

PART B: ENVIRONMENTAL STATEMENT

1 INTRODUCTION

1.1.1 The purpose of the Environmental Statement (ES) is to describe the development proposals, predict and assess their potential environmental impacts on the Site and its surroundings. The Statement considers the most appropriate form the development should take in order to minimise the potential losses and maximise the potential gains, in terms of acknowledged environmental concerns.

1.1.2 Existing land uses and environmental conditions on the Site have been assessed, including those associated with the following issues:

- Cultural Heritage (Archaeology)
- Landscape and Visual Impact
- Ecological Impact
- Highways and Traffic
- Hydrological and Hydrogeological Impact
- Noise
- Air Quality (Dust)
- Ground Stability (Geotechnical)
- Soils and Agriculture
- Socio-Economic

1.1.3 Surveys and desk studies have been used to examine the potential impact of the proposals in detail and to assess the likely magnitude of change from the existing situation. Both direct and indirect impacts are outlined and the necessary mitigation proposed. The detailed proposals set out in the Supporting Statement have been prepared taking into account the mitigation measures which have been derived from the Environmental Impact Assessment process.

1.1.4 The consultees who were contacted in the preparation of this Environmental Statement included:

West Yorkshire Archives Service (Leeds and Wakefield)

Historic England Archives

West Yorkshire Archaeology Advisory Service

Wakefield and Stanley Libraries(local studies)

Wakefield Planning Department

West Yorkshire Ecology

Environment Agency

- 1.1.5 The impacts identified as requiring assessment are dealt with in the following sections. A summary of the findings are set out together with the mitigation proposed. The individual assessments are attached as appendices to this Environmental Statement.
- 1.1.6 The drawings referred to are attached to the Supporting Statements and comprise drawings 10168/02 Topographical Survey, 10168/03 Scheme of Working, 10168/04 Restoration Bank Profiles and Figure A2C Restoration Scheme.

2 ARCHAEOLOGICAL AND HERITAGE ASSESSMENT

- 2.1 An Archaeological and Heritage Assessment has been prepared by Peter Cardwell, Archaeological and Heritage consultant and is attached as Appendix ES1.
- 2.2 Evidence for prehistoric, Roman and early medieval activity within, or in the vicinity of, the proposed development is based upon the discovery of stray finds. These consist of a hoard of Bronze Age axes recovered from the River Calder near Smalley Bight, a hoard of Roman coins, possibly found within the south-western part of the Smalley Bight area, and a logboat of early 11th century date from Stanley Ferry. All of these finds are either from the river or close to it. There is no evidence for earlier alignments of the river within the application boundaries, although such a palaeochannel could have a higher potential for the recovery of similar finds or other archaeological remains.
- 2.3 There is no evidence of any settlement sites within the application boundaries during the earlier prehistoric period. Sites of Iron Age and Roman date are mostly recorded on the higher ground above the floodplain, and principally from the more elevated locations to the north and the east. Place name evidence in the later medieval period suggests that at least parts of the area were being cleared for cultivation. Smalley Bight is documented, but whether it was a farmstead at this time is uncertain. Later field names could suggest settlement within or adjacent to the western part of the Smalley Bight area of late medieval or earlier post-medieval date.
- 2.4 There is no certain evidence for occupation within or close to the application boundaries until the early 19th century. This includes a farmstead or smallholding in the south-eastern part of the Birkwood area, and a later barn to the west, while Smalley Bight is shown at its current location to the south of the area. At this date both areas are divided into a number of fields, all old enclosures, which are mostly under arable cultivation.
- 2.5 The Calder Cut of the Aire and Calder Navigation was opened in 1839 and defines the eastern extent of the Birkwood area. It affected landholdings within the vicinity, with the farmstead being abandoned and field boundaries removed. Field boundaries were also

removed from the Smalley Bight area during this and subsequent periods, and a pond within the western part infilled. A sand pit was opened and then also infilled during the first half of the 20th century site within the south-western part of the area.

- 2.6 Stanley Ferry and the aqueduct over the River Calder to the south-east was a focus of activity with the opening of the canal. The Lofthouse Basin and later Newland Basin were both linked by tramways to nearby collieries, with further collieries, such as that on Ferry Lane to the south-west, opened later. The repair shop was built to the north in 1873, and together with other infrastructure, these associated buildings and structures form a well-preserved group. The aqueduct is both listed (Grade I) and scheduled, with Aqueduct Cottage to the south also being listed (Grade II). Later changes in the area include the replacement of the ferry with a road bridge from 1879 and the construction of the new aqueduct on the canal, opened in 1981, which was preceded by the infilling of the Newland Basin. The 1879 road bridge was itself replaced by the existing bridge in 1971.
- 2.7 It would be necessary to clarify the survival and significance of recorded archaeological remains within the proposed development areas and the predicted effect upon them, and establish the potential for additional remains or finds. Evaluation within the application boundaries is proposed by means of geophysical survey and trial trenching. This would specifically aim to establish if there was evidence for former alignments of the river with archaeological or geoarchaeological potential. Also to clarify whether any remains of the former farmstead within the south-eastern part of the Birkwood area survived, or there was evidence of any former settlement within the western part of the Smalley Bight area.
- 2.8 The geophysical survey and trial trenching will be carried out prior to the determination of this planning application, during the spring and summer of 2020.
- 2.9 Should remains of potential significance survive, then the aim would be to preserve these in situ in accordance with planning policy and guidance. This should be possible for the sites of the former buildings within the Birkwood area, as these are either outwith the development boundary or close to its edge, and could therefore be preserved beneath the soil screen mound. It would likewise be intended that surviving elements of the canal wall could be preserved beneath the loading platform next to the Birkwood area.
- 2.10 Should this not prove feasible for these sites, any surviving evidence of former field boundaries or other features identified by the evaluation would be investigated and recorded either in advance of or during initial soil stripping. This would be done in accordance with a Written Scheme of Investigation approved by the planning authority.

Any areas of archaeological or geoarchaeological potential at depth would be addressed by means of a watching brief during mineral extraction. For all such remains the predicted effect should accordingly constitute less than substantial harm.

- 2.11 There is no or restricted intervisibility with the designated heritage assets within the vicinity, namely Stanley Ferry Aqueduct and the nearby Aqueduct Cottage to the south-east, and 420 Aberford Road to the north-west. It is therefore predicted that the proposed development would have no adverse effects upon their heritage significance.

3 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

- 3.1 A Landscape and Visual Impact Assessment (LVIA) has been prepared by Mowbray Associates Ltd, landscape architects, and is attached as Appendix ES2.
- 3.2 The LVIA has considered the key features that contribute to the local landscape resource including the physical characteristics of the Site, immediate environs and landscape character, and an assessment of the visual context with reference made to local visual receptors and detractors. Relevant local planning policies and guidance documents have been reviewed in order to identify the value of the local landscape resource and context of the proposals in the wider context of the Calder Valley. Temporary and residual effects to landscape and visual receptors have been assessed and the potential for cumulative effects has also been considered.
- 3.3 In accordance with EIA regulations and Wakefield Council guidance, the LVIA process has considered both temporary and permanent impacts:
- during the set up period, mineral extraction operations and restoration scheme
 - during year 1 after restoration
 - at year 15 after restoration
- 3.4 The baseline was taken to be the situation as it would exist immediately before the extraction proposals at Birkwood and Smalley Bight are implemented. Therefore the effect of the proposals would be any change from the baseline scenario that the proposals might cause. For LVIA, the baseline year is the year when impacts are predicted to be caused by start of the construction/operation of the proposals during set up. This has been set at 2021.
- 3.5 The study area falls within the profile of 'Yorkshire and the Humber national Character Area (NCA) 38: Nottinghamshire, Derbyshire and Yorkshire Coalfield' The NCA is defined by underlying shallow Coal Measures and consists of relatively low-lying land to the east of the Pennine chain bounded by the Peak District National Park and the wool and engineering towns of the Yorkshire Pennines to the west.

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- 3.6 The long narrow NCA 38 stretches from west of Nottingham through South Yorkshire to Rotherham and Barnsley and into West Yorkshire, extending across Wakefield and Leeds towards Leeds Bradford International Airport. The landscape is sandwiched between the slim 'NCA 30: Southern Magnesian Limestone' to the east and 'NCA 37: Yorkshire Southern Pennine Fringe' to the west.
- 3.7 The landscape character is generally an attractive and open arable valley landscape flanked by undulating hillsides which mostly feature settlements and urban development fringed by vegetation. There is some diversity in landscape elements including a variety of scale of field sizes with mostly large, irregular arable fields in the floodplain and smaller field systems on the valley slopes at Birkwood. However hedgerows are limited and intermittent when present, with the fields often bounded by ditches thus restricting connectivity to wildlife corridors.
- 3.8 The key landscape elements in the study area are the two dominant but contrasting watercourses, often edged by trees and shrubs which together provide a means of navigation and leisure resource in the landscape. Both also provide a signal for change as the nature of the seasons, weather and intensity of rainfall create an ever shifting valley environment.
- 3.9 In its broader sense, the study area has no perceptual qualities of wildness although peace and seclusion can be felt amongst the woodland surrounding the former Newland Hall. The Calder Valley landscape is dominated by man-made elements such as the Aire and Calder Navigation, farmed intensively and enveloped by urban development. There is a limited sense of tranquillity promoted by the peaceful presence of the River Calder and the canal. However this can be disturbed by the presence of landscape detractors which dominate the landscape. These include the plethora of power lines and pylons in the valley and the busy traffic on the local highways including Ferry Lane to the immediate south of the Site.
- 3.10 Feelings of tranquillity are also disrupted by the proximity of built development, regular overhead aircraft, distant views of the Welbeck landfill mound and the NewCold distribution centre which is visually intrusive on the skyline in terms of scale and finish. The open nature of this area of green belt is thus influenced by encroaching development with the panoramic views from the study area to the north and north east across the increasingly urbanised Calder Valley. The condition of natural elements that survived industrialisation is however beginning to thrive in the valley within the protected areas of Local Nature Reserves and Local Wildlife Sites in the valley which facilitate further the value of the landscape.

