Environmental Statement Update

Volume 2: Original Environmental Statement (Appendix 1)

North Bierley Phase 2

KeyLand Developments

October 2021

Environmental Statement – Non Technical Summary

Environmental Statement Land at North Bierley

July 2016

Turley

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8 July 2016

1. Introduction

1.1 Keyland ("the applicant") is applying to Kirklees Metropolitan Borough Council (KMBC) and the City of Bradford Metropolitan District Council (BMDC) for outline planning permission to redevelop the former Yorkshire Water waste water treatment works (WWTW) and adjacent agricultural land to provide new industrial/warehouse buildings and houses with associated landscaping school car parking area, and off site road improvements. All matters are reserved except for means of access.

1.2 The site plan below shows the proposed application area in red. The majority of the site (ie the WWTW and agricultural land, shaded red) lies within Kirklees with a smaller area (outlined red) opposite Woodland Church of England School lying within Bradford.

Figure 1: Site Location



1.3 Environmental Impact Assessment "EIA" is a formal process by which the environmental impacts of a development project are assessed; and where there is potential for a significant impact that cannot be avoided, works are identified to lessen the impact.

1.4 The ES reports on the findings of the EIA and sets out those areas where potentially significant environmental effects have been identified and the mitigation proposed to

remedy predicted effects. It forms an important part of the planning application decision making process.

1.5 The EIA has been undertaken voluntarily by the Applicant as they consider that given the size, scale and nature of the Proposed Development it is considered to fall under schedule 2 (section 10b – urban development projects) of the EIA Regulations (The Town and Country Planning (Environmental Impact Assessment) Regulations 2011) as amended.

1.6 Therefore an EIA has been undertaken and the results are presented in two volumes:

- Volume 1 – Main Text
- Volume 2 - Technical Appendices

1.7 This Non-Technical Summary (NTS) summarises the findings of the ES and describes the potential likely significant environment effects (beneficial and adverse) that may arise from the Proposed Development. The NTS also provides details of the measures undertaken to reduce the likelihood of potential environmental effects occurring and how environmental effects will be reduced.

1.8 The application seeks outline planning permission, in other words the Applicant is looking to agree the amount of development on site and the basic principles, such as maximum floor areas, building heights and main landscaping areas. The details of how the site layout, building design, site access design will be considered at a later date.

1.9 As the proposals cover a large area of land, circa 23ha, and involves a large amount of development on a part brownfield and part greenfield site, the Applicant considers that it is "EIA" development. This view is based on the legal requirements for Environmental Impact Assessment (EIA). As a consequence, the Applicant has prepared an Environmental Statement to consider the potential impacts of the development.

1.10 This document is a non-technical summary of the main Environmental Statement, and uses wherever possible plain English.

Scope and Content of the Environmental Statement

1.11 There are legal requirements for what should be considered within an Environmental Statement (ES); these requirements are currently set out in EC Directive no 2011/92EU and are put into UK law via the Town and Country Planning (Environmental Impact Assessment) regulation 2011.

1.12 The key requirements of an ES can be summarised as:

- Description of the development
- An outline of the main alternatives considered by the Applicant and main reasons for his choice.

- A description of the aspects of the environment likely to be significantly affected by the development, i.e. population, ecology, soil, water, air, climate, heritage, landscape and any interrelationships between these.
- A description of the likely significant effects of the development on the environment.
- A description of the measures to be used to prevent, reduce or offset any significant effects.
- An indication of any difficulties or lack of know how encountered when preparing the ES.

1.13 The items listed about are provided in full within the main ES and the supporting Technical Appendices. In addition to the above, the regulations require a non-technical summary (ie this document) to be prepared.

1.14 In preparing the main ES document, Turley has co-ordinated and prepared Chapters 1-6, and Chapters 14-15. Other consultants have prepared the following Chapters:

- Chapter 7 – landscape and visual – prepared by TPP
- Chapter 8 – ground conditions – prepared by Wardell Armstrong
- Chapter 9 – ecology – prepared by Brooks Ecology Ltd
- Chapter 10 – flood risk and drainage – prepared by Curtins with assistance from Turley.
- Chapter 11 – highways – prepared by AECOM
- Chapter 12 – noise and vibration – prepared by AECOM
- Chapter 13 – air quality– prepared by AECOM

1.15 Should anyone wish to make representations on the application these can be made to Kirklees Council at the following address:

Team Leader Major Developments
Investment & Regeneration Service
Kirklees Council
Civic Centre 3
Market Street
Huddersfield
HD1 2YZ

1.16 Or Bradford Council at:

The Planning Service,
4th Floor Britannia House,
Hall Ings
Bradford,
BD1 1HX.

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Site Description

1.17 The Application Site lies in the green belt as set out in the development plans for Kirklees Council and Bradford Council. It lies to the north east of Junction 26 (Chainbar) of the M62 motorway and to the east of the M606 motorway.

1.18 The site comprises: circa 23.2 ha of land to the south of Cliff Hollins Lane including the former North Bierley Waste Water Treatment Works (WWTW) and agricultural land; and 0.354 ha of land at Mill Carr Hill Road north of Cliff Hollins Lane.

Figure 2: Aerial photograph of the site, looking southwards the M62 Chainbar roundabout



1.19 Junction 26 (Chainbar) of the M62 motorway runs immediately south of the development site. The M606 motorway, which connects Bradford in the north to the M62, runs to the west of the site. The M606 motorway is generally raised above surrounding land levels on an embankment, and crosses Mill Carr Hill Road on a bridge.

1.20 There are agricultural fields and woodlands (including Hanging Wood) to the east and north east of the Application Site. Beyond the M606 motorway to the west is agricultural land, Cleckheaton Golf Course and the settlements of Oakenshaw (Kirklees District) and Low Moor (Bradford District). Beyond the M62 to the south and south east are the settlements of Hunsworth and Cleackheaton as well as agricultural fields.

1.21 Within the wider context of the site are a number of established industrial sites including: the Euroway Trading Estate to the north in Bradford; Low Moor chemical plant to the west in Bradford; and West 26 to the south in Cleckheaton.

1.22 The nearest settlement is the Lower Woodlands area of Oakenshaw which is immediately adjacent to the area proposed for the new school car park, and circa 400m to the north of the former WWTW. This settlement lies within the Bradford District and comprises circa 100 dwellings primarily located off Mill Carr Hill Road to the north, and a number of individual houses and farms located on Cliff Hollins Lane. The residential properties off Mill Carr Hill Road vary in age and style from Victorian terraced properties to detached houses constructed in the last 20 years, generally accessed via estate or private roads.

1.23 Woodland Church of England Primary School lies on the western side of Mill Carr Hill Road, and is separated from the M606 by the embankment and an area of woodland.

1.24 To the west of the site access for the former WTWW are the three pairs of semi-detached bungalows on Cliff Hollins Lane, with a shared parking area off Cliff Hollins Lane. These are the nearest residential properties to the Application Site.

1.25 Oak Mills is located on Cliff Hollins Lane to the north of the former WTWW access. Oak Mills comprises circa 1.9ha of industrial land including a modest mill building and various outbuildings. The remainder of properties on Cliff Hollins Lane are detached or farmsteads (including a horse riding school) set within the wider landscape and with access directly from Cliff Hollins Lane.

1.26 The topography in this area is characterised as rolling with some steeply sided hillsides. The site is low lying, settled between the motorway and the wooded hillside of Hanging Wood to the east. The site is located at between 90 and 110m Above Ordnance Datum (AOD). The development site lies within the valley formed by Hunsworth Beck which runs from the north west to the south east. Hunsworth Beck is a deeply incised, narrow water course within the woodland edge along the eastern site boundary. This is joined by Cockleshaw Beck that runs from Chatts Wood

1.27 The development site is not within a national landscape designation. There are no statutory listed buildings within the development site, or conservation areas covering the site.

1.28 Hunsworth Beck forms the eastern site boundary.

1.29 Hanging Wood lies adjacent to the eastern boundary of the former WWTW site and is not a statutory designation but is identified by Kirklees Council as a "Site of Wildlife Significance"

Application Site

Former WWTW and Agricultural Lane

1.30 The former WWTW is accessed from Cliff Hollins Lane to the north of the site, which is, in turn, accessed from Bradford Road (Junction 26 of the M62). Immediately to the west of the access road to the former WWTW lies circa 11.95ha of agricultural land. This land rises in level from the access road towards the M606 in the west, with the highest point being in the north western corner.

Figure 3 Aerial photograph of the site (outlined red) looking north west towards Oakenshaw and Euroway Industrial Estate



1.31 The site was closed in 2011 as a functioning waste water treatment works for South Bradford. Within the site are the remains of the decommissioned settlement tanks and filter beds, as well as access roads. Whilst the site has been decommissioned, Hunsworth Beck remains as an outfall route for clean water and therefore Yorkshire Water has recently installed new equipment within a small part of the site. This equipment is outside of the development site as it will be retained in operational use.

1.32 **Table 1** below outlines the main buildings and structures that are currently on site.

Table 1 Existing Site Structures

Type	Location	Footprint (m^2)	Height (m)	Volume (m^3)
Building 1	Above ground	391	7.25	2,835
Building 2	Above ground	436	7.81	2,453
Tanks	Above ground	27,250	-	16,000
Tanks	Below ground	(included above)	-	4,000
Hard standing	Above ground	8,255	-	-
Total	**-**	**-**	**-**	**25,288**

1.33 The former WWTW site is generally level with a slight fall towards the south boundary, and lies between 89m and 96m AOD. The agricultural land to the west, adjacent to the M606, is around 100-112m AOD.

1.34 A public footpath enters the site at the WWTW site access southwards through to Hanging Wood.

1.35 Power lines cross the site in an east/west direction about a third of the way up the WWTW site from the south. There is also a high pressure gas pipeline which enters the site to the north of Hanging Wood and cuts diagonally through the site to the south west boundary, where it leaves the site to the north of the power line.

Field opposite Woodlands School, Mill Carr Hill Road

1.36 That part of the development site proposed for the new school car park is currently a green field. Hunsworth Beck runs along the southern boundary of the field, and lies outside of the development site. The site levels drop from Mill Carr Hill Road on the west to the south eastern corner.

1.37 A row of Victorian terraced residential properties lie on the northern boundary of the site, with residential gardens in the north eastern corner.

2. The EIA Process

2.1 The ES has been prepared pursuant to The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended).

2.2 The ES has had regard to all aspects of the environment likely to be affected by the Proposed Development and includes an assessment of the likely extent and significance of the potential environmental effects.

2.3 The topics to be included within the ES were determined by the applicant with informal agreement with the Planning Authority, although no formal Scoping Opinion (where the topics are formally agreed through consultation) was adopted.

2.4 It was agreed to assess the impact on the following topics;

- Economy, Population and Society (Socioeconomics)
- Landscape and Visual Impact
- Ground Conditions
- Ecology
- Flood Risk and Drainage
- Transport
- Noise and Vibration
- Air Quality

2.5 In order to carry out an assessment of the likely environmental effects of the Proposed Development, the existing or 'baseline' conditions must first be defined. The likely extent of the environmental effects and their significance can then be assessed. As a starting point, the ES adopts the baseline potion as being the existing site conditions. The environmental effects to be assessed are therefore the difference in effects between the existing conditions and the Proposed Development.

2.6 The likely significant environmental effects are considered against significance criteria, which is used throughout the ES, and adapted as necessary for each topic area. This is outlined below. Within each assessment, a judgement is applied to confirm at what level an effect is considered to be 'significant'. In the majority this relates to moderate effects and above.

Table 2 Significance Criteria

Magnitude	Criteria
Major adverse	The Proposed Development (either on its own or with other proposals) could have a major adverse effect on the character and integrity of the sites and/or their surrounding area.
Moderate adverse	The Proposed Development (either on its own or with other proposals) could have a moderate adverse effect on the character and integrity of the sites and/or their surrounding area.

Magnitude	Criteria
Minor adverse	The Proposed Development (either on its own or with other proposals) could have a minor adverse effect on the character and integrity of the sites and/or their surrounding area.
Negligible	No observable effect.
Minor beneficial	The Proposed Development (either on its own or with other proposals) could have a minor beneficial effect on the character and integrity of the sites and/or their surrounding area.
Moderate beneficial	The Proposed Development (either on its own or with other proposals) could have a moderate beneficial effect on the character and integrity of the sites and/or their surrounding area.
Major beneficial	The Proposed Development (either on its own or with other proposals) could have a major beneficial effect on the character and integrity of the sites and/or their surrounding area.

2.7 The assessment is undertaken for all phases of the development – demolition/remediation/construction and operation.

2.8 Where the assessment procedure indicates that the Proposed Development is likely to have significant adverse effect, the ES identifies appropriate mitigation measures to prevent, reduce, or offset these effects and/or take advantage of opportunities for environmental enhancements. Such mitigation can either be incorporated into the proposed design and operation of the Proposed Development, or through the introduction of particular safeguards or additional measures.

2.9 A cumulative assessment is also undertaken to considered effect interactions and in-combination effects. Effect interactions are the combined or synergistic effects caused by the combination of a number of effects on a particular receptor which may collectively cause a more significant effect than individually. In-combination effects are the effects of the Proposed Development together with other committed developments.

3. Proposed Development

3.1 Planning permission is sought for:

Re-development of former waste water treatment works following demolition of existing structures to provide employment uses (Use Classes B1(c), B2 and B8) and residential use (Use Class C3) on land off Cliff Hollins Lane and provision of a school car park for Woodlands Primary School on land off Mill Carr Hill Road (outline application – all matters reserved).

3.2 It is standard practice with outline planning applications to establish a set of development parameters to both guide the development and to aid the assessment of effects. This approach ensures that the future development does not exceed what has been assessed in the ES.

3.3 The Development Parameters in this case are shown on the Parameters Plan, and defined as:

- Distribution of land uses
- Maximum floorspace for industrial units
- Maximum residential numbers
- Buildings heights
- Vehicular access points
- Drainage Strategy including the size of the main drainage ponds

Figure 4: Parameters Plan



3.4 An Illustrative Masterplan has been prepared which demonstrates how the Development Parameters can be accommodated on the site (**Figure 4.2**). However, the Illustrative Masterplan is entirely illustrative, and reflects how one potential outcome in line with the parameters.

Distribution of Land uses

3.5 The distribution of uses is shown on the Parameters Plan, Figure 4 above.

Table 3 Development Parameters

Area (Net)	Use	Max Floorspace	Max Height
9.94	Employment Zone 1	14,865 sq m	18m AGL
	Employment Zone 2	11,613 sq m	18m AGL
	Employment Zone 3	11,613 sq m	18m AGL
3.25	Residential	101 units	9m AGL
0.356	School Car Park	36 spaces	-
	Drainage Attenuation Ponds		
	Residential area	2125m3	
	Employment area	6235m3	

3.6 The parameter plan confirms the dominant land use as employment with residential use (including infrastructure, parking and associated landscaping). The proposed car park for Woodlands Church of England School is also included in the scheme.

3.7 The residential zone will provide up to 101 dwellings plus associated open space. Structural landscaping is provided on the site boundaries providing an appropriate separation distance from the motorways, Hunsworth Beck and other adjacent land uses. Balancing ponds are also identified and their capacity set out.

Building heights

3.8 The proposed building heights are shown on Parameter Plan. In particular, there is reference to maximum building heights reflected in metres above the proposed ground level. The employment units are identified as being a maximum 18m in height, whilst the residential units would be a maximum 9m in height.

3.9 The height in metres in considered as a maximum, and allows for chimney heights etc., It is likely that final completed storey heights would actually be below this height. However, for the purposes of a fully robust assessment, a maximum height is given.

Location of Access

3.10 Full details of the means of access are to be reserved for later approval. The location of the access to the main site is from Cliff Hollins Lane, reflecting the existing line of the access to the former WWTW. This access route will include a realigned widened junction and widened entrance road to the site. The location of the access to the new school car park will be from Mill Carr Hill Road, opposite Woodlands Church of England School.

Site Levels

3.11 The proposals also include the creation of building plateaus in order to provide level areas for building. The Site Sections and Plateau Plan below show how the levels would be provided on site.

