

BROMLEY FARM QUARRY EXTENSION, UPPER CUMBERWORTH



SUPPORTING STATEMENT

On behalf of



May 2023
REV B

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BROMLEY FARM QUARRY EXTENSION, UPPER CUMBERWORTH. – SUPPORTING STATEMENT

1.0 INTRODUCTION

- 1.0.1 Silkstone Environmental Ltd, on behalf of Wavin Ltd has prepared this Supporting Statement for an 8.4 hectare easterly extension to the former Bromley Farm Quarry, Upper Cumberworth. The proposed extension area is to be worked for fireclay and shale for the manufacture of vitrified clay pipes. Incidental coal will also be extracted from the site.
- 1.0.2 Wavin Ltd is a leading supplier of water management, plumbing and drainage systems for the Building, Construction and Utilities markets.
- 1.0.3 Bromley Farm Quarry ceased working mineral in 2014 and has since been restored by the importation of inert waste. The site was fully restored in early 2022 and is now in agricultural use for sheep grazing.
- 1.0.4 A large volume of clay was extracted by Wavin during the final year at Bromley Farm to enable inert waste importation to commence and was stockpiled at the Hazelhead Works factory in Crow Edge as part of the blend for the manufacture of clayware products. This stockpile is estimated to be sufficient for up to 3 to 4 years provision for the factory. The Bromley Farm clay is a vital component in the blend mix for the factory and therefore a continuation of supply is essential to maintain current levels of employment at the factory which are approximately 95 in total.
- 1.0.5 The extension area is to be worked from west to east in five approximately 30 metre wide cuts at base. The area within the red line boundary is approximately 8.4 Hectares which includes the overburden storage area, settlement lagoon and the access road. The fireclay and shale reserves present have been calculated at approximately 760,000 tonnes which would equate to approximately 25 years supply at approximately 30,000 tonnes per annum.
- 1.0.6 The workings would be to an average depth of approximately 16 metres. It is not proposed to have any fixed plant operational in the quarry as all extractive product would be taken from the working area to the processing works at Crow Edge for clay pipe manufacture.
- 1.0.7 The extraction of clay is not a continuous operation and is usually removed between April and September on a campaign basis to provide sufficient material to maintain the stockpiles for the year ahead.
- 1.0.8 Inert waste importation required to restore the site back to original ground levels to enable restoration back to agricultural use with additional biodiversity enhancements.
- 1.0.9 The total volume of waste required for restoration back to original ground levels is approximately 380,000 cubic metres due to the bulkage factor when replacing virgin material.
- 1.0.10 The site is allocated as a accepted area for mineral extraction, Ref MAS3 in the adopted Kirklees Local plan.

1.1 Summary of the Application

1.1.1 A brief summary of the application is as follows:

- The proposed 8.4 Hectare extension area consists of three fields in agricultural use lie within a larger allocated mineral site, Ref MAS3 in the Kirklees Development Plan (2019).
- Extraction of fireclay and shales which is transported approximately 5km to the Wavin Hazelhead Works factory for stockpiling prior to being used for manufacture of clay pipes.
- Backfill of the quarry void with inferior quality mineral and shale overburden and approximately 380,000 cubic metres of imported inert materials (subject to an Environmental Permit with the Environment Agency) to enable the site to be restored back to original ground levels to agricultural grassland with areas of species rich grassland, shrub and tree planting. Without waste importation, due to the underlying geology, a large open void would be the only restoration option which would inevitably fill with water over time and create a large lake feature.
- The extension area would be worked to an average depth of approximately 16 metres.
- The reserves present have been calculated at approximately 760,000 tonnes which would equate to approximately 25 years supply. The 25 years would include infill by inert waste for restoration which could commence when extraction reaches cut 3 of the workings.
- Anticipated rates of extraction would be an average of 30,000 tonnes per annum, but would fluctuate subject to market demand. The mineral would be extracted on a campaign basis, typically between March to September.
 - The fireclays and shales would be lifted using a 360 hydraulic excavator and no blasting would be required. A dozer would also be utilised for the reinstatement of topsoil for restoration.
 - A small volume of coal is estimated to be encountered of varying quality, estimated at approximately 10,000 tonnes. Inferior coal will be backfilled in the void. Any coal suitable for industrial use will be exported off site. This coal seam is classed as alienated by the Coal Authority and therefore not subject to royalty payments.
- The proposed operations would be an extension to a former quarry which is now fully restored. A new access into the extension area is proposed with the first 50m hard surfaced with concrete.

1.1.2 This statement provides an overview of the proposed extension area and relevant land issues in order to clarify the proposed working method, potential environmental issues, landscaping, and site reinstatement proposals.

1.2 Screening Opinion

1.2.1 The proposed development has been the subject of an application for a screening and opinion under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011. The screening response dated 27th January 2015 stated the proposal was not considered EIA development. This proposal is the same size as was previously screened in 2015 but understand it will need to be re-assessed under the latest EIA Regulations.

1.3 The Applicant

1.3.1 Wavin UK Ltd is a member of the Wavin Group - the world leader in plastic and clay pipe systems for residential, non-residential and civil engineering projects.

1.3.2 Wavin manufacturing sites operate Environmental management systems which comply with the requirements of and are certified to, EN ISO 14001.

1.3.3 Wavin are committed not only to compliance with environmental laws and the adoption of acceptable standards, but also to the introduction of measures to limit the adverse effects of the operations on the environment.

1.4 Need for the Mineral

1.4.1 The mineral extracted from Bromley Quarry Extension would be transported to Wavin Ltd, Hazlehead Works at Crow Edge where it is used to produce vitrified clay pipes. This process requires a raw feedstock formed by blending the Bromley Farm clays with other local clays each having different physical and chemical properties.

1.4.2 The mineral extracted from Bromley Farm Quarry is used for the blending and subsequent production of clay pipes at the Hazlehead Works site and is of high importance for use in adjusting the balance for material produced. The Bromley Farm clay composition makes the mineral a valuable component of the production blend.

1.4.3 The average output of mineral on site is subject to variation dependant on the demand for clay products. The site has always been worked on a campaign basis through the spring and summer months and this will continue for the remaining lifetime of the site.

1.4.4 It is estimated that approximately 95 jobs are directly associated with the manufacturing plant at Hazelhead Works in Crow Edge. Approval of an extension to Bromley Farm will ensure Wavin maintains stable levels of employment and is in the best possible position to achieve growth in the improving demand for its products for at least another 25 years.

1.4.5 The provision of a long term fireclay provision from Bromley Farm Extension will help safeguard a significant number of jobs within Wavin.

1.4.6 The proposal will reinforce a locally and regionally important facility. Although no additional jobs will be created, because the scheme is essentially a transfer of an existing facility to another site, existing jobs will be protected.

1.4.7 The NPPF encourages authorities to look positively at development that provides sustainable economic growth. The mineral supplied from Bromley Farm Extension would have a positive impact upon the long term economic stability of the company and at Hazelhead Works in particular, therefore meeting the Government's national policy objectives for economic growth.

1.4.8 The single most important influence on the capacity to meet demand and job security is the guarantee for supply of fireclay to the factory which has been identified by Wavin as a minimum of 25 years. Approval of the proposed extension in addition to their other operational quarry at Henperch, Denby Dale will enable the guarantee of supply for this period.

1.5 Economic Benefits

1.5.1 The Hazelhead Works facility located in Crow Edge is dependent on the storage and transport of fireclay and shales from Wavin's current quarries. It is estimated that approximately 95 jobs are directly associated with the manufacturing plant.

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- 1.5.2 Approval of an extension application at Bromley Farm Quarry will ensure Wavin maintains stable levels of employment and is in the best possible position to achieve growth in the improving demand for its products and will help safeguard a significant number of jobs within Wavin. The proposal will reinforce a locally and regionally important facility. Although very few additional jobs will be created, because the scheme is essentially a continuation of supply, existing jobs will be protected. When mineral extraction ceased on site. Wavin stockpiled a significant volume of the Bromley Farm clays at the Hazelhead site to enable the inert waste importation operations to commence.
- 1.5.3 As well as the direct benefits to Wavin and the employment effects which benefit their workforce, there will be a series of spin-off benefits which are referred to as 'indirect effects'.
- 1.5.4 These arise because Wavin's expenditure induces their suppliers to sustain their production to meet their needs. In a 'virtuous circle', any sales made by Wavin's suppliers generates more business for the firms which in turn supply them. These effects are referred to as 'indirect effects' and occur down the supply chain.
- 1.5.5 The NPPF encourages Planning Authorities to look positively at development that provides sustainable economic growth. The proposal would have a positive impact upon the long term economic stability of the company therefore meeting the Government's national policy objectives for economic growth.
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1.6 Alternatives

- 1.6.1 Although the screening opinion response considered the proposal non-EIA development, the potential for alternative sites to an extension to Bromley Farm Quarry is discussed below.
- 1.6.2 In the case of mineral extraction alternative sites are often limited. The choice of site is a combination of several constraining factors such as geology, topography, geography, economics, land ownership, licensing and local knowledge.
- 1.6.3 However, the majority of the sites could be restricted in terms of output and so can only make a contribution towards meeting demand.
- 1.6.4 The proposed extension area at Bromley Farm contains a significant reserve of mineral which is used in the manufacture of vitrified clay pipes to use in the building and civil engineering industries. This mineral cannot be easily substituted and due to previous quarrying activities is easily accessible in this location which is not within any areas of ecological or environmental sensitivity and the site is relatively remote from residential properties.
- 1.6.5 The composition of the correct blend of clays is critical for Wavin in the firing process for the production of the clay products and therefore finding an alternative site and to gain planning approval would be extremely difficult and

therefore it is considered that there are no viable alternatives currently that could be considered.

- 1.6.6 Also to be considered is the extension area is allocated in the Kirklees Development Plan as a minerals area of search and planning permission will be expected to be granted if proposals accord with the development principles and technical reports that are required along with the relevant development plan policies

1.7 Planning History

- 1.7.1 Bromley Farm Quarry was originally being worked under planning permission DD/5346, granted 25th March 1974, and subsequent ROMP review application (December 1999) for clay and incidental coal extraction.
- 1.7.2 The first periodic review for mineral extraction was approved on the 21st May 2010, Ref IDO/421/PR1.
- 1.7.3 Planning permission for the importation of 450,000 tonnes of inert waste material over a four and a half year period to stabilise the quarry faces and to improve the drainage was granted on the 10th July 2013, Ref 2012/62/93497.
- 1.7.4 A Section 73 application for an extension of time, Ref 2014/70/93888/E was approved on the 20th March 2015 for the import of waste to the site to cease by 31 December 2019 and be fully restored by 30 April 2020.
- 1.7.5 A further extension of time application, Ref 2020/70/664/E was approved on the 17th February 2021 for the import of waste to the site to cease by 31 December 2021 and be fully restored by 30 April 2022.
- 1.7.6 The site was completed and fully restored within the last planning permission for the importation of waste.

2.0 SITE LOCATION & DESCRIPTION

- 2.1 The nearest residential areas to the site are Upper Cumberworth which is situated to the west and Lower Cumberworth which is approximately 650m to the east. The larger settlement of Denby Dale is over 1km to the south-east.
- 2.2 The proposed extension area is situated within broadly undulating topography and surrounded by agricultural land bounded by dry stone walls with some substantial woodland blocks which are located to the south of the A635. The site lies within a wider area of green belt land identified in the Kirklees Development Plan.
- 2.3 There is another former quarry, also called Bromley Farm Quarry, 300m to the south east which is now closed and a small household waste recycling facility is situated approximately 150 metres to the south west.
- 2.4 Other operational quarries in the vicinity of the site are:
- Appleton and Sovereign quarries, 2km to the west, operated by Marshalls Mono for sandstone extraction.
 - Peace Wood Quarry, 2.4km to the north, operated by Naylor's for clay extraction.

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- 2.5 Residential properties are located along Cumberworth Lane, approximately 350 metres to the west and 400 metres to the North East. The closest property, Lane Side Farm is located 100 metres to the northern site boundary.
- 2.6 The pattern of the surrounding landscape is of pasture and arable fields with occasional woodland blocks overlying a gently rolling topography. There are scattered farmsteads around the area with occasional strips of tree belts to the north and east with more significant woodland blocks to the south.
- 2.7 The landscape is very open in the area and long views are afforded from all directions. However, although the site is on high ground, it is not prominent within the local landscape and it is not easily overlooked from the surrounding countryside.
- 2.8 The site would be most visible from the public footpath which runs along the western site boundary and some houses to the west along Cumberworth Lane which are at a slightly elevated position to the site.

Public Footpaths

- 2.9 There are no PROW's that would need to be diverted as part of this proposal. The closest are DEN/86/30 and DEN86/50 to the north east.
- 2.10 The Denby & Cumberworth Circular trail Ref DEN/84/10 which is a heavily used footpath runs from south and west of the site where part of the route exits on Cumberworth Lane.

Statutory Designated Sites

- 2.11 There are no sites covered by a statutory nature conservation designation within 2km of the proposed extension area. The nearest site is Pye Flatts Meadows Site of Special Scientific Interest (SSSI) located near Hoylandswaine approximately 6.5km south east of the study area.
- 2.12 Also Langsett SSSI is located approximately 6.5km to the south.

3.0 DEVELOPMENT DESCRIPTION & WORKING METHOD

3.1 Introduction

3.1.1 The geological reserve assessment has identified an economic mineral reserve of approximately 760,000 tonnes of clay and shale reserves plus a small volume of incidental coal which is estimated to be approximately 10,000 tonnes of varying quality. This coal was classed as alienated by Steve Barnes of the Coal Authority in writing in 2014, therefore is not subject to royalty payments.

3.1.2 The clay and shale mineral would be extracted using a mechanical / hydraulic excavator and loaded directly into HGV lorries for transport off site to the Hazehead Works factory.

- Excavation area. Mineral extraction proposed in 5 equal 30m cuts from west to east
- Overburden storage area
- Perimeter soil storage area for screening
- Access road.
- Water treatment lagoons

3.1.3 All soils required for restoration would be stripped and stored around the northern and eastern boundaries to act as a visual and acoustic barrier and would remain in-situ until required for restoration of the site. Above ground overburden storage would be required as shown on the phasing plans. This storage areas would be located on the lowest parts of the site to the south to reduce the potential visual impact.

3.1.4 It is proposed to continue the previous phased extraction that was devised to limit the quarry working area in the previous quarry and ensure that the quarrying operations have a minimum effect on the local environment. Mineral extraction operations are typically undertaken on a campaign basis, between March and September

3.1.5 In order to facilitate this method of working, it is necessary to store the excess overburden above ground until sufficient space is available in the quarry void to backfill behind.

3.1.6 The materials extracted at the site, both the economic mineral and the overburden for restoration do not require any treatment on site. Clay is extracted and loaded directly onto tipper trucks for export off site for the manufacture of clayware and overburden will be tipped directly into the void for restoration.

3.2 Soils and Overburden

3.2.1 The proposed extension area comprises agricultural grassland with very thin soil cover (up to a maximum of 300mm) above the underlying economic mineral. The site is generally classified as agricultural Grade 3b / 4 land.

3.2.2 The soils do not therefore comprise 'best and most versatile' agricultural quality. Notwithstanding this, all soil resources will be retained on-site and safeguarded for use in restoration.

3.2.3 The quantity of overburden material stored above ground level from Cut 1 is estimated to be a maximum of 69,500 cubic metres in total at a height of 5m.

Topsoils and Subsoils

- 3.2.4 Sufficient topsoil and subsoil will be stripped from the extension area in order to create the perimeter screening mounds along the northern and eastern boundaries of the site as shown on the submitted phasing drawings.
- 3.2.5 Topsoils and subsoils will be stored in separate storage mounds and seeded to grass and will remain in-situ until they are required for restoration.

Soil Making Material

- 3.2.6 Soil making material, such as subsoil's mixed with shales will also be stored separately for use as restoration material.

Overburden

- 3.2.7 The overburden consists of weathered sandstones which is situated above the economic clay and mudstone and shale bands. Excess overburden from Cut 1 will be placed in the storage area in the south eastern corner of the site and will remain in-situ until it can be replaced in the void upon completion of mineral extraction. Thereafter, the overburden which is generated by each successive cut is used to backfill previously worked out cuts behind the operational extraction area

3.3 Soils Management

- 3.3.1 The Soil Management Strategy shall be based on the DEFRA Good Practice Guide for Handling Soils.

Soil Handling

- 3.3.2 Soils can suffer from structural damage due to trafficking with heavy machinery and through handling during stripping and stockpiling operations. The damage that can occur includes smearing and compaction, both of which reduce the soils ability to provide a good growing medium for crops.
- 3.3.3 Generally, damage to soil structure and smearing is more likely to occur, and is more likely to be severe, if soils are handled when they are too wet. To reduce damage, soils should therefore only be handled when they are in a "dry and friable" condition.
- 3.3.4 The methodology is set out in DEFRA's Good Practice Guide for Handling Soils (GPG) and will be carefully followed on site.
- 3.3.5 All available topsoil will be stored separately from any subsoil encountered.
- 3.3.6 The screening bunds will not exceed 5m in height. Their profile will allow them to be seeded with grass allow cutting and other maintenance to be carried out.
- 3.3.7 All soils shall be stripped from the working areas and shall be stored like on like this will ensure that the intermixing and loss of the soil resource does not occur.
- 3.3.8 Bunds will not be traversed by heavy vehicles or machinery, except where this is essential for their construction or for subsequent maintenance of the bund.

- 3.3.9 The topsoil bund will be formed using an excavator to ensure surface run off from rain fall, the bund surface will be compacted using the bucket of the excavator to prevent ingress of rainfall and deterioration of the topsoil.
- 3.3.10 On completion of the soil stripping, the soil storage mounds shall be seeded with a low maintenance grass seeds mixture.
- 3.3.11 This will prevent:
- wind blow of soils as the surface dries
 - reduce water erosion
 - maintain biological activity
 - reduce the growth of invasive weeds that inevitably establish on bare soil
 - provide a neat and tidy appearance to the stored soil and provides screening to the site.
- 3.3.12 The mitigation measures proposed to minimise the impact on soil resources comprise the use of best practice in the stripping, movement and storage of the soils. The soil will be stripped and stored in accordance with DEFRA Guidelines for handling soil. Soils stripped from the site will be used in restoration resulting in no net loss in soil resources at the site.

3.4 Mineral Extraction and Waste Infill

- 3.4.1 The extension area is to be worked in 5 equal 30m cuts from west to east. The working and phasing of progressive restoration plans submitted with the application are:

22007/502 – Cuts Sequence
22007/503 – Cut 1 Extraction
22007/504 – Cut 2 Extraction
22007/505 – Cut 3 Extraction
22007/505a –Cut 3 and commencement of inert waste infill for restoration
22007/506 – Cut 4
22007/506a –Cut 4 with waste infill
22007/507 – Cut 5
22007/507a –Cut 5 with waste infill
22007/509 – Final Restoration Profile

Cut 1

- 3.4.2 Once the soils have been stripped and stored in the perimeter screening mounds, any overburden encountered in Cut1 will be stored in the overburden storage area.
- 3.4.3 When there is sufficient void space and the overburden mound has reached its maximum height, any other excess overburden can be backfilled directly in the quarry void.
- 3.4.4 All economic clays extracted will be exported off site, directly to Hazelhead Works.

Cut 2

- 3.4.5 Economic clay mineral will continue to be exported directly off site with waste overburden backfilled behind.

Cut 3

- 3.4.6 Mineral extraction operations continue as in Cuts 1 and 2. At this stage, sufficient void space would be available for the waste importation operations to commence.
- 3.4.7 Inert waste will be placed in the northern area of cuts 1 and 2 up to 1m below the restoration profile prior to the replacement of topsoil and subsoil. The soils are required to remain in storage for the duration of the scheme as they are required for ongoing screening of the operations.

Cut 4

- 3.4.8 Ongoing mineral extraction with inert waste infill is taking place in the southern sections of cuts 1 and 2.

Cut 5

- 3.4.9 Cut 5 is the final cut for mineral extraction. Upon completion, a final void for waste infill to the proposed restoration profile back to original ground levels prior to soils replacement and planting for the restoration scheme.
- 3.4.10 The total volume of waste required for restoration back to original ground levels is approximately 380,000 cubic metres due to the bulkage factor when replacing virgin material.

3.5 Surface Water Management

- 3.5.1 The majority of the proposed extension area is situated in the surface water catchment of the River Dearne, via East Hill Beck.
- 3.5.2 All surface water runoff within the excavation boundary would drain naturally to the lowest point in the excavation from where it would be collected in a small sump and pumped to a water treatment area located at surface. Screening and overburden mounds would be equipped with peripheral ditch drains, as required, to direct runoff to the water treatment area.
- 3.5.3 The water treatment area would consist of two connected silt settlement lagoons. The treatment system would provide both silt settlement and hydrocarbon retention capacity upstream of off-Site discharge to a small drainage tributary of East Hill Beck.
- 3.5.4 During extractive operations at the Site, surface water runoff from Site surfaces would drain to the excavation area with pumped removal to the surface-located water treatment area, prior to controlled off-site discharge to East Hill Beck. The Site will be backfilled with relatively low permeability materials that will be unsuitable for use of infiltration devices for surface water management. The proposed restoration scheme is designed to promote effective drainage of surface water to the off-Site outfall to the upstream end of East Hill Beck.
- 3.5.5 The Site is underlain by low permeability coal measures mudstone, with no superficial cover and limited potential for rainfall infiltration. Following restoration, the Site would be underlain by compacted backfill consisting of overburden and inert waste materials. The restored Site is therefore likely to retain low infiltration capacity, comparable to the Site at present.
- 3.5.6 A dewatering permit will be applied for should planning permission be granted.

3.6 Proposed New Access

- 3.6.1 As part of this planning application, a new access will be constructed into the site to access the extension area.
- 3.6.2 This access was approved under planning permission 2012/93497 for the importation of waste.
- 3.6.3 The access location would have no issues with visibility as there are more than sufficient splays for HGV's turning right onto the access road to head towards the A635.
- 3.6.4 The first 50m of the access road will be hard surfaced with concrete and a security gate will be installed and the existing fence realigned.
- 3.6.5 This access is to be located as shown on plan 22007/511. The construction drawings provided by Paragon Highways, Ref 2074/101 to 103 are included in this application

3.7 Plant and Equipment

- 3.7.1 Different types of plant and equipment will be utilised on site at various stages of the operations for the following purposes:
- Construction of perimeter screening bunds (360 Excavator)
 - Overburden and excavation and placement (360 Excavator and Articulated Dump Trucks when required)
 - Mineral extraction and importation of restoration material (360 Excavator and dedicated road lorries)
 - Bulldozer for the re-spreading of soils over the restored areas

3.8 Weighbridge

- 3.8.1 There will be no requirement for a weighbridge for this proposal. All HGV's will be fitted with on board weighing equipment which measures the hydraulic pressure in the lift cycle and gives a display in the cab of each bucket load and the total material loaded.

3.9 Wheel Washing

- 3.9.1 Effective wheel cleaning facilities would be installed at the site prior to commencement of operations. The wheel cleaning facilities would be used by HGV's that leave the site. The wheel cleaning facilities would be maintained in efficient working order. Should conditions necessitate, supplementary cleansing equipment, such as a road sweeper, would be employed as directed by the Site Manager, in order to prevent materials from site being deposited on the public highway.

3.10 Buildings and Structures

- 3.10.1 A combined site office and mess facility would be established with a portacabin type building. All foul water will be directed to a septic tank system.

3.11 Working Hours

- 3.11.1 Operating hours will be the same as the previous quarry, between the hours of 0730 and 1800 Mondays to Fridays; and 0700 and 1300 Saturdays; and not at all on Sundays and Bank Holidays.

3.12 Blasting

- 3.12.1 There would be no blasting taking place within the site.

4.0 GEOLOGY AND MINERAL RESOURCES:

4.1 Regional Geology:

- 4.1.1 The regional geology of the Cumberworth area is described in the British 1:50,000 scale geological map for Glossop (Sheet 86, 2012).
- 4.1.2 Artificial ground is located immediately west/south west of the proposed site (Bromley Farm quarry) and immediately to the south (Bromleys quarry), both of which have been restored, Bromleys currently being dormant.
- 4.1.3 Superficial (drift) deposits comprise topsoil 0.3m thick underlain by boulder clay 0.0 to 1.4m thick. The average depth to the base of superficial deposits (rockhead) is 1.1m.
- 4.1.4 On-line records indicate the bedrock present on site consists of Pennine Lower Coal Measures Formation strata, comprising mudstones, siltstones and sandstones with occasional coal horizons, Langsettian (Westphalian A) in age, lying stratigraphically between the Cumberworth Thick (Whinmoor) and Cumberworth Thin (Low Whinmoor) coal seams.
- 4.1.5 The mudstones and seatearth mudstones in this sequence of rocks have previously been worked for their fireclay and brickshale potential. Two working brickshale horizons were encountered on Bromley Farm quarry, the Kitson Top horizon, lying below the Cumberworth Thick and the Kitson Bottom horizon, lying below the Cumberworth Thin. The proposed base of the quarry is expected to be 4.7m below the Cumberworth Thin seam.
- 4.1.6 The detailed lithology likely to be encountered in the extension area is discussed in section 4.3.
- 4.1.7 Both the Cumberworth Thick and Cumberland Thin coal seams have been worked at shallow depths below the site and will be excavated as part of the mining operations negating coal mining legacy risks. The table below describes the workings present:

Recorded Past Shallow Coal Mining Beneath Bromley Farm Extension Site						
Ref No.	Colliery	Coal Seam	Depth	Dip	Dip Direction	Year Last Mined
6NH4	Unnamed	Cumberworth Thick (Whinmoor)	7m	4.9°	North	1926
6HB3	Unnamed	Cumberworth Thin (Low Whinmoor)	9m	2.1°	North East	1955
6NL3	Unnamed	Cumberworth Thin (Low Whinmoor)	9m	1.2°	North East	1944
6HB5	Bromley	Cumberworth Thin (Low Whinmoor)	12m	2.0°	North East	1923
6NA3	Unnamed	Cumberworth Thin (Low Whinmoor)	13m	1.6°	North East	1957
6HB4	Unnamed	Cumberworth Thin (Low Whinmoor)	15m	1.6°	North East	1948

6Z2K	Unnamed	Cumberworth Thin (Low Whinmoor)	17m	2.8 ⁰	South	1936
6HPM	Unnamed	Cumberworth Thin (Low Whinmoor)	18m	0.0 ⁰	East	1943

4.1.8 Records show coal mining was active in the early/mid twentieth century, last worked in 1957.

4.2 Drilling:

4.2.1 Seven piezometers have been installed on Bromley Farm and Bromley Farm Extension, from which the geology has been interpreted. Drilling was undertaken in two phases, an initial phase managed by Silkstone Environmental comprising 5 boreholes in May 2012, followed by 2 boreholes managed by Silkstone Environmental in June 2021. All boreholes were open-holes with piezometer installations.

4.2.2 Of the 7 boreholes drilled, one is located on the southern perimeter of Bromley Farm, four are located along the western perimeter of the extension area and two on the eastern perimeter of the extension. These boreholes prove the sequence described by the BGS is present on site and is suitable as a brickshale.

4.3 Detailed Lithology:

4.3.1 Boreholes drilled on site proved the presence of two brickshale horizons lying below the Cumberworth Thick and Cumberworth Thin seams.

4.3.2 The stratigraphic sequence proven can be summarised as follows:

Sequence of Strata at Bromley Farm Extension				
Stratigraphic Horizon	Lithology	Average Thickness (m)	Range (m)	Mineral
	Topsoil	0.3	0.3 to 1.0	
	Boulder Clay	0.6	0.6 to 1.4	
Rockhead				
	Sandstone	3.4	0.0 to 4.5	
Cumberworth Thick #	Coal & Old Workings	1.6	n/a	
	Mudstone	10.7	9.1 to 11.9	Brickshale
Cumberworth Thin	Coal & Old Workings	0.3	0.2 to 0.3	
	Seatearth Mudstone	2.5	3.1 to 5.4	Fireclay
	Mudstone	2.2		Brickshale
Base of Quarry				
	Sandstone	3.3	2.5 to 3.9	
	Mudstone	9.5	9.0 to 10.1	
# The Cumberworth Thick coal seam is mostly outcropped in the extension area.				