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- 3.11 Taking into account the contribution of the individual landscape receptors, designations and detractors, the landscape is described as being relatively unimportant nationally and regionally. It is however valued locally due to its valley landscape and areas of ecological restoration and enhancement. Given the presence of the landscape detractors, the overall landscape resource is defined as having **low to medium value**.
- 3.12 The overall significance of landscape effects is concluded to be temporary significant moderate adverse from start to finish of the excavation phases and the end of the restoration year, and minor beneficial in the longer term. This would be due to the new landscape elements and biodiversity value introduced by the restoration scheme, the retention of the open character of the Site within the green belt and the assimilation of the proposals within the wider Calder Valley.
- 3.13 The overall significance of visual effects is concluded to be temporary significant moderate adverse for the duration of the operations, minor adverse at the first year after restoration has been completed and improving to minor beneficial after 15 years. This would be due to the limited number of visual receptors within a wide ranging Zone of Theoretical Visibility, visual interest introduced by the water bodies and new landscaping and the longer term assimilation of the proposals within the valley landscape.
- 3.14 There are no anticipated cumulative effects arising in conjunction with other developments in the locality.

4 ECOLOGICAL IMPACT ASSESSMENT

- 4.1 A Preliminary Ecological Assessment has been carried out by RDF Ecology, consultant ecologists and is attached as Appendix ES3.
- 4.2 An initial desk study was carried out in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Preliminary Ecological Appraisal' (2017). Records of any protected or notable species, habitats and designated nature conservation sites within a 2 km radius of the Site were obtained and reviewed.
- 4.3 West Yorkshire Ecology (WYE) was contacted for protected sites and species data. Additional information on sites and species of nature conservation interest was obtained from the Multi Agency Geographic Information for the Countryside (MAGIC) website, and from the Natural England web site and online SSSI database.
- 4.4 An extended Phase 1 Habitat Survey of the Site was completed on 17 May and 20 June 2019 with a further site visit completed on 6 February 2020. All habitats within the Site were surveyed along with habitat within 50m of the site boundary where access

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was permitted. Habitats present on the Site were classified and mapped according to the Joint Nature Conservation Committee (JNCC) Phase 1 Habitat survey methodology (JNCC, 2010).

- 4.5 Fauna and flora present at the time of survey were recorded and the Site was assessed for its potential to support notable and/or protected species that could be impacted by development following CIEEM guidance (CIEEM, 2017 and 2018).
- 4.6 Target notes were prepared for any features of ecological interest and their locations noted in Figure 3. Plant species were recorded following the nomenclature in Stace (1997) and lists of species attached to the assessment report.
- 4.7 The scheme of working restricts all of the mineral excavations to the arable agricultural cropland including screening bunds, haul roads, plant compound and settling lagoons. Consequently, the development as proposed will result in the loss of all arable agricultural habitats within the Site boundary.
- 4.8 In addition to the loss of arable agricultural habitats there will be some minor loss of bankside habitats on the River Calder to accommodate the construction of the River Conveyor. Impacts here will involve the loss of coarse neutral grassland and ruderal vegetation and some willow scrub on the east bank of the River Calder. The construction of the new loading point on the Aire and Calder Navigation will also result in the loss of some bankside vegetation comprising neutral grassland, ruderal vegetation and scrub. The exact location of the loading bay will be selected to minimise the ecological impacts.
- 4.9 The proposed landscape restoration scheme set out in Mowbray Associates Ltd Figure A2C Restoration Scheme (Appendix ES2) shows that the final restored Site will have significantly more ecological value than the two arable agricultural fields that it will replace. The restoration scheme will include the creation of a wide range of important ecological habitats including:
 - Two large water bodies to be used as angling lakes with areas of established marginal aquatic vegetation
 - Several smaller ponds to be created purely for their ecological value and will include open water and marginal aquatic vegetation
 - Oak and birch woodland
 - Wet carr woodland
 - Scrub planting
 - Neutral meadow grassland
 - Wet grassland

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- 4.10 These habitats greatly increase the ecological value of the Site. But when considered in the context of the Calder Valley and the range of designated wetlands that it contains, they greatly add to the landscape character and ecological value over a larger area and within an area designated as a West Yorkshire Wildlife Habitat Network (Network) and bat alert zone.
- 4.11 The Site is not covered by any statutory nature conservation designations. The nearest site covered by a statutory designation is Stanley Marsh Local Nature Reserve (LNR) located approximately 300m west of the Site boundary.
- 4.12 The Site is also not covered by any non-statutory nature conservation designations. The nearest site covered by a non-statutory designation is Stanley Marsh Local Wildlife Site (LWS) located approximately 300m west of the Site boundary. There are four other LWS within 2km of the Site boundary and these are located between 300m and 1.6km from the Site.
- 4.13 None of these designated sites would be directly affected by the development proposals. No significant off-site impacts are predicted that would impact upon them due to the distances between them and the Site boundary and the nature of the development proposed. Therefore no impacts upon designated sites are predicted and no further survey and assessment work are recommended.
- 4.14 The Site is located within habitats included within the Network. However the arable agricultural habitats do not add significant value to the designation due to their lack of semi-natural vegetation and intensity of agricultural management. The peripheral habitats associated with the Stanley Waste Water Treatment Works, the River Calder and the Aire and Calder Navigation contribute more significantly to the value to the Network.
- 4.15 The loss of the arable habitats during the mineral extraction phases will not significantly detract from the value of the Network in the vicinity of the Site. The more significant habitats will be retained and protected during the quarrying operations. More importantly, the restored site will contribute significantly more ecological value and connectivity to the Network in the future and will strengthen the value of the designations in this area and better link protected sites to the north, west and south of the Site.
- 4.16 The proposed restoration scheme will therefore provide better ecological connectivity once restored through the creation of much higher value habitats than those which it replaces. Therefore, no impacts upon the integrity of the habitats within the Network are predicted during the quarrying operations and a much improved ecological value

and connectivity are predicted after restoration. No further survey or assessment work is recommended.

- 4.17 The development as proposed will result in the loss of two large arable agricultural fields, along with small areas of coarse neutral grassland and ruderal vegetation and scrub in discrete areas of the River Calder and the Aire and Calder Navigation. These habitats have no intrinsic botanical value, supporting a limited range of common and widespread species and the loss of these habitats would only be felt within the zone of influence of the development. Therefore, no compensation or mitigation measures are proposed and no further survey or assessment work is recommended with regard to their botanical value.

Protected Species

- 4.18 The Site does not contain any buildings or trees of potential value to roosting bats. Therefore no significant impacts upon roosting bats in buildings are predicted and no further survey and assessment work is recommended. Large trees adjacent to the Site were also surveyed and assessed to be of negligible or low value for roosting bats.
- 4.19 The open and featureless areas of arable agricultural land were assessed to be of very low value for feeding and commuting bats and their loss is unlikely to be significant.
- 4.20 The Site is located within the West Yorkshire Bat Alert Zone but this is as a consequence of the presence of much more important habitats adjacent to the Site. These include the plantation woodland associated with the Stanley Waste Water treatment Works to the north and the River Calder and Aire and Calder Navigation corridors. All of these woodlands would be retained and protected during the development and would continue to provide feeding and commuting habitat for bats. The River Conveyor would be lifted well above the height of the River allowing bats to continue to use this corridor to feed and commute. Similarly the new loading area on the Aire and Calder Navigation will not create a significant break in the bankside vegetation and bats will still be able to continue to feed and commute along the canal.
- 4.21 The habitats to be created as the Site is restored will have much more significant value to feeding and commuting bats and will add greater connectivity to the bat alert zone corridor in which the Site is located. No significant negative impacts upon commuting or feeding bats were therefore predicted during the quarrying operations and the restored Site will provide improved habitat for bats. No further survey and assessment work was recommended.
- 4.22 No badger setts were recorded within or immediately adjacent to the Site and no evidence of badger foraging activity was recorded during the field survey. The Site also

does not contain any habitats of potential value to otters or water vole, and no evidence of their activity was recorded during the field survey along the banks of the River Calder or the Aire and Calder navigation. No significant negative impacts are predicted for habitats potentially used by otters, water voles or badgers and the value of the restored landscape is predicted to be of greater value to otters than the current baseline. No further survey or assessment work for otters, water voles or badgers was recommended.

- 4.23 The majority of the ornithological value of the area was limited to the woodland habitats associated with the Stanley Waste Water Treatment Works to the north and those associated with the River Calder and the Aire and Calder Navigation. The loss of arable agricultural habitats may impact upon ground nesting species such as skylark, but there are larger areas of similar habitat in the vicinity and arable cropland is not a scarce resource within Wakefield District or within the Calder Valley.
- 4.24 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. Upon restoration the habitats created will provide a much more diverse landscape with greatly increased opportunities for breeding birds. No significant negative impacts upon nesting birds are predicted and no further ornithological survey work is recommended.
- 4.25 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 recorded. The large and smaller ponds within the proposed restoration scheme will increase the value of the Site for breeding amphibians creating habitat where none currently exists. No negative impacts upon amphibians are predicted and no further survey work was recommended.
- 4.26 The two large arable agricultural fields were assessed to be of low to negligible value for reptiles. The adjacent habitats including the plantation woodland associated with the Stanley Waste Water Treatment Works to the north and those associated with the River Calder and the Aire and Calder Navigation, will be retained and will continue to provide habitat for reptiles during quarrying operations. The restored landscape will provide a greater diversity of habitats and a greatly improved value for reptiles leading to an overall improvement for reptiles in the longer term. No significant impacts upon reptiles are predicted and no further survey work is recommended.