Figure 5: Plateau Plan

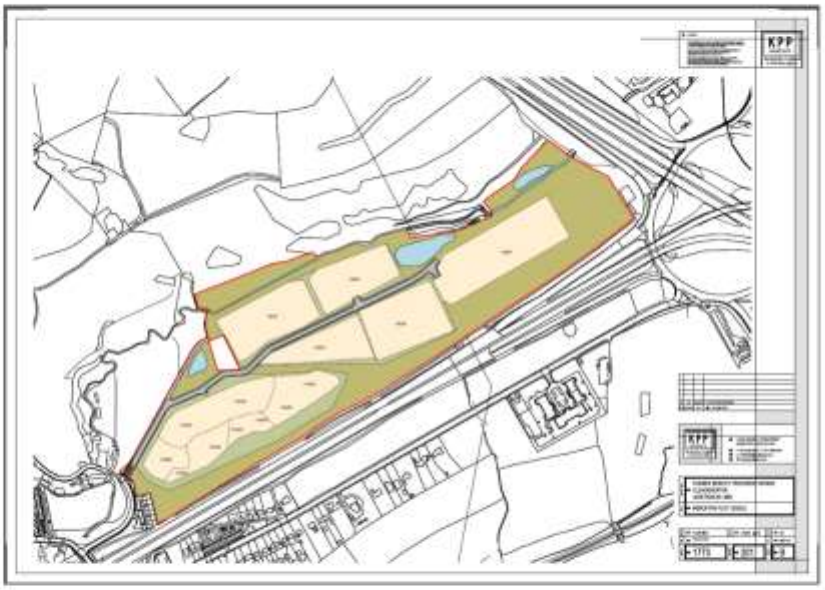
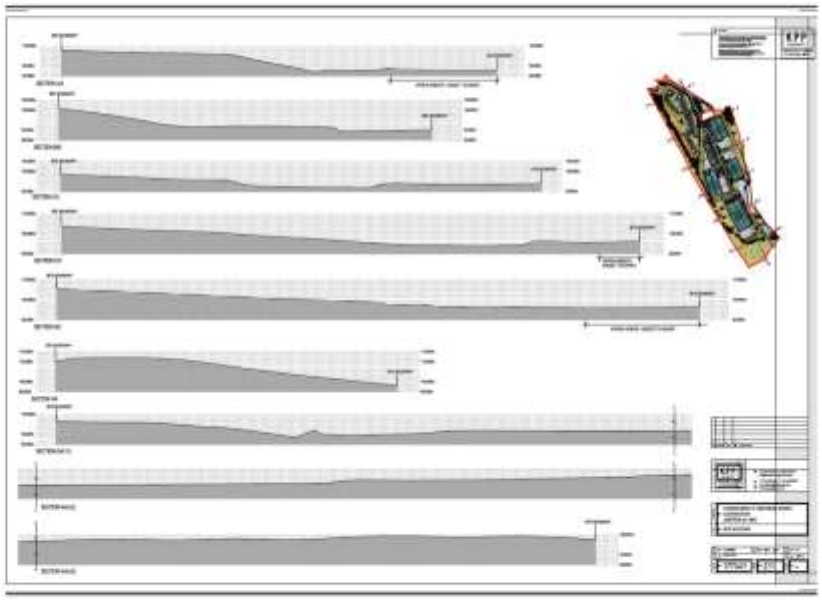


Figure 6: Site Section Plan



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Construction Phasing

3.12 At this stage in the project, no detail is known on construction programme or phasing. However, for the purposes of modelling (particularly in respect of transport), it is assumed the development will be commenced in 2018, after the submission and determination of reserved matters application (s) and will be completed by 2021.

3.13 The general approach to the construction will follow these principles:

1. Establish a site compound
2. Demolish existing structures and buildings, and stockpile the materials for reuse
3. Site remediation and regrading to create development plateaus including temporary drainage provision
4. Access road and servicing plots and advance landscaping
5. Construct buildings in line with market demand

4. Consideration of Alternatives

4.1 The need for the development and the main alternatives have been considered by the Applicant.

4.2 The need for the proposal can be considered as follows;

- The need to deliver new employment land to support the key economic sectors in the area thereby providing new job opportunities
- The need to deliver new homes and meet housing needs
- Reuse of a brownfield site including the remediation of the site.
- Requirement to provide off street car parking for Woodlands Church of England
- Fulfilment of Policy Context – the emerging Kirklees Local Plan includes an aspiration for the redevelopment of the site for employment purposes recognising its brownfield status close to good motorway connections.

Alternatives

4.3 In accordance with the EIA Regulations 2011, this section of the ES outlines the main alternatives studied by the applicant and an indication of the main reasons for the proposed development. Alternatives considered as part of the EIA process comprise:

- "Do nothing" scenario;
- Alternative sites for the Proposed Development; or
- Alternative schemes for the site.

4.4 It is not possible in this instance to disaggregate the 3 main elements of the proposal. A viability report has been undertaken and confirms that in order to secure the required employment land provision residential development is necessary to fund the abnormal remediation and development costs and the car park for the school.

"Do Nothing" Scenario

4.5 The "do nothing" scenario would result in no physical or environmental change to the WWTW site.

4.6 The need for the Proposed Development has been clearly set out above and the opportunity for redevelopment of this brownfield well connected site. Retaining the site in its current form would not deliver the economic benefits that would arise from releasing this land to meet the latent unmet demand for large scale employment sites close to the motorway network. Furthermore, housing to meet local needs and to contribute to the strategic housing requirement would be lost in this scenario. Equally the environmental benefits arising from the Proposed Development would not be delivered.

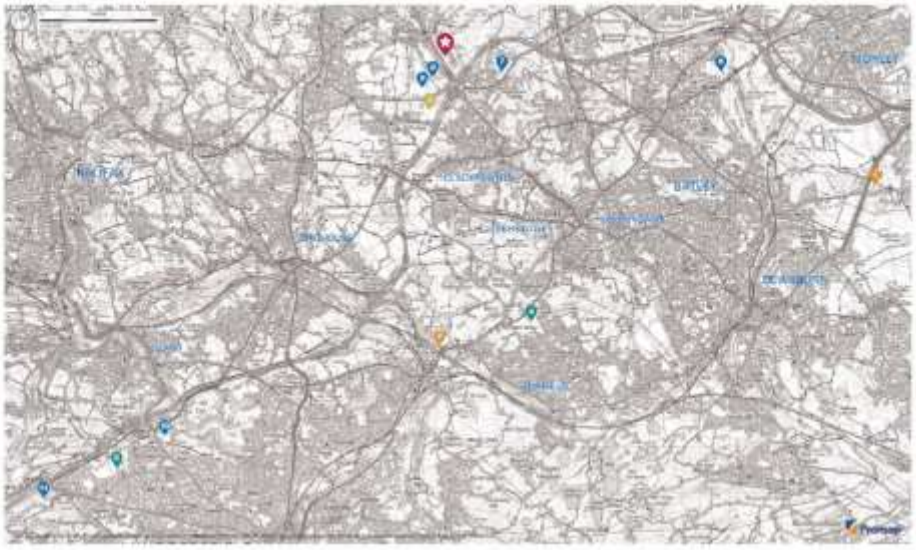
Alternative Sites

4.7 As the site is within the Green Belt, the Applicant has considered a number of alternative sites both within Kirklees and the wider area. However, it has to be noted that due to the scale of the latent and unmet demand for employment floorspace it will be necessary for a portfolio of sites to be progressed. W

4.8 There are no opportunities within Bradford to deliver the scale of development required. The main alternative sites that were considered are identified on the following map.

4.9 The first sites considered were those within existing Primary Employment Areas (PEA) as defined in the emerging Local Plan evidence base. Four PEA's were considered. However, they were discounted as they either were too small or constrained to provide a viable large scale industrial unit.

Figure 6: Plan of alternative sites



4.10 In terms of the key environmental constraints all of those sites listed below , except Cooper Bridge, are greenfield sites. Only the committed sites are allocated by the adopted development plan, and all other sites lie within the Green Belt, although it is noted that the Application Site and part of the Cooper Bridge site lie outside of this designation. All the sites, except the Application Site, lie within Flood Zone 1. Each site also has its site specific constraints relating to ecology or BAT habitats, listed buildings/conservation areas, archaeology, agricultural land quality, proximity to residential properties, public rights of way, contamination/coal mining.

4.11 The sites that were considered fell into the following categories and can be summarised as follows:

- Committed Sites: Slipper Lane; Lindley Moor

Committed Sites of Slipper Lane and Lindley Moor were discounted as neither of them could provide the scale of development required to meet the latent need for employment land. Importantly, whilst Slipper Lane might be able to come forward in the short to medium term Lindley Moor has significant infrastructure issues which would need to be resolved first.

- Draft Local Plan – Strategic Sites: Cooper Bridge; Chidswell

  The Draft Local Plan sites of Cooper Bridge and Chidswell are being pursued by Kirklees Council as potential large scale strategic development sites. Cooper Bridge is also a former WWTW but is constrained in highways terms, it is also affected by a high pressure gas main and coal mining. This site is a longer term development site which cannot meet the current employment land requirements. Chidswell is a much larger site, circa 117ha, which is to be focussed towards housing with about 122,550sqm of employment. This site has potential archaeology below the ground which may need further investigation. Access to the site will also need to be resolved. The scale and on site constraints for this site mean that it is not expected to come forward in the short term and therefore will not meet the current employment land requirements.

- Draft Local Plan – Proposed Allocations: land at A58/M606, Cleckheaton; Application Site

  Neither of these sites are unduly constrained and should be able to deliver part of the requirement for employment land. However, both of these sites would form part of the overall portfolio of sites. The Application site is partly brownfield and therefore should be released ahead of a greenfield site, such as the land at A58/M606, Cleckheaton.

- Other potential sites: Howden Clough Road; Whitehall Road, Hunsworth; Bradford Road/Sykes Lane; Oakenshaw Lane; Brighouse Road/Ainley Top; land to rear New Hey Road, Mount.

  These sites are not identified in any adopted or emerging development plan and were included due to their potential to provide employment development. However, Howden Clough Road and New Hay Road were discounted due to topographical site constraints, whilst Oakenshaw Lane and Whitehall Road West are constrained in access terms.Brighouse Road/Ainley Top was discounted as it is limited in size so whilst it may be able to deliver smaller units the market demand and viability of such is questionable.

Alternative Proposed Development Options

4.12 As well as considering whether the development could be provided on alternative sites, the Applicant has considered a number of different development scenarios and layouts.

Option 5 – Small scale Industrial Units

4.13 Option 5 was not subject to formal viability assessment. It was developed in response to the viability of the Green Belt policy compliant option. It was developed at an early

stage, while the team were still investigating site constraints and so does not fully reflect the extent of constraint which are now known on the site.

4.14 This option proposed a central spine road extending across the entire site to the M62 at the south. The scheme provided 43,153sqm of B Class accommodation over 23.5ha (net) in a number of small scale units and utilised the whole site.

4.15 This scheme shows the maximum extent of a smaller unit development that could be accommodated on the site.



Option 5: Employment Use Only

4.16 However, this Option was discounted for a number of reasons:

- The scheme does not account for the improvement works to the M62/ M606 junction, and therefore the southern end of the site would be sterilised.
- The southern end of the site, it was since discovered, is more difficult to develop due to adverse ground conditions.
- The extent of the development had the effect of increasing site servicing costs, by requiring a spine road to run along the entire length of the site (the site is around 1km in length).
- The focus on smaller units had the effect of increasing build costs, due to the extra fit out requirements and extra materials required for dividing walls.

4.17 It was considered, taking into account these factors, that this scheme would not be deliverable in practical terms.

Option 8 Employment Use Only and Motorway Improvements

4.18 This scheme addressed the issues identified in Option 5. It provided land for the motorway improvement, reduced the extent of the development (helping with both servicing / development costs) and focussed on slightly larger units. This scheme delivered 46,358sqm of commercial floorspace on 23.26ha (net).



Option 8 Employment Use including Motorway Works

4.19 This option is not viable as the value of the site for employment use is not sufficient to support the significant costs associated with remediating the WWTW, providing the site plateaus and implementing the off-site highway improvements on Cliff Hollins Lane.

Option 13:

4.20 Option 13 was derived following a number of other options. The key changes are:

- The addition of a new School Car Park. This arose following public consultation and is a direct result of local concerns about conflicts between school children and employment traffic during school pick up and drop off times. This addition is considered necessary as it represents the safest method of ensuring that the development does not affect road safety in the vicinity of the site.
- The replacement of 9940sqm of employment space with 3.8ha of residential (up to 120 units).

4.21 These changes add in a cost to the development, in the form of the car park, but also generate additional income from the higher use value of the residential development.

4.22 This scheme delivers 9.94 ha of employment space (net); 3.8ha of residential and a new school car park.



Option 13 Employment and Residential Development

4.23 This option was discounted as it was not viable and did not provide sufficient on-site open space for the residential.

Option 14: Proposed Development

4.24 The Proposed Development scheme includes an appropriate mix of employment and enabling residential development, whilst providing sufficient land for the highway improvements to the adjacent motorways. The school car park is included.

4.25 This scheme can deliver 9.94ha of employment land, 3.25ha of residential land as well as the school car park.



Proposed Development

4.26 The Proposed Development is considered to be the most viable proposal which addresses the environmental, the physical constraints, and the market requirements.

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5. Summary of Topics

Economy, Population and Society

5.1 The Proposed Development will have a beneficial effect on local economic conditions as well as on the local population. This includes job creation and additional GVA to the local economy during construction and operational phases. The local community will also benefit from the uplift in provision of public open space, which will address the deficit in provision currently apparent in the neighbourhood area and generate indirect health benefits as a result.

5.2 Specifically, the Proposed Development will have the following effects during the construction and operational phases:

Construction Phase

- Directly support 133 FTE gross construction jobs on site per annum over the construction period. When jobs held by residents elsewhere are discounted this gives a total of 124 FTE direct annual jobs, and a further 62 FTE jobs per annum through supply chain and expenditure impacts, held by residents of the wider impact area during construction.
- Help respond to unemployment of 385 Job Seekers Allowance claimants who are seeking work in the construction industry in the local impact area and a further 655 across the wider impact area.
- Generate an additional £11.0 million in GVA for the wider economy for each year of construction.

Operational Phase

- Support a total of 746 FTE jobs on site and a total of 1,041 net additional FTE jobs across the wider impact area once leakage and multipliers are included. This is inclusive of 525 FTE jobs at the local level.
- Help to respond to unemployment of 2,465 residents in the local impact area who are unemployed and claiming Job Seekers Allowance.
- Generate £43.4 million in GVA annually in the wider impact area, of which £21.1 million GVA could be supported in the local impact area.
- Generate circa £750,000 business rate revenue per annum, of which under current arrangements 50% or £370,000 could be retained by the Kirklees Council until 2020, after which 100% could be retained.
- Contribute to the 29,340homes that need to be delivered in the District by 2031 and the need to provide more affordable homes.
- Accommodate new households with the potential to grow the local labour force by circa 112 additional working age, economically active and employed residents.

- Generate an uplift in earnings equivalent to £2.5 million from new employed residents. Generate circa £1.2 million in convenience and comparison retail expenditure per annum and £730,000 per year on leisure goods and services.

- Contribute towards the demand for local health facilities which will in turn support local jobs.

- Increase provision of amenity green space and generate demand for other types of open space and recreational facilities.

- Generate £130,000 in additional Council Tax payments annually, and an additional circa £860,000 of New Homes Bonus revenue over a period of 6 years to Kirklees Council once fully occupied. This could provide an important source of revenue funding for the local authority in delivering public services as well as investing in maintaining and enhancing local infrastructure.

Landscape and Visual

5.3 Chapter 7 of the Environmental Statement considers the landscape and visual impact assessment (LVIA) of the Proposed Development at North Bierley WwTW and associated infrastructure. The LVIA has been carried out by TGP Landscape Architects (North) Ltd.

5.4 A comprehensive assessment of the existing landscape character in the vicinity of the application site was undertaken to identify and evaluate significant environmental considerations for visual impact assessment. In particular the landscape appraisal was used to determine the capacity of the landscape to withstand change. A study area of 5km radius was established for the landscape and visual impact assessment.

5.5 The significance of landscape and visual effects are determined by considering the combination of landscape or visual sensitivity with the predicted magnitude of change. These have been classified as Major, Moderate, Minor or None. In this LVIA, effects that are described as Major or Major/Moderate are considered to be significant effects as defined by the Environmental Impact Regulations 2011. It should be noted that significant effects need not necessarily be unacceptable or negative.

5.6 The assessment shows that there will be significant adverse effects on the Batley Fringe Incised Valleys Landscape Character Area designation in the vicinity of the Application Site. The Proposed Development will change the character of the site in the vicinity of the existing WwTW.

5.7 There will be significant visual effects on the users of some properties occupying the higher ground to the north (including Cliff Hollins Farm) of the Proposed Development and on users of the local footpath network.

5.8 Mitigation measures have been proposed that seek to address these significant effects. The landscape masterplan (refer to Figure 7.4: Landscape Masterplan) provides a new landscape infrastructure which reflect the field patterns of the adjacent landscape and uses topography, woodland blocks, hedgerows and trees to aid screening of the development from visual receptors and to break up the massing of the development.

5.9 It is considered that the effect on Hanging Wood to the north of the site could be beneficial once the long term mitigation measures have established and more wildlife corridors adjoining the ancient woodland have been created.

5.10 In conclusion the landscape and visual impact of the Proposed Development changes the landscape character of the site and has significant visual effects on elements within the study area, however, with sensitive design and a responsive landscape scheme, these effects may be mitigated.

