *The visibility map is based on a bare earth model of the landform and does not show any effects from obstacles such as buildings and vegetation.*

2.19. Much of the description in the following paragraphs is extracted from the LVIA and I am satisfied with this content.

2.20. There are two areas of above ground development: the main mine site (Macron site) on the former Marchon site and the RLF within the Pow Beck Valley to the south of

Whitehaven. The main mine site will be located on the southern part of the former chemical works which has been in industrial use since the 1900's as a coal mine, anhydrite mine and as a large chemical works. The works closed and the site was cleared in 2006. The brownfield site comprises extensive concrete pads/footings and access roads at various levels, partly covered in moss and weeds. A security gatehouse providing access off the High Road is the only built form remaining from the works.

2.21. The topography of the Macron site dips from the High Road on the eastern boundary to a low point in the centre. To the south of the Macron site is the rising landform of the closed and restored Ufex Raffinate landfill site, vegetated with grass and occasional dwarf scrub. To the west, the landform rises steeply again, and the banks are formed by the restored Hutbank landfill site. Beyond this is the higher ground of the St Bees Heritage Coast which is characterised by rolling agricultural fields to the steep red sandstone cliffs at the coastal edge. The coast at its closest point is located within 1km to the north west.

2.22. To the north east of the Macron site is Woodhouse, the south westerly extent of Whitehaven's residential development and to the south is the village of Sandwich.

2.23. In paragraph 10.5.11, the report notes that it is important to be cognisant of the historical element of the site and the legacy of industrial development despite the existing site in its present state. It is worth noting that during my site visit, the site was active with dog walkers despite the site being closed and surrounded by fencing.

2.24. Paragraphs 10.5.12 – 10.5.15 describes the future baseline and includes references to outline consent for a large residential development referred to in the assessment as Story Homes Phase 1 and 2. These future baseline developments were dealt with in the LVIA by labelling them as Dwelling Groups 1 to 4 and illustrating there location on Figure 10.9. However, Dwelling Groups 1, 2 and 4 are now built with Group 4 partially built.

RLF site

2.25. The RLF will be located in the Pow Beck valley which is a rural valley comprising mixed arable and pasture agriculture. The flat valley floor is enclosed by relatively steep ground to the west which rises to the coastal sandstone of the St Bees headland, and to the east by more gently rising ground towards the A595. Fields are small, typically bound by hedgerows of mixed quality with frequent trees. Tree belts and small woodland blocks are common on the valley sides. The Cumbria Coast Line runs along the base of the valley as does the Pow Beck watercourse.

2.26. A medium voltage overhead line runs along the eastern edge of the valley near the A595, and some medium scale single wind turbines are visible on higher ground to the south. Whilst the valley itself is rural and agricultural in character, the presence of Mirehouse and Whitehaven to the north and the busy A595 and development along it to the west are noticeable in the vicinity of the Pow Beck site. Further south along the valley towards St Bees, this is felt less strongly, and the valley is less developed.

2.27. During my site visit the difference in the landscape character of the two sites was very apparent. The Pow Beck valley has a distinct landscape quality and tranquillity is only reduced at the proposed site upon the passing of locomotives.

Underground conveyor route

2.28. The only landscape and visual effects will be during the construction and post-construction reinstatement phase. During the operational phase the only landscape or visual effects which could occur would arise from the access points to the conveyor.

2.29. The line of the conveyor would run through agricultural fields south of the main mine site, under the B5345 St Bees Road and down the side of the Pow Beck valley to the RLF.

Landscape character

2.30. The LVIA includes a section on landscape character and confirms that the Marchon site is located in Landscape Character Type (LCT) 5d Urban Fringe as described within the Cumbria Landscape Character Guidance and Toolkit 2011 (CLCGT). The key characteristics are

- *Long term urban influences on agricultural land;*
- *Recreation, large scale buildings and industrial estates are common;*
- *Mining and open cast coal workings are found around Keekle and Moor Row (Flooded remains at Keekle and none operational); and*
- *Wooded valleys, restored woodland and some semi-urbanised woodland provide interest.*

2.31. Further extracts from the CLCGT included within the LVIA regarding urban and industrial influences, dereliction, and encroaching towns, confirms that LCT 5d is the appropriate character type and I would concur with this decision.

2.32. The CLCGT also set out guidelines for landscape change in the LCT with regard to development.

When new development takes place consider opportunities to enhance and strengthen green infrastructure to provide a link between urban areas and the wider countryside. Reinforcing woodland belts, enhancing water and soil quality and the provision of green corridors from and between settlements could all help reinforce landscape and biodiversity features. Careful siting of any new development in non-prominent locations.

2.33. The location and extent of LCT 5d is shown on Figure 10.3 accompanying the LVIA.

2.34. The LVIA confirms that the RLF is located within LCT 4 Coastal Sandstone and its key characteristics are:

- *Coastal sandstone cliffs;*
- *Large open fields;*
- *Prominent hedge banks bound pastoral fields;*

- *Small woodland blocks along valley sides; and*
- *Exposed coastal edge moving to intimate and enclosed farmland inland.*

2.35. The LVIA continues to describe the character of LCT 4 and due to the large area covered by the LCT includes characteristics which are not typical of the more intimate nature of the Pow Beck valley. More relevant are aspects such as '*small blocks of mixed woodland and scrub occur on the valley sides'* and '*The railway follows the shoreline and is generally hidden and discrete feature in the landscape*.'

2.36. The CLCGT also set out guidelines for landscape change in the LCT with regard to development.
Strengthen definition between town and country by using extensive buffer planting to screen the built up areas and reduce the impact of industry.
Reduce the impact of any new buildings by careful siting and design.

2.37. In terms of the Fold LCA for South Whitehaven Coast, the LVIA concludes that the site is located primarily within 'Industrial character area 2:Rhodial site', with the western extent extending into 'Agricultural character area 2: Rhodia grazing land' as defined within the Fold LCA for South Whitehaven Coast. The descriptions of these areas correlate with LCT 5d Urban Fringe which they overlay.

2.38. Since the LVIA was written, the Copeland Settlement Landscape Character Assessment 2020 has been produced. The assessment provides a more local level assessment at a district level and is therefore more detailed than at a county level. The Marchon site lies within Character Type:5D Urban Fringe within Area of Local Character 5Dviii. The RLF site is situated within Character Type: 4 Coastal Sandstone within which there are several Areas of Local Character; 4i Coastal Urban Fringe Cliffs: 4ii Sandstone Coastal Downs; and 4iii Pow Beck Valley. The 4iii Pow Beck Valley Area of Local Character is the most relevant to the RLF and is described below and assessed later in this proof.

2.39. The key characteristics of Area of Local Character: 5Dviii Marchon are:
- *Landform: Gently rolling sandstone plateau, overlain by mining landforms.*
- *Land Use: Predominantly derelict reclaimed. New residential development. Some agricultural pasture around Sandwith.*
- *Landcover: semi improved pasture, derelict land.*
- *Field pattern: Small fields based on strip fields close to Sandwith. Straight boundaries, hedges and fences elsewhere, but overlain by industrial and mining development.*
- *Vegetation: Scrub and regenerated woodland. Hedgerow trees, semi improved and reclaimed grassland.*
- *Scale: Medium to large scale landscape.*
- *Perceptual character: Air of decay and neglect from remaining, unclaimed derelict land. Open panoramic views seawards.*

2.40. The qualities of Area of Local Character: 5Dviii Marchon are:
- *Open, panoramic, seaward views. Evidence of industrial and mining past.*

2.41. Landscape sensitivity and susceptibility for Area of Local Character: 5Dviii is described as:

- *The separate identify of Sandwith is sensitive to encroaching development.*
- *Residential use of the area and scenic quality of surrounding areas is sensitive to development that encroaches on the coastal margin.*

2.42. The capacity to accommodate change and mitigation potential for Area of Local Character: 5Dviii is described as:

- *Capacity for development that helps to define the urban edge of Whitehaven and provide green infrastructure links between town, coast and countryside.*
- *Maintain separation between development and coastal fringe.*

2.43. The management strategy for Area of Local Character: 5Dviii is described as:

- *The landscape will be enhanced through restoration.*
- *Management practices will create a stronger definition between town and country areas adjacent discordant land uses into the landscape.*
- *New woodland will be used strategically to create a bold landscape structure unifying disparate uses in developing areas,*
- *Access through public rights of way network from Whitehaven into the countryside will be enhanced.*

2.44. The key characteristics of Area of Local Character: 4iii Pow Beck Valley are:

- *Landform: Broad based valley, rising from sea level at St Bees to around 80m elevation on eastern valley sides.*
- *Land Use: Pasture, small area of forestry. Railway in bottom of valley, footpath and cycle path in northern portion on disused railway line. Recreational – golf links at St Bees and fishing ponds near Whitehaven.*
- *Landcover: Unimproved and semi improved pasture, broadleaf woodland, and open water.*
- *Field Pattern: Medium sized, straight sided but shapes reflect contours of the land. Hedge and fence field boundaries.*
- *Vegetation: Broadleaf woodland blocks on valley sides, successional tree growth on streamside in valley bottom. Hedgerow trees.*
- *Settlement Pattern: St Bees rises up the valley sides at the southern end of the valley, with a broad area of greenspace running through the centre of the village connecting the beach to countryside inland.*
- *The urban edge of Whitehaven is defined by Mirehouse Rd to the north of the area. Little settlement within the valley, a few isolated farmsteads on the valley sides and mining cottages at Woodend.*
- *Built features: Vernacular of stone/render with slate roofs. Modern holiday and caravan developments at St Bees. Some masts and farm buildings appear on the skyline.*
- *Scale: medium scale landscape, openness constrained by valley sides giving intimate quality within valley.*

- *Perceptual Character: Long, channelled views along valley from the edge of Whitehaven to the sea at St Bees. The valley provides a visual and functional connection between the sea and inland areas of countryside.*
- *Peaceful quality, with little traffic noise or signs of modern human intervention. The railway line in the bottom of the valley is not a dominant visual feature.*

2.45. The qualities of Area of Local Character: 4iii Pow Beck Valley are:

- Peaceful valley, connecting Whitehaven to the sea at St Bees. Green infrastructure connection to Whitehaven.

2.46. Landscape sensitivity and susceptibility for Area of Local Character: 4iii Powe Beck Valley are described as:

- *Peaceful quality of the valley is sensitive to development within it or on the upper slopes.*
- *The role of the valley in connecting inland areas to the sea is sensitive to expansion of St Bees into the green gap between the two parts of the settlement*
- *Important green infrastructure links are sensitive to unsympathetic encroaching development.*

2.47. The capacity to accommodate change and mitigation potential for Area of Local Character: 4iii Powe Beck Valley is described as:

- *Preserve open skylines, to maintain the remote and peaceful character of the valley. Preserve long views towards the sea: In particular, maintain a visual and functional green gap along the Pow Beck between the two parts of St Bees.*
- *Any new development south of Whitehaven to maintain peaceful character of valley through strong landscape definition of the urban edge. Opportunities for improved permeability between urban area and the surrounding countryside.*

2.48. The management strategy for Area of Local Character: 4iii Pow Beck Valley is described as:

- *The objective is to manage, enhance and restore the landscape.*
- *Conserve and enhance the traditional farm buildings and features within their own setting.*
- *Reduce the impact of any new buildings by careful siting and design.*
- *Improve green infrastructure links between urban area and surrounding countryside. Enhancement of the coastal strip below St Bees, including restoration of locally distinctive features such as hedge banks and the restoration of maritime heath along the cliff top.*

Landscape Designations

2.49. The Marchon site is not located within any landscape designation.

2.50. The Pow Beck site is located within a Landscape of County Importance (LOCI) as defined by the Copeland Local Plan and set out in policy DM26 Landscaping. Descriptions of the underlying landscape character are set out within the CLCGT. As previously noted it is considered that the many of the characteristics included under LCT4 Coastal Sandstone are not applicable to the Pow Beck Valley. However, the Copeland Settlement Landscape Character Assessment 2020 does include the applicable descriptions as listed above in my evidence.

2.51. The Lake District National Park (LDNP) is located to the eastern edge of the study area, more than 7km east of the Marchon site.

2.52. The St Bees Heritage Coast is located to the west of the Marchon site.

2.53. As noted in paragraph 2.5 of this proof, CCC agreed with the content of the baseline during the scoping stages of the project.

Landscape Sensitivity

2.54. The LVIA report includes judgments regarding landscape value, susceptibility and sensitivity within Appendix 10D rather than in the body of the chapter. Using factors which have a bearing on landscape value such as: designation; condition; conservation, cultural associations and recreational use, a value rating has been attributed to the relevant LCT. Similarly, a susceptibility rating has been attributed using factors such as: scale; landform, built form and tranquillity.

2.55. Both ratings were combined to attribute a level of sensitivity to the LCT as follows:

LCT 5d Urban Fringe – Medium / Low sensitivity
LCT 4 Coast Sandstone – High / Medium sensitivity

2.56. I agree with these judgements leading to the reported levels of sensitivity and considering the broad area covered by LCT 4 Coast Sandstone.

2.57. The Copeland Settlement Landscape Character Assessment 2020 describes the landscape value of the Pow Beck Valley 4iii as medium, visual value as High to Medium and the overall landscape sensitivity as High to Medium.

Visual Receptors

2.58. Visual receptors within the LVIA include residents, road users, users of recreational routes and users of outdoor recreational areas.

2.59. Paragraph 10.5.42 describes the locations of residents within the study area and relates these to the two above ground sites.

2.60. Roads within the study area are identified along which road users might experience visual effects. Rail users on the Cumbrian Coast Line are also included.

2.61. In terms of recreational users, recreational routes within the study area include the Coast to Coast walk; the England Coast Path; as well as local footpaths and public rights of way. National Cycle routes are also included.

Representative Viewpoints

2.62. Representative viewpoints were selected based on the distribution of visual receptors and were agreed with CCC as well as the National Trust (who manage the local Colourful Coast project).

2.63. Table 10.1 in the LVIA lists and describes the viewpoints 1 to 14. It is not my intention to repeat this in detail. However, the list includes views from nearby properties on High Road, Wilson Pit Road, the settlements of Sandwich and Whitehaven, the Coast to Coast walk as well as Pow Beck Valley, St Bees, Dent and within the Lake District National Park.

2.64. It is my opinion that the range of receptors is appropriate and proportionate and is a good selection of those located within the study area for the LVIA.

The Proposed Development

2.65. Section 10.7.2 – 10.7.11 includes the detail of the proposed development both during the construction and operation phases. The section contains relevant detail regarding the above ground operations and the underground conveyor including cross references to drawings. It lists and describes activities, components and features relevant to landscape and visual issues.

Assessment of Landscape Effects

2.66. Section 10.8 of the LVIA includes the assessment of landscape effects during various phases of the proposed development: Construction and Operation years 1, 5 and 12/15, decommissioning and restoration. This allows an assessment of the worst case at year 1 when planting would not be established and later years as planting establishes with trees well grown. The underground conveyor is only considered in the construction phase as the land will be remediated.

2.67. Operational effects upon landscape character are assessed in the LVIA at the level of the site and its immediate context, in the local context although without the support of the Copeland Settlement LCA 2020, and at the level of the County wide LCTs.

2.68. The following table presents the levels of landscape effects as reported in the LVIA plus extracts of relevant text in order to assist the Inquiry. Significant effects, adverse or beneficial, are highlighted in red to assist the Inquiry. I include an assessment of the landscape effects on the Pow Beck Valley Character Area 4iii identified in the Copeland Settlement LCA 2020.

Construction effects as reported in the LVIA

Landscape element	Magnitude of change	Level of effect and significance	Relevant text from the LVIA
LCT 5d Urban Fringe: Landscape Fabric (Site level)	Moderate/slight	Minor adverse. Not significant	The landscape fabric of the site is considered to be low sensitivity to the Proposed Development. The large majority of the existing landscape fabric would be removed during the construction phase. There would be no loss of valuable landscape features.
LCT 5d Urban Fringe: Landscape Character	Moderate	Moderate - moderate/minor adverse. Not significant	This area of LCA 5d Urban Fringe is not subject to any landscape designation, and it has very little recreational value. The construction activities within the main mine site and the part of the buried conveyor running through the LCT would result in a large scale change across a notable extent of the area. It is a medium/low sensitivity landscape.
LCT 4 Coastal Sandstone: Landscape Fabric	Slight (The scale of change would be large, however the extent of change, considered in the context of this LCT, would be small and the duration would be short term.)	Moderate adverse. Not significant	The landscape fabric of the underground conveyor route and RLF site comprises predominately agricultural fields, and the conveyor route cross two small clusters of woodland. It is considered to be medium sensitivity to the Proposed Development.
LCT 4 Coastal Sandstone	Slight	Moderate-moderate/minor adverse. Not significant	The western parts of the Coastal Sandstone (LCT 4) around St Bees, to the west of the site, is Heritage Coast. The rest of the LCT, with the exception of the narrow coastal strip between St Bees Head and Whitehaven harbour, is covered by the Landscapes of County Importance ('LOCI') local landscape designation. There is a relatively good network of PRoW through the area including the England Coast Path and Coast to Coast path. The scale of the landscape varies from the vast scale clifftop landscape to the medium scale elevated plateau of St Bees Head, to the smaller scale Pow Beck valley. The LCT has a high/medium sensitivity landscape.
Operation effects as reported in the LVIA			
Landscape element	**Magnitude of change**	**Level of effect and significance**	**Relevant text from the LVIA**
LCT 5d Urban Fringe:	Moderate	Moderate/minor beneficial. Not significant	Built form set within hardstanding and access roads would be introduced to the core of the site.

Landscape Fabric			The topography would be regraded around the northern and eastern boundaries and part of the south western boundary into linear mounds which would be planted with grassland and dwarf shrub species with tree planting along the northern edge and street tree planting along the eastern edge of High Road. Small depressions would be created to form wetter areas for ecological habitat benefits. Paths would be created through the new landscaped area and interpretation signage and seating would be introduced.
LCT 5d Urban Fringe: Landscape Character	See below	See below	Development of the Marchon site would essentially convert a disused brownfield site into a developed and active site comprising large scale built form within a designed landscape setting. The proposals would not conflict with the key characteristics of the landscape such as urban influences, large scale buildings and the wooded valleys. However, the unique architectural nature of the large scale built form, the overall height and scale of development and the new landscaped setting would have some characterising influence upon the landscape within the local vicinity of the site.
Effects within the immediate vicinity: Year 1	Substantial/moderate	Moderate beneficial. Significant within close proximity to the site.	Built development, in particular large scale built development, is an expected landscape change within the LCT. This is reinforced by the policy designation of employment opportunity site within the local plan. It is not in its own right considered to be an adverse change. The focus of the adopted CLCGT is to manage that change in a way that brings landscape enhancements and restoration possibilities rather than further decline. The proposed development of the Marchon site would be in line with this stated vision and guidelines for the LCA, and would provide notable enhancement benefits to the character of the typically degraded Urban Fringe.
Effects within the immediate vicinity: Year 5	Substantial/moderate	Moderate beneficial. Significant within close	Tree planting along the eastern and northern boundaries will be establishing and the proposed

		proximity to the site.	development will integrate more fully into the surrounding area.
Effects within the immediate vicinity: Year 12 to 15	Moderate	Moderate – moderate/minor adverse Not significant	As the trees become more fully established, the roof tops of the CHPP and coal stores will be significantly more screened from areas in the immediate vicinity of the site. By year 12 to 15, as the views would comprise mainly tree cover and much less built form, the scale of change would reduce across the same geographic extent.
Effects across the wider LCT	Negligible	(Level not given) Not significant	From the south eastern edge the Ufex landfill and proposed landscape mounds would limit visibility to just the very top of the CHPP dome. From the western edge, the top of the CHPP would be visible in the context of the Whitehaven urban area, extending eastwards, and as such the proposals would have limited influence upon the perception of landscape character. From the northern boundary of the LCT the landform of the northern part of the Marchon site, coupled with the proposed landscape mounds, would again limit visibility to just the very top of the CHPP, which in the context of the derelict brownfield nature of this area would have limited characterising influence. The proposed rail loading facility at the Pow Beck site would not be visible from the Urban Fringe LCT (5d) and would therefore have no influence upon it.
LCT 4 Coastal Sandstone: Landscape Fabric	Moderate	Moderate adverse. Not significant	An access road, new rail sidings, office/welfare building and the RLF building would be introduced to the landscape. A linear belt of tree planting would be introduced along the Pow Beck on the eastern side of the rail line.
LCT 4 Coastal Sandstone			
Effects within the immediate vicinity of the RLF: Year 1	Moderate/slight (Considering the large/medium scale of the change, but over a small extent within the Pow Beck valley and Coastal Sandstone LCT)	Moderate adverse. Not significant	Within the Pow Beck valley the rail loading facility building would be visible. The ZTV at Figure 10.5 demonstrates that theoretical visibility would be possible from the flat valley floor to the north, east and south of the RLF. The topography of the steeply rising valley side to the immediate west of the RLF building would quickly

			restrict visibility from the west. From the east theoretical visibility would extend up the eastern side of the valley. The proposed material palette would be traditional and agricultural in nature, being primarily timber clad. The RLF building would be a prominent structure at very close range, but it would not distract from the views through the valley. The geographic extent of this change would be small, as with increasing distance the coalescence of hedgerows across the flat valley floor would quickly filter and restrict visibility of the building. The rail sidings themselves would not appear out of character with the existing rail line and would quickly be assimilated into the landscape resulting in very little notable change. The welfare/office building would appear as another small scale agricultural building within the valley. It would not appear out of scale or out of character with the landscape, likewise the proposed access road would have no notable change.
Effects across the wider LCT	Slight	Moderate – moderate/ minor adverse. Not significant.	From the elevated western sections and the coastal strip between St Bees Head and Whitehaven, only the Marchon site would be visible (although not from all parts of this area). From the lower lying Pow Beck valley only the RLF would be visible (although again not from all parts of the valley). Only from the elevated ground on the eastern edge of the Pow Beck valley, along the A595, would both the Marchon site and the RLF be visible together, although they would be visible in different directions of view and there would be no obvious signs of connection. From the eastern edge of the valley along the A595 the RLF building, whilst larger in scale, would be, given its location alongside the existing railway line, sit well within the context of the largely linear valley. The rail line, the woodland belts, the transmission lines on the eastern side of the valley and the shape of the valley itself are all features

			which create a linear aesthetic. The building has been designed to reflect this linearity.

2.69. I am generally in agreement with the judgments regarding effects on the landscape, particularly those associated with the main mine site and the LCT 5d landscape fabric and character. However, I do consider that the local landscape effect on the Pow Beck Valley has been under represented. There seems to be too much emphasis on the fact that the effects are local and therefore do not change the overall landscape character of LCT 4 which covers a large area.

2.70. I have carried out an assessment of the Area of Local Character 4iii Pow Beck Valley and this is included in the table below.

Construction effects on 4iii Pow Back Valley			
Landscape element	**Magnitude of change**	**Level of effect and significance**	**Reasoning**
ALC 4iii Pow Beck Valley	Moderate/Slight	Moderate adverse. Not significant	Construction activity and emerging structures would be visible in the valley during the 24 month construction period. This would include the installation of the conveyor. The extent of the effect would be fairly local and would unlikely be visible within the whole character area.
Operation effects on 4iii Pow Beck Valley			
Landscape element	**Magnitude of change**	**Level of effect and significance**	**Reasoning**
ALC 4iii Pow Beck Valley Year 1	Moderate	Moderate adverse. Significant	An access road, new rail sidings, office/welfare building and the RLF building would be introduced to the landscape. A linear belt of tree planting would be introduced along the Pow Beck on the eastern side of the rail line. The ZTV at Figure 10.5 of the LVIA shows there would theoretically be more visibility to the north and east of the development. Visibility to the south would be more limited within the character area. Existing woodland and hedgerows would limit visibility of the development in the lower parts of the valley, whereas views would be possible from the higher valley sides especially from the east. Existing woodland to the west of the development would restrict views from higher ground to the west. The proposed material palette would be traditional and agricultural in nature, being primarily timber clad. The RLF building would be a

			prominent structure at very close range. Although the restriction in its height to 15m would help to limit this effect. The rail sidings although similar in nature to the existing railway line would be larger in plan.
Year 15	Moderate	Moderate adverse. Significant	Due to vegetation growth establishing on the embankments to the railway sidings, these elements would be more integrated into the landscape. The tree mitigation to the east of the RLF would have further matured to provide a degree of screening to longer views from the east. However, the RLF would still remain a noticeable feature in the landscape especially in proximity.

2.71. It should be noted that the life span of the RLF is now described as 25 years as opposed to the 50 years at the time of writing the LVIA. Whilst reducing the duration of the operational effect, this would not reduce the overall magnitude of change and thereby reduce the reported levels of effect as other magnitude criteria such as scale and extent would remain the same.

2.72. As the Copeland Settlement Landscape Character Assessment 2020 was not available at the time of writing the LVIA, I include below my assessment of the effects of the development on the relevant Areas of Local Character.

Landscape Designation

2.73. Sections 10.9.1 to 10.9.5 include an assessment of the effects on the St Bees Heritage Coast. Reference to the ZTV shows the limited visibility of the proposed development from this designation and concludes that there will be no significant landscape effects.

2.74. Appendix F considers effects on tranquillity on the Heritage Coast and Appendix G night-time lighting effects on the Heritage Coast and Pow Beck Valley. The tranquillity assessment includes definitions of tranquillity and how these relate to the limited visibility of the proposed development in terms of overt signs of human development. It notes that the development would not be visible from the majority of the Heritage Coast. The night-time assessment includes both the Heritage Coast and the Pow Beck Valley. It refers to night time photomontages which have been prepared against night-time baseline photography and highlights the low level of operational lighting that is proposed. It also points out that the night-time baseline already includes lights from within this urban area including street and car lights, the hospital, and sports pitches. The assessment also points out that lighting will not be left on overnight.

2.75. Both appendices conclude that there will be no significant effects.

2.76. I concur with these judgements regarding tranquillity and night-time effects on St Bees Heritage Coast and Pow Beck Valley.

2.77. Section 10.9.6 considers effects on the Landscape of County Importance and concludes that no significant effects would arise as is reported for LCT 4 Coastal Sandstone. As the LOCI covers a large area, I consider that this judgment is appropriate.

2.78. Section 10.9.7 considers effect on the Lake District National Park and reports that the main mine site would be perceived as a very minor component of the view and would be barely discernible due to the distance to the site. Consequently, there would be no effect upon this National Designation. I concur with this judgement.

Assessment of Visual Effects

2.79. Section 10.10.1 to 10.11.36 of the LVIA includes the assessment of visual effects during various phases of the proposed development: Construction and Operation years 1, 5 and 12/15. This allows an assessment of the worst case at year 1 when planting would not be established and later years as planting establishes with trees well grown. The section presents the levels of visual effect based on groupings of visual receptors and not on a viewpoint basis which is more common. Appendix 10e includes a viewpoint assessment but this includes a selection of key viewpoints and does not cover all 12 viewpoints. There is no explanation of how these key viewpoints were selected. However, between the two approaches, the range of visual receptors has been comprehensibly covered.

2.80. The following table presents the levels of visual effects as reported in the LVIA plus extracts of relevant text in order to assist the Inquiry. The table presents the Dwelling Groups. Where references are made to group 1,2,3 etc, the location of these can be found on Figure 10.9 – Dwelling Groups. For brevity, road users have been excluded from the table and judgements can be found in the relevant sections of the LVIA. All effects reported in the LVIA for road users are not significant. Significant effects, adverse or beneficial, are highlighted in red to assist the Inquiry.

Construction				
Visual receptor	**Additional information**	**Magnitude of change**	**Level of effect and significance**	**Relevant text**
Residents along High Road (group 1). Representative VP 1 Photomontage	Site partially built and remainder future baseline.	Moderate	Major/Moderate adverse. Significant	During the construction stage, activities would be clearly visible and prominent, including vehicle movements, the building of access roads, large-scale earthworks including creation of the earth mounds and lagoons, and the construction of the buildings and other structures. The walled covers would be prominent but would screen much of the construction activity for the 6 months that they are present. Site hoarding would be prominent at the road edge but may not screen all operations or larger equipment used on site, such as cranes. The landscape mounds at the east of the site would not be formed during the first phase of construction.
Residents along High Road (group 2). Representative VP 2 Photomontage	Currently built	Slight	Moderate adverse. Not significant	During the construction stage, activities within the main mine site would be visible although seen at oblique angles. The walled covers would be clearly visible but would screen some of the construction activity for the 6 months that they are present. The landscape mounds along the northern site boundary would be formed in the second of three construction phases so would provide some visual screening for residents at these dwellings and limit many of the adverse effects of the construction phase, although some views across the lagoons would remain possible.
Residents west of High Road (Waters Edge Close) (group 3). Representative VP 5	Currently built	Slight	Moderate adverse. Not significant	From south facing ground floor windows visibility towards the site would be largely restricted by higher ground in the immediate foreground. The landscape mounds along the northern site boundary would be formed in the second of three construction phases so visual screening for residents at these dwellings would limit the adverse effects of the construction phase, although some views across the lagoons would remain possible.
Residents along Wilson Pit Road (group 4).	Currently built	Moderate	Major/Moderate adverse. Significant	During this construction stage, activities on the main mine site would be visible although seen at oblique angles and direct views towards the underground conveyor construction would be possible.

Representative VP 2 Photomontage				Construction stage activities would be clearly visible and prominent, including vehicles movements, the building of access roads, large-scale earthworks and the construction of the buildings and other structures. The walled covers would be visible but would screen some of the construction activity for the 6 months that they are present. Site hoarding would be prominent at the road edge but may not screen all operations or larger equipment used on site, such as cranes.
Residents to the north of Sandwith (group 5). Representative VP 4 Photomontage	Currently built	Moderate/Slight	Moderate adverse. (Judgement re significance not given. Assume significant)	Views into the site would be partially unscreened. Phase 1 construction activities, including vehicle movements, the building of access roads, large-scale earthworks and the construction of the buildings and other structures on site would be visible, occupying a relatively large extent of the view. The walled covers would be visible and would screen some of the construction activity for the 6 months that they are present. Phase 2 and 3 would see the construction of a landscaped mound to reduce the views into the site.
Sandwith Representative VP 4			No significant effects.	Sandwith is located on lower ground and well enclosed by tree cover.
Individual dwellings within Pow Beck valley Representative VPs 8, 10, 12, 13				
Lake View		Moderate	Major/moderate adverse. Significant	From Lake View, views would be possible towards the access road and rail sidings, welfare/office building and RLF loading building. These features would add new development into an existing rural view which comprises limited existing development (the rail line). WCM is proposing to purchase Lake View to mitigate any impacts. During the construction phase, activities would be clearly visible in open views from different elevations of this dwelling. The underground conveyor construction activities would be visible to the west and south, and RLF construction activities would be visible to the east on lower ground.
Stanley House		Slight	Moderate adverse. Not significant	Stanley House is located on the steep hillside west of the RLF loading building and set within mature tree cover. Views from the dwelling are across the valley at a higher level than the RLF

				loading building and rail line. During the construction phase, activities would be partly screened from view from this dwelling by the existing tree cover, however some views immediately down onto the RLF building and rail sidings being constructed would be possible.
Woodend and Woodend Gardens		Slight	Moderate adverse. Not significant	Woodend and Woodend Gardens are located to the north of the RLF and west of the existing train line. The very northernmost tip of the proposed new sidings as they gradually split from the existing line will be located to the east of these dwellings. South easterly views from these dwellings are heavily filtered by existing mature vegetation and tree cover within the gardens and along field boundaries south east of the dwellings. Views of the existing train line are very limited. During the construction phase construction activities would be well screened by the existing tree cover. Some filtered views may be possible if construction takes place in winter months when the trees are not in leaf.
Linethwaite Representative		Slight	Moderate adverse. Not significant	From the cluster of dwellings at Linethwaite the RLF building would be perceived as a minor component in long distance views across the valley and to higher ground beyond to the west and north west. Tree cover around the dwellings would filter or limit views. The location of the RLF loading building adjacent to the much larger steep hillside and woodland would reduce the perception of its vertical scale.
Houses on High House Road	Construction effect not presented.			
Mirehouse Representative VP 8			No significant effects predicted	From dwellings to the south of Mirehouse visibility towards the RLF facility would be largely restricted by tree cover along the Pow Beck valley. The access road would be visible from some dwellings but only as it joins Mirehouse Road so would not result in any notable change to the character of the view.
Recreational Routes **(Significant effects only included)**				
Coast to Coast Path Representative VP 14				The Coast to Coast long distance path extends across the study area from North Head to Moor Row to the south-east. At its closest points to the main components of the proposed development, it is located c.280 metres from the southern section of the main mine site boundary, c.45 metres from the

				underground conveyor site boundary (at its most southerly position) and it passes under the RLF through an existing underpass beneath the rail line. The ZTV predicts almost continual theoretical visibility of the proposed development between the lane to the west of Sandwith and Moor Row to the east of the A595.
Between Bell House and Stanley Pond		Moderate	Major/moderate adverse. Significant.	Between Bell House and Stanley Pond (i.e. in those fields immediately surrounding the RLF and as the route passes through the site), there would be closer proximity and largely uninterrupted views of construction activities associated with the RLF and the conveyor route. Although occupying a wide angle of the view, the extent to which the existing view would be transformed would remain very limited. Elevated views from the north would still be long-ranging, while views from the valley bottom would remain characteristically curtailed by local hedgerows and trees.
Local footpaths				
Local footpath which runs along the top of the Hutbank landfill. Representative VP 3		Moderate	Major/moderate adverse. (Judgement re significance not given. Assume significant)	From the local footpath, which runs along the top of the Hutbank landfill to the west of the main mine site, clear views down into and across the site would be possible, as illustrated by Viewpoint 3. During construction, all construction related activities within the site would be visible, seen in the context of the wider Whitehaven urban area.
Local footpaths in proximity to RLF		Moderate	Major/moderate adverse. Significant	From footpaths that pass in close proximity to the RLF, including the footpath along the rail line between the RLF site and St Bees, and those to the immediate north east of Stanley Pond, some open views towards the construction of the RLF building, welfare office and rail sidings would be possible.
Operation				
Visual receptor	**Additional information**	**Magnitude of change**	**Level of effect and significance**	**Relevant text**
Residents along High Road (group 1) Year 1	Site partially built and remainder future baseline.	Moderate	Major/moderate adverse. Significant	The proposed development would result in the removal of the security fencing, derelict security gatehouse by the site entrance and brownfield wasteland beyond comprising concrete pads and rank grassland. These are all existing visual detractors and

Representative VP 1 Photomontage				create a derelict character to the site, and their removal is a beneficial aspect of the change. In their place a newly designed and public landscape would be introduced, comprising managed grassland and shrub planting on landscape mounds, street trees along High Road, footpaths and street furniture. This would introduce a positive managed character to the site and would again be a beneficial aspect of the change. Adverse aspects of the change would arise due to the introduction of the large scale built form, and the consequential reduction in the long distance views towards Sandwith and St Bees Head which are currently possible. Taking a precautionary stance and assessing a worst case scenario for this change, introduced at relatively close proximity, the scale of the built form seen above the horizon, combined with the blocking of longer distance views, is considered to be adverse.
Year 5		Moderate/slight	Moderate adverse. Significant	In year 5 the landscape planting would appear more established, allowing the development to better integrate with the urban fringe surroundings. The street trees would appear more prominently and would soften the appearance of the built form.
Year 10 onwards		Slight	Moderate adverse. Not significant	In the long-term (from year 10 onwards) the street trees along High Road would have grown high enough to filter (in winter) or screen (in summer) views towards the CHPP and coal stores from ground floor windows. From first floor windows views would likely still be possible over the street trees towards the top of the CHPP and coal stores.
Residents along High Road (group 2) Year 1 Representative VP 2 Photomontage	Currently built	Slight	Moderate adverse. Not significant	The proposed development would be seen beyond derelict brownfield land (part of the former Marchon site but to the north of the main mine site) which would remain, so the removal of more distant detractors would not be particularly noticeable. The planted landscape mound along the northern site boundary would be visible with the potential for views of the very tops of the CHPP and coal stores beyond. In these views the landscape mound would not exceed the height of the adjacent high ground of the Hutbank landfill and cliffs at St Bees. Long distance views towards the south west are currently partially obscured from ground floor windows by the Marchon site fencing, so the blocking of long distance views to the south west would have little

				influence upon the view. Existing westerly views from these dwellings towards the sea would remain unaffected. Obscuring the longer distance views to the south west is considered to be adverse however this effect would only be limited. Existing westerly views to the sea would remain unaffected.
Year 5 onwards		Slight	Moderate adverse. Not significant	As most of the screening effect is provided by the landscape mounds the establishment of the planting, whilst allowing the development to integrate better with the surroundings, would provide minimal additional screening.
Residents west of High Road (Waters Edge Close) (group 3) Year 1 Representative VP 5	Currently built	Slight	Moderate adverse. Not significant	The proposed development would be seen beyond derelict brownfield land which would remain, so the removal of more distant detractors would not be particularly noticeable. The planted landscape mound along the northern site boundary would be visible with the potential for views of the very tops of the CHPP and coal stores beyond. The landscape mound would not exceed the height of the adjacent high ground of the Hutbank landfill and cliffs at St Bees.
Year 5 onwards		Slight	Moderate adverse. Not significant	As most of the screening effect is provided by the landscape mounds the establishment of the planting, whilst allowing the development to integrate better with the surroundings, would provide minimal additional screening.
Residents along Wilson Pit Road (group 4) Year 1 Representative VP 2 Photomontage	Currently built	Moderate or less (less for dwellings further down the hill to the south east)	Major/moderate adverse. Significant	From most dwellings only the tops of the CHPP, coal stores and potentially the gatehouse and top of the office building would be visible, with ground infrastructure and activity on the site being screened by landform. Long distance views towards the south west would not be affected. With regard to the nature of the effect, the introduction of built form into a largely undeveloped view would be considered adverse, although the built form would be perceived as contemporary and iconic.
Year 5 onwards		Slight	Moderate beneficial. Not significant	As the proposed planting establishes, the proposed development would better integrate with its surroundings. Even assuming a worst-case scenario, on balance the beneficial aspects of change (removal of foreground detractors and introduction of well-designed mature landscape setting) would by year 15 outweigh the adverse aspects (introduction of large scale built form).