- 4.27 Whilst only limited bird activity was recorded from the arable cropland, these habitats could be used by breeding birds during the bird breeding season (March to September inclusive). Given the protection afforded to wild birds and their nests, a number of precautionary measures should be taken. These should include the removal of trees, shrubs and surface vegetation outside of the bird breeding season (March to September inclusive). Where this is not possible a suitably qualified and experienced ecologist should complete a survey of the Site for nesting birds and advise on exclusion zones or timing of works if nesting birds are recorded.

5 HIGHWAYS ASSESSMENT

- 5.1 A Highways Statement has been prepared by Paragon Highways and is attached as Appendix ES4. The Statement considers the site access, and traffic impact associated with the proposed development and the accident record on the local network. This statement demonstrates that the proposals should be acceptable for planning approval purposes.
- 5.2 As the Site is split into two sections by the River Calder, it is necessary for two points of access to be provided to serve the development. For the west side of the Site it is proposed to utilise the existing vehicular access for Smalley Bight Farm, situated off Aberford Road A642 to the immediate north of the Lime Pit Lane junction.
- 5.3 The Aberford Road access serves Smalley Bight Farm and two other residential properties and takes the form of a shared private road. The access takes the form of a simple priority junction with kerbed radii on both sides. The access is generally between 4.5m to 6m in width although it widens out to around 15m at the junction bellmouth. The access contains a culvert over a ditch initially and contains a wide gated entrance point allowing for simultaneous two way vehicle travel. From the gate, the access changes into a single width access road with a wide area around a sharp 90 degree bend forming an informal passing place. The access is in good condition containing a bituminous macadam surface. Visibility from the existing access appears to be suitable having regard to the speed limit on the main road and the visibility standards provided in current Government guidance in Manual for Streets. Visibility splays are 2.4m x 43m in both directions, which is appropriate for 30mph speed limit roads.
- 5.4 The footway network terminates to the south of this access on the east side of the road. From this point pedestrian access is provided to the footpath to the south of the Site, linking Aberford Road with Ferry Lane. Despite no footway provision beyond the site access to the north along Aberford Road on its east side, there is a gap in the fencing allowing for pedestrian access into the junction area.

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- 5.5 The east side of the Site will be served via the existing access off Ferry Lane, which is situated around 90m to the northeast of Stanley Ferry Marina. This existing access consists of an unmade stone surface and dropped kerbs as the access meets Ferry Lane. Gates are set back from Ferry Lane by around 16m. The access widths to the front of the gates is around 4.1m widening to 8m as it meets Ferry Lane. Beyond the gates the track is of single width and contains a stone surface. Visibility from the access is obstructed to the north due to overgrown vegetation adjacent to the highway. Visibility to the south is around 2.4m x 32m, which appears to be in accordance with the low traffic speeds experienced along Ferry Lane at this point.
- 5.6 The A642 Aberford Road is a principle route that connects Wakefield City Centre to the south with the M62 Junction 30 and Oulton to the north. It is fronted by residential properties providing one of the main arterial routes into Wakefield City Centre from the north. Subsequently, the A642 is subject to heavy traffic volumes throughout the day.
- 5.7 In the vicinity of the site access the A642 is a two way single carriageway road between 6.8m and 7m in width, with a footway provided opposite the site access along the west side of the road with a width between 1.6m and 2.1m. A footway is also provided along the east side of Aberford Road to the south of the site access which is between 1.8m and 2.5m in width and contains a pedestrian guardrail to channel pedestrians to the PROW network or opening into the access junction bellmouth.
- 5.8 Both the footways and carriageway appear to be in suitable condition and layout for their day to day use. The A642 contains street lighting to suitable standards and is subject to a 30mph speed limit. There is a vehicle activated sign located to the south of the site access, which has a positive impact in reducing traffic speeds for southbound vehicles. Traffic Regulation Orders are in place along the A642 Aberford Road in the vicinity of the site access, with 'no waiting at any time' restrictions in place on both sides of the carriageway, preventing vehicles from parking adjacent to the access allowing for suitable visibility.
- 5.9 To the south of the site access there is a path leading to a number of public rights of way along the south and east side of the entire site, this path forms part of the Section 53 Register and National Cycle Route 67 that runs along the south side of the Site.
- 5.10 Located to the immediate south of the access on the opposite side is the Lime Pit Lane junction. This junction contains a giveway arrangement with upright signing and giveway markings. Lime Pit Lane is a local access road that provides access into the centre of Stanley and to other routes leading to surrounding settlements. Lime Pit Lane is predominantly residential in nature, although initially it contains green areas along both sides prior to reaching the main residential element of the road. It is subject to

moderate traffic volumes with a noticeable increase during the network peak hours and school opening and closing times. The junction with Aberford Road contains Traffic Regulation Orders restriction waiting at all times on both sides of the road. Lime Pit Lane is a two way single carriageway road with footways providing on both sides that are separated from the carriageway by grass verges. Along the southwest side of the road the footway forms a shared cycle route as part of the National Cycle Route 67. Lime Pit Lane contains street lighting to a suitable standard and is subject to a 30mph speed limit with traffic calming measures also provided in the form of speed cushions.

- 5.11 The southeast section of the Site will be accessed from Ferry Lane. Ferry Lane forms part of a local distributor road that connects Stanley with the settlement of Altofts, providing further connections to the towns of Normanton and Castleford. Ferry Lane connects with the A642 to the west and Birkwood Road to the east and is fronted by residential properties for the majority of its length, although adjacent to the site access there is a commercial/ industrial building and Stanley Ferry Marina opposite. Given the status of the road it is subject to moderate traffic volumes during the network peak periods.
- 5.12 In the vicinity of the site access, Ferry Lane is a two-way single carriageway road with a footway along the east side of the road and grass verge along the west side. To the north of the site access the road narrows to a single lane over the canal bridge, which is controlled via traffic signals. To the immediate south there is a bridge over the River Calder and a sharp bend prior to the bridge, which help keep traffic speeds to an appropriate level. The carriageway in the vicinity of the access is around 5.6m in width and appears to be in fair condition for its day to day use. The road contains street lighting to a suitable standard and is subject to a 30mph speed limit.
- 5.13 During the study period there have been no collisions involving turning movements to and from the existing access point off Aberford Road or Ferry Lane. Therefore, the Site access arrangement and adjacent local highway network appear to operate safely. There are no significant clusters of accidents and it would appear that all accidents are disparate events occurring at varying times of the day, lighting conditions and locations. The reported injury accident record along Aberford Road and Ferry Lane in the vicinity of the Site access points does not indicate a road safety problem that would warrant treatment of be a cause for concern as a result of the slight change in traffic volumes using the access points.
- 5.14 The Ferry Lane access will be improved to allow for safe access with localised widening of the access to allow for the largest vehicles anticipated to access the Site to do so safely (articulated low loader). The access will be regraded as necessary to

provide a suitable gradient between the Site and Ferry Lane. It is also proposed to improve visibility for vehicles emerging from the site access, as the existing vegetation will be trimmed back to maximise visibility. Visibility splays of 2.4m x 32m and 2.4m x 33.5m can be provided to the south and north respectively at the access. These are considered to be proportionate to the general traffic speeds along this section of Ferry Lane that are estimated to be around 25mph in accordance with the SSD requirements within Manual for Streets. For the initial set up and delivery of the largest plant it is proposed to provide a banksman at the site access to allow for easy and safe manoeuvrability for the low loader type vehicles. Once the initial set up is complete the access will then be used by employees, fitters vans and fuel bowsers only.

- 5.15 The west side will be accessed via the Aberford access at Smalley Bight Farm from year 6 onwards. This access contains suitable geometry allowing for the largest vehicles anticipated to access the Site. Suitable visibility is also provided at the access with splays of at least 2.4m x 43m provided in both directions in accordance with the SSD requirements contained within Manual for Streets for 30mph speed limit roads. Once into the Site traffic will utilise the existing access road for Smalley Bight Farm before linking to a new haul road along the south side of the section of the Site running along the immediate north of the River Calder.
- 5.16 Suitable areas for car parking and site accommodation for employees will be provided accommodating at least 5 vehicles allowing for the maximum of 4 employee vehicles and 1 visitor. Following the initial set up there is no need to provide HGV parking or unloading areas as transportation of minerals would be carried out by barges utilising the canal system. There is space available within the Site to provide cycle parking facilities should there be a demand for it.
- 5.17 The Ferry Lane access will be used for the duration of site operations. For the initial setup of this section of the Site there will be an excavator, 2x dump trucks and two wheeled loaders equating to 5 low loader articulated HGVs accessing the Site. A crusher, 2x screens, a wash plant, and a number of conveyors will also be required at this section of the Site along with half of the river conveyor. The total low loader vehicle accessing this section of the Site would be up to 12 under the supervision of a banksman. After the initial 5 year period the excavator and dump trucks would be moved off-site, equating to 3 low loaders leaving the Site with heavy plant. Eventually, after the end of the workings the two loaders and the processing plant and conveyors will be moved off-site.
- 5.18 With regard to the Aberford Road access via Smalley Bight Farm, this will also consist of an excavator, 2 dump trucks and 2 wheeled loaders equating to 5 low loaders

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accessing the Site. The other half of the conveyor will need be brought into the Site from this access providing a total of 6 low loaders. These movements would be part of the initial setup at year 6. With the same number of low loaders leaving the Site when removing plant from this section at the end of the workings.