4.3.3 Nomenclature used in the above table reflects usage on Bromley Farm site.

4.4 Geological Structure:

- 4.4.1 Geological records indicate an east south east/west south west trending fault crosses the northernmost part of the site, down-throwing strata to the north by up to 5m. To the north of the fault strata dips at 5° to the north; to the south, at between dips at 1-2° to the north east.
- 4.4.2 The disposition of the fault and dip of the strata means that the Cumberworth Thick seam is mostly outcropped on site, only being present in significant amounts in the extreme north of the site.

4.5 Identification of Mineral Reserves/Resources:

- 4.5.1 Reserves are natural accumulations of mineral or bodies of rock that are of potential economic interest, which may be extracted as a commodity. The Coal Measures mudstones of the Cumberworth area have long been known for their potential use as fireclay/brickshale and have been worked for a number of years.
- 4.5.2 Reserves of fireclay/brickshale have been identified in two discrete correlatable mudstone horizons, the Kitson Top and Kitson Bottom, both of which can be further subdivided by their potential yields, as described in the table below.

Mineral Horizons Present at Bromley Farm Extension				
Horizon	Lithology	Thickness (m)	Mineral	Yield
	Topsoil	0.3		
	Boulder Clay	0.6		
Rockhead				
Kitson Top, Bench 1	Sandstone	3.4		
	Coal & Old Workings	1.6		
	Mudstone	7.7	Brickshale	100%
Kitson Top Blend, Bench 2	Mudstone	1.5	Brickshale	95%
	Mudstone	1.5	Brickshale	80%
Kitson Bottom, Bench 3	Coal & Old Workings	0.3		
	Seatearth Mudstone	1.5	Fireclay	100%
Kitson Bottom, Bench 4	Mudstone	1.0	Discard	0%
	Mudstone	2.2	Brickshale	100%
Base of Quarry				
	Sandstone	3.3		
	Mudstone	9.5		

- 4.5.3 It should be noted that although there is a high degree of consistency in the development of the fireclay/brickshale in boreholes, there is significant variation in rock thickness across the reserve area. This means that the fireclay/brickshale reserve will vary across the site.

4.6 Mineral Reserves & Resources:

- 4.6.1 Following consultation with the client, it has been agreed that the reserve should be calculated as an in-situ (bank) volume/tonnage. Further deductions will therefore be needed to take account of potential losses incurred in the extraction of material from the quarry, losses due to poor quality and loss from handling

materials before the end-product leaves site. The following gross in-situ (bank) volumes of materials are present on site:

In-Situ (Bank) Volumes of On Site Materials, Bromley Farm Extension		
Horizon	Lithology	Volume (m³)
Topsoil	Soil	11,800
Subsoil	Boulder Clay	12,000
	Coal & Old Workings	23,800
Kitson Top, Bench 1	Mudstone	248,100
Kitson Top Blend, Bench 2	Mudstone	155,400
	Mudstone	113,600
Kitson Bottom, Bench 3	Coal & Old Workings	11,000
	Seatearth Mudstone	54,000
Kitson Bottom, Bench 4	Inferior Seatearth/Mudstone	35,100
	Mudstone	99,700
Total Reserve		764,500
Total In-Situ Superficials	Soil & Boulder Clay	23,800
Total In-Situ Waste Material	Sandstone, Mudstone, Coal, Old Workings	318,000
Total In-Situ Mineral	Fireclay/Brickshale	422,700

4.6.2 In summary, the following in-situ (bank) mineral reserves are present at Bromley Farm:

In-Situ (Bank) Reserve at Bromley Farm Extension			
Horizon	Volume (m³)	CF	Tonnes
Kitson Top	155,400	1.8	310,800
Kitson Top Blend	113,600	1.8	227,200
Fireclay	54,000	1.8	108,000
Kitson Bottom Blend	99,700	1.8	199,400
Total Fireclay/Brickshale Reserve	422,700		760,860

5.0 NEED FOR INERT WASTE IMPORTATION

5.1 Introduction

- 5.1.1 As with the adjacent former quarry, a large percentage of the mineral will be extracted; with both clay and shales exported from the site for the production of clayware products, and therefore the volume of overburden/backfill at the site will not be sufficient to enable restoration back to original ground levels. Only occasional bands of low-quality sandstones and mudstones were used in Bromley Farm Quarry as restoration material. This low-quality material was placed against the exposed quarry faces in previously worked parts of the site.
- 5.1.2 As with the adjacent site, because of a lack of overburden available for restoration, it is inevitable that a low-level restoration creating a large open void will generate a large lake area. Further saturated ground conditions and resultant surface water accumulation would render the adjacent sloping land into an un-workable condition, with inherent land management and long term safety implications. Wavin UK, as landowners would like to avoid these potential issues on the restored land by way of providing a restoration scheme which adequately drains and is long term stable.
- 5.1.3 A high level restoration scheme that is achievable will be dependent on the importation of inert waste to raise the levels. Without importation, a low-level restoration scheme as described above would be the only option. As a low-level proposal was not considered acceptable for the existing site, we assume that this approach would not be acceptable for the extension area. We would therefore propose that inert waste material would also be imported to restore the extension area to enable the quarry faces to be fully stabilised and the site adequately drained to enable the site to be restored to agricultural/pasture use. The proposed restoration scheme for waste importation would be subject to a waste recovery plan being submitted and approved by the Environment Agency and a subsequent permit application.
- 5.1.4 The mineral recovery rate in the proposed quarry extension area would be similar to the existing quarry at approximately 75%. The proposed quarry extension would generate a significant quarry void and surface water accumulation at the quarry base and formation of a significant pond/lake after exhaustion of mineral extraction.
- 5.1.5 Rather than having a pond/lake in the quarry base of the proposed extension area, the operator wishes to restore the land to agricultural use. An engineered surface water drainage scheme is therefore required to provide adequate drainage and to prevent the pond/lake formation.
- 5.1.6 The operator proposes to import suitable inert waste from offsite sources to be placed at the quarry base of the extension area to engineer a suitable gradient to assist with surface water drainage at the site to the proposed restoration contours on plan 22007/508. The total volume of waste required for restoration back to original ground levels is approximately 380,000 cubic metres due to the bulkage factor when replacing virgin material.
- 5.1.7 In summary, the operator proposes to import suitable inert waste to be used as engineering material as follows;
- To restore land at the proposed quarry extension area to agricultural use upon completion of mineral extraction, rather than have surface water

accumulating in the base of the quarry and subsequent pond/lake formation.

- To provide sufficient drainage at the quarry to maintain land in a suitable condition for agricultural use.
- To prevent the formation of a pond/lake on the land, and the inherent land management and safety issues associated with such a feature.

Problems with Low Level Restoration Scheme

5.1.8 The low-level scheme comprising a pond feature was reluctantly accepted by the planning authority due there being insufficient material available at the site for alternative options.

5.1.9 A letter dated 27th October 2008 from Kirklees Council confirms the position as follows.

“Whereas it is disappointing that the area of water cannot be significantly reduced, it is accepted that in order to do so the gradients of the slopes around the perimeter of the extraction area would have to be engineered to a much steeper gradient. Because of the way the site has been operated under the terms of the planning permission a large percentage of mineral extracted (clay and shale) is exported from site, and the generation of overburden and waste is low. The result is a significant shortfall of material to a) reduce the gradient of the outer slopes, and b) infill the void where water accumulation is taking place.”

and;

“The Mineral Planning Authority therefore reluctantly accepts that the low-level restoration scheme submitted is the best that can be achieved given the shortfall of material available....”

5.1.10 The Planning Authority letter makes it clear they are disappointed with the low-level scheme and would much preferred to see a scheme which does not comprise a pond feature.

5.1.11 Without the importation of waste, saturated ground conditions and resultant surface water accumulation would render the land in an un-workable condition, with inherent land management and long-term safety implications. The operator wanted to address these issues by way of providing a scheme of land drainage and stability improvements.

5.1.12 A waste recovery proposal for the previous Bromley Farm Quarry which detailed a long-term stability and a surface water drainage solution was submitted to the Environment Agency (EA) in 2011. The waste recovery proposal comprised the placement of 450,000 tonnes of inert waste against the quarry face to form stabilising buttresses, and also to raise the quarry base to provide a suitable surface water drainage scheme. The waste recovery plan was approved by the Environment Agency in a letter dated 1st December 2011.

5.1.13 Upon approval of the Waste Recovery scheme, a planning application was submitted to Kirklees Council. This was approved on the 10th July 2013.

5.1.14 Saturated ground conditions and resultant surface water accumulation would render the land in an un-workable condition, with inherent land management and long-term safety implications. The operator wishes to address these issues by way of providing a scheme of land drainage and stability improvements.

-
- 5.1.15 Overburden/backfill material at the site comprises mudstone which, when compacted is particularly impermeable. The deposit and compaction of backfill/overburden at the site as well as the impermeable nature of the underlain geology prevents egress of surface water from the base of the worked quarry.
- 5.1.16 The operator previously pumped water from the base of the quarry to a settlement pond situated near the site entrance. Long term pumping of surface water at the site is not considered sustainable.
- 5.1.17 The permanent saturated ground conditions that would arise from a current low level scheme would also impact the long term stability of existing unconsolidated backfill slopes at the site.

Proposed High Level Restoration Scheme

- 5.1.18 A high level restoration scheme back to original ground levels is proposed for the purpose of providing sufficient surface water management at the site for it to be restored to agricultural use.
- 5.1.19 It is considered that a scheme which prevents surface water accumulation at the quarry base is preferable than a permanent pond/lake feature which would render the land unsuitable for agricultural use.
- 5.1.20 It is proposed that the quarry basal level in the extension area be raised using imported inert material to make up for a shortfall of available overburden/backfill material at the site.
- 5.1.21 There would be insufficient overburden/backfill material available from quarrying activity at the extension area to provide an adequate drainage scheme.
- 5.1.22 The gradient of the raised basal elevation would be such that surface water drains from the quarry perimeter towards an existing outfall to the south of the site.
- 5.1.23 The proposed ground elevation is therefore required to be higher at the site perimeter than at the centre, to drain in the required direction. The slope of land from site perimeter to the drainage system should not be too steep as it would not be suitable for the intended agricultural use.
- 5.1.24 The drainage channel system should provide sufficient fall for surface water to drain from the northern part of the site to an existing culvert system in the south and prevent siltation. The gradient should also ensure surface water does not back up and accumulate inside the quarry boundary.

6.0 ECOLOGY

6.1 Introduction

6.1.1 Silkstone Environmental Ltd commissioned RDF Ecology Ltd to prepare a preliminary ecological appraisal to describe the baseline ecological condition of the site and to assess the potential ecological impacts of the proposals. The full report can be found in Appendix A of the supporting statement.

6.1.2 An extended phase 1 habitat survey of the site was completed on 14th July 2022. All habitats within the site were surveyed.

6.1.3 The study area covered the whole site and extended 50m beyond the boundary where access was possible.

6.1.4 The objectives of the commission were to:

- i) To complete a desk-top study to review any existing information regarding protected or notable species and designated sites within a 2 kilometre (km) radius of the site, extended to 10 km for International and European conservation sites including Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites;
- ii) To undertake an extended phase 1 habitat and protected species walkover survey to describe and map the habitats on the site and to identify the presence or potential presence of any protected or notable species;
- iii) To identify and assess potential ecological constraints to the proposed development;
- iv) To prepare a preliminary ecological appraisal report
- v) To provide recommendations for further ecological surveys where necessary; and,
 - Recommend appropriate mitigation measures to enable compliance with wildlife legislation, offset potential negative ecological effects and enhance biodiversity where possible.
 - This report describes the findings of the desktop study and field survey work, considers the potential impacts arising from the proposed development and proposes appropriate mitigation measures.

6.1.5 Below is a summary of the full report which can be found in Appendix A of this submission.

6.2 Protected Species

6.2.1 Areas of suitable habitat on site and within 50m of the site boundary (where accessible) were searched for evidence of:

- Badger
- Otter
- Water Vole
- Bats
- Wild Birds
- Amphibians
- Reptiles

6.3 Limitation of Field Survey

- 6.3.1 The extended phase 1 habitat survey was undertaken on 14 July 2022 within the period generally considered to be the optimal vegetation survey period (i.e. April to September). Given the timings of the survey and the nature of the modified habitats recorded on site it is considered that no limitations are present in the assessment of the site for protected/notable species and habitats. However, an extended phase 1 habitat survey does not comprise a full botanical assessment of all species present within a site; therefore species lists are indicative only.
- 6.3.2 The baseline conditions described in this report are accurate at the time at which the survey was undertaken. Should a considerable time pass (e.g. more than 2 years) and/or conditions/land-use on the site change prior to the commencement of works, it is recommended that an up-date survey is undertaken.

6.4 Habitat Descriptions

- 6.4.1 The following Phase 1 habitat types were recorded on site during the field survey:

- Broadleaved Plantation Woodland
- Dense Scrub
- Semi-improved Neutral Grassland;
- Improved Grassland
- Tall Ruderal and Semi-improved Grassland Mosaic
- Arable
- Species Poor Hedgerow with Trees; and,
- Dry Stone Wall

Broadleaved Plantation Woodland

- 6.4.2 Along the western site boundary with Cumberworth Lane are a number of areas of plantation woodland Tree species here included:

- silver birch (*Betula pendula*)
- alder (*Alnus glutinosa*)
- hazel (*Corylus avellana*)
- goat willow (*Salix caprea*)
- pedunculate oak (*Quercus robur*)
- ash (*Fraxinus excelsior*)
- field maple (*Acer campestre*) and
- hawthorn (*Crataegus monogyna*).

- 6.4.3 The ground vegetation comprises a range of coarse grasses including false oat-grass (*Arrhenatherum elatius*) cock's-foot (*Dactylus glomerata*), common couch (*Elytrigia repens*) and Yorkshire fog (*Holcus lanatus*) with some developing bramble (*Rubus fruticosus agg.*) underscrub.

Dense Scrub

- 6.4.4 A small area of scrub and trees is present in the south of the site with an area of tall ruderal and coarse grassland vegetation.

- 6.4.5 Species included pedunculate oak, ash and hawthorn with dense bramble underscrub and stands of common nettle (*Urtica dioica*) and creeping thistle (*Cirsium arvense*). Also present were a range of coarse grasses including false oat-grass, cock's-foot, common couch and Yorkshire fog.

Semi-improved Neutral Grassland

- 6.4.6 A small area of semi-improved grassland has been established on the site of a former spoil mound and supported a range of common species including perennial rye-grass (*Lolium perenne*), red fescue (*Festuca rubra*), common bent (*Agrostis capillaris*), sweet vernal-grass (*Anthoxanthum odoratum*) and crested dog's-tail (*Cynosurus cristatus*) along with common mouse-ear (*Cerastium fontanum*), ribwort plantain (*Plantago lanceolata*), creeping buttercup (*Ranunculus repens*), dandelion (*Taraxacum officinale* agg.), common sorrel (*Rumex acetosa*), white clover (*Trifolium repens*) and red clover (*Trifolium pratense*) and less frequent germander speedwell (*Veronica chamaedrys*).

Improved Grassland

- 6.4.7 The proposed access for the quarry extension passes through an area of former quarry which has been restored to improved agricultural grassland where the sward is dominated by perennial rye-grass, common bent and red fescue with some white clover and common sorrel.

Tall Ruderal and Semi-improved Grassland Mosaic

- 6.4.8 On the southern portion of the site is an area of abandoned arable land which has become overgrown and comprises a mix of coarse tussocky grassland and ruderal vegetation. Species here included false oat-grass, cock's-foot, common couch, and Yorkshire fog with less frequent common bent and red fescue and damper hollows contained creeping bent (*Agrostis stolonifera*). Ruderal and robust perennial species are at moderate to high abundance and included extensive stands of common nettle along with creeping thistle, broad-leaved dock (*Rumex obtusifolius*), ragwort (*Senecio vulgaris*), hogweed (*Heracleum sphondylium*) and localised stands of rosebay willowherb (*Chamerion angustifolium*).

- Less frequently encountered species included ribwort plantain, white dead-nettle (*Lamium album*), red dead-nettle (*Lamium purpureum*), creeping buttercup, dandelion, red and white clover.
- Young ash and hawthorn sapling were frequent in the vegetation.
- A smaller of similar vegetation was present along the southern boundary of the former topsoil mound

Arable

- 6.4.9 The majority of the site comprises arable agricultural land which supports a limited range of common agricultural weed species including groundsel (*Senecio vulgaris*), pineappleweed (*Matricaria discoidea*), common poppy (*Papaver rhoeas*), knotgrass (*Polygonum aviculare* agg.), common chickweed (*Stellaria media*) and annual meadow-grass (*Poa annua*).

Species Poor Hedgerow with Trees

- 6.4.10 A tall hedgerow with some trees runs along the southern site boundary adjacent to a small ditch and has developed from an outgrown hedgerow. Canopy

species included pedunculate oak, goat willow, mature hawthorn, and field maple and occasional elder (*Sambucus nigra*).

- 6.4.11 The ground vegetation comprises coarse grasses including false oat-grass, cock's-foot and Yorkshire fog and stands of common nettle with some developing bramble scrub and occasional bramble underscrub.

Dry Stone Wall

- 6.4.12 Along the site boundary and diving the areas of arable a land were small derelict sections of dry stone walls which supported a small number of hawthorn and field maple saplings with false oat-grass, cock's-foot, Yorkshire fog and common couch and ruderal species including mugwort (*Artemisia vulgaris*), creeping thistle, and broad-leaved dock.

6.5 Protected Species

Bats

- 6.5.1 The site does not contain any large trees with potential value to roosting bats.
- 6.5.2 There are a small number of semi-mature ash that are located in hedgerows. These were inspected from the ground and no potential roost features were identified and the trees were assessed to have negligible potential value for roosting bats.
- 6.5.3 The site does not contain any buildings or other structure of potential value to roosting bats.
- 6.5.4 The site comprises an area of open arable agricultural land at 230m AOD which is open and exposed. Areas to the south of the site are more enclosed and provides some sheltered foraging habitat for bats.
- 6.5.5 Beyond the site are extensive areas of improved agricultural grassland with few or fragments hedgerows being mostly defined by dry stone walls.
- 6.5.6 There are small areas of woodland to the north beyond Cumberworth Lane and these connect with large areas of woodland around Yew Tree Wood LWS via the wooded banks of the disused railway line.
- 6.5.7 Large areas of woodland are also present to the south of the A635 at Green Wood and Munchcliffe Wood
- 6.5.8 There are areas of residential development contain older properties to the west at Upper Cumberworth and the south at Denby Dale.

Badgers

- 6.5.9 No badger setts were recorded within or immediately adjacent to site.
- 6.5.10 No evidence of badger foraging activity was recorded during the field survey.

Otters

- 6.5.11 The site does not contain any habitats of potential value to otter (*Lutra lutra*), no evidence of otter activity was recorded during the field survey.

Water Vole

- 6.5.13 The site does not contain any habitats of potential value to water vole (*Arvicola amphibius*), no evidence of water vole activity was recorded during the field survey.

Wild Birds

- 6.5.14 During the field survey a number of birds were recorded and these were predominantly from the hedgerows along the southern site boundary and included Wren (*Troglodytes troglodytes*), robin (*Erithacus rubecula*), blackbird (*Turdus merula*), blue tit (*Cyanistes caeruleus*), Greenfinch (*Carduelis chloris*), goldfinch (*Carduelis carduelis*), magpie (*Pica pica*), woodpigeon (*Columba palumbus*) and willow warbler (*Phylloscopus trochilus*). A single skylark (*Alauda arvensis*) was recorded singing high over a small area of grassland to the south-east.

Amphibians

- 6.5.15 The site does not contain any ponds suitable for breeding amphibians including great crested newts (*Triturus cristatus*) and no amphibians were recorded during the field survey.
- 6.5.16 Examination of OS maps and satellite imagery indicates that there are two ponds located within 500m of the site boundary that are connected to the site by areas of suitable terrestrial habitat .
- 6.5.17 Pond 1 was examined in 2012 and assessed to have low value for GCN. The pond was examined again in 2022 and the HSI score is set out in table 1 below and indicates that the pond still remains of low potential value to GCN.

Table 1—HSI Score for Pond 1

Habitat Suitability Index factors	HSI Score	0.46
	Pond Suitability	Poor
Location	1	Optimal
Pond Area	1	750m ²
Pond Drying	0.9	Never dries
Water quality	0.33	Poor due to pumping of quarry water into pond on a regular basis
Shade	1	Shoreline shade <10%
Waterfowl	0.67	Present but little indication of impact
Fish	0.01	Large population of Sticklebacks
Ponds	0.65	3 ponds within 1km
Terrestrial Habitat	0.67	Moderate
Macrophytes	0.5	20% cover

- 6.5.18 The major limiting factor regarding the potential value of the pond for Great Crested Newts was the large population of Sticklebacks that was noted during the field survey.
- 6.5.19 Pond 2 is located outside the site boundary and access was not possible. However the pond was subject to eDNA surveys for the nearby Bromley Quarry in 2019 (Wardell Armstrong 2019) and this indicated that GCN was absent.

Reptiles

- 6.5.20 No reptiles were recorded during the field survey. However a number of collapsed dry stone walls exist with the site which provide potential shelter and foraging habitat for reptiles. Other habitats of potential value to reptiles present on site included areas of neutral grasslands and ruderal vegetation.

Non-Native Invasive Species

- 6.5.21 No non-native invasive species, or plant species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded within the site during the survey.

6.6 Evaluation and Recommendations

Development Impacts

- 6.6.1 The development as proposed is likely to result in the loss of all habitats within the site boundary with the exception of hedgerow the hedgerow to the south east in the overburden storage area which would be retained and protected during the quarry operation and will and the topsoil mound proposed to be constructed to the south of the hedgerow will have a stand off to protect the hedgerow trees.
- 6.6.2 Boundary features and plantation woodland along Cumberworth Lane would be retained and protected during the life of the quarry.
- 6.6.3 The proposed restoration will seek to create the following habitats:
- agricultural grassland (5.0ha)
 - native shrub planting (0.87ha)
 - species rich grassland (0.97ha).
 - Tree Planting (1.31ha)

Bats

- 6.6.4 All UK species of bat are afforded full protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5 of the Act and also receive full protection as European Protected Species under Section 41 of The Conservation of Habitats and Species Regulations 2017 through their inclusion on Schedule 2.
- 6.6.5 The site does not contain any buildings of potential value to roosting bats
- 6.7.6 **No** significant impacts upon roosting bats in buildings are predicted and **no** further survey and assessment work is recommended.
- 6.6.7 The site does not contain any trees of potential value to roosting bats
- 6.6.8 **No** significant impacts upon roosting bats in trees are predicted and **no** further survey and assessment work is recommended.
- 6.6.9 **No** significant impacts upon commuting or feeding bats are predicted and **no** further survey and assessment work is recommended.

Badgers

- 6.6.10 Badgers are protected under the Protection of Badgers Act 1992.
- 6.6.11 No badger setts were recorded within or immediately adjacent to site and no evidence of badger foraging activity was recorded during the field survey.
- 6.6.12 **No** impacts upon badgers are predicted and **no** further survey or assessment work is recommended

Otters

- 6.6.13 Otters are afforded full protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5 of the Act and also receive full protection as European Protected Species under Section 41 of The Conservation of Habitats and Species Regulations 2017 through their inclusion on Schedule 2.
- 6.6.14 The site **does not** contain any habitats of potential value to otters, **no** evidence of otter activity was recorded during the field survey and the desktop study did **not** provide any records for this species within 2km of the site boundary. **No** impacts upon otter are predicted and **no** further survey or assessment work for otters is recommended.

Water Vole

- 6.6.15 Water vole is afforded full protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5 of the Act.
- 6.6.16 The site **does not** contain any habitats of potential value to water vole, **no** evidence of water vole activity was recorded during the field survey and the desktop study did **not** provide any records for this species within 1.8km of the site boundary. **No** impacts upon water vole are predicted and **no** further survey or assessment work for water vole is recommended.

Wild Birds

- 6.6.17 With certain exceptions, all wild birds, their eggs, nests and young are protected under the *Wildlife and Countryside Act 1981* (as amended).
- 6.6.18 The majority of the ornithological interest recorded during the survey as from the boundary hedgerows which would be protected and retained during the life of the quarry. Quarry operations
- 6.6.19 In any case, potential impacts upon nesting birds can be prevented during construction by ensuring that vegetation removal is programmed to occur outside of the bird nesting season (March to September inclusive) or where this is not possible under the supervision of a suitably qualified and experienced ecologist as set out in the recommendations below.
- 6.6.20 **No** significant impacts upon nesting birds are predicted and **no** further ornithological survey work is recommended.

Amphibians

- 6.6.21 All UK native amphibians are afforded partial or full protection under Section 9 of the *Wildlife and Countryside Act 1981* (as amended) through their inclusion on Schedule 5 of the Act and Great Crested newts (*Triturus cristatus*) are provided the highest level of protection. Great crested newts (GCN) are fully protected from capture, injury, killing and damage or destruction of their breeding sites or resting places under The Conservation of Habitats and Species (as amended) Regulations 2017.
- 6.6.22 The site does not contain any ponds suitable for breeding amphibians including great crested newts and no amphibians were recorded during the field survey. No other ponds linked to the site by semi-natural vegetation were considered suitable for supporting breeding GCN and **no** impacts upon amphibians are predicted and **no** further survey work is recommended.

Reptiles

- 6.6.23 All species of native reptiles are protected under the Wildlife and Countryside Act 1981 (as amended). The sand lizard (*Lacerta agilis*) and smooth snake (*Coronella austriaca*) are further protected under Conservation of Habitats and Species (Amendment) Regulations 2017.
- 6.6.24 The desktop study identified two records of grass snake approximately 450m north of the site boundary dating from 2014. The arable habitats are considered to be of low value to foraging and resting reptiles, however other parts of the site have some potential value.
- 6.6.25 Potential impacts upon reptiles can be prevented during the works proposed by completing them in accordance with standard mitigation measures and under the guidance of a reasonable avoidance measures method statement which sets out methods of working and timing of works.
- 6.6.26 **No** significant impacts upon reptiles are predicted and **no** further survey work is recommended.

6.8 Recommendations

Breeding Birds

- 6.8.1 Whilst only limited bird activity was recorded from the boundary hedgerow, woodland plantation and isolated trees and scrub with the site boundary these are likely be used by breeding birds during the bird breeding season (March to September inclusive). Given the protection afforded to wild birds and their nests the following precautionary measures are recommended:
- That removal of trees, shrubs and surface vegetation should be completed outside of the bird breeding season (March to September inclusive). Where this is not possible a suitably qualified and experienced ecologist should complete survey of the site immediately prior to completion of the proposed works to search for nesting birds and to advise on exclusion zones or timing of works if nesting birds are recorded.

7.0 LANDSCAPE AND VISUAL IMPACT

7.1 Introduction

- 7.1.1 An appraisal of the existing landscape character has been made followed by an assessment of the impact that the proposed activity will have on the landscape character and visual amenity of the area, both following completion and restoration of the site, and for the duration of the works and where appropriate, recommend mitigation measures.
- 7.1.2 In carrying out the appraisal the 'Guidelines for Landscape and Visual Impact Assessment (GLVIA) (3rd edition 2013)' published by The Landscape Institute and the Institute of Environmental Management and Assessment (IEMA) have been used, with the methodology being adapted to suit the site specific circumstances.
- 7.1.3 Below is a summary of the full report which can be found in Appendix B of this submission.