Residents to the north of Sandwith (group 5) Year1 Representative VP 4 Photomontage	Currently built	Substantial/moderate	Major/moderate adverse. Significant.	The coal stores and top of the CHPP would be prominent within the view beyond a large landscape mound. The office building and other lower level buildings would be largely if not entirely screened by the landscape mound. The designed landscape setting around the eastern site boundary would be visible and would largely block views of the existing and consented housing along High Road.
Year 5 onwards		Moderate	Major/moderate adverse. Significant	As the proposed planting establishes the development would integrate better with the landscape, and the coal stores and CHPP would become well screened in summer months, with filtered views possible in winter when trees are not in leaf.
Year 15 onwards		Moderate/slight	Moderate adverse. Not significant	In the long-term (from year 15 onwards) the tree planting within the landscape would have grown high enough to filter (in winter) or largely screen (in summer) views towards the CHPP and coal stores.
Sandwith. Representative VP 4 Photomontage			No significant effects.	Sandwith is located on lower ground and well enclosed by tree cover.
Whitehaven		Slight/negligible	Minor adverse. (Judgement re significance not given. Assume not significant)	Distant views of the top of the CHPP and coal store would be possible from the wider Whitehaven area including Hensingham and Rosebank which are on rising ground to the eastern side of the town. Views would typically be from first floor windows past adjacent built form. As illustrated by Viewpoint 11, the development would be seen as a minor feature in the view within the context of the urban area and wider landscape.
Individual dwellings within Pow Beck valley				
Lake View Year 1 onwards		Moderate	Major/moderate adverse. Significant	From year 1 onwards the access road and rail sidings, welfare/office building and RLF loading building would be visible in open views with no screening. The underground conveyor route would be restored. The welfare building would have an agricultural design aesthetic and would not be out of scale with the surrounding landscape. The RLF loading building would have an agricultural design aesthetic but would appear larger scale than any comparable building in the valley. The scale and extent of change would be medium and the duration long term, resulting

				in a moderate magnitude of change and major/moderate significant effects. These effects would continue through the long term as the proposed planting for the RLF facility would not provide any screening to these views.
Stanley House Year 1 onwards		Slight	Moderate adverse. Not significant	From year 1 onwards the RLF building and rail sidings would be visible in limited views at lower level than the house. Long views across the valley would remain unaffected. The RLF loading building would have an agricultural design aesthetic but would appear larger scale than any comparable building in the valley. These effects would continue through the long term as the proposed planting for the RLF facility would not provide any screening to these views, although they would allow the development to integrate better into the landscape.
Woodend and Woodend Gardens Year 1 onwards		Negligible	Negligible. Not significant	From year 1 onwards the new siding would be indiscernible from the existing line as it gradually splits from it.
Linethwaite.		Slight	Moderate adverse. Not significant	From the cluster of dwellings at Linethwaite the RLF building would be perceived as a minor component in long distance views across the valley and to higher ground beyond to the west and north west. Tree cover around the dwellings would filter or limit views. The location of the RLF loading building adjacent to the much larger steep hillside and woodland would reduce the perception of its vertical scale.
Houses on High House Road. Representative VP 12 Photomontage		Slight	Moderate adverse. Not significant	There is a small cluster of dwellings on High House Road between 800m – 1km south of the proposed RLF. Most of the these dwellings are orientated broadly westwards and look across the Pow Beck valley to the high ground of St Bees Head, and so views towards the RLF would be at oblique angles. The only dwellings oriented north are the most southerly dwellings of the cluster. Whilst located within the rural Pow Beck valley, it would also be seen in the context of the Whitehaven urban area which spreads across the horizon. Mirehouse would be seen beyond the RLF building on the more distant hillside horizon. In either oblique or more direct views, whilst the RLF would represent a new feature, the character and composition of the

				long distance wide views up the valley would remain similar to the baseline existing view.
Mirehouse Representative VP 8			No significant effects predicted	From dwellings to the south of Mirehouse visibility towards the RLF facility would be largely restricted by tree cover along the Pow Beck valley. The access road would be visible from some dwellings but only as it joins Mirehouse Road so would not result in any notable change to the character of the view.
Recreational Routes **(Significant effects only included)**				
Coast to Coast Path –				
Between Bell House and Stanley Pond Year 1		Moderate	Moderate adverse. Significant	Between Bell House and Stanley Pond close proximity views of the RLF and associated infrastructure would be possible, especially as the route passes through the site. Tree planting along the southern edge of the existing railway embankment would not provide any screening in Year 1. The welfare building would have an agricultural design aesthetic and would not be out of scale with the surrounding landscape. The RLF loading building would have an agricultural design aesthetic but would appear larger scale than other comparable buildings in the valley.
Year 5 onwards		Moderate	Moderate adverse. Significant	In views from the west, the proposed planting would not provide any screening and significant visual effects would continue through the medium and long term.
Local footpaths				
Local footpath which runs along the top of the Hutbank landfill Year 1		Moderate	Major/moderate adverse. Significant	When the proposed development becomes operational, the large scale built form, of a unique architectural style, would be introduced in close proximity, however it would be seen in the context of the wider Whitehaven urban area and large scale wind turbines to the north along the coast. Views towards the Lakeland Fells would be unaffected.
Local footpaths in proximity to RLF Year 1		Moderate	Major/moderate adverse. Significant	From footpaths that pass in close proximity to the RLF, including the footpath along the rail line between the RLF site and St Bees, and those to the immediate north east of Stanley Pond, some open views towards the RLF building, welfare office and rail sidings would be possible.
Year 5		Judgement not given.	Moderate adverse. Not significant	As the proposed planting establishes it would aid the integration of the development into the landscape and would limit visibility of the rail sidings and lower parts of the RLF building from the east.

2.81. I agree with the judgments regarding visual effects on visual receptors which take into account the design of the enclosing structures on the main mine site. The absence of the enclosing structure would have resulted in a highly visible array of processing infrastructure and activity. In addition, embedded mitigation has been used to minimise the visual effects of the conveyor belt system by undergrounding the whole structure. This is reflected in the low level of significant effects reported in the operational section of the LVIA. Many of the significant visual effects are associated with the proximity of the Coast to Coast path to the RLF site. I agree with these judgments regarding significant effects arising during construction and operation whilst users of the Coast to Coast path are in proximity to the RLF. However, it is acknowledged that this is transitory, and the level of visual effect would reduce as distance from the RLF increases assisted by the screening and filtering of views by existing hedgerows and hedgerow trees.

Viewpoint photography and Photomontages

2.82. Viewpoint photography was taken from 13 viewpoints prior to the original application in 2017. As a result these images are at least 4 years old, and the baseline has changed since that time. This is particularly relevant to housing development, which was included as future baseline in the LVIA, but as of this date is now substantially built.

2.83. In order to address this matter, viewpoint photography has been retaken and, where it was considered appropriate during recent fieldwork, to include a number of slightly alternative locations, these have been added. These alternate locations are generally close to the existing viewpoints and are labelled with an a, b etc after the original viewpoint number e.g 6b. The retaken viewpoint photography is presented on each sheet as a site context photograph (more or less a panorama) and then below, as a 76.9deg actual size extract. The latter can be printed at A3 and then held at arm's length on site for viewing.

2.84. During the recent fieldwork and preparation of the viewpoint plans, it was noted that the coordinates for viewpoint 12 are incorrect as listed in the LVIA. This is an error based on a previous location for the photography for viewpoint 12. The photography for viewpoint 12 has been taken at the agreed location.

2.85. The following table indicates the viewpoints which have alternate locations and the reasoning for their selection. A map indicating the locations of the retaken photography and the alternate VPs is included in Document B.

Viewpoint Number	**Location**	**Reasoning for alternate**
6	Local footpaths crossing St Bees Heritage Coast	Original seems to be within the adjacent field.
The LVIA does not present a visual assessment of this specific viewpoint. However, the extent of the ZTV is very limited in this area. Site visits show that it would be challenging to see any part of the development.		
6a		Taken adjacent the road which is where walkers would be located. Road embankments restrict wider visibility.

This alternative location indicates that visibility for walkers walking along the road is much more limited compared to the location of viewpoint 6. The magnitude of change would be negligible, and the level of effect would be negligible and not significant.		
6b		Further west along the road, indicating the limited visibility due to road embankments.
This alternative location indicates that visibility for walkers walking along the road is much more limited compared to the location of viewpoint 6. The magnitude of change would be negligible, and the level of effect would be negligible and not significant.		
7	England Coast Path, Kells	
Views towards the main mine site from this route are limited by screening by local landform. Despite the prediction of theoretical views, actual views of the proposed development from this viewpoint would be predominantly restricted by landform. As a result, the magnitude of change would be no greater than negligible and there would be no significant effects on views from this viewpoint during any stage of the proposed development.		
7a		On path to rear of existing houses and closer to site.
There would be no difference to the level of effects predicted at this alternate location along the Path.		
7b		Further north along coastal path.
There would be no difference to the level of effects predicted at this alternate location along the Path.		
11	Whitehaven	
Distant views of the top of the CHPP and coal store would be possible from the wider Whitehaven area including Hensingham and Rosebank which are on rising ground to the eastern side of the town. Views would typically be from first floor windows past adjacent built form. The development would be seen as a minor feature in the view within the context of the urban area and wider landscape. The scale of change would be small and the extent of change from these areas would be negligible resulting in a slight/negligible magnitude of change and minor effects.		
11a		Further south west at edge of settlement.
There would be no difference to the level of effects predicted at this alternate location within Rosebank and views of the development would be seen in the context of adjacent housing.		
12	High House Road	Taken from road walking, looking perpendicular towards RLF.
This is a valley-bottom view from a minor road to the south-east of the RLF site. It is representative of views from local roads and PRoW within this area, where similarly open views towards the site are available. Further north intermittent screening by trees limits some views from the PRoW. The RLF site and the lower reaches of the conveyor route would be visible from here. A moderate significant effect is predicted during construction on users of the PRoW whilst during operation year 1, the effect is major/moderate significant reducing to moderate not significant from year 5 onwards.		
12a		On route of PRoW within field. At this location more attention is paid to the surroundings as away from road and traffic.
There would be no difference to the level of effects predicted at this alternate location along the PRoW. However, the location is more representative of the route of the PRoW and transient views would be interrupted by trees and hedgerows.		
12b		On route of Coast to Coast path closer to RLF site.
There would be no difference to the level of effects predicted at this alternate location along the PRoW. However, the location is more representative of the route of the PRoW and transient views would be interrupted by trees and hedgerows.		

2.86. Six photomontages were prepared for the following viewpoints and included with the LVIA chapter:

- VP 1 - Woodhouse High Road – Years 1, 5 and 15;
- VP2 - High Road/Wilson Pit Road – Years 1, 5 and 15;

- VP3 – PRoW west of the Main Mine site – Year 1 and night-time;
- VP4 – View from Sandwith – Year 1;
- VP10 – View from A595 – Year 1, 5 and 15; and
- VP 12 – View from High House Road – Year 15

2.87. In terms of the methodology for producing the photomontages, the following detail has been provided by the company, Tangible Visual Limited, who prepared the visualisations.

> *Stevenson Haliday (SH) approached Tangible Visual Ltd. to create photo montages to present in the planning application process. SH took the photography using a full-frame camera (Canon 5D) with a fixed 50mm lens on a fixed tripod to perform 360 panoramas. Along with the photography SH supplied, for reference, a GPS position of the camera, and a photograph of the tripod (for most viewpoints, a couple were missing/forgotten). I did enquire if survey data existed (a requirement for verification) I was told that none would be provided.*
> *An accurate and highly detailed model of the Cumbria mine buildings and landscaping was built by Tangible Visual from the CAD data supplied by SH, we also custom-built 3D trees and shrubs of various varieties SH specification to show the landscaping foliage at differing levels of maturity. To make the photomontages as accurate as we possibly could we took the innovative step of purchasing and importing OS terrain 5 data to assist in aligning the photography with the 3D model.*
> *In terms of stitching the photography, PTGUI the industry-standard VVM (visually verified montages) software was used, the field of view for each montage was precisely calculated and matched to a digital camera within 3DS Max of the same FOV, the GPS coordinates were used along with photo-reference of the tripod, was used to accurately position the camera within the 3D software (3DS Max). The 3D model was aligned with the backplate photography using points of reference on the horizon and other features in the landscape, using this method we were able to get a very good match, as we got the OS landscape data to line up within just a few pixels of the photography. Although this was not a traditional VVM workflow, or sold as such, much of the process does fall within the traditional VVM workflow, and the missing component, namely the survey data, is to some degree compensated for by the use of the OS terrain 5 data. Overall, I am confident in the accuracy of the photomontages and believe that if they were to be re-done by a 3rd party using a survey team, that they would get practically the same / a very similar result.*

2.88. Based on the LI Technical Note 06/19 Visual Representation of Development Proposals, these visualisations would be classified as Type 3 Photomontage / Photowire and a description of that type is included below:

> *This Type encompasses photomontages and photowires which will commonly be produced to accompany planning applications, LVAs and LVIAs. They provide a reasonable level of locational and photographic accuracy, but are not suitable for the most demanding and sensitive of contexts. Type 3 visualisations do not need*

to be accompanied by verification data, nor is a precise survey of features and camera locations required. Although minimum standards are set for image presentation, the visualisations do not need to be reproduced with scale representation. Type 3 visualisations offer an appropriate level of detail and accuracy for a range of EIA and non-EIA projects.

2.89. During my review of the photomontages, it has been brought to my attention that the photomontages have been incorrectly labelled as planar projection. The projections are in fact cylindrical; however, this labelling error has no effect on the process of producing the photomontages or the accuracy of the final results. The LI Technical Note 06/19 indicates that cylindrical projection is suitable for producing panoramic images at A1 sheet size for Type 3 visualisations.

2.90. I consider that the photomontages have been prepared accordingly and are appropriate for the intended purpose and anticipated users of the visualisations, the stage in the planning application process at the time of preparation and the likely levels of effect.

3. The Committee Report

3.1. A committee report was issued on the 19th March 2019 by CCC which included a section entitled 'Is the proposed development likely to result in any unacceptable impacts to landscape character or visual receptors' under paras 6.140 to 6.253. The report states under 6.141 that:

..sufficient information has been submitted to enable the nature of the development and its effects on landscape and visual amenity to be judged.

..potential significant effects were identified and mitigated as far as possible.

In general, the LVIA sets the large scale of both the proposed built development and the landscape strategy in context appropriately, with a systematic review of the proposals against the key characteristics, guidance and vision for the Landscape Character Types set out in the Cumbria Landscape Character Guidance and Toolkit (CLCGT).

3.2. In the summary paras 6.210 to 6.212, the report concludes

In summary, the LVIA identified significant visual effects for the closest dwellings along High Road, to the north of Sandwith, and for isolated dwellings near the RLF in the Pow Beck Valley. Effects on other residential viewers were not regarded as significant. No significant effects were identified for travellers on roads within the study area. Visual effects on users of the Coast to Coast path were assessed as significant for a short section either side of the RLF.

The LVIA has been comprehensively reviewed by the landscape advisors and I am advised and of the opinion myself that the LVIA undertaken is robust and that the conclusions drawn are entirely reasonable.

3.3. It is worth pointing out that the specialist working for WYG who *comprehensively reviewed* the LVIA was Mary O Connor. She is a highly respected and knowledgeable individual in the field of LVIA and was a member of the GLVIA3 advisory panel. The summary goes on to state that the main sources of landscape and visual effects would arise from the construction phase and the long term presence of the very large buildings in the landscape at the main site and the large RLF building in the Powe Beck Valley. It reiterates the aims of the landscape proposals to integrate the proposed development into the surrounding area, with transitions to the neighbouring urban and rural areas, and to address views and visual impact through balancing screening and filtering view from the adjacent residential areas and providing dramatic views in to the site of the 'icon' main building, deploying extensive mounding and planting.

3.4. Under conclusions in paras 6.249, the committee report considers that the judgment of moderate adverse and not significant on the landscape of the Pow Beck valley is an under estimate. The reasoning for this aligns with my opinion expressed earlier in this proof in terms of judging the level of effect based on the overall landscape character type. The committee report concludes a significant landscape effect is more likely to arise despite the mitigation measures. Otherwise, the report considers the conclusions of the assessment to be reasonable.

4. Policy Compliance / Compliance with Landscape Character Guidelines

4.1. With regard to **NPPF (2021**) and of relevance to landscape and visual, paragraph 120 states that planning policies should:

> *..encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains – such as developments that would enable new habitat creation or improve public access to the countryside; and recognise that some undeveloped land can perform many functions, such as for wildlife, recreation, flood risk mitigation, cooling/shading, carbon storage or food production…*

4.2. Development on the main mine site would provide several benefits as well as serving its main function. These benefits include improving public access and habitat creation on a derelict site. At the end of the operational life of the mine, it is proposed to remove all above-ground structures on the Marchon site and the rail loading facility. The landscaped bunds will be retained on the Marchon site, and the site will be restored to an area for biodiversity and public access as illustrated on the Main Mine Site Restoration Plan (869 /AM /042).

4.3. Paragraphs 126-136 focus on achieving well-designed places and promote good design of the built environment. This approach is enshrined in Paragraph 127, and states the following relevant to landscape and visual effects:

- *Will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development.*
- *Are visually attractive as a result of good architecture, layout and appropriate and effective landscaping.*

4.4. Reference to the Design and Access Statement (DAS) submitted as part of the planning application, demonstrates that design was a key consideration in developing the site as well as mitigating a number of potential effects. It states that the primary drivers for the design of the buildings at Marchon was to minimise impacts from noise, dust light and visual impact. It goes on to state:

> *The overall design concept from the start of the project has been to produce a modern site with 'statement' buildings in contrast to a more traditional mining site. From the outset, the decision was made that all coal storage, handling and processing should take place either underground or housed within structures to reduce sound, dust and visual impacts on local receptors. The site buildings have been designed to fundamentally change the nature of a coalmine, there has been balancing of the operational requirements of the mine with location considerations through master planning of the site to protect the surrounding environment from the day to day processing needs.*
>
> *The innovative approach taken by world leading designer of industrial buildings, Geometrica was a natural fit to ensure WCM could meet its design aspirations. The buildings provide for a contemporary visual design statement, whilst incorporating a series of curves to emulate local landscapes.*

4.5. In terms of landscape design, the DAS explains that the landscape strategy for the main mine site focuses on integrating the proposed development into the surrounding area. With urban development to the east and potential future urban development to the north, and rural countryside to the south and west, the site forms a key transition between the urban townscape and rural landscape. To successfully integrate the development into the area the landscape design strategy for the main mine site was centred around 3 key principles.

- Urban transition: create a transition of scale and character between the mine and adjacent urban land use using mounding, a hierarchy of paths and the use of formal street trees and more natural planting.
- Views and visual impact: the design seeks to balance the need for screening and filtering of views, whilst still providing some dramatic views into the site of the iconic buildings.
- Rural transition: the landscape aims to create a defined but soft edge to sensitive adjacent landscapes to the south and west through earth mounding and planting.

4.6. Section 15 of the NPPF relates to the conservation and enhancement of the natural environment, with Paragraph 174 setting out that planning policies and decisions should look to achieve the above by "protecting and enhancing valued landscapes" and

"recognising the intrinsic character and beauty of the countryside". This is particularly relevant to the RLF situated within a LOCI in the Pow Beck Valley.

4.7. Included in the DAS are the design principles adopted for the RLF. The design goal was to provide as low key and subtle design intervention as possible. Tree planting along the Pow Beck is proposed along the eastern side of the rail line to provide screening to the rail sidings, access road and low level activity from the east. In terms of reducing the impact of the facility, the designers moved away from from the traditional coal loading facilities of over 25 metres high and proposed a 15m high facility. In addition, the entire process would be enclosed. Due to the landscape sensitivities associated with the valley, a lower profile, longer bunker was designed. Different finishes have been considered including rubble stone plinths, timber cladding and composite deck roofing to break up the mass of the building and present an agricultural type of appearance.

4.8. With regard to **Planning Practice Guidance** and those of relevance to landscape and visual, under the topic of **Design** (Paragraph 001) the PPG states that:

> *permission should be refused for development that fails to take the opportunities available for improving the character and quality of an area and the way it functions.*

4.9. Paragraphs 4.4 and 4.5 of my proof demonstrate that the opportunity for improving the character and quality of the main mine site and the way it functions has been taken.

4.10. There are a number of principal issues identified which mineral planning authorities should address in determining planning applications for mineral development. Those which relate to landscape and visual include:

- *Lighting*; (Appendix 10G)
- *Visual impact on the local and wider landscape*; (LVIA 10.10 & 10.11 plus Appendix 10e)
- *Landscape Character*; (LVIA 10.8)
- *Impacts on nationally protected landscapes*; (LVIA 10.9.7) and
- *Site restoration and aftercare*. (LVIA 10.12)

4.11. The LVIA chapter has included all of these issues as part of the environmental assessment of the development and the location of the relevant sections has been added above to the bulleted list.

4.12. With regard to **Development Plans**, the **Cumbria Minerals and Waste Local Plan (September 2017).** The current Policies relevant to landscape and visual are:

Policy SP15 Environmental Assets
Minerals and waste management developments, including restoration and after use, should:

- protect, maintain and enhance people's overall quality of life and the natural, historic and other distinctive features that contribute to the environment of Cumbria and to the character of its landscapes and places;

- *help to create new green infrastructure, and to conserve and manage where it is existing, and enhance its functionality, quality, connectivity and accessibility;*
- *Information on environmental assets and guidance on implementing parts of this policy are provided by the Cumbria Landscape Character Guidance and Toolkit, the Guide to using the Cumbria Historic Landscape Character database, the Cumbria Biodiversity Evidence Base and the Cumbria Historic Environment Record. There are national policies for areas and features that are identified to be of international, European or national importance, as set out below.*
- Major developments that adversely affect the designated areas or the settings of National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts, will only be granted planning permission in exceptional circumstances and where it can be demonstrated that they are in the public interest, in accordance with paragraph 116 of the National Planning Policy Framework.

4.13. As discussed in paragraphs 4.4, 4.5 and 4.7 of my proof, the development through design and improvements to a derelict site would enhance the local landscape and the visual amenity for a large number of residential receptors over the longer term. Accessibility across the main mine site would improve due to the construction of footpaths connecting High Road to the local footpath network.

4.14. The Cumbria Landscape Character Guidance and Toolkit was used as a basis for preparing the landscape baseline and carrying out the landscape impact assessment.

4.15. The landscape and visual effects of the development on the National Park were assessed in section 10.9.7 of the LVIA and no significant effects were reported.

Policy SP16 & DC22 Restoration and aftercare.
Restoration, after use and aftercare schemes for mineral working and waste management sites should demonstrate that best practicable measures have been taken to help deliver the sustainability objectives of this Plan.

4.16. As noted in 4.2 above, at the end of the operational life of the mine, it is proposed to remove all above-ground structures on the Marchon site and the rail loading facility. The landscaped bunds will be retained on the Marchon site, and the site will be restored to an area for biodiversity and public access as illustrated on the Main Mine Site Restoration Plan (869 /AM/042).

Policy DC18 Landscape and Visual
Proposals for development should be compatible with the distinctive characteristics and features of Cumbria's landscapes and should:

- *A Avoid significant adverse impacts on the natural and historic landscape;*
- *B Use Landscape Character Assessment to assess the capacity of landscapes to accept development, to inform the appropriate scale and character of such development, and guide restoration where development is permitted;*
- *C In appropriate cases, use the Guidelines for Landscape and Visual Impact Assessment to assess and integrate these issues into the development process;*

- *D Ensure that development proposals avoid significant adverse visual impacts and consider the effects on: locally distinctive natural or built features; scale in relation to landscape features; public access and community value of the landscape; historic patterns and attributes; and openness and remoteness;*
- *E Ensure high quality design of modern waste facilities to minimise their impact on the landscape, or views from sensitive areas, and to contribute to the built environment;*
- *F Direct minerals and waste developments to less sensitive locations, wherever this is possible, and ensure that sensitive siting and high quality design prevent significant adverse impacts on the principal local characteristics of the landscape including views to or from, and the setting of, Areas of Outstanding Natural Beauty, the Heritage Coast, National Parks or World Heritage Sites.*

4.17. As previously noted, the LVIA did use the Cumbria Landscape Character Guidance and Toolkit and an iterative process was followed to avoid significant effects at year 1 or reduce residual effects following the establishment of mitigation planting. The attention given to the design of the facilities in order to reduce significant effects has been previously described.A

4.18. With regard to directing mineral development to less sensitive locations, it is worth pointing out, and as outlined in the DAS under site selection, the Pow Beck valley was initially selected as the site for the main mine. However, the Marchon site was eventually selected based on physical and environmental constraints of the Pow Beck valley and feedback from the local community. The Marchon site had some significant advantages including its size, its need for remediation and the fact it was allocated for employment use in the Copeland Local Plan. The RTF remains in the Pow Beck valley due to the need to connect to the local rail network.

4.19. With regard to the policies of the **Copeland Local Plan 2013 – 2028**, the following are relevant to landscape and visual.

ENV5 Protecting and Enhancing the Borough's Landscapes
The Borough's landscape will be protected and enhanced by:

- *A Protecting all landscapes from inappropriate change by ensuring that development does not threaten or detract from the distinctive characteristics of that particular area;*
- *B Where the benefits of the development outweigh the potential harm, ensuring that the impact of the development on the landscape is minimised through adequate mitigation, preferably on-site;*
- *C Supporting proposals which enhance the value of the Borough's landscapes'.*

4.20. As described above, the main mine site was moved from the more sensitive landscape within the Pow Beck valley to the derelict Marchon site. This decision avoided the potential for high level landscape and visual effect on a sensitive landscape. The RLF site has been designed to reduce the level of significant effects on landscape and visual receptors within the Pow Beck Valley as described in the DAS and outlined in paragraph

4.7 of my proof. Both the operational phase and the after use of the Marchon site can be considered an enhancement of a derelict site within the Borough.

ENV6 Access to the Countryside

The Council's policy is to ensure access to the countryside for residents and visitors by:

- *A Identifying opportunities to provide or improve access on routes and gateways from settlements and to secure the implementation of improvement measures with key partners and developers;*
- *B Investigating opportunities for reclaiming contaminated and derelict land for recreation purposes'.*

4.21. As part of the site masterplanning and to provide further benefit to the community, the layout and management of the site would encourage recreational access around the secured facilities. This would allow recreational access across the site connecting settlements to local footpaths, PRoWs as well as to the England Coast path.

4.22. Although it is not the main purpose of the development, as a consequence of reclaiming the derelict land, there will be recreational access across the mounded and landscaped areas of the site. This will be much safer than the current informal access that members of the public are enjoying across a potentially dangerous site.

DM26 Landscaping

- *All development proposals will be assessed in terms of their potential impact on the landscape. Developers should refer to the Cumbria Landscape Character Assessment and Cumbria Historic Landscape Characterisation documents for their particular character area and design their development to be congruent with that character.*
- *The Council will continue to protect the areas designated as Landscapes of County Importance on the Proposals Map from inappropriate change until a more detailed Landscape Character Assessment can be completed for the Copeland plan area.*
- *Proposals will be assessed according to whether the proposed structures and associated landscaping relate well in terms of visual impact, scale, character, amenity value and local distinctiveness and the cumulative impact of developments will be taken into account as part of this assessment.*
- *Development proposals, where necessary, will be required to include landscaping schemes that retain existing landscape features, reinforce local landscape character and mitigate against any adverse visual impact. Care should be taken that landscaping schemes do not include invasive non-native species.*
- *The Council will require landscaping schemes to be maintained for a minimum of five years.*

4.23. The above points where relevant have been addressed in my evidence above. With regards to the 2nd bullet point, I have carried out an assessment of the landscape effects of the development using the latest Landscape Character Assessment i.e. The Copeland Settlement Landscape Character Assessment 2020.

4.24. I consider that the proposed development complies with the policies relevant to landscape and visual effects.

4.25. With regard to the Landscape Character Assessments, I base my review on guidance contained within the **Copeland Settlement Landscape Character Assessment 2020**.

Area of Local Character 5Dviii Marchon

Sensitivity

- *The separate identify of Sandwith is sensitive to encroaching development.*
- *Residential use of the area and scenic quality of surrounding areas is sensitive to development that encroaches on the coastal margin.*

4.26. Landscape mounding and tree planting has been positioned between the main components of the main mine site and Sandwith as indicated on the Proposed Landscaping Plan 869 /AM/ 041. Adjustments were made to the location of the mounding as a result of engagement and feedback from the community during consultation, to ensure adequate screening and filtering of views from the northern edges of Sandwith.

4.27. The ZTV indicates that there is limited visibility of the development along the coastal margin due to existing intervening topography.

Capacity to accommodate change and mitigation potential

- Capacity for development that helps to define the urban edge of Whitehaven and provide green infrastructure links between town, coast and countryside.
- Maintain separation between development and coastal fringe.

4.28. Paragraph 4.5 outlines the content of the DAS with regard to the landscape strategy for the site in terms of using 3 key principles. Two of these are referred to as the urban and the rural transition and utilise the mounding and planting to create a soft edge to the sensitive landscapes to the south and west. In this way the urban edge of Whitehaven is better defined and there is a transition between the more urban elements of the site and the rural coastal fringe.

Management Strategy

- *The landscape will be enhanced through restoration.*
- *Management practices will create a stronger definition between town and country areas adjacent discordant land uses into the landscape.*
- *New woodland will be used strategically to create a bold landscape structure unifying disparate uses in developing areas,*
- *Access through public rights of way network from Whitehaven into the countryside will be enhanced.*

4.29. As discussed in paragraph 4.12, the development, through design and improvements to a derelict site, would enhance the local landscape and the visual amenity for a large number of residential receptors over the longer term. Accessibility across the main mine

site would improve due to the construction of footpaths connecting High Road to the local footpath network. Paragraph 4.5 outlines the content of the DAS with regard to the landscape strategy for the site in terms of using 3 key principles. Two of these are referred to as the urban and the rural transition and utilise the mounding and planting to create a soft edge to the sensitive landscapes to the south and west.

Area of Local Character 4iii Pow Beck Valley

Sensitivity

- *Peaceful quality of the valley is sensitive to development within it or on the upper slopes.*
- *The role of the valley in connecting inland areas to the sea is sensitive to expansion of St Bees into the green gap between the two parts of the settlement*
- *Important green infrastructure links are sensitive to unsympathetic encroaching development.*

4.30. The design of the RLF in the Pow Beck valley has been influenced by the valley's sensitivity to development. This has resulted in an enclosed structure whereas loading facilities would typically be open to the elements. The DAS describes how the facility has been designed to mitigate visual and noise impacts.

Capacity to accommodate change and mitigation potential

- *Preserve open skylines, to maintain the remote and peaceful character of the valley.*
- *Preserve long views towards the sea: In particular, maintain a visual and functional green gap along the Pow Beck between the two parts of St Bees.*
- *Any new development south of Whitehaven to maintain peaceful character of valley through strong landscape definition of the urban edge. Opportunities for improved permeability between urban area and the surrounding countryside.*

4.31. The height of the RLF has been restricted from the normal 25 metres to 15 metres. This would help to preserve long views along the valley which otherwise could have been interrupted.

Management Strategy

- *The objective is to manage, enhance and restore the landscape.*
- *Conserve and enhance the traditional farm buildings and features within their own setting.*
- *Reduce the impact of any new buildings by careful siting and design.*
- *Improve green infrastructure links between urban area and surrounding countryside. Enhancement of the coastal strip below St Bees, including restoration of locally distinctive features such as hedge banks and the restoration of maritime heath along the cliff top.*

4.32. With regards to reducing the impact of any new building, included in the DAS are the design principles adopted for the RLF. The design goal was to provide as low key and

subtle design intervention as possible. Tree planting along the Pow Beck is proposed along the eastern side of the rail line to provide screening to the rail sidings, access road and low level activity from the east. In terms of reducing the impact of the facility, the designers moved away from the traditional coal loading facilities of over 25 metres high and proposed a 15m high facility. In addition, the entire process would be enclosed. Due to the landscape sensitivities associated with the valley, a lower profile, longer bunker was designed. Different finishes have been considered including rubble stone plinths, timber cladding and composite deck roofing to break up the mass of the building and present an agricultural type of appearance.

4.33. Overall, I consider that the proposed development complies with the guidance sections of the relevant landscape character assessments.

5. Conclusions

5.1. It is my opinion that the LVIA was scoped in accordance with the requirements of CCC. This included methodology, referencing the appropriate guidance documents and the extent of the study area. Evidence of the approval by CCC is included in my appendix.

5.2. The methodology adopted for the assessment followed the guidance included in GLVIA 3.

5.3. The relevant legislation and policies relevant at the time of writing the LVIA were included. Relevant updates have been reviewed during the writing of this proof of evidence.

5.4. An appropriate landscape and visual baseline was included to take account of the three sites and the value, susceptibility and sensitivities of landscape and visual receptors were assessed using the relevant guidance. Updates to the landscape and visual baseline have been addressed in my proof.

5.5. Following my review of all relevant documents and plans and a site visit, I concur with the majority of the judgments regarding the level of landscape and visual effects arising from the development. I do not support the assessment of the landscape effect on the Pow Beck Valley during operation as being not significant. It appears that using the landscape character assessment available at the time which included a broader area, led to this under-estimate. Carrying out my own assessment and using the more appropriate Copeland Settlement Landscape Character Assessment 2020, I judged the level of effect as moderate adverse, the same as reported in the LVIA, but significant.

5.6. Viewpoint photography has been updated in line with good practice as the baseline has changed since writing the LVIA. Any errors noted during the review, in terms of locations of viewpoint photography, have been addressed.

5.7. I have reviewed the photomontage methodology against the LI TN 06/19 and classify the visualisation as Type 3. I consider that the photomontages have been prepared accordingly and are appropriate for the intended purpose and anticipated users of the visualisations, the stage in the planning application process at the time of preparation

and the likely levels of effect. The error in labelling with regard to cylindrical as opposed to planar has been addressed and has no consequence on the accuracy of the photomontages. In summary, I consider that the visualisations are suitable for use at the Inquiry.

5.8. The LVIA was comprehensively reviewed by WYG (including an industry expert) on behalf CCC. and was found to be robust.

5.9. I consider that the development complies with the relevant policies with regard to landscape and visual accords with the guidance included in the latest landscape character assessment applicable to the study area.

Signed: *John Flannery* Dated: 10.08.21

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/JF/2

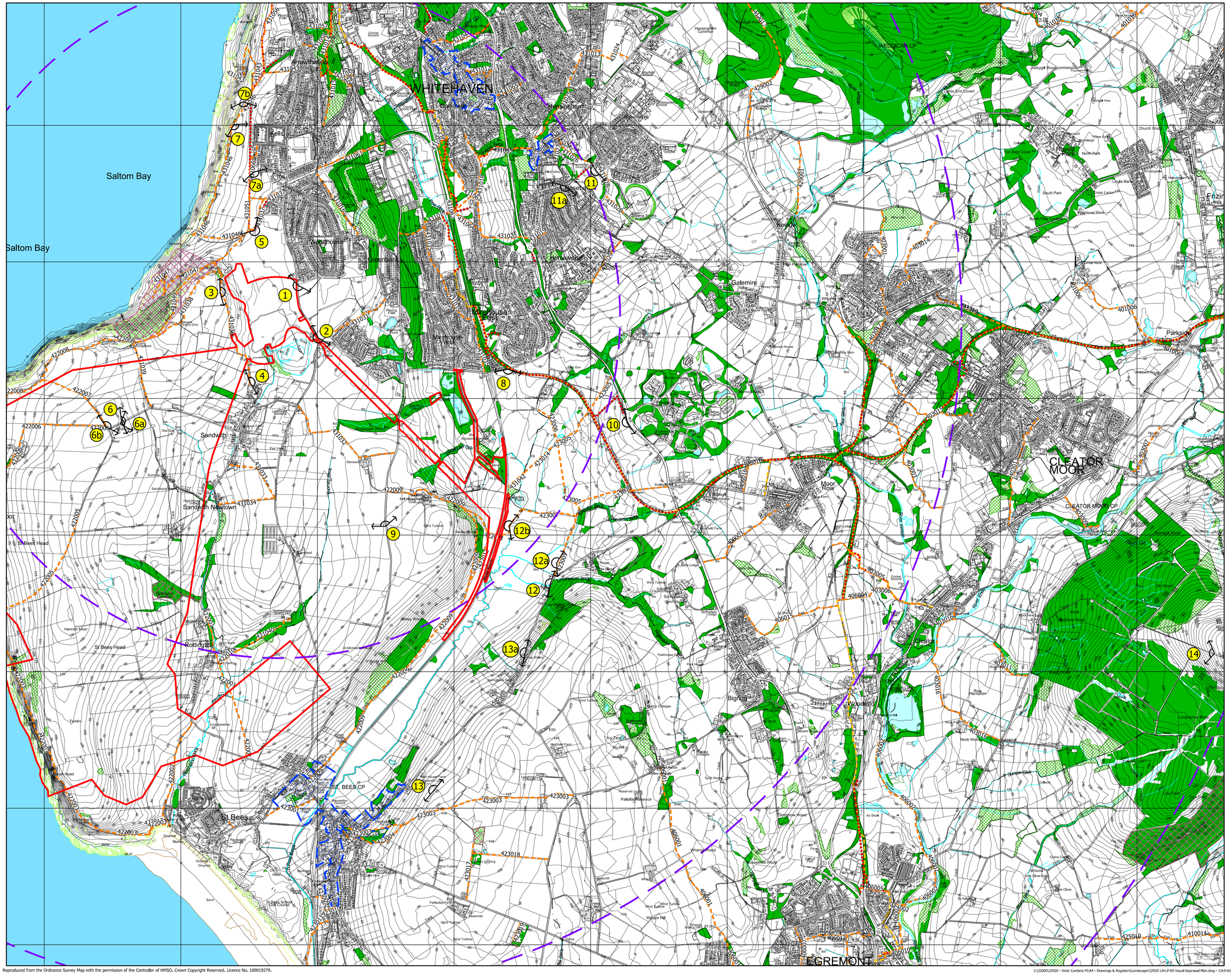
This is the Appendix marked WCM/JF/2 referred to in the Proof of Evidence of John M Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Document No.

Document No.1

This is document 1 referred to in the Appendix marked WCM/JF/2 on the Proof of Evidence of John Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32431753v1



The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

N

LEGEND

- Site Boundary
- 2.5km Distance Bands from CHHP Building
- Existing Woodlands, Copses and Tree Belts ^
- Existing Scrub ^
- Existing Water Courses and Features ^
- Contours/Spot Heights (Metres AOD) ^
- Public Rights of Way *
- English Coastal Path ^
- Countryside Rights of Way Access Areas #
- Sustrans Cycle Route +
- Cycle Route ++
- Conservation Area #/##
- Location of Updated Photographic Viewpoints
- Location of Alternate Photographic Viewpoints

Sources:
^ OS Mapping
# Natural England GIS Data Set
~ Historic England National Monument Record GIS Data Set
* Cumbria County Council GIS Data Set
+ Sustrans National Cycle Network GIS Data
++ Department of Transport Cycle Network Model
^^ Department for Communities and Local Government GIS Data
Copeland District Council Emerging Local Plan Proposals Map (Interactive Map)

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate.

FIGURE 1

Project
Cumbrian Metallurgical Coal Project

Drawing Title
Location of Viewpoints

Date	Scale	Drawn by	Check by
29.07.2021	1:12,500 @A1 1:25,000 @A3	ML	XXX
Project No	Drawing No		Revision
32920	LN-LP-05		-

DRAFT

WEST CUMBRIA MINING

J:\32000\32920 - West Cumbria PFLM - Drawings & Registers\Landscape\32920 LN-LP-05 Visual Appraisal Plan.dwg - 12X5-A1

Document No.2

This is document 2 referred to in the Appendix marked WCM/JF/2 on the Proof of Evidence of John Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32431762v1

Reproduced from the Ordnance Survey Map with the permission of the Controller of HMSO. Crown Copyright Reserved. Licence No. 100019279.