- 5.19 It should be noted that low loader deliveries would be carried out at pre arranged times with the site operators, so that only one low loader is to use the access points at any one time, which will also ensure suitable internal capacity for these delivery vehicles is provided at all times.
- 5.20 Under normal operations once extraction on the east side has started, there will be 4 employee cars accessing the Ferry Lane access per day together with a fuel bowser and a fitters van movement per week. Therefore, should the fitters van and fuel bower enter the Site during the same day of the week, there would be a maximum of 12 vehicle movements during the busiest day of the week. The employee movements will be out of the network peak times given that the operational hours are between 07:30hrs and 18:00hrs.
- 5.21 Once mineral extraction starts on the west side, 2 of the employees using the Ferry Lane access will then utilise the Aberford access, with a fuel bowser and fitters van visiting this section of the Site via Smalley Bight Farm once per week. Therefore, during years 6 to 10 there will be 8 vehicle movements per day using the Aberford Road access. At the same time, the vehicle movements at the Ferry Lane access will reduce to 8 per day for years 6 to 10.
- 5.22 The combined traffic generation would not be considered to be material or significant in terms of its impact on Ferry Lane or Aberford Road. Also, given the proposed access geometry, road safety record and traffic generation associated with the proposed development, the access arrangements are considered to be suitable.
- 5.23 The report concludes that both capacity and safety elements of the proposals are acceptable as minerals would be transported off-site via the canal system. The small amount of traffic associated with employees and the maintenance of plant would not be discernible from the daily fluctuations in flows that can be expected on the local network. Both could be readily accommodated with suitable links with the wider strategic highway network from the Site.
- 5.24 It was therefore concluded that the development is considered acceptable, and that there are no highway safety or efficiency reasons why planning consent for the proposed development should not be granted.

6 HYDROLOGICAL AND HYDROGEOLOGICAL IMPACT

- 6.1 A Hydrological and Hydrogeological Impact Assessment has been undertaken by S M Foster Associates Ltd and is attached as Appendix ES5. The report provides an assessment of the potential hydrological and hydrogeological effects associated with the proposed development of the new quarry. Assessment of potential effects has been undertaken through a combination of baseline analysis, site-based survey and assessment, quantitative impact assessment and detailed consideration of potential impact mitigation requirements.
- 6.2 Detailed hydrological analysis, supported by a separate Flood Risk Assessment, has demonstrated that the development would have no adverse impact on flood flow through the area. The additional floodplain storage introduced by the development could lead to a significant reduction in local flood risk.
- 6.3 The proposed sand & gravel workings would be worked dry by dewatering to reduce local groundwater levels. Hydrogeological analysis has demonstrated that there are no groundwater dependent features in the vicinity of the Site and that temporary development dewatering would have no significant adverse effect on local groundwater resources. The limited lateral extent of the sand and gravel aquifer determines that the required groundwater abstraction rates at the development would be relatively low. The presence of historic industrial development in the vicinity of the Site may create the potential for induced migration of historic contamination.
- 6.4 The development design incorporates on-site water quality management systems to minimise the risk of surface water or groundwater quality deterioration due to sediment migration. The assessment has concluded that mitigation may be required to provide a basis for management of any unforeseen risk associated with potential migration of contamination from former industrial sites upstream of the proposed development area.
- 6.5 Appropriate mitigation could be achieved through further development of the existing site water resource monitoring programme to incorporate periodic monitoring of groundwater quality. Mitigation measures as proposed would make sure that there would be no significant residual hydrological or hydrogeological effects as a consequence of the proposed development.
- 6.6 The proposed extraction areas currently consist of previously undeveloped greenfield land underlain by Alluvium and River Terrace Deposits. The area is comparatively flat and low lying, forming part of the floodplain of the River Calder and drains directly to the river. However, as the Site is underlain by relatively permeable superficial

MWP PLANNING

geological deposits the majority of incident rainfall infiltrates to ground rather than generating surface runoff.

- 6.7 Environment Agency flood risk mapping indicates that the northern part of the Site, on the left bank of the River Calder, is at medium risk of fluvial flooding (Flood Zone 3) with a flood probability of between 1:100 years and 1:1,000 years. The southern part of the Site is designated Flood Zone 3b, the functional floodplain, with a fluvial flood risk of approximately 1:20 years. The flood storage function of the southern part of the Site is confirmed by flood maps in the 2016 Wakefield Council Strategic Flood Risk Assessment (SFRA).
- 6.8 Flood defences are present within the site boundary on both sides of the River Calder. However, current flood mapping indicates that the existing defences provide a relatively low standard of flood protection. Environment Agency flood defence details confirm that all fluvial flood defences in the area provide a 1:30yr standard of protection. Further details related to flood risk at the Site and surrounding area are provided in the Flood Risk Assessment attached to the Supporting Statement as Appendix SS1.
- 6.9 Water quality in the River Calder in the vicinity of the Site is classified at GCA grade C 'fairly good'. The biological quality of river water is classified as poor. The chemical quality has been improving in recent years from 'poor' in 1990 to fairly good.
- 6.10 Groundwater is present within the superficial deposits, as demonstrated by recent and historic site investigation. The superficial deposits are designated 'Secondary A' aquifer by the Environment Agency with 'high' vulnerability to groundwater contamination. The underlying bedrock mudstone is also classified Secondary A aquifer although the designation refers to the Pennine Middle Coal Measures formation in the area in general rather than specifically to the mudstone unit beneath the Site.
- 6.11 Any groundwater present in the mudstone units of the coal measures is likely to be restricted to joints and fractures as the intergranular hydraulic conductivity is expected to be low. Ground investigation boreholes have demonstrated that the top of the mudstone is weathered to clay materials. The weathered top of the mudstone is likely to isolate groundwater in the overlying superficial deposits from draining to the coal measures. On that basis, groundwater present in the superficial deposits can be considered as separate and hydraulically isolated from the underlying coal measures.
- 6.12 Six new groundwater monitoring boreholes were installed at the Site during July 2019. All boreholes extend to the base of the superficial deposits. Comparison of groundwater depth data with historic site investigation records, demonstrates that the groundwater table in the superficial deposits is within the River Terrace Deposits and

below the base of the Alluvium. It is noted that the 1975 borehole constructed at the sewage treatment works recorded a rest groundwater depth of 3.45mbgl. The borehole was located close to the current monitoring borehole GW3 at which groundwater is observed at a comparable depth of 3.34mbgl.

- 6.13 It is anticipated that there will be a degree of hydraulic continuity between groundwater in the River Terrace Deposits and the River Calder. However, as demonstrated at other sand & gravel workings in the Calder Valley, river bed sediments tend to have low hydraulic conductivity and limit the rate at which water can move between river and aquifer.
- 6.14 The Site is not located in a groundwater source protection zone. There is only one licensed groundwater abstraction within a 2km radius of the centre of the Site. The abstraction at Normanton Golf Club is located approximately 1km south west of the western site boundary, and is permitted for use for spray irrigation.
- 6.15 A groundwater flow model of the Site and surrounding area has been developed using the industry-standard Modflow code. The model has been used as a basis to investigate the potential impact of the proposed development on local groundwater and surface water resources. The model indicates that there is limited hydraulic connectivity with the River Calder as a consequence of the low hydraulic conductivity of the river bed sediments. This conclusion is consistent with observations at other sand & gravel quarries located adjacent to the River Calder in the area.
- 6.16 The proposed development would involve extraction of sand and gravel from two separate excavations either side of the River Calder. The mineral would be worked dry by progressive dewatering of the excavations during the extractive phases of the development. On completion, the former excavation areas would be allowed to flood and the Site would be restored as two landscaped water bodies.
- 6.17 At present, any surface water runoff from either of the two fields drains directly to the River Calder. On-site activities that have the potential to impact the quality or quantity of surface water drainage to the river need to be considered as part of this assessment of potential development effects. It is noted however, that the percentage rainfall runoff from the Site is likely to be low with most rainfall able to infiltrate underground strata.
- 6.18 Dewatering of the River Terrace Deposits to allow dry extraction of mineral would lead to a reduction in groundwater levels around the extraction areas and a change in the local hydraulic gradient. Such changes need to be considered in relation to potential impacts on ground stability, river baseflow, groundwater quality and local groundwater resources. Discharge of pumped groundwater to the River Calder would need to be managed to avoid adverse impact on flow, flood risk or water quality.

MWP PLANNING

- 6.19 Both proposed extraction areas are located on the River Calder floodplain. The southern exaction area is designated a flood storage area. Any above ground development within the Site would need to be designed and implemented in a manner that does not adversely affect local flood risk.
- 6.20 On completion and restoration of the Site the open water bodies that form the proposed restoration scheme would provide a significantly greater flood storage capacity than available at the Site at present. The restored site could therefore provide an enhanced flood attenuation function with the potential to reduce downstream flood risk.
- 6.21 Modelled groundwater contours predict that the maximum steady-state dewatering rate would be approximately 850m³/day and that during 'normal' flow conditions the excavation would induce negligible inflow from the River Calder.
- 6.22 The average depth of mineral in at Smalley Bight is shallower than at Birkwood and therefore dewatering would be shallower. The groundwater model predicts that dewatering of Smalley Bight would have less extensive effect on local groundwater levels than dewatering Birkwood. The model predicts that the maximum steady-state dewatering rate would be approximately 350m³/day and that during 'normal' flow conditions the excavation would induce no significant inflow from the River Calder.
- 6.23 In general, shallow excavations should act as a collection basin for accumulation of any surface runoff from working areas and therefore direct discharge of surface water from such areas to the river should not occur. It is proposed that procedures for surface water management during preparatory works at the Site are formalised in a formal Pollution Prevention Policy for the proposed development. The policy would be agreed with the Environment Agency prior to commencement of works.
- 6.24 The sensitivity of the River Calder to inflow of sediment in site runoff is considered to be Low. With the magnitude of any impact likely to be Minor. Potential effect sensitivity is therefore defined as Minor-Negligible.
- 6.25 Hydrological analysis, including groundwater flow modelling, indicates that the interchange of water between the sand & gravel aquifer and the River Calder is low with a low baseflow contribution at present and low rate of inflow to the proposed excavations at maximum dewatering. On the basis that rainfall over the workings would be attenuated within the excavation, the average discharge rate from the Site would equate to the predicted groundwater inflow rate. A maximum pumped discharge rate of up to 850m³/day would have no observable impact on flows in the River Calder. The river is therefore considered to have Low sensitivity to inflow of this magnitude. The magnitude of any impact would be Negligible resulting in Negligible effect significance.