Ground Conditions

5.11 This chapter assessed the subsurface ground conditions beneath the Application Site that may potentially impact upon and be impacted by, the Proposed Development. This included an assessment of general ground conditions, the potential presence of contamination and the possibility of mining instability.

5.12 The assessment was carried out based on the findings of a desk based assessment, a Phase II Site Investigation, a Soils and Agricultural Land Desk Study and Mining Remediation Strategy. The methodology for the assessment was based on a combination of sensitivity and magnitude which was used to determine the significance of the effect.

5.13 Baseline data was collected from a desk based assessment and from site investigation data. Historical plans show that a sewage works was present on part of the Application Site in 1893. The Valley Pit Coal and Ironstone workings were also present in the west of the Application Site at this time along with an Old Coal pit in the south. A tramway is reported extending across the western part of the Application Site. Subsequent maps show general expansion and changes to the layout up until 2004.

5.14 The Application Site is situated on Lower Coal Measures which are considered a minor aquifer. Alluvium drift deposits are indicated as likely to be present along the eastern boundary associated with the Hunsworth Beck. Findings from the Coal Authority report suggest that shallow mine workings will potentially be present beneath the southern portion of the Application Site and there are potentially up to 12 mine shafts at the Application Site.

5.15 Results from the site investigation indicate isolated elevated arsenic concentrations in the residential area and may pose a risk to human health in a residential land use and also to construction workers during construction. No elevated concentrations were identified in the commercial area and are unlikely to pose a significant risk to long term human health given an ongoing commercial land use.

5.16 Gas protection measures are recommended as a precaution in the southern area of the Application Site to address high levels of methane. No gas protection is required over the remainder of the commercial area. Depending on the development type in the residential area, ground gas protection measures are expected to be required in this area.

5.17 Potential significant effects have been assessed with regard to the baseline data and both the construction and operational phases of the Proposed Development and a number of adverse effects identified including:

- Permanent loss of soils/natural strata through construction/ excavation;
- Introduction of additional contamination into soil/groundwater during construction phase as a result of accidental spillages i.e. fuels, construction materials;
- Impact on construction workers as a result of excavations into contaminated soils/groundwater;
- Impact on construction workers due to excavations into and treatment of unstable mining features;
- Introduction of contamination into soil/groundwater as a result of accidental spillage/leakage from vehicles (site users and delivery vehicles);
- Degradation of building materials over time as a result of contact with sulphates within soils;
- Impact on buildings/development as a result of unstable ground; and
- Impact on future occupiers as a result of ground gas.

5.18 Mitigation measures have been outlined such as a remediation scheme and Construction Environmental Management Plan and will controlled through planning conditions. These measures will reduce the significance of the impacts identified. In all instances the significance of the impact can be reduced to negligible once mitigation measures are implemented

Ecology

5.19 Chapter 9 of the ES considers the potential significant effects on ecology. Reference will be made to the Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the United Kingdom (2006). These guidelines have become a standard point of reference for Ecological Impact Assessment methodologies.

Wildlife sites

5.20 No statutory designated sites are found within a 2km search radius.

5.21 Five locally designated sites are located within the search area, only one of which is considered to be within the sites Zone of Influence; this being Hanging Wood Kirklees SWS. As such this feature will be taken forward as a Valued Ecological Receptor.

Invasive species

5.22 Three invasive species listed under Schedule 12 of the Wildlife & Countryside Act (1981) are found on, or immediately adjacent to the site. These are Himalayan Balsam, Japanese knotweed and Cotoneaster. Their long term management and removal from site is recommended.

Protected Species

5.23 West Yorkshire Ecology is the key local holder of biological records, and was consulted during the initial assessment of the site. Consultation with any other groups is not been considered necessary. A record search was completed by West Yorkshire Ecology

(WYE) which was tasked with carrying out a search for BAP, red data book and protected species, and listed wildlife sites within 2km of the application site.

5.24 WYE retuned a number of records within the 2km search radius. These included: common frog and toad, great crested newt, smooth newt, bluebell, a range of designated bird species, common blue butterfly and 9 records of bats. None of these records were located within the application site.

5.25 An extended Phase 1 Habitat Survey for the site was undertaken by the Applicant and identified the need for further baseline surveys covering: bat emergence; riparian mammal; White clawed crayfish; reptiles

5.26 The conclusion of the Phase 1 survey and the subsequent detailed surveys confirmed the site holds limited or no potential for the bird species recorded, as well as limited potential for bluebell and no valuable breeding habitat for amphibians. Hunsworth Beck passes along the sites northeast boundary and represents a strong linear feature across the local landscape. This also has the potential to support riparian mammals and crayfish, for which surveys were carried out in 2014 and determined likely absence. This feature also connects the site to the adjacent Kirklees Site of Wildlife Significance – Hanging Wood.

5.27 Pockets of good reptile habitat are found on site, however dedicated survey spread across the 2014 survey season have found likely absence of this group. A single building is found on site which provides bat roosting opportunities, though again dedicated survey revealed likely absence of roosting in 2013. In the absence of evidence of the species being confirmed on site, no further assessment was undertaken.

5.28 The surveys and record searches have not revealed important habitats on site or notable species or assemblages of species, and no further baseline studies have been considered necessary to make an assessment of the value of the application site as a whole. Given the proximity of Hunsworth Beck to the site, and its value as a likely corridor, this feature will be taken forward in the assessment, along with Hanging Wood and the invasive plant species.

5.29 During the demolition and construction phase the one of the main effects on Hanging Wood and also Hunsworth Beck would be as a result of the dust, noise and light pollution arising from this stage of the work. It is considered that this would be negligible, temporary and subject to appropriate mitigation such as a Construction Environmental Management Plan. The demolition/construction phase will also result in the removal of the invasive plant species, special invasive species management plan will be in place to ensure that this is appropriate disposed of and not spread elsewhere.

5.30 During the operational phase, the effect on Hunsworth Beck and Hanging Woof is negligible subject to the implementation of the mitigation measures and the structural planting as shown on the Parameters Plan. The safe removal of the invasive plant species will result in a minor/moderate benefit.

5.31 As a result a Construction Environmental Management Plan will be provided that will set out how the impacts of construction can be mitigated. Further, a Biodiversity

Environmental Management Plan is provided, which will set out long term plans for the enhancement of the wider site to benefit biodiversity and will be conditioned.

5.32 Overall, after mitigation, all impacts are considered to be either beneficial or not significant. There are no cumulative effects.

Flood Risk and Drainage

5.33 Chapter 10 of the ES provides an assessment of the likely significant effects of the Proposed Development on flood risk and drainage. A full baseline positon is outlined, before an assessment of significant effects. Mitigation measures are proposed as necessary where adverse effects are identified.

5.34 In terms of the baseline, the Hunsworth Beck flows along the eastern boundary of the Application Site. There

5.35 The Environment Agency Indicative Flood Zone mapping shows the Application Site to be situated across Flood Zones 1, 2 and 3, although the majority of the developable area lies in Zone 1, with just a small area in the south eastern corner currently occupied by WWTW filter tanks is identified as Flood Zone 2 and 3.

5.36 There are likely significant effects to the water environment and flood risk associated with both the remediation and construction and operational phases. Generally risks caused by the demolition/construction phases are considered short term, whilst those associated with the operational phase are longer term.

5.37 During construction a Construction Environment Management Plan (CEMP) is proposed to set out detailed methodologies and monitoring requirements of the measures below to prevent adverse effects on the water environment.

5.38 During operation, runoff from highway and the employment and residential areas will be collected in designated drainage ponds before its discharge to the local watercourses. The detail of which will be contained within a drainage strategy to be conditioned.

5.39 A reduction in infiltration, and the associated increase in surface water runoff rates and volumes will be mitigated through a detailed surface water drainage strategy. Therefore there will be no increase in surface water runoff rates from the Site. Overall, mitigation measures will be included within the proposed development to reduce adverse effects and in some cases, provide betterment to the long-term situation when compared to the existing baseline situation.

5.40 On this basis, negligible effects are predicted during remediation and construction, with a minor beneficial effect at operation on flood risk as suitable surface water drainage systems will be utilised. However, as these effects fall below the threshold for this topic, no significant effects are predicted. There are cumulative effects predicted.

Transport

5.41 Chapter 11 of the ES provides an assessment of the likely significant effects of the Proposed Development on transport. It provides a full assessment of the baseline positon, followed by an assessment of effects in terms of pedestrian, cycling and public

transport environment, traffic impact, severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation, hazardous loads, parking, accidents and safety, in line with the published methodology for this discipline. Mitigation measures are then proposed and residual effects predicted.

5.42 During demolition and remediation and construction phases of the Proposed Development, the following potential direct impacts are likely:

- During remediation and construction, HGV vehicle trips to deliver and remove materials;
- temporary closure of pedestrian footpaths;
- dirt and mud on road services; and
- construction workers accessing the Site.

5.43 However, all effects are predicted to be minor/negligible during this phase and would be temporary.

5.44 In terms of operation, the proposed development includes amendments to the Site Access Junction, as well as off-site improvements to improve road width at the junction of Cliff Hollins Lane/Mill Carr Hill Road, and Bradford Road/Mill Carr Hill Road. The amendments to the Site Access Junction will enhance safety for all users, improve pedestrian connectivity, and make access to and from the site simpler and easier. The highway network will continue to operate efficiently with the changes to the junction in place. The off-site improvements will be secured through planning conditions.

5.45 The proposals include a school parking area to alleviate an existing issue with on-street parking at the beginning and end of the school day. This parking area will provide 36 spaces and will improve highway and pedestrian safety.

5.46 In terms of traffic impact, the proposed development will increase the amount of traffic particularly on Cliff Hollins Lane (west), Mill Carr Hill Road (west) and Bradford Road this will have only a negligible effect on the overall operation of the highway network.

5.47 Mitigation is identified in respect of the CEMP to control dust and dirt and in respect of the travel plan to seek to encourage sustainable transport choices. These measures will be controlled by planning condition. The off-site works to Cliff Hollins Lane/Mill Carr Hill Road, and Bradford Road/Mill Carr Hill Road will be secured through planning conditions and subsequent S278 agreement. With the mitigation measures in place there are no significant effects.

Noise

5.48 Chapter 12 of the ES assesses the likely significant effects of the Proposed Development with respect to noise and vibration. It describes the methods used to assess the impacts; the baseline conditions currently existing at the Application Site and in the surrounding area; the mitigation measures required to prevent, reduce or offset

any significant adverse effects; and the likely residual effects after these measures have been adopted.

5.49 Effects are considered during the site preparation and various construction phases and on completion, the operation of the Proposed Development. In particular, the Chapter considers potential impacts on identified NSRs in terms of:

- Potential noise and vibration impacts from construction works;
- Noise from building services and plant and any other activities associated with the Proposed Development during operation; and
- Any increases to road traffic associated with the Proposed Development.

5.50 Baseline noise surveys have been undertaken in March/April 2014 and July 2015.

5.51 It is considered that through the use of appropriate design measures (to be determined during detailed design phases) ambient noise affecting future occupants of the development can be controlled to achieve internal ambient noise criteria as per BS 8233:2014.

5.52 Through the use of 'Best Practicable Means', appropriate control measures and on-site management of works activities and HGV access/departure points, it is considered that noise and vibration effects during construction works can be limited to an effect of negligible.

5.53 The operational noise from typical site operations on surrounding NSRs has been assessed, including the proposed residential zone. Daytime HGV deliveries to the site would result in a negligible effect.

5.54 Night-time HGV movements may result in significant adverse effects at dwellings located in proximity to the site (i.e. the eastern boundary of the proposed residential zone). It is therefore recommended that if 24hr HGV deliveries and associated activities be required a further detailed noise assessment will be required, and may include further mitigation measures. This can be controlled through planning conditions.

5.55 Based on the results of the baseline noise surveys, appropriate operational noise limits for building services and plant have been recommended. Through the use of appropriate noise control measures in order to achieve the specified operational noise limits, it is considered that noise and vibration effects of operational building services and plant noise can be limited to negligible.

5.56 Effects of operational traffic noise have been calculated using methodologies in line with CRTN and assessed against DMRB guidance. It is predicted that long-term effects from operational traffic will be limited to negligible.

Air Quality

5.57 Chapter 13 Air Quality considers the potential effects on air quality specifically, the impacts of road traffic emissions of nitrogen dioxide and fine particulate matter albeit consideration has also been given to dust impacts during the construction phase.

5.58 The draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) was followed to determine the potential air quality impacts during the construction and operational phases of the proposed development.

5.59 A qualitative construction phase assessment was conducted; the potential risk of nuisance and health impacts from dust was determined and appropriate mitigation measures were described. A detailed quantitative operational phase assessment was undertaken to determine the impact of the development on traffic derived pollutant concentrations. In addition, the air quality damage costs associated with the proposed development were calculated.

5.60 With regard to potential impacts during the construction phase, the assessment concluded that with appropriate mitigation measures (ie Construction Environmental Management Plan) impacts can be effectively controlled and so the residual impacts were considered to be negligible.

5.61 With regard to potential impacts during the operational phase, traffic derived pollutant (NO_2 and PM_{10}) concentrations were predicted at several sensitive receptors, including the residential area of the development. The following provides a summary:

- The background pollutant concentrations at the proposal site are well below the relevant annual mean objectives.
- Pollutant concentrations were predicted to decrease in the future due to anticipated improvements in vehicle technology regardless of whether the proposed development goes ahead or not.
- No concentrations in excess of the relevant air quality objectives and limit values were predicted.
- The largest impacts due to the development were predicted at receptors located on Bradford Road, near the junction with Mill Carr Hill Road and those on Cliff Hollins Lane, near to the site entrance.
- A worst case sensitivity test was undertaken to take account of known uncertainties with regard the degree in which NO_2 concentrations will reduce in the future due to vehicle emission technology improvements.

5.62 Overall taking account of the modelling undertaken, including the sensitivity test, recent monitored trends, and the measures within the Travel Plan to reduce emissions, the significance of the impacts was concluded to be negligible during the operational phase.

Residual and Cumulative Effects

5.63 The preparation of the ES has been undertaken in parallel with the design process. As a consequence, many measures to mitigate likely significant adverse environmental effects have been incorporated into the Proposed Development design in order to avoid, reduce or offset such effects. As such, many mitigation measures have been 'designed in' and these have been set out in Chapter 4, and addressed throughout the ES.

5.64 In this case 'designed in' mitigation includes adherence with the Parameter Plans, plateau levels, and adherence with the Remediation Strategy and Drainage Strategy.

5.65 However, additional mitigation measures have been proposed in relation to both construction and operation and these have been set out in each of the preceding technical chapters. These have been defined and clear and binding methods set out to ensure they are secured. A summary of these measures are set out below.

Table 4 Summary of Mitigation Measures

Topic Area	Measures	How it can be secured
Ground conditions, Air quality, Transport, Noise, Flood Risk and Drainage, Ecology	Construction Environmental Management Plan (CEMP)	Planning condition
Flood risk and drainage, and Ground Conditions	Drainage Strategy to secure detail of SUDs and foul drainage, with water efficiency measures to be included in detailed design	Planning condition
Ground conditions	Adherence to Remediation Strategy	Planning condition
Highways and Transport	Framework Travel Plan	Planning condition
Ecology	BEMP, lighting scheme and detailed design	Planning condition
Noise	Operational noise limits, traffic management plan, detailed design and detailed glazing design, noise assessment for 24hr operations including mitigation in detailed design	Planning condition
Air Quality	Framework Travel Plan	Planning condition
Landscape and visual	Securing landscape scheme	Planning condition

5.66 In addition, consideration has been given to the potential cumulative effects of the Proposed Development and other committed schemes that may come forward.

Table 5 Summary of Potential Cumulative Effects

Topic Chapter	Committed Scheme	Potential Cumulative Effects
Chapter 6 Socio-economic	Lindley Moor employment site and Slipper Lane employment site	**Major Beneficial** Employment Productivity Business Rates Retail and service provision Housing Labour force Household income and expenditure New Homes Bonus Council tax revenue **Minor adverse/Negligible** Education Open space and recreation

5.67 Chapter 7 – Landscape and Visual Impact considered the possible effect of the highway improvements to the Junction 26 of the M62 as set out in the Kirklees Councils Local Plan. These proposals have not been confirmed, and therefore it is difficult to assess the potential effect. Based on the potential line as set out in the Kirklees Plan it is considered that this would affect views into the site and provide additional planting. There were no committed schemes of relevance to the other Chapters within the ES.