J:\32000\32920 - West Cumbria PT\A4 - Drawings & Registers\Landscape\32920 LN-LP-06 Site Appraisal Plan.dwg - NTS-A1

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

N

LEGEND

- Site Boundary
- Contours/Spot Heights (Metres AOD) ^
- Public Rights of Way *
- English Coastal Path ^
- Countryside Rights of Way Access Areas #
- Sustrans Cycle Route +
- Cycle Route ++
- Heritage Coast
- Ancient Woodland #
- Landscape of County Importance ##
- Location of Site Photography

Sources:
^ OS Mapping
# Natural England GIS Data Set
~ Historic England National Monument Record GIS Data Set
* Cumbria County Council GIS Data Set
+ Sustrans National Cycle Network GIS Data
++ Department of Transport Cycle Network Model
Copeland District Council Emerging Local Plan Proposals Map (Interactive Map)

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate.

FIGURE 2

Project
Cumbrian Metallurgical Coal Project

Drawing Title
Site Photography Plan

Date	Scale	Drawn by	Check by
29.07.2021	N.T.S.	ML	XXX
Project No	**Drawing No**		**Revision**
32920	LN-LP-04		-

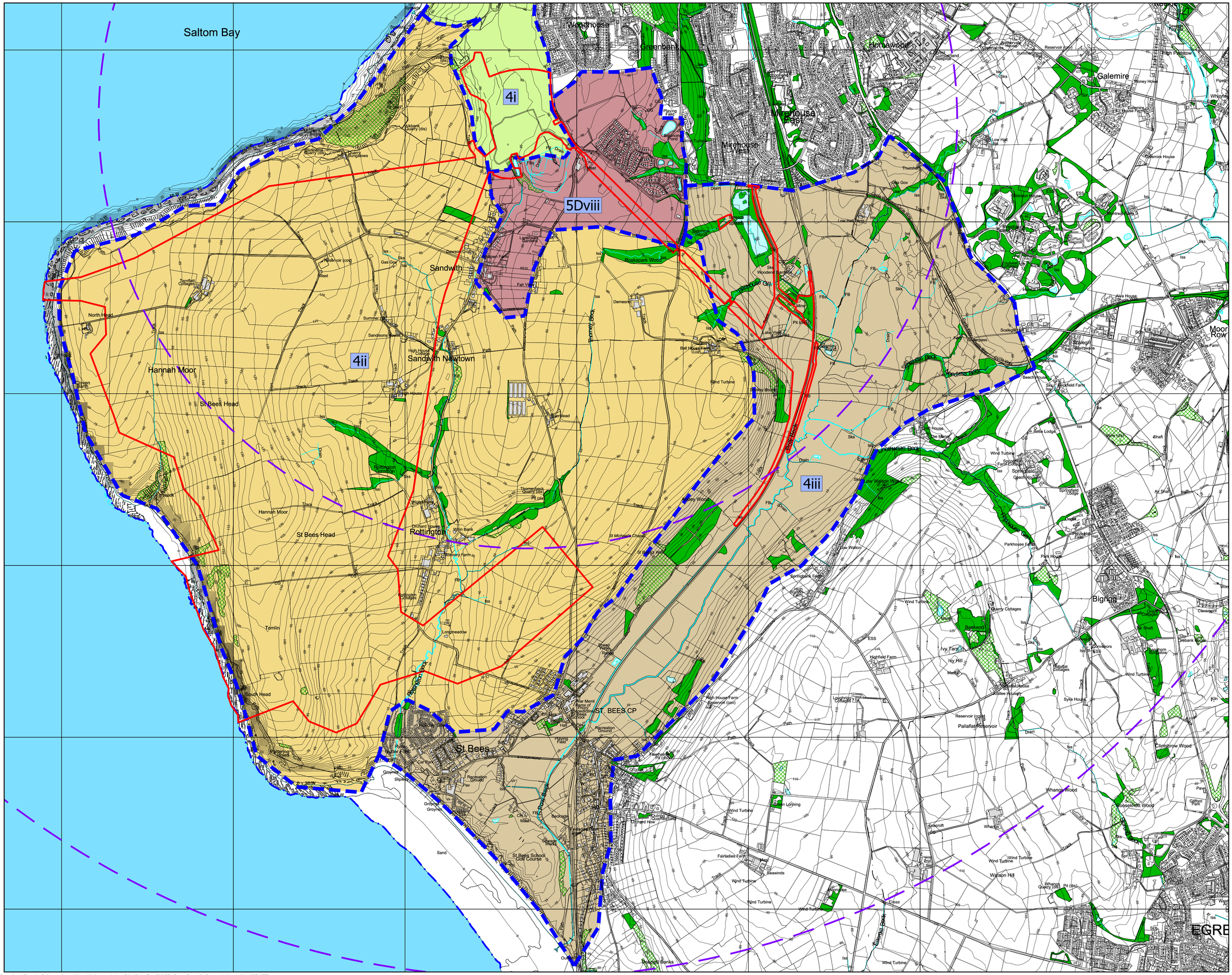
DRAFT

WEST CUMBRIA MINING

Document No.3

This is document 3 referred to in the Appendix marked WCM/JF/2 on the Proof of Evidence of John Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32431780v1



J:\32000\32920 - West Cumbria PFLM - Drawings & Registers\Landscape\32920 LN-LP-07 Local Landscape Character Plan.dwg - A1

The scaling of this drawing cannot be assured

Revision	Date	Drn	Ckd
-	-	-	-

N

LEGEND

- Site Boundary
- Distance Bands (2.5km Intervals from CHPP)
- Existing Woodlands, Copses and Tree Belts ^
- Existing Scrub ^
- Existing Water Courses and Features ^
- Contours/Spot Heights (Metres AOD) ^
- Local Planning Authority Boundary ^

Copeland Landscape Character Areas

4 Coastal Sandstone

- 4i Coastal Urban Fringe Cliffs
- 4ii Sandstone Coastal Downs
- 4iii Pow Beck Valley

5D Urban Fringe

- 5Dviii Marchon

Sources:
^ OS Mapping
# Natural England GIS Data Set
~~ Cumbria County Council Landscape Character Guidance and Toolkit, 2011
** Lake District National Park Landscape Character Assessment and Guidelines, 2008
++ Copeland Landscape Settlement Study, July 2020

Data collated for constraints and analysis mapping is based on publicly available sources at the time of preparation inserted using the British National Grid and may itself not be accurate.

FIGURE 3

Project
Cumbrian Metallurgical Coal Project

Drawing Title
Local Landscape Character Plan

Date	Scale	Drawn by	Check by
05.08.2021	1:10,000 @A1 1:20,000 @A3	ML	JF
Project No	Drawing No		Revision
32920	LN-LP-07		-

0 100 200 300 400 500m

WEST CUMBRIA MINING

Document No.4

This is document 4 referred to in the Appendix marked WCM/JF/2 on the Proof of Evidence of John Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32431793v1

SITE PHOTOGRAPHY A: VIEW EAST OVERLOOKING MACRON SITE

SITE PHOTOGRAPHY B: VIEW SOUTH-EAST OVERLOOKING MACRON SITE

SITE PHOTOGRAPHY C: VIEW WEST FROM EASTERN BOUNDARY OF MACRON SITE

PROJECT NUMBER: **32920**
PROJECT NAME: **CUMBRIAN METALLURGICAL COAL PROJECT**

SITE PHOTOGRAPHY A - C

DATE TAKEN: JUNE / JULY 2021

WEST CUMBRIA MINING

SITE PHOTOGRAPHY D: VIEW NORTH FROM SOUTHERN PART OF MACRON SITE

SITE PHOTOGRAPHY E: VIEW WEST FROM SOUTH-WEST OF MACRON SITE

PROJECT NUMBER: 32920
PROJECT NAME: CUMBRIAN METALLURGICAL COAL PROJECT

SITE PHOTOGRAPHY D & E

DATE TAKEN: JUNE / JULY 2021

WEST CUMBRIA MINING

SITE PHOTOGRAPHY F: VIEW EAST FROM PROW 422009, OVERLOOKING RAIL LOADING FACILITY SITE

SITE PHOTOGRAPHY G: VIEW EAST FROM PROW 422009, OVERLOOKING RAIL LOADING FACILITY SITE

SITE PHOTOGRAPHY H: VIEW SOUTH FROM PROW 422011, WITHIN RAIL LOADING FACILITY SITE

SITE PHOTOGRAPHY I: VIEW NORTH-EAST FROM PROW 422011, OVERLOOKING RAIL LOADING FACILITY SITE

PROJECT NUMBER: **32920**
PROJECT NAME: **CUMBRIAN METALLURGICAL COAL PROJECT**

SITE PHOTOGRAPHY F - I

DATE TAKEN: JUNE / JULY 2021

WEST CUMBRIA MINING

SITE PHOTOGRAPHY J: VIEW EAST FROM B5345 ST. BEES ROAD, OVERLOOKING RAIL LOADING FACILITY CONVEYOR CULVERT

SITE PHOTOGRAPHY K: VIEW WEST FROM B5345 ST. BEES ROAD, OVERLOOKING RAIL LOADING FACILITY CONVEYOR CULVERT

PROJECT NUMBER: **32920**
PROJECT NAME: **CUMBRIAN METALLURGICAL COAL PROJECT**

SITE PHOTOGRAPHY J & K

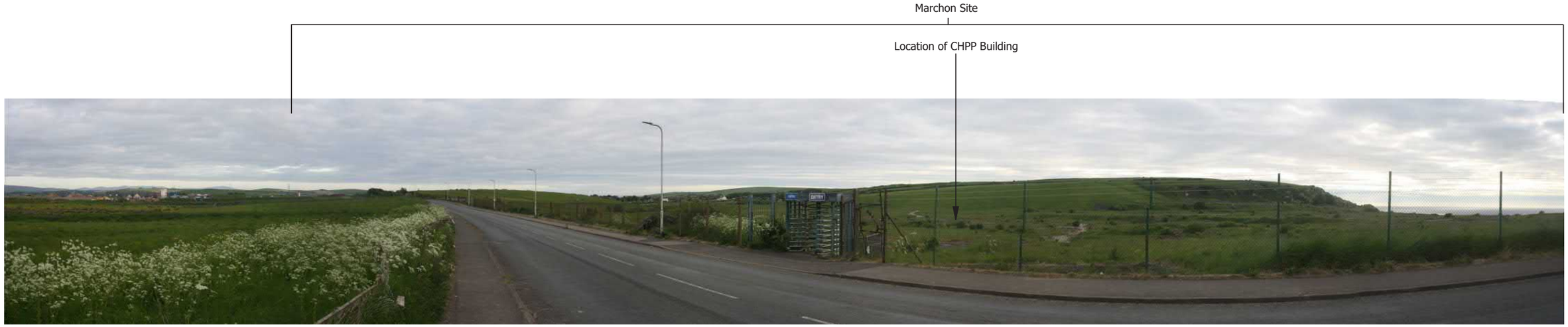
DATE TAKEN: JUNE / JULY 2021

WEST CUMBRIA MINING

Document No.5

This is document 5 referred to in the Appendix marked WCM/JF/2 on the Proof of Evidence of John Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32431804v1

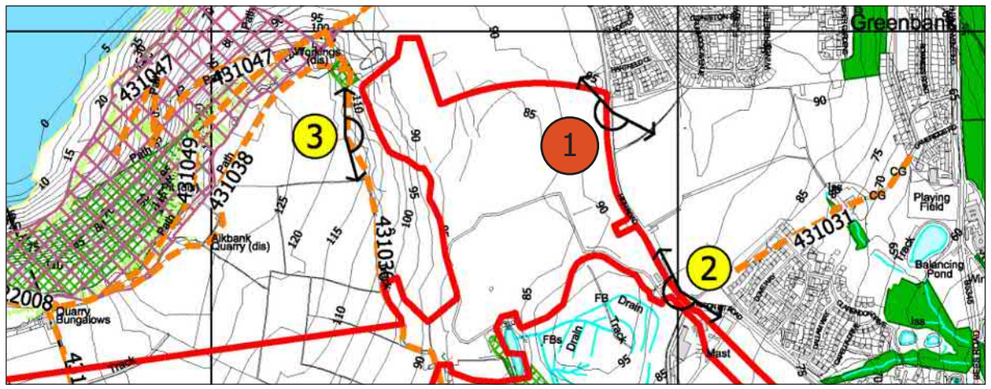


VIEWPOINT PHOTOGRAPH 1: VIEW SOUTH-EAST FROM WOODHOUSE, HIGH ROAD
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 13m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 1

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

Marchon Site

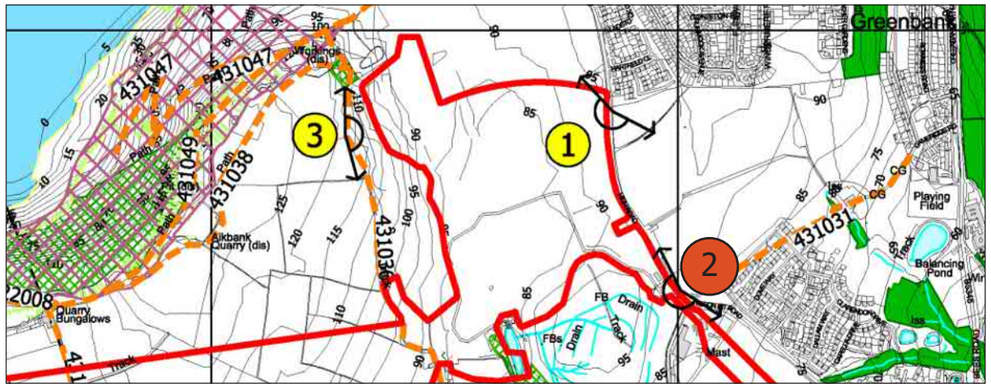
Location of CHPP Building

VIEWPOINT PHOTOGRAPH 2: VIEW SOUTH-WEST FROM HIGH ROAD / WILSON PIT ROAD
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 7m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 2

DATE TAKEN: JUNE 2021

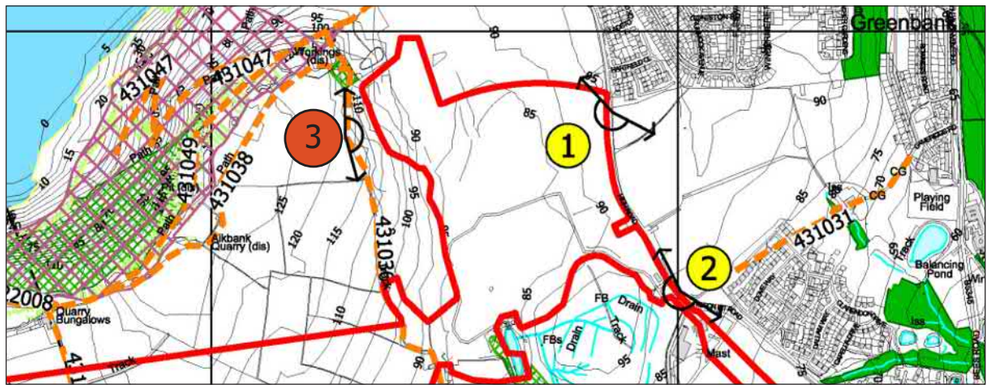
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 3: VIEW EAST FROM PROW 431036
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 69m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 3

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 4: VIEW NORTH-EAST FROM PROW 431036, SANDWITH
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 74m

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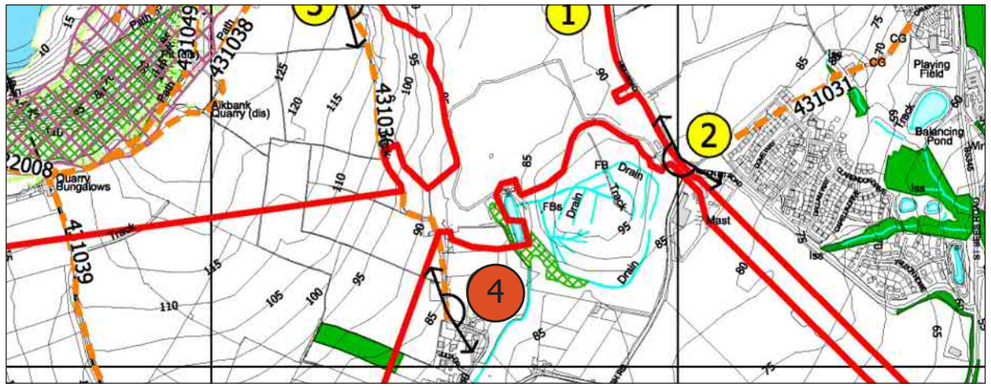
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 4

DATE TAKEN: JUNE 2021

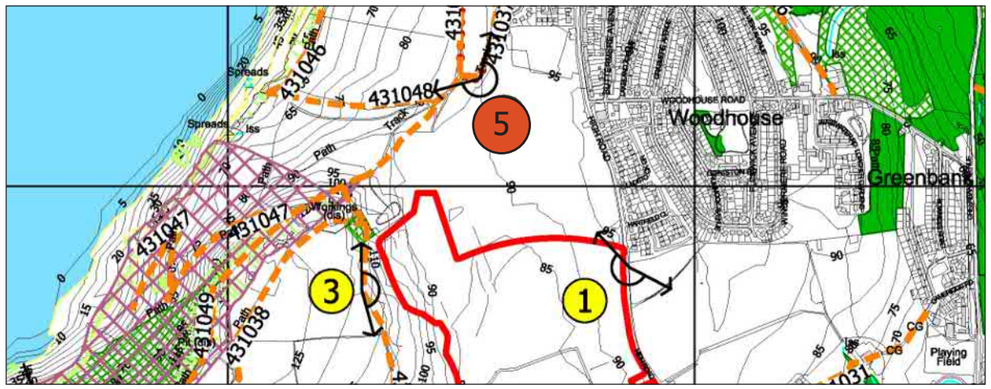
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 5: VIEW SOUTH-EAST FROM PROW 431037
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 262m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 5

DATE TAKEN: JUNE 2021

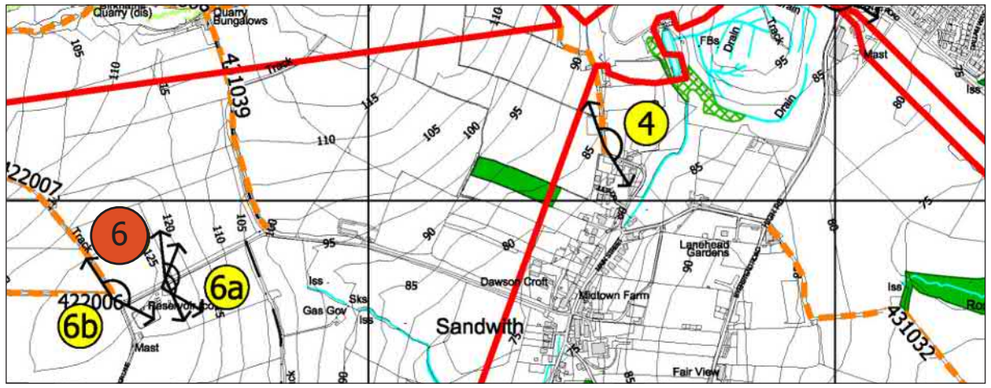
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 6: VIEW EAST FROM ST. BEES HERITAGE COAST
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 418m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 6

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

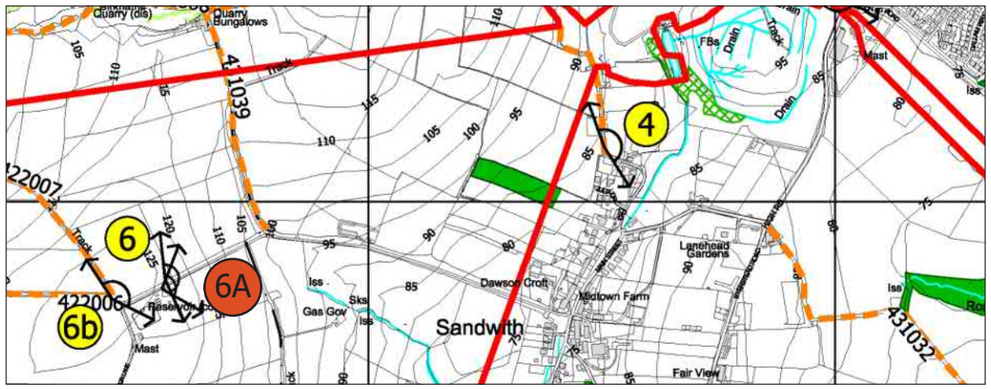
Marchon Site

VIEWPOINT PHOTOGRAPH 6A: VIEW EAST FROM ST. BEES HERITAGE COAST
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 438m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 6A

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

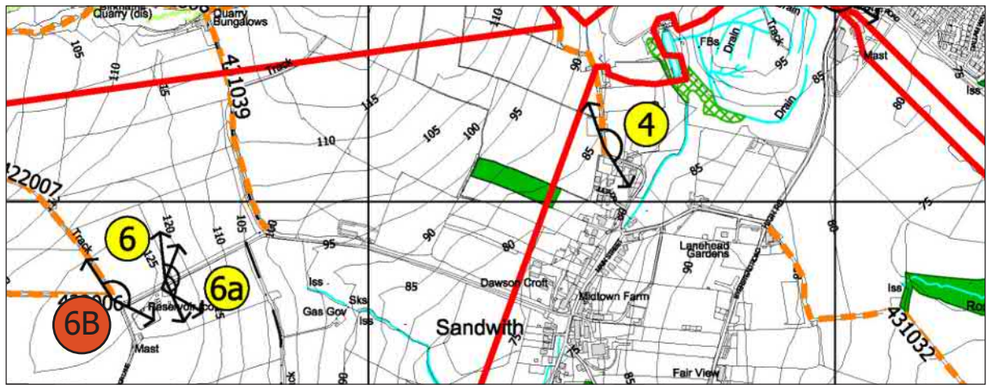
Marchon Site

VIEWPOINT PHOTOGRAPH 6B: VIEW NORTH-EAST FROM ST. BEES HERITAGE COAST
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 445m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 6B

DATE TAKEN: JUNE 2021

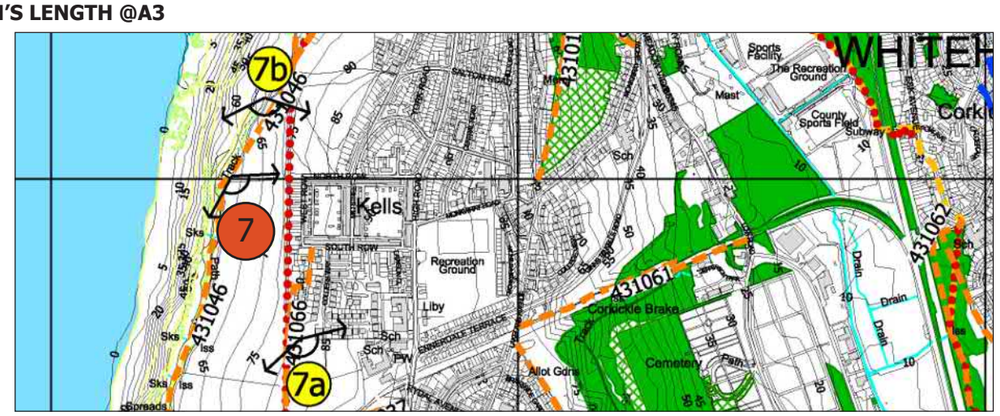
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 7: VIEW SOUTH FROM ENGLAND COAST PATH / PROW 431046, KELLS
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 1.02km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 7

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 7A: VIEW SOUTH FROM PROW 431066
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 0.68km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 7A

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

Marchon Site

VIEWPOINT PHOTOGRAPH 7B: VIEW SOUTH FROM ENGLISH COASTAL PATH / PROW 431046
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 1.19km

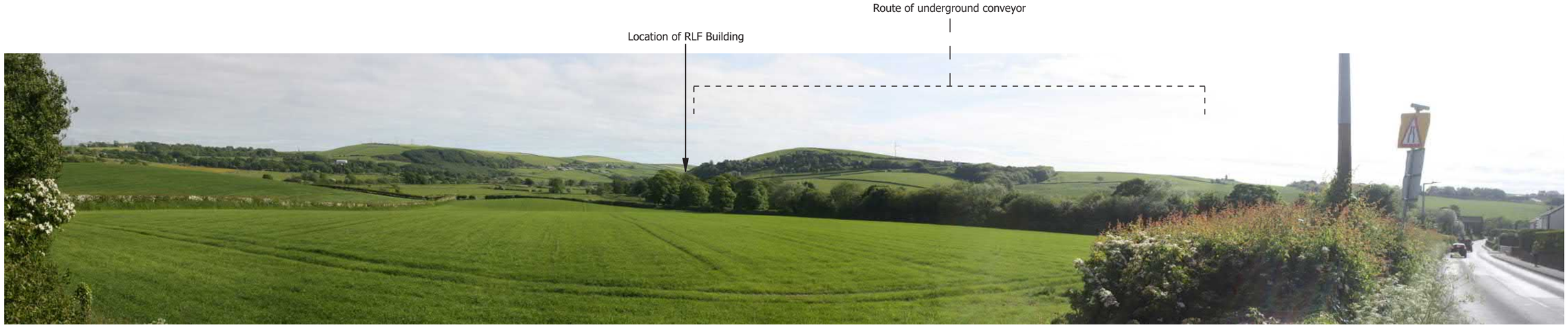
Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 7B

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

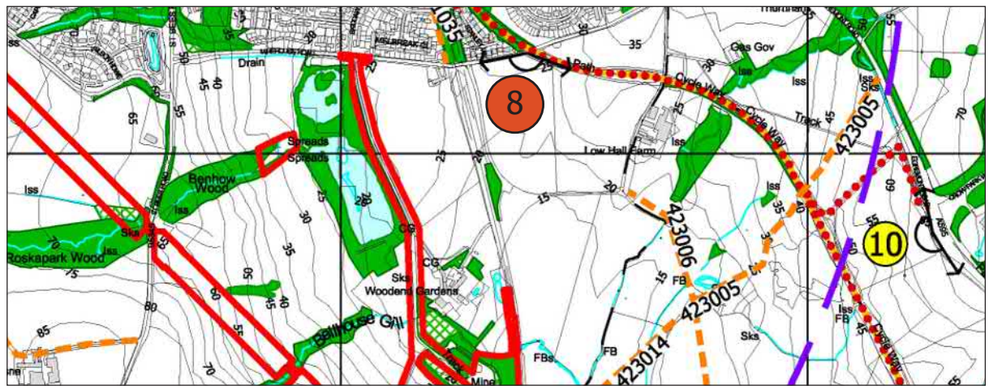


VIEWPOINT PHOTOGRAPH 8: VIEW SOUTH FROM MIREHOUSE ROAD
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 335m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 8

DATE TAKEN: JUNE 2021

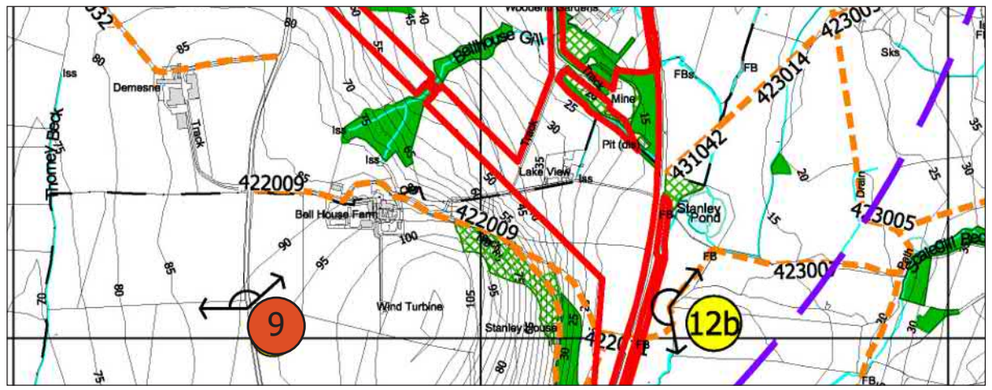
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 9: VIEW NORTH-WEST FROM B5345
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 0.58km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

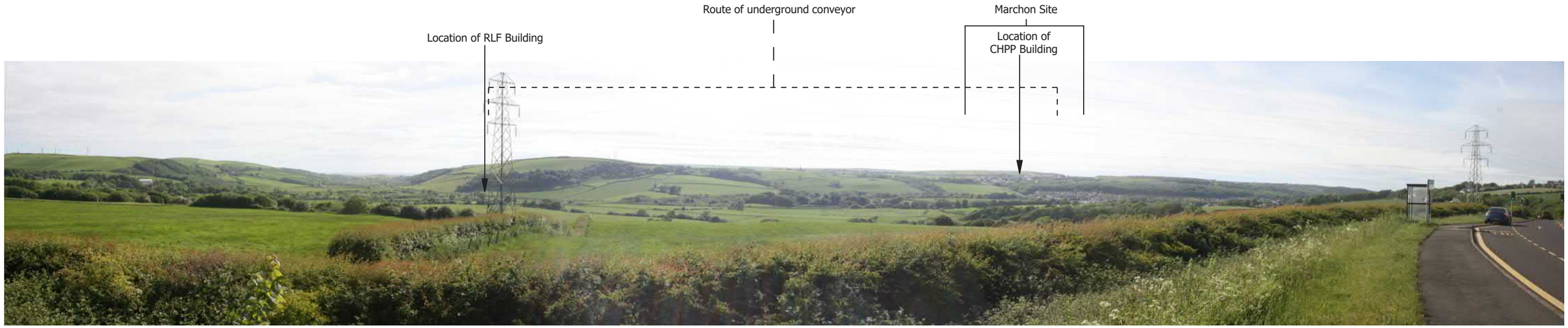


CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 9

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

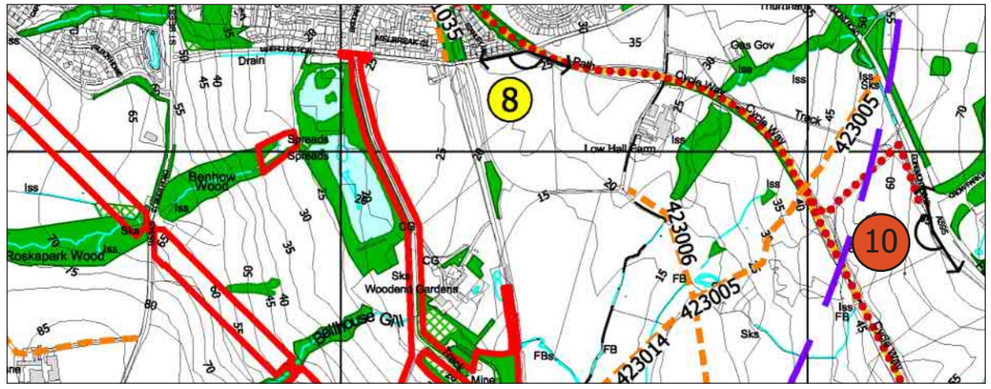


VIEWPOINT PHOTOGRAPH 10: VIEW WEST FROM A595 EGREMONT ROAD
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 0.92km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 10

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

Marchon Site

Location of CHPP Building

VIEWPOINT PHOTOGRAPH 11: VIEW SOUTH-WEST FROM RECREATION GROUND AT ROSEMONT, WHITEHAVEN
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 1.76km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 11

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 11A: VIEW SOUTH-WEST FROM ROASEBANK AT JUNCITION WITH LINCOLN ROAD
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 1.54km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 11A

DATE TAKEN: JUNE 2021

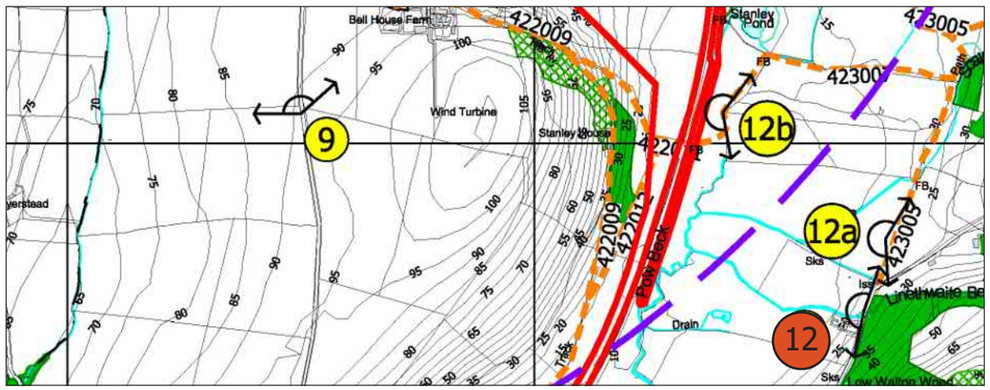
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 12: VIEW WEST FROM HIGH HOUSE ROAD
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 449m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

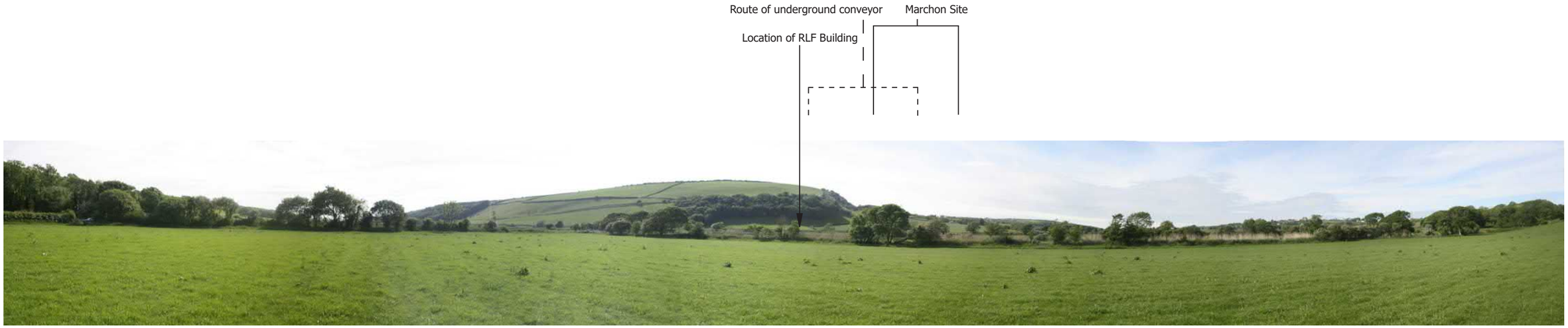


CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 12

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

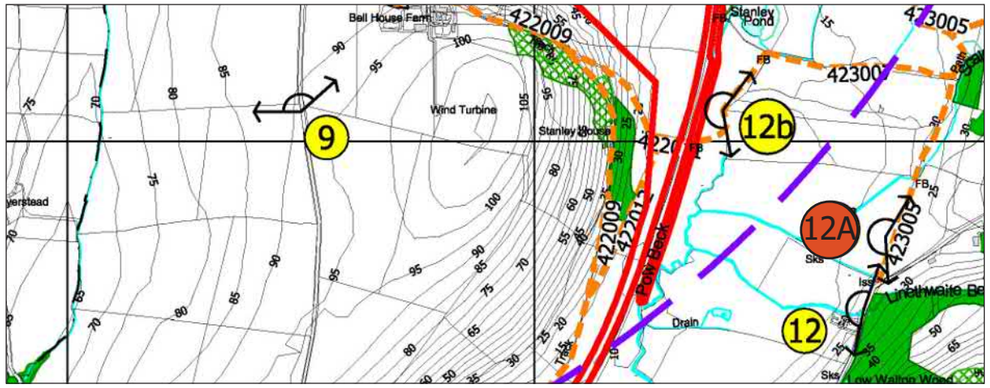


VIEWPOINT PHOTOGRAPH 12A: VIEW WEST FROM PROW 423005
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 447m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

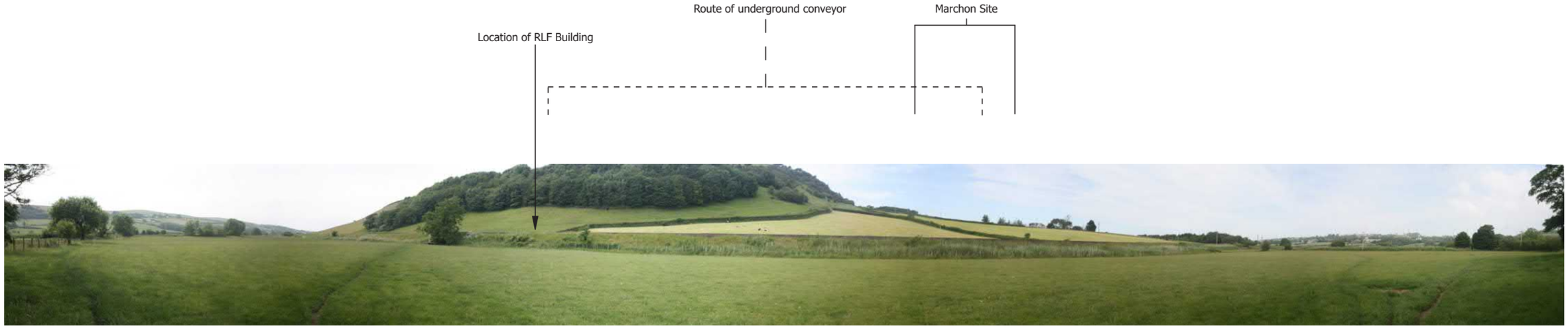


CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 12A

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

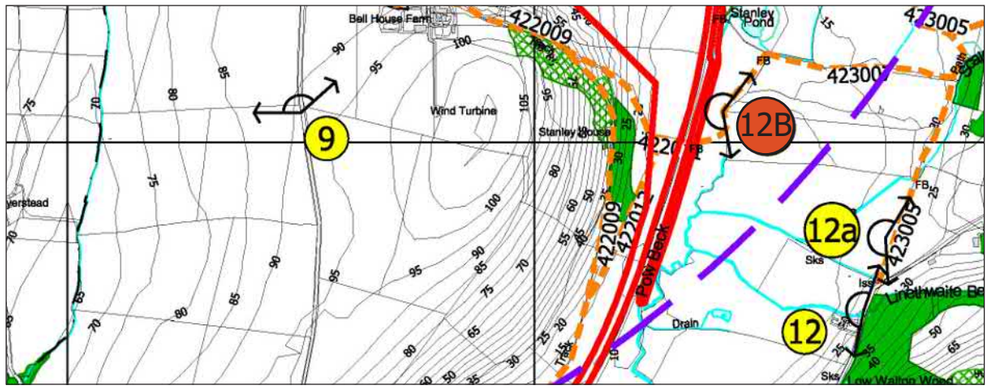


VIEWPOINT PHOTOGRAPH 12B: VIEW WEST FROM PROW 422011
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 37m