MWP PLANNING

- 6.26 Water accumulating within sand & gravel excavations has the potential to accumulate sediment. Fine-grained sediment can be highly mobile and affect surface water quality through an increase in suspended solids and/or turbidity. Water pumped from the Site to the River Calder will need to be treated to remove particulate matter prior to off-site discharge. Given the relatively low volume of water to be discharged, the sensitivity of the river to sediment influx is judged to be Moderate and the potential impact magnitude to be Minor. The significance of the effect would therefore be Minor.
- 6.27 At present the proposed development area consists of level agricultural land at risk of fluvial flooding during a 1:100 year or 1:1,000 year flood event in the River Calder. Existing floodplain storage is defined by the depth of flood water on existing land. The proposed development would lead to a substantial increase in the flood storage capacity of the Site during both the operational and restoration phases of development with a potential reduction in downstream flood risk.
- 6.28 The proposed development has been designed to have no significant effect on the conveyance of flood water through the area. As discussed above, peripheral soil storage mounds could be established to ensure no restriction of floodplain access and no obstruction to flood flow across the floodplain. The proposed overburden storage mound, at the northern end of Smalley Bight, has been designed to be situated approximately parallel to the direction of flood flow through the Site to minimise any obstruction. The sensitivity of the River Calder to restricted flood flow conveyance is considered to be Moderate. With the approach to site design specified above, the potential magnitude of any impact is judged to be Minor resulting in a Minor effect significance.
- 6.29 The rest water level of the proposed landscaped water bodies would be approximately 3m below existing ground level. The 3m freeboard across the Site would provide a significant increase in the available floodplain storage on both sides of the river post restoration of the Site. Therefore the proposed restoration scheme would have a significant beneficial impact on local flood risk.
- 6.30 The groundwater model indicates the potential effect of excavation dewatering on local groundwater levels assuming that dewatering continues long enough to reach equilibrium conditions. At the mineral excavations, the groundwater level would be reduced to up to 8m below ground level, depending on local conditions. This would represent a groundwater reduction of up to approximately 4.0m from rest levels. Reduction of groundwater levels at the excavations would lead to reduction of groundwater levels in the surrounding area for up to 1km for Birkwood and 500m for Smalley Bight.

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- 6.31 Available evidence indicates that, within this area, the groundwater table is within the River Terrace deposits and is not confined by the overlying Alluvium. On that basis there would appear to be limited potential for ground settlement as a consequence of groundwater level reduction,
- 6.32 With no significant change in baseflow to the River Calder, the primary physical impact of excavation dewatering would be the reduction in groundwater levels in the surrounding area. On the basis that the water table would remain within the sand & gravel aquifer and that no groundwater dependent features have been identified within the assessment area, it is considered that the sensitivity of the groundwater system to level reduction is Low. The impact of dewatering can be considered Moderate resulting in a Minor effect significance.
- 6.33 Groundwater modelling has demonstrated that dewatering of the proposed sand & gravel excavation would lead to a reduction in groundwater levels in the vicinity of two nearby historic landfill sites and Stanley Waste Water Treatment Works by around 2m and steepen the hydraulic gradient into the excavations. It is unlikely that the former Stanley Council landfill was lined and therefore a change in the local hydraulic gradient could lead to increased migration of any contaminants that might still be present within or beneath the landfill. However, given the age of the landfill, and the relatively high permeability of the surrounding sand & gravel aquifer, it is likely that any contaminants present would have migrated from the landfill many years ago and therefore the risk is considered to be low.
- 6.34 The presence of any form of lining or landfill engineering at the former Wellbeck Landfill to the south east has not been established. Depending on local hydrogeological conditions, an increase in the local hydraulic gradient could induce enhanced migration of any contaminants still present at the Site.
- 6.35 The proposed development could therefore have the potential to induce migration of historic contamination from historic landfills and the Water Treatment Works into groundwater flowing into the proposed excavations in response to dewatering activities. Although groundwater would be contained and managed within the workings, it would ultimately be discharged to the River Calder. On the basis that the area surrounding the Site has experienced extensive industrial development over many years, and that the quality of water in the River Calder is designated 'fairly good', it is judged that the sensitivity of groundwater and surface water resources to migration of historic contaminants is Moderate. If widespread groundwater contamination is experienced, the magnitude of any impact on surface water or groundwater resources

MWP PLANNING

would be classed as Moderate. The resulting effect significance would therefore be Moderate-Minor.

- 6.36 Depending on the potential risk of drawing contaminated groundwater from former landfill and industrial areas around the Site, the quality of water in the restored lakes could be influenced by contaminant inflow. However, as water levels would have been restored to pre-development levels, reducing the inward hydraulic gradient, and as there would be a substantial volume of water within each flooded excavations, the sensitivity of each lake to groundwater contamination is judged to be Low. Similarly, the sensitivity of the River Calder to any baseflow would also be judged to be Low. As the magnitude of any contamination impact is likely to be Minor the resulting effect significance would be Minor-Negligible.
- 6.37 During early stage scoping of potential development effects on water resources and flood risk, a number of potential impacts were identified and mitigated as part of the development design process. These measures were as follows:
- The design and location of temporary soil and overburden stockpiles to minimise flood flow obstruction;
 - Proposed development to meet standard requirement for standoff from existing flood defences on both banks of the River Calder;
 - Proposed restoration scheme to be achieved with on-site materials with no requirement for importation of additional materials; and
 - Establishment of a groundwater monitoring network to support early identification of any effect on groundwater quality.
- 6.38 The impact assessment has resulted in identification of one activity that could have moderate or major significance with regard to impacts on water resources or flood risk. Additional mitigation is proposed to reduce the significance of this activity.
- 6.39 The potential significance of water quality effects related to contaminant migration to groundwater entering mineral excavations and subsequently pumped to the River Calder is judged to be Moderate-Minor. As there is no direct evidence that leachate may be present in groundwater in the vicinity of historic landfills or the Water Treatment Works, the only available means of attempting to mitigate any risk of groundwater contamination would be to have a well-defined groundwater monitoring system that could identify any trends in the composition of groundwater over the lifetime of the proposed development.
- 6.40 A groundwater monitoring system, consisting of six monitoring boreholes, has been in place at the Site since July 2019. Monthly sampling and analysis of groundwater level and quality is being proposed to allow pre-development baseline groundwater quality

MWP PLANNING

to be established. It is proposed that, following the granting of planning permission for the proposed development, a formal Groundwater Monitoring and Action Strategy is developed and agreed with the Environment Agency.

- 6.41 It is considered that continuous monitoring of groundwater quality through periodic sampling and analysis would allow early identification of groundwater quality deterioration due to contaminant migration from surrounding land. On that basis the potential magnitude of any impact could be reduced from Moderate to Minor which would reduce the effect significance to Minor.
- 6.42 Adoption of the mitigating measures proposed in this Chapter would reduce the potential significance of any adverse effect on water resources and flood risk to minor or negligible. Consequently, there would be no significant residual effects

7 NOISE IMPACTS

- 7.1 A Noise Impact Assessment has been prepared by S & D Garritt Ltd and is attached as Appendix ES6.
- 7.2 The normal requirements of National Planning Policy are that daytime sound levels (07.00 to 19.00 hours) at noise-sensitive properties should not exceed the background level by more than 10 dBA. In circumstances where it is not possible to meet this requirement without unreasonable burden on the mineral operator, the upper limit between 0700 to 1900 hours is 55 dB LAeq (1-hour) at noise-sensitive properties.
- 7.3 Operations at Site will involve the digging of raw material using a tracked excavator, transport of the excavated material by dump truck and conveyor to the site processing area. Then the finished product will be transported away from of the Site by canal barges, which are loaded by a conveyor discharging through a shroud. Operating hours of the quarry will not extend outside of 07.00 – 19.00 weekdays and 07.00 – 13.00 on Saturday.
- 7.4 The predicted sound levels reaching dwellings are summarised in Table 1 below for the closest and furthest operations on each of the sites.
- 7.5 The typical daytime representative background sound level was measured using a long duration unattended survey as being 40 dB LA90 during the week and 34 dB LA90 on Saturday morning.

Table 1: Sound Pressure Levels (dB LA_{eq})

Receptor	Smalley Close	Smalley Far	Birkwood Close	Birkwood Far
Dwelling to NE	49.1	48.7	49.1	48.7
Calder House, SE	51.5	51.2	59.7	51.3
Dwelling to south	49.6	49.4	51.3	49.6
Ferry Lane Estate, SW	43.9	42.7	44.2	42.8
Smalley Bight, W	53.6	45.1	48.9	45.0
Stanley, NW	44.7	42.0	42.5	41.7
Dwelling to NW	57.7	45.9	47.3	45.4

7.6 The summary of results analysis is:

- The target to not exceed background by more than 10 dBA is likely to be met at the large residential estates of Stanley and off Ferry Lane at all times.
- At the dwelling to the south and the dwelling to the northeast, sound levels will fluctuate around 10 dB above background during weekday working, and be above this on a Saturday morning, but always be in compliance with the 55 dBA limit.
- At Calder House, sound levels are predicted at more than 10 dBA above background at all times, but within the 55 dBA limit except for when workings are within approximately 100m of site. Using direct measurement predictions, sound levels are likely to be within 10 dBA above background during weekday working, unless excavation is within approximately 100m of the dwelling.
- At Smalley Bight and the dwelling to the northwest, sound levels during weekday working are within 10 dBA above background unless mobile workings are close to the dwellings. On Saturday or when working are close to the dwelling, levels exceed 10 dBA above background. The predictions are within the 55 dBA limit at all times, except at the dwelling to the northwest when workings are within approximately 85m of the receptor.