7.2 Site Context & Description

Baseline Conditions

- 7.2.1 The proposed extension to Bromley Farm Quarry covers an area of approximately 8.4 Hectares which includes the area required for the perimeter screening mounds to the north and east, the above ground overburden storage and the new access road. The full area to be extracted for mineral is currently in agricultural use for pasture.
- 7.2.2 The nearest residential areas to the site are Upper Cumberworth which is situated just 100m to the east of the edge of the village and Lower Cumberworth which is approximately 650m to the east. The larger settlement of Denby Dale is over 1km to the south east.
- 7.2.3 Within the wider landscape of the area there are variations within the local characteristics and landscape quality. There are substantial areas of settlement and major transport routes. The main transport route near to the site is the A635 to the south.
- 7.2.4 The proposed extension area is situated within broadly undulating topography and surrounded by agricultural land bounded by dry stone walls with some substantial woodland blocks which are located to the south of the A635. There are scattered farmsteads around the area with occasional strips of tree belts to the north and east with more significant woodland blocks to the south. The site lies within a wider area of green belt land identified in the Kirklees Development Plan.
- 7.2.5 There is another former quarry, also called Bromley Farm Quarry to the south which is now closed but unrestored and a small household waste recycling facility is situated approximately 150 metres to the south west.
- 7.2.6 Residential properties are located along Cumberworth Lane, approximately 350 metres to the west and 400 metres to the North East. The closest property, Lane Side Farm is located 100 metres to the northern site boundary.

- 7.2.7 The landscape is very open in the area and long views are afforded from all directions. However, although the site is on high ground, it is not prominent within the local landscape and it is not easily overlooked from the surrounding countryside.
- 7.2.8 The site as existing is most visible from the public footpath which runs along the western site boundary and a number of houses to the west along Cumberworth Lane which are at a slightly elevated position to the site.
- 7.2.9 The proposed extension area is already well screened by a combination of topography and established vegetation which screens views from the south and east. The site is most visible from the public footpaths to the east and west and a number of houses to the west along Cumberworth Lane which are at a slightly elevated position to the site. Some of this screening was planted for the previous quarry and is now well established.
- 7.2.10 The agricultural land is used predominantly for pastoral farming with distinctive walled enclosures forming linear patterns within the landscape. Along the site boundary and diving the areas of arable land are small derelict sections of dry stone walls
- 7.2.11 The development will result in the temporary loss of areas of arable grassland and a species poor hedgerow with occasional trees in the centre of the site. Boundary features would be protected and retained during the life of the quarry.

Public Footpaths

- 7.2.12 There are no PROW's that would need to be diverted as part of this proposal. The closest are DEN/86/30 and DEN86/50 to the north east.
- 7.2.13 The Denby & Cumberworth Circular trail Ref DEN/84/10 which is a heavily used footpath runs from south and west of the site where part of the route exits on Cumberworth Lane.
- 7.2.14 The main section of the route of the trail where views of the site could potentially be visible are to the west on a 200m unmarked route from the new site access point towards Cumberworth Lane.

Statutory Designated Sites

- 7.2.15 There are no sites covered by a statutory nature conservation designation within 2km of the proposed extension area. The nearest site is Pye Flatts Meadows Site of Special Scientific Interest (SSSI) located near Hoylandswaine approximately 6.5km south east of the study area.

Road Network

- 7.2.16 The site would be served from an existing unnamed road which adjoins the A635 Barnsley Road which has been constructed to a high standard. This access is a two lane highway which runs for approximately 500 metres to its junction and is also used to access to Council's waste recycling facility,
- 7.2.17 The site is bounded by Cumberworth Lane, a minor road to the north of the proposed extension area.

Listed Buildings

- 7.2.18 There are a number of listed buildings identified in the study area. The majority of these are located within the settlements with a small number of others scattered within the surrounding area. There will be no impact from the proposal on listed buildings.

Conservation Areas

- 7.2.19 Upper Cumberworth conservation area lies 500m to the west. It contains a small group of clustered houses and farm buildings centred on St Nicholas Church

Ancient Woodlands

- 7.2.20 There are no ancient woodlands in proximity to the proposed development.

SSSI's

- 7.2.21 There are no SSSI's in proximity to the proposed development.

Trees and Woodland

- 7.2.22 There are no trees or woodland that would be affected by the proposed extension area. The nearest woodland blocks are approximately 700 to 800m to the south.

Land Use

- 7.2.23 The site is located in a landscape which has undergone much change due to extraction of minerals in the past, and which continues to change with the presence of the previous Bromley Farm Quarry, and Bromley (Naylors) Quarry to the south which is now closed.

- 7.2.24 The land is classed as agricultural in arable use.

7.3 Landscape Assessment

Landscape Quality

- 7.3.1 The extension area is wholly agricultural grassland for arable use. There are some small hedgerow trees within the site which need to be removed but the existing perimeter hedgerows and trees will be retained and utilized to add to the additional screening measures that are proposed and incorporated into the scheme.
- 7.3.2 The landscape quality of the surrounding area is considered to be moderate. The proposed extension area is largely devoid of surface landscape features and consequently the landscape quality is considered to be moderate. The development will result in the temporary loss of arable grassland and a species poor hedgerow with occasional small trees.
- 7.3.3 The significance of the proposal on the landscape would be assessed as moderate adverse for the duration of the operations due to the effects on the current land being open agricultural use but would be minor beneficial on completion of the restoration scheme.

Landscape Value

- 7.3.4 The proposed extension is not designated specifically as being of any significant landscape value and no Tree Preservation Order, Hedgerow Notice or other conservation designation applies.

Landscape Sensitivity

- 7.3.5 Due to the lack of the landscape features within the proposed extension area, and the historical and recent quarrying that has been undertaken in close proximity, the application site is not considered sensitive. The land is within Green Belt designation but the NPPF this is not considered inappropriate development so long as the openness is preserved.

Landscape Effect

- 7.3.6 The main effect on the landscape during extraction is in respect of the landform and land use, whilst other landscape characteristics remain relatively unaffected.
- 7.3.7 Overall the magnitude of effect is considered to be medium due to the length of the operations but will effectively be screened and be progressively restored with the aim to minimise the overall effect.
- 7.3.8 The sensitivity of the landscape is considered to be medium. Consequently, the significance of the effect of the restored site on the landscape is considered to be minor beneficial.
- 7.3.9 The duration of effect is long term at an estimated 25 years and the reversibility of effect is non-permanent as the site will be fully restored upon completion of mineral extraction.

Impact during works

- 7.3.10 The landscape of the area will be largely unaffected by the operations due mainly to its low visibility in the surrounding landscape.
- 7.3.11 The majority of the mineral extraction and infilling works undertaken are below ground surface and will not be seen due to the topography of the landscape and the existing and proposed screening measures. However, during the construction of the new access and the stripping of the soils to create the screening mound, the operations will involve vehicles and plant moving over the surface of the land. Also the movement of HGV's exporting mineral and importing waste for restoration will have a negative impact on the local landscape character and views from Cumberworth Lane, particularly when in close proximity to parts of the site that are not fully screened.
- 7.3.12 This impact is considered minor adverse as mineral extraction and waste infill have been a feature in the locality for many years.
- 7.3.13 However, the disruptive elements of these works are of a temporary nature and will be mitigated as far as is practicable.

Impact of the completed works

- 7.3.14. Without the importation of inert waste to create a suitable landform, a large open void would be the only option and due to the impermeable nature of the geology, the void would inevitably fill with water over time and create a large lake feature. It is considered that this would not fit in with the surrounding landscape and would look out of place in the locality.
- 7.3.15 The proposed final restoration scheme has been designed for long-term stability and would allow the land to be farmed for arable or pastoral use in the future.
- 7.3.16 The restoration scheme provides the opportunity to increase potential for habitat creation and provide an enhanced area of biodiversity.
- 7.3.17 The elements of the proposed restoration scheme include:
- agricultural grassland (5.0ha)
 - native shrub planting (0.87ha)
 - species rich grassland (0.97ha).
 - Tree Planting (1.31ha)
- 7.3.18 It is considered that the mitigation measures proposed will ensure that the development can take place without permanent detriment to the visual appearance and quality of the surrounding landscape and should positively enhance the habitat value of the site.
- 7.3.19 Therefore, on completion of the restoration we consider the impact on the landscape character as minor beneficial.

7.4 Summary of Landscape Appraisal

- 7.4.1 A site-specific landscape assessment has been undertaken in order to identify the key characteristics of the landscape in accordance with current guidance and also to make an assessment of factors such as the landscape quality, sensitivity and capacity to absorb change or development. The site-specific assessment deals both with the application site and land in the immediate vicinity.
- 7.4.2 The Guidelines for Landscape & Visual Impact (GLVIA 3) sets out in Box 5.1 a range of factors that can help in the identification of valued landscapes. These factors include:
- Landscape quality (condition);
 - Scenic quality;
 - Rarity;
 - Representativeness;
 - Conservation Interests;
 - Recreation Value;
 - Perceptual aspects; and
 - Associations.
- 7.4.3 In terms of landscape quality, the site reflects that of its locality, comprising three agricultural fields with small hedgerow trees of low ecological value interspersed in the centre of the proposed extension area which would need to be removed but any perimeter trees along the site edges will be retained.

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- 7.4.4 The agricultural fields total approximately 8 Hectares which will be lost temporarily for mineral extraction but will be progressively restored back to agricultural use with additional biodiversity enhancements.
- 7.4.5 The site is not considered to be valued in terms of the NPPF (Paragraph 174) as it is not covered by any statutory designations or identified as having high quality in any of the development plan documents or published landscape study documents.
- 7.4.5 The scenic quality of the site is reduced by the presence of operational and historic quarries in the area which has been in industrial use for decades.
- 7.4.6 With regard to rarity and representativeness, the site is currently under arable agricultural use and is therefore considered to be consistent with the land use of the landscape and is commonplace within the localised and wider setting and as such is not considered rare. There are no internal landscape features of note within the site.
- 7.4.7 In terms of conservation interests, there are no features which are considered significant to elevate the conservation value of the site or its setting.
- 7.4.8 The site is in agricultural use so has no recreational value apart from users of public footpaths outwith of the site which will be unaffected by the proposal.
- 7.4.9 In terms of the perceptual aspects of the site, the current and historic mineral and landfill sites reduces the perceived tranquillity of the site and its immediate surroundings. In terms of the site, it is considered that the perceptual value is low.
- 7.4.10 With regard to literary, artistic and historic associations, there are no known links with regard to the site or its immediate setting.
- 7.4.11 On a large scale, the proposal will impact on an area having no outstanding features of regional, national or international importance. It is a disturbed landscape with intermingled housing, roads, railways, industrial buildings, redevelopment, intermixed with rural areas.
- 7.4.12 At a local scale, the proposed development lies in an area designated Green Belt in the LDF. There are no other formal designations applicable to the site or land immediately adjacent
- 7.4.13 The existing and previous historical Quarries do not positively contribute to characteristics of the surrounding area, although mineral extraction operations have taken place within the landscape of this region for many decades, so in that respect the existing quarries contribute in part to the overall landscape character of the area.
- 7.4.14 The appraisal of the baseline landscape of the proposed development identifies that it:
- i) It is allocated in the LDF as a larger site allocated as a Minerals area of search, subjects to a number of constraints being addressed
 - ii) Lies within the Green Belt
 - iii) No significant characteristic landscape elements will be lost
 - iv) The site is arable agricultural fields with no specific features of landscape or ecological interest
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- v) The area has historically been worked for mineral for many years historically and subsequently been used for landfill.
- vi) The site will be restored back close to original ground levels and back to agricultural use in 25 years.
- vii) The restoration scheme will add biodiverse areas to the land where it will not impact on future farming use.
- 7.4.16 The significance of the proposal on the landscape would be assessed as minor adverse when the site is operational due to the site being in agricultural use but is not in a valued landscape area with few ecological habitats.
- 7.4.17 The restoration scheme will restore the majority of the site back to agricultural use. Additional tree and hedgerow planting will add areas of biodiversity and wildlife habitat where practical and would not impact on future agricultural use.
- 7.4.18 We would therefore assess the proposal overall would be minor beneficial upon completion of the restoration scheme in accordance with the significance criteria for landscape effects.
- 7.4.19 With regards to Landscape sensitivity, the study area is assessed through professional judgment, as being of Low sensitivity. Similarly, most of the landscape of the study area is considered to be of Low quality.
- 7.4.20 The landscape value of the proposed site is assessed as being of medium/poor value as the application site is an open agricultural field but within a surrounding landscape of low value.
- 7.4.21 Overall the impacts on landscape character are considered to be of medium magnitude as they would not be considered substantially uncharacteristic when considered against the surrounding landscape of current and historic mineral extraction and landfill.

7.5 Visual Effects

- 7.5.1 The assessment of visual effects considers the potential for changes in views and visual amenity. The aim is to establish the area in which the development may be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity (meaning the overall quality and pleasantness to a view).
- 7.5.2 Residential receptors, users of PROW's and users of allotments are of high visual sensitivity. Users of the local residential road network where the view is not the focus of the activity, are of medium visual sensitivity. Passengers on commercial railway lines are of low visual sensitivity.
- 7.5.3 Changes in views may give rise to adverse or beneficial visual effects through obstruction in views, alteration of the components of the view and through the opening up of new views by the removal of screening. Potential visual effects arising from the development, excluding mitigation, may include:
- Short term visual impact during the initial earthmoving and construction period arising from the use of machinery and stripping of vegetation and soils.
 - Short term visual intrusion and obstruction arising from the construction of perimeter screening bunds
 - Visual intrusion from ongoing extraction.
 - Visual intrusion from vehicles entering and leaving the site.

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- Visual effects of the overburden storage mound

- 7.5.4 This section will summarise the potential visual effects for the proposed extension area.
- 7.5.5 During the field study, a photographic record was made to represent the full range of potential views towards the site, from available viewpoints within the study area. These locations are shown on the visual photographs. No access to private locations has been obtained during the field study; the majority of photographs have been taken from as close to the properties as possible, from public locations.
- 7.5.6 Existing views of the site were examined from public footpaths, roads and individual properties.
- 7.5.7 Whilst there is professional judgement inherent in determining the category of impact, the assessment process is both systematic and structured. The assessment of visual impacts is based upon summer views obtained at the time of assessment.
- 7.5.8 Where significant differences in impact between summer and winter are apparent, these would be identified.
- 7.5.9 The sensitivity of a receptor and the level of impact upon it can be combined to assess the significance of the resultant effects.

Zone of Theoretical Visibility (ZTV)

- 7.5.10 To establish the potential extent of visibility, a ZTV has been produced. The ZTV was produced based on a LIDAR Composite Digital Surface Model (DSM) at a 2m spatial resolution which takes into terrain and large blocks of vegetation and gives a representation of where the site could be seen, given the complex landform of the study area.
- 7.5.11 The map indicates theoretical visibility only of the areas where there may be a line of sight. However, the site may not be actually visible in reality due to localized screening which is not represented by the DSM.
- 7.5.12 The site visit established the potential extent of visibility of the proposed development within the landscape. Given the complex topography of the study area, the visibility is limited by landform.
- 7.5.13 A Digital Terrain Model (DTM) has also been produced showing a representation of the bare ground (bare earth) topographic surface of the Earth excluding trees, buildings, and any other surface objects.

Principal Representative Viewpoints

- 7.5.14 There are two particular elements to this assessment which are:
- i) The landscape and visual impacts of the proposed quarry extension and ongoing operations and;
 - ii) The landscape and visual impacts of the proposed 5m high overburden storage mound
- 7.5.15 A photographic survey of the proposed extension area and the surroundings has been undertaken.

7.5.16 The representative viewpoints have been determined as those from:

- Closest Proximity Properties
- Cumberworth Lane
- Public Rights of Way

7.5.17 The extension area would not be visible from any other locations due to the topography surrounding the site and significant areas of tree cover.

7.5.18 A total of 12 representative viewpoints were chosen.

7.5.19 No other locations were included where there are no possible views into the site, so these were scoped out of this assessment.

Predicted Visual Effects

7.5.20 The nearest residential areas to the site are Upper Cumberworth which is situated just 400m to the east of the edge of the village and Lower Cumberworth which is approximately 300m to the east. The larger settlement of Denby Dale is over 1km to the east/south east.

7.5.21 Residential properties are located along Cumberworth Lane, approximately 350 metres to the west and 400 metres to the North East. The closest property, Lane Side Farm is located 100 metres to the northern site boundary.

7.5.22 In the long-term, once the site has been restored, earth bunds removed and with additional tree planting, the effects would be minor beneficial overall.

Roads

7.5.23 Any visual effects will be classed as long term at 25 years duration during the operational and restoration phases of the quarry. Passing vehicles would be limited to daytime hours which would give a minor adverse effect and would be temporary and infrequent. The screening measures proposed will mitigate any potential visual intrusion from passing motorists along Cumberworth Lane.

Footpaths and Tracks

7.5.24 There are no PROW's that would need to be diverted as part of this proposal. The closest are DEN/86/30 and DEN86/50 to the north east.

7.5.25 The Denby & Cumberworth Circular trail Ref DEN/84/10 which is a heavily used footpath runs from south and west of the site where part of the route exits on Cumberworth Lane.

7.5.26 All operations would be screened from any users of the PROW network adjacent to the site so there would be no potential impacts to consider.

Long Distance Viewpoints

7.5.27 The immediate area allows extensive views towards the landmarks of Castle Hill and Emley Moor on the horizon. The dominant feature looking north is the imposing Emley Moor Mast. Along the northern boundary of the site, to the north of Cumberworth Lane, the landscape is dominated by the outstretching agricultural fields towards Shelley and to the east towards Scissett and Clayton West.

- 7.5.28 The elevated views to the north from Shelley and Emley are considered negligible due to intervening vegetation, topography and occasional woodland blocks make any potential viewpoints imperceptible without the aid of binoculars.

7.6 Summary of Visual Appraisal

- 7.6.1 The low numbers of potential visual receptors to this proposal are such that they would be limited to a small number of properties in close proximity and users of the public footpath network and possibly road users along Cumberworth Lane.
- 7.6.2 Most residential properties on the edges of Lower and Upper Cumberworth do not face towards the site, being part of terraced or semi-detached houses along roads orientated in a east-west orientation. Select residential properties along Cumberworth Lane have the opportunity for glimpsed views from upper floors, limited by back garden fencing and vegetation.
- 7.6.3 Once in operation, views of the quarry bunding along northern and eastern boundaries would be visible, with only glimpses of activity within the quarry, including vehicles and plant along the access road., earth bunds removed and boundary hedgerows retained, the effects would be neutral with some minor benefits as a result of the proposed restoration scheme to increase biodiversity on the site.
- 7.6.4 Overall, the visual impact is assessing as a Low Magnitude of Change in such that any change in the view is not prominent but could be visible to some visual receptors. The duration of effect is long term at 25 years with the type of effect assesses as neutral.
- 7.6.5 All visual effects would be temporary in nature, and once the landscape is restored, would provide potential visual benefits to local receptors in the long-term with improvements and additional biodiversity included in the submitted scheme.

7.7 Conclusions

- 7.7.1 The landscape and visual context of the application site has been described in relation to a desktop study of published information alongside a site walkover in accordance with guidance on landscape and visual assessment.
- 7.7.2 Potential landscape and visual impacts of the proposed development have been identified taking mitigation into account to reduce or eliminate adverse effects where possible.
- 7.7.3 A medium scale 8.4 Hectare extension to Bromley Farm Quarry will have a temporary effect on the landscape and visual character of the area, albeit for a long term duration of 25 years.
- 7.7.4 The magnitude of change as a result of the temporary quarry is considered medium resulting in a moderate visual effect for a long term period of 25 years due to the fact the site is only visible from close viewpoints to the north, east and west, a small number of residential properties and users of the PROW network but effective screening would mitigate this as much as is possible.

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- 7.7.5 The landscape character assessment concludes that the landscape of the proposed development area is overall of low sensitivity to change mainly due to the detracting effect of the previous and existing quarries in the area.
- 7.7.6 When putting into context against the surrounding landscape of historic mineral extraction in the area and the proposed restoration scheme with additional planting to increase biodiversity and habitats on the site, it is considered that the proposals are acceptable and would not be adverse in terms of landscape or visual impact.
- 7.7.7 To summarise, the overall level of effect of landscape and visual impact is assessed as moderate/minor.

8.0 NOISE ASSESSMENT

8.1 Introduction

- 8.1.1 A full noise impact assessment for the proposed extension area was undertaken by Silkstone Environmental Ltd.
- 8.1.2 The noise impact assessment comprised data calculated using SoundPlan modelling software and free-field noise survey data. SoundPlan modelling software provides three dimensional sound propagation simulations, and generates predicted noise levels for user defined scenarios.
- 8.1.3 Noise survey data and SoundPlan model calculations were used to assess noise impact associated with the proposed development in accordance with British Standard 5228. The assessment findings are presented further in the report.
- 8.1.4 Below is a summary of the full report which can be found in Appendix D of this submission.

8.2. Noise Assessment Methodology

Relevant Guidance and Assessment Criteria

- 8.2.1 The relevant guidance and assessment criteria for the development were identified as follows;
- National Planning Policy Framework (NPPF) – Revised 2019
 - Planning Policy Guidance
 - British Standard 5228-1:2009+A1:2014

National Planning Policy Framework

- 8.2.2 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied.

Paragraph 174.

- 8.2.3 Planning policies and decisions should contribute to and enhance the natural and local environment by:

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

Paragraph 185

- 8.2.4 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:

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- (a) mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;
- (b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.
- Planning Practice Guidance (PPG, 2014)
- 8.2.5 PPG is written in support of the NPPF and provides an increased level of specific planning guidance.
- 8.2.6 PPG states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It is also suggested that noise should not be considered in isolation and separately from issues such as the economic, social and other environmental dimensions of proposed development.
- 8.2.7 Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:
- whether or not a significant adverse effect is occurring or likely to occur;
 - whether or not an adverse effect is occurring or likely to occur; and
 - whether or not a good standard of amenity can be achieved.
- 8.2.8 The supporting Minerals Planning Practice Guidance to the NPPF, is the current Government advice applicable to the control of noise from surface mineral workings in England.
- 8.2.9 Minerals includes the appropriate noise criteria for 'normal operations';
- "Mineral planning authorities should aim to 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(A) during normal working hours (0700-1900).*
- 8.2.10 Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq,1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (LA90,1h) by more than 10dB(A) and should not exceed 55dB(A) LAeq,1h (free field). For any operations during the period 2200 – 0700 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property.
- 8.2.11 Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing beepers, may also require separate limits that are independent of background noise (e.g. Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)
- 8.2.12 Care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed."
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- 8.2.13 The same document includes instances where particularly noisy short-term activities may occur and the appropriate criteria for such circumstances;

“Activities such as soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance”

- 8.2.14 Increased temporary daytime noise limits of up to 70dB(A) LAeq,1h (free field) for periods of up to eight 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.

- 8.2.15 Where work is likely to take longer than eight weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq,1h (free field) limit referred to above should be regarded as the normal maximum”.

British Standard BS 5228-1:2009+A1:2014; Code of practice for noise and vibration control on construction and open sites

- 8.2.16 BS5228 provides a methodology for predicting noise levels associated with activity such as construction and industrial development. The standard also provides sound power level data for a number of different types of operations and machinery.

- 8.2.17 The extent of noise generated by the proposed development would be subject to a number of variables relevant to the noise assessment, including;

- The Sound Power Level (L_{WA}) of plant and machinery to be utilised at the development.
- Noise Characteristics (i.e. clatters and bangs which are accounted by tonal or impulse correction)
- The extent of the operational periods of plant (percentage on time)
- Distance between noise source and identified receptors (e.g. noise sensitive property).
- Noise attenuation provided by either barrier or soft ground located between source and receptor.
- Noise propagation associated with reflection and influence of buildings and hard surfaces.

- 8.2.18 Existing and proposed noise levels were determined using noise modelling software (SoundPlan Essential 2.0), which utilises accepted UK noise calculation methodology including standards BS 5228-1:2009+A1:2014 and ISO9613-2:1996. The proprietary modelling software is the accepted industry standard in noise propagation simulation.

8.3 SoundPlan Modelling Approach

- 8.3.1 Noise levels associated with the proposed complement of plant at the site were simulated using SoundPlan software. Model validation was done by comparing calculated (using SoundPlan) noise levels at specified locations (at the closest residential properties), with free field noise measurements recorded at the same location in a previous assessment. Validation was confirmed where modelled

values match free-field recorded noise levels within an acceptable range of variation (± 0.5 dB).

8.3.2 Model parameterisation of the proposed development was based on reference Sound Power Levels (L_{WA}) of similar plant/equipment specification as provided by British Standard BS5228. Noise associated with waste export from the site was considered in the SoundPlan model. Full details of BS5228 reference values and SoundPlan model parameterisation are provided in later sections of the report.

8.3.3 The SoundPlan model software was used to calculate noise levels associated with the proposed new development. A simulation of noise associated with the proposed development was provided by SoundPlan modelling software to predict noise levels for the purpose of undertaking a BS5228 assessment.

Additional Information

8.3.4 Site specific information related to plant compliment, vehicle numbers for mineral extraction were provided by the applicant. The information was used to parameterise the SoundPlan models to accurately replicate the proposed development.

8.3.5 During the background noise survey on the 14th April 2022, there was no activity on the former Bromley Farm Quarry as the site is now fully restored. The noise survey results for the model validation position are therefore considered to represent free field measurement for existing operations.

8.4. Instrumentation and Meteorology

8.4.1 Instrument description and specification used during the noise survey on the 14th April 2022 was as specified in Table 1.

Table 1. Instrumentation

Manufacturer	Description	Type	Serial No.
Cirrus	Integrating Averaging Sound Level Meter	CR:811B (Type 1)	C19842FD
Cirrus	Acoustic Calibrator	CR:515	45577

8.4.2 The sound level meter was configured with the set up parameters as detailed in Table 2 for all noise survey positions.

Table 2. Sound level meter set-up parameters

Time Weighting	Fast
Frequency Weighting	A
Operational Mode	Broadband Mode
Measurement Period	1 hour (15 minute multiples)

8.4.3 All instrumentation used during the noise survey was within the manufacturer's recommended period for both service and calibration. Certification of service and calibration are provided in Appendix E.

8.4.4 The sound level meter was calibrated in-situ using an acoustic calibrator (Serial no.45577) prior to the commencement of the noise measurement at each survey position.

Noise Measurement Parameters

- 8.4.5 The following free-field noise measurement indices were recorded at each survey position;
- L_{Aeq} – A-weighted equivalent noise measurement for the survey duration.
 - L_{90} – A-weighted noise measurement for exceeded for 90% of the survey duration.

Meteorological Conditions

- 8.4.6 Meteorological conditions observed during the noise survey periods were as follows;
- Cloud cover ranging between 40% and 50%
 - Low wind speed ranging between 0.01 and 2.7m s⁻¹.
 - Wind direction from the south-west.
 - Dry ground conditions and no rainfall.
- 8.4.7 Details of meteorological conditions specific to each noise survey position are provided on the survey log sheets in the full report.
- 8.4.8 Meteorological conditions during the noise survey period complied with the criteria specified in British Standard BS 4142.

8.5. Noise Sensitive Properties

- 8.5.1 The 3 closest properties to the proposed extension area are:
- 62 Cumberworth Lane
 - Lane Side Farm
 - 43 Cumberworth Lane
- 8.5.2 A noise survey was carried out on the 14th April 2022 at the selected noise sensitive properties considered relevant to the proposed development.
- 8.5.3 Noise survey positions were set up at the properties as discussed, and at least 3.5m distance from any vertical reflective surface, and 1.5m above ground level.
- 8.5.4 A noise measurement of 1hr duration (1hr L_{Aeq}) comprising 15 minute intervals was recorded on the 14th April 2022 at 62 Cumberworth Lane, Lane Side Farm and 43 Cumberworth Lane at 10.53am, 12.12pm and 13.29pm respectively.
- 8.5.5 All readings were taken at the rear boundary fence of each property. No access onto private land was carried out for the purposes of the background noise monitoring.

8.6. Background Noise Survey Results

8.6.1 Noise survey data was downloaded from the sound level meter using Deaf Defier 3.2 software.

8.6.2 A summary of the noise survey results are presented in Table 3 below.

Table 3. Free field noise measurements taken on 14th April 2022.