5.68 There are no significant adverse effects identified in the Cumulative assessments.

Residual effects

5.69 The following table summarises the significant environmental effects that would arise with mitigation in place:

Topic	Stage	Description	Significance	Extent (L/R)	Nature (D/I, T/P, ST/MT/LT, R/I)
Socio-economic	Construction	Employment – Local	Substantial beneficial	L	D\I, T,ST
		Economic Productivity - Local	Substantial beneficial	L	D\I, T,ST
	Operational	Business rates	Moderate beneficial	L	D\I, P,LT
		New homes bonus	Moderate beneficial	L	D\I, P,MT
Landscape and Visual	Construction	Batley Fringe Incised Valleys – Landscape Character area	Major/Moderate adverse	L	D,T,LT,I
		Viewpoint 1 – Footpath by Cliff Hollins Farm	Major/Moderate adverse	L	D,T, LT, I
		Viewpoint 3 – Junction Cliff Hollins Lane and access to site	Moderate adverse	L	D,T,LT,I
		Viewpoint 4 – Footpath north of Hanging Wood	Major/moderate adverse	L	D,T,LT,I
		Cliff Hollins Farm	Major/moderate adverse	L	D, T, LT, I
		Two properties at grid refs 417862 and 428084	Major/moderate adverse	L	D, T, LT,I
		Bungalows at Cliff Hollins Lane	Moderate adverse	L	D, T, LT,I
		Footpaths within the site	Major/moderate	L	D,T,LT,I
	Operational	Batley Fringe Incised Valleys – Landscape Character area	Major/Moderate adverse	L	D,T,LT,I

Topic	Stage	Description	Significance	Extent (L/R)	Nature (D/I, T/P, ST/MT/LT, R/I)
		Viewpoint 1 – Footpath by Cliff Hollins Farm	Major/Moderate adverse	L	D,T, LT, I
		Viewpoint 3 – Junction Cliff Hollins Lane and access to site	Moderate adverse	L	D,T,LT,I
		Viewpoint 4 – Footpath north of Hanging Wood	Major/moderate adverse	L	D,T,LT,I
		Cliff Hollins Farm	Major/moderate adverse	L	D, T, LT, I
		Two properties at grid refs 417862 and 428084	Major/moderate adverse	L	D, T, LT,I
		Bungalows at Cliff Hollins Lane	Moderate adverse	L	D, T, LT,I
		Footpaths within the site	Major/moderate adverse	L	D,T,LT,I
Ground conditions		No Significant effects identified			
Ecology		Invasive Species	Minor/moderate beneficial	L	D,T
		Invasive species	Minor moderate beneficial	L	D,P
Flood Risk and Drainage		No significant effects identified			
Highways and Transport		No significant effects identified			
Noise		No significant effects identified			

Topic	Stage	Description	Significance	Extent (L/R)	Nature (D/I, T/P, ST/MT/LT, R/I)
Air Quality		No significant effects identified			

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Environmental Statement

Land at North Bierley Waste Water Treatment Works, Oakenshaw

July 2016

Turley

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ABBREVIATIONS

AADT	Annual Average Daily Total flow
AOD	Above Ordnance Datum
BAP	Biodiversity Action Plan
BBS	Breeding Bird Survey
BEMP	Biodiversity Ecology Management Plan
BGS	British Geological Society
CEMP	Construction Environmental Management Plan
DEFRA	Department of Environment Food and Rural Affairs
DFT	Department for Transport
DMRB	Design Manual for Roads and Bridges
EA	Environmental Agency
EC	European Commission
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FRA	Flood Risk Assessment
GQRA	Generic Quantitative Risk Assessment
HA	Highways Agency
HCA	Homes and Communities Agency
HDV	Heavy Duty Vehicle
IEEM	Institute of Ecology and Environmental Managment
JNCC	Joint Nature Conservation Committee
km	Kilometres
km/hr	Kilometres per hour

LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
LDF	Local Development Framework
LNR	Local Nature Reserve
LVIA	Landscape and Visual Impact Assessment
mg/m^3	Milligrams (of pollutant) per cubic meter (of air)
m	Metres
mm	Millimetres
NBN	National Biodiversity Network
NPPF	National Planning Policy Framework
NRTF	National Road Traffic Forecast
NTS	Non Technical Summary
NVC	National Vegetation Classification
ODPM	Office of Deputy Prime Minister
ONS	Office for National Statistics
OS	Ordnance Survey
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Areas
SPD	Supplementary Planning Document
SSSI	Sits of Special Scientific Interest
SUDS	Sustainable Urban Drainage System
TA	Transport Assessment
TG	Technical Guidance
UKAS	United Kingdom Accreditation Service

UKBAP	UK Biodiversity Action Plan
VER	Valued Ecological Receptors
ZVI	Zone of Visual Interest
ELC	European Landscape Convention
GLVIA	Guidelines for Landscape and Visual Impact Assessment
LCA	Landscape Character Area
LCT	Landscape Character Types
LVIA	Landscape and Visual Impact Assessment
NCA	National Character Areas
NCN	National Cycle Network
NPPF	National Planning Policy Framework
PRoW	Public Right of Way
SCOPSA	Standing Conference of South Pennines Authorities
UDP	Unitary Development Plan
VP	Viewpoint
WwTW	Wastewater Treatment Works
ZTV	Zone of Theoretical Visibility
ZVI	Zone of Visual Influence

GLOSSARY

Term	**Meaning Adopted in this Assessment**
Annual average daily total flows	A daily traffic flow (24hrs), expressed as a mean daily flow across all 365 days of the year (AADT) in units of vehicles per hour
Baseline scenario	Scenarios with the proposed development/project not in operation

Construction Environmental Management Plan	A framework developed to address and manage the environmental aspects and impacts related to the construction of the proposed development/project
DMRB screening tool	An empirical computer modelling tool that predicts future air quality levels as a result of road traffic characteristics under different scenarios
Heavy Duty Vehicle	A vehicle type classification, including rigid and articulated heavy goods vehicles, plus buses and coaches, that is used by air quality dispersion models
	A vehicle type classification, including motorcycles, cars and light goods vehicles, that is used by air quality dispersion models
Light Duty Vehicle / Road links	Individual sections of the road network, usually divided by junctions, used in the modelling of scenarios
24 hour mean concentration	The average (mean) of the hourly pollutant concentrations measured or predicted for 24 consecutive hours in one day
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and asses the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.
Landscape Character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Areas (LCAs)	These are single unique areas which are the discrete geographic areas of a particular landscape type.
Landscape Character Assessment (LCA)	The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscape distinctive.

	The process results in the production of a Landscape Character Assessment.
Landscape Character Types (LCTs)	These are distinct types of landscape that are relatively homogenous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape Effects	Effects on the landscape as a resource in its own right.
Landscape Quality (condition)	A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape Receptors	Defined aspects of the landscape resource that have the potential to be affected by a proposal.
Landscape Value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.
Magnitude (of effect)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
Photomontage	A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.
Significance –	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.

Visual Amenity	The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.
Visual Effects	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors	Individuals and /or defined groups of people who have the potential to be affected by a proposal.
Visualisation	A computer simulation, photomontage or other technique illustrating the predicted appearance of a development.
Zone of Theoretical Visibility (ZTV, sometimes Zone of Visual Influence)	A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

1. Introduction

1.1 This Environmental Statement (ES) has been prepared on behalf of Keyland Developments (the 'Applicant') to accompany an outline planning application with all matters reserved for the mixed use redevelopment of land including former North Bierley Waste Water Treatment Works, Cliff Hollins Lane and Mill Car Hill Road, Oakenshaw ('the Application Site').

1.2 This ES forms part of a suite of documents that accompany the planning application. For the purposes of the ES, the 'Proposed Development' comprises a planning application for the:

"Re-development of former waste water treatment works following demolition of existing structures to provide employment uses (Use Classes B1(c), B2 and B8) and residential use (Use Class C3) on land off Cliff Hollins Lane and provision of a school car park for Woodlands Primary School on land off Mill Carr Hill Road (outline application – all matters reserved)."

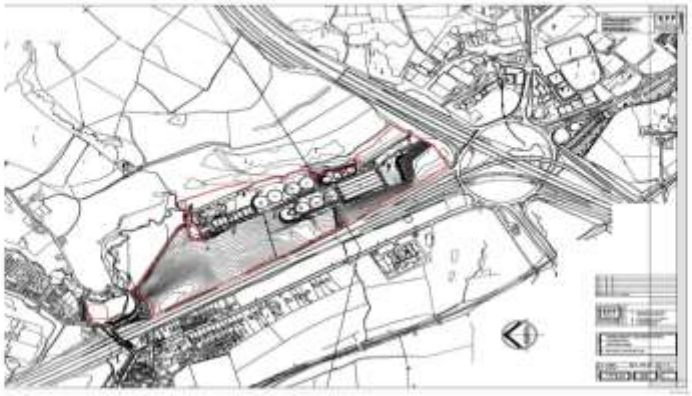


Figure 1.1: Site location plan

1.3 The majority of the Application Site including the WWTW access and agricultural land lying within the administrative boundary of Kirklees Metropolitan Borough Council ('KMBC'), and the smaller area opposite Woodlands CofE School lying with the administrative boundary of City of Bradford District Council ('BMDC').

Reason for EIA

1.4 The requirement for an Environmental Impact Assessment (EIA) is a procedure derived from the EC Directive No 2011/92/EU on the assessment of the effects of certain projects on the environment. It is transposed into UK law through the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, as amended in 2015 (hereinafter referred to as the "EIA Regulations"). Certain types of development that are likely to have significant effects on the environment come within the scope of the EIA Regulations, known as "EIA Development". The EIA Regulations require that prior to

the grant of planning permission for EIA Development, the planning authority must consider environmental information relating to that development.

1.5 EU Directive 2014/52/EU replaces 2011/92/EU but is not required to be transposed to national statute until 16 May 2017and there is now uncertainty regarding this date. The transition arrangements mean that the EU Directive 2011/92/EU is the correct legislative provision for the consideration of this Proposed Development through to determination.

1.6 Environmental Impact Assessment (the EIA) is the process of collection, publication and consideration of environmental information, in order to assess the likely significant effects of a proposed EIA Development. The environmental information that applicants for EIA Development are required to provide is defined in the EIA Regulations and includes prescribed information, which forms the content of an ES.

1.7 EIA has been undertaken voluntarily by the Applicant. This is on the basis that the applicant considers the Proposed Developments is an urban development project which constitutes EIA Development under Schedule 2 Part 10b of the EIA Regulations due to its size, scale and nature.

1.8 The Applicant has not submitted a "Screening Opinion Request" or "Scoping Opinion Request" to the Council.

1.9 The scope of this ES is considered further in Chapter 2.

1.10 Consequently, the prescribed EIA information including describing the Proposed Development, the likely significant environmental effects (during construction and operation) and the proposed ways to prevent, reduce and offset any significant adverse effects on the environment, known as mitigation measures, has been gathered and is presented in this document, the Environmental Statement (ES).

Structure of the ES

1.11 The ES is provided in three parts:

- Non-technical summary (NTS);
- Volume 1: Main text and figures;
- Volume 2: Technical appendices.

1.12 The ES should also be read alongside the documents submitted with the planning application (detailed in paragraph 1.22 below).

The ES – Non-Technical Summary

1.13 A non-technical summary (NTS) has been produced as a freestanding document. The NTS provides a concise summary of the whole ES in non-technical language to be understood by a lay audience.

The ES Volume 1 – main body

1.14 This is the full text of the ES and comprises a total of 15 chapters which are illustrated throughout by a series of tables and figures. It presents details required by the EIA Regulations and it is supported by Volume 2.

1.15 The EIA Regulations (Part 1 of Schedule 4) identifies a requirement for the Application to include in an ES information that is:

'reasonably required to assess the environmental effects of the development and which the application can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile.'

1.16 An outline of what this information comprises in respect of the Proposed Development and where it can be found in the ES is presented in **Table 1.1**.

Table 1.1: Location of information within the ES required by Part I of the EIA Regulations

Specified Information		Location in ES
1. Description of development including in particular:	a) A description of the physical characteristics of the whole development and the land use requirements during the construction and operational phases.	Chapter 3 Existing Site and Surroundings; Chapter 4 The Proposed Development
	b) A description of the main characteristics of the production process, for instance, nature and quantity materials used.	Chapter 4 The Proposed Development
	c) An estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the Proposed Development.	Chapter 4 Proposed Development and all technical chapters so far are relevant to the assessment of significant environmental effects.

Specified Information		Location in ES
2. An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects.		Chapter 5 Consideration of Alternatives
3. A description of the aspects of the environment likely to be significantly affected by the development, including in particular, population, fauna, flora, soil, water, air, climate factors, material assets (including the architectural heritage, landscape and interrelationship between the above factors.		Technical chapters 6-13
4. A description of the likely significant effects of the development on the environment, which should cover the direct effects on any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects of the development resulting from:	a) the existence of the development	Chapter 4 Proposed Development; technical chapters 6-13;
	b) the use of natural resources	Chapter 4 The Proposed Development
	c) the emission of pollutants, the creation of nuisances and elimination of waste	Chapter 4 The Proposed Development and technical chapters 12 and 13
5. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.		All technical chapters (6-13) and Chapter 14 Summary of Residual Effects and Chapter 15 Summary of Interactive and Cumulative Effects

Specified Information	Location in ES
6. A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.	Non-Technical Summary (separate document)
7. An indication of any difficulties (technical deficiencies) or lack of know-how) encountered by the applicant in compiling the required information.	All technical chapters (6-13)

Table 1.2: Location and information within the ES required by Part 2 of Schedule 4 of the EIA Regulations

Specified Information	Location within the ES
1. A description of the development comprising information on the site, design and size of the development.	Chapter 3 Existing Site and Surroundings; Chapter 4 The Proposed Development
2. A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.	All technical chapters 6-13
3. The data required to identify and assess the main effects which the development is likely to have on the environment.	All technical chapters 6-13
4. An outline of the main alternatives studied by the applicant of the main reasons for the choice.	Chapter 5 Consideration of Alternatives.
5. A non-technical summary of the information provided under paragraphs 1 to 4 of this Part.	Non-Technical Summary (separate document)

1.17 The structure of the ES includes the following Chapters which set the context to the scheme, including:

- Chapter 1 Introduction.
- Chapter 2 Approach to EIA
- Chapter 3 Existing Site and Surroundings
- Chapter 4 The Proposed Development
- Chapter 5 Consideration of Alternatives

1.18 Chapters 6-13 provide an assessment of the environmental effects on a topic by topic basis as follows:

- Chapter 6 Socio-economic
- Chapter 7 Landscape and Visual
- Chapter 8 Ground conditions
- Chapter 9 Ecology
- Chapter 10 Flood Risk and Drainage
- Chapter 11 Transportation
- Chapter 12 Noise and Vibration
- Chapter 13 Air Quality

1.19 In addition, the ES includes the following Chapters:

- Chapter 14 Residual Interrelated and Cumulative Effects
- Chapter 15 Summary of Residual Effects

1.20 Figures are provided either within or at the end of each chapter as relevant.

The ES Volume 2 - Technical Appendices

1.21 A complete set of technical appendices is provided for reference to prevent the main parts of the ES becoming excessively long.

Application documents

1.22 Whilst they do not form part of this ES, the following documents have been submitted with the planning application:

- Planning Statement, prepared by Turley
- Statement of Community Involvement, prepared Turley

Project Design Team

1.23 This ES including the assessments within Chapters 6 (Socio-Economic), have been prepared by specialists Turley using the Proposed Development drawings prepared by the project architect, KPP. Turley also prepared the Flood Risk Chapter using the FRA prepared by Curtins.

The other Chapters have been prepared by:

- Chapter 7 – Landscape and Visual – TPP
- Chapter 8 – Ground Conditions – Wardell Armstrong
- Chapter 9 – Ecology – Brooks Ecology
- Chapter 11 – Highways and Transport – Aecom
- Chapter 12 – Noise – Aecom
- Chapter 13 – Air Quality - Aecom

Comments

1.24 Comments on the Planning Application and ES should be forwarded to: Kirklees Metropolitan Borough Council at:

Team Leader Major Developments
Investment & Regeneration Service
Kirklees Council
Civic Centre 3
Market Street
Huddersfield
HD1 2YZ

The Planning Service,
Bradford Council
4th Floor Britannia House,
Hall Ings
Bradford,
BD1 1HX.

Availability of Documents

1.25 Additional copies of the NTS (free of charge) and the ES and Technical Appendices (price on application) are available from:

Turley
2 Bond Court
Leeds
LS1 2JZ

2. Approach to EIA

Introduction

2.1 This Chapter sets out the methodology for undertaking the ES. In particular, the details of the process of identifying the likely significant environmental effects of the Proposed Development and the method of assessing the significance of the effects.

2.2 The content and conclusions of the ES are based on an assessment of the application drawings, baseline surveys and a series of technical studies. The assessment has been informed by consultation and engagement with the local authorities. A process of public consultation and engagement has also been undertaken. A series of baseline studies has been undertaken including desk-based and some fieldwork based. The Proposed Development has been described to allow detailed assessment of issues including visual impact. The proposals have been subject to internal team design review and have been refined through the iterative EIA process.

2.3 The EIA has been carried out in accordance with the relevant legislation including the EIA Regulations, guidance and case law. Each technical aspect has been prepared using industry standard methods and criteria.