7.7 It is recommended that care is taken to ensure that the effective height and overall integrity of earth bunds and fences are maximised at positions close to individual dwellings, especially when mobile excavation works are close to them. It is essential that any noise barriers are of adequate dimensions and in particular, the effective height of them should be maximised when mobile sources are close to the dwellings. The higher a barrier is, the greater attenuation is offered by it.

7.8 If practicable, it is recommended to provide a barrier around the immediate boundary of the processing plant compound to maximise the attenuation offered by it. The barrier may take the form of an imperforate timber fence (if practicable with sound absorption on the inner face), an earth bund /mound, or combination of each. The barriers should

be of sufficient height to break line of sight from all parts of all machinery to all parts of all nearby dwellings.

- 7.9 It may be argued that the movement of barges on the open waterways should not form part of the impact assessment since they are not strictly on the quarry site, in a similar manner to HGVs not being assessed once they are on the public highway. Despite this, the operation of the quarry does introduce barge movements in close proximity to the Site and existing dwellings, so levels from them have been quantified for the areas of river closest to each dwelling set. The summary of predicted levels is given below in Table 2.

Table 2: Sound from Barge Movements

	Dwelling to NE	Calder House SE	Dwelling to S	Ferry Lane Estate, SW	Smalley Bight, W	Stanley, NW	Dwelling to NW
LWA	110	110	110	110	110	110	110
Q (movements/hr)	1	1	1	1	1	1	1
V, kmh	6.4	6.4	6.4	6.4	6.4	6.4	6.4
D (distance)	300	35	180	750	740	1000	2680
A (angle of view)	90	110	90	90	90	60	90
Shielding	0	5	5	10	0	5	5
LA _{eq} , 1 hr	41.2	46.4	38.4	27.2	37.2	29.2	32.6

- 7.10 It can be seen that in any case, the movements of barges do not make a fundamental difference to the overall impact assessment. At many locations, the sound levels from passing barges are predicted at least 6 – 10 dBA less than the sound levels from site operations, depending on the area being excavated.
- 7.11 The highest predicted sound levels from barge movement is at Calder House, which lies in close proximity to the waterway and Stanley Ferry Moorings where sound associated with the canal may be expected. The prediction at this location is 46.4 dB LA_{eq}. There are no quantitative criteria directly applicable to sound levels from barge movement, but the following comments can be made:
- All barge sound falls within the 55 dBA limit for site activities outlined in BS 5228 if it were deemed to apply
 - The sound levels from barges would comply with the normal outdoor criteria contained in BS 8233 for dwellings affected by relatively anonymous sources such as road traffic.
 - Sound levels inside the nearest dwellings with windows open caused by barge movement would comply with the guidance of BS 8233, though this is generally used for road traffic sources.

8 AIR QUALITY (DUST) IMPACTS

Introduction

- 8.1 This assessment deals primarily with the potential for dust emissions arising from the Site and has been prepared by MWP Planning.
- 8.2 The exhaust emissions from Site mobile plant, generators and from road transport are likely to be very small when compared with ambient NO₂ and particulate levels due to the low level of activity. Guidance published by Environmental Protection UK (EPUK and the Institute of Air Quality Management (IAQM) "Land-Use Planning and Development Control: Planning for Air Quality 2015", suggests that assessment of exhaust emissions is only necessary with a change of HGV traffic flows in excess of 100 movements per day Average Annual Daily Traffic AADT where the site is not within or adjacent to a declared Air Quality Management Area (AQMA). This level of traffic movements would not be exceeded at Stanley Ferry due to the use of canal transport, however, the Site is close to an AQMA.
- 8.3 Wakefield Council has declared 10 AMQAs, the closest of which is the Wakefield City AQMA with its eastern boundary on Aberford Road to the west of the Site. The M62 AQMA has its closest boundary to the north and north east.
- 8.4 The small number of daily vehicle movements and items of diesel powered mobile plant that would be used on Site, plus the fact that the river conveyor, crusher and screens would be powered by a single diesel generator, would lead to a low level of emissions. It may also be possible for the canal barges to use electric motors instead of diesel engines. By comparison to the major source of exhaust emissions, being traffic movements on the local road network and the M62, the Site would not be a significant source of emissions.
- 8.5 Wherever possible, road going vehicles and quarry plant will be selected on the basis of the most up-to-date emissions standards, including Euro V Standard where applicable.
- 8.6 The assessment has therefore concentrated on the issue of prevention rather than measurement of background air quality levels and comparison with quantitative predictions.
- 8.7 The National Planning Policy Framework (Framework) describes the policy context in relation to pollutants including air pollutants. The Government's objective is that planning should help to deliver a healthy natural environment for the benefit of everyone and safe places which promote wellbeing. To achieve this objective;

Planning policies and decisions should contribute to and enhance the natural and local environment by: 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." (Paragraph 170)

Specifically in terms of development with regard to air quality:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan." (Paragraph 181)

- 8.8 Further guidance to the Framework is set out in the web based Planning Practice Guidance.
- 8.9 The closest dust sensitive receptors in the locality include the dwelling on Water Lane close to the Water Treatment Works which is 30m to the north west of the Smalley Bight extraction area. In addition, Bungal House (200m), 400 and 396 Aberford Road (200m), Smalley Bight (69m) and Smalley Bight Farm (114m) are closest to the west of the Smalley Bight extraction area. Houses no 386 to 282 are 215m to the west, as is Stanley Grove Junior and Infant School at 200m.
- 8.10 To the south of both Smalley Bight and Birkwood lie dwellings on Ferry Lane, separated from the Site by woodland along the disused railway line and more than 250m to the south. Immediately adjacent to the Birkwood extraction area is the Calder House dwelling (30m) and the Canal and Rivers Trust Stanley Ferry Workshops (106m). Further away are a sawmill (270m), Dunbrik Flues (250m), a dwelling (170m), the Stanley Ferry Pub (150m) and the Marina (130m).
- 8.11 To the east is Birkwood Farm at 380m, with the nearest houses in Altofts a minimum 1.3km further away.

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- 8.12 The larger housing areas around the junction of Ferry Lane with Aberford Road including Riverdale Road lie more than 370m to the south west, whilst Stanley itself is 340m to the north west at its closest.
- 8.13 There are no ecologically designated sites in the immediate vicinity although the Site is bounded by deciduous woodland to the north on its boundary with the Water Treatment Works. There are occasional trees along the river and canal banks, with a more developed line of trees along the disused railway line to the south. The woodland and surrounding agricultural land are considered as low sensitivity receptors.
- 8.14 Prevailing winds will blow from sectors in the south and west resulting in potentially the highest dust impacts arising at the Water Treatment Works and adjacent farmland. However, a significant feature of the proposed quarry is that the mineral will largely be extracted below maximum groundwater levels. Although the excavation will be pumped to enable dry working, the sand and gravel will be damp when dug and this will not be a dusty operation.
- 8.15 All of the operations and activities proposed on site have the potential to generate dust. In quarrying, dust is generally created by firstly the breaking of materials, secondly by the handling of previously broken materials, and thirdly by the movement of mobile plant and lorries over the ground.
- 8.16 For dust to become airborne, energy is required to overcome the gravitational and cohesive forces binding dust particles together or to a surface. Dust particles are dispersed by suspension in moving air, and the area of dispersal is affected by particle size and wind speed as well as by particle shape and density.
- 8.17 The largest proportion of dust likely to be emitted from site operations will be large dust particles of size greater than 30 μm , which will largely be deposited within 100m of their source. Finer dusts of size up to 30 μm may travel further, but concentrations will decrease rapidly with distance from the source, due to dispersion and dilution.
- 8.18 Dust control will be concentrated on the prevention of dust emissions beyond the site boundary and will be centred on the use of water to condition materials and damp down running surfaces. However, in dry windy conditions it can become difficult to maintain effective dust controls and so when local wind speeds exceed 20m per second in dry conditions, all site operations would be suspended that have the potential to give rise to fugitive dust emissions beyond the Site boundaries.

Activities with the potential to give rise to dust emissions

- 8.19 The primary sources of dust at the Quarry will be:
- the soil stripping operation and the formation of soil mounds;

MWP PLANNING

- the mineral extraction operation;
- the mineral processing, stockpiling and loading out operations;
- the movement of mobile plant around the site which is likely to be the main source of Site dust emissions;
- the placement of soils as part of the restoration process.

8.20 The creation and dispersion of dust will be highly dependent on weather conditions. Wind speed can determine the amount of dust raised, while wind direction determines those areas that may be affected. Higher wind speed increases the potential for airborne dust to be generated with the suspension and entrainment of particles in airflow. Precipitation will suppress dust generation.

8.21 The amount of dust generated by each activity depends on the size of particles and, crucially, upon their moisture content.

Soils Handling

8.22 Soils have to be stripped in advance of site operations, from extraction areas, haul routes and other operational areas. The protection of soil resources require that the stripping and replacement of soils can only take place in dry conditions, usually between April and October, and fugitive dust emissions are therefore possible. The soil stripping and replacement process are very similar to normal agricultural operations such as ploughing and cultivation which already take place on and around the Site. Soil handling operations are however transitory and are only likely to occur over a period of a few weeks. The only realistic means of controlling dust emissions is to suspend operations when fugitive dust emissions are likely to impact on residential, woodland and agricultural areas external to the site boundary and that is in dry windy conditions when the wind is blowing from the Site towards the receptor.