Location	L _{Aeq} dB(A)					L _{A90} dB(A)				
	0 to 15 min	15 to 30 min	30 to 45 min	45 to 60 min	L _{Aeq} 60 min	0 to 15 min	15 to 30 min	30 to 45 min	45 to 60 min	L _{A90} 60 min
62 Cumberworth Lane	53.7	54.6	48.4	54.3	52.8	36.8	37.2	35.8	37.5	36.8
Lane Side Farm	52.5	53.1	52.6	51.7	52.5	32.3	33.3	34.2	29.6	32.4
43 Cumberworth Lane	39.9	43.7	43.5	42.2	42.3	32.2	33.1	35.7	36.7	34.4

8.6.3 All of the noise survey locations were subject to varying degrees of noise associated with the rural location, Lane Side operational farm and road noise from the adjacent Cumberworth Lane.

8.6.4 As previously stated, the previous Bromley Farm Quarry is now completed and fully restored so no activity was taking place on the site,

8.7 Plant and Machinery (Noise Sources)

8.7.1 For the purpose of the noise assessment, all plant and equipment with attributable noise at the development were identified. The plant identified in the noise models were as follows;

HGV's associated with mineral export and waste importation
HGV's movements up to six per hour (peak)

Soil Stripping and Construction of Screening Mounds
360 Excavator and Dump Truck

Mineral extraction
360 Excavator (100% on time for worse case scenario calculations)

Movement of overburden
Articulated Dump Trucks (100% on time)

Replacement of soils for restoration
Bulldozer required only when an area has been restored ready to spread soils (Max once per year – Measured at 50% on time)

8.7.2 Details of the number and type of plant and equipment to be used at the development are provided in Table 4. Sound power levels for specific plant and equipment were sourced from literature values.

Table 4. Plant and equipment proposed for use for the proposed extension area

Plant/ Equipment	No.	Sound Power Level (L_{WA}) dB (A)	% on time	Corrected Sound Power Level dB (L_{WA})	BS5228 reference
360 Excavator	1	106	100%	106	Table C.1 No 16
HGV lorry – 4 axle wagon	6 loads per hour (Max)	110	50%	71	Table C1 No 34
Articulated Dump Truck	1	110	100%	110	Table C1 No 30
Bulldozer	1	108	50	54	Table C1 No 11

8.7.3 The 360 excavator used at the quarry have been modelled at 100% on time to demonstrate worse case scenario levels.

6.4 No other noise sources (other than those identified in Table 4) were considered at the site in the noise models.

8.8. SoundPlan Model Parameters

8.8.1 SoundPlan noise modelling software was utilised to determine the noise impact for the proposed extension to Bromley Farm Quarry. The model was parameterised based on operational details provided by the applicant for the type, number, and location of plant, operational periods, and HGV movements.

8.8.2 The models have been produced for soil stripping and bund construction to get the site established and 3 different scenarios for mineral extraction progressing through the extension area, in Cuts 1, 3 and 5.

8.8.3 SoundPlan was used to create a three dimensional replication of the topographic and structural detail of the assessment area. It was also possible to characterise the ground type, and include further structural detail such as bunds, walls and reflective surfaces. Sound Power Levels (L_{WA}) were assigned to individual items of plant such as the 360 excavator etc.

8.8.4 The core calculation model of SoundPlan used for predicting noise levels from the proposed development, utilised British Standard BS5228 and ISO9613-2:1996 methodology. The two standards are the accepted methodology for calculating noise propagation.

8.8.5 A combination of site specific topographic details and ground level data purchased from Ordnance Survey were used to create the ground terrain model (GTM) of the study area. The terrain model was therefore considered an accurate 3-dimensional replication of the development and the surrounding land.

8.8.6 The type and location of modelled plant/equipment was as detailed by the applicant to accurately replicate the proposed development. The SoundPlan model calculations are therefore considered to be very reliable.

8.8.7 General parameters assigned to the SoundPlan model was as follows;

- HGV's – Assigned as a linear noise source 2m above ground (Sound Power Level calculated in accordance with section F2.5.2 of BS5228). Maximum 6 per hour.
- Plant (360 excavator) – Only one excavator assigned as a single point noise source at 2m height above ground (Sound Power Level from literature value or BS5228).
- Articulated Dump Trucks (ADT's) – One required for the movement of overburden. Modelled at 100% for worse case scenario but would be an infrequent operation due to the low levels of overburden encountered.
- 1 bulldozer required for soil stripping and bund construction
- 1 bulldozer required for soil reinstatement
- Noise sensitive properties – Assigned as free-field single point receivers, 3.5m distance from façade and 1.5m height above ground.
- Ground absorption – Ground type assigned set at default setting (hard).

8.8.8 The sound power level (SWL) for HGV movements into the quarry along the haul road from the site entrance was calculated as follows;

$$L_{Aeq} = L_{WA} - 33 + 10\log_{10}Q - 10\log_{10}V$$

L_{WA} = HGV sound power level = 107dB

Q = Maximum number of movements per hour = 6

V = Average vehicle speed = 25 Km/Hr

Calculated L_{Aeq} = **71dB (A)**

8.8.9 Plant and equipment used at the existing and proposed development was parameterised in SoundPlan as detailed in Table 4 above.

8.8.10 Noise propagation model simulations were used to create noise contour plans, indicating the noise impact at the site and surrounding area. The noise contour plans accurately illustrate noise propagation at the study area and also anticipated noise levels at NSP's from the proposed development.

8.9 Noise Level Predictions

Prediction Methodology

8.9.1 The noise prediction methodology used in the SoundPlan modelling simulations were British Standard BS5228 and ISO9613-2:1996. The simulation results therefore conform to accepted prediction methodologies for the proposed development.

8.9.2 The prediction calculations therefore provided a range of anticipated noise levels from typical operations (including worst case scenario).

8.9.3 Prediction calculations also accounted for HGV movements within the site boundary based on calculation methodology provided in BS5228.

8.9.3 Four scenarios were modelled showing soil stripping and mineral extraction.

- 1) Plans 1 and 2 – Soil Stripping and bund construction
- 2) Plans 3 and 4 – Overburden mound construction
- 3) Plans 5 and 6 – Mineral extraction in Cut 1
- 4) Plans 7 and 8 – Mineral extraction in Cut 3
- 5) Plans 9 and 10 – Mineral extraction in Cut 5.
- 6) Plans 11 and 12 – Restoration by waste importation

Noise Prediction Assumptions

- 8.9.4 A number of assumptions were applied during noise prediction modelling. These related to operational specifics of the proposed development. It was assumed that worst case scenario for noise generation would be when plant was operated at closest proximity to any particular NSP.
- 8.9.5 Rates of clay extraction are estimated to be a maximum of 30,000 tonnes per annum (tpa) but is dependent upon market demand.
- 8.9.6 For 30,000 tpa, over a 48 week working year, this equates to a maximum of 60 HGV movements per day. 12 movements per hour as a maximum (6in, 6out) have been included in the noise modelling calculations.
- 8.9.7 The 60 movements includes the importation of inert waste for restoration when a sufficient void has been created for this to be undertaken. This is expected to be approximately during the working of Cut 3.
- 8.9.8 The previous quarry had a restriction of 20 HGV imports per day and this is anticipated to be sufficient in any new permission.

8.10 Noise Assessment Results

- 8.10.1 The following tables present the assessment results of predicted continuous free field noise levels at nearby NSP's, and comparison with the relevant assessment noise limit criteria.
- 8.10.2 Predicted free-field noise levels L_{Aeq} were compared with NPPF technical guidance criteria of no more than 10dB above background measurements (L_{90}) where possible, or in any case against a maximum permitted level of 70 dB for temporary operations such as soil stripping and bund construction and 55dB for normal daytime mineral extraction activity. The assessment results are presented in tables 5.1 to 5.5.

Table 5.1 – Soil Stripping and Screening Bund Construction

Location	Predicted noise emission from Soil Stripping & Bund Construction activity L_{Aeq} , 1hr dB	Measured background noise level LA_{90} , 1hr dB	NPPF technical guidance. noise criteria dB*1	Difference between predicted noise and assessment criteria dB*1	Compliance with NPPF
62 Cumberworth Lane	46.5	36.8	70	-23.5	Yes
Lane Side Farm	56.5	32.4	70	-13.5	Yes
43 Cumberworth Lane	27.9	34.4	70	-42.1	Yes

Note *1: NPPF technical guidance criteria of 70dB maximum for temporary activities such as baffle mound construction etc

Table 5.2 – Construction of Overburden Mound (Cut 1 only)

Location	Predicted noise emission from Soil Stripping & Bund Construction activity LAeq, 1hr dB	Measured background noise level LA90, 1hr dB	NPPF technical guidance. noise criteria dB*1	Difference between predicted noise and assessment criteria dB*1	Compliance with NPPF
62 Cumberworth Lane	45.7	36.8	55	-9.3	Yes
Lane Side Farm	47.9	32.4	55	-7.1	Yes
43 Cumberworth Lane	45.8	34.4	55	-9.2	Yes

Note *1: NPPF technical guidance criteria of no more than 10dB above background where possible or a maximum of 55dB

Table 5.3 – Mineral extraction (Cut 1)

Location	Predicted noise emission from Soil Stripping & Bund Construction activity LAeq, 1hr dB	Measured background noise level LA90, 1hr dB	NPPF technical guidance. noise criteria dB*1	<i>Difference between predicted noise and assessment criteria dB*1</i>	<i>Compliance with NPPF</i>
62 Cumberworth Lane	37.0	36.8	55	-8.0	Yes
Lane Side Farm	42.6	32.4	55	-12.4	Yes
43 Cumberworth Lane	27.4	34.4	55	-27.6	Yes

Note *1: NPPF technical guidance criteria of no more than 10dB above background where possible or a maximum of 55dB

Table 5.4 – Mineral extraction (Cut 3)

Location	Predicted noise emission from Soil Stripping & Bund Construction activity LAeq, 1hr dB	Measured background noise level LA90, 1hr dB	NPPF technical guidance. noise criteria dB*1	<i>Difference between predicted noise and assessment criteria dB*1</i>	<i>Compliance with NPPF</i>
62 Cumberworth Lane	46.7	36.8	55	-8.3	Yes
Lane Side Farm	48.0	32.4	55	-7.0	Yes
43 Cumberworth Lane	34.8	34.4	55	-20.2	Yes

Note *1: NPPF technical guidance criteria of no more than 10dB above background where possible or a maximum of 55dB

Table 5.5 – Mineral extraction (Cut 5)

Location	Predicted noise emission from Soil Stripping & Bund Construction activity LAeq, 1hr dB	Measured background noise level LA90, 1hr dB	NPPF technical guidance. noise criteria dB*1	Difference between predicted noise and assessment criteria dB*1	Compliance with NPPF
62 Cumberworth Lane	46.7	36.8	55	-8.3	Yes
Lane Side Farm	48.0	32.4	55	-7.0	Yes
43 Cumberworth Lane	34.8	34.4	55	-20.2	Yes

Table 5.6 – Waste Importation (Cuts 3 to 5)

Location	Predicted noise emission from Soil Stripping & Bund Construction activity LAeq, 1hr dB	Measured background noise level LA90, 1hr dB	NPPF technical guidance. noise criteria dB*1	Difference between predicted noise and assessment criteria dB*1	Compliance with NPPF
62 Cumberworth Lane	47.2	36.8	55	-7.8	Yes
Lane Side Farm	50.0	32.4	55	-5.0	Yes
43 Cumberworth Lane	42.8	34.4	55	-12.2	Yes

Note *1: NPPF technical guidance criteria of no more than 10dB above background where possible or a maximum of 55dB

8.11. Conclusions

- 8.11.1 The background noise readings at various locations around the proposed development were low due to the rural location and the previous Bromley Farm Quarry being now completed and fully restored.
- 8.11.2 Part of the development includes the construction of 2m high perimeter bunds on the northern and eastern boundaries. NPPF guidelines allow for a noise limit criteria of 70dB for bund engineering work for a period of 8 weeks per year.
- 8.11.3 Noise model results for bund engineering activity indicated compliance with the 70dB temporary noise limit criteria for all noise sensitive properties near to the development.
- 8.11.4 Noise model results for mineral extraction indicated compliance with the 55dB limit in the NPPF at all locations.
- 8.11.5 All noise model results produced in SoundPlan are provided in the main report. The noise model results and contour plans indicate that noise from the development complied with the noise limit criteria specified in NPPF and PPG guidelines at all noise sensitive properties and would not have a significant adverse noise impact at the surrounding locality.

- 8.11.6 Noise prediction calculations confirm that the proposed extension to Bromley Farm Quarry is unlikely to cause any significant noise impact at nearby noise sensitive properties (NSP's).
- 8.11.7 Predicted noise levels from the proposed development were below the noise limit criteria as specified in the National Planning Policy Framework and Planning Practice Guidance at all NSP's.
- 8.11.8 Based on the findings of the noise assessment it was concluded that the proposed development would not have an adverse noise impact on nearby noise sensitive properties or the surrounding area.

9. NOISE MANAGEMENT PLAN

9.1 The quarry will be operated in accordance with a noise management plan which is detailed below.

9.2 The aims of the noise management plan are:-

- a) To minimise noise disturbance and annoyance.
- b) To ensure compliance with environmental noise legislation.
- c) To develop a noise control strategy that can be implemented during operations.
- d) To ensure site operations do not cause disturbance from noise nuisance.

9.3 The noise management plan will be reviewed on an annual basis. Changes may be made to the plan to ensure noise is minimised at all times.

Noise Control Measures

9.4 The following control measures will be implemented at the site to minimise noise nuisance:-

- a) The operator shall ensure that plant and equipment procurement policy considers the lowest possible sound power levels where possible.
- b) Operations will be co-ordinated to minimise noise levels at the site at all times.
- c) Noise will be directed away from potential noise sensitive receptors wherever possible, particularly when noise from the plant/equipment is highly directional.
- d) All plant shall be properly maintained to ensure the integrity of silencers, lubrication of bearings etc. so as to avoid unnecessary noise emissions.
- e) Haul road surfaces will be graded to ensure that they are kept smooth to minimise clattering etc. Pot holes shall be regularly repaired, and the surface shall be regularly inspected to ensure it is kept in a satisfactory condition.
- f) Haul roads and areas within the quarry which are being worked shall be appropriately screened where possible i.e. by temporary bunding or mounds of material which are situated at or below planning permitted restoration levels to provide effective screening.
- g) Drop heights will be kept to a minimum when material is being handled at the site.
- h) Plant and equipment operatives shall take care to avoid unnecessary clanging of excavator buckets etc.
- i) All plant and equipment will be switched off when not in use and revving of engines shall be avoided at all times.
- j) All plant will be serviced according to its schedule and maintained in good working order at all times.

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- k) All plant engine covers will be kept in place at all times.
 - l) Noise mitigation will be considered in procurement or replacement of plant and equipment.
 - m) The use of reversing alarms is required for health and safety reasons; however care should still be taken to minimise noise disturbance at nearby noise sensitive properties. High pitch reversing beepers shall not be used on plant at the site.
 - n) Reversing of vehicles will be avoided as much as is practical, and routing of vehicles should be made with this in mind.
 - o) All relevant site employees will receive appropriate training in order to ensure familiarity with noise control measures at the site.
 - p) Best practice techniques shall be employed by the site manager at the site at all times to reduce noise sources to a minimum.

Management and Review Procedure

- 9.5 The site manager will be responsible for the management of noise. The manager will ensure that staff are trained appropriately. Mitigation and operational controls will ensure the effective management of noise at the site.
- 9.6 It is considered that the noise controls stated above shall be effective in minimising noise at the site.

Noise Action Plan

- 9.7 In the event that noise generated from the site is likely to cause nuisance to nearby properties, or complaints regarding noise are likely, then the following noise action plan will be implemented at the site.
 - a) If operations at the site create an unacceptable level of noise, the relevant activity will be reviewed by the site manager, and improvements shall be made to significantly reduce noise emissions. If necessary the site manager may consider temporary suspension of significant noise related activity until the operational review is complete, and a noise minimisation strategy is implemented.
 - b) In the event of a complaint associated with noise created at the site, an investigation will be undertaken immediately to determine the source. Appropriate action will be taken which will include the cessation of the activity if necessary. Any action taken will be communicated to the complainant. The nature of the complaint, the findings of the investigation, and the action taken will be recorded in writing.
 - c) On receipt of a noise complaint, consideration will be given to wind speed and direction, and the nature of the operations taking place at the time. As necessary, the relevant operational procedures will be reviewed and improvements implemented to significantly reduce noise related activity.
 - d) The noise management plan will be reviewed by the site manager on an annual basis. The noise management plan will be continually developed and updated to ensure minimum noise is caused at the site throughout its operational life.

Noise Complaints Procedure

- 9.8 In the event that a complaint is received by the site operator regarding noise emissions from the site, the following procedures will be implemented by the site manager/supervisor;
- a) A noise complaint will be immediately investigated, and where necessary, measures will be implemented to reduce noise levels associated with quarrying and site restoration activity.
 - b) Within 72 hours of receipt of complaint the complainant will be informed of the findings of the investigation and what actions are to be taken.
 - c) Details of all noise complaints, and any actions undertaken as a result of investigations, will be recorded on a Noise Complaint Form and a record will be held at the site manager's office. A record of noise complaints will be made available upon reasonable request by the mineral planning authority.
 - d) If noise complaints persist, then noise monitoring will be carried out at the location of the complainant to determine the source, scale and nature of noise which is causing disturbance. The results of the noise monitoring will be evaluated independently and an appropriate course of action shall be taken by the quarry manager to reduce noise emissions.

10. DUST AND AIR QUALITY

10.1 Introduction

- 10.1.1 Miller Goodall Limited were commissioned by Silkstone Environmental Limited to undertake an air quality assessment of the proposed 8.4 hectare extension.
- 10.1.2 It assesses the potential air quality changes arising from vehicle emission and disamenity dust during the operational phase, and whether these potential changes would significantly alter air quality.
- 10.1.3 An assessment of disamenity dust and particulate matter generation has been completed for each individual dust-generating operations during all five phases and restoration of the operational phase. The assessment has been undertaken in accordance with the source-pathway-receptor methodology recommended for assessment of mineral dust by the Institute of Air Quality Management. The potential timeframes of when receptors might be downwind of dust-generating operations has been calculated and assessed for potential impact. The assessment concludes that there is a negligible risk of dust effects associated with the operations proposed for the extension at Bromley Farm Quarry.
- 10.1.4 The potential air quality effects of emissions from vehicle haulage have been assessed. The extension will be worked with existing vehicles and will utilise the same number of permitted traffic movements, therefore, there is no discernible change in regard to vehicular emissions, and the potential air quality effects can be concluded as not significant.
- 10.1.5 The proposed development is not expected to have a significant impact on local air quality. There is, therefore, no reason for this application to be refused on the grounds of air quality.
- 10.1.6 Below is a summary of the findings of the full report.

10.2 Legislation, Guidance and Literature Review

Air Quality Objectives

- 10.2.1 The standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance.
- 10.2.2 The IAQM Minerals Guidance¹ recognises that most suspended dust is typically in the coarse subfraction (PM_{2.5-10}) rather than the fine sub-fraction (PM_{2.5}). The assessment procedure outlined in the guidance concentrates on PM₁₀. PM_{2.5} forms part of the total PM₁₀ concentration, therefore, if PM₁₀ is below the objectives, it is likely PM_{2.5} is too.

National Planning Policy Framework & Planning Policy Guidance

- 10.2.3 Section 17 of the National Planning Policy Framework³ is relevant to minerals. There is no specific mention of dust or air quality, however, Paragraph 210, point f) does state due consideration is needed to protect human health from adverse effects:

“set out criteria or requirements to ensure that permitted and proposed operations do not have unacceptable adverse impacts on the natural and historic environment or human health, taking into account the cumulative effects of multiple impacts from individual sites and/or a number of sites in a locality”

- 10.2.4 The Mineral sub-section of the Planning Practice Guidance (PPG) includes an assessment procedure for dust⁴. Paragraphs 23 to 32 outline the approach required for dust assessments:
- Stage 1: establish baseline conditions of the existing dust climate around the site of the proposed operations;
 - Stage 2: identify site activities that could lead to dust emission without mitigation;
 - Stage 3: identify site parameters which may increase potential impacts from dust;
 - Stage 4: recommend mitigation measures, including modification of site design
- 10.2.5 All four stages are assessed in this report. Paragraph 32 provides a site assessment flow chart for PM₁₀, indicating PM₁₀ should be assessed up to 1 km from the operation.

10.3 Disamenity Dust (10 to 75 µm)

- 10.3.1 Dust from a mineral operation has the potential to reduce amenity in the local community due to visible dust plumes and dust soiling onto property, which may lead to annoyance and complaint.
- 10.3.2 The generally coarser dust (i.e. visible dust) that leads to these effects is referred to in the IAQM Mineral Guidance¹ as disamenity dust.
- 10.3.3 The Department of the Environmental Minerals Division⁵ defines dust as organic and/or inorganic particles in the size range of 1 to 75 µm. The IAQM Minerals Guidance also notes British Standard 6069 refers to dust up to particle size diameter of 75 µm. Particle sizes below 10 µm are defined in UK air quality legislation as particulate matter (PM₁₀ and PM_{2.5}).
- 10.3.4 Various information sources have informed the IAQM Minerals Guidance¹ screening methodology for assessment, which states an assessment of dust is required if there are sensitive receptors within 250 m of a soft-rock quarry or 400 m of a hard-rock quarry.
- 10.3.5 Dust may still be present in an airflow beyond these distance of the dust-generating source.
- 10.3.6 However, it is unlikely that it exists in such volume to cause significant annoyance or complaint.
- 10.3.7 Dust complaint is usually associated with periods of peak deposition that can be exacerbated by meteorological conditions such as prevailing wind patterns and dried out surfaces. The airflow naturally contains dust; however, it is when this 'norm' is exceeded that disamenity dust may become recognisable and lead to complaint; as there may be annoyance caused by the obscuring of surfaces (such as vehicles or window ledges). Nuisance is subjective and what one individual may deem to be significant, another may not. The effect of dust to a community can be attributed to several factors:

- the location of the dust-generating source to the community i.e. prevailing wind directions and downwind orientations;
 - duration of site activities that produce dust;
 - meteorological conditions, such as dry weather (drying out of surfaces) and wind patterns;
 - the frequency of the above three bullet points; and
 - the effectiveness of the dust management and controls employed at the source.
- 10.3.8 Dust can be controlled and mitigated effectively with dust management techniques. A dust management plan is a standard mitigation inclusion on almost all UK land reclamation and earthworks sites, often being employed successfully even when sensitive uses are located within 100 m of the sources.
- 10.3.9 There are no statutory thresholds for dust deposition or annoyance. The Environment Agency often adopts a custom-and-practice deposition guideline value of 200 mg/m²/day as a threshold for when complaints may begin to arise. This guideline value is used throughout the UK for mineral and permitted operations.

10.4 Particulate Matter (<10 µm)

- 10.4.1 Particulate matter is a sub-fraction of dust, comprising particle sizes below 10 µm diameter. UK air quality legislation recognises PM10 and PM2.5, however, PM2.5 is not usually considered in quarry dust assessments. This is due to limited information and research available for dust-related PM2.5 emissions. The IAQM Minerals Guidance and PPG state the assessment should focus on PM10. PM2.5 is a fraction of PM10, therefore, controlling emissions of PM10 will also control PM2.5 emissions.
- 10.4.2 Research published by Vallack et al. (1998)⁶ found that from construction-derived dust, only 10% to 15% (by weight) were in the PM2.5 fraction size. Defra LAQM.TG (22) provides a methodology for calculating the potential PM2.5 contribution of a total PM10 concentration. It found a relationship of 0.7 linked the two pollutants. Therefore, where PM10 impacts can be concluded as not significant, it is highly likely a similar conclusion can be made for PM2.5 too.
- 10.4.3 Information on the PM10 process contribution (PC) from mineral extraction is limited. The IAQM Mineral Guidance has compiled a list of known PC for PM10:
- 10.4.4 Local air quality management technical guidance LAQM.TG(03) – mathematical calculation and graphical plot outlined decreasing PM10 PC with distance. This is a simplistic mathematical approach and is not based on air quality monitoring evidence. The annual mean PC is classed as variable, up to 5 µg/m³;
- The Newcastle Study assessed PM10 contributions near opencast coal mining sites. This study comprised of long-term monitoring at various distances from the surface mine. A PM10 process contribution of 2 µg/m³ was concluded from the study;
 - Committee on Medical Effects of Air Pollutants (2002) – The research concluded that a +14% factor should be applied to the worst-case annual background concentration
- 10.4.5 H J Banks & Company Ltd has an extensive history of operating surface coal mines in North East England. A scientific study was commissioned by the firm for the former, now restored Shotton surface coal mine located in

Northumberland. The King Study included an extensive automatic air quality monitoring network during an operational period of Shotton surface mine. The research concluded that the process contribution was a +7% factor to the worst-case annual background concentration.

- 10.4.6 The IAQM Minerals Guidance¹ provides a methodology for the assessment of PM₁₀. The guidance states:

“If the long-term background PM₁₀ concentration is less than 17 µg/m³ there is little risk that the Process Contribution (PC) would lead to an exceedance of the annual-mean objective and such a finding can be put forward qualitatively, without the need for further consideration, in most cases.”

- 10.4.7 Further steps and assessment is required if the annual mean concentration is above 17 µg/m³, which is described in the guidance. The IAQM Mineral Guidance¹ recommends the assessment focus on the annual mean objective, rather than short-term objective due to limited published data and evidence for short-term contributions.

10.5 Methodology

Consultation

- 10.5.1 The proposed air quality assessment methodology was sent to Kirklees Council.. It was agreed that an assessment will be completed as per the IAQM Minerals Guidance using the source-pathway- receptor methodology, and that a 250 m soft-rock screening criterion will be applied. It was also agreed that vehicle emissions will be scoped out of the assessment as there is no increase in vehicle generation from the extension.

Road Traffic Emissions Assessment

- 10.5.2 The extension will be worked as a continuation of existing activities. No changes to the extraction rate or vehicle movements are proposed. The extension will be worked using the existing traffic movements of the recently restored Bromley Farm Quarry.
- 10.5.3 The proposed development will therefore not introduce any increase of Annual Average Daily Traffic (AADT) in terms of light-duty vehicles (LDV) or heavy-duty vehicle (HDV). Vehicle emissions from heavy-duty vehicles will, therefore, remain unchanged in comparison to the existing baseline.
- 10.5.4 An assessment of vehicular emissions is not required and can be concluded as not significant.
- 10.5.5 If the net development flows are below 500 LDV AADT or 100 HDV AADT outside an AQMA, or 100 LDV AADT and 25 HDV AADT within an AQMA as detailed in EPUK 2017 Guidance¹⁰, then there is not expected to be a significant risk of air quality change. Air quality changes from trip generation below these criteria can be concluded as not significant.
- 10.5.6 The potential for air quality changes arising from development traffic to cause adverse effects can be concluded as not significant.

IAQM Minerals Guidance

- 10.5.7 The IAQM has produced guidance¹ on the assessment of air quality impacts from dust associated with mineral excavation activities and provides a methodology by which to complete such assessments.
- 10.5.8 The first stage of the guidance is to determine the scale of assessment needed by reviewing whether there are sensitive receptors within distances of either 250 m of soft-rock extraction or 400m of hard-rock extraction. This distance should be drawn from a dust-generating sources, rather than the site boundary.
- 10.5.9 Clay will be extracted at the extension which is a soft-rock so a distance of 250 m is used. There are sensitive receptors located within 250 m of the dust-generating activities. Further assessment is required as it is not possible to screen out effects.
- 10.5.10 The potential air quality impacts of disamenity dust and particulate matter during the extraction timeframe have been assessed using the source-pathway-receptor methodology of the IAQM Minerals Guidance¹.
- 10.5.11 The source for various activities is calculated as either small, medium or large depending on the scale of the activities. The IAQM Minerals Guidance¹ includes various parameters to consider in the selection of the risk. Residential receptors are classed as highly sensitive.
- 10.5.12 The pathway has been assessed by calculating the amount of time sensitive receptors may be downwind of each dust-generating operation, across all Phases of working for the various operations. A semi-quantitative meteorological assessment has been completed using a dry-day wind dataset (<0.2 mm rainfall) for Emley Moor Meteorological Station to calculate the pathway effectiveness when receptors would be downwind during the working hours of the quarry. Dust will not be generated during damp conditions or rainfall, neither will there be significant dust generation when operations cease.
- 10.5.13 The source-pathway-receptor are combined to calculate the risk of dust effects. It should be noted that quarries will often always deploy mitigation regardless of the risk and impact; often in the form of a dust management plan. The matrixes listed in the guidance are used to classify the risk.
- 10.5.14 The IAQM Minerals Guidance¹ advises calculating the pathway effectiveness above 5 m/s only, which often dismisses a significant proportion of the overall wind dataset. For the Emley Moor dataset used in this study, 46% of the dataset is in the <5 m/s category.
- 10.5.15 Wind speeds above 5 m/s can raise dust from the surfaces and contribute to eroding of a surface, whereas winds below 5 m/s are usually incapable of raising dust from a surface. However, dust raised into the air (such as vehicle movements or unloading) can be carried by winds below 5 m/s.
- 10.5.16 Often the inclusion of mitigation (such as wheel washes and low drop height unloading) will reduce the risk of dust being raised into the air. The percentage of winds below 5 m/s is shown for reference in this assessment.