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 12B

DATE TAKEN: JUNE 2021

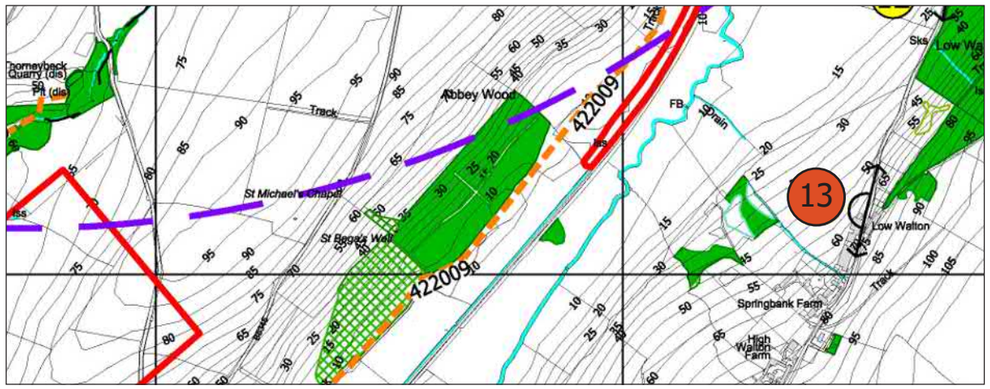
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 13: VIEW WEST FROM ST. BEES
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 1.06km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 13

DATE TAKEN: JUNE 2021

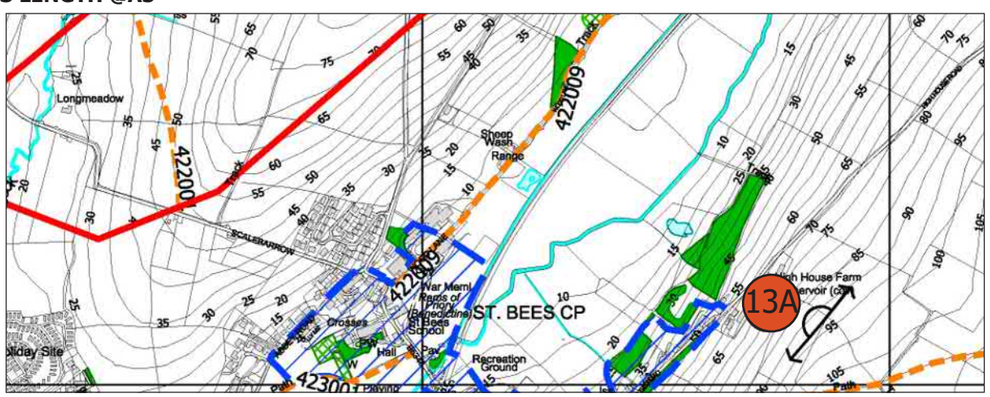
WEST CUMBRIA MINING

VIEWPOINT PHOTOGRAPH 13A: VIEW WEST FROM SPRINGBANK FARM
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 0.53km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens

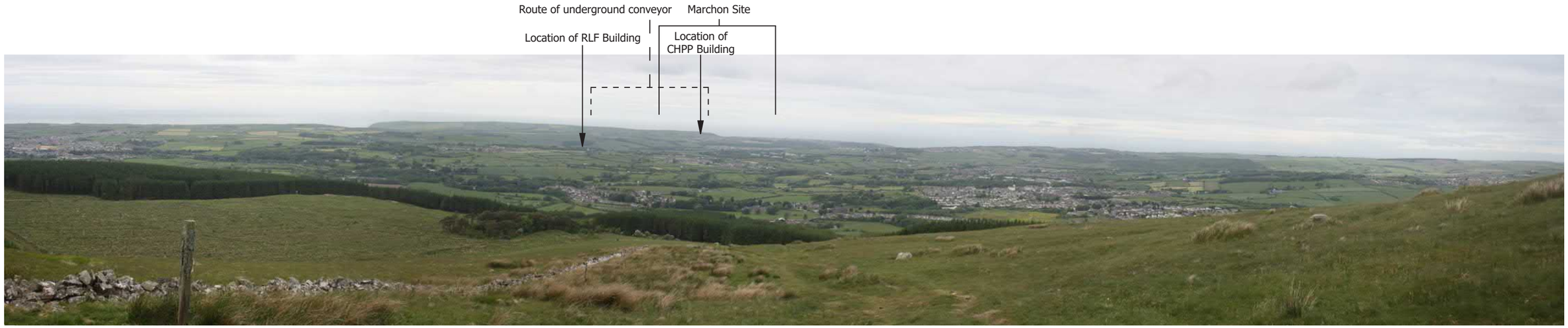


CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 13A

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

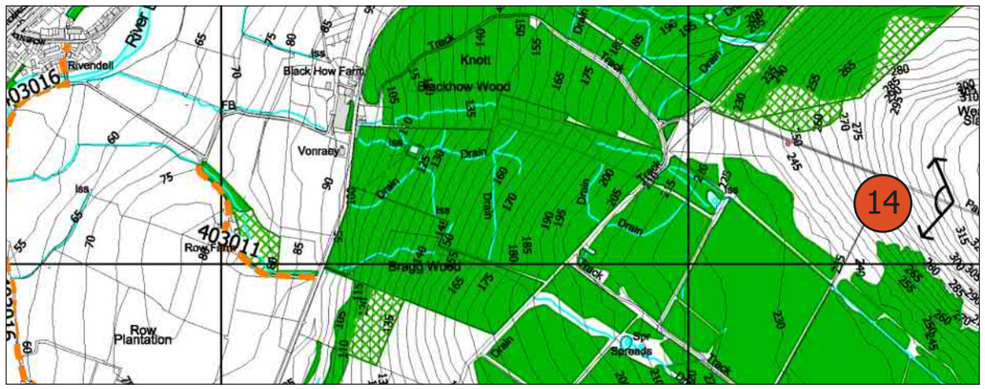


VIEWPOINT PHOTOGRAPH 14: VIEW WEST FROM COAST TO COAST WALK, DENT
PANORAMIC PHOTOGRAPH: NOT TO SCALE AND FOR CONTEXT ONLY

ACTUAL SIZE EXTRACT, HORIZONTAL FIELD OF VIEW 76.9°, TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH @A3

Approximate distance from the Site boundary: 5.28km

Visualisation Type: Type 1 Annotated Viewpoint Photograph
Camera: Canon 6D with 50mm fixed lens



CUMBRIAN METALLURGICAL COAL PROJECT

VIEWPOINT PHOTOGRAPH: 14

DATE TAKEN: JUNE 2021

WEST CUMBRIA MINING

Document No.6

This is document 6 referred to in the Appendix marked WCM/JF/2 on the Proof of Evidence of John Flannery dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32431819v1

Cumbria County Council: West Cumbria Mining, Whitehaven
Comments on WCM LVIA Methodology & Baseline

General comment

The Assessment Methodology is generally acceptable, with the following comments:

- I suggest omitting references to "inherent sensitivity" and "landscape capacity", as not relevant to the assessment of the effects of a specific proposal.
- The "significance matrices" could be omitted, as the text gives a better explanation of how the significance of effects would be assessed – in both the landscape and the visual effects sections.
- Note the specific comments regarding "value" and "susceptibility" in relation to sensitivity of receptors; consideration of the urban/ rural context of views; how duration and reversibility are handled in assessing magnitude of change.

The Baseline description is generally acceptable, with the following comments:

- For readability, I suggest a brief introduction to set the proposals and site in context. It might be more helpful to the reader if the context were described first and then the project specific description of the site and context.
- As set out in GLVIA3, landscape value should be established at baseline stage, before embarking on assessment of effects.
- It is important to maintain a clear distinction between landscape and visual aspects of the assessment.
- The scope of the development at Pow Beck is to be increased substantially and the landscape & visual baseline and potential views of that area will need to be re-examined in the light of the updated proposals.

Specific comments

Ref	Comment
LVIA	**Methodology**
Introduction	The correct attribution for GLVIA3 is: The Landscape Institute & Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment Third Edition, Routledge 2013 The publisher is given as Spon in the footnotes – should be Routledge
	Discussion of "future baseline" needs an introduction to set the scene and enable easy identification of the places etc mentioned.
	"The indirect landscape effects are …": not correctly described. As noted in the Glossary included in the document, copied from the one in GLVIA3: "Effects that result indirectly from the proposed project, as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or as a result of a complex pathway. They may be separated in distance or in time from the source of the effects." Ensure the assessment process recognises this.
Landscape sensitivity	"landscape value and susceptibility to change, which vary …": as per GLVIA3, the landscape is valued regardless of any development proposal; susceptibility is dependent on the development proposal i.e. to what degree the landscape can accommodate it
	"inherent sensitivity": an unnecessary complication in a LVIA of a specific development proposal?

Ref	Comment
Magnitude of change	"the reversibility of the construction effects is not applicable …": Is this entirely true for this project? E.g. no features removed in the construction period that cannot be replaced?
	"would give rise to a fresh characterising effect" – needs explanation – and similar terms in rest of table
Significance of Landscape Effects	"This matrix should not be used as a prescriptive tool …": Might it be better not to have the matrix at all but use a general description similar to the one above for combining value & susceptibility to judge sensitivity? Explanatory text such as that in 3rd para following is preferable to the matrix.
Visual Effects	"Views in a rural context … in a semi-rural context … in an urban or industrial context …": Why does the rural, semi-rural or urban context of the viewer's residence alter the value of the view? Table 6.3 needs re-thinking in these terms also
Table 6.4	Not clear how duration and reversibility are handled - "could be short term": supposing the "slight change" were long or medium term, what would be the category of magnitude?
Table 6.5	Significance of Visual Effects – Matrix: same comments as for landscape effects
Significance of Visual Effects	"the combination of viewpoint or landscape sensitivity": Should be the sensitivity/ susceptibility of the viewer. Value may be associated with the location, which, combined with the susceptibility of the viewer might influence assessment of "sensitivity" of the viewer
Glossary	"Landscape Capacity": Relevant to this assessment?
	"Visual amenity - Value of a particular place in terms of what is seen by visual receptors taking account of all available views and the total visual experience": source for this definition? OR: The value to the people viewing the landscape of the views available to them, and the pleasantness of the experience – rather than the value of the place
	"Visual Receptors": this is as per GLVIA3 Glossary, but doesn't explain that it is their visual amenity that may be being affected. I suggest using either para 3.21: "the people who will be affected by changes in views or visual amenity at different places or 6.13: "the people within [an] area who will be affected by the changes in views and visual amenity"
LVIA	**Baseline**
Title	Suggest "Landscape and Visual Amenity", rather than leaving the adjective "visual" hanging
6.1.1	Clarify that it is assessing effects on landscape & visual amenity & effects other than "likely significant"
6.2.1	Just "WYG" – the old name is not used any more
6.3.1	Provide a brief introduction for the benefit of the new reader as to what and where – and so the different elements and their geographical locations are clear from the start
6.4.7	"visual receptors": Clarify - i.e. people viewing the landscape
6.5.5	In this context, para 109 + first bullet should also be mentioned
6.5.8	"aimed at more typical open cast minerals sites": Not necessarily: other minerals developments can have working phases … just say they are not relevant as this proposal etc …?
6.6.12	"a change to their views": and the character of their landscape context?
6.6.18	"Linking the Marchon site and the Pow Beck site is the underground conveyor": presumably not existing but part of the proposals?

Ref	Comment
6.6.25	"Hence for the purposes of this assessment the Marchon site is considered to fall within LCT 5d": Agreed – a reasonable approach
6.6.31	"rather than the Pow Beck valley" - but presumably your proposals for/ affecting the landscape of the valley would be influenced by the CLCGT (as below)?
6.6.37	Heritage Coast definitions apply to England <u>and</u> Wales
6.6.39	Definition of visual receptors - agreed
Table 6.2	Proposed viewpoints: locations agreed However, I understand the scope of the development at Pow Beck is to be increased substantially and potential views of that area will need to be re-examined in the light of the updated proposals.
Table 6.2	"**L**: Landscape receptor" – it is important that the distinction between landscape and visual receptors and effects is maintained throughout the assessment, i.e. the identification of visual receptors as people viewing the landscape and experiencing change in their view and visual amenity as opposed to effects on landscape features/ qualities/ characteristics/ character as an environmental resource. Please clarify what is intended in the use of the terms here.
Table 6.2	"high road" – throughout, should have initial capitals

TOWN AND COUNTRY PLANNING ACT 1990

TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (ENGLAND) ORDER 2015/595

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND) RULES 2000/1624

PLANNING INQUIRY UNDER SECTION 77 OF THE TOWN AND COUNTRY PLANNING ACT 1990 IN RELATION TO THE PLANNING APPLICATION REFERENCE 4/17/9007 FOR APPLICATION FOR DEVELOPMENT OF A NEW UNDERGROUND METALLURGICAL COAL MINE AND ASSOCIATED DEVELOPMENT TO BE LOCATED AT
FORMER MARCHON SITE, POW BECK VALLEY AND AREA FROM MARCHON SITE TO ST BEES COAST, WHITEHAVEN, CUMBRIA

PINS REFERENCE: APP/H0900/V/21/3271069

Proof of Evidence on matters relating to Ecology

Dr Peter Shepherd MCIEEM

On behalf of West Cumbria Mining Ltd

Table of Contents

Appendices (Separately Bound)

- Appendix 1 - Summary of Ecological Surveys
- Appendix 2 - Biodiversity Net Gain Assessment
- Appendix 2 - Ecology Surveys Update Report

0. Executive Summary

0.1 I am Dr Peter Shepherd of BSG Ecology Ltd and I have been commissioned by West Cumbria Mining to carry out an updated review of the assessment of the project and thereafter provide evidence to the Inquiry on ecology in general and specifically the assessment of impacts arising from the proposed scheme on ecological receptors and how these will be protected from significant adverse impacts through avoidance, mitigation and compensation measures in line with relevant planning policy and legislation.

0.2 My proof is based on the suite of habitat and species surveys of the site since 2016, including further update survey information collected in 2021, the Chapter 11 - Ecology of the Environment Statement (2018) and supporting technical appendices, additional information provided as Supplementary Environmental Information and the shadow Habitats Regulations Assessment prepared by BSG Ecology. It reviews the assessments of impacts on valued ecological receptors as set out in the Environmental Statement (ES) and the shadow Habitats Regulations Assessment (sHRA).

0.3 The potential impacts of the proposed development on internationally designated sites has been the subject of a detailed assessment through the Habitats Regulations Assessment process. This has considered potential likely significant effects of the project on River Derwent and Bassenthwaite Lake SAC, Lake District High Fells SAC, Wast Water SAC, Morecombe Bay and Duddon Estuary SAC, SPA, River Ehern SAC, Drigg Coast SAC and Solway Firth SPA.

0.4 The SHRA concludes there will be no likely significant adverse effect on these internationally designated sites. I consider the conclusions of the sHRA process are correct and that the proposed development will not affect these and as such this complies with the Conservation Regulations 2017 (as amended) and the requirements of DM25 of the Copeland Local Plan and SP15 and DC16 of the Cumbria Waste and Minerals Local Plan.

0.5 Chapter 11 of the Environmental Statement (ES) considers impacts on Clint Quarry SSSI, St Bees Head SSSI, Roska Park Wood and Bellhouse Wood Local Wildlife Site (LWS), and Stanley Pond LWS. Of these the ES concluded that only Roska Park and Bellhouse Wood Local Wildlife Site (LWS) would be permanently adversely affected by the proposal to cross these woodland sites with the proposed conveyor to the Rail Loading Facility using a cut and fill method. The applicant is now proposing to avoid harm to these woodlands by taking the conveyor route through tunnels beneath the woods. I consider this to be a welcome improvement on the approach set out in the ES as it will prevent any loss or deterioration of ancient woodland (an irreplaceable habitat) and parts of the LWS ensuring compliance with national and local planning policy.

0.6 The proposed development will result in the loss of Open Mosaic Habitat within the Main Mine Site and the Main Band Colliery which is a Habitat of Principal Importance. I consider this will result in an adverse impact that is significant at

the Site level given the quality and extent of OMH present on these sites. However, the loss of this priority habitat will be compensated through the creation of a mosaic of open habitats within the retained and landscaped parts of the proposed development during the operational phase. Further open mosaic habitat will be created following decommissioning with the restoration of the whole site to a local green space supporting a mosaic of semi-natural habitats. I am confident that the creation of further mosaic habitat will be successful. This approach is in line with DM25 of the Copeland Local Plan and DC16 of Minerals and Waste Local Plan and Paragraph 180 (d) the NPPF(2021) as it incorporates biodiversity designs into the development from the outset.

0.7 A range of species of note (species subject to legal protection, priority species and scare or rare species) will potentially be adversely affected by the proposed development including common lizard, slow worm, common pipistrelle bat and a number of terrestrial invertebrates. A mitigation strategy for reptiles has been prepared and is attached to this proof. The small bat roost in the security building on the main mine site will be demolished under the control of a bat mitigation licence which will require appropriate mitigation and compensation measures to be undertaken. I consider if the development is granted consent a licence is likely to be issued. Notable invertebrates will be retained on site through a combination of habitat retention and creation and positive management controlled through the proposed Habitat Management Plan required by draft condition 8. I do not consider the impacts of the proposed development to be more than significant at the Site or Local level. I also consider the proposed mitigation measures are in line with local and national planning policy.

0.8 In response to draft condition 8, a preliminary net gain calculation has been commissioned by West Cumbria Mining which indicates, subject to final detailed design, that the development is capable of delivering a biodiversity gain of at least 10% in line with national and emerging local planning policy.

1. Qualifications and Experience

1.1. I am Peter Shepherd. I hold the degree of Bachelor of Science with Honours in Botany and the degree of Doctor of Philosophy from the University of Nottingham. My research focussed on the ecology and phytosociology of plant communities of urban and post-industrial habitats across the UK.

1.2. I have been a full member of the Institute of Ecology and Environmental Management since 1992. I currently hold or have been granted a number of licences by Natural England for working with a range of protected species including bats (various species), great crested newts and badgers. These licences enable me to undertake scientific study and survey and mitigation and compensation works associated with development.

1.3. I have 30 years of professional experience in the voluntary and private sectors. I am a Board Director in the ecology consultancy practice BSG Ecology Ltd., which was formed in July 1997. BSG Ecology currently operates out of six offices in Hathersage (Derbyshire), Newcastle-upon-Tyne, Oxford, Newport, Swansea and Cambridge. Within the practice there are currently 40 ecologists and 7 administrative and support staff.

1.4. BSG Ecology undertakes commissions in ecology working in environmental impact assessment, research, policy development, survey, protected species issues and land management advice. Clients come from both public and private sectors. Public sector clients include Natural England, and local authorities. The practice has worked in many different counties across the UK. During the last 10 years I have undertaken or advised on hundreds of contracts ranging from the ecological design of the Olympic Park and Queen Elizabeth Olympic Park in London to small projects such as single barn conversions.

1.5. Prior to forming BSG Ecology I worked as the Urban Conservation Officer for Nottinghamshire Wildlife Trust between 1989 and 1992, where I was responsible for the development and implementation of conservation policy and managing a number of nature reserves across the City. Between 1992 and 1997 I established and worked for the Trust's own consultancy company. During this time I undertook or advised on over one hundred and fifty consultancy commissions.

1.6. I have been working with protected species, in particular bats, great crested newts and badgers as a volunteer and as a professional for over 25 years. In relation to great crested newts I have worked on over 25 mitigation licences since 1998 including a strategic road scheme that passed through Orton Pit SSSI, SAC, which is designated for its large (*circa* 30,000) population of great crested newts, major housing developments, rail infrastructure schemes, Energy from Waste plants and other renewable projects including wind and solar power.

1.7. In relation to bats I hold a Class 4 scientific survey licences that enables me to disturb, capture (using hand nets, mist nets and harp traps) and handle bats for development projects. I also have applied for and implemented over 30

mitigation licences issued by Natural England (formerly Defra) for specific development projects throughout the UK. Since 2000 I have prepared and delivered training courses for consultants on bats and their ecology for the Bat Conservation Trust and I was a member of the editorial board for the Bat Conservation Trust's Bat Survey Guidelines (2007, 2012 and 2016). I am currently a member of the editorial board for the next iteration of the guidance and I a member of Natural England's Bat Expert Panel which provides advice to Natural England as they develop their policies and practices in relation to bat conservation.

1.8. I understand my duty to the Inquiry to help the Inspector on matters within my expertise and that this duty overrides any obligation to the person from whom I have received instructions or by whom I am paid. I confirm that my fees are not conditional upon the outcome of the Inquiry. I have complied, and will continue to comply, with that duty. I confirm that this evidence identifies all facts which I regard as being relevant to the opinion that I have expressed and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion. I believe that the facts stated within this proof are true and that the opinions expressed are correct.

Statement of Truth

1.9. The evidence which I have prepared and provide for this planning inquiry (PINS Reference APP/H0900/V/21/3271069) in this Proof of Evidence is to the best of my knowledge and belief true and I confirm that the opinions expressed are my true and professional opinions.

2. Scope and Structure of Evidence

2.1. I am commissioned by West Cumbria Mining to carry out an updated review of the assessment of the proposed development and thereafter provide evidence to the Inquiry on issues relating to ecology in general and specifically the assessment of impacts arising from the proposed scheme on ecological receptors (designated, sites, habitats and species) and how these will be protected from significant adverse impacts through avoidance, mitigation and compensation measures in line with relevant planning policy and legislation. My proof also addresses the delivery of a net gain in biodiversity value.

2.2. I have been aware of and have provided advice and field work support to the project team working on this proposed scheme since January 2016. I first visited the site in July 2016 to undertake a Phase 2 botanical survey of the Main Mine site. I have since visited the Main Mine site to review its current state on 18th May 2021 and during the same visit I surveyed the gill woodlands at Roska Park Wood, Benhow Wood and Bellhouse Wood to familiarise myself with these sites and to assess their botanical interest. I made a further visit to the site on 22nd June 2021 when I undertook a second visit to Roska Park Wood, Benhow Wood and Bellhouse Wood and I undertook a botanical and reptile survey of the Main Band colliery site and walked over the Rail Loading Facility area. I also accompanied Dr Martin on his site visit on 23rd June during which time we walked parts of the conveyor route between Roska Park Wood

and Bellhouse Gill Wood, entered Roska Park Wood and Benhow Wood and walked the Main Mine site.

2.3. My evidence is based on the suite of habitat and species surveys of the site since 2016, the Chapter 11 - Ecology of the Environment Statement (2018) and associated technical appendices, additional information provided as Supplementary Environmental Information and the shadow Habitats Regulations Assessment prepared by BSG Ecology.

2.4. Since 2015 ecological surveys have been undertaken in 2017, 2018, 2019 and most recently in 2021. These have been driven primarily by the assessment of the likely presence of species and habitats of ecological value and by consideration of the impacts that might arise from the proposed development. They have also been driven by requests for additional information by the local planning authority. A summary of the surveys is provided in Appendix 1 to this proof. My evidence is also based on a review of the various correspondence between West Cumbria Mining and their consultants and the local planning authority and Natural England.

2.5. Any documents which are appended to this Proof of Evidence are referred to as Appendix . Appendix 1 contains tables or drawings that support the main text of the proof.

2.6. My evidence reviews the conclusions of the EIA and HRA process and considers further information and proposed changes to the scheme since the EIA was completed. It is confined to matters which I think are relevant to the Inquiry and which are within my area of expertise.

3. Policy and Legislative context

3.1. I consider the relevant national policy and legislative basis to include: National Planning Policy Guidance (2021); The Conservation of Habitats and Species Regulations 2017 (as amended), The Natural Environment and Rural Communities Act 2006 and The Wildlife and Countryside Act 1981 (as amended). These policies and legislation were identified in the ES chapter. However, I am conscious there have been revisions to the National Planning Policy Framework as of July 2021, and the government has published the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, (the 2019 Regulations) which amend The Conservation of Habitats and Species Regulations 2017 (as amended).

3.2. In relation to the NPPF I consider the changes do not materially change the overall thrust of Government policy. However, I note that paragraph 180 (d) places a stronger requirement for developments to integrate biodiversity improvements in and around development. Paragraph 180(d) also refers to enhancing public access to nature ‘where appropriate’.

3.3. The 2019 Regulations are intended to make the 2017 Regulations operable from 1 January 2021 once the UK left the European Union. I understand most of the changes enable the transfer of functions from the European Commission to the appropriate authorities in England and Wales and that requirements in relation to Habitats Regulations Assessment and protection of species effectively remain.

3.4. There have been no changes to The Natural Environment and Rural Communities Act 2006 and The Wildlife and Countryside Act 1981 (as amended). Although the 7th quinquennial review of Schedules 5 and 8 of the Act is currently being undertaken it will not be determined until December 2021 and as such I have considered the existing protections afforded to those species listed on the Schedules from the 6th quinquennial review to be the appropriate legislative basis.

3.5. The relevant local planning policy is contained within the Cumbria Minerals and Waste Local Plan (2015-2030) policies SP15, SP16, DC16 and DC22 and the Copeland Local Plan (2013-2028) policies ENV3 and DM25. I am also conscious that the Copeland Local Plan is undergoing review and in September 2020 a preferred options draft of the Local Plan for 2017-2035 was published. It contains two draft policies relating to ecology and biodiversity N1PO and N2PO.

3.6. In relation to Biodiversity Net Gain I have also considered the impending requirements of the Environment Bill which is currently passing through Parliament.

4. Habitats Regulations Assessment

4.1. The proposed development and its potential impacts on internationally designated sites has been the subject of a detailed assessment through the Habitats Regulations Assessment process. This has considered potential likely significant effects of the project on the following existing and proposed internationally designated sites: River Derwent and Bassenthwaite Lake SAC, Lake District High Fells SAC, Wast Water SAC, Morecombe Bay and Duddon Estuary SAC, SPA, River Ehern SAC, Drigg Coast SAC and Solway Firth SPA.

4.2. BSG Ecology has prepared a shadow Habitats Regulations Assessment (sHRA) (Feb 2019) and a validation review of the sHRA following proposed process changes to the operation of the development (May 2020). There has also been extensive consultation with the competent authority's advisors and Natural England during the preparation of the sHRA which concludes that the proposed development would not have an adverse effect on the integrity of the existing and proposed international designated sites. I consider the conclusions of the HRA process are correct and that the proposed development will not have a likely significant effect on any of internationally important sites assessed and as such complies with the Conservation Regulations 2017 (as amended) and the requirements of DM25 of the

Copeland Local Plan and SP15 and DC16 of the Cumbria Waste and Minerals Local Plan.

5. Impacts on other designated sites and habitats

5.1. The EIA (2018) scoped in a number of designated sites and habitats and assessed the potential impacts of the proposed scheme upon these valued ecological receptors. Designated sites (in addition to the internationally designated sites assessed by the HRA process) included in the Environmental Statement (ES) were Clint Quarry SSSI, St Bees Head SSSI, Roska Park Wood and Bellhouse Wood Local Wildlife Site (LWS), and Stanley Pond LWS. Of these I consider there will be no adverse impacts on St Bees Head SSSI, Clint Quarry SSSI and Stanley Pond LWS arising from the development.

5.2. In relation to Roska Park Wood and Bellhouse Wood LWS, permanent, adverse impacts on Roska Park Wood and Bellhouse Wood were identified arising from the construction of the conveyor. Despite proposed mitigation aimed at minimising the extent of habitat loss, the impact was assessed as being permanent, adverse significant at the Local level. I agree with this assessment, primarily because of the small area of each site that would be affected and the mitigation measures proposed within the ES to reduce harmful impacts.

5.3. Roska Park Wood and Bellhouse Wood LWS is of county importance and supports plant species indicative of ancient and or long-standing woodland. Bellhouse Wood is listed as ancient woodland on the Multi Agency Geographic Information for the Countryside (MAGIC) website. Although not noted on the MAGIC website, I consider much of Roska Park Wood and Benhow Wood likely to support ancient woodland, with the exception of the woodland immediately to the west of the St Bees Road, which has clearly been subject to quarrying activity in the past, and parts of the southern and northern fringes of Roska Park Wood which historic maps indicate were not under woodland in the mid 1800's. Despite the past quarrying and industrial activity to the west of St Bees Road, a woodland ground flora with species associated with ancient woodland sites has recolonised the previously quarried part of the site.

5.4. Since the publication of the ES further mitigation measures have been discussed within the project team to determine if impacts on the Local Wildlife Site and woodland habitats they support can be further reduced or avoided in line with the principles of the Mitigation Hierarchy. It is now proposed to place the conveyor in a tunnel beneath the woodlands at Roska Park and Bellhouse Woods through the use of a drilling technique known as pipe jacking, which has been used to install pipes beneath sensitive features such as railways, roads, canals, river and woodland where disturbance to ground level features/structures was to be avoided.

5.5. This revised approach to the construction of the conveyor will avoid direct loss of woodland and associated fauna and flora at Roska Park Wood, and Bellhouse Wood and, as such, I consider this to be an improvement on the

approach proposed in the 2018 ES enabling compliance with local planning policy and the primary objective of paragraph 180(c) of the NPPF, namely the avoidance of loss or deterioration of irreplaceable habitats rather than reliance upon compensation for unavoidable loss. I consider the use of pipe jacking to tunnel under the woodlands will reduce impacts on these designated sites to a negligible level.

5.6. In addition to the semi-natural broadleaved woodland habitat within Roska Park Wood and Bellhouse Wood, the proposed development would result in the loss of the habitat of principal importance (HPI), open mosaic habitat of previously developed land at the Main Mine Site and to a much smaller degree at the Main Band colliery site. The ES considers the loss of this HPI to be significant at the Site level and I agree with this conclusion given the quality and extent of OMH present. The loss of OMH will be compensated through the creation of a mosaic of habitats as part of the landscape and Ecology Management Plan for the landscape mounds that will fringe the eastern and northern boundaries of the site and post decommissioning the restoration of the whole site to a green space with semi-natural habitat. I have led and monitored the creation of OMH in Peterborough over a 10 year period for which BSG Ecology was awarded the CIEEM Tony Bradshaw award for outstanding best practice in 2019 and as such I am confident this habitat can be re-created. This approach is in line with DM25 of the Copeland Local Plan and DC16 of Minerals and Waste Local Plan and Paragraph 180 (d) the NPPF(2021) as it incorporates biodiversity designs into the development from the outset, which is carried through into the decommissioning phase of the project enabling a biodiversity gain to be delivered.

6. Impacts on protected species and species of conservation concern

6.1. Baseline survey between 2015 up to 2018 (see appendix 1) identified the presence of a number of protected species and species of conservation concern with the survey area, which have been assessed in the ES chapter.

6.2. Further update surveys and additional surveys have been undertaken in 2019 and 2021 (Appendix 2). These include: (a) Update reptile survey of the Main Mine Site in 2019, which recorded a small population of common lizard and slow worm; (b) Reptile survey of the Main Band Colliery (2021), which has recorded a small population of common lizard; (c) Update botanical survey of the Roska Park Wood, Benhow Wood and Bellhouse Wood in 2021; (d) Update survey of bat activity using static bat detectors in 2021; (e) Update emergence survey of the Main Mine Site security building for roosting bats and vantage point surveys of hedgerow by the Rail Loading Facility in 2021; (f) Update large mammal survey 2021; (g) Update breeding bird survey 2021; (h) Update survey of great crested newts 2021; and, (i) Update survey of terrestrial invertebrates (May-July) 2021. I have reviewed the baseline survey reports that underpin the 2018 ES assessment and do not consider they change the conclusions drawn in the ES. With the exception of the reptile surveys, the emergence survey of the security building and the terrestrial invertebrate surveys, the update survey work has not recorded new information that

amends or changes the assessments made in 2018 ES chapter. I consider the results from these surveys below.

6.3. Additional reptile survey information provided between 2019 and 2021 includes the confirmed presence of common lizard and slow worm on the Main Mine Site and common lizard on the Main Band Colliery Site. These two species are common and widespread reptiles, which are currently protected from killing and injury under Schedule 5 of the Wildlife and Countryside Act 1981. They are also both species of principal importance for the conservation of biodiversity (priority species) listed under section 41 of the Natural Environment and Rural Communities Act 2006. I consider populations of these two species to be of importance at the local level as the survey indicates small populations are likely to be present and because these species are considered to be widely distributed occurring in suitable habitat across Cumbria and the rest of England.

6.4. Given the legal protection afforded to these species and their status as priority species a mitigation strategy titled "*Cumbrian metallurgical coal project – Reptile translocation and habitat creation method statement"* has been prepared by BSG Ecology (July 2021) (Appendix 2). This proposes the capture and removal of animals from the development area in advance of the start of site clearance and release into suitable receptor areas. Reptile translocations for these species are regularly undertaken typically being controlled through suitable planning condition and I consider the approach will ensure the continued survival of populations of both species within the vicinity of the site. Mitigation for reptiles is included within draft condition 8 which will enable compliance with the legal protection afforded to common lizard and slow worm (Wildlife and Countryside Act 1981) and local planning policies DC16 and DM25. Considering the status of these species within Cumbria and the proposed mitigation measures I assess the impacts of the proposed development to be significant at the Site level only.

6.5. Due to vandalism of the security building at the Man Mine Site new potential roosting features/access points for bats may have been created and it was considered necessary to update the survey of the building for use by bats. The survey in 2021 has recorded two animals of common pipistrelle emerging from the buildings indicating it has been colonised for use as a day roost. I consider this to be a low conservation importance and of significance at the Site level only. However, as bats and their roosts are protected under the Conservation Regulations (2017) (as amended), it will be necessary to seek a licence for the removal of the security building and provide alternative roosting opportunities by way of compensation. I consider that should consent for the proposed development be granted it is likely a licence for the demolition of the security building will be forthcoming and that this will ensure a suitable level of compensation is provided such that the favourable conservation status of this common and widespread bat species can be maintained. As such, I consider the impact of the proposed development to be significant at the Site level only and the application for a mitigation licence to be in line with the legal protection afforded to bats and their roosts. I also consider this approach to be in line with local planning policies DC16 and DM25 relating to protected species and

development. The application for and implementation of a Mitigation licence will ensure compliance with he Conservation Regulations 2017 (as amended).

6.6. The initial assessment of the site as a habitat for invertebrate species made at the start of the assessment process identified the need for invertebrate surveys focussed on butterfly species at the Main Mine Site. In 2021, it was considered that this survey should be updated. At the same time a review of the Main Band Colliery site indicated it may have the potential to support a different range of species to that of the Main Mine Site and as such further invertebrate survey (May, June and July) was undertaken to inform the restoration of the Main Band Colliery, which was extended to the Main Mine Site.

6.7. The survey has confirmed that the Main Mine Site and the Main Band Colliery supports a typical assemblage of terrestrial invertebrates with relatively few species of note being recorded. The relatively low level of notable species is reflected in the low Site Quality Index score. As such, I consider the invertebrate community is of value in the local context. However, in common with survey of invertebrates of such sites a small number of species of note (a species of principal importance for the conservation of biodiversity or nationally scarce) have been recorded and appropriate habitat management and compensation will be required to maintain these species on site. Of these three are species of lepidoptera, grayling butterfly, latticed heath butterfly, and cinnabar moth. One is a weevil (*Grypus equiseti*), one a rove beetle (*Ocypus nitens*) and one a ground bug (*Megalonotus dilatatus*). Whilst the weevil has nationally scarce status it is considered that this status is likely to change as it has been widely reported in invertebrate surveys and is considered to be more widespread than its status suggests. The rove beetle and the ground bug are considered to be nationally notable.

6.8. The habitat requirements for the species affected are understood and habitat supporting these species will be retained where possible and compensated through habitat enhancement and creation. The Habitat Management Plan required by draft condition 8 will include mitigation measures for invertebrates, which I consider will maintain a diverse invertebrate assemblage on or adjacent to the site, including the notable species. As such, I consider the proposed development will comply with local planning policies DC16 and DM25.

7. Delivering Biodiversity Net Gain

7.1. The NPPF (2021) sets out in paragraph 174, 179 and 180 the government expectation that development should deliver a measurable gain in biodiversity value. At the time of the publication of the ES there was no requirement to prepare a measured biodiversity gain assessment (metric). However, the preferred options draft for the Copeland Local Plan policy N2PO seeks the delivery of biodiversity net gain and draft condition 8 proposed to be attached to the planning consent for the development requires the Habitat Management Plan to demonstrate a net gain will be achieved. In addition, the need to prepare a biodiversity gain assessment is a key requirement of the

Environment Bill currently passing through parliament which is expected to be passed into law in the near future. The Bill sets a mandatory requirement for development to deliver biodiversity gain and establishes a minimum gain of 10% above the baseline value of the site.

7.2. In response to draft condition 8 BSG Ecology was commissioned by West Cumbria Mining to undertake a biodiversity gain assessment using the DEFRA 3.0 metric (see Appendix 2) to determine if the delivery of biodiversity net gain is likely without the need for additional offsite compensation by West Cumbria mining or a financial contribution to enable net gain to be delivered elsewhere by a third party.

7.3. The initial biodiversity gain assessment has been on based the plans submitted with the planning application and a series of reasonable assumptions discussed with West Cumbria Mining about the range, extent and timing of delivery of habitats the landscaping scheme can deliver. These will subsequently be refined through the approval of the detailed landscape design a key objective of which will be to ensure a minimum 10% net gain is delivered. The initial biodiversity net gain assessment (completed by BSG Ecology Ltd, August 2021 using DEFRA Metric 3.0) indicates that the proposed development will deliver a net gain of greater than 10 % over the lifetime of the project above the current baseline value of the site. The ability to achieve a net gain will result in an overall positive benefit for biodiversity value for the site arising from the proposed development. As such, I consider the proposed development is in line with government policy as set out in the NPPF 2021 (to achieve a net gain for biodiversity), the preferred option draft policy of the Copeland Local Plan (2017-2035) (a minimum 10% net gain) and what is anticipated will be the future legal requirements as set out in the Environment Bill (a minimum 10% net gain). The restoration to a net positive biodiversity end use and restoration is also in line with SP16 and DC22 of the Cumbria Minerals and Waste Local Plan which seek positive restoration of mineral sites to support overall sustainability objectives.

8. Conclusion

8.1 I consider the assessment of the proposed development has identified the appropriate valued ecological receptors (designated sites, habitats and species), provided an assessment of the relative value and importance of these and identified and assessed likely impacts. It provides information on how impacts will be avoided mitigated and compensated. The proposed development will result in the loss of existing habitats and will affect, to varying degrees, a suite of species and species assemblages supported by the site. However, taking account of the relative value of the ecological receptors and the proposed mitigation and compensation measures, I consider that the development will not result in a significant adverse impact, and that, as such, the development is in accordance with the requirements of the NPPF (2021), Wildlife and Countryside Act 1981 and the Conservation Regulations 2017 (as mended), local plan policies ENV3, DM25, SP15, SP16, DC16 and DC22 in

relation to international and national statutory site and the protection of habitats and species. I also consider the proposed development to be in line with the NPPF (2021), emerging local planning policy (preferred option draft policy N2PO of the Copeland Local Plan (2017-2035) and future legislation (Environment Bill) in relation to biodiversity gain.