2.4 The key objectives of the EIA are as follows:

- to establish existing baseline environmental conditions
- to identify, predict and assess the significance of any environmental effects, both positive and negative, direct and indirect and short / medium / long term effects of the Proposed Development; and
- to identify suitable mitigation, enhancement and monitoring measures to prevent, reduce or remedy significant negative environmental effects.

2.5 Throughout this ES reference is made to adverse environmental "effects" that are likely to result from the Proposed Development. This is in line with the requirements of the EIA Regulations, which require the assessment of "likely significant effects" on the environment. There are however, topic specific guidelines which refer to "impacts". For the avoidance of doubt the terms "impacts" and "effects" have been used in this ES to address the likely significant environmental effects resulting from the Proposed Development.

Screening and Scoping of the ES

2.6 Having regard to the 2011 Regulations, and the characteristics and location of the development and the characteristics of the potential impact it is considered by the Applicant that the Proposed Development is EIA development. On this basis, EIA is undertaken voluntarily by the Applicant.

2.7 Whilst there have been discussions with KMBC and BMDC during the preparation of the application, the applicant has not requested a Screening or Scoping Opinion from either Council. There have been informal discussions with KMBC, BMDC, Yorkshire

Water, Highways England regarding the scope of the relevant assessments. This is referenced in each topic chapter as appropriate.

2.8 This Environmental Statement considers the potential significant environmental effects arising from the proposed development. The full list of the topics considered is provided in paragraph 1.19 above. When preparing this ES consideration was given to other potential significant environmental effects such as odour and heritage. Given the historic use of the WWTW there may have been odour issues associated with this activity. However, recent investment in the sewerage facilities and the decommissioning of the facility means that odour is no longer an issue at this site.

2.9 There are a number of Listed buildings near to the site, to the west of the M606. However, the setting of these Listed buildings has already been significantly been compromised by the M606, which is adjacent to/near to these assets. It is not expected that the Proposed Development will affect the significance of these heritage assets.

2.10 This ES therefore considers those topics as set out in paragraph 1.23.

Approach to the ES

2.11 The application is assessed on the basis of the application drawings submitted with the application. A full description of the Proposed Development is set out in **Chapter 4** with the key associated drawings provided in **Technical Appendices 4.1 and 4.2**.

Approach to the Technical Assessment

2.12 Each key issue has been given a separate chapter within the ES (Chapters 6-13). The technical assessments follow the same format.

2.13 Each chapter starts with an **introduction** outlining the topic area to be assessed.

2.14 The **legislative and policy framework** for the relevant topic area is then set out, including reference to any non-statutory guidance or standards.

2.15 The methods for undertaking the technical studies are then outlined in the **methodology** section, making reference to best practice. Whilst the Proposed Development is described consistently (based on the description in chapter 4), the geographical extent of the assessment varies depending on the aspect being assessed. As a result, study areas are different depending on the topic, as the geographical extents of the predicted effects differ.

2.16 The methodology will also confirm any assumptions and limitations specific to each topic area.

2.17 Each chapter also sets out the detailed definitions it uses to assess impacts, including significance, magnitude, type, receptor sensitivity and the nature of the impact (i.e. whether it is permanent, temporary, reversible or irreversible). What this means for each topic is set out in the relevant chapter.

2.18 The **baseline conditions** are then described, against which the potential environmental impacts are to be assessed. Baseline data has been obtained from, inter alia, desktop reviews, consultations and survey work undertaken for the project. The base conditions are referred to as at the present (or current) time on the basis of no significant change anticipated between assessment and the development being undertaken.Where different timescales are used, this is explained in the chapter. Where any immediate change is anticipated (other than as result of the development, or committed developments considered) this is described in full in each chapter.

2.19 The assessment of **potential impact** is then undertaken. As required by the relevant Regulations, the assessment considers the impacts in terms of the factors referenced in paragraphs 2.19-2.23 and, where possible, adopts consistent terminology.

2.20 The assessment consider the following phases:

- Demolition, remediation and construction
- Operational

2.21 The effect criteria used in this ES are outlined in each Chapter and reflects **Table 2.1**. Each Chapter explains how the effect criteria have been applied.

Table 2.1: Criteria for determining the significance of the environmental effect

Magnitude	Criteria
Major adverse	The Proposed Development (either on its own or with other proposals) could have a major adverse effect on the character and integrity of the site and/or the surrounding area.
Moderate adverse	The Proposed Development (either on its own or with other proposals) could have a moderate adverse effect on the character and integrity of the site and/or their surrounding area.
Minor adverse	The Proposed Development (either on its own or with other proposals) could have a minor adverse effect on the character and integrity of the site and/or their surrounding area.
Negligible	No observable effect.
Minor beneficial	The Proposed Development (either on its own or with other proposals) could have a minor beneficial effect on the character and integrity of the site and/or their surrounding area.
Moderate beneficial	The Proposed Development (either on its own or with other proposals) could have a moderate beneficial effect on the character and integrity of the site and/or the surrounding area.
Major beneficial	The Proposed Development (either on its own or with other

Magnitude	Criteria
	proposals) could have a major beneficial effect on the character and integrity of the site and/or their surrounding area.

Level of Significance

2.22 The significance of predicted effects has been determined by reference to the effect criteria for each assessment topic. Specific criteria for each issue has had regard to the following:

- extent and magnitude of the effect;
- whether the effect is positive or negative
- frequency of effect
- the probability of the effect occurring
- effect duration (short, medium or long term);
- effect nature (direct or indirect, reversible or irreversible);
- whether the effect occurs in isolation, is cumulative or interactive;
- performance against environmental quality standards or other relevant pollution control thresholds;
- sensitivity of the receptor; and
- compatibility with environmental policies

2.23 For issues where definitive quality standards do not exist, the assessment significance has been based on the following:

- local, regional or national scale of value of the resource affected;
- number of receptors affected;
- sensitivity of those receptors; and
- duration of the effect.

2.24 Where the assessment procedure indicates that the Proposed Development is likely to have significant adverse effects, the ES identifies appropriate **mitigation measures** to reduce, compensate or eliminate these effects and/or take advantage of opportunities for environmental enhancement. Such mitigation measures can either be incorporated into the proposed design and operation of the Proposed Development, or through the introduction of particular safeguards.

2.25 When considering impact, mitigation measures will be considered in two broad categories:

- Mitigation measures embedded in the design of the project and inherent within the scheme. These have been identified throughout the Project and used to inform Project Design. Such measures are considered part of the project and are referred to as 'designed in' mitigation.
- Additional mitigation and enhancement measures which have been developed later in the process when any specific impacts on key environmental receptors have been identified which can't be mitigated through design.

2.26 'Designed in' mitigation is considered in more detail in Chapter 4, where necessary. It is important to distinguish between the two types, as the assessment of impacts prior to mitigation includes elements of embedded design, whilst the residual effects consider the project with the additional mitigation and enhancement measures in place.

2.27 Following mitigation measures being in place, a **summary of the residual effects** has been prepared in order to assess the overall effects of the Proposed Development following demolition, construction and for its completed operation. A summary table is provided. Where residual effects are identified but may be subject to change over time, or may only be fully understood with the passage of time, proposals for future monitoring and management are discussed.

2.28 As required by the EIA Regulations the **cumulative effects** of the Proposed Developments is then considered within the ES. The following approach has been adopted for the assessment of cumulative effects, based on previous experience, the types of receptors being assessed, the nature of the Proposed Development, the committed developments under consideration and the information available to inform the assessment.

2.29 All technical assessments have considered effect interactions and in-combination effects. Effect interactions are the combined or synergistic effects caused by the combination of a number of effects on a particular receptor which may collectively cause a more significant effect than individually. In-combination effects are the effects of the Proposed Developments together with other committed development/s.

2.30 For EIA, cumulative effects are generally considered to arise from the combination of effects from the Proposed Developments and from other permitted schemes (not yet constructed or still under construction) in the vicinity, acting together to generate elevated levels of effects.

2.31 The cumulative effects resulting from the Proposed Development and the committed schemes are assessed in each of the technical ES chapters (**Chapters 6-13**) and Volume 2, as appropriate.

2.32 The level of detail of assessment has been dependent on the information available for each of these schemes and has generally been undertaken in a qualitative manner. These developments have been assessed within each chapter as relevant, **Chapter 15** provides a summary. Where no cumulative effects are predicted, this has also been stated.

Assumptions and Limitations

2.33 The principal assumptions that have been made and any limitations that have been identified, in preparing the ES are set out below. Assumptions specifically relevant to each topic have been made in each chapter:

- All of the principal existing land uses adjoining the Assessment Site remain.
- Baseline conditions have been established from a variety of sources, including historical data, but due to the dynamic nature of certain aspects of the

environment, conditions will change during the construction and operation of the Proposed Development.

- Information received by third parties is complete and up to date.
- The design, construction and completed scheme will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge.
- Necessary off-site services infrastructure for the Proposed Development will be provided by statutory undertakers.

3. Description of the Development Site

3.1 This Chapter of the ES presents a brief description of the location of the development site and its specific characteristics.

3.2 Further and more detailed descriptions of the site and wider area are presented in each of the topic **Chapters (6-13**) as relevant.

The Location of the Development Site

3.3 The Application Site lies to the north east of Junction 26 (Chainbar) of the M62 motorway and to the east of the M606 motorway.

3.4 The site comprises: circa 23.2 ha of land to the south of Cliff Hollins Lane including the former North Bierley Waste Water Treatment Works (WWTW) and agricultural land; and 0.12 ha of land at Mill Carr Hill Road north of Cliff Hollins Lane.

3.5 The majority of the site lies within the administrative boundary of KMBC, with the northern area lying within the administrative boundary of BMDC. The whole site lies within the Green Belt as defined in the development plan.

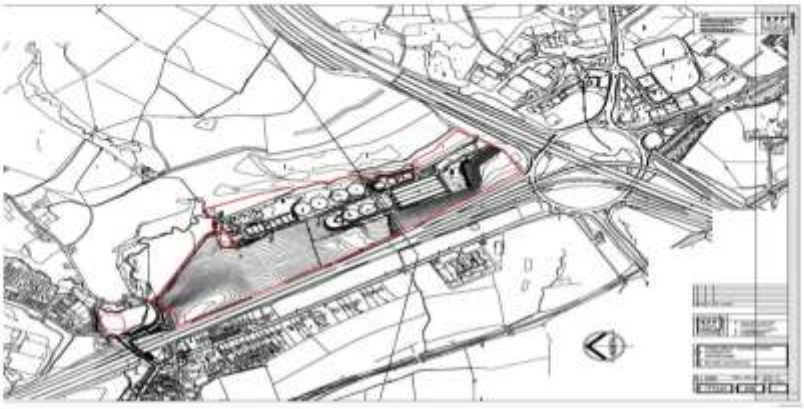


Figure 3.1: Site location plan

3.6 Junction 26 (Chainbar) of the M62 motorway runs immediately south of the development site. The M606 motorway, which connects Bradford in the north to the M62, runs to the west of the site. The M606 motorway is generally raised above surrounding land levels on an embankment, and crosses Mill Carr Hill Road on a bridge.

3.7 There are agricultural fields and woodlands (including Hanging Wood) to the east and north east of the Application Site. Beyond the M606 motorway to the west is agricultural land, Cleckheaton Golf Course and the settlements of Oakenshaw (Kirklees District) and Low Moor (Bradford District). Beyond the M62 to the south and south east are the settlements of Hunsworth and Cleackheaton as well as agricultural fields.

3.8 Within the wider context of the site are a number of established industrial sites including: the Euroway Trading Estate to the north in Bradford; Low Moor chemical plant to the west in Bradford; and West 26 to the south in Cleckheaton.

3.9 The nearest settlement is the Lower Woodlands area of Oakenshaw which is opposite Woodlands CofE School and circa 400m to the north of the former WWTW. This settlement lies within the Bradford District and comprises circa 100 dwellings primarily located off Mill Carr Hill Road to the north, and a number of individual houses and farms located on Cliff Hollins Lane. The residential properties off Mill Carr Hill Road vary in age and style from Victorian terraced properties to detached houses constructed in the last 20 years, generally accessed via estate or private roads.

3.10 Woodland Church of England Primary School lies on the western side of Mill Carr Hill Road, and is separated from the M606 by the embankment and an area of woodland.

3.11 To the west of the site access for the former WTWW are the three pairs of semi-detached bungalows on Cliff Hollins Lane, with a shared parking area off Cliff Hollins Lane. These are the nearest residential properties to the Application Site.

3.12 Oak Mills is located on Cliff Hollins Lane to the north of the former WTWW access. Oak Mills comprises circa 1.9ha of industrial land including a disused modest mill building and various outbuildings. The remainder of properties on Cliff Hollins Lane are detached or farmsteads (including a horse riding school) set within the wider landscape and with access directly from Cliff Hollins Lane.

3.13 The topography in this area is characterised as rolling with some steeply sided hillsides. The site is low lying, settled between the motorway and the wooded hillside of Hanging Wood to the east. The site is located at between 90 and 110m Above Ordnance Datum (AOD). The development site lies within the valley formed by Hunsworth Beck which runs from the north west to the south east. Hunsworth Beck is a deeply incised, narrow water course within the woodland edge along the eastern site boundary. This is joined by Cockleshaw Beck that runs from Chatts Wood

3.14 The development site is not within a national landscape designation. There are no statutory heritage assets within the development site, or conservation areas covering the site.

3.15 Hunsworth Beck forms the eastern site boundary.

3.16 Hanging Wood lies adjacent to the eastern boundary of the former WWTW site and is not a statutory designation but is identified by Kirklees Council as a "Site of Wildlife Significance"



Figure 3.2: Aerial Photograph of the Application Site Outlined in Red

Application Site

3.17 The site as a whole lies in the Green Belt and the outer consultation zone for the hazardous installation at Wyke

Former WWTW and agricultural land

3.18 The former WWTW is accessed from Cliff Hollins Lane to the north of the site, which is, in turn, accessed from Bradford Road (Junction 26 of the M62).

3.19 The site was closed in 2011 as a functioning waste water treatment works for South Bradford. Within the site are the remains of the decommissioned settlement tanks and filter beds, as well as access roads. Whilst the site has been decommissioned, Hunsworth Beck remains as an outfall route for clean water and therefore Yorkshire Water has recently installed new equipment within a small part of the site. This equipment is outside of the development site as it will be retained in operational use.

3.20 **Table 3.1** below outlines the main buildings and structures that are currently on site.

Table 3.1: Existing Site Structures

Type	Location	Footprint (m^2)	Height (m)	Volume (m^3)
Building 1	Above ground	391	7.25	2,835
Building 2	Above ground	436	7.81	2,453
Tanks	Above ground	27,250	-	16,000
Tanks	Below ground	(included above)	-	4,000

Type	Location	Footprint (m^2)	Height (m)	Volume (m^3)
Hard standing	Above ground	8,255	-	-
Total	**-**	**-**	**-**	**25,288**

3.21 The former WWTW site is generally level with a slight fall towards the south boundary, and lies between 90m and 96m AOD. The agricultural land to the west, adjacent to the M606, is around 100-110m AOD. The site is brownfield and there is evidence of former coal mining, however the site is not considered to be heavily contaminated.

3.22 This brownfield site area of the site comprises circa 11ha. The site is contaminated following its previous use and from coal mining. However, the level of contamination is not heavy or extensive across the site.

3.23 Power lines cross the site in an east/west direction about a third of the way up the WWTW site from the south. There is also a high pressure gas pipeline which enters the site to the north of Hanging Wood and cuts diagonally through the site to the south west boundary, where it leaves the site to the north of the power line.

3.24 A public footpath passes through the northern access to the WWTW into Hanging Wood.

3.25 Immediately to the west of the WwTW is circa 11.95ha of agricultural land. This land rises in level from the access road to the WwTW towards the M606 in the west. The highest point is in the north west.

Field opposite Woodlands School, Mill Carr Hill Road

3.26 That part of the development site proposed for the new school car park is currently a green field, southern part of which is damp pasture. Hunsworth Beck runs along the southern boundary of the field, and lies outside of the development site. The site levels drop from Mill Carr Hill Road on the west to the south eastern corner.

3.27 A row of Victorian terraced residential properties lie on the northern boundary of the site, with residential gardens in the north eastern corner.

4. Proposed Development

4.1 This Chapter of the ES describes the Proposed Development. Details of the programme of works are included within this Chapter as far as they are known as this stage. Detailed consideration of effects during the construction and proposed mitigation measures are provided in each relevant Chapter of the ES.

4.2 This Chapter should be read in conjunction with the application drawings including Parameters Plan and Indicative Masterplan, the Transport Assessment and numerous technical reports provided as technical appendices. All matters other than means of access are reserved for subsequent approval and hence much of the detail will come forward at a later stage.