Sensitive Receptors

- 10.5.17 Sensitive receptors are located within 250 m of a potential dust-generating operation at the extension. These two sensitive receptors located to the north west (Lane Side Farm) and south east (Bluehills Lane) of the extension.

10.5.18 There are residential receptors to the north east at Top Road as well west at Cumberworth Lane, however the distances of these are above 250 m so these have been screened out from the assessment.

10.5.19 The sensitive receptor locations are listed in Table 1 below.

Receptor	Grid Ref (x, y)		Sensitivity	Distance to Site Boundary
ESR 1 (Lane Side Farm)	421486	409108	High	40 m
ESR 2 (Lane Side Farm)	421448	409057	High	100 m
ESR 3 (Bluehills Lane)	422293	408952	High	215 m
ESR 4 (Bluehills Lane)	422293	408983	High	210 m
ESR 5* (Cumberworth Lane)	421326	408904	High	292 m

*included for the on-site trackout risk assessment only, as the access route is within 250 m of this receptor

Table 1: Existing Sensitive Receptor Locations

10.6 Baseline Environment

Local Air Quality

10.6.1 Kirklees Council operates an air quality monitoring network, however, it is located in urban areas where the risk of air pollution exceedances is greatest. The nearest air quality monitor from the quarry is 5.5 km to the north of the quarry at Emley Moor

10.6.2 There is no air quality monitoring data near the site, however, as discussed concentrations are unlikely to be elevated due to the site's rural location.

Background Concentrations

10.6.3 There are no background monitoring locations in the vicinity of the proposed development site.

10.6.4 The PM10 concentration has been obtained from the background concentration maps provided by Defra for the grid square covering the sensitive receptors and quarry.

10.6.5 The background concentration is shown in Table 2 below.

Grid Square	Pollutant	2022
		($\mu\text{g}/\text{m}^3$)
421500, 409500	NO ₂	6.67
	PM ₁₀	11.21
	PM _{2.5}	6.11
421500, 408500	NO ₂	6.79
	PM ₁₀	11.19
	PM _{2.5}	6.11
422500, 408500	NO ₂	7.90
	PM ₁₀	11.20
	PM _{2.5}	6.21

* Background concentrations obtained from the latest 2018-based background maps

Table 2: Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site and Receptor Locations*

Meteorological Data

- 10.6.6 To provide quantification of how sensitive receptors might be affected by dust deposition caused by local weather conditions, a 3-year averaged dry-day wind frequency dataset for 2019 to 2021 (<0.2 mm hourly rainfall) has been obtained from Air Pollution Services for the Emley Moor meteorological station. This dataset excludes rainfall, as dampened and wet surfaces are unlikely to raise significant levels of dust. This station is considered to be the most representative of the site.
- 10.6.7 Wind speeds below 0.5 m/s (i.e. calm) are not expected to hold or raise significant levels of dust, therefore, these are excluded from the calculation. The Beaufort Scale specifies intensity value ('moderate breeze') as being able to raise loose dust from an exposed surface which is defined as approximately 5.5 m/s to 8 m/s. Wind speeds above 17 m/s are generally considered to be capable of eroding a surface and may generate significant levels of dust into the airflow.
- 10.6.8 Whilst wind speeds above 5 m/s are considered capable to raise dust from a surface, wind speeds below 5 m/s are still an important consideration as they may carry dust that is already entrained or lifted into an airflow above the surface; for example, dust generated from unloading activities, or breaking of the rock face with the excavator. The effects of this can often be mitigated by reducing the level of dust raised from the operation.
- 10.6.9 To calculate the pathway, the dust analysis includes two wind speed categories and 12 compass directions (wind direction indicates the direction wind has originated from):
- < 5 m/s wind speed: movement of dust in the airflow; and
 - >5 m/s wind speed: some and/or potentially significant erosion and lifting of dust from a surface.

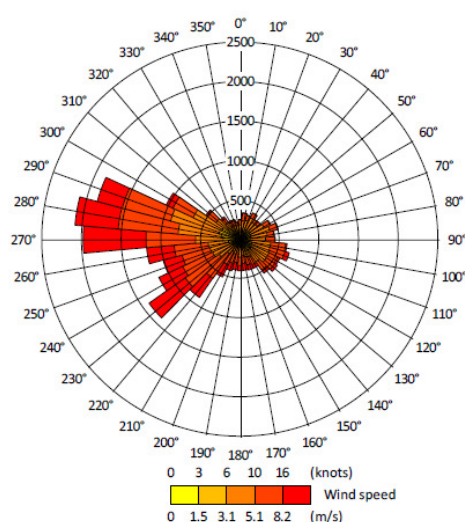
10.6.10 The percentages of wind from the Emley Moor dry-day 2019 to 2021 dataset are shown in **Table 3**

Table 3: Wind Frequency Percentage (<0.2 mm Rainfall) for Emley Moor

Degree Arc	Compass Direction	< 5 m/s	> 5m/s	Total Percentage of Wind
Incomplete/Missing Data/Calm Winds (<0.5 m/s)	-	-	-	5.56%
348.75°- 11.25°	N	2.23%	0.85%	3.08%
11.25°- 33.75°	NNE	2.10%	0.54%	2.64%
33.75°- 56.25°	NE	2.08%	0.44%	2.53%
56.25°- 78.75°	ENE	2.75%	0.95%	3.69%
78.75°- 101.25°	E	4.01%	1.96%	5.97%
101.25°- 123.75°	ESE	3.09%	1.69%	4.78%
123.75°- 146.25°	SE	2.88%	1.45%	4.33%
146.25° - 168.75°	SSE	1.87%	1.36%	3.23%
168.75° - 191.25°	S	2.40%	2.29%	4.69%
191.25° - 213.75°	SSW	1.48%	2.31%	3.79%
213.75° - 236.25°	SW	2.06%	7.08%	9.14%
236.25° - 258.75°	WSW	2.95%	5.56%	8.51%
258.75° - 281.25°	W	6.70%	14.21%	20.91%
281.25° - 303.75°	WNW	6.08%	5.54%	11.62%
303.75° - 326.25°	NW	2.41%	1.07%	3.48%
326.25° - 348.75°	NNW	1.41%	0.65%	2.06%

Degree Arc	Compass Direction	< 5 m/s	> 5m/s	Total Percentage of Wind
Totals		46.50%	47.94%	100.00%

Figure 1: Dry-data (<0.2 mm) Wind Rose for Emley Moor



10.6.11 The dominant wind direction is from the west and south-west. The sensitive receptors are located to the north, east, south-east and west of the extension.

10.7 Operational Phase Assessment – Disamenity Dust and Particulate Matter

10.7.1 The assessment has been assessed to the source-pathway-receptor methodology.

10.7.2 The main activities and sources of dust at UK quarrying sites are similar. The IAQM Minerals Guidance groups these activities as:

- site preparation/restoration;
- mineral extraction;
- material handling;
- on- and off-site transportation (haul roads, site access routes, public highway road network);
- mineral processing (e.g. mobile screening plant); and
- stockpiling/exposed surfaces.

10.7.3 Site preparation includes the removal of the top soil layers, which is similar to restoration as both can be likened to earthwork activities. All these activities will be carried out at the extension except any mineral processing. There is no mineral processing (mobile screening etc.) to be carried out at the quarry as all extracted material will be sent to Crow Edge for clay pipe manufacture.

10.7.4 The activities may involve the use of different equipment in different areas of the quarry, however, it is recognised that several activities will often overlap. For example, the top surface layer is removed (site preparation), the mineral is extracted at the rock face (mineral extraction) and is then deposited into dumper trucks (material handling). These activities are carried out in the same location, therefore, producing a similar or identical pathway calculation.

10.7.5 The scale of each source is calculated and assigned as either small, medium or large, using the methodology outlined in the IAQM Minerals Guidance¹.

10.7.6 A summary of each source risk is shown in **Table 4**.

Table 4: Summary of Activity Source Risks

Activity	Risk
Site preparation/restoration	Small
Mineral extraction	Small
Material handling	Small
On-site transportation	Small
Off-site transportation	N/A*
Mineral processing	N/A
Stockpiling/exposed surfaces	Small

* off-site transportation does not alter from the existing baseline and does not require further assessment.

Pathway

- 10.7.7 The pathway effectiveness considers the time sensitive receptors that may be exposed to dust emissions from each source and in each phase of the development, using a semi-quantitative meteorological assessment. This calculation procedure considers the operational hours, as outside of this period there is unlikely to be significant levels of dust raised. It also assumes annual working for ease of the annual meteorological dataset calculations and to produce a worst-case assessment. In reality, the quarry is only expected to be worked between March to September on a campaign basis. The reduced working schedule will also lower the overall risk associated with dust generation.
- 10.7.8 Operating hours will be the same as the previous quarry as below:

Monday to Friday – 07:30 to 18:00
Saturday – 07:00 to 13:00
No working on Sundays or bank holidays.
- 10.7.9 The quarry is operational for 2,990 hours per year.
- 10.7.10 By the process of a pro-rata calculation, the number of operational hours in each wind category and compass direction at Emley Moor (determined from **Table 3**) can be calculated to determine the number of hours when dry winds may blow from each direction for a typical operational year, as shown in **Table 4**.

Table 4: Dry Day Wind Frequency Analysis - Working Hours per Year

Degree Arc	Compass Direction	Operational Hours		
		Hours < 5 m/s	Hours > 5m/s	Total Hours (per year)
348.75°- 11.25°	N	67	25	92
11.25°- 33.75°	NNE	63	16	79
33.75°- 56.25°	NE	62	13	76
56.25°- 78.75°	ENE	82	28	110
78.75°- 101.25°	E	120	59	179
101.25°- 123.75°	ESE	92	51	143
123.75°- 146.25°	SE	86	43	129
146.25° - 168.75°	SSE	56	41	96
168.75° - 191.25°	S	72	68	140
191.25° - 213.75°	SSW	44	69	113
213.75° - 236.25°	SW	62	212	273
236.25° - 258.75°	WSW	88	166	254
258.75° - 281.25°	W	200	425	625
281.25° - 303.75°	WNW	182	166	347
303.75° - 326.25°	NW	72	32	104
326.25° - 348.75°	NNW	42	19	62
Total Hours		1,390	1,433	2,824 *

***Total hours do not equal 2,990 due to the exclusion of the calm winds and missing/incomplete data (that account for 5.56% of the dataset, Table 3).**

- 10.7.11 Sensitive receptors will be downwind of a source in a specific orientation and direction, this can be termed a degree arc. This is the degree angle when the source and sensitive receptor align. Outside of this degree arc, the winds would transport dust away from the sensitive receptor location (taken as 360° with north at 0° reference). In accordance with the IAQM Minerals Guidance¹, only dust generating operations within 250 m of the sensitive receptor require assessment.
- 10.7.12 The on-site transportation haul route enters the extension in the southwest, travels northwards along the western boundary (bordering Phase 1), and then makes a 90° clockwise turn (adjacent to the bund) in the northern part of the extension. For each subsequent Phase, the haul route extends eastwards from this 90° turn and enters the void of each Phase from the north.
- 10.7.13 Several activities can be grouped as they overlap and will work the same locations. The quarry will be worked west to east and follows a broadly straight line for each successive phase.
- 10.7.14 Consequently, the degree arcs between the different phases are very similar. The assessment considers the entirety of the quarry and all phases as a single assessment. The degree arcs between the ESR and each source to be assessed are shown in **Table 5**.

Table 5: Degree Arcs to Sensitive Receptors

Receptor	Site Preparation/Extraction /Restoration	On-site Transportation
ESR 1	59 - 122°	60 - 220°
ESR 2	55 - 101°	60 - 220°
ESR 3	266 - 279°	N/A
ESR 4	272 - 288°	N/A
ESR 5	N/A	45 - 138°

N/A indicates the dust source is located more than 250 m from the sensitive receptor

- 10.7.16 The percentage of time-sensitive receptors that would be downwind of the sources for a typical operational year has been calculated.
- 10.7.17 The degree arcs cover the maximum boundaries of the different sources. This assumes, for example, that the entire void of each Phase is being worked, which would not occur during the day-to-day working of the extension, given the quarry is to be worked over a 25 year timespan.
- 10.7.18 The result does not equate to actual periods of time when a sensitive receptor would be impacted, but merely the maximum amount of time-based on the recorded 3-year average meteorological statistics of the Emley Moor meteorological station. The calculation is based on the probability of the specific

dry-day wind direction occurring for a constant period of time, which is not likely to occur in the real world.

10.7.19 The results of the pathway effectiveness are shown in Table 6.

Table 6: Pathway Effectiveness Calculations

Receptor	Degree Arc (°)	Distance to Source (m) and IAQM Category	Percentage (%) of dry-wind <5 m/s	Percentage (%) of dry-wind >5 m/s	Number of Days Per Month When Winds Blow from Source to	Frequency	Pathway Effectiveness	Dust Impact Risk*	Magnitude of Dust Effects**
Site Preparation / Restoration/Extraction All Phases									
ESR 1	59 - 122°	70 (Close)	10%	5%	1.50	Infrequent	Ineffective	Negligible risk	Negligible effect
ESR 2	55 - 101°	115 (Intermediate)	7%	3%	1.00	Infrequent	Ineffective	Negligible risk	Negligible effect
ESR 3	266 - 279°	235 (Distant)	7%	14%	2.17	Frequent	Moderately Effective	Negligible risk	Negligible effect
ESR 4	272 - 288°	235 (Distant)	13%	20%	3.38	Frequent	Moderately Effective	Negligible risk	Negligible effect
On-Site Trackout									
ESR 1 & ESR 2	60 - 220°	30 (Close)	21%	19%	4.11	Frequent	Highly Effective	Low risk	Slight adverse effect
ESR 5	45 - 138°	40 (Close)	15%	6%	2.21	Moderately Frequent	Moderately Effective	Negligible risk	Negligible effect

*Calculated by combining the pathway effectiveness and the source risk

**Calculated by combining the dust impact risk and receptor sensitivity

The number of days statistic is the time period when winds may blow in the degree arc for an average operational month for all wind speeds >0.5 m/s.

10.7.19 It should be noted that vehicles using the haul route are transient, but have been assessed as a continuous source of emission in the above risk assessment. This would not be the case, as the vehicles would quickly leave the area, and mitigation will also be employed to reduce the risk of dust generation along the trackout route.

10.7.20 It is important to recognise that the pathway calculation is a worst-case exposure calculation.

10.7.21 Several factors will reduce the potential for dust generation during the day-to-day working of the extension:

- Mineral extraction will be carried out in the quarry void. Wind speed and patterns will be disrupted by the presence of the void and void walls, which will ultimately assist to reduce the amount of dust leaving the void.
- Continuous working in a single location. Per day and hourly, the operations will move and activities will alter. For example, activities may be carried out beyond 250 m for variable periods of the day, or even years given the campaign extraction activities. As the Phases progress, the activities will move further away from sensitive receptors.
- Transient use of the on-site routes. This includes transient use, vehicles only taking minutes to travel the route and extended periods when no vehicle is using the haul route. The pathway calculation considers the entire route (degree arc) as a continuous dust emission source, which is an overestimation.

- Daily wind pattern variations. The assessment assumes one continuous directional movement for a prolonged period. Wind directions will alter over minutes and hours, reducing the overall likelihood of prolonged dust transportation in any single direction.
- Obstructions such as trees can act as a blockage to wind, causing the wind speed to lower and the obstructions themselves causing the winds to divert into different directions. This may be sufficient to cause some of the airborne dust to deposit out of the airflow and/or limit the dust being raised in the first place. Trees and vegetation occupy the land between the extension and ESRs 3 and 4.
- The calculation assumes dust may freely travel based on no mitigation being employed. Mitigation, particularly dampening, will significantly reduce the likelihood of dust being available to travel beyond the site boundaries. Daily visual dust inspections will monitor the situation and inform mitigation during day-to-day operations.

10.7.22 The potential dust effects derived from the calculation indicate that all source activities at each sensitive receptor will have a **negligible dust effect**. On-site transport, for ESR 1 and 2, is concluded to meet a slight adverse effect. However, as described above the risk from this activity will be negligible due to the transient use of the dust source.

10.7.23 The inclusion of dust mitigation is sufficient to ensure negligible effects are achieved throughout the working of the extension at Bromley Farm Quarry. The inclusion of a dust management plan is a standard mitigation strategy for mineral development proposals.

Particulate Matter Impact from Mineral Working

10.7.24 The IAQM Minerals Guidance¹ provides a methodology for the assessment of PM10 from mineral working operations. PPG requires an assessment up to 1 km from the development. PM10 background concentrations have been obtained for the local area, as outlined in **Table 5**.

10.7.25 The IAQM Minerals Guidance provides a 5-step procedure for the assessment of particulate matter and process contribution. The guidance specifies the focus should be on PM10 and the annual mean only, due to insufficient research and data to inform the short-term objective or PM2.5.

10.7.26 Step 1 of the methodology is a screening assessment. A detailed assessment, and continuation to steps 2 to 5, are only required if the background PM10 annual mean is above 17 µg/m³.

10.7.27 The 2022 annual mean is less 12 µg/m³, and therefore does not require further assessment. It should be noted that Bromley Farm Quarry was operational when the Defra background maps were prepared in 2018 and it is likely a quarrying contribution was included for the 1km*1km grid square where the quarry resides.

10.8 Summary of Impacts and Conclusion

10.8.1 This air quality and dust report assesses the potential changes in air quality due to the working of the extension at Bromley Farm Quarry and whether these potential changes would significantly alter air quality.

10.8.2 A semi-quantitative meteorological assessment for disamenity dust using the source-pathway receptor methodology has concluded there are negligible and

not significant effects at five existing dust-sensitive receptors that are located within 250 m of the extension.

- 10.8.3 An assessment of particulate matter increases from the extension has been undertaken. It is concluded there is minimal risk of PM10 impacts associated with the working of the extension.
- 10.8.4 The existing dust management plan that is used for Bromley Farm Quarry is considered suitable and sufficient to control dust generation at the extension. The document will be updated with general details to reflect the new working location; however, the dust control and management are considered to be sufficient to ensure dust is controlled during the working of the extension.
- 10.8.5 There is, therefore, no reason for this application to be refused on the grounds of air quality or dust.

11. DUST MANAGEMENT PLAN

11.1 Introduction

11.1.1 There are potential for dust emissions to occur at various stages of the quarrying operations, but these can generally be controlled by good practice. Dust emissions can occur at a number of stages during the working life of the site but these can generally be controlled by best practice measures such as:

- Appropriate design and layout of the site and working procedures
- Using and properly maintaining carefully selected equipment
- Understanding the potential for dust emissions to occur
- Training and supervising site staff in dust control
- Applying appropriate mitigation measures

11.1.2 A range of dust control and mitigation measures are set out below, including dust containment, where dust emissions are minimised through use of appropriate equipment and systems; dust suppression, where dust emissions are controlled by the use of water sprays and wheel washes etc. and dust management, where the potential for dust emissions to occur are reduced through effective site management.

11.2 Dust sources

11.2.1 The quantity and size range of dust likely to be generated at a minerals site depends on the type of material being worked and the processes applied.

11.2.2 Dust emissions can arise from a range of processes at mineral sites. These include overburden removal, mineral extraction, loading and unloading, on-site transfer of dusty materials, stockpiles and roadways, including haulage roads.

11.3 Site management controls

11.3.1 There are a number of processes that might lead to unacceptable dust emissions at the site without proper mitigation.

11.3.2 As set out below, the site manager will be responsible for maintaining good standards and reduce unacceptable dust emissions at the site by ensuring that routine checks are carried out and that regular staff training is provided. This will be facilitated by the processes and procedures set out in Tables 1 to 3 in Appendix A which set out specific areas to enable the site manager to review and assess site dust management on a routine basis.

11.3.3 The actions in the tables in Appendix A will be reviewed and revised as appropriate during the operational life of the site, including within a review of the DMP.

Visible dust emissions

11.3.4 The site manager will be responsible for a daily inspection for visible dust emissions across the site boundary to be carried out. Inspections will take place along the site access road and at the relevant extraction area according to the working phase of the site. The results of the visual inspections will be recorded and kept with results of other environmental monitoring carried out at the site.

- 11.3.5 The table below will be used to assess whether there is potential for dust movement during operations.

Wind speed (m/s)	Description
Below 0.5 essentially calm	very low potential for dust movement
0.5 – 2 low wind speeds	low potential for dust movement
2 – 6 ‘average’ wind speeds	moderate potential for dust movement
6 – 10 high wind speeds	reasonable potential for dust movement
Above 10 very high wind speeds	significant potential for dust movement

Site engineering controls

- 11.3.6 The site manager will be responsible for ensuring that unacceptable dust emissions do not arise from operations at the site by evaluating the planned site activities and dust mitigation measures in place and modifying them as appropriate.
- 11.3.7 Procedures to address specific processes that might lead to unacceptable dust emissions are set out below. All dust control equipment will be maintained and operated in accordance with the manufacturer’s instructions.

11.4 Quarrying Operations & Mitigation Measures

- 11.4.1 The operations involved in the extraction and movement of clay have the potential to generate dust emissions. The extension area will be split into 5 phases of working.

Soil Stripping & Overburden Removal (including bund construction and removal)

- 11.4.2 Topsoil and subsoil will be stripped and placed in screening bunds which will be constructed along the northern and eastern perimeter of the workings. The screening bunds will be approximately 5 metres in height. The bunds shall be seeded as soon as is practicable in order to prevent the potential for wind blow from this source. Overburden would be moved to the allocated storage area constantly where encountered.
- 11.4.3 The maximum amount of heavy plant used in the movement of overburden within the quarry void will be a 360 Excavator and 1 dump truck.
- 11.4.4 Soil stripping, overburden and bund formation shall be conducted in such a way as to minimise the handling of material. Drop heights will be minimised when handling overburden to prevent dust generation.

Mineral Extraction and Transportation Operations

- 11.4.5 A hydraulic 360 excavator will be used to extract mineral which will be exported directly off site.
- 11.4.6 The maximum amount of heavy plant used within the quarry extension will be 1 hydraulic 360 excavator and 1 dump trucks.
- 11.4.7 The material being extracted will have a high moisture content. Notwithstanding this, the dust suppression measures detailed within Appendix A of this DMP will be implemented to reduce the potential for dust emission from the site.

- 11.4.8 The drop height from the hydraulic 360 excavator bucket to the dump truck will be minimised. The on site speed limit will be 10 mph and the use of a water bowser will help to minimise dust emissions from the operation.
- 11.4.9 Internal haul roads will consist of compacted material and shall be regularly maintained by grading in order to minimise dust generation. Mobile plant exhausts and cooling fans will be discharged away from the ground to prevent dust mobilisation.

Waste Importation for Restoration

- 11.4.10 Inert waste is proposed to be imported to enable the site to be restored close back to original ground levels. This is not predicted to commence until Phase 3 of the mineral extraction operations which could be approximately 8 to 10 years.
- 11.4.11 Prior to commencement of waste import, this document will be reviewed and updated as required.

11.5 Dust Monitoring Programme

- 11.5.1 If the control measures listed in this DMP are adhered to for the duration of the operations, complaints should be unlikely.
- 11.5.2 Should any complaints be made regarding dust nuisance during extractive operations, the applicant is prepared to carry out dust monitoring for the remaining life of the site if required by Kirklees Council's (KC) Environmental Health Officer (EHO).
- 11.5.3 If required, dust can be measured by sticky pad samplers which would be strategically located to measure both dust dispersion at the site boundary towards neighbouring receptors.
- 11.5.4 Dust monitors in the form of sticky pad samplers (as seen below in Fig 1) will be installed and maintained around the site in locations to be agreed by the EHO. These locations may be amended or supplemented by agreement with the EHO dependent on the results recorded. Dust monitors will be changed weekly and inspected at intervals as deemed necessary. The sticky pads are retained for the duration of site activities.



Fig 1 – Sticky Pad Dust Sampler

Site records and reporting

- 11.5.5 The results of dust management and monitoring procedures at the site will be recorded and kept with results of other environmental monitoring carried out at the site. As noted above, a daily record of environmental dust will be kept at the Site Office.

Complaints procedure

- 11.5.6 In the event of a complaint from a member of the public regarding dust emissions from the site, a record will be kept at the Site Office and made available to KC as required.
- 11.5.7 The Site Manager will be ultimately responsible for addressing all complaints and notifying Kirklees Council accordingly. All complaints will be investigated as soon as possible by the site manager and the complainant kept informed throughout the investigation. KC will be informed within the 2 working days that a complaint is received and will be kept informed regarding the progression of any subsequent investigation.

Dust mitigation measures

- 11.5.8 A water bowser will be available at all times and will be used to wet haul roads *etc.* as necessary. The site operator will ensure that appropriate environmental awareness training is conducted to ensure that all staff appreciate acceptable and unacceptable airborne dust levels.

11.6 Review and assessment

- 11.6.1 The results of environmental monitoring at the site will be considered in relation to baseline monitoring data, weather data and site activities during the assessment period and with reference to changes in national and local air quality guidance. The type and extent of dust monitoring that takes place after the review will be decided following consultation between the site operator and KC.
- 11.6.2 The DMP will be reviewed and revised if required during the working life of the site until restoration is complete. It may be reviewed at the reasonable request of KC at any time during the working life of the site.

12. HIGHWAYS

12.1 Introduction

- 12.1.1 Paragon Highway Consultants were appointed to prepare a Highways Statement for the extension area.
- 12.1.2 The Highway Statement considers the site access, and traffic impact associated with the proposed development and the accident record on the local highway network.
- 12.1.3 Below is a summary of the full report which can be found in Appendix E of this submission.

12.2 Local Highway Network

- 12.2.1 Access to the site will be from the A635 Barnsley Road. The A635 is a class 1 highway and is a two-way single carriageway at this point. It is the subject of a 40-mph speed limit. Traffic movements along the route are moderate with a noticeable increase in traffic movements at the recognised peak times.
- 12.2.2 On the approach to the site access on the A635, from both directions, there is central carriageway hatching and slow markings and with a right turn pocket when approaching from the direction of Denby Dale.
- 12.2.3 The A635 at this point is lit to an appropriate standard and is also a bus route. There is a continuous footway along its northern flank in the immediate locality and generally a verge on its southern flank with an intermittent footway. On the opposite side of the carriageway to the site access, to the rear of the verge is a metal crash barrier above an embankment.

12.3 Road Traffic Accidents

- 12.3.1 The personal injury accident records for the last 5 years up until July 2021 within the vicinity of the site have been obtained from the Crashmap. The data used is provided by the Department for Transport which is based upon records provided by local police forces.
- 12.3.2 It should be noted that there have been no collisions within the vicinity of the site access or along the immediate section of the A635. Therefore, it can be assumed that the access and surrounding highway network appear to operate safely during the current level of traffic associated with its day-to-day use.
- 12.3.3 The injury accident record does not indicate a road safety problem that would warrant treatment or be a cause for concern as a result of the minor additional use of the quarry at its proposed level of operation.

12.4 Access

- 12.4.1 Access to the site will be via the existing arrangement off the A635 Barnsley Road. Access to the site from the A635 is in the form of a simple priority junction situated on the outside of a sweeping bend which affords excellent visibility for emerging drivers.
- 12.4.2 The access is some 7.4 metres wide with 7.0 metre kerb radii. The access narrows to approximately 5.3 metres in width some 30 metres or so from its

junction with the major road. This widens out to an average of 5.5 metres beyond this point. There are several passing places along the route leading up to the application site access point off the recycling centre access road with good forward visibility where there are significant bends in the route. The speed limit along the route is 20mph.