Signed: *Peter Shepherd* Dated: 10/08/21

Town And Country Planning Act 1990

Town And Country Planning (Development Management Procedure) (England) Order 2015/595

Town And Country Planning (Inquiries Procedure) (England) Rules 2000/1624

Planning Inquiry Under Section 77 Of The Town And Country Planning Act 1990 In Relation To The Planning Application Reference 4/17/9007 For Application For Development Of A New Underground Metallurgical Coal Mine And Associated Development To Be Located At

Former Marchon Site, Pow Beck Valley And Area From Marchon Site To St Bees Coast, Whitehaven, Cumbria

PINS REFERENCE: APP/H0900/V/21/3271069

APPENDIX – WCM/PS/2

This is the Appendix marked WCM/PS/2 referred to in the Proof of Evidence of Dr Peter Shepherd dated 10.08.2021 on behalf of West Cumbria Mining Ltd

Document No.

Document No.1

This is document 1 referred to in the Appendix marked WCM/PS/2 on the Proof of Evidence of Dr Peter Shepherd dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442199v1

Appendix 1 – Summary of Ecological Surveys

Task	Date	Area/structure covered
Desk study		
Initial desk study	20.11.2015	Main Mine Site as central location + 2km buffer.
Updated desk study	01.08.2017	Buffer of 2km in all directions from the site redline boundary.
Second update desk study	28.05.2021	As above.
Extended Phase 1 Habitat surveys (EXP1)		
ERAP Environmental consultants walkover survey	01.07.2013	Initial site survey covering most of the former Marchon chemical works site (This is mentioned in the ES but not used in impacts assessment)
Initial walkover survey an preliminary assessment	01.12.2015	The whole former Marchon chemical works site, including the area to the north originally proposed as the site access, and the proposed NPL housing development land directly north of the MMS.
EXP1	01.03.2016	MMS
EXP1	11.04.2017	Conveyor, Rail Loading Facility (RLF), Access road and Main Band Colliery (MBC).
EXP1 Update	22.03.2018	MMS, Conveyor, Access road, RLF and MBC
EXP1	24.04.2017	St Bees Head, and coastal headlands. Survey completed at a time when the project still featured the potential for a marine outfall.
EXP1	11.04.2017	Bellhouse Gill and Roska Park woodland
EXP1	27.05.2017	Bellhouse Gill and Roska Park woodland (second survey completed to ensure data was collected

		across the core growing period for woodland indicator species.
EXP1	04.10.2017	Survey of the habitats on the eastern side of the St Bees railway line, including the Pow Beck, railway embankment and inbye land.
EXP1	22.03.2018	Survey (1) of the surface habitats associated with the terrestrial mining areas. Habitat survey mostly completed from car and sought to characterise habitats as landownership and access could not be established for all habitats within these areas.
EXP1	12.04.2018	Survey (2) of the surface habitats associated with the terrestrial mining areas. Habitat survey mostly completed from car and sought to characterise habitats as landownership and access could not be established for all habitats within these areas.
EXP1	11.05.2021	Update survey of the MMS, Conveyor route, RLF, Access track, MBC and land on east side of the St Bees railway line.
Habitat surveys (Phase 2 botanical)		
Phase 2 botanical	06.06.2016	Phase 2 botanical assessment of all grassland and scrub habitats within the MMS and 20-30m buffer area to the south.
Phase 2 botanical and woodland update	18.05.2021	Update of the 2016 phase 2 survey, including all grassland habitats within the MMS and woodland habitats associated with

		the Roska Park, and Bellhouse Gill woodland.
Phase 2 botanical survey	22.06.2021	Main Band Colliery grasslands and other habitats including all areas directly affected by the access road and lay down.
Breeding bird surveys		
Breeding bird surveys and Territorial mapping	28.04.2016, 12.05.2016, 19.06.2016	MMS, and Conveyor. Survey of the MMS also included the NPL land to the north.
Breeding bird surveys and Territorial mapping	07.04.2017, 15.05.2017, 16.06.2017	MBC, Access road and RLF. Also included land on the east side of the Railway that Tetratech (WYG) were concerned the area might support Curlew.
Breeding bird surveys and Territorial mapping	11.05.2021, 17.05.2021, 03.06.2021	MMS, Conveyor, RLF, Access road, MBC and land on the eastern side of the St Bees railway.
Wintering and migratory birds		
Wintering bird survey and coastal (Offshore Vantage Point (VP))	11.12.2017, 17.12.2017, 10.01.2018, 22.03.2018	Work covered St Bees Head, MMS, Conveyor route and RLF. Survey also covered land behind Mr Barwises farm (to the SW) as WYG thought this area might support wintering waders.
Bat transect surveys		
Bat transect surveys and static monitoring	26.04.2016, 14.06.2016, 29.09.2016	Survey covered the MMS only, 5 days of static monitoring following each survey visit.
Bat transect surveys and static monitoring	13.04.2017, 22.05.2017, 22.06.2017	Survey covered the RLF and Conveyor route and was followed by 5 days of static monitoring following each visit.
Static monitoring		
Static monitoring	May, June and July 2021	Statics have been deployed on the MMS, crossing point of Roska

		Park Wood and Bellhouse Gill Wood.
Bat activity survey		
Dusk emergence surveys)	31.05.2016 and 14.06.2016 (Drift head) 31.05.2016 and 14.06.2016 (Security building) 24,06.2016 (Air shaft)	The drift head has not been extensively modified to allow safe site investigation. It no longer has any risk of supporting bats. The security building has been vandalised recently (see below). The air vent is a remote site to the SW and no longer in the redline.
Dusk emergence survey	21.07.2021	Update survey of the security building.
Dusk emergence survey	14.07.2016 and 1.08.2016	Survey of the trees at Roska Park and Bellhouse Gill woodland. Survey focussed on tree likely to be lost to the 'Cut and cover' approach. The survey utilised thermal imaging cameras.
Terrestrial Mammal survey		
Large mammal walkover survey	06.07.2016 and 22.03.2018	Survey of the MMS and 30m buffer beyond boundary.
Large mammal walkover survey	13.04.2017 and 22.03.2018	Survey of the RLF, Conveyor, MBC, Access road and land to the east of the St Bees rail line.
Large mammal walkover survey	11.05.2021	MMS, Conveyor, MBC, Access road, RLF, land east of St Bees (inc Pow Beck for otter) all + 30m buffer where access allowed. Survey for badger, red squirrel, brown hare, otter and water vole. Trail cameras were deployed from the 11 May until 21 June (a total of 43 days)
Otter survey	04.10.2017	Pow Beck, Stanley Pond LWS and fishing lakes to the north of the MBC.
Great crested newt		

GCN survey	April to June 2016	Using four survey methods of the pond within the MMS (which is now permanently dry)
eDNA sampling (NB)	April and May 2018	Pond to the south of the MMS in the leachate treatment plant. First sample was indeterminate, so was repeated and was negative.
GCN Survey (Wood PLC)	April to June 2016	Ponds located in private gardens to the immediate north of the MBC. Work completed by Wood PLC and info provided to BSG.
eDNA sampling	18.04.2018	Sampling of the three concrete basins within the MBC.
eDNA sampling	11.5.2021	Update of the sampling for the leachate pond south of the MMS, three concrete lagoons in the MBC and ponds in the private gardens to the north of MBC.
Reptiles		
Reptile survey and terrestrial searching	April to July 2016	Main Mine Site only,
Reptile survey and terrestrial searching	September to October 2017	Main Mine Site only
Reptile survey and terrestrial searching	April 2018	MBC and St Bees railway embankment parallel with the RLF.
Reptile survey and terrestrial searching	July and August 2019	MMS only.
Reptile survey and terrestrial searching	May to July 2021	MBC only.
Invertebrates		
Terrestrial searches and walked transects	28.06.2016, 06.07.2016 and 19.07.2016	Survey covered the MMS only.
Terrestrial searches, pitfall trapping and walked transects	Late May to end of July 2021 (three visits in total)	Survey has covered the MMS and MBC.

Document No.2

This is document 2 referred to in the Appendix marked WCM/PS/2 on the Proof of Evidence of Dr Peter Shepherd dated 10.08.2021 on behalf of West Cumbria Mining Ltd

wh32442197v1

Biodiversity Net Gain Assessment

The Biodiversity Metric 3.0 - Calculation Tool
Start page

Project details	
Planning authority:	Cumbria County Council
Project name:	Whitehaven
Applicant:	West Cumbria Mining
Application type:	Full
Planning application reference:	
Assessor:	
Reviewer:	
Metric version:	Metric 3.0
Assessment date:	
Planning authority reviewer:	

Instructions

Main menu

Results

Cell style conventions	
	Enter data
	Automatic lookup
	Result

View all

Reset view

On-site baseline map Insert

On-site post intervention map Insert

Off-site baseline map Insert

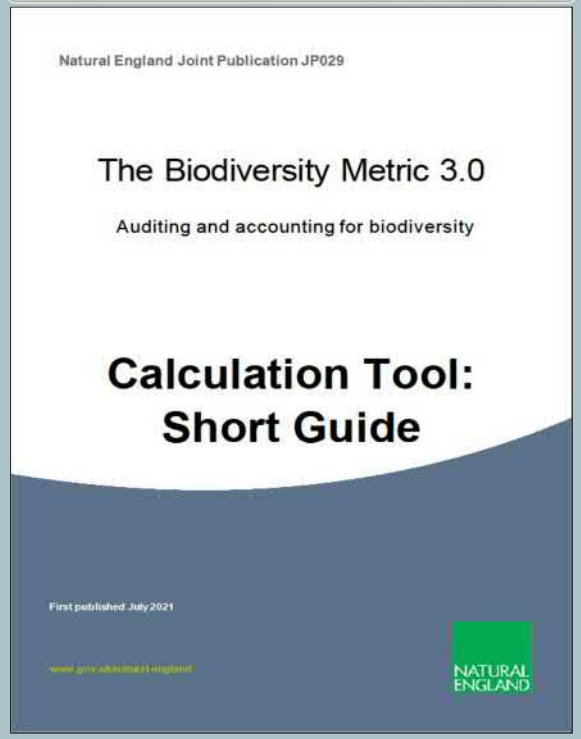
Off-site post intervention map Insert

The Biodiversity Metric 3.0 - Calculation Tool Instructions

Start page

Main menu

Double click the front page below to open the file


Natural England Joint Publication JP029

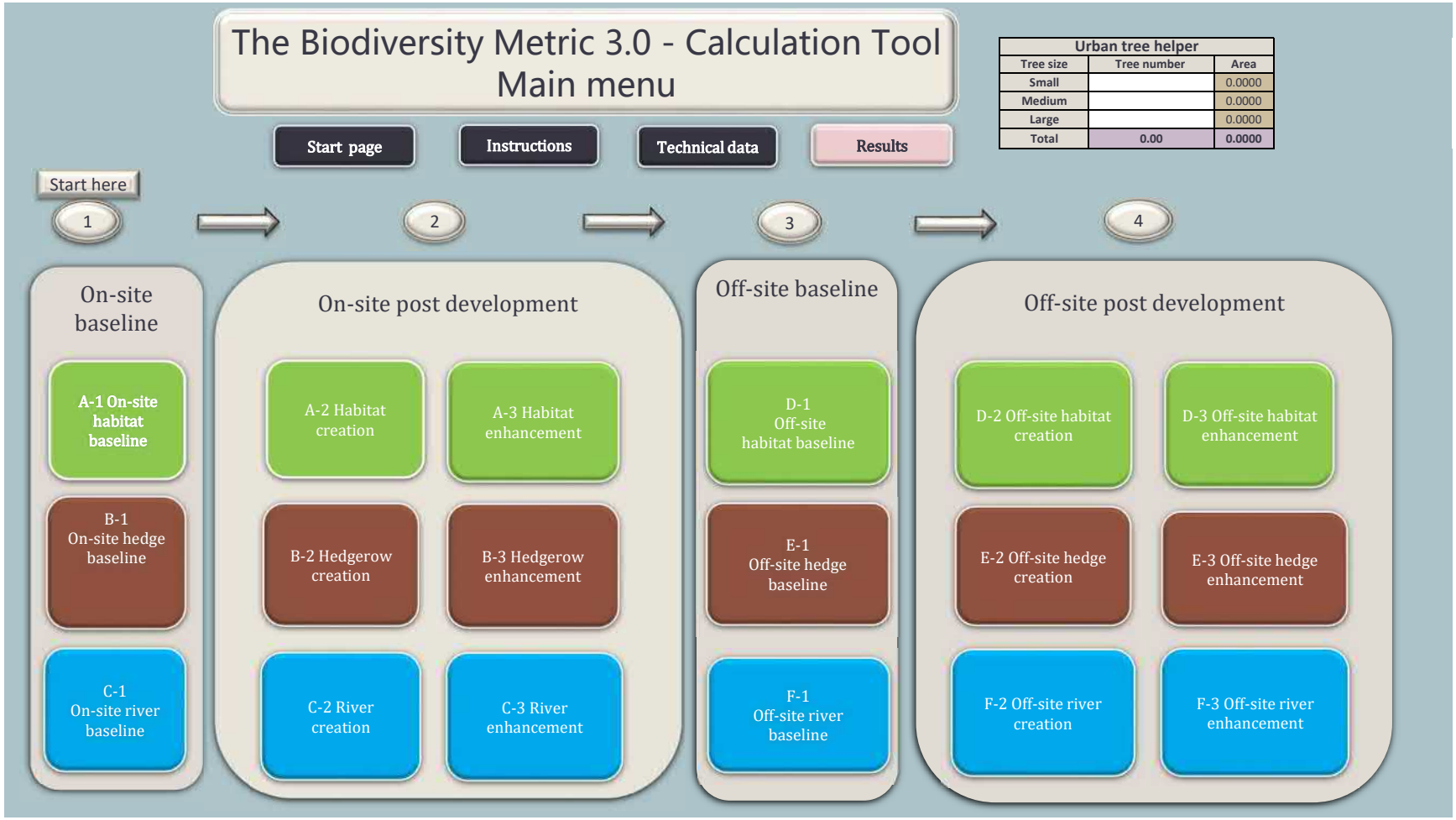
The Biodiversity Metric 3.0

Auditing and accounting for biodiversity

Calculation Tool: Short Guide

First published July 2021

NATURAL ENGLAND



Urban tree helper		
Tree size	Tree number	Area
Small		0.0000
Medium		0.0000
Large		0.0000
Total	0.00	0.0000

The Biodiversity Metric 3.0 - Calculation Tool
Start page

Return to start page

Headline results

Detailed results

Habitat trading summary

Whitehaven

Headline Results

Return to

On-site baseline	*Habitat units*	179.73
	Hedgerow units	3.28
	River units	0.00
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	230.57
	Hedgerow units	5.32
	River units	0.00
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	28.29%
	Hedgerow units	62.06%
	River units	0.00%
Off-site baseline	*Habitat units*	13.76
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	15.63
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	52.71
	Hedgerow units	2.04
	River units	0.00
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	29.33%
	Hedgerow units	62.06%
	River units	0.00%
Trading rules Satisfied?		No - Check Trading Summary

Return to results menu

Trading Summary

Distinctiveness Group	Trading Rule	Trading Satisfied?
Very High	Bespoke compensation likely to be required	Yes
High	Same habitat required	No
Medium	Same broad habitat or higher distinctiveness habitat required	Yes
Low	Same distinctiveness or better habitat required	Yes

Very High Distinctiveness

Habitat group	Group	On Site Unit Change	Off Site Unit Change	Project wide Unit Change	Unit Losses
Grassland - Lowland dry acid grassland	Grassland	0.00	0.00	0.00	
Grassland - Lowland meadows	Grassland	0.00	0.00	0.00	
Grassland - Upland hay meadows	Grassland	0.00	0.00	0.00	
Heathland and shrub - Mountain heaths and willow scrub	Heathland and shrub	0.00	0.00	0.00	
Lakes - Aquifer fed naturally fluctuating water bodies	Lakes	0.00	0.00	0.00	
Sparsely vegetated land - Calminarian grasslands	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Limestone pavement	Sparsely vegetated land	0.00	0.00	0.00	
Wetland - Blanket bog	Wetland	0.00	0.00	0.00	
Wetland - Depressions on Peat substrates (H7150)	Wetland	0.00	0.00	0.00	
Wetland - Fens (upland and lowland)	Wetland	0.00	0.00	0.00	
Wetland - Lowland raised bog	Wetland	0.00	0.00	0.00	
Wetland - Oceanic Valley Mire[1] (D2.1)	Wetland	0.00	0.00	0.00	
Wetland - Purple moor grass and rush pastures	Wetland	0.00	0.00	0.00	
Wetland - Transition mires and quaking bogs (H7140)	Wetland	0.00	0.00	0.00	
Woodland and forest - Wood-pasture and parkland	Woodland and forest	0.00	0.00	0.00	
Rocky shore - High energy littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Rocky shore - Low energy littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Rocky shore - Features of littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Intertidal sediment - Littoral sisgraus on peat, clay or chalk	Intertidal sediment	0.00	0.00	0.00	
		0.00	**0.00**	**0.00**	**0.00**

Very High Distinctiveness Summary

Very High Distinctiveness Units available to offset lower distinctiveness deficit	0.00

High Distinctiveness

Habitat group	Group	On Site Unit Change	Off Site Unit Change	Project wide Unit Change	Losses not yet accounted for
Grassland - Traditional orchards	Grassland	0.00	0.00	0.00	
Grassland - Floodplain Wetland Mosaic (CFGM)	Grassland	0.00	0.00	0.00	
Grassland - Lowland calcareous grassland	Grassland	0.00	0.00	0.00	
Grassland - Tall herb communities	Grassland	0.00	0.00	0.00	
Grassland - Upland calcareous grassland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Lowland Heathland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Sea buckthorn scrub (Annex 1)	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Upland Heathland	Heathland and shrub	0.00	0.00	0.00	
Lakes - High alkalinity lakes	Lakes	0.00	0.00	0.00	
Lakes - Low alkalinity lakes	Lakes	0.00	0.00	0.00	
Lakes - Marl Lakes	Lakes	0.00	0.00	0.00	
Lakes - Moderate alkalinity lakes	Lakes	0.00	0.00	0.00	
Lakes - Peat Lakes	Lakes	0.00	0.00	0.00	
Lakes - Ponds (Priority Habitat)	Lakes	0.65	0.00	0.65	
Lakes - Temporary lakes, ponds and pools	Lakes	4.58	0.00	4.58	
Sparsely vegetated land - Coastal sand dunes	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Coastal vegetated shingle	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Inland rock outcrop and scree habitats	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Maritime cliff and slopes	Sparsely vegetated land	0.00	0.00	0.00	
Urban - Open Mosaic Habitats on Previously Developed Land	Urban	-65.34	0.00	-65.34	-65.34
Wetland - Reedbeds	Wetland	0.00	0.00	0.00	
Woodland and forest - Felled	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Lowland beech and yew woodland	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Lowland mixed deciduous woodland	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Native pine woodlands	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Upland birchwoods	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Upland mixed ashwoods	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Upland oakwood	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Wet woodland	Woodland and forest	0.00	0.00	0.00	
Coastal lagoons - Coastal lagoons	Coastal lagoons	0.00	0.00	0.00	
Rocky shore - High energy littoral rock	Rocky shore	0.00	0.00	0.00	
Rocky shore - Moderate energy littoral rock	Rocky shore	0.00	0.00	0.00	
Rocky shore - Low energy littoral rock	Rocky shore	0.00	0.00	0.00	
Rocky shore - Features of littoral rock	Rocky shore	0.00	0.00	0.00	
Intertidal sediment - Littoral mud	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Littoral mixed sediments	Intertidal sediment	0.00	0.00	0.00	
Coastal saltmarsh - Saltmarshes and saline reedbeds	Coastal Saltmarsh	0.00	0.00	0.00	
Intertidal sediment - Littoral biogenic reefs - Mussels	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Littoral biogenic reefs - Sabellaria	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Features of littoral sediment	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Littoral muddy sand	Intertidal sediment	0.00	0.00	0.00	
		-60.11	**0.00**	**-60.11**	**-65.34**

High Distinctiveness Summary

High Distinctiveness Units available to offset lower distinctiveness deficit	5.23
Unit Deficit, Like for like not satisfied	-65.34

Medium Distinctiveness

Habitat Group	Group	On site unit change	Off Site Unit Change	Project wide unit change	Cumulative Broad Habitat Change
Cropland - Arable field margins cultivated annually	Cropland	0.00	0.00	0.00	0.00
Cropland - Arable field margins game bird mix	Cropland	0.00	0.00	0.00	
Cropland - Arable field margins pollen & nectar	Cropland	0.00	0.00	0.00	
Cropland - Arable field margins tussocky	Cropland	0.00	0.00	0.00	
Cropland - Cereal crops winter stubble	Cropland	0.00	0.00	0.00	
Grassland - Other lowland acid grassland	Grassland	0.00	0.00	0.00	58.25
Grassland - Other neutral grassland	Grassland	58.25	0.00	58.25	
Grassland - Upland acid grassland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Blackthorn scrub	Heathland and shrub	0.00	0.00	0.00	16.43
Heathland and shrub - Bramble scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Gorse scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Hawthorn scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Hazel scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Mixed scrub	Heathland and shrub	16.43	0.00	16.43	
Lakes - Ponds (Non- Priority Habitat)	Lakes	0.00	0.00	0.00	0.00
Lakes - Reservoirs	Lakes	0.00	0.00	0.00	
Sparsely vegetated land - Other inland rock and scree	Sparsely vegetated land	-1.16	1.09	-0.07	-0.07
Urban - Brown roof	Urban	0.00	0.00	0.00	0.00
Urban - Cemeteries and churchyards	Urban	0.00	0.00	0.00	
Urban - Intensive green roof	Urban	0.00	0.00	0.00	
Woodland and forest - Other Scot's Pine woodland	Woodland and forest	0.00	0.00	0.00	23.60
Woodland and forest - Other woodland; broadleaved	Woodland and forest	23.60	0.00	23.60	
Woodland and forest - Other woodland; mixed	Woodland and forest	0.00	0.00	0.00	
Intertidal sediment - Littoral coarse sediment	Intertidal sediment	0.00	0.00	0.00	0.00
Intertidal sediment - Littoral sand	Intertidal sediment	0.00	0.00	0.00	
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infrastructure (IGGI)	Intertidal	0.00	0.00	0.00	
		97.12	1.09	98.21	

Medium Distinctiveness Summary

Medium Distinctiveness Units available to offset lower distinctiveness deficit	98.28
Medium Distinctiveness Broad Habitat Deficit to be offset by trading up	-0.07
Higher distinctiveness surplus units minus Medium Distinctiveness Broad Habitat Deficit	5.16
Cumulative surplus of units	103.41

Low Distinctiveness

Habitat group	Group	On site unit change	Off Site Unit Change	Project wide unit change
Cropland - Cereal crops	Cropland	0.00	0.00	0.00
Cropland - Cereal crops other	Cropland	0.00	0.00	0.00
Cropland - Horticulture	Cropland	0.00	0.00	0.00
Cropland - Intensive orchards	Cropland	0.00	0.00	0.00
Cropland - Non-cereal crops	Cropland	0.00	0.00	0.00
Cropland - Temporary grass and clover leys	Cropland	0.00	0.00	0.00
Grassland - Modified grassland	Grassland	13.86	0.79	14.65
Grassland - Bracken	Grassland	0.00	0.00	0.00
Heathland and shrub - Rhododendron scrub	Heathland and shrub	0.00	0.00	0.00
Lakes - Ornamental lake or pond	Lakes	-0.04	0.00	-0.04
Sparsely vegetated land - Ruderal/Ephemeral	Sparsely vegetated land	0.00	0.00	0.00
Urban - Bioswale	Sparsely vegetated land	0.00	0.00	0.00
Urban - Allotments	Urban	0.00	0.00	0.00
Urban - Facade-bound green wall	Urban	0.00	0.00	0.00
Urban - Ground based green wall	Urban	0.00	0.00	0.00
Urban - Ground level planters	Urban	0.00	0.00	0.00
Urban - Extensive green roof	Urban	0.00	0.00	0.00
Urban - Introduced shrub	Urban	0.00	0.00	0.00
Urban - Rain garden	Urban	0.00	0.00	0.00
Urban - Sand pit quarry or open cast mine	Urban	0.00	0.00	0.00
Urban - Urban Tree	Urban	0.00	0.00	0.00
Urban - Sustainable urban drainage feature	Urban	0.00	0.00	0.00
Urban - Vacant/derelict land/ bareground	Urban	0.00	0.00	0.00
Urban - Vegetated garden	Urban	0.00	0.00	0.00
Woodland and forest - Other coniferous woodland	Woodland and forest	0.00	0.00	0.00
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	Coastal saltmarsh	0.00	0.00	0.00
Intertidal sediment - Artificial littoral coarse sediment	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral mud	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral sand	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral muddy sand	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral mixed sediments	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral seagrass	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral biogenic reefs	Intertidal sediment	0.00	0.00	0.00
Intertidal Hard Structures - Artificial hard structures	Intertidal	0.00	0.00	0.00
Intertidal Hard Structures - Artificial features of hard structures	Intertidal	0.00	0.00	0.00
Heathland and shrub - Sea buckthorn scrub (other)	Heathland and shrub	0.00	0.00	0.00
		13.83		14.61

Low Distinctiveness Summary

Low Distinctiveness Net Change in Units	14.61
Cumulative surplus of units	118.05

Whitehaven

A-1 Site Habitat Baseline

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	Habitats and areas			Distinctiveness	Condition	Strategic significance	Suggested action to address habitat losses	Ecological baseline	Retention category biodiversity value						Bespoke compensation agreed for unacceptable losses	Comments	
Ref	Broad habitat	Habitat type	Area (hectares)	Distinctiveness	Condition	Strategic significance		Total habitat units	Area retained	Area enhanced	Baseline units retained	Baseline units enhanced	Area lost	Units lost		Assessor comments	Reviewer comments
1	Grassland	Modified grassland	16.22	Low	Poor	Area/compensation not in local strategy/ no local strategy	Same distinctiveness or better habitat required	32.44	8.3871	0	16.77	0.00	7.83	15.67		Modified grassland is mostly asscoiated with the conveyor route and Rail Loading areas	
2	Grassland	Other neutral grassland	8.87	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required	70.96	0.4744	0	3.80	0.00	8.40	67.16		Current habitats within the Main Mine Site	
3	Grassland	Other neutral grassland	0.17	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required	0.68	0	0	0.00	0.00	0.17	0.68		Habitats within Main Band Colliery	
4	Heathland and shrub	Mixed scrub	1.17	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required	4.68	0.7424	0	2.97	0.00	0.43	1.71		Present within the Main Mine Site and Main Band Colliery	
5	Lakes	Ornamental lake or pond	0.018	Low	Poor	Area/compensation not in local strategy/ no local strategy	Same distinctiveness or better habitat required	0.04	0	0	0.00	0.00	0.02	0.04		This habitat refers to the concrete lined basins within the Main Band colliery. This habitat type has been selected as the closest fit available within the metric.	
6	Lakes	Temporary lakes, ponds and pools	0.02	High	Poor	Area/compensation not in local strategy/ no local strategy	Same habitat required	0.12	0	0	0.00	0.00	0.02	0.12		Ephemeral pool within the Main Mine Site, This feature is dry for the majority of the year except after exceptionally heavy rains.	
7	Sparsely vegetated land	Other inland rock and scree	0.289	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required	1.16	0	0	0.00	0.00	0.29	1.16		Area of condolidated rock within the Main Mine Site	
8	Urban	Developed land; sealed surface	7.25	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Compensation Not Required	0.00	1.0238	0	0.00	0.00	6.23	0.00		Footprints and roads of the former buildings asscoiated with the Marchin Chemcial works and Main Band.	
9	Urban	Open Mosaic Habitats on Previously Developed Land	4.95	High	Moderate	Location ecologically desirable but not in local strategy	Same habitat required	65.34	0	0	0.00	0.00	4.95	65.34		Located within the Main Mine Site and Main Band. Habitat is gradually undergoing sucession to more coarse grass and scrub dominated habitat.	
10	Woodland and forest	Other woodland; broadleaved	0.34	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required	2.72	0	0	0.00	0.00	0.34	2.72		Establish mature trees associated with the conveyor route.	
11	Woodland and forest	Other woodland; broadleaved	0.4	Medium	Poor	Area/compensation not in local strategy/ no local strategy	Same broad habitat or a higher distinctiveness habitat required	1.60	0	0	0.00	0.00	0.40	1.60		Immature and semi-mature trees in Main Mine Site and Main Band Colliery.	
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			39.70					179.73		10.63	0.00	23.54	0.00	29.07	156.19			

Whitehaven

A-2 Site Habitat Creation

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Check Areas - Area of development footprint and habitat creation exceeds the area of habitats lost

Post-development/ post-intervention habitats																									
			Distinctiveness		Condition		Strategic significance						Temporal multiplier			Difficulty multiplier					Comments	
Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier	Standard time to target condition/years	Habitat created in advance/years	Delay in starting habitat creation/years	Standard or adjusted time to target condition	Final time to target condition/years	Final time to target multiplier	Standard difficulty of creation	Applied difficulty multiplier	Final difficulty of creation	Difficulty multiplier applied	Habitat units delivered	Assessor comments	Reviewer comments
											0	0										
Grassland	Modified grassland	15.3	Low	2	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	1	0	0	Standard time to target condition applied	1	0.965	Low	Standard difficulty applied	Low	1	29.53	Extensive agricultural grazing grassland. Following installation of conveyor. Reduced area from baseline is accounted for by additional clearing	
Grassland	Other neutral grassland	9	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	5	25	0	Check details - Is there evidence that habitat has reached target condition?	0	1.000	Low	Low Difficulty - only applicable if all habitat created before losses	Low	1	72.00	Grassland created on embankments during construction phase	
Heathland and shrub	Mixed scrub	0.11	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	4	0	0	Standard time to target condition applied	4	0.837	Low	Standard difficulty applied	Low	1	0.79	Areas of scrub remained during restoration phase	
Urban	Developed land; sealed surface	0.38	V.Low	0	N/A - Other	0	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	0	0	0	Standard time to target condition applied	0	1.000	Low	Standard difficulty applied	Medium	0.67	0.00	Areas of retained hard standings and access routes.	
Woodland and forest	Other woodland; broadleaved	2.99	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	15	25	0	Check details - Is there evidence that habitat has reached target condition?	0	1.000	Low	Low Difficulty - only applicable if all habitat created before losses	Low	1	23.92	Woodland created on embankments during construction phase	
Woodland and forest	Other woodland; broadleaved	0.5	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	15	25	0	Check details - Is there evidence that habitat has reached target condition?	0	1.000	Low	Low Difficulty - only applicable if all habitat created before losses	Low	1	4.00	Woodland created during construction phase	
Grassland	Other neutral grassland	8.08	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	5			Standard time to target condition applied	5	0.837	Low	Standard difficulty applied	Low	1	54.09	Neutral grassland and scrub mosaic (80/20 ratio) created during restoration phase	
Heathland and shrub	Mixed scrub	2.6	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	5			Standard time to target condition applied	5	0.837	Low	Standard difficulty applied	Low	1	17.41	Neutral grassland and scrub mosaic (80/20 ratio) created during restoration phase	
Lakes	Ponds (Priority Habitat)	0.09	High	6	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	3			Standard time to target condition applied	3	0.899	Medium	Standard difficulty applied	Medium	0.67	0.65	Formal ponds within Main Mine Site designed to hold water all year round.	
Lakes	Temporary lakes, ponds and pools	0.65	High	6	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	3			Standard time to target condition applied	3	0.899	Medium	Standard difficulty applied	Medium	0.67	4.70	Shallow and dynamic ponds to be created within the Main Mine site following restoration. These will be designed to provide good quality habitats.	
	Total area	39.70																	Total Units	207.03		

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D-1 Off Site Habitat Baseline

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	Habitats and areas			Habitat distinctiveness	Habitat condition	Strategic significance	Suggested action to address habitat losses	Ecological baseline	Retention category biodiversity value						Bespoke compensation agreed for unacceptable losses	Comments	
Baseline ref	Broad habitat	Habitat type	Area (hectares)	Distinctiveness	Condition	Strategic significance		Total habitat units	Area retained	Area enhanced	Baseline units retained	Baseline units enhanced	Area lost	Units lost		Assessor comments	Reviewer comments
1	Grassland	Modified grassland	1.18	Low	Poor	Area/compensation not in local strategy/ no local strategy	Same distinctiveness or better habitat required	2.36		1.18	0.00	2.36	0.00	0.00		Area to be used as reptile mitigation (Refered to as translocation site 2 in the BSG reptile method statement doc)	
2	Grassland	Modified grassland	3.8	Low	Fairly Poor	Area/compensation not in local strategy/ no local strategy	Same distinctiveness or better habitat required	11.40	3.5108		10.53	0.00	0.29	0.87		Area to be used as reptile mitigation (Refered to as translocation site 1 in the BSG reptile method statement doc)	
3																	
4																	
5																	
			4.98				Total Site baseline	13.76	3.51	1.18	10.53	2.36	0.29	0.87			

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D-2 Off Site Habitat Creation

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Post development/ post intervention habitats

Broad Habitat	Proposed habitat	Area ha	Distinctiveness	Condition	Strategic significance	Temporal risk multiplier		Difficulty risk	Spatial risk multiplier	Habitat units delivered	Comments	
					Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation	Spatial risk category		Assessor comments	Reviewer comments
Sparsely vegetated land	Other inland rock and scree	0.2892	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	10	Medium	Compensation inside LPA or NCA, or deemed to be sufficiently local, to site of biodiversity loss	1.09	Reptile mitigation habitats at Hutbank Landfill adjacent to MMS. Created by moving existing scree habitats within the Main Mine Site to Traslocation site 1	
	Total Length	0.29								1.09		

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D-3 Off Site Habitat Enhancment

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	Baseline habitats	Proposed Habitat (Pre-Populated but can be overridden)		Change in distinctiveness and condition		Post development/ post intervention habitats										Comments	
									Strategic significance	Temporal multiplier		Difficulty multiplier	Spatial risk multiplier				
Baseline ref	Baseline habitat	Proposed Broad Habitat	Proposed Habitat	Distinctiveness change	Condition change	Area ha	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Difficulty	Spatial risk category	Habitat units delivered	Assessor comments	Reviewer comments
1	Grassland - Modified grassland	Grassland	Modified grassland	Low - Low	Poor - Moderate	1.18	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applies	10	Low	Compensation inside LPA or NCA, or deemed to be sufficiently local, to site of biodiversity loss	4.01	Grassland enhanced as part of reptile mitigation strategy. (Translocation site 2)	
						1.18								4.01		

B-1 Site Hedge Baseline

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	UK Habitats - existing habitats			Habitat distinctiveness	Habitat condition	Strategic significance	Suggested action to address habitat losses	Ecological baseline	Retention category biodiversity value						Comments	
Baseline ref	Hedge number	Hedgerow type	Length KM	Distinctiveness	Condition	Strategic significance		Total hedgerow units	Length retained	Length enhanced	Units retained	Units enhanced	Length lost	Units lost	Assessor comments	Reviewer comments
1		Native Hedgerow	0.313	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Same distinctiveness band or better	1.25	0.077	0	0.31	0.00	0.24	0.94		
2		Native Hedgerow	0.123	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Same distinctiveness band or better	0.49	0	0	0.00	0.00	0.12	0.49		
3		Native Species Rich Hedgerow	0.192	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Like for like or better	1.54	0	0	0.00	0.00	0.19	1.54		
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			0.63					3.28	0.08	0.00	0.31	0.00	0.55	2.97		

B-2 Site Hedge Creation

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		Proposed habitats		Habitat distinctiveness	Habitat condition	Strategic significance	Temporal multiplier		Difficulty risk multipliers	Hedge units delivered	Comments	
Baseline ref	New hedge number	Habitat type	Length km	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation		Assessor comments	Reviewer comments
1		Native Hedgerow	0.296	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	0.99		
2		Native Species Rich Hedgerow	0.6	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	4.02	These hedgerows will be newly planted around the margins of the landscaping bunds within the Main Mine Site.	
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6												
7												
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The Biodiversity Metric 3.0 - Calculation Tool Technical Data

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BSG | ecology

Cumbria Metallurgical Coal Project

Ecology survey update report

August 2021

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Client	West Cumbria Mining
Project	Cumbria Metallurgical Coal Project, Ecology survey update report
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	Name	**Position**	**Date**
Originated	Neil Beamsley	Principal Ecologist	03 August 2021
Reviewed	Peter Shepherd	Director	04 August 2021
Approved for issue to client	Peter Shepherd	Director	05 August 2021
Issued to client	Neil Beamsley	Principal Ecologist	05 August 2021

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Contents

1 Introduction

Background to commission

1.1 BSG Ecology was commissioned in April 2021 by West Cumbria Mining (WCM) to complete ecological survey and prepare an ecological survey report. The work has been commissioned in support of WCM's proposals to develop a new underground metallurgical coal mine and associated development (Cumbria County Council (CCC) planning reference 4/17/9007).

1.2 The proposed development is located to the south of the town of Whitehaven, in west Cumbria, at a central Ordnance Survey Grid Reference of NX 97239 15205.

1.3 Following the initial award of planning permission by Cumbria County Council (CCC) in 2018 (planning reference 4/17/9007), the application has been 'called-in' for public examination by the Secretary of State, and therefore a Public Inquiry will commence in September 2021. The findings of this report will therefore be used to inform and support WCMs case during this process in respect of potential impacts from the development upon important ecological interest features.

1.4 Within this report, the phrase 'the Site' has been used to refer to all habitats located within the development redline planning boundary. Where relevant, specific areas of the Site have been described separately.

Site description

1.5 Detailed habitat descriptions for all elements of the Site are provided within Chapter 11 (BSG Ecology 2018) and the supporting technical appendices of the project Environmental Statement (WCM 2018).

1.6 Any changes to the habitats recorded within the Site during the 2021 ecological update work are described in section 3 of this report.

Aim of the study

1.7 The aims of this report are to present the findings of the ecology survey work completed in 2021.

1.8 Survey work completed during 2021 is as follows:

- Update extended phase 1 habitat survey (Site redline)
- Phase 2 botanical survey (Main Mine Site, Main Band Colliery, Roska Park LWS and Bellhouse Gill LWS
- Update Phase 2 invertebrate assessment (Main Mine Site and Main Band Colliery)
- Update Breeding bird survey (Site redline + minimum 50m buffer where access allows)
- Update Bats – Static monitoring (Main Mine Site, Roska Park LWS and Bellhouse Gill LWS – Buried conveyor crossing points).
- Update Bats - Hedgerow commuting activity surveys and survey of a building.
- Update Large mammal survey (Site redline – badger, otter, water vole, red squirrel, brown hare)
- Update Great crested newt – Environmental DNA (8 ponds)
- Reptile surveys – Main Band Colliery.