Description of Development

4.3 Outline Planning permission is sought for:

Re-development of former waste water treatment works following demolition of existing structures to provide employment uses (Use Classes B1(c), B2 and B8) and residential use (Use Class C3) on land off Cliff Hollins Lane and provision of a school car park for Woodlands Primary School on land off Mill Carr Hill Road (outline application – all matters reserved).

Development Parameters

4.4 It is standard practice with outline planning applications to establish a set of development parameters to both guide the development and to aid the assessment of effects. This approach ensures that the future development does not exceed what has been assessed in the ES.

4.5 The Development Parameters in this case on the Parameter Plan (as **Figure 4.1)** and are defined as:

- Distribution of land uses
- Maximum floorspace for industrial units
- Maximum residential numbers
- Buildings heights
- Vehicular access locations



Figure 4.1: Parameters Plan

4.6 An Illustrative Masterplan has been prepared which demonstrates how the Development Parameters can be accommodated on the site (**Figure 4.2**). However, the Illustrative Masterplan is entirely illustrative, and reflects how one potential outcome in line with the maximum parameters.

4.7 The KMBC development plan identifies the possible line of improvements to the Chainbar roundabout (Junction 26 M62). The parameters Plan ensures that the developable area takes this possible alignment into account.

Distribution of Land uses

4.8 The distribution of uses is shown on Parameters Plan **Figure 4.1.**

Table 4.1 Development Parameters

Area (Net)	Use	Max Floorspace	Max Height
9.94	Employment Zone 1	14,865 sq m	18m AGL
	Employment Zone 2	11,613 sq m	18m AGL
	Employment Zone 3	11,613 sq m	18m AGL
3.25	Residential	101 units	9m AGL
0.356	School Car Park	36 spaces	-
	Drainage Attenuation Ponds		
	Residential area	2125m3	

	Employment area	6235m3

4.9 The parameter plan confirms the dominant land use as employment with residential use (including infrastructure, parking and associated landscaping). The proposed car park for Woodlands CofE School is also identified on the Parameter Plan, **Figure 4.1**.

4.10 Structural landscaping is provided on the site boundaries providing an appropriate separation distance from the motorways and other adjacent land uses. Balancing ponds are also identified.

Building heights

4.11 The proposed building heights are shown on Parameter Plan in **Figure 4.1.** In particular, there is reference to maximum building heights reflected in metres above the proposed ground level. The employment units are identified as being a maximum 18m in height, whilst the residential units would be a maximum 9m in height.

4.12 The height in metres in considered as a maximum, and allows for chimney heights etc., It is likely that final completed storey heights would actually be below this height and there will be variety within the zone. However, for the purposes of a fully robust assessment, a maximum height is given.

Location of Access

4.13 Full details of the means of access are to be reserved for later approval. However, the PP defines the location of the access from Cliff Hollins Lane, reflecting the existing line of the access to the former WWTW. The location of access to the new school car park will be from Mill Carr Hill Road, opposite Woodlands CofE School.

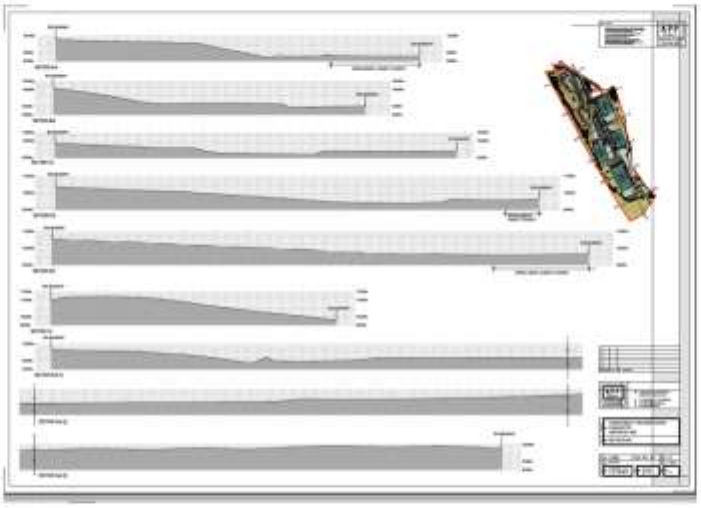
Site Levels

4.14 The proposals also include the creation of building plateaus in order to provide level areas for building. The Site Sections and Plateau Plan below show how the levels would be provided on site.

Figure 4.2: Plateau Plan



Figure 4.3: Site Section Plan



Construction Phasing

4.15 At this stage in the project, no detail is known on construction programme or phasing. However, for the purposes of modelling (particularly in respect of transport), it is assumed the development will be commenced in 2018, after the submission and determination of reserved matters application (s) and will be completed by 2026.

4.16 The general approach to the construction will follow these principles:

1. Establish a site compound
2. Demolish existing structures and buildings, and stockpile the materials for reuse
3. Site remediation
4. Site regrading to create development plateaus including temporary drainage provision
5. Access road and servicing plots and advance landscaping
6. Construct buildings in line with market demand

5. Consideration of Alternatives

5.1 This Chapter of the ES considers the need for the development and the alternatives that the applicant has considered.

Legislative and Policy Context

5.2 Notwithstanding this Schedule 4, Part 1(2) and Part 2(4) EIA Regulations 2011, which specifies the information to be included in an ES, explains that an ES should contain an outline of the main alternatives studied and an indication of the main reasons for the applicant's choice, taking into account the environmental effects.

5.3 The EIA Regulations are supplemented by national Planning Practice Guidance (PPG). This guidance acknowledges that it is not always necessary to consider alternatives; however, where alternatives have been considered, paragraph 4 part II of Schedule 4 requires the applicant to include an outline of the main alternatives considered and the main reasons for their choice in their ES.

Requirement and Need for Development

Employment

5.4 The Applicant has identified an urgent need to deliver new employment floorspace in the short term within Kirklees. This need is required to meet the latent requirement for Use Class B1 (C) B2/B8 floorspace within the M62 corridor.

5.5 Due t6o the very constrained nature of BMDC no sites have been identified in the District that would serve the identified need close to the M62 Corridor

5.6 In identifying this need the Applicant has reviewed the following documents:

- Leeds City Region Local Enterprise Partnership (LEP) Strategic Economic Plan (SEP) (May 2016) (Ref 5.1)
- Kirklees Council's statutory adopted Unitary Development Plan (UDP) (1999) (ref 5.2)
- Kirklees Council's emerging Local Plan (Ref 5.3)
- Kirklees Council's emerging Local Plan evidence base including the Kirklees Economic Strategy (KES) (Ref 5.4)
- Kirklees Council's emerging Local Plan technical paper on employment land (Ref 5.5)
- Market research prepared by Dove Haigh Philips **(Technical Appendix 5.1)**

Leeds City Region

5.7 The Leeds City Region LEP SEP sets a framework for achieving economic growth and identifies advanced manufacturing as a key industrial sector. The SEP's (Ref 5.1) ambition for 2036 is to have increased the region's economic output by £3.7billion and have created 35,700 jobs with a zero NEET level. To support this ambition, the SEP also identifies an objective of doubling house building and securing transformational improvements to connectivity.

5.8 The SEP identifies a number of employment growth priority areas including Cooper Bridge and Lindley Moor in Kirklees. In addition, the SEP identifies a Mixed Use site at Chidswell also in Kirklees.



Figure 5.1: Extract from LEP SEP Spatial Priorities

Kirklees Council Policy

Adopted Policy

5.9 The Kirklees Council's statutory adopted Unitary Development Plan 1999 (as saved) (UDP) (Ref 5.2) allocates land for employment purposes up to 2006. The Council is currently preparing a new development plan, however, this has been delayed and a new plan allocating sites is not expected to be adopted until late 2017. Until a new development plan is adopted, the only employment sites identified in a statutory development plan are those which were originally identified over 20 years ago, when the current allocations were originally assessed and adopted.

5.10 In the 17 years since the current allocations were adopted, there has been a significant change in the economy, land availability and market requirements. As a consequence

many of those sites allocated in the Kirklees UDP which have not been developed are not in the correct locations or of a size appropriate to serve the growing manufacturing and logistics economy in Kirklees and the wider M62 corridor.

5.11 The UDP identified employment land sufficient to meet expected land requirements up to 2006. The sites that remain allocated but undeveloped equate to approximately 2 years employment land need, of which the better quality sites suitable for the advanced manufacturing sector equate to less than one years' supply.

Emerging Policy and Evidence Base

5.12 The Council commenced preparation of a Core Strategy to provide an up to date planning policy for the Borough. This document sought to allocate the Application Site for employment purposes. However, this document was subsequently withdrawn in 2013 due to the need for further evidence in relation to housing requirements.

5.13 Following the withdrawal of the draft Kirklees Core Strategy, the Council started to prepare a new Local Plan (Ref 5.3). This new Local Plan seeks to allocate the majority of the application site for employment purposes. The evidence base to this new emerging development plan includes the Kirklees Economic Strategy (2014) (KES) (Ref 5.4) and the Employment Needs Assessment Technical Paper (November 2015) (Ref 5.5).

5.14 KMBC's KES notes a sub-regional strength in advanced manufacturing, but also found corresponding challenges, including low economic output, poor skills and high unemployment. This sector currently provides 25,000 jobs equating to 17% of jobs in the Borough.

5.15 Growth in advanced manufacturing is considered to be the primary opportunity to reverse these challenges. It seeks to unlock £500million of additional GVA and increase investment, innovation, exports and embedded local supply chains. The document links the supply of good quality accessible land with the achievement of this economic growth.

5.16 The KES recognises that the advanced manufacturing and engineering sector is important to the economy in the adjacent districts of Bradford and Calderdale. Furthermore, in paragraph 4.3 it seeks to increase job growth in this sector to twice the rate of the wider economy, targeting the creation of 3,500 jobs by 2020.

5.17 Para 5.1 of the KES advises that creating a M62 manufacturing hub linking the supply chains, inward investment, exports and innovation and developing strategic employment sites with a focus on engineering and manufacturing will stimulate growth.

5.18 A key component of supporting economic growth is identified as ensuring that there is a good supply of high quality employment land in accessible locations to meet the districts business requirements, paragraph 8.1 of KES.

5.19 The Technical Paper on Employment Needs Assessment (2015) (Ref 5.5) seeks to support the KES target of achieving 75% employment in the District, primarily through focussed growth in the engineering and manufacturing sector.

5.20 This Technical Paper confirms an objectively assessed need for jobs as 32,200 FTE resulting in a land requirement of 265ha. The Technical Paper concludes that taking into account completions, commitments, flexibility allowance and potential windfall, and existing UDP allocations, and locational requirements of specific sectors the new Local Plan will seek to identify 148ha of new employment land.

5.21 Between November 2015-Feburary 2016 KMBC consulted on a new Local Plan. This included a Strategy and Policies Plan setting the overall scale and location of development, and an Allocations and Designations Plan, which is aimed at identifying sufficient land to meet the boroughs development needs. The Allocations and Designations Plan identifies the Application Site as a potential employment site, reference E1985.

Local Policy Summary

5.22 There is a latent requirement for land for manufacturing and associated distribution sectors in the North Kirklees area where there is good access to the motorway network and skilled workforce. Furthermore, the Council's ambition to increase GVA and employment opportunities supports the need to release land to meet the land requirements of these sectors.

5.23 The need for employment land has been unmet for a considerable number of years as the UDP allocated land up until 2006, now some 10 years ago. KMBC has tried to resolve this issue through the preparation of a Core Strategy, however, this document did not progress further delaying the identification of appropriate sites and constraining the market.

5.24 More recently, KMBC has consulted on a new Local Plan which seeks to set the locational strategy and identify suitable sites. This Plan is at the early stages but does recognise the need to identify employment sites capable of meeting the manufacturing and distribution sectors. Importantly, the Local Plan also recognises the locational advantages and opportunities the Application Site represents.

5.25 In this context it is concluded that there is a need for an early release of land to meet economic development needs in the short term.

Market Demand

5.26 Market research prepared by Dove Haigh Philips **(Technical Appendix 5.1)** advises that strategic warehouse and distribution occupiers will seek market terms for the occupancy based on the following key criteria:

- Proximity to affordable labour pool and markets
- Strong communication links for goods/HGV's and workforce, and access to motorway networks
- A high profile environment including proximity to similar quality property and efficient infrastructure and naturally advantageous topography and security

- An efficiency of design to embrace new technologies with full consideration given to the cost of operation for more factors influencing occupation and function of the property
- The initial cost of the development and/or ongoing operational costs
- Certainty of delivery (timing)

5.27 In addition to these key criteria, these occupiers also have requirements for the specification of the building which include:

- Minimum eaves height of 9 metres
- Dock loading doors commensurate with the site of the unit
- A number of level access doors in addition to the dock loading doors
- 50 Kn er sqm floor loading
- High bay lighting, heating and sprinkler systems
- Yard depth of 40metres/50metres
- Site density layout of 40% footprint cover

5.28 Dove Haigh Philips also report on the historical and current market and supply of sites in Yorkshire. In particular, they comment on the historical success of high quality developments in West Yorkshire along the M62 around junctions 31 and 31 Normanton and Castleford, as well as the top of the M1 at its intersections with the M621 motorway close to Leeds city centre as well as the M1 Aire Valley. There are also a number of key locations in South Yorkshire, particularly Junction 34-35 of the M1 at Sheffield, Junction 4 and 6 of the M18 at Doncaster and the more recent significant i-Port proposals at junction 3 of the M18.

5.29 They acknowledge that following an oversupply of premises for the warehouse and distribution sector in the West Yorkshire area during the recession, there is now a growing demand by occupiers looking to relocate or expand and a reducing supply of large scale premises (ie over 50,000sq ft, 4645sqm). As a consequence, rental values and capital values are returning to levels, which can support development.

5.30 Dove Haigh Philips also advise that in order to ensure the market requirements are met there needs to be an adequate supply of development land which can meet the requirements set out in paragraphs 5.26 and 5.27 above.

Need for Residential Development

5.31 The proposed development includes up to 101 new homes.

5.32 The Local Plan technical paper on housing identifies a need for 1,630 homes per annum for the period 2013-2031. Taking into account houses already delivered, extant permissions and allowances for windfalls and losses, the paper calculates that

allocations need to be made for 19,833 new homes for the plan period, The draft plan (Ref 5.3) includes sites in the Green Belt which are being released in order to meet this requirement.

5.33 Therefore, it is clear that there is a general need for more housing in the wider area.

5.34 However, the key reason the residential development is proposed on this site, rather than an alternative, potentially non-Green Belt, site is that it is required to ensure that the employment development is viable.

5.35 Sections 5 and 7 of this report show how the scheme has evolved in order to respond to its viability challenges. The housing element of the development is needed in order to ensure the delivery of the employment development, for which there is a clear and pressing need identified above.

5.36 It is notable that this viability issue has arisen on two other key employment sites. Both of the enterprise zone sites at Lindley Moor and Mirfield have high proportions of housing development included in order to secure viable employment development. This therefore appears to be a factor inherent in values in the area. The application site also has greater challenges in terms of demolition and remediation costs which are abnormal and require additional funding in order to create a suitable development platform.

5.37 The housing elements of the development are therefore not proposed as a standalone development, which requires justification in its own right. Rather, it is inherent in the delivery of the much needed employment development and therefore a necessary element of the scheme if the site is to deliver the jobs and investment which it has been identified for in the emerging plan.

Need for Car Park Development

5.38 The application also proposes a new car park, which also sits in the Green Belt in Bradford District. This has been included as issues were raised during public consultation around road safety and the vulnerable nature of some road users in the area,

5.39 The car park has been provided to serve the Woodlands C of E Primary School. The school currently has no car park for use by parents to drop off / pick up. The frontage of the school is protected by “keep clear” markings and single yellow lines which prohibit parking at school opening and closing times.

5.40 Parent parking is undertaken on street along Mill Carr Hill Road and Cliff Hollins Lane. High levels of parking from the school gates, back past the M606 overbridge have been observed. Similarly, parking most of the way down Cliff Hollins Lane, almost to the proposed site access point has been observed.

5.41 This results in children walking along Mill Carr Hill Road and also crossing the road from Cliff Hollins Lane to Mill Carr Hill Road.

5.42 Once the development is complete, the composition of traffic using these two roads will change, increasing the number of HGVs. It is considered that this will increase the risk

of conflicts between development generated traffic and vulnerable road users. Public consultation feedback, including consultation with the school Governors and Head Teacher, has also suggested a concern that this change would increase the risk of accidents.

5.43 The options to reduce this risk were to provide a car park or to extend parking restrictions and provide new crossing points. The option of increasing the level of parking controls was not considered appropriate for the following reasons:

- There is a lack of alternative suitable location for parent parking, should they be displaced from the current on street locations;
- Displacing parent parking could create unexpected issues elsewhere on the network;
- The nature of the vulnerable users is that they can be impulsive which increases the risk profile of retaining road crossings;
- The provision of a car park is safer.