- 12.4.3 The access road is surfaced to a good standard and the access is used on a regular basis by large tipper type vehicles which remove and replace the recycling containers.

12.5 Parking Provision

- 12.5.1 It is envisaged that there will be between 3- 4 employees at the site including a site manager initially, and this number is not expected to rise throughout the contract. Therefore, considering the sites rural location it is proposed to provide 3no. car parking spaces for staff initially, although if employee numbers increase (which is not envisaged) so will the parking provision at a rate of 1 car parking space per employee.

- 12.5.2 Within the site there will be adequate HGV parking and unloading areas that can easily accommodate the intended HGV parking and unloading demands.

- 12.5.3 Given the above, the parking provision for the development is therefore considered appropriate.

12.6 Pedestrian and Cycle Provision

- 12.6.1 There is space available within the site to provide cycle parking facilities should there be a demand for it.

- 12.6.2 Bus services are available along the Barnsley Road with a regular hourly service available to destinations such as Huddersfield, Lepton, Kirkburton, Denby Dale, Holmfirth, Clayton West and the city of Wakefield.

- 12.6.3 There is a public right of way that crosses the access leading to the site that connects Denby Dale with Upper Cumberworth – Definitive footpath no. Den/84/10. This route provides a suitable access for employees who may wish to walk to the site from the rail station in Denby Dale a distance of approximately 550 metres or so.

- 12.6.4 Denby Dale rail station has an hourly service to Huddersfield and Sheffield (the Penistone Line) and many local stations such as Stocksmoor and Shepley which provides a suitable alternative means of transport to the site for some employees.

12.7 Servicing

- 12.7.1 Other than the hgv's removing material from the quarry no servicing of the site is envisaged in this case.

12.8 Traffic Impact

- 12.8.1 There are currently no vehicle movements associated with the proposed location of the quarry extension.

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- 12.8.2 The volumes of shale / clay to be extracted is 760,000 tonnes which will be extracted and the quarry eventually restored over a 25-year period. The volume of inert waste required for restoration will be 690,000 tonnes.
- 12.8.3 It is anticipated that there will be a maximum of 120 hgv movements per day associated with the proposed quarry with 60 in and 60 out. This equates generally to a hgv movement along the access road leading from the A635 every 6 minutes or thereabouts.
- 12.8.4 The access is of adequate width at the access roads junction with the A635 to allow 2 hgv's to pass which will ensure that there will be no significant waiting on the major road to allow a large vehicle to egress the site.
- 12.8.5 The road leading to the site which also serves the recycling centre does narrow to some 5.3 metres some distance from the junction with the A635, however, beyond this point there are significantly wide passing bays, and the carriageway averages some 5.5 metres in width which would allow 2 hgv's to pass. This carriageway width also allows for a hgv to pass a private car with adequate clearance.
- 12.8.6 As noted previously in this report there is a public right of way that crosses the access to the site / recycling centre. Additional signage will be erected at this point to inform pedestrians / ramblers of the additional HGV traffic movements associated with the proposed quarry extension. This will be to a standard to be agreed with the LHA Public Rights of Way Section.

12.9 Conclusion

- 12.9.1 It is considered that the proposed development would not result in excessive vehicle trips that would be discernible from the daily fluctuations in flows that could be expected on the local public highway network.
- 12.9.2 Therefore, the level of traffic generated by the proposals can easily be accommodated and will have no material impact on the safe operation of the local highway and will not significantly add to any congestion at the peak times on the local network.

13. FLOOD RISK

13.1 Introduction

13.1.1 SM Foster & Associates produced a Flood Risk Assessment (FRA) for the proposed extension area.

13.1.2 Below is a summary of the full report.

13.1.3 The Site is located within the catchment of East Hill Beck, a tributary of the River Dearne. East Hill Beck flows north west to south east approximately 100m to the south east of the proposed extension area. The Site is designated as being at low risk of fluvial flooding (Flood Zone 1) on the current Environment Agency Flood Map for Planning. As the Site extends to an area in excess of 1ha, a FRA is required to support a planning application.

13.1.4 The primary objective of this FRA is to evaluate potential risk of flooding from all sources and the consequent implications for Site operation and safety. Assessments have been undertaken of potential flood risk related to:

- (i) Flooding from rivers and sea
- (ii) Flooding from surface water
- (iii) Flooding from groundwater
- (iv) Flooding from sewers and drainage infrastructure

13.1.5 Flood risk assessment has been based on analysis of published Government data sources, additional hydrological references, Site survey and consultation, ground level survey and independent hydrological analysis. Where information is available or can be derived, an assessment has been made of the potential implications of climate change effects on flood risk at the Site. Reference has been made to current Government climate change allowances for rainfall intensity.

13.1.6 Where potential flood hazard is identified, an assessment of operational vulnerability has been undertaken in relation to the definition of low vulnerability development. Where relevant, further analysis has been undertaken in relation to flood hazard to personnel and any existing

13.2 Site location and flood risk status

13.2.1 The majority of the proposed extension area is situated in the surface water catchment of the River Dearne, via East Hill Beck. The River Dearne flows west to east approximately 600m south of the application Site. East Hill Beck rises at issues 100m south east of the application Site, passing beneath the railway line to emerge in open channel at the northern end of Denby Dale.

13.2.2 Hydrological indicates that East Hill Beck is connected to the small pond immediately south of the Site, and the upstream field drain that flows around the south western Site boundary. On this basis, surface water runoff from the majority of the Site is currently draining indirectly to East Hill Beck. Ground levels in the north eastern area of the Site fall towards the north west.

13.2.3 Flood Estimation Handbook (FEH) catchment models confirm that, downstream of the Site, East Hill Beck drains a catchment area of 0.5km², including the majority of the application Site.

- 13.2.4 The existing quarry workings have been restored to establish ground levels that allow gravity drainage of surface water runoff towards the Site entrance. Surface water from the restored site drains via a small settlement pond at the site entrance to a small field drain adjacent to the access track for final discharge to the East Hill Beck system. The location of the application

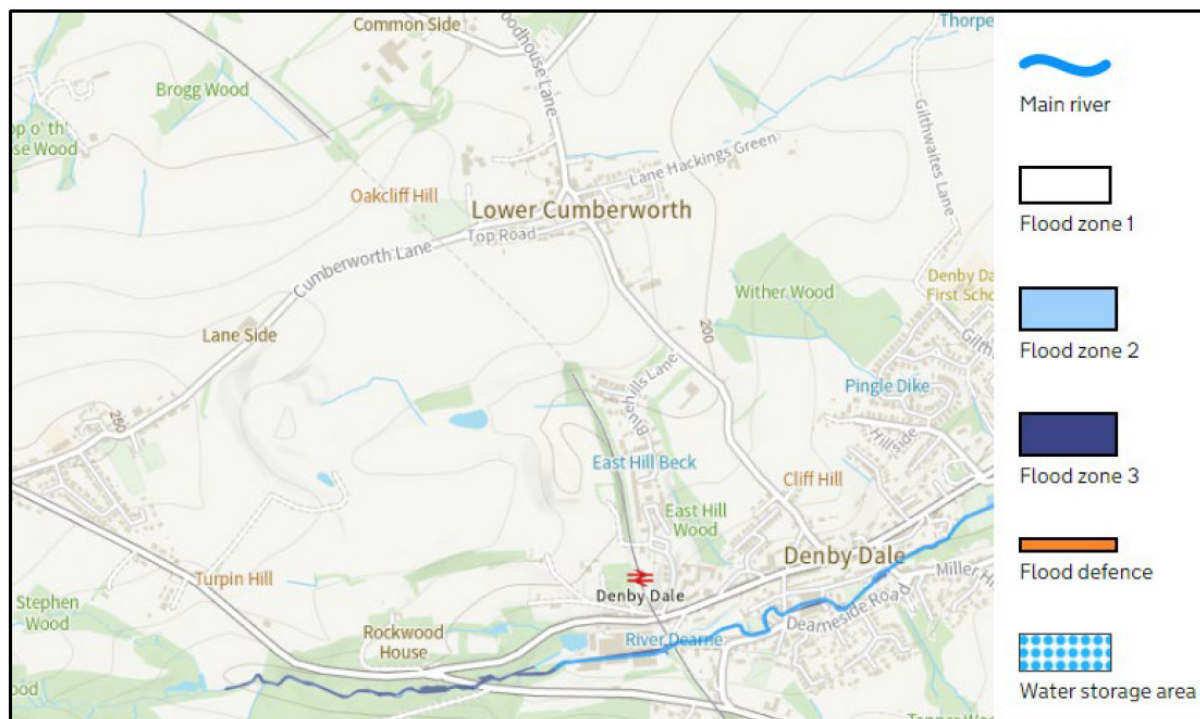


Figure 1: Flood Map for Planning extract © Environment Agency

- 13.2.5 The elevated location of the Site ensures that it is at low risk of fluvial flooding, as shown on the Environment Agency Flood Map for Planning, an extract from which is included as Figure 1 and also at low risk of surface water flooding as indicated on the Environment Agency Long Term Flood Risk Map, included as Figure 2. Reference to Defra's Magic map application confirms that the Site is not within a source protection zone and is not subject to any surface water or groundwater quality designation.

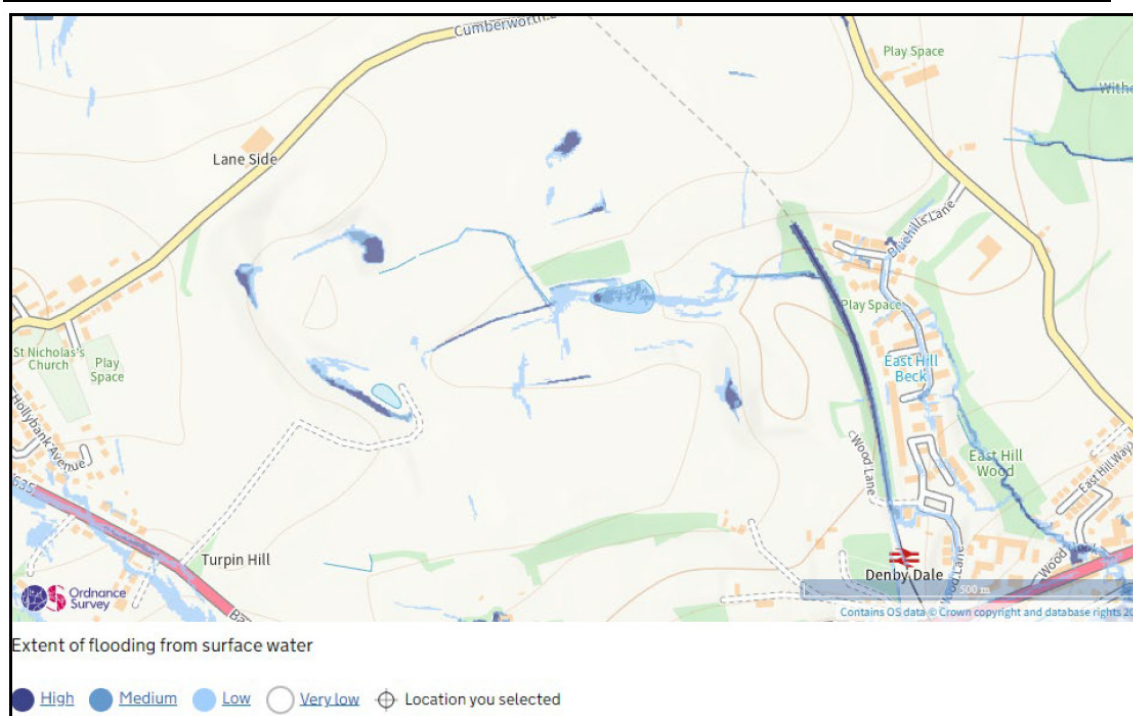


Figure 2: Surface water flood risk map extract © Environment Agency

- 13.2.6 The proposed development would be drained by pumping to a water treatment area with off-site outfall to the existing field drainage tributary of East Hill Beck. Once completed and restored, surface water runoff from restored surfaces would drain naturally towards the south for discharge to the same field drainage system.
- 13.2.7 Surface water drainage to East Hill Beck would therefore continue throughout the operational life of the development and post Site restoration.

13.3 Flood risk assessment

- 13.3.1 All surface water runoff within the excavation boundary would drain naturally to the lowest point in the excavation from where it would be collected in a small sump and pumped to a water treatment area located at surface. Screening and overburden mounds would be equipped with peripheral ditch drains, as required, to direct runoff to the water treatment area.

Flood mechanisms

- 13.3.2 Environment Agency flood zone maps indicate that the Site is not at risk of fluvial flooding in response to either the 1 in 100 year or 1 in 1000 year flood event in local surface watercourses.
- 13.3.3 NPPF Guidance suggests that consideration should be given to Site vulnerability to other potential sources of flooding including:
- flooding from groundwater;
 - flooding from sewer systems;
 - flooding from surface water drainage.

Groundwater flood risk

- 13.3.4 The Site is covered by the British Geological Survey (BGS) groundwater flood risk mapping.
- 13.3.5 The map indicates that there is 'limited potential for groundwater flooding to occur' at the Site.
- 13.3.6 British Geological Survey (BGS) mapping of the area indicates that the Site is underlain by Lower Coal Measures bedrock consisting of mudstone with subordinate sandstones and thin coals. Quarry workings would be primarily established in a weathered mudstone formation with two relatively thin sandstone units and thin coal horizons. There is no record of superficial deposits above the bedrock.
- 13.3.7 Lower Coal Measures strata at the Site and surrounding area are designated Secondary A Aquifers, by the Environment Agency. However, it is generally accepted that coal measures mudstones are rarely productive, and hence the Secondary A Aquifer designation is usually related to the more permeable sandstone units. The absence of any superficial cover results in a Site-wide groundwater vulnerability designation of medium-high.
- 13.3.8 The presence of discrete sandstone horizons, within low permeability mudstone formations, and the presence of extensive local faulting tends to result in both vertical and lateral partitioning of local groundwater systems. As a result, groundwater systems in faulted coal measures strata tend to be localised with discharge to the surface water system influenced by stratigraphic boundaries and fault location.
- 13.3.9 The base of the proposed workings will extend through a thin water-bearing sandstone unit with the expectation that groundwater would enter the workings and require removal by pumped abstraction to a water treatment area located at surface. Groundwater inflow rates are expected to be low and effectively managed by drainage to a small internal sump. On this basis the proposed development is not considered to be at risk of groundwater flooding.

Sewer flood risk

- 13.3.10 The proposed north western extension area is situated in a rural location with limited development in the immediate vicinity. No evidence has been found of stormwater or foul water sewer infrastructure within the Site boundary. The Site is elevated above local transport infrastructure. As a consequence, the proposed development Site is considered to be at low risk of flooding from sewer surcharging or other stormwater drainage infrastructure.

Surface water flood risk

- 13.3.11 The proposed development would consist of a below ground excavation. All surface water entering the Site, either as a consequence of direct rainfall or due to runoff from surrounding land, would drain to the lowest point in the workings for collection and removal, as required, to the water treatment area, prior to off-Site discharge. The exceptionally high storage volume within the workings would ensure that surface water could be managed within the Site without risk of flooding or property or people.

- 13.3.12 Following restoration of the Site to original ground level by placement of quarry backfill and inert materials, it is anticipated that Site drainage characteristics will be comparable to the Site at present, with potential for slow infiltration to underlying strata and surface water runoff to East Hill Beck, as at present, following peak flow regulation and attenuation. It is therefore concluded that the proposed development is at low risk of surface water flooding.

Climate change

- 13.3.13 Rainfall intensity is expected to increase in future years in response to climate change. With high stormwater storage capacity within quarry excavations progressive increase in rainfall depth and subsequent surface water volume would have no adverse effect on the ability to manage surface water within the Site boundary without risk to people or property.

13.4 Surface water management

- 13.4.1 In addition to the requirement to consider flood risk to the development it is also necessary to consider the implications of development on flood risk in the surrounding area. In particular, it is necessary to demonstrate that surface water generated from the proposed development can be sustainably managed without introducing risk of flooding to the Site or surrounding land.
- 13.4.2 In accordance with the requirements of the NPPF and Kirklees Council planning policy, surface water will be managed at the Site through installation and operation of a Sustainable Drainage System (SuDS) based on discharge to underground strata. Current National Standards for Sustainable Drainage Systems (National Standards - Defra 2015) require that, where reasonably practicable, all new developments are to be equipped with sustainable drainage systems (SuDS) that are approved by the Local Lead Flood Authority (LLFA) under the terms of the Flood and Water Management Act 2010.

Sustainable Drainage Systems (SuDS)

- 13.4.3 Basic standards for SuDS design at previously developed sites is stated in the current Defra Non-statutory technical standards (NSTS) for sustainable drainage systems as follows:

S2 *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.*

S4 *Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.*

- 13.4.4 Sustainable drainage systems are generally based on a stormwater management train that assigns priority to local control of surface water. SuDS systems should be designed to optimise control at the earliest stage in this sequence.
1. Prevention: Good site management, best practice approaches to minimise the risk of flooding or migration of pollutants to surface water;
 2. Source control: control of runoff at or close to the source using permeable surfaces, filter trenches or swales etc.;

3. Site control: local facilities that receive surface runoff to attenuate off-site discharge i.e. balancing ponds etc.;
4. Regional Control: larger ponds and wetlands used to control flow and quality prior to final discharge to receiving water.

13.4.5 National Standards define the appropriate SuDS approach to final discharge destination as the following in order of preference:

1. Discharge into the ground
2. Discharge to a surface water body
3. Discharge to a surface water sewer
4. Discharge to a combined sewer

13.4.6 During extractive operations at the Site, surface water runoff from Site surfaces would drain to the excavation area with pumped removal to the surface-located water treatment area, prior to controlled off-site discharge to East Hill Beck. The Site will be backfilled with relatively low permeability materials that will be unsuitable for use of infiltration devices for surface water management. The proposed restoration scheme is designed to promote effective drainage of surface water to the off-Site outfall to the upstream end of East Hill Beck.

13.4.7 Therefore, during all stages of development, excess surface water would discharge to a surface water body in accordance with the highest suitable SuDS priority.

13.4.8 The Site is underlain by low permeability coal measures mudstone, with no superficial cover and limited potential for rainfall infiltration. Following restoration, the Site would be underlain by compacted backfill consisting of overburden and inert waste materials. The restored Site is therefore likely to retain low infiltration capacity, comparable to the Site at present. On that basis the Site would continue to drain at the current greenfield rate.

13.5 Residual risk

13.5.1 The assessment documented in this report has incorporated identification of potential flooding mechanisms and confirmed that the proposed development is at low risk of flooding from fluvial, groundwater, surface water and sewer sources. The proposed SuDS-based surface water management scheme can be established in compliance with national guidance and local authority policy to ensure that the development will have no adverse impact on flood risk in the surrounding area.

13.5.2 In the absence of risk to the Site or surrounding area there is no requirement for any additional flood risk mitigation or management measures for the proposed development.

13.6 Summary and conclusions

13.6.1 The assessment has resulted in the following conclusions:

- The site is fully located in Flood Zone 1 and therefore at low risk of fluvial flooding. The development is classed as 'less vulnerable' development which is defined as 'appropriate development' in Flood Zone 1. The development passes the Sequential Test with no requirement to pass the Exception Test.
- Flood hazard analysis has demonstrated that the development is at low risk of flooding from groundwater, surface water or sewer sources. The

proposed SuDS-based surface water drainage scheme will ensure that all surface water is managed within the Site and discharged to an open water body with no increase in flood risk at the Site or elsewhere.

- In the absence of risk to the Site or surrounding area there is no requirement for any additional flood risk mitigation or management measures for the development. The development can be established in full compliance with the National Planning Policy Framework and local authority policy related to development and flood risk.

14. HYDROLOGY AND HYDROGEOLOGY

14.1 Introduction

14.1.1 SM Foster & Associates Ltd has prepared a Hydrogeological impact assessment (HIA) based on a detailed review of local hydrological, geological and hydrogeological conditions at the proposed extension Site and surrounding area.

14.1.2 Below is a summary of the full report. The assessment has been supported by reference to recent and past ground investigation results, including the recent installation of six new groundwater monitoring boreholes.

14.2 Hydrogeology

14.2.1 Lower Coal Measures strata at the Site and surrounding area are designated Secondary A Aquifers, by the Environment Agency. However, it is generally accepted that coal measures mudstones are rarely productive, and hence the Secondary A Aquifer designation is usually related to the more permeable sandstone units. The absence of any superficial cover results in a Site-wide groundwater vulnerability designation of medium-high. There are no source protection zones (SPZ's) at the Site or in the surrounding area.

14.2.2 The presence of discrete sandstone horizons, within low permeability mudstone formations, and the presence of extensive local faulting tends to result in both vertical and lateral partitioning of local groundwater systems. As a result, groundwater systems in faulted coal measures strata tend to be localised with discharge to the surface water system influenced by stratigraphic boundaries and fault location.

Groundwater levels and hydraulic gradients

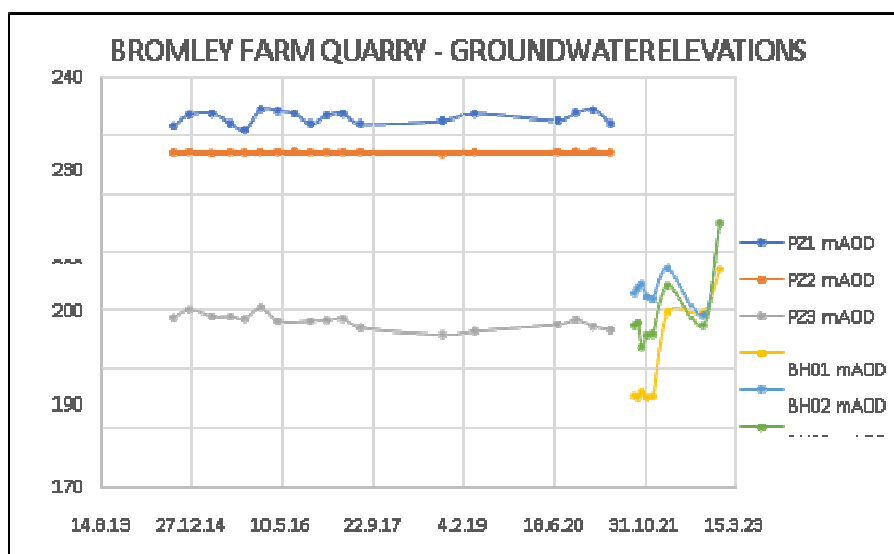
14.2.3 At a regional scale there are few indicators of the presence of groundwater in coal measures sandstones. Springs at Stephen Wood approximately 900m south west of the application Site may be related to the same geological sequence but, at an elevation of approximately 225mAOD, are too high to be related to groundwater beneath the Site. A spring present at Oakcliff Hill 300m to the north appears to originate from a fault at a sandstone/mudstone junction, separated by intermediate faulting between the spring and the application Site.

14.2.4 At an elevation of approximately 205mAOD, this spring is below estimated groundwater elevation within the Site but unlikely to originate from a continuous groundwater system.

14.2.5 All 6 boreholes established at Bromley Farm Quarry have been fitted with piezometer installations. Groundwater level and quality monitoring has been undertaken since 2011.

14.2.6 Groundwater levels were recorded in the 2011 boreholes (PZ1, PZ2 & PZ3) during the period September 2014 to April 2021. Groundwater levels have been recorded in the 2021 boreholes (BH01, BH02 & BH03) since August 2021. Groundwater levels are shown graphically in Figure 1.

Figure 1: Groundwater levels in Site monitoring boreholes



- 14.2.7 PZ3 is located close to BH01 and there is reasonable consistency between observed groundwater levels at both locations, at 195mAOD-200mAOD, once levels at BH01 stabilised.
- 14.2.8 Observed groundwater levels at BH02 and BH03 are slightly higher but exhibit the same seasonal response suggesting that they are likely to be monitoring the same system. In contrast, the observed groundwater levels at PZ1 and PZ2 are significantly higher at around 230mAOD. It is notable that there is no seasonal variability in PZ2. Reference to the borehole logs for PZ1 and PZ2 demonstrates that the response zone in both boreholes is restricted to the mudstone below the lower sandstone. It is therefore likely that observed groundwater levels in these boreholes reflect accumulation of water in the borehole, from mudstone seepage, with a potential threshold at the elevation of the coal seam/void. Groundwater levels in PZ1 and PZ2 are not therefore indicative of groundwater levels in the coal measures sandstones.
- 14.2.9 On the basis that any groundwater present in strata beneath the proposed extension area would be present within the two sandstone units identified in boreholes, an indicative direction of groundwater flow can be derived from comparative analysis of groundwater levels in boreholes PZ3, BH01, BH02 and BH03. Monitoring data indicates a shallow hydraulic gradient to the south east. It is noted that the pond located close to the south eastern Site boundary is established at approximately 210mAOD which is too high to be an outlet for groundwater beneath the Site.
- 14.2.10 The elevation of East Hill Beck upstream of the railway line is approximately 180mAOD and the elevation of the small stream at Rockwood House 600m to the south of the application Site is approximately 200mAOD. These are the lowest surface water features in the vicinity of the Site. Indicative groundwater contours suggest that, if Hydrogeologically continuous, groundwater levels in the sandstones would be below 200mAOD at both locations.
- 14.2.11 As confirmed on Envirocheck datasheets, substantial areas of land to the south and south east of the application Site have previously been subject to mineral extraction and subsequent infilling with waste materials.

- 14.2.12 Comparison of groundwater flow directions demonstrates that historic landfill areas are situated down-gradient of the application Site and may obstruct groundwater flow in a south and south easterly direction. It is considered likely that the sandstone units will have been worked through in historic mineral workings, removing potential for down-gradient drainage through sandstone units. On the basis of available evidence it is considered that the most likely receptor of any groundwater flowing in the sandstone units beneath the application Site is backfilled land in former mineral workings. There may remain potential for seepage to East Hill Beck upstream of the railway line during periods when groundwater levels are elevated.
- 14.2.13 Reference to BGS mapping of the area, as shown on Geological Sheet 86 Glossop, indicates that the proposed base of working in the extension area would remain approximately 100m above more regionally significant coal measures sandstone aquifers such as the Grenoside Sandstone and the Greenmoor Rock. The intervening strata consists of a sequence of thick low permeability mudstone with intermittent sandstone. Coal Measures strata to be worked at Bromley Farm Quarry is considered to be fully hydraulically isolated from such deeper aquifers.

Groundwater Abstractions

- 14.2.14 A survey of licensed surface water and groundwater abstractions has been undertaken.
- 14.2.15 There are no licensed groundwater abstractions within a 500m radius of the Site. There are four licensed groundwater abstractions within a 1km radius of the Site. A summary of licenced groundwater abstractions within a 1km radius of the Site is presented in Table 2.

Table 2: Licenced groundwater abstractions within 1km radius of the Site

No.	Ref	NGR	Owner	Source	Distance
25	2/27/11/124	421800 408197	Hepworth Pipe Company	CM Spring	522
29	2/27/08/053	422500 408200	Hinchcliffe & Sons	Groundwater	912
31	2/27/08/144	422200 408270	Hinchcliffe & Sons	Borehole	951
32	2/27/08/144/R01	422259 408307	Hinchcliffe & Sons	Borehole	952

- 14.2.16 Abstraction No.25 relates to abstraction from a spring near Oakcliff Hill to the north of the application Site. As discussed above, the spring appears to originate from a fault at a sandstone/mudstone junction, separated by intermediate faulting between the spring and the application Site. The other three licenced abstractions are located at Hinchcliffe & Sons textile works located 950m south east of the application Site, south of the A636 Wakefield Road and south of the River Dearne. Reference to geological mapping of the area indicates that the site of these abstractions may be underlain by the same geological strata as present beneath the application Site. However, all three abstractions appear to be related to the route of Holm Fault and may therefore be associated with fault-related groundwater systems rather than groundwater that originates in sandstones beneath the application Site.