1.9 The results of reptile survey work completed within the Main Mine Site (MMS) in 2019 are also presented in this report.

Personnel

1.10 The report has been written by Neil Beamsley CEcol, MCIEEM, Principal Ecologist at BSG Ecology. Neil has worked in the ecological sector for more than 19 years and he has undertaken ecological assessments on many different sites across the UK.

1.11 The report has been reviewed by Dr Peter Shepherd, Director at BSG Ecology.

1.12 Full details of staff experience can be found at www.bsg-ecology.com/people.

2 Methods

Desk study

2.1 The desk study presented within chapter 11 of the supporting Environmental Statement (BSG Ecology 2018) has been updated for the purposes of this report. The data has been obtained from a number of sources and these are summarised in Table 1 below.

2.2 A 2 km study area has been adopted as proportionate. The study area takes into account the size of the Site, the current land use and the impacts that might arise during the different stages of the development. Due to the large size of the Site, the 2km buffer has been taken from the Site boundary in all directions, rather than from the centre of the Site itself.

2.3 The Cumbria Biological Record Centre (CBRC) was contacted in May 2021 (see below) to obtain records of protected species and habitats within the desk study area.

2.4 A search has also been made of a range of openly available data sources such as the government MAGIC website, google earth, Ordnance Survey 1:25,000 mapping (via Bing maps) and the Cumbria County Council planning portal.

2.5 Reference has been made to habitats and species which have been identified as part of the Government's obligations as set out under Sections 40 and 41 of the (NERC) 2006. These species are a material consideration in the planning process.

***Table 1**: Data sources referenced in the assessment*

Data Source	Date Accessed / Received	Notes
MAGIC[1] (www. Magic.defra. gov.uk)	Most recently accessed 3 July 2021	A 2 km desk study area was adopted for statutory designated sites, Impact Risk Zones[2], S.41 habitats and species, European protected species licences.
CBRC	Data were requested in May 2021	A 2 km desk study area was adopted and data were requested on protected species, S.41 habitats and designated wildlife sites.
Bing maps (www. Magic.defra. gov.uk)	Most recently accessed 3 July 2021	A search was made for ponds within 500m of the Site (https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects). Habitats were assessed using aerial imagery.
Cumbria County Council online planning portal	Reviewed 2 July 2021	A search was made of ecological data submitted in support of other recent planning applications within the 2km search area to identify habitats and species which may need to be considered in reference to the development. https://planning.cumbria.gov.uk/

[1] Multi Agency Geographic Information for the Countryside (MAGIC).

[2] The Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to: Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Field survey

Phase 1 Habitat Survey

2.6 An update of the Phase 1 habitat surveys undertaken by BSG in 2016, 2017 and 2018 was undertaken on 11 May 2021 by Neil Beamsley. The vegetation and land use types present within the Site were classified with reference to industry guidance (JNCC, 2010), and a habitat map was produced. During the survey the weather was mild and dry with no wind. Cloud cover was approximately 20%.

2.7 The habitats present were also then classified in accordance with the UK Habitats (UKHAB) classification system (UK Habitats Classifications working group - May 2018), and assigned a habitat condition score (Defra metric 3.0 – Habitat Condition Assessment tool 2021). This additional stage being completed to allow an assessment of the impacts upon the habitats within the Site to be made using the Defra 3.0 Metric calculator. This Biodiversity Gain assessment will be provided separatley to the findings of this report. Habitats recorded within the Site are shown in Figure 1, section 4 of this report.

2.8 The survey included all areas of the development redline boundary, and where access allowed a buffer area of between 30-50m outside of the boundary. Access was available to all areas within the boundary.

2.9 The survey was then extended to include an assessment of the habitats present to determine their suitability for supporting protected species and S.41 species. The assessment was undertaken at the same time as the Phase 1 habitat survey. During the Site visit any signs of protected species that were observed were recorded. Full detailed of the phase 2 species survey are provided in the following sections.

2.10 During the survey a record was made of any invasive species that were present, such as Japanese knotweed *Fallopia japonica*, i.e. species included in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Phase 2 botanical survey

2.11 A botanical assessment of the ground flora within the woodland components of the Site, and update to previous botanical survey work within the Main Mine Site and Main Band Colliery (2016 and 2018) was completed on 22 May 2021 by Dr Peter Shepherd and Senior ecologist, Gemma Cone of BSG Ecology. The survey assessed the habitats present within the Main Mine Site, Roska Park woodland LWS, Bellhouse Gill woodland LWS and Main Band Colliery.

2.12 During the survey a record of the grass, herb, shrub and tree species present was made, and their relative abundance recorded using the DAFOR (Dominant, Abundant, Frequent, Occasional, Rare) recording system. Notes were also made on any moss, lichen and bryophyte species encountered. Each habitat was then mapped and photographed.

2.13 Weather conditions during this survey work were bright and clear, with no rain and a light breeze. Survey access was available to all of the survey areas.

Phase 2 invertebrate survey

2.14 An update to the invertebrate assessment previously completed in 2016 was completed between May and July 2021. This work considered habitats within the Main Mine Site and was extended to include the habitats within the Main Band Colliery of the Site.

Initial invertebrate habitat potential assessment

2.15 The Site was assessed for its potential to support important invertebrate assemblages by Dr Jim Fairclough MCIEEM, an experienced entomologist and Principal Ecologist at BSG Ecology, on 02 June 2020. For the purposes of the present survey, this comprised an assessment of two

areas: the former Marchon chemical works (the Main Mine Site), including northern margins of a closed landfill (Site A) and the Main Band Colliery (Site B). Site locations are shown on Figure9.

2.16 The distribution and extent of such features informed the nature of targeted invertebrate surveys that were subsequently conducted at the Site. To enable a baseline characterisation of the Site for invertebrates, the habitat assessment included observations of features that might limit invertebrate interest, as well as those which might be of particular value for invertebrates.

Targeted survey for invertebrates

2.17 Terrestrial habitats with potential to support important invertebrate assemblages (identified during the habitat potential assessment) were subject to targeted survey. The main habitats targeted included: mosaic habitat of grassland and scrub, patchily distributed aggregations of bare ground and crushed rock substrate, marshy and seasonally inundated areas, and areas of ephemeral/ neutral grassland with dense patches of flowering plants. Therefore, the survey was designed to target the collection of key indicator groups associated with such habitat. This approach relates to the guidance set out in Drake *et al*. (2007); which lists many of the target taxa of field layer and arboreal assemblages and their value in assessment. Coleoptera (beetles), aculeate Hymenoptera (bees, ants and wasps), Hemiptera (true bugs)and Orthoptera (grasshoppers and crickets) are four orders that are strongly represented in such assemblages; therefore these orders were targeted by the surveys. Certain families (and suborders) of the order Diptera (flies) (e.g. Syrphidae (hoverflies) and other families of the larger Brachycera were also targeted. This approach was also extended to ensure that survey included a systematic search for all species of butterflies and day-flying moths (Lepidoptera) present within the Site during each survey visit.

2.18 The following sampling methods were employed: pan traps, pitfall traps, window trap, sweep-netting, beating and grubbing. These methods are described below.

Pan Traps

2.19 Clusters of three to five pan (or water) traps were set out in flower-rich areas of the Sites A & B in May, June and July. The pan traps comprised a mixture of yellow, blue and white plastic trays into which a small amount of water was poured (along with a few drops of detergent to break the surface tension). Such traps mimic large flowers and attract flying insects of many groups' especially aculeate Hymenoptera and certain Diptera, which become trapped in the fluid and can be collected later. During each visit the traps were set in the morning and collected in at the end of the day; therefore were each collecting invertebrates for periods of at least 6 hrs.

Pitfall Traps

2.20 Pitfall traps were set out in clusters of three to five, at various parcels within the Sites A & B. Pitfall trapping involved the use of circular plant pot trays (24 cm diameter x 5 cm depth) sunk into an excavated circular hole with the tray rims flush with the surrounding ground level. Preserving fluid (and a drop of detergent to break the surface tension) was poured into the trays until they were half full. Lastly, a piece of mesh was secured over the tray to prevent capture of small mammals, amphibians and reptiles. Traps were operational during the period 30 May to 15 June 2021.

Window Trap

2.21 One window flight interception trap (referred to hereafter as 'window trap') was used to capture winged insects flying along through the wet woodland at Site B. The trap was composed of four 2 L. plastic drinks bottles, securely locked in place at the base, and so contained within a circular plant pot tray (24 cm diameter x 5 cm depth), which also acted as a roof to shield the trap from excessive rain water. Wire fittings were used to bind the four bottles to the circular tray. An outward facing rectangular hole (the 'window') was cut out of each bottle. The constructed trap was inverted and therefore suspended from its base by hanging it from a branch. Approximately 30 ml of preserving fluid, comprising 1 part ethylene glycol (antifreeze) to 2 parts water was poured into each bottle via the 'windows' made on each bottle.

2.22 The trap was operational during the period from 30 May 15 June 2021.

Sweep Netting

2.23 Sweep netting was conducted in May, June and July 2021 across various parts of Sites A and B. Sweep netting involved walking at a steady pace through the vegetation and passing an entomologist's sweep net back and forth through vegetation in a figure of eight motion. Sweep netting was accompanied by 'spot-sweeping' where individual invertebrates were targeted and collected via a single sweep.

Beating

2.24 Beating is a useful technique for extracting arboreal invertebrates from overhanging branches. This method involves placing a beating tray beneath a branch before delivering several sharp blows to the branch, sending any dislodged invertebrates into the beating tray for inspection. Beating was conducted in May, June and July 2021 across various parts of Sites A and B, targeting scrub and lower reaches of wet woodland canopy (Site B).

Grubbing

2.25 Grubbing is the name generally applied to the extraction of invertebrates by hand from a variety of media such as: dead wood or fungi and under bark; from moist cracked ground in seasonally inundated habitats; or from dense aggregations of leaf matter and detritus (e.g. base of grass tussocks, fern shuttlecocks and leafy / woody deposits). If appropriate, to assist in the detection of small beetles, material was sieved or placed in a bucket of water to capture invertebrates moving to the surface. Grubbing from such media took place in June 2021, across various parts of Sites A and B.

Pond Netting

2.26 A pond net with a narrow (0.5 mm mesh size) was passed through areas of standing water to sample aquatic invertebrates. This method was reserved for Site B, in temporary pools within the wet woodland, and in the three concrete lined ponds in the south of the site.

Photograph 1: Pitfall trap in situ.

Photograph 2: Window trap in situ.

Photograph 3: Pan trap in situ.

Survey dates and weather conditions

2.27 Table 2 shows the weather conditions on the days of survey and gives details of the weather in the week preceding surveys.

Table 2: Weather conditions during terrestrial invertebrate surveys

Survey date	Survey type	Survey Effort (Hours)	Weather conditions
11 May 2021	Habitat potential assessment of the Site; Targeted survey (sweep, beat, pond net, pan trap, search for lepidoptera)	8	Preceding week: Wet, windy and cool. Date of Survey: Warm and dry. Gentle breeze. Cloud cover – 1-3 Oktas. Max temp. 15ºC.
30 May 2021	Targeted survey (sweep, beat, pitfall & window trap setting, search for lepidoptera)	5	Preceding week: Dry and warm; breezy. Date of Survey: Hot and dry. Light breeze. Cloud cover – 1-2 Oktas. Max temp. 22ºC.
14 – 15 June 2021	Targeted terrestrial survey (sweep, beat, grub, pond net, pan trap, pitfall and window trap retrieval, search for lepidoptera)	9	Preceding week: Mostly dry and warm with occasional rain showers. Dates of Survey: Warm and dry. Light breeze. Cloud cover – 2-4 Oktas. Max temp. 17ºC.
8 July 2021	Targeted terrestrial survey (sweep, beat, pan trap, search for lepidoptera)	5.5	Preceding week: Wet, windy and cool. Date of Survey: Warm and dry. Light breeze. Cloud cover – 4-6 Oktas. Max temp. 18ºC.

Sample Sorting and Identification

2.28 For all surveys, whilst some species could be identified in the field, the majority of specimens were stored in 70% IMS for later identification, using a stereoscopic microscope with the aid of identification literature. For all target groups identification was taken down to species level.

Data Analysis

2.29 The results and discussion section places a value on the rare and notable invertebrates found at the two sites dependent on their current national status. Further information on status definitions and criteria of invertebrate groups can be found in Appendix 1.

Pantheon Assemblage Analysis

2.30 The list of species derived from the invertebrate surveys was analysed using the "Pantheon" database tool developed by Natural England and the Centre for Ecology and Hydrology (Webb *et al*., 2018). For each species recognised by Pantheon, various attributes relating to associated habitats and resources, assemblage types and habitat fidelity scores are placed against them. Reports can then be generated including those that provide:

- information on each individual species entered into the database;
- a list of species belonging to different feeding guilds (e.g. xylophagous, saprophagous, nectivorous);
- a list of species with different associations (e.g. to certain groups of plant, fungi or animal);
- a summary of the number of species within the sample that have a particular score or fidelity and, if relevant an overall score that provides insight into the quality of the site that the sample has come from; and
- summary tables that assess where species live and what assemblages they are associated with.

2.31 In the context of the present assessment, it is the report that Pantheon provides relating to where species live and with which assemblages they are associated, that is most useful in evaluating the relative importance of a site for its invertebrates. This considers the habitats and resources used by an invertebrate species at various hierarchical levels, from broad biotopes (e.g. tree associated, wetland, coastal) at the highest level, down to specific habitats (e.g. tall sward and scrub, decaying wood, arboreal, marshland) at a mid-level, and resources (e.g. sapwood & bark decay, heart-rot and fungal fruiting bodies all associated with the decaying wood habitat) at the finest level. The assessment also considers the "ISIS" (Invertebrate Species-habitat Information System) assemblage types that had previously been developed by Natural England (Drake et al., 2007). The original Specific Assemblage Types (SATs) are therefore carried forward in their original form, although 'Habitats' have replaced the ISIS Broad Assemblage Types (BATs).

2.32 SATs include only habitat specific species, which are normally faithful to a single habitat or resource, which are often closely associated with sites of higher conservation value. Analysis of SATs is helpful to inform the determination of the nature conservation value of a site for invertebrates; sites with high-scoring SATs are considered to have good quality invertebrate assemblages.

2.33 The original role of ISIS was to guide Natural England on assessing the conservation value of SSSIs for their invertebrate assemblages (especially for the purposes of Common Standards Monitoring). This was done by identifying whether an assemblage associated with a site was in a "favourable condition" (i.e. where it was considered to be of sufficient condition to meet the threshold criteria for an assemblage of SSSI-level value). However, whilst the condition assessment function is still retained within Pantheon, it is not the sole use. Accordingly, the analysis may be used in other situations (e.g. by nature reserve managers or those assessing the effects of a development) to help understand which assemblages (SATs) within a site are likely to be important.

2.34 A useful measure of the quality of a site for its invertebrate assemblage is to count and assign scores that are more heavily weighted towards the rarer species. The Species Quality Index (SQI) is a numerical scoring system contained within Pantheon that does exactly this. Each species recorded from a sample is given a Species Quality Score (SQS) based on their conservation status. The SQI is the sum of all SQSs divided by the number of species in that sample. This score is multiplied by 100 to give a 3 figure value without decimal places (e.g.100 rather than a 1.00). This SQI score is preferred to the SQS since it eliminates, to a greater extent the effect of

recorder effort. Notwithstanding this, sites where little effort has been made to record the common species could result in overly amplified SQI scores. There is presently no published guidance on what SQI score might be classed as 'good' or 'average' as this might vary between habitats and regions (e.g. northern vs. southern England). However, as a general rule of thumb, based on the experience of the assessor, a habitat with an SQI score exceeding 125 is likely to be of some value and merit further consideration.

Personnel

2.35 The team for this survey and reporting involved the following personnel:

- Dr Jim Fairclough BSc, PhD, MCIEEM (Principal Ecologist, BSG Ecology): Jim led the field surveys, identified certain invertebrates in the field and laboratory (notably aquatic invertebrates), and prepared the technical report. He studied invertebrates for his PhD and has worked full-time as a professional ecologist since 2003, during which time he has completed invertebrate surveys and assessment at over 100 development sites.
- Don Stenhouse MSc, FRES: Don completed the identification of most invertebrates He is a fellow of the Royal Entomological Society and Curator of Natural Science at Bolton Museum. He specialises in invertebrate identification, particularly Coleoptera, and has carried out work for a wide range of clients across the UK over the last fifteen years.

Breeding bird survey

2.36 Breeding birds survey were completed on three occasions between May and June 2021. Each survey was completed using a walkover technique where a constant search effort was employed during each survey visit, with the same survey transect being walked on all occasions, however the surveyor walked this in both a clockwise and anti-clockwise direction to remove any potential bias relating to the timing of bird activity in the results obtained.

2.37 All surveys were carried out by Neil Beamsley CEcol, MCIEEM, who is an experienced ornithological surveyor (www.bsg-ecology.com/people/neil_beamsley).

2.38 All surveys were completed during the morning (see Table 3 below), which is the period when breeding birds are most vocal. All birds were recorded using standard British Trust for Ornithology species and behaviour codes. The resultant data were subsequently analysed to create maps of breeding bird activity and to estimate the numbers of breeding pairs within the Site. The following approach was used to characterise breeding bird activity:

- Birds were considered to be probably breeding (Pr) if singing, displaying or carrying nest material; if adults repeatedly alarmed; if there was disturbance display; if adults were seen carrying food; or if there were territorial disputes.
- If nests or young were found the species was confirmed as breeding (B).
- If birds were present within the Site in low numbers amongst suitable nesting habitat, the birds were considered to be possibly breeding (Po).
- Species that were present but where no suitable nesting habitat was present were considered not to be breeding (N).

2.39 Estimates of territory numbers have been assigned to each breeding species recorded on Site using the territory analysis approach described by Bibby et al (2000). Notable species, in terms of their rarity or abundance, are then considered further. Territories for the those species confirmed or considered likely to be breeding within the Site are shown in Figures 2, 3, 4 and 5 in section 4 of this report..

2.40 A summary of the dates, times and weather conditions encountered during each survey visit is provided in Table 3 below.

Table 3 – Timings and weather conditions of bird survey

Date	Start time	Finish time	Duration	Weather
11.5.21	05:30	08:50	3hrs 20	Dry, light cloud, light breeze, no rain
17.5.21	05:30	09:00	3hrs 30	Dry, full cloud, light breeze, no rain
03.6.21	04:40	08:30	3hrs 50	Dry, full cloud, no wind, no rain

2.41 Variation in the duration in survey visits can be accounted for by the varying degree of activity encountered during each survey visit. As the breeding season progresses more bird fledge and therefore the time taken during survey to record them increases.

Bat survey – Static monitoring

2.42 A review of the bat survey data gathered previously by BSG Ecology in support of the development (See chapter 11 – Ecology – (BSG Ecology 2018)), identified that the levels of bat foraging and commuting activity within the Site were generally very low. With the generally poorly connected, open and exposed nature of the habitats present likely to be a significant factor in the low numbers recorded, these habitats being of low suitability to bats. The habitats present in 2021 were found to be consistent with those recorded in 2018. Therefore, it was assessed that the likely level of bat activity would remain very similar to those previously recorded in 2018.

2.43 Bat transect and static monitoring in 2018, did however detect three areas within the Site where bat foraging activity was slightly greater, these were: vegetation along the southern boundary of the Main Mine Site, the St Bees road crossing point through Roska Park LWS and the proposed conveyor crossing location in Bellhouse Gill LWS. These three areas have therefore been targeted as part of the 2021 survey update and are referred to as monitoring locations 1, 2 and 3.

2.44 Wildlife Acoustics SM4+ full spectrum static bat detectors were deployed at each of the three location identified in paragraph 2.46 for a period of five nights during both May 2021 and June 2021 (the core bat activity period). The resultant sound files were then converted from MP4 into ZCA files to allow analysis using the Analook acoustic analysis software. These sound files were analysed manually by experienced ecologists (Matthew Breadin and Neil Beamsley of BSG ecology). The results of this analysis are summarised in section 3 of this report.

2.45 Three static detectors were deployed between 13 and 17 May 2021 (five nights) and again between 21 and 25 June 2021 (5 nights). Each deployment coincided with periods of mostly calm and dry weather (See figure 6 for the three locations sampled).

Bat Activity Survey

2.46 Dusk activity surveys for bats have been completed at two locations within the Site during the 2021 update survey

Bat Hedgerow survey 2021

2.47 Two dusk activity surveys have been completed of hedgerows associated with the Rail Loading Facility (RLF) elements of the project (see figure 6 for survey locations). The hedgerows will be directly affected by the installation of the RLF infrastructure and were identified by the earlier 2018 data (see Chapter 11-Ecology) as being features used by low to occasionally moderate levels of commuting and forging bats.

2.48 On each occasion, the hedgerows, which form a an inverted ‘u’ shape, were surveyed by two trained surveyors who sought to box-in the survey areas and cover all bat activity along the hedgerows, in addition to the edge of the adjacent woodland (survey areas are shown in Figure

6). Each surveyor used an Anabat express Frequency Division (FD) bat detector, with a Batbox Duet FD detector to allow identification of calls in the field. Surveyors also used a Sannace Infra-red CCTV system to record all activity along the central sections of the survey area. Each of the two CCTV cameras used was deployed alongside an additional Anabat Express detector with bat calls and the CCTV footage being analysed at a later data to ensure all bat activity was recorded and accounted for.

2.49 Survey was completed from 15 minutes before dusk, to 90 minutes after dusk in accordance with the approach described within the Bat Conservation Trusts survey guidelines (Collins, ed 2016). Survey was completed by Hannah Breadin, Matt Breadin, Gemma Cone and Neil Beamsley. All of whom a very experienced bat surveyors from BSG Ecology. Times and weather conditions during each survey are shown in table 4 below.

Main Mine Site security building survey 2021

2.50 A single dusk activity survey was completed of the former Marchon chemical works security building, which stands to the east of the entrance into the Main Mine Site in July 2021. Two trained surveyors from BSG Ecology (Matt Breadin and Shona Velazquez) stood at opposites sides of the building, to 'Box-in' the building and ensure that any bats emerging from the structure could be reliably detected. Each surveyor used a Bat-box duet FD bat detector to allow for call to be identified in the field, in combination with an Anabat Express static bat detector to allow all calls recorded to be checked at a later date using the analook acoustic analysis software.

2.51 Survey was completed from 15 minutes before dusk, to 90 minutes after dusk in accordance with the approach described within the Bat Conservation Trusts survey guidelines (Collins, ed 2016). Times and weather conditions during each survey are shown in table 4 below.

Table 4 – Timings and weather conditions of dusk activity survey

Date	Survey location	Start/Finish time	Sunset	Weather	Surveyors
21.6.21	Hedges	21:35 – 23:30	21:50	Fine, dry, still	MB+HB
8.7.21	Hedges	21:24 – 23:11	21:41	Fine, dry, still	NB+GC
21.7.21	Security building	21:20 – 23:05	21:34	Fine, dry, light breeze	MB+SV

Large Mammal survey

2.52 A survey for large mammal field signs was completed by Neil Beamsley on 11 May 2021. This survey covered the Site, and where safe access would allow a 50m additional survey buffer area. During this survey, the surveyor walked the area looking for any activity and field signs which may suggest the presence of otter *Lutra lutra*, badger *Meles meles*, Water vole *Arvicola amphibius*, red squirrel *Sciurus vulgaris* and brown hare *Lepus europaeus.*

2.53 Survey included all areas of scrub, woodland and the Pow beck watercourse to the east of the St Bees railway line, in addition to all areas of the Site. A note was made of any field signs encountered such as footprints, droppings, feeding remains, potential rest and shelter areas and individual animals.

Trail camera monitoring

2.54 Following the initial large mammal walkover survey on 11 May 2021, signs of badger activity were recorded on the small watercourse located immediately north of the Main Band Colliery, which then flows under the St Bees railway line via a culvert. Two Spy-point IR 7 passive monitoring (trail) cameras were therefore deployed to monitor this location from the 11 May until 21 June (a total of 43 days). The location of the two trail cameras deployed is shown in Figure 6, section 4 of this report).

Great crested newt survey 2021

2.55 The results of the great crested newt survey work completed previously in support of the development are provided in Chapter 11 (BSG Ecology 2018) of the supporting Environmental Statement.

2.56 8 ponds were found to be present either within the Site or in a 250m radius of the Site boundary during the updated to the extended phase 1 habitat survey in May 2021. The pond previously located within the Main Mine Site and that had previously been previously surveyed (Chapter 11 2018), was found to be completely dry in May 2021.

2.57 In order to establish the presence or likely absence of great crested newt within each pond, water samples were collected to permit the detection of great crested newt genetic material within each pond using eDNA analysis techniques.

2.58 The use of eDNA analysis has been highlighted by Natural England (https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects, accessed 7 July 2021) as a way of gaining information about the presence or likely absence of great crested newts within a site. Guidance published by Defra (Biggs et al., 2014) describes a sampling method, which has been adopted for the ponds included in this study.

2.59 Water samples were collected from Ponds 1-8 in May 2021, which is within the recommended survey period (mid-April to the end of June). Samples were collected by Neil Beamsley and Jim Fairclough of BSG Ecology. A total of 20 samples were taken from each pond using a specialist sampling kit provided by Sure-screen and using the standard sampling method (Biggs et al., 2014). The samples were then labelled and sent for analysis on 31 May 2020, and the results were provided on 5 June 2021.

2.60 Table 5 (below) provide the location of each of the 8 ponds sampled using eDNA sampling techniques in 2021.

Table 5 – Edna sampling locations 2021.

Pond number	OSNG location	Description
1	NX 96645 15335	Pond located in leachate facility South of MMS
2	NX 98345 14429	One of three interconnected concrete basin MBC
3	NX 98345 14429	One of three interconnected concrete basin MBC
4	NX 98345 14429	One of three interconnected concrete basin MBC
5	NX 98281 14693	Ornamental pond private garden
6	NX 98348 14685	Pond located in private garden
7	NX 98337 14720	Pond located in private garden
8	NX 98345 14740	Pond located in private garden

Reptile survey 2019 and 2021

2.61 This report provides an update on two reptile surveys completed in support of the proposed mine development. Survey of the Main Mine Site was completed in 2019. This survey was completed following the initial grant of planning permission in 2018 and was commissioned in order to provide information necessary to discharge a planning condition. The methods and results of this survey were not included within Chapter 11 9BSG Ecology 2018), so have been provided as part of this update report.

2.62 A second update survey for reptiles has been completed at the Main Band Colliery in 2021. The methods used are described in the following sections, and the results described in section 3 of this report. The location of the reptile tiles deployed and any species recorded are provided in Figures 6 and 7 in section 4 of this report.

Reptile survey 2019 - Main Mine Site

2.63 Following the initial grant of planning permission by Cumbria County Council, survey was completed of the Main Mine Site during July and August 2019. A total of 120 artificial refugia, comprising 50x50cm squares of bitumastic roofing felt were installed and checked on a total of seven occasions when weather conditions were favourable for survey.

2.64 Table **6** (below) shows the dates and weather conditions experienced during each survey visit.

Date	Start time	End time	Temp	Wind	Cloud	Rain
12.07.19	11:00	15:00	16	F1	30%	Nil
17.07.19	09:00	11:00	16	F1	100%	Nil
01.08.19	09:30	11:30	16	F1-2	40%	Nil
08.08.19	10:30	12:20	17	F1-2	30%	Nil
15.08.19	12:00	13:45	17	F4	50%	Nil
21.08.19	12:00	13:40	16	F4	90%	Nil
29.08.19	11:00	12:30	16	F4	60%	Nil

Reptile survey 2021 - Main Band Colliery

2.65 At the time of writing this report, survey is being updated for reptiles by BSG Ecology within the Main Band Colliery element of the Site. A total of 50 artificial refugia comprising 50x50cm squares of bitumastic felt were installed in this area on 22 June 2021. The tiles were allowed to 'bed-in' for a period of 8 days and have been checked on the following dates.

Table **7** - Weather conditions and dates of reptile surveys, June and July 2021

Date	Time	Temp (^{0}C)	Wind	Rain	Cloud
30.6.21	17:30-18:15	17	Light	Nil	60%
6.7.21	10:00-10:45	16	Nil	Nil	40%
8.7.21	10:00-10:45	17	Nil	Nil	50%
15.7.21	09:00-10:00	19	Nil	Nil	80%
18.7.21	10:15–11:00	16	Nil	Nil	5%
21.7.21	10:00-10:40	17	Nil	Nil	50%

24.7.21	09:45 – 10:45	15	Nil	Nil	30%

Limitations to methods

2.66 No access restrictions have been experienced during any of the ecology survey work completed in 2021. Therefore, site access is not considered to be a limiting factor with any of the survey data.

2.67 Survey work for all species and habitats has been completed within the relevant industry standard survey guidelines (i.e. within the recommended survey period), and therefore survey timings are not considered to be a limiting factor.

2.68 Invertebrate surveys conducted between May and July cover a large part of the optimal survey period for invertebrates. However, certain species active only in late summer and autumn may have been missed. Notwithstanding this, it is considered that the surveys that were undertaken at the Site during 2021 provide a good representation of the invertebrate assemblages likely to be present.

2.69 The survey approach has been designed with reference to guidance set out in Drake et al. (2007). It should be noted that the confidence in the ISIS / Pantheon analysis of SATs is reduced where survey work does not follow the precise ISIS sampling protocols. Since the objectives of the present survey were to identify a broad a range of invertebrates across target groups in predicted key areas of habitat, the methods employed do vary slightly from the ISIS protocol. In such instances Webb et al. (2018) advises that caution is applied when using the SAT assessments, and that confidence in a favourable condition should be considered as 'Medium' for semi-ISIS compliant samples. In the present context, the analysis is considered to be broadly indicative; and may therefore give further steer to help understand which assemblages within the Site are likely to be important.

3 Results

3.1 In the following section the results of the 2021 update survey and 2019 reptile survey of the Main Mine Site are presented.

3.2 In cases where no significant and discernible difference between the 2018 (Chapter 11 – Ecology 2018) survey baseline and that recorded in 2021 has been detected, then reference is made to the 2018 assessment

Desk study

3.3 No new statutory and non-statutory designated sites have been identified within the search area. No new Habitats of Principal Importance (HPI) have been identified from a search of MAGIC.gov.uk. The desk study information and contained within Chapter 11 of the ES (BSG Ecology 2018) are therefore considered to provide an accurate reflection of the broad habitat types and species found within the Site.

Extended phase 1 habitat survey

3.4 No new habitat types have been identified within the Site during the 2021 update. The pond previously recorded within the Main Mine Site is no longer holding any water and is starting to be encroached by coarse grass species from the surrounding habitats.

3.5 Habitat descriptions contained within Chapter 11 (BSG Ecology 2018) are therefore considered to provide an accurate reflection of the broad habitat types and species found within the Site.

Phase 2 botanical survey

Main Mine Site

3.6 The update Phase 2 botanical survey of the Main Mine site shows that the habitats present are broadly comparable with those described within Chapter 11 (BSG Ecology 2018). Some areas of the grassland have become more coarse in composition and a greater percentage of scrub cover is now evident. This is considered to be part of the natural course of ecological succession for a site of this nature.

Roska Park (and Benhow Woodland) LWS

3.7 The following additional target notes are provided in regard to the woodland habitats associated with Roska Park LWS. Roska Park woodland comprises the vegetation to the west of the St Bees Road and Benhow Wood comprises the vegetation found to the east of the road. The location of the habitat components and Target Notes (TN) described in the following sections are shown in Figure 10a, section 4 of this report.

Roska Park Wood

3.8 TN 1. Former quarry area between the water pipe and road about 1 to 2m below the road level. Open canopy with sycamore *Acer pseudoplatanus*, hazel *Corylus avellana*, ash *Fraxinus excelsior*, hawthorn *Crataegus monogyna* and beech *Fagus sylvatica* on the boundary with the road. Trees have been pruned under the overhead wires. Ground flora dominated by ransoms *Allium ursinum* with dog's mercury *Mercurialis perennis*, smaller amount of bluebell *Hyacinthoides non-scripta*. Other species include wood dock *Rumex sanguineus*, primrose *Primula vulgaris*, wood millet *Milium effusum*, red campion *Silene dioica*, tufted hair grass *Deschampsia cespitosa*, wood sedge *Carex sylvatica*, remote sedge *Carex remota*, sweet woodruff *Galium odoratum*, wood stitchwort *Stellaria holostea*, nettle-leaved bellflower *Campanula trachelium*, male fern *Dryopteris filix-mas*, soft shield fern *Polystichum setiferum* and harts tongue fern *Phyllitis scolopendrium*.

3.9 TN 2. Natural part of the gill upstream from the former quarry area described in TN1 is about 10m below the road and supports dense carpets of ransoms *Allium ursinum* on the floor of gill and greater proportion of bluebell *Hyacinthoides non-scripta* on the steeper slopes. Same range of species as

recorded elsewhere in the gill. Stream goes into a culvert and this passes under the quarry fill and the road.

Benhow Wood.

3.10 TN3. Embankment off the road is very steep and drops to about 20 m below the road. The ground flora has been heavily poached and grazed by cattle with large areas of bare ground. Close to the southern boundary by the old limekiln sites a range of tipped material including asbestos and plastic has been dumped partially blocking the outfall of the culvert under the road. Remnants of the original flora are still present including ransoms *Allium ursinum*, bluebell *Hyacinthoides non-scripta*, primrose *Primula vulgaris*, and creeping jenny *Lysimachia nummularia*. In the wetter sections close to the stream there are seepages with opposite leaved golden saxifrage *Chrysosplenium oppositifolium*. The cattle poaching and grazing has also encouraged stands of nettle *Urtica dioica*.

Bellhouse Gill woodland LWS

3.11 The following Target Notes relate to the Bellhouse Gill Woodland LWS. The location of the habitat components and Target Notes (TN) described in the following sections are shown in Figure 10a, section 4 of this report.

3.12 TN1. Ancient, wooded gill. The northern part of the wood has been partially buried by infill of inert waste and topsoil. Two small streams appear near the north eastern boundary and eventually merge into a single meandering stream. The upper slopes are dominated by dense carpets of bluebell *Hyacinthoides non-scripta* with a range of other woodlands plants including, sweet woodruff *Galium odoratum*, wood sorrel *Oxalis acetosella*, tufted hair grass *Deschampsia cespitosa*, dog's mercury *Mercurialis perennis*, pignut *Conopodium majus*, and Wood sedge *Carex sylvatica*. Ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus* dominate the canopy with understorey of hazel *Corylus avellana* and wych elm *Ulmus glabra*. Along the stream where the gradient is flatter there is a stream side community with ransoms *Allium ursinum* and male fern *Dryopteris filix-mas* and wetlands plants such as meadowsweet *Filipendula ulmaria*, opposite leaved golden saxifrage *Chrysosplenium oppositifolium*, remote sedge *Carex remota*, creeping jenny *Lysimachia nummularia*, and large bittercress *Cardamine amara.*

3.13 TN2. At the point where the proposed crossing by the conveyor is located the gill is at its narrowest and is relatively shallow and with a more gradual gradient than upper and lower parts of the gill. A number of elm trees have been felled/fallen and are regenerating. As such there is no canopy to speak off and as a consequence, bramble *Rubus fruticosus* and to a less extent nettle *Urtica dioica* have grown up and dominate much of the ground flora. However, under this layer there is still dog's mercury *Mercurialis perennis*, ransoms *Allium ursinum*, wood sedge *Carex sylvatica*, wood sorrel *Oxalis acetosella*, male fern *Dryopteris filix mas*, pignut *Conopodium majus* and opposite leaved golden saxifrage *Chrysosplenium oppositifolium*.

Main Band Colliery

3.14 The following Target Notes relate to the Main Band Colliery. The location of the habitat components and Target Notes (TN) described in the following sections are shown in Figure 10a, section 4 of this report.

3.15 TN1. Marshy Grassland on the southern edge of the site south of the access road. Tall grassland damp to wet in places being colonised by grey willow scrub. Yorkshire fog *Holcus lanatus* (A), false oat grass *Arrhenatherum elatius* (LF), and meadow foxtail *Alopecurus pratensis* (LA) dominate the grass sward with patches of compact rush *Juncus conglomeratus* (LA), red fescue *Fesuca rubra* (LF), tufted hair grass *Deschampsia cespitosa* (O) and sweet vernal grass *Anthoxanthum odoratum* (O). A range of forbs characteristic of damp conditions occur including; northern marsh orchid *Dactylorhiza purpurella* (O), wild angelica *Angelica sylvestris* (O), water mint *Mentha aquatica* (R), creeping buttercup *Ranunculus repens* (LF), marsh thistle *Cirsium palustre* (LF), bog stitchwort *Stellaria uliginosa* (R), oval sedge *Carex ovalis* (O), valerian *Valeriana dioica*(O) and bitter sweet *Solanum dulcamara* (O)

3.16 TN2. Shelter belt on southern boundary with birch *Betula sp*. (F), alder *Alnus glutinosa* (F), pedunculate oak *Quercus robur* (O), nettle *Urtica dioica* (A), bramble *Rubus fruticosus,* (LF), common cleavers *Galium aparine* (LA).

3.17 TN3. Dry access road track bed leading up to the weighbridge. Fine leaved grassland with a variety of herbs. Crested dog's tail *Cynosurus cristatus* (F), Yorkshire fog *Holcus lanatus* (O), red fescue *Festuca rubra* (F), sweet vernal grass *Anthoxanthum odoratum* (L), cock's-foot grass *Dactlyis glomerata* form the grass sward with (O), ribwort plantain *Plantago lanceolata* (F), red clover *Trifolium pratense* (F), springy turf moss *Rhytidiadelphus squarrosus* (A), glaucous sedge *Carex flacca* (LF), common knapweed *Centaurea nigra*(O), lesser trefoil *Trifolium dubium* (O), coltsfoot *Tussilago farfara* (F), ox-eye daisy *Leucanthemum vulgare* (O), selfheal *Prunella vulgaris* (F) black medick *Medicago lupulina* (LF), and field forget-me-not *Myosotis arvensis* (L) present.

3.18 TN4. Lagoons and ditch. Sege warbler breeding in scrub and reed. Wetland plants include greater reedmace *Typha* latifolia, common reed *Phragmites australis*, remote sedge *Carex remota*, figwort *Scrophularia nodosa*, cuckoo flower *Cardamine pratensis*, jointed rush *Juncus articulatus*, brooklime *Veronica beccabunga*, and hemlock water dropwort *Oenanthe crocata*.

3.19 TN5. Banks on the eastern side of the hardstanding support a dry sparse grassland and lichen community. Silver hair grass *Aira caryophyllea* (O), lichens *Cladonia* spp. (LA), ling heather *Calluna vulgaris* (R), squirrel tail fescue *Vulpia bromoides* (LA), cock's-foot grass *Dactylis glomerata* (O), common spotted orchid *Dactylorhiza fuchsia* (R), white clover *Trifolium repens* (LF), ox-eye daisy *Leucanthemum vulgare* (LF), mouse-ear hawkweed *Pilosella officinarum* (LD), hair moss *Polytrichum* sp (LA), and *dog lichen Peltigera* sp. (O) are present.