5.44 It is concluded that the car park option is a preferable means of managing the potential conflict between school children and HGVs.

5.45 The car park is therefore needed to ensure that the development does not increase the risk of accidents in the vicinity of the site by removing vulnerable road users from the routes that would be used by HGVs destined for the site.

Alternatives

5.46 When considering alternatives it is important to consider the following three scenarios:

- Do nothing
- Alternative locations/sites
- Alternative schemes on the Application Site.

Do nothing scenario

5.47 It is clear from a review of the City Region and local policy that there is a clear ambition to increase GVA and employment opportunities for the population. It is also clear from the evidence base to the emerging Local Plan (Ref 5.3-5.5) that there is not sufficient land currently allocated or committed to achieve these aims. It is therefore imperative that new employment sites are brought forward to enable the advanced manufacturing and associated distribution sectors to grow.

5.48 The "do nothing" scenario would not achieve the ambitious economic growth plans identified by the Leeds City Region or KMBC, indeed it would further stifle economic growth. It is considered that the "do nothing" scenario should not be progressed.

5.49 In addition, the "do nothing" scenario would not secure redevelopment of the Application Site, which is partly brownfield. Following the decommissioning of the WWTW the

majority of the site has been vacated, with the existing structures and buildings remain in situ. Redeveloping this site would remove the need to develop a completely greenfield site as well as secure the remediation of the Application Site. In addition, redeveloping this brownfield site provides the opportunity to remove the former WWTW structures and bring the site back into beneficial use.

5.50 The "do nothing" scenario is not being progressed further.

Alternative Sites

5.51 Having identified a requirement for good quality employment land to serve the advanced manufacturing and distribution industries, it is necessary to consider the industry requirements which will dictate where the land will need to be provided. Advice from Dove Haigh Philips confirms that the following criteria are key:

- Close proximity to labour force and market
- Good communication links via motorway junctions;
- Good quality design building design (min 9m to eaves, dock loading and level loading, etc) using latest technology;
- Certainty of delivery; and
- Attractive environment[1].

5.52 The Applicant's next step was to identify sites within the Kirklees area and along the M62 corridor, which meet these criteria. Specifically, consideration was given to those sites identified by the following documents:

- Kirklees Council's UDP 1999 – undeveloped but allocated employment sites
- Kirklees Council's Draft Local Plan Site Allocations (November 2015) – proposed employment allocations
- Site visit to the area by the Applicant

5.53 It should be recognised that when considering alternative sites, that due to the substantial requirements for additional employment land in Kirklees and the wider area more than one site will be required to meet all the employment land needs of district and wider area. The Application Site will form part of a network of sites aimed at meeting the requirements of the manufacturing and distribution sectors.

5.54 The Employment land requirements of Kirklees and the wider city region requires a significant provision of employment land capable of providing the size of units required. Disaggregating the Proposed Development would not need this identified need.

5.55 The Applicant has reviewed four Primary Employment Areas which were considered by Kirklees Council to have the potential to provide 'windfall sites' in the coming years. These sites include:

[1] Taken from Para 6.19 of Employment Technical Paper, presented in bullet point form

- Site B&S3 (Oakwell Industrial Park, Centre 27 Birstall, 63.41ha) is proximate to the M62 / M621 and has a vacant site with potential for a separate access onto an estate road. However, it is at the rear of the park and is only 2.3ha in size (circa 10% of the Proposed Development). At 40% site density it could accommodate a unit of roughly 100,000sqft (around 10,000sqm), although it is triangular in shape which would limit site efficiencies considerably, meaning that a smaller unit would only be achieved in reality. This is an example of a good available site, in a modern context within the PEA. It could feasibly serve local expansion needs but its contribution would be limited and in line with the normal performance of the employment market in Kirklees. It has been on the market for some time.

- Site B&S11 (West 26 / Stubs Beck Lane, Cleckheaton, 11.56ha) is in an excellent and high profile location, at the junction of the M62 and M606, on relatively flat land with good access to markets and a labour force. This would meet the locational requirements set out in the agent's survey undertaken as part of the plan evidence base. However, there is currently no accessible land within the PEA boundary which could accommodate new development. There is landscaping and scrubland between the built development and the motorway junction roundabout which could feasibly accommodate additional development, but it would need to be accessed through either existing development or directly off a busy roundabout with a sub-optimal access arrangement (eg a left in / left out only access). This land has also been visible to the market for some time.

- Site HUD5 (Mamas & Papas, Colne Bridge, Leeds Road, 6.25ha) is in a good location, just off Leeds Road with good access to the M62 via Cooper Bridge. There is vacant land in two areas: one within the curtilage of one of the Mamas & Papas buildings between the warehouse and car parking, which is only really suitable for a very small scale extension, more car parking or some smaller ancillary building associated with the existing operation. The second area is roughly square and around 1ha in size. At 40% site density, this could accommodate a 4,000sqm/43,000sqft building. Again, this is a small building in a good and well-known location. However, similar to the sites above, it is clearly not adequate to deliver the kind of step change in offer which is needed to transform the market.

- Site B&S1 (Grange Road Industrial Estate, Batley, 14.22ha) is removed from the motorway network but has moderate access to the M1 Motorway via Ossett in Wakefield District. It has one vacant area which is roughly rectangular and bounded to its east and west by industrial development and its north and south by residential development. It has no road frontage but there is a dirt track which runs between Mill Forest Way and Fort Ann Road, which is not suitable for vehicular access. This site is 0.65ha and at 40% site density could accommodate a building of around 2,600sqm/28,000sqft. Given the access constraints, this building capacity could only feasibly be used as an extension to the adjacent building. Again, this theoretical hectarage could only serve a local/churn-based need.

5.56 All four PEA sites are in good locations to serve the market. However, these are established locations which are well known to the market and offer only very limited

opportunities for new buildings of the size required by the market. Importantly, many of the sites are constrained, small and in remnant locations which may be attractive for existing businesses expanding but not attractive to new companies looking to relocate. The ability of the PEA sites to be brought forward is also debateable, given their long standing presence in the market and lack of historic interest.

5.57 A number of other potential sites have been identified and reviewed by the Applicant. These can be categorised as follows:

- Committed Sites: Slipper Lane; Lindley Moor
- Draft Local Plan – Strategic Sites: Cooper Bridge; Chidswell
- Draft Local Plan – Proposed Allocations: A58/M606, Cleckheaton; Application Site
- Other potential sites: Howden Clough Road; Whitehall Road, Hunsworth; Bradford Road/Sykes Lane; Oakenshaw Lane; Brighouse Road/Ainley Top; land to rear New Hey Road, Mount.

5.58 When considering the suitability, viability and deliverability of each site it was necessary to consider the environmental constraints, physical constraints and planning constraints. The first step is to review the sites constraints; the results are summarised in **Table 5.1** below.

Table 5.1 Summary of key environmental constraints of alternative sites

Site	Hectares (Employment)	Current use and Status in Plans	Environmental Constraints
Committed Sites			
Slipper Lane, Mirfield	1.7	Agricultural fields - greenfield Draft Local Plan (MX1929 – mixed use) UDP Employment Allocation (B9.2) planning permission granted (ref 2014/90688)	Flood zone 1; no landscape or ecological designations on the site; high risk of mining area; no listed buildings or conservation areas; nearest residential properties on Sunny Bank Road and Sunny Bank Drive.
Lindley Moor	15.7[2][2]	Agricultural land - greenfield Draft Local Plan	Flood zone 1; power lines cross the site; no landscape or ecological

[2] Based on 62,964sqm using formula in footnote 2

Site	Hectares (Employment)	Current use and Status in Plans	Environmental Constraints
		(MX1911) – mixed use UDP Employment Allocation (B8.1) Outline planning permission granted (ref 2014/93136)	designations on the site; agricultural land grade 4 (low); high risk of mining area; no listed buildings or conservation areas; nearest residential properties on Sunny Bank Road and Sunny Bank Drive.
Local Plan Strategic Sites			
Chidswell	303	Agricultural land – greenfield. Draft Local Plan (ref MX1905) – mixed use UDP allocated Green Belt	Flood zone 1; Grade 3 agricultural land; UK BAP4 priority habitats on the site; potential archaeology significance on part of the site; high risk mining area; public rights of way cross the site; residential dwellings on the site boundaries; no listed buildings or conservations on or near to the site.
Cooper Bridge	46.83	Agricultural land and former Waste Water Treatment Work – part greenfield /brownfield, Draft Local Plan (E1832) – employment UDP - part Green Belt and Unallocated Urban land	Flood zone 1; high pressure gas main through the site; no landscape or ecological designations on the site; high risk mining area; UK BAP Priority Habitat for Lapwing; no listed buildings or conservation areas; public rights of way cross the site; residential properties circa 300 m east.

[3] Calculated on the basis of 122,500sqm as per draft site allocation. Formula: sqm / 0.4 (to give 40% site density) / 10,000 = Ha

[4] UK BAP priority habitats cover a wide range of semi-natural habitat types, and were those that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP 2016).

Site	Hectares (Employment)	Current use and Status in Plans	Environmental Constraints
Draft Local Plan Sites Proposed Allocations			
A58/ M606, Cleckheaton	24.57	Agricultural land - greenfield Draft Local Plan (E1831) – employment. UDP Green Belt	Flood zone 1; high pressure gas main through the site; TPO on site; in outer zone of a hazardous material facility; part of site in coal mining area; grade 3 agricultural land; no landscape or ecological designations on the site; no listed buildings or conservation areas; potential for archaeological interest; public rights of way cross the site; nearest residential properties on Whitechapel Road.
Application site	9.94	Disused water works, brownfield Draft Local Plan (E1985) – employment UDP Green Belt	Part of site within Flood Zone 2 and 3a; non-agricultural land rating; within the outer zone of a hazardous material facility; no valuable habitats on the site; site affected by overhead power lines; part of the site is within a Coal Mining Area.
Other Potential Sites			
Howden Clough Road	Approximately 17	Open green fields – greenfield Unallocated in	Flood zone 1; Grade 2 and 3 agricultural land; habitat for Arable Assemblage

Site	Hectares (Employment)	Current use and Status in Plans	Environmental Constraints
		emerging Local Plan UDP Green Belt	Farmland Birds; Grey Partridge; Lapwing and Tree Sparrow; The site slopes steeply; largely wooded with extensive areas of deciduous woodland; crossed by other head pylons; public rights of way cross the site; Access to the motorway would need to be achieved through the existing Industrial Estate, via Nab Lane, Pheasant Drive and the A62;residential dwellings on the site boundaries, no listed buildings or conservations on or near to the site.
Whitehall Road, Hunsworth	Approximately 19	Agricultural land – greenfield Unallocated in emerging Local Plan UDP Green Belt	Flood zone 1; Grade 3 sloping agricultural land; Habitat for Lapwing; public rights of way cross the site; to avoid taking access through a residential area, access would be needed directly off the A58; adjacent to approximately 74 houses on its western edge; Grade II listed barn on site, two Grade II listed buildings adjoin site in nearby residential area. Not in a Conservation Area.
Bradford Road/Sykes Lane	Approximately 16	Open green fields – Greenfield Unallocated in emerging Local Plan UDP Green Belt	Flood Zone 1; Grade 3 agricultural land; tree sparrow habitat; Approximately 40 residential dwellings bound the site to the east along Bradford Road and Sykes Lane and to the north along Wyke Lane; Access would need to be taken either from Sykes Lane, which is narrow and shared by several dwellings, or directly from Bradford Road;

Site	Hectares (Employment)	Current use and Status in Plans	Environmental Constraints
			No listed buildings on site (three Grade II listed buildings to the north of the site on Wyke Lane), not in a Conservation Area.
Oakenshaw Lane	Approximately 16	Open green fields – Greenfield Unallocated in emerging Local Plan UDP Green Belt	Flood Zone 1; Grade 3 agricultural land; tree sparrow habitat; nearest residential dwellings are located c.70ms north along Wyke Lane; no listed buildings, not in a Conservation Area.
Brighouse Road/Ainley Top J24 M62	Approximately 7	Open green fields - Greenfield Unallocated in emerging Local Plan UDP Green Belt	Flood Zone 1; Grade 4 agricultural land; part of the site accommodates overhead pylons; Part of the eastern area of the site slopes steeply, difficult to re-grade without moving the pylons; no landscape or ecological designations on the site; close proximity to scheduled monuments; residential dwellings are located c. 90m north west of the site; no listed buildings, not in a Conservation Area.
Land to rear New Hey Road, Mount	Approximately 11.5	Open green fields – greenfield Unallocated in emerging Local Plan UDP Green Belt	Flood Zone 1; Grade 4 agricultural land; land slopes steeply down from the houses on New Hey Road; no landscape or ecological designations on the site; access off an existing farm track, or off Rey Gate, though an existing farm; Nearby dwellings along Swan lane approximately 100m south of site no listed buildings, not in a Conservation Area.

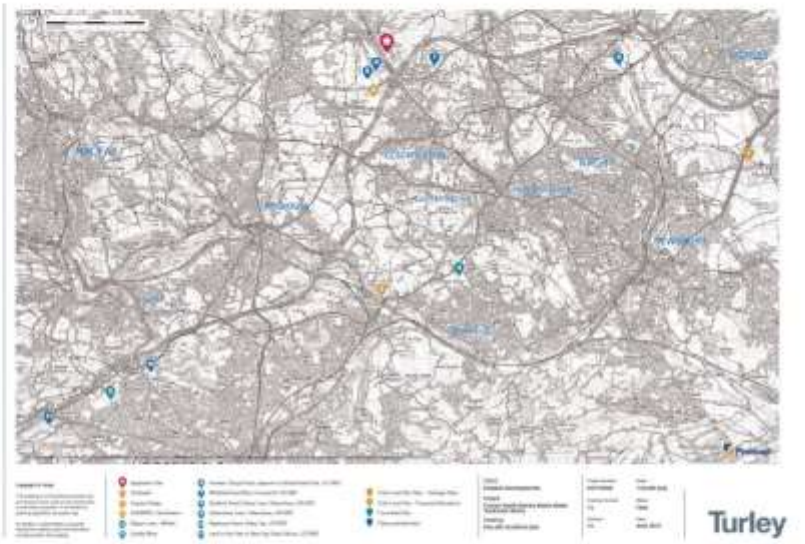


Figure 5.2 Location of Alternative Sites

Location Map

5.59 Each of the site identified in **Table 5.1 and Figure 5.2** is considered in more detail in the following paragraphs.

Committed sites

Slipper Lane

5.60 This site is a greenfield UDP employment allocation (reference B9.2). It has therefore been allocated for a considerable period of time.

5.61 The site secured outline planning permission in 2014 (reference 2014/90688). The permission provides for a mix of housing (166 homes) and employment uses (17,233sqm). The draft allocation provides for 21,382sqm of employment uses.

5.62 There are no significant environmental constraints as set out in **Table 5.1** above. Furthermore, the planning application addressed any localised environmental effects through appropriate mitigation and scheme design, and controlled through appropriate planning conditions.

5.63 The employment development has access approved, but other reserved matters are yet to be submitted. The S106 requires the following works to be delivered on the employment land, before construction of the first house on the site: delivery of site accesses, earth works to level the site, site remediation and servicing to development plots.

5.64 This will assist in marketing the site and will make it more attractive to occupiers looking for a building in the short term. This site is quite likely to cater for an element of latent demand. However, in terms of scale, the site is limited in its own right (17,233 sqm) and the size of units achievable are also limited. The illustrative masterplan shows a range of smaller units, the largest being 4,646sqm. This site will cater for smaller businesses, start-ups and businesses looking for better quality buildings or an improved environment. However, it will not cater for businesses which are in similar sized buildings already and entering a growth phase.

5.65 This site benefits from permission and commitments to deliver infrastructure works. As such, it is likely to provide a short term supply for immediate needs, at the smaller unit end of the market.

5.66 There remains a need for short and medium term opportunities for larger buildings marketed at already successful and growing businesses. This site is not considered to be a reasonable alternative to the Application Site because the site only has the potential to deliver a unit of a very limited size.

Lindley Moor

5.67 This site is also a UDP employment allocation (ref B8.1). It has therefore been allocated for a considerable period of time.

5.68 Part of the UDP allocation B8.1 (which is largely the same as proposed allocation MX1911 in the emerging Local Plan) secured planning permission in 2015. The permission was in outline for 19,510 sqm of employment development. Full permission was also sought for 252 dwellings. The scheme was subject to a S106 agreement which would secure access improvements, highways works, diversion of pylons, drainage works and cut and fill of the employment land. The inclusion of housing on the employment land was justified on the basis of higher value uses being needed to deliver the employment development.

5.69 The illustrative masterplan shows 2/3 units, one of 4,645sqm and the other(s) at 9,290 sqm+ 5,574sqm or a combined total of 14,864 sqm.

5.70 There are no significant environmental constraints as set out in **Table 5.1** above. Furthermore, the planning application addressed any localised environmental effects through appropriate mitigation and scheme design, and controlled through appropriate planning conditions.