Groundwater quality

- 14.2.17 The quality of groundwater at Bromley Farm Quarry has been monitored on a quarterly basis since 2012. Samples have been obtained from monitoring boreholes PZ1, PZ2 and PZ3 located around the perimeter of the former quarry workings. As discussed above, groundwater present in borehole PZ3 is considered to be most representative of groundwater in the coal measures sandstones present beneath the proposed extension area. Groundwater in PZ1 and PZ2 is likely to represent groundwater accumulating from slow seepage from more permeable horizons within the mudstone units.
- 14.2.18 The groundwater contour map demonstrates that borehole PZ2 is located at the up-gradient side of the quarry site, in common with borehole BH02 at the northern side of the proposed extension area. Boreholes PZ1 and PZ3 are located partially down-gradient of the former quarry workings. More recent boreholes BH01 and BH03 are similarly located partially down-gradient of groundwater flowing in sandstone units beneath the proposed extension area.
- 14.2.19 Groundwater analysis over the monitoring period has been undertaken to include a comprehensive suite of determinants related to the UK Drinking Water Standards (DWS).
- 14.2.20 On that basis, there is no evidence to indicate that mineral extraction or subsequent restoration by inert waste placement in the former Bromley Farm Quarry workings has resulted in any adverse impact on groundwater quality. The proposed extension would involve working the same sequence of mudstone and sandstone formations as the former quarry, with restoration by placement of overburden and inert waste materials to form a stable, free-draining landform. On the basis of the detailed hydrogeochemical data available for the Site there is no expectation that the proposed development would represent a risk to groundwater quality.

14.3 Conceptual hydrogeological model

- 14.3.1 The results of the hydrological and hydrogeological baseline assessment have been used to develop a conceptual hydrogeological model of the proposed extension area and surrounding land. The conceptual model provides the basis for subsequent assessment of potential development impacts on groundwater resources.
- 14.3.2 The conceptual hydrogeological model aims to define groundwater flow characteristics for defined water-bearing strata using the standard source-pathway-receptor approach. Development of the conceptual model has been based on a combination of baseline hydrogeological assessment and analysis of Site-specific hydrogeological data.

Sources

- 14.3.3 The proposed development would extend to a minimum elevation of 203mAOD. The minimum base of working would therefore extend below the elevation of the upper water-bearing sandstone formation identified in on-Site monitoring boreholes. There would be potential for groundwater drainage into the excavation area which would extend below the piezometric elevation of groundwater in both sandstone formations.
- 14.3.4 Mineral extraction would not involve the use of any potentially contaminative substances at the Site, with the exception of fuel and lubricants used in mobile

plant. There is no evidence to indicate the presence of ground contamination within the Site.

- 14.3.5 During the operational life of the workings, mineral extraction would lead to the liberation of fine particulate materials that would be subject to distribution within the Site by entrainment in surface water runoff. However, it is noted that mineral extraction would take place with a hydraulic excavator, without requirement for blasting, and therefore the potential for formation of fine particulates would be reduced. As shown on development phasing drawings the excavation area would consist of a vertical excavation contained on all sides with progressive restoration. All water accumulating within the excavation area would be pumped to a water treatment area. With a low permeability mudstone base to the excavation area there is unlikely to be any risk of particulate matter migration to underlying groundwater systems.
- 14.3.6 As all materials used to achieve the proposed restoration profile would be inert, there would be no significant source of potential risk to groundwater quality. The proposed water treatment area would act as an attenuation pond for the restored site on completion. Infilling of the excavation void may result in local obstruction to groundwater flow in the upper sandstone unit.
- 14.3.7 Sources of potential risk to local groundwater resources can therefore be summarised as follows:
- Localised dewatering of sandstone units
 - Accidental spillage of hydrocarbons from mobile plant
 - Groundwater flow obstruction due to excavation backfilling

Pathways

- 14.3.8 Baseline hydrogeological assessment has demonstrated that groundwater is present in the sandstone units between thick mudstone formations beneath the Site and that groundwater is flowing in a southerly to south easterly direction beneath the Site. The two sandstone units represent the only potential pathways for groundwater to enter or leave the proposed excavations. Localised dewatering of the upper sandstone would lead to inflow of groundwater from the surrounding area. As the excavations would be contained, there would be no potential for discharge of Site water to the sandstone and hence no pathway from the Site.
- 14.3.9 Progressive restoration of the excavation area, as shown on development phasing drawings would result in the placement of overburden and inert waste materials against the upper sandstone unit in some areas of the excavation boundary. Unless fully sealed by waste placement, there would be potential for seepage of groundwater into the base of the restored Site leading to saturation of material below the rest groundwater elevation in the upper sandstone i.e. c. 210mAOD on average. Any contaminants present in the inert waste material could potentially drain down-gradient to the sandstone aquifer at the southern site boundary.
- 14.3.10 Potential impact pathways can therefore be summarised as follows.
- Groundwater flow or contaminant migration through the upper sandstone aquifer

14.4 Receptors

- 14.4.1 Baseline hydrogeological analysis has demonstrated that the only potential receptor of groundwater flowing in the sandstone aquifer within the strata to be excavated at the Site is the upstream end of East Hill Beck. The presence of a thick sequence of low permeability mudstone beneath the proposed extraction area would mitigate risk of contaminant migration to deeper aquifers.
- 14.4.2 As summarised in Table 2, there are four licenced groundwater abstractions within a 1km radius of the Site. The spring source at Commonside Wood 500m north of the Site, originates from a separate aquifer unit, up-gradient of the proposed excavation area. The three other licenced abstractions are located at a textile mill to the south of the River Dearne with abstraction borehole locations associated with the route of Holm Fault. Available evidence indicates that these abstractions are not sourced from groundwater flowing beneath the Site.
- 14.4.3 Defra Magic mapping indicates that there are no statutory or non-statutory groundwater dependent ecological or landscape designations or features within a 1km radius of the Site.

14.5 Hydrogeological impact assessment

- 14.5.1 The potential impact of the proposed development on local hydrogeology has been evaluated by reference to the conceptual hydrogeological model, supporting hydrological and hydrogeological data sets and by definition of aspects of the proposed development with potential relationship to local surface water and groundwater systems.
- 14.5.2 The application Site extends to a total area of approximately 8ha of which the proposed excavation area would extend to a surface area of approximately 5ha. Development phasing drawings, indicate that minimum quarry floor elevation would be 203mAOD. This is below the top of the upper sandstone in some parts of the Site and below the groundwater elevation in the upper sandstone across the entire Site. It is therefore anticipated that as the excavation develops, groundwater will enter the excavation area and be removed by pumping to a water treatment area to be located at the southern Site boundary.
- 14.5.3 Topsoils and subsoils would be excavated in advance of extraction on a phased basis and stored separately around the perimeter of the Site. There are no superficial geological deposits at the Site. A perimeter screening bund would be established around the excavation area.
- 14.5.4 Surface water runoff from soil storage bunds would be managed through installation of a perimeter drainage system that would direct runoff to the proposed water treatment area prior to off-site discharge.
- 14.5.5 The excavation area would be progressively restored by placement of overburden and inert waste materials in the excavation void. Backfill materials would have a relatively low permeability. Extraction of parts of the upper sandstone unit and replacement with low permeability inert materials would potentially reduce hydraulic connectivity across the Site.
- 14.5.6 Coal Measures sandstones typically have low intergranular porosity but may contain secondary fracture-based porosity, providing a mechanism for storage and transmission of groundwater. However, bulk hydraulic conductivity of the coal measures sandstone is expected to be relatively low and hence

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- groundwater flow rates into the Site during mineral extraction are likely to be relatively low.
- 14.5.7 The upper sandstone aquifer extends northwards in an up-gradient direction from the Site. Geological mapping of the area indicates that the groundwater catchment area is constrained by the presence of faulting and stratigraphic outcrop. There is no evidence to indicate the presence on any groundwater dependent features in this area. With a potentially low groundwater inflow rate, small catchment area and absence of upstream receptors it is concluded that minor inflow of groundwater to the excavation area is unlikely to have any adverse impact on local groundwater resources.
- 14.5.8 Excavation of mudstone would remove part of the unsaturated zone above the sandstone aquifer. However, as coal measures mudstone is considered to be non-productive strata with no significant potential for storage or transmission of groundwater, loss of unsaturated zone would have no adverse impact on local groundwater resources.
- 14.5.9 Mineral extraction would provide a direct pathway from the excavation to the upper sandstone aquifer. Groundwater level monitoring has demonstrated that the sandstone constitutes a confined aquifer with groundwater under an excess pressure of several metres hydraulic head. Whilst the workings form an open excavation there would be a head gradient into the excavation, mitigating risk of contaminant migration to the sandstone aquifer.
- 14.5.10 The Site would be restored by progressive restoration with overburden and imported inert waste materials. Whilst, by definition, inert waste materials should not contain potential contaminants at a concentration that would represent a risk to water resources and therefore restoration proposals should have no potential to affect groundwater quality, it is appropriate to consider the nature of any residual hydrogeological risk in the context of local geological conditions.
- 14.5.11 The proposed excavation would be underlain by a 9m thick Lower Coal Measures Mudstone. Laboratory hydraulic conductivity testing on coal measures mudstone at a nearby location returned a value of 8.8×10^{-13} m/sec. However, it is acknowledged that this is a rock mass hydraulic conductivity and may not be representative of mudstone hydraulic conductivity at site-scale when fracture induced secondary porosity is accounted for, if present.
- 14.5.12 With regard to deposition of inert waste as part of the restoration scheme, the underlying mudstone would form a natural geological barrier to mitigate downward migration of any contaminants present in inert waste materials. For reference, it is noted that for inert landfill installations the geological barrier requirement is a thickness of 1m with a maximum hydraulic conductivity of 1×10^{-7} m/s. Allowing for secondary fracture porosity, it is concluded that the average hydraulic conductivity of the underlying Lower Coal Measures Mudstone would remain several orders of magnitude lower than the specified inert landfill requirement.
- 14.5.13 Restoration with low permeability fill materials may interrupt groundwater flow from north to south through the upper sandstone aquifer. Under such conditions groundwater in the sandstone may tend to flow around the eastern boundary of the Site, through unworked sandstone with potential for discharge to East Hill Beck, as at present. There may also be potential for increase in up-gradient groundwater elevation, although there is no surface outfall in this area. It is important to note that the sandstone aquifer is confined and an increase in hydraulic head does not imply emergence of groundwater at surface. Given that
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groundwater flow rates are expected to be low, and recharge is restricted to a relatively small catchment area, there is no evidence to indicate that elevated groundwater levels up-gradient of the Site would have adverse effect on local groundwater resources.

14.6 Mitigation and management

14.6.1 Hydrogeological impact assessment, based on a robust understanding of baseline hydrological and hydrogeological conditions, has demonstrated that the proposed development has low potential for adverse impact on groundwater resources throughout the operational and post-operational lifetime of the development.

14.6.2 It is understood that, in common with previous quarry operations at Bromley Farm Quarry, extractive and subsequent backfilling operations at the proposed extension area would be undertaken in accordance with the provisions of a standard pollution prevention plan and environmental monitoring programme. No other mitigation or management measures are proposed.

14.7 Summary and conclusions

14.7.1 Baseline hydrological, geological and hydrogeological analysis has led to the development of a robust conceptual hydrogeological model for the Site and surrounding area. The model defines discrete aquifer units beneath the proposed extension area. Each aquifer is overlain by a substantial thickness of low hydraulic conductivity Lower Coal Measure mudstone.

14.7.2 Available evidence indicates that the base of the proposed workings would extend below average groundwater elevation in a thin sandstone unit within the mudstone sequence.

14.7.3 Hydrogeological impact assessment has demonstrated that the proposed extension area is situated in a location of relatively low hydrogeological sensitivity. Proposed extractive, and subsequent restoration, operations are considered to represent a low risk to groundwater resources. No sensitive surface water or groundwater receptors have been identified within the potential area of influence of the proposed development.

14.7.4 It is understood that, in common with previous quarry operations at Bromley Farm Quarry, extractive and subsequent backfilling operations at the proposed extension area would be undertaken in accordance with the provisions of a standard pollution prevention plan and environmental monitoring programme. No other mitigation or management measures are proposed.

14.7.5 It is concluded that the proposed development would represent low risk to groundwater resources and could therefore be established in full compliance with both local and national policy and practice with regard to groundwater protection.

15.0 RESTORATION

15.1 Introduction

- 15.1.1 CB Land Consultancy were commissioned to provide a restoration and aftercare scheme for the proposed quarry extension.
- 15.1.2 Below is a summary of the full report.
- 15.1.3 The report describes the restoration and aftercare proposals for the creation of agricultural land, woodland and shrub planting areas as shown on Drawing number 22007/510.
- 15.1.4 The Bromley Farm Extension Restoration and Aftercare Scheme has been designed to complement the adjacent Bromley Farm Quarry Restoration Scheme the landscaping of which has been designed to increase the natural habitats having regard to the proposed reinstated contours for the site and increasing the bio-diversity of the site considerably to that which exists at present. Through providing productive agricultural land and areas for the establishment of trees, shrubs and species rich grass land, in all returning the site to a beneficial after use of high ecological diversity.
- 15.1.5 The ongoing management responsibility for the area intended for agricultural use will be undertaken by tenant farmers in conjunction with their routine agricultural practices following a five-year aftercare period. Management operations for the five-year aftercare period are described later in this report. These elements have been designed to create cover, food source, light, shade and diversity of aspect, long term maintenance regimes will maximise natural regeneration and sustainability.

15.2 Creation to Landform

- 15.2.1 The site shall be restored to the proposed contours as detailed on Drawing No 22007/510. Contouring of the site shall be carried on completion of quarrying operations. Those areas where soils are to be reinstated the final 0.3 metre depth of overburden shall be ripped with a wing tyne subsoiler where gradients permit the safe working of machinery the aim of which is to alleviate compaction prior to replacing the subsoils and topsoil.

Soil Replacement

- 15.2.2 The aim of the sub and topsoil replacement is to utilise the stored site soils to achieve a thickness of soil suitable as a growing medium to promote the intended after-use of the land. To this end all activities in the replacement of soils are designed to ensure stability, permeability and freedom from compaction. The agricultural area shall be restored having a subsoil and topsoil profile commensurate to that existing prior to quarrying operations commencing. The remainder of the site area shall have subsoil and topsoil spread uniformly from the remaining reserves that were stripped and placed into storage bunds on commencement of quarrying operations.

Soil Testing

- 15.2.3 Following the replacement of soils, the soils will be tested by soil sampling for the pH, N:P:K and organic content. The results of these tests will indicate the need, if any, for soil amelioration and the application of fertiliser to correct any

deficiencies, which may be present, relevant to the intended after-use of the habitat areas to be created.

15.3 Landscaping

15.3.1 On completion of the overburden replacement, due to the relatively small scale of operations it is likely that the reinstatement of soils will be carried out in one operation.

15.3.2 Elements to be included within the landscaping phasing include the following:

Fencing and Boundary Treatment

15.3.3 The fencing indicated will provide stock proofing for the agricultural enclosure and protect the proposed woodland shrub areas, which will be set out in accordance with the approved plan.

15.3.4 Fencing will be erected on completion of the soiling operations, any initial drainage works and the creation of other physical features. The boundaries will comprise of stock proof fencing of either square or round timber posts driven to give a fence height of 1.065 metres of galvanised stock proof mesh with two strands of barbed wire above.

15.3.5 Field access gates 3.6 metres in width shall be provided at strategic points to allow for the movement of stock and machinery between enclosures. Access gates of suitable size to allow for the maintenance of the woodland/shrub areas, shall be installed as appropriate.

Agricultural Enclosure.

15.3.6 The aim of the restoration to the agricultural enclosures is to restore the land to at least its agricultural productivity, prior to the extraction of the mineral resource.

15.3.7 The results of the soil testing undertaken following completion of the soil replacement will be used to assess the analysis of fertiliser and the rate to be applied depending on the use of the land. The aim throughout the aftercare period is to achieve a P & K indices of 2, for the agricultural land. The actual quantities of subsoil stored from the stripping operations shall be quantified prior to re-spreading, subsoils shall be respread evenly over the loosened overburden to the available thickness with minimal trafficking to prevent unnecessary compaction to the overburden layer. Following the laying of the subsoil, the whole depth of subsoil shall be ripped with a wing tyne subsoiler to alleviate compaction, that ensure that the profile is thoroughly loosened to its whole depth. Particular attention shall be paid to penetrating the interface with the previous layer which will ensure that no compacted layer exists, once the relaying of soils has been completed any compaction at depth will not be capable of being alleviated. The importance of de-compacting as each layer of soil is laid cannot be over emphasised, the objective is to bring any compaction to the surface where normal agricultural equipment can manage the task.

15.3.8 Stored topsoil shall be quantified and laid onto the subsoiled areas in the same fashion as the subsoil to an even thickness as determined by the resource available. On completion, the topsoil shall be ripped with a subsoiler preferably with a wing tyne suitable for agricultural operations, particularly attention shall be paid to the correct working depth in ensuring the interface with the subsoil is pierced and alleviates any compaction caused through the spreading process.

Attention shall be taken in the machine settings so as not to intermix subsoil with topsoil in carrying out this operation.

- 15.3.9 All works to the top and subsoil shall be carried out when soil moisture levels are suitable, the machines used in carrying out this operation shall be tracked vehicles whenever possible with low ground pressure tracks.
- 15.3.10 The method described in replacing the soils is to maximise and utilise the soil resource conserved and stored in the storage mounds, to this end all activities in the replacement of soils are designed to ensure suitability, permeability and be free from compaction.
- 15.3.11 The soils shall be cultivated with typical operations consisting of discing, harrowing and rolling to produce a fine firm seedbed into which to sow grass seeds. Stone picking will be carried out as necessary to remove any material that would impede agricultural operations. The variety of seeds quoted are likely to change given the continual development of grass seeds, in which case the appropriate alternative variety will be used to produce a sustainable pasture given its intended after use. A seedbed fertiliser of an appropriate analysis will be incorporated prior to the sowing of seeds to promote growth.

Tree/Shrub Planting Areas

- 15.3.12 Planting will take place during the first available planting season October - March following the restoration of soils. Prior to the planting of trees and shrubs the areas to be planted will be sown with a non-aggressive fine grass seed mixture. This is to allow for the protection of the soils from erosion and to assist in preventing the emergence of undesirable weed species, which may establish themselves within the planting areas.
- 15.3.13 As with the agricultural operations, soils shall be worked when sufficiently dry as to produce a fine firm seedbed following the soil loosening operation described in 3.5 above. In addition to these operations ground preparation work will be carried out prior to planting consisting of subsoiling slightly across the contours at 2 metre centres over the area in which the tree plants will be planted. This operation will assist tree roots to penetrate, establish and promote the movement of and retention of water along the rip lines, in all aiding the development of the plants. The amenity grass mixture will be sown uniformly over the whole woodland shrub planting area. Within the planting area up to 20% of the total area shall be left as open ground in to which will be sown wild flower seeds at 4gms/m² mixed with the amenity seed mix at the time of sowing.
- 15.3.14 The trees and shrubs to be planted, the species shall consist of native species growing in the area. In the main these shall be planted as bare rooted stock at a spacing of 2.0 metres between plants, in species groups of 5, 7 and 9 randomly distributed throughout the planting area.

Drainage

- 15.3.15 Interception ditches shall be constructed at strategic points, where surface flows are likely to occur, these ditches shall be of shallow cross sections and gradients to prevent erosion. During the aftercare period the drainage characteristic of the site will be assessed. At the annual aftercare meeting any additional drainage works will be reviewed and if appropriate remedial work agreed for implementation.

15.4 Aftercare Proposals

- 15.4.1 To ensure successful establishment and long-term care of the restored landscape this section of the report describes the proposed maintenance and management operations, which will be carried out. These activities will follow on from the construction, planting and seeding phase described above, the management regime for the tree and shrub areas has been designed to maximise the potential for wildlife and conservation habitats. The operative aim is to create sustainable features.
- 15.4.2 Those parts of the scheme which are to be returned to agricultural use will be maintained for five years following practical completion of restoration works after which this will become the responsibility of the tenant farmers in conjunction with their management regime for other land they farm.

15.5 Management Operations.

- 15.5.1 On completion of the construction and planting works the following vegetative types will be present on site: -

Woodland / shrubs

- 15.5.2 The aim of management is to create and maintain the newly planted areas in such a way as to ensure their development into healthy mature plants with diverse composition through carrying out a regular cycle of thinning, removal of dead and damaged plants and gapping up and control of invasive species.

Year 1 - 3

- 15.5.3 Weed control in the early establishment years is perhaps the most important management operation determining to a large extent the success of new planting. During the first three years after planting, a weed free zone will be maintained around each plant. To achieve this, two maintenance visits as a minimum need to be made throughout April to September. Weed control will be by an approved method of either a chemical application and or hand weeding as felt appropriate given site conditions.
- 15.5.4 During the early establishment years attention will be given to firming up plants which shall be carried out following periods of frost to prevent exposure of roots.
- 15.5.5 Any stakes or canes used to support plants will be checked annually and replaced and secured as necessary.
- 15.5.6 Depending on ground conditions particularly if success of planting is poor, investigation will be made of the likely causes and appropriate mitigating measures taken, this may involve the use of slow-release fertiliser, pesticides or other specific treatments.
- 15.5.7 Pruning of any dead, dying, diseased or damaged branches will be carried out with an appropriate tool to leave a clean angular cut to prevent disease.
- 15.5.8 Replacement of failed plants will be undertaken annually, to achieve by the end of year 3 a ninety percent survival rate providing that any failed planting stations are evenly distributed throughout the planted areas.

Species Rich Grassland

- 15.5.9 The seed mix has been selected to provide a diverse habitat of conservation value whilst enable a late hay crop to be harvested once seeds have dropped providing conditions for natural regeneration to occur.

15.6 Site Inspection

- 15.6.1 In order to ensure the objectives, set out in this report are achieved an annual aftercare meeting will be held to deal specifically with the details of the agreed aftercare and restoration scheme. The success of the planting and seeding will be assessed, and a schedule agreed of replacement planting required or other appropriate management regime to be adopted. Fencing and gate conditions shall be inspected and if necessary appropriate repairs will be undertaken.
- 15.6.2 At the end of the statutory aftercare period the area restored to agricultural use will be managed by the occupier of the land or local farmer as part of their normal farming practice.

Appendix N° 1 Seed Mixture Specification

Mixture No 1

Perennial Ryegrass	Fenema	8.0
Perennial Ryegrass	Gilford	12.0.
Perennial Ryegrass	Glen	8.0
Timothy	Motim	3.0
White Clover	Avoca	1.0
White Clover	Menna	2.0
Creeping Red Fescue	(Festuca rubra rubra)	<u>8.0</u>

Seed Rate per Ha 42.0 Kg/ha

Mixture No 2

Strong Creeping Red Fescue	21.0
Highland Browntop	7.0
Smooth Stalked Meadow grass	4.0
Hard Fescue	4.0

Seed rate per Ha 36.0 Kg/ha

Mixture No 3

Wild Flowers	%		Grasses	%
Yarrow	0.5		Common Bent	10
Common Knapweed	1.0		Crested Dogstail	36
Tufted Vetch	2.0		Red Fescue	25
Wild Red Clover	0.5		Smaller Cat's tail	4
Yellow Rattle	1.5		Vernal-grass	1
Lady's Bedstraw	2.1		Meadow Foxtail	4
Oxeye Daisy	2.0			80
Birdsfoot Trefoil	0.5			
Ribwort Plantain	1.0			
Cowslip	1.0			
Selfheal	2.2			

Meadow Buttercup	3.5			
Common Sorrel	1.0			
Pepper Saxifrage	1.0			
Ragged robin	0.2			
	20		Sowing rate 4 grams per M ²	

Appendix N° 2 Tree and Shrub Species

<i>Native trees planting at 2 metre centres</i>		
Species	Specification	% to be planted
Silver Birch	60-90 cm Bare rooted	15
Rowan	60-90 cm Bare rooted	10
Common Alder	45-60 cm Bare rooted	10
Goat Willow	45-60 cm Bare rooted	10
Scots Pine	45-60 cm Bare rooted	15
<i>Shrubs /trees planting at 1.5 mtre centres on steeper slopes</i>		
Holly	Container grown	2.5
Hawthorn	45-60 cm Bare rooted	7.5
Hazel	45-60 cm Bare rooted	5.0
Guelder Rose	45-60 cm Bare rooted	5.0
Alder	45-60 cm Bare rooted	5.0
Silver Birch	45-60 cm Bare rooted	5.0
Goat Willow	45-60 cm Bare rooted	5.0
Blackthorn	45-60 cm bare rooted	5.0

Appendix N° 3

Annual Maintenance Requirements

Operation	Timing	Year
Maintain a weed free zone 0.5 metre in diameter around each planting station	April, June & September	1 - 3
Check stake, ties and fencing	Once per year	1 - 5
Apply fertiliser, pesticides as appropriate	April - June	1 - 3
Re-firm plants after frost or strong winds	Once per year	1 - 5
Replace initial planting to 100% where plants have failed	Once per year October - March	1 - 3
Remove stake and ties	As soon as tree is wind firm	3 - 5

16.0 ARCHAEOLOGY

16.1 Introduction

- 16.1.1 Archaeological Services WYAS (ASWYAS) were commissioned by Silkstone Environmental Ltd to undertake a desk-based assessment on land within the proposed extension area.
- 16.1.2 An assessment of the significance of any recorded heritage assets within a 1km zone around the site has been undertaken, together with an assessment of any potential impacts, in line with the requirements of National Planning Policy Framework (NPPF; Chapter 16: 'Conserving and enhancing the historic environment', paragraph 189).
- 16.1.3 Below is a summary of the findings of full report.

16.2 Walkover survey

- 16.2.1 A walkover survey was undertaken on the 8th September 2022 in order to identify any archaeological features visible on the ground and to determine the potential for any future archaeological investigations. A selection of photographs of this exercise are provided in Plates 1-5. The PDA is located on the south side of Cumberworth Lane and gently slopes down towards the south-east, and consists of four roughly rectangular east-northeast west-southwest aligned fields. The fields formerly formed six fields, but two of the perpendicular boundaries have been removed in recent times. At the time of the visit, the PDA was ungrazed pasture and was bounded by drystone walls around the perimeter of the fields, which were breached in parts, and partially robbed out in places. There were no visible earthworks within the fields.

16.3 Archaeological archives and databases

- 16.3.1 Information on recorded heritage assets and archaeological investigations within a 1km radius centred on the PDA was obtained from the West Yorkshire Environment Record (WYHER). Historic maps and plans, and antiquarian histories and other relevant documentary sources were consulted.
- 16.3.2 English Heritage's National Heritage List for England Database were consulted for information on all designated Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields, Conservation Areas and World Heritage Sites within the study area.

16.4 Assessment Criteria

- 16.4.1 An assessment of the significance of any recorded heritage assets within a 1km radius around the centre of the PDA has been undertaken, in line with the requirements of the National Planning Policy Framework (NPPF; Chapter 16: 'Conserving and enhancing the historic environment', paragraph 189). Scheduled Monuments, Grade I and II* Listed Buildings, Registered Parks and Gardens, Registered Battlefields and World Heritage Sites are assessed to be of high significance, in line with paragraph 194 of the NPPF. The significance of other heritage assets has been determined based on the following criteria, and broadly follows levels of national designation.

16.5 Significance Type of Heritage Asset

High

Scheduled Monuments
Listed Buildings (Grade I and II*)
Registered Parks and Gardens
Registered Battlefields
World Heritage Sites

Medium

Listed Buildings (Grade II)
Conservation Areas
Heritage Assets identified as being of regional or local importance on the HER
Sites identified within this assessment considered to be of regional or local importance

Low

Non-designated Heritage Assets recorded on the HER Previously unrecorded sites identified in this assessment and not considered to be significant
None Previously recorded heritage assets or sites recorded in documentary sources now destroyed

Unknown

Potential but previously unrecorded sub-surface archaeological remains
Historical sites or features identified through documentary evidence as part of this assessment

16.6 Designated heritage assets

- 16.6.1 A total of fifteen recorded heritage assets and six events (archaeological interventions) have been identified within the study area. These are discussed below.
- 16.6.2 There are six Listed Buildings in the study area. The study area does not incorporate a Conservation Area, and no Registered Battlefields, Registered Parks or Gardens or World Heritage Sites are situated here.
- 16.6.3 Upper Cumberworth Conservation Area lies 500m to the west of the PDA, it contains a small group of clustered houses and converted farm buildings centred on St Nicholas' Church. The school and Balk Farm also play an important role in creating and maintaining this characterful, stone-built settlement.