Invertebrates

Site A - Main Mine Site

3.20 Site A comprises two distinct areas: the former Marchon chemical works and the northern margins of a closed landfill. See Figure 9, section 4 of this report for the survey areas.

Former Marchon chemical works

3.21 This area is formed across several terraces that provide topographical diversity. Localised structural diversity is provided by small willow shrubs, however, overall, this area is exposed to prevailing south-westerly and westerly winds, and rarely were sheltered areas experienced during the surveys. The terraces include a mosaic of habitats dominated by parcels of semi-improved neutral grassland interspersed with areas of bare ground / exposed concrete and tarmac, ephemeral/short perennial vegetation, and rows of stored crushed aggregate materials covered in species-rich herbs. The semi-improved neutral grassland is mostly species-poor, with tall grasses dominant and frequent tall ruderal; vegetation including nettles, thistles and umbellifers.

3.22 The most species-rich areas are those overlying crushed aggregates, that are formed into rows / banks thus providing topographical diversity. Here, frequently occurring plants of value to phytophagous and nectar and pollen feeding species of invertebrate include: viper's bugloss *Echium vulgare*, rosebay willowherb *Chamaenerion angustifolium*, ox-eye daisy *Leucanthemum vulgare*, creeping buttercup *Ranunculus repens*, colt's-foot *Tussilago farfara*, hogweed *Heracleum sphondylium,* cow parsley *Anthriscus sylvestris*, bird's-foot trefoil *Lotus corniculatus*, hop trefoil *Trifolium campestre*, red clover *Trifolium pratense*, yarrow *Achillea millefolium*, ragwort *Jacobaea vulgaris*, common knapweed *Centaurea nigra*, common teasel *Dipsacus fullonum* and various small yellow composites (including dandelion *Taraxacum officinale* agg. autumn hawkbit *Scorzoneroides autumnalis* and cat's-ear *Hypochaeris radicata*). The loose substrate and frequent patches of bare substrate are also likely to be important for thermophilic (warmth-loving) species many of which may create burrows (e.g. solitary bees and wasps) in exposed soils or seek refuge in crevices within the substrate (e.g. ground and rove beetles). At the margins of the concrete platforms are species of rocky substrates, including the matt-forming biting stonecrop Sedum acre.

Photograph 4: Species-rich banks with exposed substrate in background and concrete platforms with patchy ephemeral vegetation in foreground (July, 2021)

Photograph 5: Unmanaged, species-poor grassland in foreground (May, 2021)

3.23 Structural diversity across the Site is complemented by a diversity of plants, providing a plentiful source of nectar and pollen for invertebrates (such as aculeate Hymenoptera), as well as foliage to feed on for phytophagous species, whereby the greater the diversity of plants the more likely it is that specific species solely associated with a particular plant will be represented at the Site.

Northern margins of closed landfill

3.24 The northern margin of the closed landfill and southern margin of Marchon chemical works is delineated by a bank of planted shrubs. Included are several species of willow Salix sp., hawthorn *Crataegus monogyna,* blackthorn *Prunus spinosa*, common gorse *Ulex europaeus*, wild privet *Ligustrum vulgare*, hazel *Coryllus avellana*, elder *Sambucus nigra*, guelder rose *Viburnum opulus* and dogwood *Cornus sanguinea*. Collectively these form a wind-break, so that areas in the lee are more sheltered and invertebrates will benefit from a locally warmer microclimate. They also provide additional structural complexity to the wider site, offering sources of nectar and pollen early in the year. Beneath and alongside the shrub belt, the ground is damp and favours a number of species of wetter ground, including common fleabane *Pulicaria dysenterica*, ragged robin *Lychnis flos-cuculi* marsh orchid *Dactylorhiza* sp. and creeping buttercup. These were seen to be well visited by a wide range of invertebrates during the surveys.

Photograph 6: Shrub belt (southern edge of Marchon chemical works) (May, 2021)

Photograph 7: Shrub belt (northern edge of former landfill site) (July, 2021)

3.25 Overall, Site A meets the criteria for the Priority Habitat Open Mosaic Habitat on Previously Developed Land as outlined in Table 8 below. Each of these criteria must be met for an area of habitat to be defined as Open Mosaic Habitat.

Table 8: Comparison of the site against criteria used to identify Open Mosaic Habitat

Criterion	Site Assessment	Site Meets Criterion?
The area of open mosaic habitat is at least 0.25 ha in size.	Habitat mosaic comprising scrub, ruderal vegetation, grassland and bare ground exceeds 0.25 ha. within the Site.	**Yes**
Known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added.	The Site has been previously developed and is has been subject to extensive demolition work.	**Yes**
The site contains some vegetation. This will comprise early successional communities consisting mainly of stress-tolerant species (e.g. indicative of low nutrient status or drought). Early successional communities are composed of (a) annuals, or (b) mosses/liverworts, or (c) lichens, or (d) ruderals, or (e) inundation species, or (f) open grassland, or (g) flower-rich grassland, or (h) heathland.	Habitats present within the Site include examples of early successional communities including: annuals; mosses and liverworts; tall ruderal and locally distributed flower-rich grassland habitats.	**Yes**
The site contains un-vegetated, loose bare substrate and pools may be present.	Un-vegetated bare ground is also present. Pools are not present.	**Partially met**
The site shows spatial variation, forming a mosaic of one or more of the early successional communities (a)–(h) above (criterion 3) plus bare substrate, within 0.25 ha.	Vegetation communities throughout the Site (especially within the central part of the former Marchon chemical works) form a complex mosaic.	**Yes**

3.26 Main Band Colliery – Site B - includes a number of discrete habitats including a concrete pad at the centre that is surrounded by bare ground, species-rich grassland, dry heath species-poor neutral grassland, tall ruderal vegetation scrub and wet woodland. The species-rich grassland is predominately located on an artificial bank immediately south of the concrete pad. Included here are a variety of herbs favoured by invertebrates, including: ox-eye daisy, mouse-ear hawkweed *Pilosella officinarum*, creeping buttercup, colt's-foot, hogweed, bird's-foot trefoil Lotus corniculatus, hop trefoil, red clover, white clover Trifolium repens, yarrow *Achillea millefolium*, common knapweed, rough hawkbit *Leontodon hispidus* and dandelion *Taraxacum officinale agg*.. Lichen *Cladonia sp*. and heather *Calluna vulgaris* are patchily distributed and indicate slightly acidic conditions.

Photograph 8: Species-rich grassland with bare substrate (June, 2021)

Photograph 9: Tanks in south of Site B (June 2021)

3.27 Bramble scrub is located throughout the site, including at the margins of the grassland, and gives way to wet woodland in waterlogged areas to the north and west of the central concrete pad. Willow (mostly grey willow *Salix cinerea*), common alder *Alnus glutinosa* and silver birch *Betula pendula* are all abundant. There is little dead wood (standing or fallen) to benefit saproxylic invertebrate assemblages. However, conditions are sheltered and humid so are likely to benefit a range of invertebrates associated with still and humid air, such as craneflies and hoverflies. The ground flora beneath includes valerian *Valeriana officinalis*, meadowsweet *Filipendula ulmaria*, hemlock water dropwort *Oenanthe crocata* and wild angelica *Angelica sylvestris*, all of which have broad inflorescences of white flowers that are important nectar and pollen sources for invertebrates. During the site visit in early May, the wet woodland included a number of seasonal pools of standing water. These had completely dried out by the visit in June.

Photograph 10: Wet woodland in north of Site B (June 2021)

Photograph 11: Ephemeral pool in wet woodland (May 2021)

3.28 In the south of the Site are three concrete-lined tanks. These hold water and the two furthest north include marginal vegetation dominated by bulrush *Typha latifolia*. The tank furthest south was not vegetated. Common duckweed *Lemna minor* was forming a veil over the two northern tanks by the time of the visit on 14-15 June. This is most likely limiting the invertebrate interest of the tanks by blocking out light from penetrating and enabling a more diverse aquatic flora to establish.

3.29 Although Site B has a known history of disturbance, the juxtaposition of open mosaic habitats is such that they do not attain the required area (0.25 hectares) to be considered as a UK priority habitat.

3.30 Overall, due to the range of habitats within Site B and the relatively good condition of these for invertebrates, it is considered likely to be an important area for invertebrate assemblages.

Invertebrate Species Assemblage

3.31 The results of the targeted invertebrate survey provide an indication of the relative species diversity within the targeted groups of invertebrates. Over 800 specimens were collected or recorded over the course of the survey, allowing 269 species to be identified from Sites A and B. 172 species from Site A and 147 species from Site B.

3.32 Of the target groups Coleoptera was the dominant order recorded at 133 species, and other well represented groups included were the Hemiptera (30 species), Hymenoptera (27 species), Diptera (28 species) and Lepidoptera (15 species). Other groups included Aranaeae (spiders), Dermaptera (earwigs), Isopoda (woodlice), Julida (snake millipedes), Lithobiomorpha (centipedes), Mecoptera (scorpionflies), Opiliones (harvestmen), Gastropoda (snails and slugs) and Orthoptera (grasshoppers and crickets).

3.33 The majority of the species recorded (ca. 85%) are without a status, being widely distributed and common, and exhibiting little habitat specificity. However, 34 species are regarded as locally common or Locally Scarce, with six species being Species of Principal Importance, Nationally Scarce or Rare. The full list of invertebrates recorded within the Site is displayed in tabular format in Appendix 2.

COLEOPTERA (BEETLES)

Curculionidae (True Weevils) *Grypus equiseti* - GB Status: Nationally Scarce (Notable B)

3.34 As the vernacular name suggests this distinctive weevil is usually found on horsetail *Equisetum species* but is apparently restricted to field horsetail *E. arvense* and marsh horsetail *E. palustre* (Duff, 2016). It is typically found in fens, mires and other wet places such as damp meadows.

3.35 This species has not been reviewed since Hyman & Parsons (1992), has a wide distribution and is commoner than the status suggests, and should be regarded as local.

3.36 Two specimens were taken, one from a pitfall trap and one from sweeping, both in Site A on 15 June 2021.

Staphylinidae (Rove beetles) *Ocypus nitens* - GB Status: Nationally Scarce (Notable A)

3.37 Although it is widely distributed across England there are relatively few records for this fairly large rove beetle. There are few records for Vice County 70 (Cumberland), most being many years old, the most recent being 2003. According to Lott and Anderson (2011) the species can be found on both open and shaded environments on dry to damp soils. This rather broad flexibility in habitat choice suggests that it may be commoner than records indicate. Two specimens were identified from the Site A, within a pitfall trap set on 15 June 2021.

HEMIPTERA (BUGS)

Lygaeidae (ground bugs) *Megalonotus dilatatus* – UK Status: Nationally Scarce (Notable)

3.38 According to the British Bugs website (2021) 'although scarce, this species is found widely across southern Britain in mainly sandy heathland and grassland habitats, as well as coastal dunes'. There are relatively few records for this bug, although it is widespread and recorded as far north as Yorkshire. This record is new for Vice County 70.

3.39 One specimen was taken from a pitfall trap set in scrub at the toe of the landfill of Site A, on 15 June 2021.This is outside of the development boundary.

LEPIDOPTERA (BUTTERFLIES AND MOTHS)

Erebidae (Moth) *Tyria jacobaeae* – Section 41 listed Species of Principal Importance (Research only)

3.40 This species, Cinnabar moth, is a common species that is well distributed throughout most of England and is listed on Section 41 of the NERC Act (2006) for research purposes only. It is frequently found in open grassy habitats including waste ground, gardens and woodland rides, but is most frequent on well drained rabbit-grazed grassland, mature sand dunes and heathland. The larvae of this species feed on common ragwort, and this plant was common in open areas of the Site. Larvae and adults were found in across both Sites in June and July.

Nymphalidae (Butterfly) *Coenonympha pamphilus* UK status: Near Threatened. Section 41 listed Species of Principal Importance

3.41 Small heath butterflies typically occur in well-drained semi-improved grassland habitats where they lay their eggs on fine grasses such as fescues (*Festuca spp*.), meadow grasses (*Poa spp*.) and bents (*Agrostis spp*.) (Asher et al., 2001). The species was recorded frequently at Site A during late May and June 2021.

3.42 According to the UK Butterflies site, this small nymphalid 'has shown a severe decline over the long term and is therefore a priority species for conservation efforts'. It also shows a positive abundance change between 2005 and 2014.

Nymphalidae (Butterfly) *Hipparchia semele* UK status: Vulnerable. Section 41 listed Species of Principal Importance

3.43 Grayling was recorded frequently within Site A on 22 July. A single butterfly was also recorded from Site B during the survey on 22 July . UK Butterflies states that 'This butterfly has suffered severe declines over the long term and is therefore a priority species for conservation efforts'. Butterfly Conservation (2013) state that 'many colonies occur in coastal habitats such as sand dunes, saltmarsh, undercliffs and clifftops. Inland colonies are found on lowland heathland, limestone pavement, scree and brownfield sites such as old quarries, railway lines and derelict industrial areas.'

3.44 It is described by Butterfly Conservation (2013) as occupying habitats 'characterised by sparse vegetation, sheltered sunny spots and plenty of bare ground in open situations.' Less commonly, the Grayling still occurs on calcareous grassland or in open woodland on stony ground.

Pantheon Assemblage Analysis

3.45 As explained in the methodology section, the Pantheon database has been used principally to help understand which terrestrial invertebrate assemblages within the Site are likely to be important. The species lists for Sites A and B, derived from the invertebrate surveys were entered into Pantheon. The data output from the analysis is shown in Tables 9 and 10 below, which considers invertebrate assemblages at two different levels.

Broad Biotopes

Table 9: Summary of Pantheon output for Broad Biotopes

	Site A		**Site B**	
Broad biotope	**No. of species**	**Species with conservation status**	**No. of species**	**Species with conservation status**
open habitats	118	6	85	1
wetland	17	1	41	-
tree-associated	13	-	12	-
shaded woodland floor	1	-		
coastal			1	-

3.46 Table 9 shows that there are five broad biotypes across the two sites recognised by Pantheon. The best represented is that belonging to open habitats, which is unsurprising given that much of the survey effort targeted this broad biotope that includes grassland, herb communities and open, bare ground not associated with woodland closed canopies. The recording of a good proportion of invertebrates from the open habitats points towards this being an important feature of both sites. This is further emphasised at Site A by the presence of six species with conservation status from this biotope.

3.47 The wetland biotope is shown to be fairly well-represented, particularly for Site B; here there was permanent water and temporary water in the form of seasonal pools in the wet woodland. Wetland covers a range of habitats including permanent wetlands and waterbodies, lake margins, and areas of land whose soil is saturated with moisture either permanently or seasonally. The tree-associated biotype didn't return a large data set from either site, and in the case of Site B, which has some woodland present (wet woodland), it may indicate that this habitat of limited value for invertebrates or that sampling techniques did not target those species associated with woodland habitat; more likely it will be a combination of the two factors.

3.48 Only two of these biotypes are considered to require further scrutiny as the tree-associated, shaded woodland floor and coastal biotypes have fewer than 15 species in each.

Habitats

Table 10: Summary of Pantheon output for Habitats

		Site A			Site B		
Broad biotope	**Habitat**	**No. of species**	**SQI**	**Species with conservation status**	**No. of species**	**SQI**	**Species with conservation status**
Open habitats	Tall sward & scrub	88	103	1 (*Ocypus nitens*)	68	100	0
	Short sward & bare ground	25	125	4 (*Grypus equiseti, Megalonotus dilates, Coenonympha pamphilus, Hipparchia semele*)	13	N/A	1 (*Coenonympha pamphilus)*
Wetland	Marshland	5	N/A	1 (*Grypus equiseti*)	25	100	0
Other habitats with fewer than ten species at both sites: Shaded woodland floor, acid & sedge peats, marshland, running water, decaying wood, arboreal.							

3.49 Table 10 adds a finer level of detail to Table 9, sub-dividing broad biotopes into habitats. The most prominent habitat that features at both sites is that of 'tall sward scrub' that lies within the broad biotope of open habitats. Whilst belonging to the open habitats biotope, it could be considered as intermediate with the tree-associated biotope, since the definition of this habitat in Pantheon, as 'Areas of dense herbage or partial shade where a humid microclimate is maintained at ground level. Dominance by woody plants is limited by exposure, grazing or cutting of vegetation, but they often form an important component of the habitat' leans on the importance of woody plants. The number of species with a recognised conservation status associated with this habitat is low at both sites, with only one such species of the 88 recorded at Site A, and no species conservation status out of the 68 species recorded at Site B, which is reflected by a low SQI scores.

3.50 The short sward and bare ground habitat at Site A was represented by 25 species, four of which have a recognised conservation status. This habitat type includes areas where disturbance as a result of direct human activity in a brownfield context has removed or maintained vegetation to create areas of bare or sparsely vegetated ground. *Grypus equiseti, Megalonotus dilates, Coenonympha pamphilus,* and *Hipparchia semele* were all recorded from the areas of open mosaic habitat, which reflect the short sward and bare ground habitat description. The SQI score for this habitat is relatively high at Site A and likely suggesting that this assemblage of invertebrates is a valuable feature of the Site. Site B, however, had fewer invertebrates associated with this habitat (13 species) and therefore did not return a reliable SQI score.

3.51 Marshland habitat at Site B was represented by 25 species, that will have been taken from the concrete lined ponds and ephemeral wet woodland pools. However, no species had conservation status and therefore the SQI was low, inferring that this habitat did not support an important invertebrate assemblage. Wetland habitat was absent from Site A, therefore species recorded from this are only likely to have been vagrants or associated with some of the damp areas that are locally distributed in Site A.

Specific Assemblage Types

3.52 The only Specific Assemblage Type with 'Favourable' condition was that of the 'rich flower resource', associated with Site A. This suggests that the open habitats within Site A have an important resource of large flower patches capable of supporting a range of associated species (especially *Aculaeate Hymenoptera).* The flower patches were prominent throughout the surveys, with dandelions

providing sources of nectar and pollen early in the season, followed by an array of umbellifers, composites and legumes in mid-summer, and the promise of a different range of composites in late summer. Flower-rich resources may also include those associated with woody species (e.g., ivy, hawthorn, gorse and willow) as well as those associated with more typical herbaceous flowering plants. As explained in Pantheon, the detection of this assemblage is relevant in that it flags up the importance of the floral resource within Site A.

3.53 It is not appropriate to assess favourable condition of any of the other Specific Assemblage Types (SATs) recognised by Pantheon at either Site. This is because for all SATs recognised, the number of species was below the threshold levels to make a meaningful assessment of condition. This is likely to be explained by the fact that the other habitats sampled are not of sufficiently high quality to support enough species with specialised habitat requirements.

Breeding Bird survey

3.54 Table 11 below shows the number of nesting territories identified during the breeding bird survey completed in 2021. Territories are shown for the following key areas: The Main Mine Site, The Conveyor route (which includes Roska Park and Benhow wood), Main Band Colliery and Bellhouse Gill Woodland and the Rail Loading Facility. The table indicates if the species was considered to be breeding and the estimated number of territories present. The location of each territory is shown in Figures 2, 3, 4 and 5 in section 4 of this report.

3.55 Species are listed in accordance with their conservation status as described by the British Trust for Ornithology Bird of Conservation Concern (BoCC) report (December 2015). Species are colour coded – **Red** - Species of high conservation concern, **Amber** – Species of Moderate Conservation Concern and **Green** – species of least conservation concern

Table 11 – Breeding bird survey results 2021

		Number of territories per area			
Species	**BTO Code**	**Main Mine Site**	**Route of Conveyor**	**Main Band Colliery and Bellhouse Gill Woodland**	**Rail loading facility**
Linnet	**LI**	1	0	0	0
Skylark	**S.**	3	0	0	0
Song Thrush	**ST**	1	0	1	1
Starling	**SG**	0	0	1	0
Bullfinch	**BF**	0	0	1	1
Meadow pipit	**MP**	4	0	0	0
Willow warbler	**WW**	0	0	0	1
Blackbird	**B.**	2	2	4	3
Blackcap	**BC**	0	0	1	0
Blue Tit	**BT**	0	0	2	1

Chiff Chaff	**CC**	0	1	3	3
Goldfinch	**GO**	1	0	1	0
Greater Spotted Woodpecker	**GS**	0	0	1	0
Jackdaw	**JD**	0	0	1	0
Magpie	**MG**	0	1	0	0
Pheasant	**PH**	0	1	0	0
Robin	**R.**	0	2	2	3
Wheatear	**W.**	1	0	0	0
Whitethroat	**WH**	2	2	1	3
Wood pigeon	**WP**	0	0	1	0
Wren	**WR**	0	0	0	1
Sedge warbler	**SW**	1	0	4	2
Stonechat	**SC**	1	0	0	0
	Total Nesting Species	10	6	14	10
	Total Territories	17	11	24	19

3.56 In summary, breeding bird survey in 2021 has recorded a total of 23 species which are considered likely to be breeding within the Site, or in the habitats immediately adjacent to the site boundary. A total of 71 breeding territories have been identified.

3.57 Of the 23 species considered to be resident breeding species, four are listed on the BoCC red list, three are listed on the BoCC amber list and the remaining 16 are listed on the BoCC green list.

3.58 In addition to the 23 species considered to be breeding within the Site, 15 further species were recorded during survey but were not considered to be a breeding species, these were: Raven *Corvus corax*, swift *Apus apus*, sand martin *Riparia riparia*, house martin *Delichon urbicum*, swallow *Hirundo rustica*, garden warbler *Sylvia borin*, buzzard *Buteo buteo*, chaffinch *Fringilla coelebs*, goldcrest *Regulus regulus*, Canada goose *Branta canadensis* , pied wagtail *Motacilla alba*, rook *Corvus frugilegus,* carrion crow *Corvus corone*, mallard *Anas platyrhynchos*, and reed bunting *Emberiza schoeniclus*.

3.59 In total 38 bird species were recorded during the 2021 update survey.

Bat static surveys

3.60 Tables 12 to 17 below provide a summary of the number of bat passes recorded by each of the three static bat detectors during May and June 2021. The average number of bat passes per night per species are provided as the figure in brackets.

	Table 12 – May 2021 Location 1 - Main Mine Site					
	13/05/2021	**14/05/2021**	**15/05/2021**	**16/05/2021**	**17/05/2021**	**Total**
Common Pipistrelle	82	26	174	45	43	370 (74)
Soprano Pipistrelle	1	1	172	1	0	175 (35)
Myotis sp	0	0	0	1	0	1 (0.2)

	Table 13 – May 2021 Location 2 – Roska Park Woodland					
	13/05/2021	**14/05/2021**	**15/05/2021**	**16/05/2021**	**17/05/2021**	**Total**
Common Pipistrelle	262	1085	192	221	630	2390 (478)
Soprano Pipistrelle	2	13	7	4	12	38 (7.6)
***Myotis* Sp.**	0	0	0	0	3	3 (0.6)

	Table 14– May 2021 Location 3 – Bellhouse Gill Woodland					
	13/05/2021	**14/05/2021**	**15/05/2021**	**16/05/2021**	**17/05/2021**	**Total**
Common Pipistrelle	103	90	191	453	301	1138 (227.6)
Soprano Pipistrelle	18	13	37	19	37	124 (20.66)
Myotis sp.	2	7	11	11	10	41 (8.2)

	Table 15 June 2021 – Location 1 – Main Mine Site					
	21/06/2021	**22/06/2021**	**23/06/2021**	**24/062021**	**25/06/2021**	**Total**
Common Pipistrelle	129	199	219	58	152	757 (151.40)
Soprano Pipistrelle	5	11	14	4	2	36 (7.2)
***Myotis* Sp.**	1	0	2	0	0	3 (0.6)

	Table 16 – June 2021 – Location 2 – Roska Park woodland					
	21/06/2021	**22/06/2021**	**23/06/2021**	**24/062021**	**25/06/2021**	**Total**
Common Pipistrelle	532	610	416	696	253	2507 (501.6)
Soprano Pipistrelle	9	21	61	6	7	104 (20.5)
Noctule	0	0	1	0	0	1 (0.2)
Myotis Sp.	4	0	0	0	0	4 (0.8)

	Table 17 - June 2021 – Location 3 – Bellhouse Gill Woodland					
	21/06/2021	**22/06/2021**	**23/06/2021**	**24/06/2021**	**25/06/2021**	**Total**
Common Pipistrelle	555	610	404	997	265	2831 (566.20)
Soprano Pipistrelle	6	90	30	376	9	511 (102.2)
***Myotis* Sp.**	3	1	0	244	2	250 (50)

3.61 Static survey during 2021 has shown that low numbers of common and soprano pipistrelle used the Main Mine Site (location 1) during both the May and June 2021 survey period. Individual passing records of a *Myotis* species of bat were also recorded.

3.62 Static surveys of Roska Park woodland (Location 2) Indicate a broadly similar pattern of bat activity in both May and June 2021. Common pipistrelle was the most commonly recorded species, with an average of 500 passes per night during the June survey period. Less regular activity by soprano pipistrelle was also recorded, with very sporadic activity by Noctule and *Myotis* bat species.

3.63 The greatest levels of foraging and commuting activity were recorded at Bellhouse Gill woodland (location 3). As with Roska Park, common pipistrelle was the most frequently recorded species, with a peak of 997 passes recorded during the evening of 24 June 2021. Less frequent activity by soprano pipistrelle was also recorded with sporadic activity by *Myotis* and noctule bats. An abnormal peak of 244 *Myotis* bat passes was recorded at location 3 on 24 June. It is noted that this also coincides with peaks for common and soprano pipistrelle during the June 2021 monitoring period. It is suggested therefore that these may have been caused by factors such as local weather conditions in this location

during this evening, causing local bat populations to alter their more regular foraging and commuting patterns.

Hedgerow survey

3.64 No significant bat activity was recorded in association with any of the sections of hedgerows surveyed on 21 June or 8 July 2021. Bat activity, exclusively by common pipistrelle was recorded in the woodland to the west of the survey locations, but no bats were seen using the hedgerows for commuting or foraging activity.

Former Marchon Chemical works security building.

3.65 Two common pipistrelle bats were recorded emerging from mortar gaps at the west facing ridge of this building. The bats emerged approximately 35 and 42 minutes after sunset and existed the site to the south. No bats were seen to return to the building during the survey.

3.66 Background bat activity was no more than sporadic, with occasional commuting passes by common pipistrelle commuting along the eastern security fence of the Site.

Large Mammal survey

3.67 The results of the large mammal survey work are shown in figure 6, section 4 of this report.

3.68 No evidence of red squirrel activity was recorded during the survey. The suitability of habitats within the Site remain as described in Chapter 11 (BSG Ecology 2018)

3.69 A single relatively fresh otter spraint was located below the footbridge which crosses the Pow Beck as part of the Coast-to-Coast footpath. The spraint appeared to contain a combination of both small fish and amphibian bone fragments. No other evidence of otter activity was found.

3.70 The suitability of habitats within the Site for use by otter remain as described in Chapter 11 (BSG Ecology 2018).

3.71 Four recent badger footprints were found in the soft sands at the edge of the small gill which flows below the St Bees railway line, in the northeast corner of Main Band Colliery. The footprints were isolated, suggesting water levels may had risen since the badger was present, and any additional prints had been washed away. This location was monitored for 43 consecutive days from 11 May 2021, and no further evidence of badger was recorded. The camera detecting activity by birds and occasional roe deer *Capreolus capreolus* commuting only during the monitoring period.

3.72 The suitability of habitats within the Site for use by badger remain as described in Chapter 11 (BSG Ecology 2018)

3.73 No evidence of water vole activity was recorded during the survey, and the suitability of habitats for this species within the Site remain as described in Chapter 11 (BSG Ecology 2018).

3.74 No evidence of brown hare activity was recorded during the survey, and the suitability of habitats for this species within the Site remain as described in Chapter 11 (BSG Ecology 2018).

Great crested newt

3.75 All eDNA samples collected for ponds 1 to 8 in May 2021 returned negative results, suggesting that great crested newt is likely to be absent from all ponds surveyed.

3.76 The suitability of habitats within the Site for use by great crested newt remains as described within Chapter 11 (BSG Ecology 2018).

Reptiles

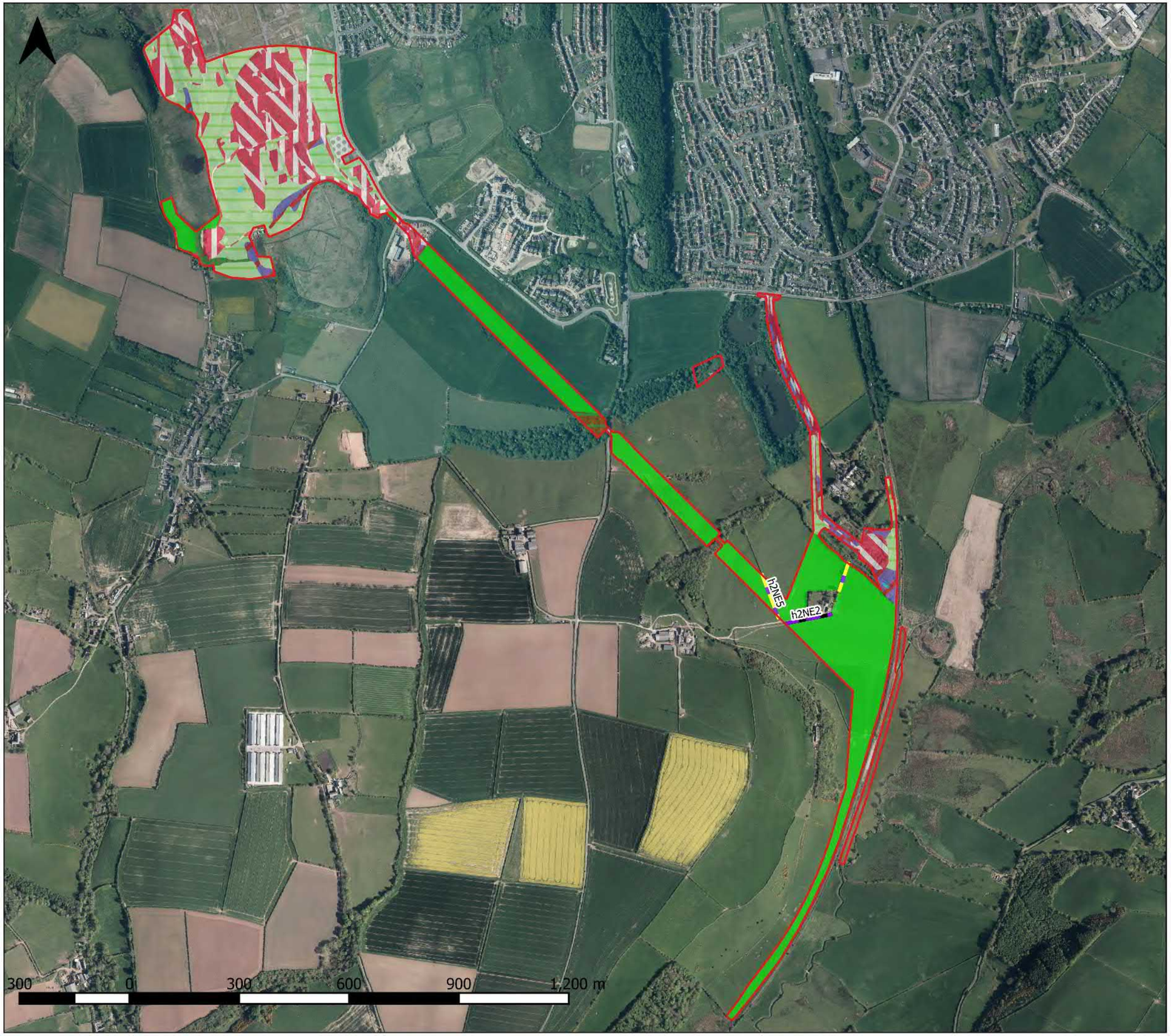
3.77 The results of the 2019 reptile survey of the Main Mine Site and 2021 survey of Main Band Colliery are shown in Figures 7 and 8 respectively.

3.78 Table 18 below, provides a summary of the results of the of the 2019 reptile survey of the Main Mine Site

	Date of visit																																									
	12.07.19						17.07.19						01.08.19						08.08.19						15.08.19						21.08.19						29.08.19					
Tile No.	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)	Cm Liz (Ml)	Cm Liz (fm)	Cm Liz (Jue)	Sl Wm (Ml)	Sl Wm (fm)	Sl Wm (Jue)
3																												1														1
25																																1										
26																																1										
50																																1										
62				1																																	1					
63																1								1																		
64					1																																					
66																	1												1						1							
68					1		1																																			
69																										1	1															
70																									1							1										
71								1																	2																	
74																													1		1	1										
75																	1							1																		
76																							1		1																	
79																																1										
80																														1					1							
86																											1															
87																										1																
92																										2																
95																										1																
Total	0	0	0	1	2	0	1	1	0	0	0	0	0	0	0	1	2	0	0	0	0	0	1	2	4	5	2	1	2	1	1	6	0	0	2	0	1	0	0	0	0	1

3.79 Reptile survey of Main Band Colliery in 2021 recorded a single adult common lizard. This individual was recorded basking on top of a tile in the southeast corner of the site, adjacent to the St Bees Railway. No other reptile species were recorded during the survey.