8.23 There is a potential for short term moderate to high levels of dust emissions in the absence of mitigation measures.

Excavation Activities

8.24 Mineral extraction will take place all year round and will be excavated using a tracked excavator loading one or more dump trucks. Most of the excavation will take place below ground level. The dump trucks will transport the excavated sand and gravel to a stockpile adjacent to the processing plant at the north side of the Birkwood area or to the stockpile adjacent to the river conveyor at Smalley Bight.

8.25 From the stockpile, the mineral will be moved by wheeled loading shovel to the processing plant, or in the case of the Smalley Bight stockpile, loaded onto the river conveyor with a wheeled loading shovel. Where the mineral has been brought across

MWP PLANNING

the river conveyor, it will be discharged directly onto the ground to be loaded into the processing plant by a wheeled shovel.

- 8.26 The mineral will be loaded into the wash plant receiving hopper by a wheeled shovel, and once washed it will pass through a crusher and/or screens to be discharged onto different stockpiles depending on material size grading. A wheeled shovel will then load onto a conveyor to be transported the short distance to the canal wharf. The conveyor will discharge directly into a barge through a shroud.
- 8.27 Once the mineral has emerged from the wash plant in a damp condition, it will be conveyed automatically to the crusher or screen. The mineral is likely to remain damp through this process, but water spray bars will be fitted to the crusher and screens in accordance with a permit to be issued by Wakefield Council. When the mineral arrives in the product stockpiles, it is likely to remain damp. The surface of the stockpiles will crust, but when disturbed, there is potential for dust to be released and so the stockpiles would be conditioned with water and coagulation agents as and when necessary.
- 8.28 Most of the fine materials will be separated from the sand and gravel in the wash plant, and will be transport via a pipeline to the settlement facility at the western end of Birkwood. The potential for fine materials to find their way through to the product stockpiles is therefore limited, and together with the inherent moisture content of the sand and gravel, the potential for the generation of nuisance dust would be considered low.

Transportation

- 8.29 The excavated mineral would be transported within the quarry using dump trucks over relatively short distances. The areas traversed would be the quarry floor and the riverside haul roads. Such "haul" routes would inevitably have a covering of loose material. Dust emissions in such circumstances increase with the transporting vehicle weight and speed. Internal haul roads are therefore considered to have a high potential for dust generation.

Dust Potential Summary

- 8.30 Table 2 following summarises the different activities and their potential for dust generation.

Mitigation Measures

- 8.31 Industry good practice measures are based on guidance issued by the Minerals Industry Research Organisation (MIRO) and Process Guidance notes published by

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Defra. The later includes PG 3/08 (12) Quarry Processes and PG 3/16 (12) Mobile Crushing and Screening.

Table 3: Dust Sources

Activity	Emission Magnitude	Location
Soil Stripping and Replacement	Moderate to High	Original ground surface and quarry floor
Excavation	Low to Moderate	Levels below original ground surface
Processing	Low	Plant Compound
Stockpiling and Handling	Moderate to High	Adjacent to river conveyor and plant compound
Transportation	High	Quarry floor and haul roads

Soil Stripping and Replacement

- 8.32 The primary mitigation that would be implemented would be the avoidance of soil stripping and replacement activities during inclement weather conditions when the wind speeds create the potential for dust to be blown well beyond the area of soil handling itself. The duration and frequency of soil handling would be minimised.

Excavation

- 8.33 The excavation environment would be damp and dust generation therefore unlikely. The use of portable water sprays would be considered if necessary during dry windy conditions or excavation would be suspended in high wind speeds.

Processing Plant and River Conveyor

- 8.34 The Environmental Permit controlling the processing plant would require a number of mitigation measures to be applied, including the following:

- The use of variable height conveyors, wind boards and chutes on conveyors;
- The use of dust spray bars on crusher or dust arrestment if available;
- All conveyors should be fitted with belt scrapers and dust catch plates; and
- All materials should be deposited carefully into screens and crushers by reducing drop heights.

- 8.35 However, the mineral would be taken through a wash plant to remove fines and the sand and gravel would emerge damp from this process before it entered the crusher and screen.

Stockpiling and Handling

- 8.36 All stockpiles would be located in discrete areas where machines or other vehicles are at least risk of running over the stockpiled materials. All stockpiles containing files would be conditioned with water where necessary and consideration will be given to

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the use of portable water sprays. The area around the stockpiles will be maintained in a clean and tidy condition.

Internal Haul Routes

- 8.37 All vehicle speeds will be restricted but the main mitigation measure would be the use of a water bowser in dry windy conditions.

Site Management

- 8.38 The Site Manager would be responsible for ensuring compliance with all dust control measures. The Site would be inspected on a daily basis to ensure that dust was not escaping beyond the site boundaries. A daily record would be kept of weather conditions, site inspections, complaints and any corrective action taken.

Residual Effects

- 8.39 Effective site dust control in the form specified should ensure that no nuisance dust leaves the site boundary. There should therefore be no significant residual effect.

Conclusions

- 8.40 This Assessment has covered the proposed extraction and processing of sand and gravel at Stanley Ferry. It has considered the various site activities and the potential for dust impacts to arise from them. Impacts from traffic and plant emissions have been screened out as below the relevant criteria and so not considered significant.
- 8.41 The Assessment has been based on a qualitative approach and no quantitative measurements have been taken. The sources and impacts of deposited dust have been described and potential receptors identified. Risk levels were determined for sensitive receptors on the basis of distance and wind direction.
- 8.42 Given the mitigation measures proposed, it is considered that the risk of impacts on the locality are assessed as insignificant or acceptable. Similarly, the risk of impacts on adjacent woodland and agricultural operations are also assessed as insignificant or acceptable.
- 8.43 Once quarrying has ceased and restoration completed, all sources of potential dust nuisance will have been removed and so there will be no residual impacts.

9 GROUND STABILITY (GEOTECHNICAL)

- 9.1 A slope stability analysis has been prepared by ARP Geotechnical Ltd and is attached as Appendix ES7. The proposed quarry will comprise slopes, bunds, and haul roads, in close proximity to existing slopes associated with the River Calder. As such, it was considered appropriate to carry out both a slope stability assessment for the proposed

quarry along the worst conceivable profiles and also design a resource standoff boundary for the faces adjacent to the river.

- 9.2 An assessment of the available information indicates that the Site is underlain by alluvium comprising silty clay, underlain by river terrace deposits comprising silty gravelly sand. The alluvium is widespread across the Site, typically to depths of between 0.1m and 4.2m in the north and between 0.5m and 5.0m in the south. The underlying solid strata (bedrock) comprises mudstone of the Pennine Middle Coal Measures Formation. This is first encountered as a stiff grey clay with fragments of hard grey mudstone. The bedrock is encountered from depths of between 6.0m and 9.2m in Smalley Bight and from depths of between 3.2m and 10.8m in Birkwood.
- 9.3 The mineral resource of interest on this Site is the river terrace deposits. This unit is described as sand, with laboratory testing confirming that the mean composition is: 4.2% silt, 34.0% gravel and 61.8% sand. In Smalley Bight, the deposits range from 4.2m thick to 8.9m thick. Isopachytes show that the thickest deposits in the north are roughly in the centre of the mining area. In Birkwood, the deposits range from 0.4m thick to 9.7m thick. Isopachytes show the distribution to be thickest in the far west of this area, reducing steadily towards the east. The alluvium above the terrace deposits is considered to be overburden.
- 9.4 Groundwater is being monitored independently by the Applicant, via a number of recently installed piezometers. These piezometers have recorded the groundwater to be at depth of between 4.9m and 3.34m below existing ground level. This is typically within the terrace deposits.
- 9.5 The basis for the slope stability modelling considers the conceivable failure mechanisms combined with the material/soil quality and structural analysis. These were rotational or circular failure, skin failure and mass failure, all of which are affected by hydrogeological conditions in variable ways.
- 9.6 The parameters chosen for the types of material present were assigned values determined from the site investigation information obtained and from the various standards (such as BS8002, 1994) and guidelines recommended by the Quarries Regulation. Factoring of the elements is accounted for during the modelling, to ensure the modelling was in compliance with EuroCode 7 Design Approach 1 (EC7 DA1).
- 9.7 Given that the geological strata are relatively homogeneous, circular slip surfaces (rather than planar slip surfaces) have been used for the modelling. The Morgenstern-Price method of slip circle analysis has been used. Typically, slip planes have been drawn and the software uses optimisation to find the most likely slip plane, and this is then analysed. Where appropriate, a slip surface has been chosen and then analysed.