16.7 Local Heritage Assets

- 16.7.1 There are six Listed Buildings in the study area. The study area does not incorporate a Conservation Area, and no Registered Battlefields, Registered Parks or Gardens or World Heritage Sites are situated here.
- 16.7.2 Upper Cumberworth Conservation Area lies 500m to the west of the PDA, it contains a small group of clustered houses and converted farm buildings centred on St Nicholas' Church. The school and Balk Farm also play an

important role in creating and maintaining this characterful, stone-built settlement.

St Nicholas Church, Cumberworth

Medium

St Nicholas Church, Cumberworth, re-built in 1876 but was in existence by 1299 - Chartulary of St John of Pontefract. The church is built of finely dressed stone with ashlar dressings and has a Welsh slate roof with gable copings. The lower stage of the tower may be 18th century. On the south side of the tower is a small, blind, round arched window with an inscribed lintel dated 1767. The church has an arched-braced king post nave roof and a 17th century octagonal font with pedistal; the faces of the bowl have paired, traceried panels. A petition for rights of burial was granted in 1627.

Historic England Listing Description- Church. 1876. Gothic Revival. Lower stage of tower may be C18. Finely dressed stone with ashlar dressings. Welsh slate roof with gable copings. Two-stage square west tower, 4-bay nave with gabled south porch, 2-bay chancel with vestry on north side. Diagonal buttresses to west tower applied to the quoins of the earlier lower stage. On the south side of the tower is a small, blind, round arched window with inscribed lintel 1767. Below is a small ogee-headed window. At base of tower, on south side, is a small, recent addition. The upper stage of the tower has large 2-light bell-chamber openings, louvred, and with reticulated tracery. Slated pyramidal roof, with moulded gutter on moulded brackets. Iron weather cock. 2-light nave windows, single light chancel windows and 3-light east window, all with traceried heads. Interior: arched-braced king-post nave roof. Scissor-braced truss to chancel. Font, probably C17 with octagonal bowl and pedestal. The faces of the bowl have paired, traceried panels, and of the pedestal single traceried panels. Colourful stained glass to east window of 1879. Chancel windows on south side have good stained glass of 1938 and 1939 by William Morris and Co., Westminster, the latter signed.

Hartcliffe Mills

Medium

An early 19th-century woollen mill complex, featuring 11 principal buildings (one of which has listed building status). The buildings include two spinning mills, a range of weaving sheds, a dyehouse, engine house and a brick chimney. The mill complex was subject to a survey by RCHME in 1985. Shown on the 1st ed 6" series OS map. The listed mill building is constructed of hammer dressed stone, with a stone slate roof and gable copings on cut kneelers to north. It has 3 storeys to the east, and 2 to the west. 7 bays of sashes some with early glazing of 30 panes. On the west side are 2-light windows and a doorway at first floor level with stone external stair. In April 2004 Archaeological Services WYAS undertook initial survey work at Hartcliffe Mills at the request of Kirklees District Council in advance of demolition of one of the mill's buildings. An archaeological watching brief was carried out at the mill on 29/10/2004 during stabilisation works to the mill dam wall after the building had been demolished (ASWYAS, 2006) (EWY5175). Description: Recorded on 1850s mapping. Still occupied by original owner Z Hinchliffe. Additional 1930's shed to original buildings, mill pond.

Church of England School

Medium

This former National School is dated 1820, but has since been altered. It is built of hammer-dressed stone with ashlar dressings, and has a hipped stone slate roof. It is a single storey high and originally had a symmetrical façade. There are four three-light gothic arched windows with intersecting tracery. A central oval is inscribed: NATIONAL SCHOOL 1820. A doorway lies within a recent brick porch to the left, and a recent window, probably a former doorway, lies to the right. Further to the right, there is a late 19th century gabled wing. There is also a recent single storey brick extension to the whole of the rear (text edited from English Heritage LBO description).

Long Royd

Low

Long Royd consists of a dwelling and barn building. They are both shown on the 1st Edition OS map (Yorkshire, Sheet 261) indicating that they existed in 1851.

Top O' Th' Close

Low

Top O' Th' Close consists of a cottage and barn. They are both shown on the 1st Edition OS map (Yorkshire, Sheet 261) 1851.

Toby Wood Farmstead

Low

Toby Wood Farmstead is shown on the 1st Edition OS Map (map sheet 273) 1851. In June 2003, D. Moir (WYAAS) commented on a planning application for the re-use, extension and adaptation of an existing storage building at Toby Wood Farm to form one dwelling. It was recommended that the building in question should be the subject of a photographic record. It is not known if such a record ever took place.

Braggs Farmhouse (Sycamore Farm), Cumberworth

Medium

House, part of group, now divided. C17 or early C18 with C19 alterations. Rendered walls. Quoins. Stone slate roof with gable copings on moulded kneelers. Two storeys. Central doorway (No. 8) with one 4-light double chamfered window to left with two mullions removed. Part of a hood mould over. Small recent extension to right. Two single light C19 windows to 1st floor. Left gable is part obscured by adjoining outbuilding. Part blocked doorway with deep chamfered lintel, and tiny, chamfered fire-window to 1st floor. The right gable, to the road, has a 4-light, double chamfered window to ground floor, with two mullions removed. Hood mould over has square stop to right end only. To 1st floor is a former 4-light double chamfered window, now altered with recent head and two mullions. Remains of hood mould (National Heritage List of England- Listed 15/08/1985- <http://www.historicengland.org.uk/listing/the-list/list-entry/1313331>). The Farmhouse was visited by Colum Giles in May 1981 as

part of the WYAS/RCHME Rural Houses Survey. NB Giles refers to the building as Sycamore Farm.

2 Balk Lane and Attached Barn, Upper Cumberworth

Medium

Laithe house. 17th century origin with late 18th century and late 19th century alterations and additions. Deeply coursed hammer dressed stone. Stone slate roof with later stacks. The house, to right, has Tudor arched entrance with inscribed lintel thought to read: CRE 16 -- SH. One 4-light double chamfered window to right with 2 mullions removed. Hood mould. Late 18th century openings include a 2-light window and a doorway to left, and a 3-light and a 4-light window to 1st floor. Further to left is a square headed cart entry to barn. The left end of the barn is late 19th century.

4/28 Lane Side, house to east of group

Medium

Terraced pair of houses, now one dwelling. Early or mid C19. Recent alterations. Hammer dressed stone. Stone slate roof (turned). New stacks. Two storeys. Moulded stone brackets to gutter. Gable copings on cut kneelers. Four 3-light windows, to 1st floor, with continuous sill band. Two 3-light windows to ground floor and two entrances that to right part blocked.

16.8 Impact Assessment and Mitigation

- 16.8.1 There are no direct impacts to consider as there are no recorded heritage assets within the PDA or its immediate vicinity.
- 16.8.2 As any works associated with the proposed quarry extension will take place below current ground level and will be relatively short-lived, they should not have a major adverse impact on the visual setting of Lane Side (1135296), Cumberworth Conservation Area and the listed buildings within the wider study area. It is also noted that the topsoil and subsoil stripped from the quarry area will form a screening mound adjacent to Cumberworth Lane. The proposed track will be screened from Cumberworth Lane and Lane Side by a stand of mature trees.
- 16.8.3 Short-term minor impacts may include any combination of the following;
- the creation of soil bunds, soil heaps or mounds and mineral stockpiles. The use of winding gear, crushers and
 - other production facilities will also temporarily change historic visual relationships between heritage assets and their surroundings.

16.9 Impact on Historic Landscape

- 16.9.1 The PDA will be restored to agricultural use once the quarry extension has been worked. As a result, no long-term change to the historic landscape is anticipated.
- 16.9.2 There have been no archaeological investigations within the PDA, or immediate vicinity, and there are no known heritage assets within the PDA. There is potential for unknown heritage assets, however, which may include evidence of

early mining, quarrying and farming activities. These may be of some archaeological interest and may have some local significance.

- 16.9.3 The map regression undertaken as part of this desk-based assessment shows that the PDA has remained undeveloped (agricultural fields) from the middle of the 19th century until the present day. This could facilitate the survival of earlier (prehistoric, Roman or medieval) archaeological remains.

16.10 Recommendations for further mitigation

- 16.10.1 Nothing of great archaeological importance has been identified within the study area that would be impacted upon by the proposed extension of Bromley Farm Quarry. No features survive as earthworks on the surface, and due to the pastoral nature of the land here it has not been possible to identify archaeological features which could manifest themselves as crop marks in arable fields. However, given the topography of the PDA (south-facing slope), it is possible that this area may have been exploited during the prehistoric period (or later).
- 16.10.2 Consequently, in the first instance a geophysical survey is recommended. This may be followed by a programme of trial trenching, but the final decision regarding further mitigation lies with the archaeological advisors to West Yorkshire's planners.

16.11 Summary & Conclusions

- 16.11.1 An archaeological desk-based assessment was undertaken on land to the south of Cumberworth Lane, on the outskirts of Upper Cumberworth, West Yorkshire. This identified that the Proposed Development Area is likely to have been used as agricultural land, as it has been in the recent past. Based on the results of the desk-based assessment, the archaeological potential is considered to be low based on the sparsity of known heritage assets in the wider study area.
- 16.11.2 An assessment of the significance of any recorded heritage assets within a 1km zone around the site has been undertaken, together with an assessment of any potential impacts, in line with the requirements of National Planning Policy Framework (NPPF; Chapter 16: 'Conserving and enhancing the historic environment', paragraph 189).
- 16.11.3 There is no evidence of archaeological activity within the PDA but it does occupy land that was, and continues to be, used for agricultural purposes. This lack of development might facilitate the survival of earlier (e.g. prehistoric, Roman or medieval) activity.
- 16.11.4 The archaeological desk-based assessment, however, has established that there is a low potential for archaeological remains within the PDA based on the sparsity of known heritage assets in the study area.

17.0 PLANNING POLICY

17.1 National Policy

The National Planning Policy Framework (NPPF)

- 17.1.1 The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how these are to be applied, including the consideration and protection of environmental and amenity assets where necessary.
- 17.1.2 Paragraph 146 confirms that some types of development including mineral extraction are "not inappropriate in the Green Belt provided they preserve its openness and do not conflict with the purposes of including land within it".
- 17.1.3 Paragraph 170 in Section 15 Conserving and Enhancing the Natural Environment confirms that planning decisions should enhance the natural and local environment by:
- "recognising the intrinsic character and natural beauty of the countryside, and the wider benefits of natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland";
- "minimising impacts on and providing net gains for biodiversity"; and by
- "remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate".
- 17.1.4 Section 17 of the NPPF deals with the sustainable use of minerals including in paragraph 205 the need to "ensure that there are no unacceptable adverse impacts on the natural and historic environment ... and take into account the cumulative effect of multiple impacts from individual sites and / or from a number of sites in a locality", and "provide for restoration and aftercare at the earliest opportunity, to be carried to high environmental standards".
- 17.1.5 National Planning Practice Guidance (NPPG) provides guidance on the application of the NPPF and NPPG for the Natural Environment (MHCLG, 2016) promotes landscape character assessment as "a tool to help understand the character and local distinctiveness of the landscape and identify the features that give it a sense of place".

17.2 Mineral Working in the Green Belt

- 17.2.1 The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how these are to be applied, including the consideration and protection of environmental and amenity assets where necessary.
- 17.2.2 Paragraph 146 confirms that some types of development including mineral extraction are "not inappropriate in the Green Belt provided they preserve its openness and do not conflict with the purposes of including land within it".
- 17.2.3 Paragraph 170 in Section 15 Conserving and Enhancing the Natural Environment confirms that planning decisions should enhance the natural and local environment by:

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- “recognising the intrinsic character and natural beauty of the countryside, and the wider benefits of natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland”;
 - “minimising impacts on and providing net gains for biodiversity”; and by
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- 17.2.5 National Planning Practice Guidance (NPPG) provides guidance on the application of the NPPF and NPPG for the Natural Environment (MHCLG, 2016) promotes landscape character assessment as “a tool to help understand the character and local distinctiveness of the landscape and identify the features that give it a sense of place”.
- 17.2.6 On July 22nd 2019, the Ministry of Housing, Communities & Local Government, published updated Online Guidance ‘Advice on the role of the Green Belt in the planning system’. This included the following guidance (Paragraph: 001 Reference ID: 64-001-20190722, Revision date: 22 07 2019):
- 17.2.7 Assessing the impact of a proposal on the openness of the Green Belt, where it is relevant to do so, requires a judgment based on the circumstances of the case. By way of example, the courts have identified a number of matters which may need to be taken into account in making this assessment. These include, but are not limited to: openness is capable of having both spatial and visual aspects – in other words, the visual impact of the proposal may be relevant, as could its volume; the duration of the development, and its remediability – taking into account any provisions to return land to its original state or to an equivalent (or improved) state of openness; and the degree of activity likely to be generated, such as traffic generation’.
- 17.2.8 The LVIA submitted with the application identifies how the ability to see and perceive any change to the openness of the Green Belt would be limited and that the visual effects are limited and localised such that the openness will be preserved.
- 17.2.9 The issue of effects on openness is a matter of judgement, in the context of the site and the proposal and in the knowledge of the typical effects of mineral extraction, such judgement to be assisted and informed by the approach in other decisions and appeals.
- 17.2.10 The benefits of the proposal are great in terms of the need for the mineral, continuation of supply for a major employer in the local area, limitations on suitable local alternatives, the acknowledged policy safeguarding of the site because of the importance of the mineral and the economic benefits associated with it. These amount to very special circumstances that clearly outweigh any inappropriateness and any other harms, even if the scheme was judged not to meet the terms of Green Belt policy which is not accepted.
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17.2 Local Policy

- 17.2.1 Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires that planning applications are determined in accordance with the Development Plan unless material considerations indicate otherwise.
- 17.2.2 The Council's Local Plan was adopted on the 27th February 2019 and is now the statutory development plan for Kirklees.
- 17.2.3 National Planning Policy Framework (NPPF) states that minerals are essential to support sustainable economic growth and our quality of life. It is therefore important that there is a sufficient supply of material to provide the infrastructure, buildings, energy and goods that the country needs. However, since minerals are a finite natural resource, and can only be worked where they are found, it is important to make best use of them to secure their long-term conservation.
- 17.2.4 The two principal minerals which are currently extracted in the district are sandstone which is primarily used in the construction of buildings and for paving, and clay and shale used for pipe manufacture. However, there are limited reserves of sand and gravel in the River Calder valley, where one operational sand and gravel quarry is located. Parts of the district are also underlain by significant coal reserves although none are being worked at prese

Clay and Shale

- 17.2.5 Extensive economically important reserves of clay and shale are located in the Coal Measures strata on the eastern side of the district, and they provide raw material for two of the Country's leading manufacturers of clay pipes which are located in the adjacent Barnsley local authority area.
- 17.2.6 Several clay and shale quarries are located in the south east of the district. A feature of clay pipe production is that the different types of clay are blended together and therefore it is necessary for a single operator to have several sources of the raw material at any one time. Satisfactory restoration of clay and shale workings is often proving to be possible without the need for backfill with waste material although these sites would provide suitable void space for landfill if required.
- 17.2.7 The relevant policies to this application are as follows:
- Local Plan Policy PLP1 – Presumption in favour of sustainable development
 - Local Plan Policy PLP3 – Location of new development
 - Local Plan Policy PLP7 – Efficient and effective use of land and buildings
 - Local Plan Policy PLP 21 – Highway safety and access
 - Local Plan Policy PLP22 - Parking
 - Local Plan Policy PLP24 - Design Local Plan Policy PLP 30 – Biodiversity and geodiversity
 - Local Plan Policy PLP 36 – Proposals for mineral extraction
 - Local Plan Policy PLP 37 – Site restoration and aftercare
 - Local Plan Policy PLP52 – Protection and improvement of environmental quality

Local Plan Policy	Relevant Policy Text	Proposal accords with MLP Policy
PLP1 Presumption in favour of sustainable development	When considering development proposals, the council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. The council will always work pro-actively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area. Proposals that accord with the policies in the Kirklees Local Plan (and, where relevant, with policies in neighbourhood plans) will be approved without delay, unless material considerations indicate otherwise. Where there are no policies relevant to the proposal or relevant policies are out of date at the time of making the decision then the council will grant permission unless material considerations indicate otherwise – taking into account whether: a. any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or b. specific policies in that Framework indicate that development should be restricted.	✓
Policy LP 26 Renewable and low carbon energy	Renewable and low carbon energy proposals (excluding wind) will be supported, and planning permission granted where the following criteria are met: a. the proposal would not have an unacceptable impact on landscape character and visual appearance of the local area, including the urban environment; b. the proposal would not have either individually or cumulatively an unacceptable impact on protected species, designated sites of importance for biodiversity or heritage assets; c. the statutory protection of any area would not be compromised by the development; d. any noise, odour, traffic or other impact of development is mitigated so as not to cause	✓

	unacceptable detriment to local amenity; e. any significant adverse effects of the proposal are mitigated by wider environmental, social and economic benefits.	
Policy LP28 Drainage	The presumption is that Sustainable Drainage Systems (SuDS) will be used to assist in achieving the following on each site: a. for proposals on greenfield sites, typical greenfield run-off rates should not be exceeded; b. for proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven. New connections will be subject to at least greenfield restrictions; c. No negative impact on local water quality and improvements in water quality where practicable; d. Consider whether proposed open spaces and green infrastructure within sites can contribute to the sustainable drainage of the site. Local conditions including the existence of critical drainage areas may require a lower run-off rate to be agreed to reflect volume control, local surface water risks, water course capacity and flood risk further downstream. There will be a general presumption against pumping surface water. It must also be demonstrated that the surface water management solution is designed to meet requirements over the lifetime of the development including evidence that management and maintenance arrangements have been secured to cover that period. This includes ensuring proposals to store water meet national standards and latest best practice. Flow paths accommodating water from outside the site or due to an exceedance event should be designed to avoid buildings and curtilages. Development will only be permitted if it can be demonstrated that the water supply and waste water infrastructure required is available or can be co-ordinated to meet the demand generated by the new development.	✓
Policy LP30 Biodiversity & Geodiversity	The council will seek to protect and enhance the biodiversity and geodiversity of Kirklees, including the range of international, national and locally designated wildlife and geological sites, Habitats and Species of Principal Importance and the Kirklees Wildlife Habitat Network. South Pennine Moors Proposals which may directly or indirectly compromise achieving the conservation objectives of a designated or candidate European protected site will not be permitted unless the proposal meets the conditions specified in Article 6 (3) - (4) of the Habitats Directive. Statutory Designated Sites Statutory designated sites, including the South Pennine Moors Special Protection Area (SPA) and Special Area for Conservation (SAC) and Sites of Special Scientific Interest, are already highly	☐ ✓

	protected through existing laws and legislation. In accordance with legislation, the Council will seek to ensure that harmful impacts to these areas as a result of development proposals are avoided. Development proposed within or outside a designated Site of Special Scientific Interest, likely to have an adverse effect on the site's special nature conservation features, will not normally be permitted. Exceptionally development will be allowed where the benefits of the development clearly outweigh the impacts on the site's special conservation features and measures are provided to mitigate harmful impacts. The Dark Peak Nature Improvement Area Proposals that contribute to the aims and objectives of the Dark Peak Nature Improvement Area will in principle be supported, subject to other policies in this plan. Development likely to have an adverse impact on the aims and objectives of the NIA will not be permitted. Local Designated Sites & Important Local Ecological Features Proposals having a direct or indirect adverse effect on a Local Wildlife Site or Local Geological Site, Ancient Woodland, Veteran Tree or other important tree, will not be permitted unless the benefits of the development can be clearly shown to outweigh the need to safeguard the local conservation value of the site or feature and there is no alternative means to deliver the proposal. In all cases, full compensatory measures would be required and secured in the long term. Habitats and Species of Principal Importance Proposals will be required to protect Habitats and Species of Principal Importance unless the benefits of the development clearly outweigh the importance of the biodiversity interest, in which case long term compensatory measures will need to be secured. Biodiversity and Development Development proposals will be required to:- Kirklees Local Plan - Strategy and Policies 129 13 Natural environment i) result in no significant loss or harm to biodiversity in Kirklees through avoidance, adequate mitigation or, as a last resort, compensatory measures secured through the establishment of a legally binding agreement; ii) minimise impact on biodiversity and provide net biodiversity gains through good design by incorporating biodiversity enhancements and habitat creation where opportunities exist; iii) safeguard and enhance the function and connectivity of the Kirklees Wildlife Habitat Network at a local and wider landscape-scale unless the loss of the site and its functional role within the network can be fully maintained or compensated for in the long term; iv) establish additional ecological links to the Kirklees Wildlife Habitat Network where opportunities	
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	exist; and v) incorporate biodiversity enhancement measures to reflect the priority habitats and species identified for the relevant Kirklees Biodiversity Opportunity Zone.	
Policy LP32 Landscape	Proposals should be designed to take into account and seek to enhance the landscape character of the area considering in particular: a. the need to protect the setting and special qualities of the Peak District National park, views in and out of the park and views from surrounding viewpoints; b. the setting of settlements and buildings within the landscape; c. the patterns of woodland, trees and field boundaries; d. the appearance of rivers, canals, reservoirs and other water features within the landscape.	✓
Policy LP35 Historic environment	1. Development proposals affecting a designated heritage asset (or an archaeological site of national importance) should preserve or enhance the significance of the asset. In cases likely to result in substantial harm or loss, development will only be permitted where it can be demonstrated that the proposals would bring substantial public benefits that clearly outweigh the harm, or all of the following are met: a. the nature of the heritage asset prevents all reasonable uses of the site; b. no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; c. conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and d. the harm or loss is outweighed by the benefit of bringing the site back into use. 2. Proposals which would remove, harm or undermine the significance of a non-designated heritage asset, or its contribution to the character of a place will be permitted only where benefits of the development outweigh the harm having regard to the scale of the harm and the significance of the heritage asset. In the case of developments affecting archaeological sites of less than national importance where development affecting such sites is acceptable in principle, mitigation of damage will be ensured through preservation of the remains in situ as a preferred solution. 3. Proposals should retain those elements of the historic environment which contribute to the distinct identity of the Kirklees area and ensure they are appropriately conserved, to the extent warranted by their significance, also having regard to the wider benefits of development. Consideration should be given to the need to: a. ensure that proposals maintain and reinforce local	2 ✓

	distinctiveness and conserve the significance of designated and non-designated heritage assets; b. ensure that proposals within Conservation Areas conserve those elements which contribute to their significance; c. secure a sustainable future for heritage assets at risk and those associated with the local textile industry, historic farm buildings, places of worship and civic and institutional buildings constructed on the back of the wealth created by the textile industry as expressions of local civic pride and identity; d. identify opportunities, including use of new technologies, to mitigate, and adapt to, the effects of climate change in ways that do not harm the significance of heritage assets and, where conflict is unavoidable, to balance the public benefit of climate change mitigation measures with the harm caused to the heritage assets' significance; e. accommodate innovative design where this does not prejudice the significance of heritage assets; f. preserve the setting of Castle Hill	
Policy LP36 Proposals for mineral extraction	Proposals for mineral extraction will be considered having regard to: a. the impact on the environment including water resources and the best and the most versatile agricultural land; b. the impact on residential amenity, highway safety and local heritage assets; c. the impact on human health; d. any cumulative effects arising from multiple impacts from individual sites and/or a number of sites in a locality. Part 2 Proposals to explore for, or extract minerals, including from former waste deposits will be permitted provided that they will not: a. cause unacceptable detriment to the landscape including its character or local visual amenity during or subsequent to extraction; b. be materially detrimental to interests of nature conservation, cultural heritage, geological or archaeological importance; c. cause nuisance or materially significant disturbance to local residents as a consequence of the generation of dust, noise or vibration by site operations or associated transport; d. prejudice highway safety through the volume or nature of vehicle movements generated; e. result in pollution of water resources or soils or the interruption of land drainage; f. cause materially significant permanent change to local rights of way networks; or g. result in permanent loss of best and most versatile agricultural land. Proposals to extract minerals should be accompanied by sufficient information to demonstrate that such unacceptable impacts would not occur, or could	☑ ✓

	be satisfactorily controlled, and to demonstrate the presence of and need for the mineral	
Policy LP37 Site restoration and aftercare	Part 1 - Mineral working will be permitted only where the council is satisfied that the site can be restored and managed to a high standard, the proposed restoration is sympathetic to the character and setting of the wider area and is capable of sustaining an appropriate after-use. Restoration proposals for mineral workings should be designed to: a. clearly indicate how the site will be restored and managed, before, during and after working; b. ensure that restoration is completed at the earliest opportunity including the use of progressive restoration techniques where appropriate; c. ensure that restoration and aftercare is appropriate with regard to the characteristics of the site's surroundings, including landscape character; d. demonstrate that adequate financial provision has been made to fulfil the proposed restoration and aftercare requirements; and e. include, where appropriate, provision for the extended management of a site beyond any aftercare period required by planning condition. Part 2 - Mineral working will be permitted only where the proposed site restoration delivers benefits such as enhancement of biodiversity interests, improved public access and the provision of climate change mitigation. Restoration proposals should therefore include: a. measures to assist or achieve priority habitat or species targets and/or biodiversity Action Plan targets; b. where appropriate, measures to protect and/or improve geodiversity and provide educational opportunities to visit such sites; c. provision for increased flood storage capacity for sites which fall within high flood risk areas; d. where appropriate, opportunities to provide for local amenity uses, including appropriate sport and recreational uses; and e. measures to restore land back to agriculture for sites involving the best and most versatile agricultural land.	✓
Policy LP43 Waste Management Hierarchy	The council will encourage and support the minimisation of waste production, and the re-use and recovery of waste materials including, for example, recycling, composting and Energy from Waste recovery. Proposals for facilities to manage waste within the district will be considered based upon the following principles: a) seeking to move the management of all waste streams up the waste hierarchy of prevention, re-use, recycling, recovery, disposal; b) promoting the opportunities for on-site management of waste where it arises; c) promoting the use of waste as a resource, particularly encouraging co-location of	☐ ✓

	developments that can use each other's waste materials; d) working towards achieving the objectives and targets for recycling/recovery for waste as set out in the Waste Framework Directive; e) supporting opportunities to locate complementary facilities, such as waste disposal points and treatment facilities, in close proximity to each other.	
Policy LP44 New waste management facilities	Proposals for waste management facilities should be located in sustainable locations, appropriate to the proposed waste management use and its operational characteristics, where potentially adverse impacts on people, biodiversity and the environment can be avoided or adequately mitigated. Proposals should have regard to the following sequential priorities, unless the use of an appropriate alternative site can be justified: a) sites specifically allocated for waste management purposes; b) employment sites where co-location with existing waste management processes is possible without detriment to residential amenity; c) employment sites suitable for Use Classes B2 and B8; d) sustainable locations within vacant previously developed land. Proposals for waste management facilities should demonstrate that the following potential impacts have been fully considered and satisfactorily addressed so as to make them acceptable to the council: a) duration of the development; b) the layout and design of the site and any associated buildings; c) influence on visual amenity; d) the treatment of boundary features and new screening as appropriate; e) environment and amenity issues such as noise, dust, litter, odour, vermin and gas emissions; f) protection of controlled waters; g) drainage and use of sustainable drainage; h) effects on the natural and historic environment; i) restoration and aftercare where appropriate; j) measures to prevent dirt and debris being carried onto the public highway; k) the adequacy of the highway network and the safety of access and egress arrangements; l) routing and the frequency of vehicle movements; m) hours of operation; n) the protection of public rights of way; o) fairly and reasonably related community	☒

	benefits.	
Policy LP51 Protection and improvement of local air quality	1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people. 2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted. 3. Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted.	☐ ✓

Silkstone Environmental Ltd
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