4 Figures



Legend

- Red Line Boundary
- Native Hedgerow (h2NE5)
- Native Hedgerow with trees (h2NE4)
- Native Species Rich Hedgerow (h2NE2)
- Developed land; sealed surface
- Lowland mixed deciduous woodland
- Mixed scrub
- Modified grassland
- Open Mosaic Habitats on Previously Developed Land
- Other inland rock and scree
- Other neutral grassland
- Other woodland; broadleaved
- Reservoirs
- Temporary lakes, ponds and pools

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Figure 1: Baseline habitat plan

DATE: 06.08.21 | CHECKED: NB | SCALE: 1:10,000
DRAWN: EM/SL | APPROVED: NB | STATUS: DRAFT

Sources: BSG Ecology survey data

Document path

Legend

- Site boundary
- W. = Wheateer
- B. = Blackbird
- GO = Goldfinch
- WH = Whitethroat
- SC = Stonechat
- SW = Sedge Warbler
- MP = Meadow Pipit
- S. = Skylark
- ST - Song thursh
- LI - Linnet

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DRAWING TITLE
Figure 2: Breeding bird survey 2021

DATE: 03.08.2021 CHECKED: NB SCALE: 1:4000
DRAWN: JT APPROVED: NB STATUS: FINAL

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: BSG Ecology survey data

Document path

Legend

- Site boundary
- B. = Blackbird
- CC = Chiffchaff
- PH = Pheasant
- MG - Magpie
- R. = Robin
- WH - Whitethroat

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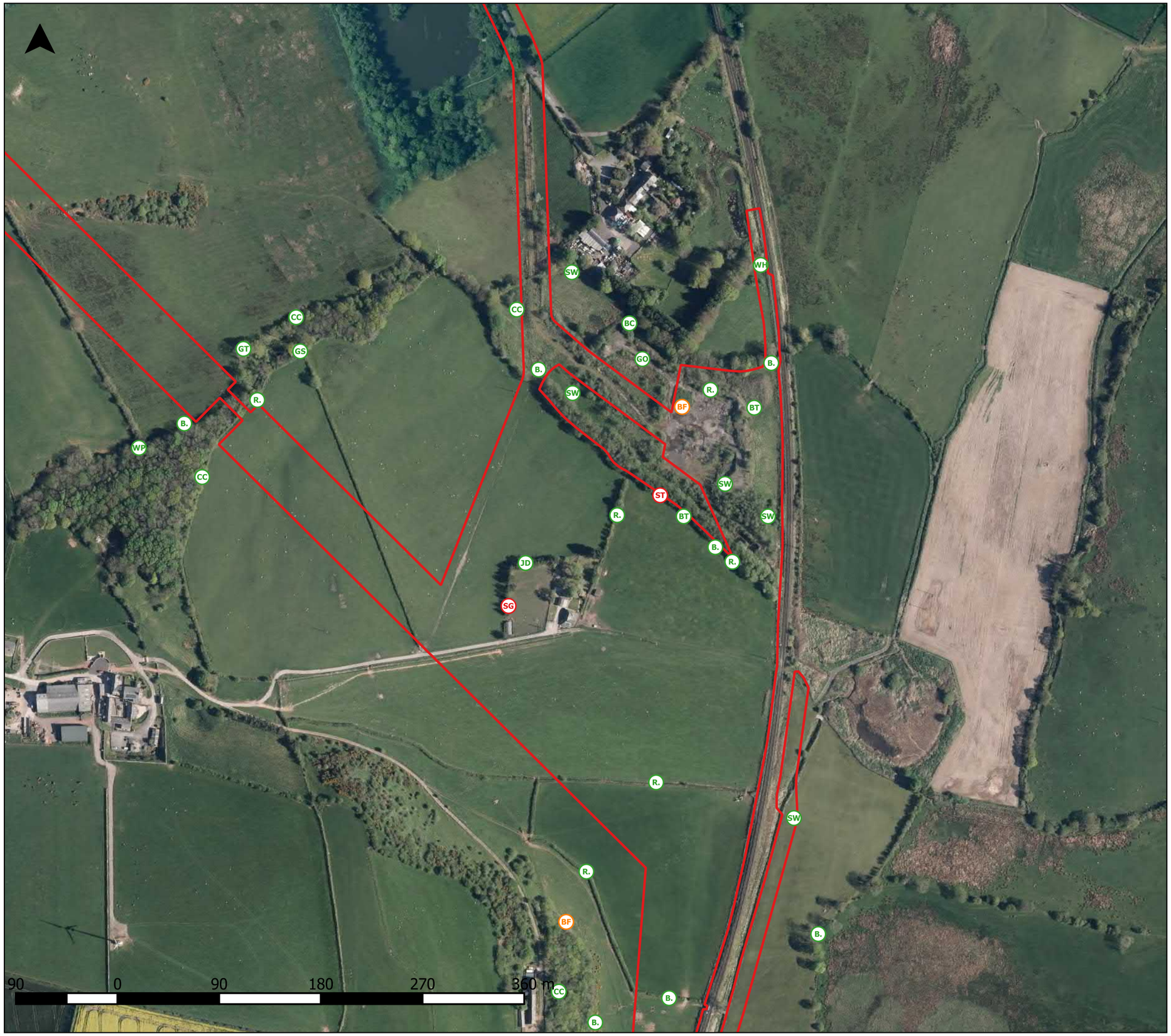
Figure 3: Breeding bird survey 2021

DATE: 03.08.2021	CHECKED: NB	SCALE: 1:4000
DRAWN: JT	APPROVED: NB	STATUS: FINAL

Sources: BSG Ecology survey data

Document path



Legend

- Site boundary
- BF = Bullfinch
- ST = Song thrush
- SG = Starling
- SW = Sedge warbler
- BT = Blue tit
- WH - Whitethroat
- B. - Blackbird
- R. - Robin
- CC = Chiff chaff
- BC = Blackcap
- GO = Goldfinch
- JD = Jackdaw
- WP = Wood pigeon
- GT = Great tit
- GS = Greater spotted woodpecker

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DRAWING TITLE
Figure 4: Breeding bird survey 2021

DATE: 03.08.2021	CHECKED: NB	SCALE: 1:4000
DRAWN: JT	APPROVED: NB	STATUS: FINAL

Sources: BSG Ecology survey data

Document path

Legend

- Site boundary
- ST = Song thrush
- BF = Bull finch
- WW = Willow warbler
- R. = Robin
- WH = White throat
- B. = Blackbird
- CC = Chiff chaff
- WR = Wren
- BT = Blue tit

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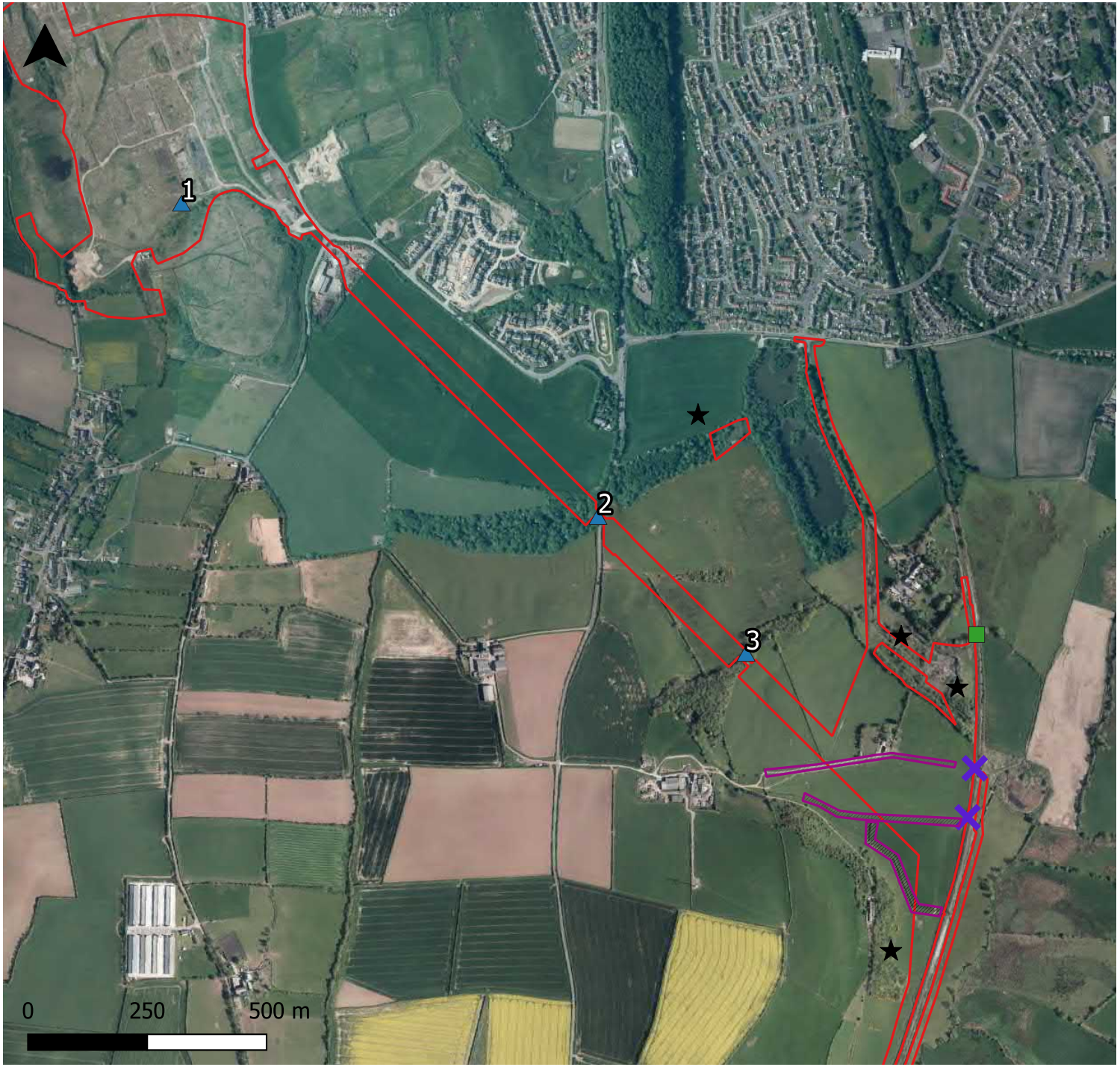
DRAWING TITLE

Figure 5: Breeding bird survey 2021

DATE: 03.08.2021	CHECKED: NB	SCALE: 1:4750
DRAWN: JT	APPROVED: NB	STATUS: FINAL

Sources: BSG Ecology survey data

Document path



Legend

Site Boundary

Bat hedgerow survey locations

Static bat detector

Trail camera

Otter spraint

Roe deer

Badger footprint

Locations are approximate

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Figure 6: Mammal survey 2021

DATE: 03.08.21 CHECKED: NB SCALE: 1:1,100

DRAWN: GC APPROVED: NB STATUS: FINAL

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: BSG Ecology survey data

Legend

Site Boundary

Reptile tile locations

Common lizard record

Slow worm record

Locations are approximate

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Figure 7: Reptile Survey Main Mine Site 2019

DATE: 03.08.21	CHECKED: NB	SCALE: 1:3,000
DRAWN: GC	APPROVED: NB	STATUS: FINAL

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: BSG Ecology survey data

Legend

Site Boundary

Reptile tile locations

Common lizard record

Locations are approximate

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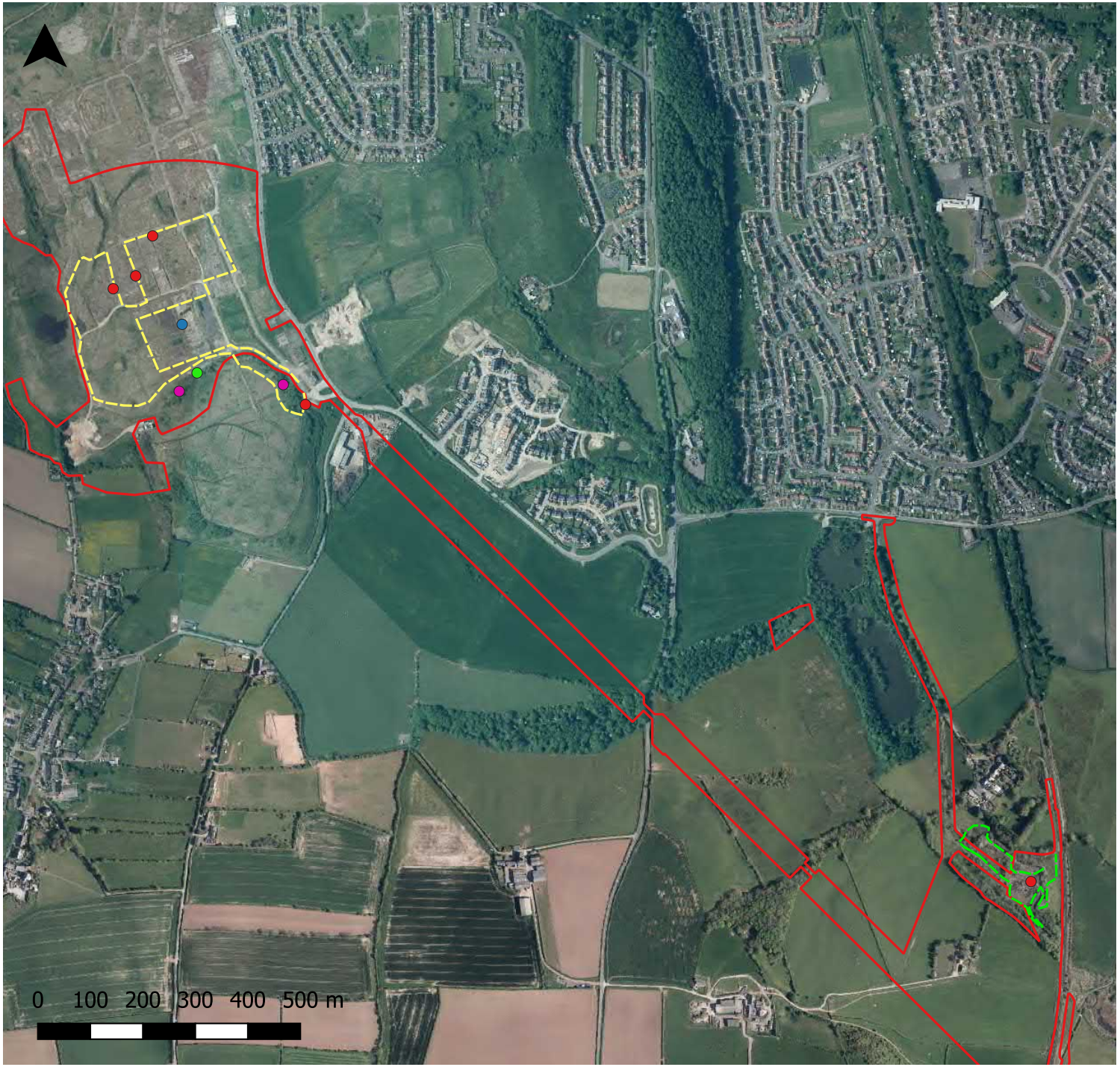
Figure 8: Reptile Survey Main Band Colliery 2021

DATE: 03.08.21 CHECKED: NB SCALE: 1:1,500

DRAWN: GC APPROVED: NB STATUS: FINAL

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: BSG Ecology survey data



Legend

- Site boundary
- Butterfly transect route Site B: the Mainband Colliery Site
- Butterfly transect route Site A: the former Marchon chemical works and the northern margins of a closed landfill

Notable Species:

- Grayling
- *Grypus equiseti*
- *Megalonotus dilatatus*
- *Ocypus nitens*

Locations are approximate

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Figure 9: Survey Area and Butterfly Transect

DATE: 03.08.21 CHECKED: NB SCALE: 1:10,000
DRAWN: GC APPROVED: NB STATUS: FINAL

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site.
Area measurements for indicative purposes only.

Sources: BSG Ecology survey data

Legend

- Site boundary
- Target notes 1-2
- Natural gill not quarried
- Former quarry area on fill material
- Benhow wood cattle grazed bank

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Figure 10a: Phase 2 botanical suvey target notes

DATE: 05.08.2021	CHECKED: NB	SCALE: 1:1750
DRAWN: JT	APPROVED: NB	STATUS: FINAL

Sources: BSG Ecology survey data

Document path

Legend

- Site boundary
- Target note 1-2
- A = Area affected by tipping of fill material
- Flatter area with open canopy
- Upper part of wood dominated by bluebell

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Figure 10b: Phase 2 botanical survey target notes

DATE: 05.08.2021	CHECKED: NB	SCALE: 1:1750
DRAWN: JT	APPROVED: NB	STATUS: FINAL

Sources: BSG Ecology survey data

Document path

Legend

- Site boundary
- Target note 1-5
- Dry grassland off access track
- Lichen rich sparse grassland with a few long heather
- Lagoons and ditch
- Marshy damp grassland
- Lichen rich sparse dry grassland
- Shelter belt

BSG | ecology

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PROJECT TITLE

Whitehaven Public Enquiry

DRAWING TITLE

Figure 10c: Phase 2 botanical survey target notes

DATE: 05.08.2021	CHECKED: NB	SCALE: 1:1750
DRAWN: JT	APPROVED: NB	STATUS: FINAL

Sources: BSG Ecology survey data

Document path

5 References

Chapter 11 (Ecology) – Planning application 4/17/9007, September 2018 – BSG Ecology

Froglife (1999). Froglife Advice Sheet 10: Reptile Survey - An introduction to planning, conducting and interpreting surveys for snake and lizard conservation.

Herptofauna Groups of Britain and Ireland (1998). Evaluating local mitigation/translocation programmes: Maintaining best practice and lawful standards. HGBI advisory notes for Amphibian and Reptile Groups (ARGs). HGBI. c/o Froglife, Halesworth. Unpubl.

Asher, J., Warren, M., Fx, R., Harding, P., Jeffcote, G. and Jeffcote, S. (2001). *The Millennium Atlas of Butterflies in Britain and Ireland*. Oxford University Press, Oxford.

BRIG (ed. Ant Maddock) (2008, updated Dec 2011). UK Biodiversity Action Plan; Priority Habitat Descriptions.

British Bugs website (undated). Available at: https://www.britishbugs.org.uk/heteroptera/Lygaeidae/megalonotus_dilatatus.html (Accessed 01 August 2021).

Butterfly Conservation website (undated) *UK Butterfly Monitoring Scheme*. Available at: http://www.ukbms.org/Methods.aspx (Accessed 01 August 2021).

Butterfly Conservation (2013) *Grayling species factsheet*. Available at: https://butterfly-conservation.org/sites/default/files/1grayling-species-factsheet.pdf (Accessed 01 August 2021).

Drake, C. M., Lott, D. A., Alexander, K. N. A. and Webb, J. (2007). *Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England Research Report NERR005*. Natural England , Worcester.

Duff, A.G. (2016). *Beetles of Britain & Ireland. Vol 4: Cerambycidae to Curculionidae*. A.G. Duff (Publishing).

Hyman, P.S. and Parsons, M.S. (1992). *A review of the scarce and threatened Coleoptera of Great Britain*. Part 1. UK Nature Conservation: 3. Peterborough: Joint Nature Conservation Committee.

Lott, D.A. & Anderson, R. (2011). *The Staphylinidae (rove beetles) of Britain and Ireland. Oxyporinae, Steninae, Euaesthetinae, Pseudopsinae, Paederinae, Staphylininae. Handbooks for the Identification of British Insects: Royal Entomological Society*. Vol. 12 Part 7 and 8.

UK Butterflies website (undated) Grayling. Available at: https://www.ukbutterflies.co.uk/species.php?species=semele (Accessed 01 August 2021).

Webb, J., Heaver, D., Lott, D., Dean, H.J., van Breda, J., Curson, J., Harvey, M., Gurney, M., Roy, D.B., van Breda, A., Drake, M., Alexander, K.N.A. and Foster, G. (2018). Pantheon - database version 3.7.4 [Online] Available at: http://www.brc.ac.uk/pantheon/ [Accessed 01 August 2021].

6 Appendix 1: Status Definitions, Habitats of Principal Importance (HPI) and Species of Principal Importance (SPIs)

Much invertebrate conservation evaluation hinges on nationally threatened and scarce species. For many invertebrate groups, species rarity has often been gauged by the number of national 10 km grid squares in which they occur. The fewer "spots on a map", the rarer it is. This, however, does not exactly equate with how threatened a species is, since some species may be naturally confined to very few localities but are very abundant where they do occur and under no immediate threat of extinction. The matter of how threatened the "rarest" species are has been addressed in a series of Red Data Books (RDB), such as for insects[3]. Here, the listing as RDB1 (Endangered), RDB2 (Vulnerable) and RDB3 (Rare) is an assessment of how threatened or endangered the species is in Britain, rather than how scarce it is in terms of map spot counting.

Over the last decade the RDB categories are slowly being replaced by IUCN red-list categories (Critically Endangered, Endangered and Vulnerable), which use different criteria to those developed for the RDBs. The process of replacing RDB categories with IUCN ones is however slow, and IUCN categories are not available for all groups. Accordingly, wherever IUCN categories have been allocated in the report, these are also shown in preference, ahead of RDB categories.

IUCN also recognised the value of a Near Threatened category to identify species that need to be kept under review to ensure that they have not become vulnerable to extinction. This category is used for species which have been evaluated against the criteria but do not qualify for a threatened category, although they may be close to qualifying or likely to qualify in the near future.

At the national level, countries are permitted to refine the definitions for the non-threatened categories and to define additional ones of their own, which essentially sit below RDB / IUCN status (i.e. Near Threatened). Thus, less rare but still significant species can be defined as Nationally Scarce (formerly called Nationally Notable), which is often sub-divided into Na (scarce), Nb (less scarce). These sub-categories were originally devised by[4] and are based on 10 km square spot counting for the Great Britain grid system. The Na sub-category represents scarce taxa that are thought to occur in 30 or fewer 10 km squares of the Great Britain grid system. The Nb sub-category represents less scarce taxa that occur in 31 to 100 10 km squares. Taxa in the N- sub-category are those listed as 'Notable', but not always distinguished into sub-category Na or Nb. These species are thought to occur in 16 to 100 10 km squares of the National Grid but are too poorly known for their status to be more precisely estimated.]

IUCN (pre 1994) categories remain relevant to certain taxa if an update has not been forthcoming. These categories are as follows:

- IUCN (pre 1994) Rare - taxa with small populations that are not at present Endangered or Vulnerable, but are at risk. In the UK, this was interpreted as species which exist in fifteen or fewer 10km squares. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994.
- IUCN (pre 1994) Vulnerable - taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994.

Habitats of Principal Importance (HPI) and Species of Principal Importance (SPIs) for the Conservation of Biodiversity in England are listed in accordance with requirements of Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a duty to have regard for the conservation of biodiversity when carrying out their functions.

[3] Shirt, D. B (ed) (1987) British Red Data Books: Insects. JNCC.
[4] Ball, S.G. (1986) Terrestrial and freshwater invertebrates with Red Data Book, Notable or habitat indicator status. Invertebrate Site Register internal report number 66. NCC.

Appendix 2: Invertebrate Species List

Site A			Site B		
Order	**Family**	***Taxon***	**Order**	**Family**	***Taxon***
Aranaeae	Aranaeidae	*Araneus diadematus*	Amphipoda	Crangonyctidae	*Crangonyx pseudogracilis*
Aranaeae	Lycosidae	*Pardosa nigriceps*	Aranaeae	Gnaphosidae	*Zelotes latreillei*
Aranaeae	Thomisidae	*Xysticus cristatus*	Aranaeae	Salticidae	*Euophrys frontalis*
Coleoptera	Apionidae	*Apion frumentarium*	Aranaeae	Tetragnathidae	*Meta mengei*
Coleoptera	Apionidae	*Eutrichapion viciae*	Aranaeae	Tetragnathidae	*Tetragnatha montana*
Coleoptera	Apionidae	*Exapion ulicis*	Aranaeae	Thomisidae	*Xysticus cristatus*
Coleoptera	Apionidae	*Oxystoma subulatum*	Coleoptera	Apionidae	*Perapion hydrolapathi*
Coleoptera	Apionidae	*Protapion assimile*	Coleoptera	Apionidae	*Protapion assimile*
Coleoptera	Apionidae	*Protapion trifolii*	Coleoptera	Apionidae	*Protapion fulvipes*
Coleoptera	Apionidae	*Stenopterapion tenue*	Coleoptera	Byrrhidae	*Cytilus sericeus*
Coleoptera	Cantharidae	*Cantharis cryptica*	Coleoptera	Cantharidae	*Cantharis cryptica*
Coleoptera	Cantharidae	*Cantharis flavilabris*	Coleoptera	Cantharidae	*Cantharis flavilabris*
Coleoptera	Cantharidae	*Cantharis pallida*	Coleoptera	Cantharidae	*Cantharis nigra s.str*
Coleoptera	Cantharidae	*Rhagonycha fulva*	Coleoptera	Cantharidae	*Cantharis pallida*
Coleoptera	Carabidae	*Abax parallelepipedus*	Coleoptera	Cantharidae	*Malthodes guttifer / mysticus*
Coleoptera	Carabidae	*Agonum fuliginosum*	Coleoptera	Cantharidae	*Rhagonycha fulva*
Coleoptera	Carabidae	*Bembidion guttula*	Coleoptera	Cantharidae	*Rhagonycha testacea*
Coleoptera	Carabidae	*Bembidion tetracolum*	Coleoptera	Carabidae	*Amara ovata*
Coleoptera	Carabidae	*Clivina fossor*	Coleoptera	Carabidae	*Carabus nemoralis*
Coleoptera	Carabidae	*Harpalus rubripes*	Coleoptera	Carabidae	*Clivina fossor*
Coleoptera	Carabidae	*Loricera pilicornis*	Coleoptera	Carabidae	*Pterostichus diligens*
Coleoptera	Carabidae	*Nebria salina*	Coleoptera	Carabidae	*Pterostichus nigrita*
Coleoptera	Carabidae	*Notiophilus biguttatus*	Coleoptera	Chrysomelidae	*Altica palustris*
Coleoptera	Carabidae	*Paradromius linearis*	Coleoptera	Chrysomelidae	*Chaetocnema hortensis*
Coleoptera	Carabidae	*Pterostichus strenuus*	Coleoptera	Chrysomelidae	*Chaetocnema picipes*
Coleoptera	Chrysomelidae	*Crepidodera fulvicornis*	Coleoptera	Chrysomelidae	*Crepidodera fulvicornis*
Coleoptera	Chrysomelidae	*Altica species (indet)*	Coleoptera	Chrysomelidae	*Hydrothassa marginella*
Coleoptera	Chrysomelidae	*Longitarsus parvulus*	Coleoptera	Chrysomelidae	*Oulema obscura*
Coleoptera	Chrysomelidae	*Longitarsus species*	Coleoptera	Chrysomelidae	*Phratora vitellinae*
Coleoptera	Chrysomelidae	*Longitarsus suturellus*	Coleoptera	Chrysomelidae	*Phyllotreta tetrastigma*
Coleoptera	Chrysomelidae	*Oulema duftschmidi*	Coleoptera	Chrysomelidae	*Phyllotreta exclamationis*
Coleoptera	Chrysomelidae	*Phratora vitellinae*	Coleoptera	Chrysomelidae	*Psylliodes affinis*
Coleoptera	Chrysomelidae	*Sphaeroderma rubidum*	Coleoptera	Chrysomelidae	*Psylliodes napi*
Coleoptera	Coccinellidae	*Coccinella septempunctata*	Coleoptera	Coccinellidae	*Coccidula rufa*
Coleoptera	Coccinellidae	*Propylea quattuordecimpunctata*	Coleoptera	Coccinellidae	*Coccinella septempunctata*
Coleoptera	Coccinellidae	*Psyllobora vigintiduopunctata*	Coleoptera	Coccinellidae	*Subcoccinella vigintiquatuorpunctata*
Coleoptera	Coccinellidae	*Scymnus redtenbacheri*	Coleoptera	Curculionidae	*Ceutorhynchus obstrictus*
Coleoptera	Cryptophagidae	*Atomaria rubella*	Coleoptera	Curculionidae	*Exomias pellucidus*
Coleoptera	Curculionidae	*Ceutorhynchus obstrictus*	Coleoptera	Curculionidae	*Mecinus pascuorum*
Coleoptera	Curculionidae	*Exomias araneiformis*	Coleoptera	Curculionidae	*Phyllobius pomaceus*
Coleoptera	Curculionidae	*Grypus equiseti*	Coleoptera	Curculionidae	*Rhinoncus pericarpius*
Coleoptera	Curculionidae	*Hypera postica*	Coleoptera	Curculionidae	*Rhynchaenus fagi*
Coleoptera	Curculionidae	*Leiosoma deflexum*	Coleoptera	Dytiscidae	*Agabus bipustulatus*
Coleoptera	Curculionidae	*Mecinus labilis*	Coleoptera	Dytiscidae	*Agabus nebulosus*
Coleoptera	Curculionidae	*Otiorhynchus porcatus*	Coleoptera	Dytiscidae	*Hydroporus palustris*
Coleoptera	Curculionidae	*Otiorhynchus sulcatus*	Coleoptera	Dytiscidae	*Hydroporus planus*
Coleoptera	Curculionidae	*Parathelcus pollinarius*	Coleoptera	Dytiscidae	*Hydroporus tessellatus*

Coleoptera	Curculionidae	*Sitona hispidulus*	Coleoptera	Dytiscidae	*Hygrotus inaequalis*
Coleoptera	Curculionidae	*Sitona humeralis*	Coleoptera	Dytiscidae	*Ilybius fuliginosus*
Coleoptera	Curculionidae	*Sitona lineellus*	Coleoptera	Dytiscidae	*Hydroporus species (indet)*
Coleoptera	Elateridae	*Adrastus pallens*	Coleoptera	Elateridae	*Agriotes obscurus*
Coleoptera	Elateridae	*Agriotes obscurus*	Coleoptera	Elateridae	*Hypnoidus riparius*
Coleoptera	Elateridae	*Hypnoidus riparius*	Coleoptera	Gyrinidae	*Gyrinus substriatus*
Coleoptera	Latridiidae	*Cortinicara gibbosa*	Coleoptera	Helophoridae	*Helophorus aequalis*
Coleoptera	Latridiidae	*Enicmus transversus*	Coleoptera	Helophoridae	*Helophorus brevipalpis*
Coleoptera	Leiodidae	*Leiodes rufipennis*	Coleoptera	Helophoridae	*Helophorus species (indet)*
Coleoptera	Nitidulidae	*Epuraea aestiva*	Coleoptera	Hygrobiidae	*Hygrobia hermanni*
Coleoptera	Nitidulidae	*Meligethes aeneus*	Coleoptera	Latridiidae	*Cartodere nodifer*
Coleoptera	Nitidulidae	*Meligethes nigrescens*	Coleoptera	Nitidulidae	*Epuraea aestiva*
Coleoptera	Nitidulidae	*Meligethes planiusculus*	Coleoptera	Nitidulidae	*Meligethes aeneus*
Coleoptera	Scraptiidae	*Anaspis fasciata*	Coleoptera	Oedemeridae	*Oedemera lurida*
Coleoptera	Staphylinidae	*Anotylus rugosus*	Coleoptera	Salpingidae	*Salpingus planirostris*
Coleoptera	Staphylinidae	*Anotylus sculpturatus*	Coleoptera	Scarabaeidae	*Hoplia philanthus*
Coleoptera	Staphylinidae	*Atheta species (indet)*	Coleoptera	Scirtiidae	*Cyphon coarctatus*
Coleoptera	Staphylinidae	*Ocypus brunnipes*	Coleoptera	Scirtiidae	*Microcara testacea*
Coleoptera	Staphylinidae	*Ocypus nitens*	Coleoptera	Scraptiidae	*Anaspis frontalis*
Coleoptera	Staphylinidae	*Philonthus cognatus*	Coleoptera	Scraptiidae	*Anaspis maculata*
Coleoptera	Staphylinidae	*Quedius curtipennis*	Coleoptera	Staphylinidae	*Amischa analis*
Coleoptera	Staphylinidae	*Quedius curtipennis / fuliginosus*	Coleoptera	Staphylinidae	*Anotylus rugosus*
Coleoptera	Staphylinidae	*Quedius fumatus*	Coleoptera	Staphylinidae	*Atheta fungi*
Coleoptera	Staphylinidae	*Quedius schatzmayri*	Coleoptera	Staphylinidae	*Callicerus obscurus*
Coleoptera	Staphylinidae	*Quedius semiobscurus*	Coleoptera	Staphylinidae	*Gabrius appendiculatus*
Coleoptera	Staphylinidae	*Stenus brunnipes*	Coleoptera	Staphylinidae	*Othius punctulatus*
Coleoptera	Staphylinidae	*Stenus clavicornis*	Coleoptera	Staphylinidae	*Quedius curtipennis / fuliginosus*
Coleoptera	Staphylinidae	*Stenus fulvicornis*	Coleoptera	Staphylinidae	*Stenus cicindeloides*
Coleoptera	Staphylinidae	*Stenus similis*	Coleoptera	Staphylinidae	*Stenus clavicornis*
Coleoptera	Staphylinidae	*Tachinus laticollis*	Coleoptera	Staphylinidae	*Stenus juno*
Coleoptera	Staphylinidae	*Tachinus rufipes*	Coleoptera	Staphylinidae	*Stenus providus*
Coleoptera	Staphylinidae	*Tachyporus dispar*	Coleoptera	Staphylinidae	*Stenus tarsalis*
Coleoptera	Staphylinidae	*Tachyporus hypnorum*	Coleoptera	Staphylinidae	*Tachinus rufipes*
Coleoptera	Staphylinidae	*Tachyporus nitidulus*	Coleoptera	Staphylinidae	*Tachyporus hypnorum*
Coleoptera	Staphylinidae	*Tachyporus solutus*	Coleoptera	Staphylinidae	*Tachyporus nitidulus*
Coleoptera	Staphylinidae	*Xantholinus longiventris*	Coleoptera	Tenebrionidae	*Lagria hirta*
Coleoptera	Tenebrionidae	*Lagria hirta*	Dermaptera	Forficulidae	*Forficula auricularia*
Dermaptera	Forficulidae	*Forficula auricularia*	Diptera	Bibionidae	*Dilophus febrilis*
Diptera	Bibionidae	*Bibio marci*	Diptera	Dolichopodidae	*Dolichopus popularis*
Diptera	Calliphoridae	*Lucilia caesar*	Diptera	Rhagionidae	*Rhagio scolopaceus*
Diptera	Dolichopodidae	*Dolichopus popularis*	Diptera	Scathophagidae	*Scathophaga stercoraria*
Diptera	Dolichopodidae	*Dolichopus* species (indet)	Diptera	Stratiomyidae	*Microchrysa flavicornis*
Diptera	Empididae	*Empis tessellata*	Diptera	Syrphidae	*Eristalis arbustorum*
Diptera	Muscidae	*Mesembrina meridiana*	Diptera	Syrphidae	*Eristalis tenax*
Diptera	Rhagionidae	*Rhagio scolopaceus*	Diptera	Syrphidae	*Helophilus pendulus*
Diptera	Scathophagidae	*Scathophaga stercoraria*	Diptera	Syrphidae	*Orthonevra splendens*
Diptera	Stratiomyidae	*Beris vallata*	Diptera	Syrphidae	*Syrphus ribesii*
Diptera	Stratiomyidae	*Chloromyia formosa*	Diptera	Syrphidae	*Tropidia scita*
Diptera	Syrphidae	*Cheilosia bergenstammi*	Diptera	Syrphidae	*Xylota segnis*
Diptera	Syrphidae	*Episyrphus balteatus*	Diptera	Ulididae	*Herina frondescentiae*
Diptera	Syrphidae	*Eristalis arbustorum*	Hemiptera	Anthocoridae	*Anthocoris nemorum*
Diptera	Syrphidae	*Eristalis horticola*	Hemiptera	Aphrophoridae	*Neophilaenus campestris*

Diptera	Syrphidae	*Eristalis pertinax*	Hemiptera	Cicadellidae	*Cicadella viridis*
Diptera	Syrphidae	*Eristalis tenax*	Hemiptera	Cicadellidae	*Eupteryx aurata*
Diptera	Syrphidae	*Helophilus pendulus*	Hemiptera	Delphacidae	*Javesella pellucida*
Diptera	Syrphidae	*Sphaerophoria species (indet)*	Hemiptera	Delphacidae	*Stenocranus minutus*
Diptera	Syrphidae	*Melanostoma scalare*	Hemiptera	Lygaeidae	*Chilacis typhae*
Diptera	Syrphidae	*Neoascia podagrica*	Hemiptera	Lygaeidae	*Megalonotus chiragra*
Diptera	Syrphidae	*Sphaerophoria scripta*	Hemiptera	Lygaeidae	*Nysius huttoni*
Diptera	Syrphidae	*Volucella bombylans*	Hemiptera	Lygaeidae	*Scolopostethus affinis*
Diptera	Ulididae	*Herina frondescentiae*	Hemiptera	Miridae	*Capsus ater*
Hemiptera	Aphrophoridae	*Neophilaenus campestris*	Hemiptera	Miridae	*Dicyphus stachydis*
Hemiptera	Aphrophoridae	*Neophilaenus lineatus*	Hemiptera	Miridae	*Stenodema laevigatum*
Hemiptera	Aphrophoridae	*Philaenus spumarius*	Hemiptera	Pentatomidae	*Dolycoris baccarum*
Hemiptera	Ciccadellidae	*Cicadella viridis*	Hemiptera	Pentatomidae	*Palomena prasina*
Hemiptera	Ciccadellidae	*Cicadula quadrinotata*	Hemiptera	Rhopalidae	*Myrmus miriformis*
Hemiptera	Ciccadellidae	*Eupelix cuspidata*	Hygrophila	Lymnaeidae	*Galba truncatula*
Hemiptera	Ciccadellidae	*Macustus grisescens*	Hygrophila	Lymnaeidae	*Lymnaea stagnalis*
Hemiptera	Delphacidae	*Javesella pellucida*	Hymenoptera	Andrenidae	*Andrena haemorrhoa*
Hemiptera	Lygaeidae	*Megalonotus dilatatus*	Hymenoptera	Apidae	*Bombus hypnorum*
Hemiptera	Lygaeidae	*Nysius senecionis*	Hymenoptera	Apidae	*Bombus lapidarius*
Hemiptera	Lygaeidae	*Peritrechus nubilus*	Hymenoptera	Apidae	*Nomada marshamella*
Hemiptera	Lygaeidae	*Scolopostethus thomsoni*	Hymenoptera	Colletidae	*Hylaeus confusus*
Hemiptera	Miridae	*Capsus ater*	Hymenoptera	Crabronidae	*Tachysphex pompiliformis*
Hemiptera	Miridae	*Leptopterna dolabrata*	Hymenoptera	Crabronidae	*Trypoxylon attenuatum*
Hemiptera	Miridae	*Stenodema laevigatum*	Hymenoptera	Formicidae	*Lasius niger*
Hemiptera	Nabidae	*Nabis flavomarginatus*	Hymenoptera	Halictidae	*Halictus tumulorum*
Hemiptera	Nabidae	*Nabis rugosus*	Hymenoptera	Halictidae	*Lasioglossum cupromicans*
Hemiptera	Psyllidae	*Chamaepsylla (Psylla) hartigii*	Hymenoptera	Halictidae	*Lasioglossum leucopus*
Hemiptera	Rhopalidae	*Myrmus miriformis*	Hymenoptera	Megachilidae	*Osmia bicolor*
Hymenoptera	Andrenidae	*Andrena nigroaenea*	Isopoda	Asellidae	*Asellus aquaticus*
Hymenoptera	Andrenidae	*Andrena scotica*	Isopoda	Asellidae	*Asellus meridianus*
Hymenoptera	Andrenidae	*Andrena subopaca*	Julida	Blaniulidae	*Blaniulus guttulatus*
Hymenoptera	Apidae	*Apis mellifera*	Julida	Julidae	*Julus scandinavius*
Hymenoptera	Apidae	*Bombus lapidarius*	Julida	Julidae	*Ophyiulus pilosus*
Hymenoptera	Apidae	*Bombus lucorum*	Lepidoptera	Hesperidae	*Ochlodes sylvanus*
Hymenoptera	Apidae	*Bombus lucorum / terrestris*	Lepidoptera	Nymphalidae	*Aglais io*
Hymenoptera	Apidae	*Bombus pratorum*	Lepidoptera	Nymphalidae	*Aglais urticae*
Hymenoptera	Apidae	*Bombus terrestris*	Lepidoptera	Nymphalidae	*Hipparchia semele*
Hymenoptera	Apidae	*Nomada flava*	Lepidoptera	Nymphalidae	*Maniola jurtina*
Hymenoptera	Apidae	*Nomada marshamella*	Lepidoptera	Nymphalidae	*Thymelicus sylvestris*
Hymenoptera	Colletidae	*Hylaeus confusus*	Lepidoptera	Pieridae	*Pieris brassicae*
Hymenoptera	Colletidae	*Hylaeus hyalinatus*	Lepidoptera	Pieridae	*Pieris napi*
Hymenoptera	Crabronidae	*Trypoxylon attenuatum*	Lepidoptera	Pieridae	*Pieris rapae*
Hymenoptera	Formicidae	*Lasius niger*	Littorinimorpha	Tateidae	*Potamopyrgus antipodarum*
Hymenoptera	Formicidae	*Myrmica lobicornis*	Odonata	Aeshnidae	*Aeschna cyanea*
Hymenoptera	Formicidae	*Myrmica ruginodis*	Orthoptera	Acrididae	*Chorthippus brunneus*
Hymenoptera	Halictidae	*Lasioglossum albipes*	Orthoptera	Acrididae	*Chorthippus parallelus*
Hymenoptera	Halictidae	*Lasioglossum cupromicans*	Orthoptera	Acrididae	*Stenobothrus lineatus*
Hymenoptera	Megachilidae	*Osmia aurulenta*	Orthoptera	Tetrigidae	*Tetrix undulata*
Hymenoptera	Megachilidae	*Osmia bicolor*	Pulmonata	Geomitridae	*Cernuella virgata*
Hymenoptera	Pompilidae	*Anoplius nigerrimus*	Pulmonata	Helicidae	*Cornu aspersum*
Hymenoptera	Tenthredinidae	*Hoplocampa species (indet)*	Pulmonata	Succineidae	*Oxyloma elegans*
Hymenoptera	Vespidae	*Odynerus spinipes*	Pulmonata	Vitrinidae	*Vitrina pellucida*

Isopoda	Oniscidae	*Oniscus asellus*			
Isopoda	Philosciidae	*Philoscia muscorum*			
Isopoda	Porcellionidae	*Porcellio scaber*			
Julida	Julidae	*Ommatoiulus sabulosus*			
Julida	Julidae	*Ophyiulus pilosus*			
Lepidoptera	Crambidae	*Anania hortulata*			
Lepidoptera	Erebidae	*Tyria jacobaeae*			
Lepidoptera	Hesperidae	*Ochlodes sylvanus*			
Lepidoptera	Hesperidae	*Thymelicus sylvestris*			
Lepidoptera	Lycaeinidae	*Polyommatus icarus*			
Lepidoptera	Nymphalidae	*Coenonympha pamphilus*			
Lepidoptera	Nymphalidae	*Hipparchia semele*			
Lepidoptera	Nymphalidae	*Maniola jurtina*			
Lepidoptera	Nymphalidae	*Pyronia tithonus*			
Lepidoptera	Pieridae	*Anthocharis cardamines*			
Lepidoptera	Pieridae	*Pieris brassicae*			
Lepidoptera	Pieridae	*Pieris napi*			
Lepidoptera	Pieridae	*Pieris rapae*			
Lepidoptera	Zygaenidae	*Zygaena filipendulae*			
Lepidoptera	Erebidae	*Tyria jacobaeae*			
Lepidoptera	Zygaenidae	*Zygaena species*			
Mecoptera	Panorpidae	*Panorpa communis*			
Opiliones	Nemostomatidae	*Nemastoma bimaculatum*			
Opiliones	Phalangiidae	*Phalangium opilio*			
Orthoptera	Acrididae	*Chorthippus brunneus*			
Polydesmida	Polydesmidae	*Polydesmus angustus*			
Pulmonata	Arionidae	*Arion species (indet)*			
Pulmonata	Helicidae	*Cepaea hortensis*			
Pulmonata	Helicidae	*Cornu aspersum*			
Pulmonata	Hygromiidae	*Zenobiellina subrufescens*			
Pulmonata	Succineidae	*Oxyloma elegans*			