MWP PLANNING

- 9.8 As an initial assessment, areas of the natural topography were modelled to assess their stability, so that a baseline for the effect of potential quarry work can be applied. The site walkover indicated that, due to the steep nature of many of the river banks, it is anticipated that a number of the existing river slopes will be in some state of instability.
- 9.9 The results of the modelling indicated that the initial proposed cut face was typically unstable with respect to circular failure, and that the proposed quarry plan required re-sculpting. As the circular failure was shown to be unstable, the shallow skin failures and mass failures were not modelled for. The proposed 3m high bunds (of alluvium/overburden) have also been shown to be unstable. Further modelling was undertaken to ascertain safe slope angles for the quarry cut slopes and soil bunds.
- 9.10 The analysis has shown that, as long as the mineral deposits are cut back to a slope of 23 degrees or shallower, and the temporary bunds are placed at an angle of 20 degrees or shallower, then the slopes formed within the proposed quarrying will be stable for circular failure.
- 9.11 Resource standoff zones have been calculated from the crest of the mineral resource slope. The crest of the mineral resource slope has been taken as the point at which extraction of the resource commences. The high risk resource standoff zone has been calculated as 15m from the crest of the mineral deposit slope to any permanent structures and 9m to any temporary structures. In areas of very high risk, such as around the northern river bank in the hairpin bend, it is recommended that a resource standoff of 21m is applied.
- 9.12 Modelling has also been undertaken for the alluvial deposits where they are to form a permanent slope. These slopes should only be present at the very top of the profiled slope at the restoration stage, and should be cut at a maximum of 16 degrees.
- 9.13 Rapid drawdown conditions can occur when the water table experiences a rapid reduction. This can lead to slope instability where conditions were stable previously. Pumping to reduce the groundwater level will be required to facilitate the quarrying activities. This will need to be undertaken in a manner that reduces the groundwater level at such a rate that is deemed to be safe and not create rapid drawdown conditions.
- 9.14 There are also a number of steep existing slopes associated with the River Calder. These are primarily located at the southern boundary of Birkwood, on the northern side of the very tight bend in the river (shown on Section A-A) and at the north eastern tip of Birkwood, in the area of the proposed plant compound and river conveyor. The proposed quarrying activities have been shown to have no adverse impact upon these

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existing slopes, but they have been shown to be already unstable or at least over steepened. Therefore, it is recommended that vigilance is paid to these existing slopes during the period of quarrying activities.

9.15 The Assessment concluded

- A cut angle of a maximum of 23 degrees is recommended for the mineral resource (sands and gravels) excavation slopes. This for temporary and permanent slopes.
- The overburden (alluvial clay) should have a cut angle that is at or below 16 degrees for any permanent profiling works.
- The temporary bunds that are proposed for the Site, which will comprise the overburden material (alluvial clay), should have a cut angle that is at or below 20 degrees. These slopes can be steeper than the permanent profiling works, due to the bunds being a temporary structure.
- The majority of the bunds proposed to be located on the Site (which are screening mounds that surround the main excavations) are approximately 14m wide. At this width, the bunds can be 2.5m in height. The larger bund that is proposed to be located close to the river conveyor is approximately 22m wide. At this width, this bund can have a maximum height of 4m.
- A standoff of 9m, from the crest of the mineral resource slope, to any temporary structures, such as bunds, must be maintained. Given that it is proposed there will be an approximate 11m re-profiled width between the crest of the mineral resource slope and the crest of the overall slope, then this is not anticipated to create any issues.
- A standoff of 15m, from the crest of the mineral resource slope, to any permanent structures at high risk from the quarrying works must be maintained. Given that it is proposed there will be an approximate 11m re-profiled width between the crest of the mineral resource slope and the crest of the overall slope, and any permanent structures (existing river slopes and canal footpaths) are a reasonable distance away, then this is not anticipated to create any issues.
- In areas of very high risk, such as around the northern river bank in the hairpin bend, it is recommended that a resource standoff of 21m is applied (from/to the existing river bank). Again, this is not anticipated to create any issues.
- Any instability of slopes created by rapid drawdown will need to be avoided by pumping groundwater at a controlled/slow rate.
- Vigilance should be paid to existing steep slopes associated with the River Calder during the quarrying works.

9.16 These recommendations have been incorporated into the excavation design.

10 SOILS AND AGRICULTURE

- 10.1 An Agricultural Land Classification Assessment and Soil Characteristics Report has been prepared by Land and Restoration & Management Ltd and is attached as Appendix ES8.
- 10.2 The land is shown on the 1:250,000 Scale Agricultural Land Classification Map for Yorkshire and Humber as Grade 3 but the limitation of scale of this map means that this allocation cannot be regarded as accurate. Furthermore, this map predates 1988 and so land shown as Grade 3 classification is not subdivided into 3a and 3b.
- 10.3 This Report assesses the Agricultural Land Classification (ALC) grade, but is not a detailed Land Quality Statement. The ALC and soil characteristics are based on soil samples at 100m intervals across the Site. The assessment of the ALC grade was undertaken using the methodology set out in the '*Agricultural Land Classification of England and Wales*' (MAFF, October 1988).
- 10.4 To compile the required data, Land Restoration & Management Ltd undertook a site inspection on 6 and 8 August 2019 and the report provides a summary of the condition of the soils at the time of the inspection.
- 10.5 For Smalley Bight, auger borings revealed an average depth of topsoil of just less than 50cm and just less than 60cm subsoil. However, the landowner indicated that a small area located between boreholes 2 and 3 had a thinner depth of soil before sand and gravel were exposed by ploughing. The auger examinations did not extend into this area of the survey. At Birkwood, the auger borings revealed a slightly thinner average depth of topsoil of just under 40cm and 55cm subsoil.
- 10.6 The soils have been mapped as Wharfe 561a association by the NSRI. The field survey has confirmed the presence across the whole Site of the Wharfe series which is deep, stoneless permeable loamy soil over river alluvium.
- 10.7 The survey confirmed that the Site falls within ALC subgrade 3b. Land having an ALC subgrade 3b is regarded as moderate quality agricultural land. This type of land is capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year. Based upon the currently available information and the proximity to the river Calder, the consequent waterlogging and flood risk is of overarching significance limiting the ALC to subgrade 3b.
- 10.8 The agricultural land to be taken for the mineral extraction is contained in 2 separate ownerships. The loss will reduce the farming area of Smalley Bight Farm by

approximately half but will coincide with the owner's plan to retire from farming. The loss to Birkwood Farm will reduce the farmed area by less than 5%.

11 SOCIO-ECONOMIC ASSESSMENT

- 11.1 The National Planning Policy Framework describes three dimensions to sustainable development as economic, social and environmental, and seeks positive improvements in the quality of the built, natural and historic environment. The Quarry operations will contribute to building a strong, responsive and competitive economy by providing an additional source of construction materials into a competitive market place. The supply of construction materials supports built development and roads, thus contributing to the needs of present and future generations. It also uses natural resources prudently without adding to climate change factors and the restoration process will improve biodiversity.
- 11.2 The Quarry operations would provide direct employment for 6 people, with additional indirect employment in maintenance, supplies, barge transport and contractors. The majority of employees will live locally in the West Yorkshire area and their expenditure will add to the local economy.
- 11.3 The use of the canal to transport the mineral products away from the quarry would also provide new business for the canal and contribute towards its upkeep. It may also provide a good example of business use that might encourage others to use canal transport. In addition, the barges would use significantly less fuel than would road transport and it is possible that electric propulsion could be used, further minimising emissions.
- 11.4 The Quarry would provide approximately 1.6 million tonnes of aggregate for the local construction industry over a period of around 11 years. Restoration would be progressive and would be completed approximately 12 months after extraction had ceased, giving an operational period of around 12 years.
- 11.5 The West Yorkshire Local Aggregate Assessment 2018 identified a continuing under supply in West Yorkshire and the surrounding region for sand and gravel. This was in relation to the quantity of aggregates required to fully meet economic requirements. This situation has continued to the present day with only a single operational West Yorkshire sand and gravel quarry, which is nearing exhaustion. The supply of construction materials into the local market from Stanley Ferry will help meet the identified shortfall and reduce the need for minerals to be imported from further afield.
- 11.6 The design of the Quarry has been optimised to reduce impact on the environment to acceptable levels, thus providing effective protection of the environment. The

restoration design has also been optimised to enhance biodiversity as well as providing recreational angling, which will improve the local environment and provide indirect benefits for human health and wellbeing.

11.7 The key aspects of the Quarry with regard to local socio-economic effects are as follows:

- The operation of the Quarry would provide employment for up to 6 people on site plus the maintenance of existing office staff employment at the Applicant's Dewsbury offices;
- There would be benefits to local industry and service suppliers including repairs, servicing and supplies for site mobile plant, equipment hire, haulage and the supply of fencing, site cabins, and other materials;
- Expenditure of wages in the local economy;
- The provision of 1.6 million tonnes of sand and gravel aggregate over an 11 year period into the West Yorkshire market, in substitution for aggregate brought in from further afield, thus increasing competition and reducing overall environmental impacts; and
- The use of canal transport instead of road transport will reduce the use of fossil fuels and emissions.

11.8 Overall, the socio-economic effect of the proposed Stanley Ferry Quarry would be positive with employment and economic benefits in the short to medium term. In addition there would be long term benefits for biodiversity and recreation.

12 CONCLUSION

12.1 In conclusion, the Environmental Assessment has provided information for the applicant to assess the impacts of the proposed future workings, including the restoration.

12.2 The environmental impacts of the scheme are well within acceptable limits. Mitigation has been set out within each topic area covered and has been incorporated into the working and restoration schemes described in the Supporting Statement.

APPENDICES

ES1 ARCHAEOLOGICAL AND HERITAGE ASSESSMENT

ES2 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

ES3 ECOLOGICAL IMPACT ASSESSMENT

ES4 HIGHWAYS ASSESSMENT

ES5 HYDROLOGICAL AND HYDROGEOLOGICAL IMPACT ASSESSMENT

ES6 NOISE IMPACT ASSESSMENT

ES7 SLOPE STABILITY ANALYSIS

ES8 AGRICULTURAL LAND CLASSIFICATION ASSESSMENT AND SOIL
CHARACTERISTICS

APPENDIX ES1
Archaeological and Heritage Assessment

APPENDIX ES2
Landscape and Visual Impact Assessment

APPENDIX ES3
Ecological Impact Assessment

APPENDIX ES4
Highways Assessment

APPENDIX ES5
Hydrological and Hydrogeological Impact Assessment

APPENDIX ES6
Noise Impact Assessment

APPENDIX ES7
Slope Stability Analysis

APPENDIX ES8

Agricultural Land Classification Assessment and Soil Characteristics