5.71 This permission has potential to deliver in the short term and can offer a larger building for any businesses needing to expand from an already strong base.

5.72 This site also therefore benefits from permission and commitments to deliver infrastructure works. As such, it is likely to provide a short term supply for immediate needs, at the small and medium end of the market. However, based on the illustrative masterplan the site is only capable of supporting one larger building, which is a very limited supply given the weight attached to growth in advanced manufacturing and the need for large releases for land intensive logistics developments.

5.73 A proportion of the allocated site, to the east, is not subject to this permission. It is likely that this area has been excluded as it presented challenged to the development team, either from a technical or landowner perspective. If this remnant area of the site was capable of quickly being developed to meet employment needs, it is highly likely that it would have been included in the current permission area. Rather, it has been allocated for 17 years and has not come forward. Whilst it remains an area of land that should be pursued for employment development, it is not likely to deliver in the short term.

5.74 This site is not considered to be a reasonable alternative to the Application Site as it can only deliver units of a limited size and is unlikely to be delivered in the short term due to the infrastructure requirements.

Local Plan : Strategic Sites

Chidswell

5.75 The site at Chidswell is a major strategic release of 117ha of greenfield land in the green belt. However, the majority of the site will focus on delivering housing development. The emerging KMBC Local Plan envisages around 122,500 sqm (1.3m sqft) of employment floorspace.

5.76 The emerging Local Plan notes that third party land is required to deliver access. Aerial photography reveals that the eastern and northern edges of the site, which would offer the best accessibility to the motorway (M62, J28 at Tingley) are lined with residential properties. This will be a constraint not only for access, but also on where to locate the employment development within the site.

5.77 Protecting existing residential amenity, whilst avoiding creating amenity impacts for new residents on the site and placing the employment uses in the most accessible position within the site, will be a difficult balance to achieve on this site.

5.78 The site also has potential significance for archaeology, agricultural land quality and coal mining. Further investigations will be required to ensure that these issues do not affect the suitability or viability of the site.

5.79 As the site has a focus on housing, which will provide better returns and help to fund the wider infrastructure needed on the site, this may have the effect of delaying implementation of the employment areas. Whilst recognising the importance of this site for the plan period, the highways constraints and third party land issues also likely to require a reasonable lead time before development can take place. The site is unlikely to deliver meaningful employment space in the next 1-5 years.

5.80 This site is not considered to be a reasonable alternative to the Application Site.

Cooper Bridge

5.81 The site at Cooper Bridge (46ha) is a very well-located site with good access to the motorway and in the right area to benefit from proximity to businesses serving the South Calderdale – North Kirklees - South Bradford manufacturing arc. It is well placed to serve the needs of businesses which are expanding or new start-ups in the areas priority sector. It has the potential to provide exactly the kind of accommodation noted as being required, namely new premises in close proximity to the motorway and

workforce, in a high quality environment and with little congestion. This site would clearly help to meet the need identified in the supporting evidence.

5.82 However, whilst it is likely to provide for a proportion of the 44.5ha identified need for precision engineering and advanced manufacturing (B1b, B1c, B2), it will also need to provide accommodation for businesses offering support service to that sector.

5.83 Cooper Bridge is also likely to provide accommodation for logistics and distribution buildings which is related to this key growth sector and for which there is an extensive identified need in its own right. It will also be attractive to more general B8 provision, given the lack of larger flat sites at this end of the West Yorkshire conurbation. Whilst it may not be able to accommodate a larger logistics building (750,000 sqft to 1m+ sqft), it is likely to be attractive to small to mid-range requirements, particularly those businesses with links to the manufacturing arc.

5.84 These distribution uses are less dense and will therefore require more land within the overall allocation. However, such support uses are critical to the success of a well-functioning cluster of engineering and manufacturing activity. Successful businesses require efficient logistics to secure components, consolidate and assemble components and export them to the end user. Without such support the businesses in the cluster will be less efficient and therefore less attractive.

5.85 Cooper Bridge also has constraints. It is partially previously developed, but is largely greenfield and requires highways improvements to be undertaken using, in part, public funding sources. Whilst this site is recognised as being sub-regionally important, it is likely to have a reasonable lead-in time to development.

5.86 The site is also affected by a high pressure gas pipeline, and lies within a high risk mining area. These may further affect the suitability and viability of the site and will require detailed investigation.

5.87 The site is unlikely to meet an immediate employment need in the next 1-5 years due to site access constraints.

5.88 This site is not considered to be a reasonable alternative to the Application Site as it is constrained in access terms which will take some time to address.

Draft Local Plan: Proposed Allocations

5.89 There are also two employment allocations proposed for allocation in the draft Plan. These are at land at the A58/M606, Cleckheaton (24ha, Site E1831) and the Application Site at North Bierley (23ha, Site E1985).

A58/M606, Cleckheaton

5.90 This site is located just off the M62/M606 junction and, as such, is in an excellent location. It is also accessible to strong workforce in each of Kirklees, Bradford and Calderdale. This site is greenfield and green belt and whilst it is 24.5ha, an area is affected by a high pressure gas pipeline, so the developable.

5.91 This area has been estimated in the plan at 11.72ha.

5.92 This site has a number of lower level environmental constraints which should be able to be addressed through mitigation and scheme design and controlled through appropriate planning conditions. It is a high performing site in terms of the land requirement criteria and is a suitable option for release for development.

5.93 This site is well contained by the A58, M606 and existing development, albeit that the site remains in the Green Belt.

5.94 However, whilst the site is well contained by defensible boundaries, this part of the site is greenfield and thus should not be preferred for an early release over the application site. This part of the site is not considered to be a reasonable alternative to the Application Site.

5.95 In summary, part of the site can deliver a proportion of the required employment land within a reasonable timescale however, this will not meet all the requirements. The additional area is greenfield and should not be progressed ahead of brownfield sites.

North Bierley

5.96 This is the application site which is considered in this document. Clearly this does not fall to be considered as an 'alternative' and a full analysis of the site's location and characteristics is set out in the following sections of this ES.

Other Potential Sites

Howden Clough Road, adjacent to Birstall Retail Park, J27 M62

5.97 This site is approximately 17ha and is bounded by the existing Centre 27 Business Park, Norquest Business Park, Howden Clough Industrial Estate and a watercourse. It is greenfield and occupies the gap between this established industrial area and the Kirklees boundary.

5.98 However, the site slopes steeply, is largely wooded and is crossed by overhead pylons and public rights of way. Access to the motorway would need to be achieved through the existing Industrial Estate, via Nab Lane, Pheasant Drive and the A62.

5.99 This site is not considered to be a suitable release as the topography would offer a major barrier to development. This site is not considered to be a reasonable alternative to the Application Site due to the site constraints.

Whitehall Road West (A58), Hunsworth J26 M62

5.100 This site is bounded by the M62, Whitehall Road West, woodland and existing housing areas off Hunsworth Lane. It is greenfield and approximately 19ha. It is sloping agricultural land with well-established and treed field boundaries at its southern end close to Whitehall Road West. To avoid taking access through a residential area, access would be needed directly off the A58.

5.101 There is a Grade II listed barn on site and two Grade II listed buildings in close proximity.

5.102 The site is adjacent to approximately 74 houses on its western edge and, whilst the A58 is a major highway, traffic from the site would need to pass though Hunsworth to access the motorways.

5.103 This site is not considered to be a reasonable alternative to the Application Site as it is greenfield and potentially difficult to access issues.

Bradford Road / Sykes Lane, Oakenshaw, J26 M62

5.104 This site is approximately 16ha and is bounded by a disused railway embankment, houses on Bradford Road, houses on Sykes Lane and the Cleckheaton Golf Club. It is greenfield, relatively flat and well contained by existing features. It is crossed by overhead pylons.

5.105 Access would need to be taken either from Sykes Lane, which is narrow and shared by several dwellings, or directly from Bradford Road, close to Woodlands Park (a small office complex).

5.106 The site is adjacent to around 40 homes and as such has potential to cause more residential amenity issues than other equally well located sites.

5.107 This site is not considered to be a reasonable alternative to the Application Site due to its greenfield status in the green belt it should not be developed ahead of brownfield sites, particularly those more remote from residential properties.

Oakenshaw Lane, Oakenshaw, J26 M62

5.108 This site is also approximately 16ha and located immediately adjacent to site 3 above. It is greenfield and bounded by the disused railway, Oakenshaw Lane and the Cleackheaton Golf Club. It is crossed by overhead pylons. It is well contained by recognisable features and would not significantly reduce the separation between settlements in the area.

5.109 Access would need to be taken from Oakenshaw Lane. At its north, the Lane is shared with a farm, and crosses the railway cutting in a narrow cobbled bridge which is unlikely to be suitable for commercial traffic. At its south the lane is a dirt track directly accessing the A58. It would require major upgrading works to be used as an access point for commercial traffic and this would involve acquiring additional land along a considerable length of the Lane.

5.110 This site cannot achieve a suitable access, and therefore is not considered to be a reasonable alternative to the Application Site.

Brighouse Road, Ainley Top, J24 M62

5.111 This site is greenfield, with an area of approximately 7ha, and is bounded by Brighouse Road, woodland and Burn Road. It is dissected by Grimescar Road and, as a result, forms a smaller triangular area and a broadly rectangular section. It slopes gently to the south. It is crossed by overhead pylons.

5.112 The site has good accessibility to the motorway as well as access in to both Huddersfield and Halifax. It could accommodate smaller units but is unlikely to

accommodate any larger scale distribution development. It is well contained and would not reduce settlement separation distances.

5.113 Part of the eastern area of the site slopes steeply and accommodates overhead pylons, which means that it would be difficult to re-grade without moving the pylons. The remaining area is around 5.5ha. Theoretically, at 40% plot ratio, this could accommodate a building of 22,000sqm, although the need to re-grade the site to achieve a level platform would be likely to reduce the developable footprint.

5.114 Whilst this site would be capable of contributing to supply, it is quite constrained and it is notable that other sites with similar constraints at Lindley Moor have had to rely on cross subsidisation to deliver employment space. This suggests that similar market return/cost balancing issues may well exist on this site.

5.115 This site is a good potential release site, although it could only accommodate either a single moderate sized unit, or a range of smaller units.

5.116 This site is not considered to be a reasonable alternative to the Application Site as it could not achieve the size of units required to meet the market requirements.

Land to the rear of New Hey Road, Mount, J23 M62

5.117 This site is located to the rear of dwellings off New Hey Road. It would need to take access off an existing farm track, through a small gap between existing dwellings, or off Rey Gate, though an existing farm. Neither of these options is likely to deliver an acceptable standard of access.

5.118 The site is greenfield, approximately 11.5ha, and slopes steeply down from the houses on New Hey Road.

5.119 This site is not likely to be feasible to access and is also likely to have other abnormal costs associated with re-grading the site for development. This site is therefore not considered to be a reasonable alternative to the Application Site.

Alternative options

5.120 In addition to considering the potential alternative locations, the Applicant has examined a number of alternative development options for the Application Site, all of which are centred on maintaining the employment focus of the development.

5.121 In total, 14 development options were considered through the iterative process a scheme that balances the site constraints and opportunities in a viable scheme that can be delivered. As many of the schemes were very similar in nature, the main options that were considered can be summarised as follows:

Option 5

5.122 Option 5 was developed to understand the viability and deliverability of a scheme that delivered smaller industrial uses across the whole of the main site. It was developed at an early stage, while the team were still investigating site constraints and so does not fully reflect the extent of constraints which are known on the site.

5.123 The scheme provided 43,153sqm of B Class accommodation over 23.5ha (net). The units were small scale based around a spine road.

5.124 This scheme shows the maximum extent of a smaller unit development that could be accommodated on the site.



Figure 5.3 Option 5 Employment Use Only

5.125 However, this Option was discounted for a number of reasons:

- The scheme does not account for the improvement works to the M62/ M606 junction, and therefore the southern end of the site would be sterilised.
- The southern end of the site, it was since discovered, is more difficult to develop due to adverse ground conditions.
- The extent of the development had the effect of increasing site servicing costs, by requiring a spine road to run along the entire length of the site (the site is around 1km in length).
- The focus on smaller units had the effect of increasing build costs, due to the extra fit out requirements and extra materials required for dividing walls.
- Did not reflect flooding issues or other constraints

5.126 It was considered, taking into account these factors, that this scheme would not be deliverable in practical terms.

Option 8 Employment Use Only and Motorway Improvements

5.127 This scheme addressed most of the issues identified in Option 5. It provided land for the motorway improvement, reduced the extent of the development (helping with both servicing / development costs) and focussed on slightly larger units. This scheme delivered 46,358sqm of commercial floorspace on 23.26ha (net).



Figure 5.4 Option 8 Employment Use including Motorway Works

5.128 This option is not viable as the value of the site for employment use is not sufficient to support the significant costs associated with remediating the WWTW, providing the site plateaus and implementing the off-site highway improvements on Cliff Hollins Lane.

Option 13:

5.129 Option 13 was derived following a number of other options. The key changes are:

- The addition of a new School Car Park. This arose following public consultation and is a direct result of local concerns about conflicts between school children and employment traffic during school pick up and drop off times. This addition is considered necessary as it represents the safest method of ensuring that the development does not affect road safety in the vicinity of the site.
- The replacement of 9940sqm of employment space with 3.8ha of residential (up to 120 units).

5.130 These changes add in a cost to the development, in the form of the car park, but also generate additional income from the higher use value of the residential development.

5.131 The introduction of housing, whilst reducing the land available on site for employment purposes, contributes towards the overall housing supply in Kirklees and supports the viability of the employment units.

5.132 This scheme delivers 9.94 ha of employment space (net); 3.8ha of residential and a new school car park.



Figure 5.5 Option 13 Employment and Residential Development

5.133 This option was discounted as it was not viable and did not provide sufficient on-site open space for the residential.

Option 14: Proposed Development

5.134 The Proposed Development scheme includes an appropriate mix of employment and enabling residential development, whilst providing sufficient land for the highway improvements to the adjacent motorways. The school car park is included.

5.135 This scheme can deliver 9.94ha of employment land, 3.25ha of residential land as well as the school car park.



Figure 5.6 Proposed Development

5.136 The Proposed Development is considered to be the most viable proposal which addresses the environmental, the physical constraints, and the market requirements.

References

5.1 Leeds City Region Local Enterprise Partnership (LEP) Strategic Economic Plan (SEP) (May 2016)

5.2 Kirklees Council's statutory adopted Unitary Development Plan (UDP) (1999)

5.3 Kirklees Council's emerging Local Plan (2015)

5.4 Kirklees Council's Kirklees Economic Strategy (KES) (November 2015)

5.5 Kirklees Council's technical paper on employment land (November 2015)

6. Economy, Population and Society

Purpose of the Assessment

6.1 This chapter of the ES, prepared by Turley Economics, assesses the potential impacts of the Proposed Development on the local economy and population and reviews the economic impact of the Proposed Development, as well as the impacts with regards to employment, homes, education, health, open spaces and recreation facilities. It provides an overview of the relevant legislation and planning policies and methodology to the assessment. An assessment of effects follows and considers whether mitigation measures are required to prevent, reduce or offset the impact. Residual impacts are then considered.

Legislative Framework

6.2 This section provides details of the legislative framework relevant to the assessment of socio-economic effects, including policy and guidance documents.

National Policy and Legislation

Fixing the Foundations: creating a more prosperous nation

6.3 HM Treasury published 'Fixing the Foundations' (Ref 6.1) in July 2015, in order to set out the Government's ambitions to increase the productivity of the UK and secure long-term economic stability and growth across the country. This responds to a recent slowing in productivity growth, and the gap between productivity in the UK and other developed countries.

6.4 In order to grow productivity, the Government is seeking to encourage long-term investment in economic capital – including infrastructure, skills and knowledge – and promote a dynamic economy that encourages innovation and helps the flow of resources to their most productive use.

6.5 The long-term failure to build sufficient new homes to meet demand is noted within the strategy, with a view that this has harmed productivity and restricted flexibility in the labour market. An effective housing market can support economic growth, by enabling the economy to adapt to change and ensure that people can live close to where they work. New housing development, therefore, has an important role to play in securing and supporting future economic growth across the country.

Laying the Foundations: a Housing Strategy for England

6.6 In November 2011 'Laying the Foundations: A Housing Strategy for England' was published by the Government (Ref 6.2). This reinforced the intentions of the Government to ensure that the housing market supported rather than constrained the economic recovery.

6.7 The strategy also acknowledged evidence – in the form of official household projections, released by DCLG in 2010 – which suggests that household formation and growth will continue to drive demand for housing, with the cited projections anticipating 232,000 households to form per year on average in England between 2008 and 2033.

6.8 The foreword of the strategy clearly sets acknowledgement from both the Prime Minister and Deputy Prime Minister of the long-term failure of successive Governments to build enough housing to meet growing need:

"One of the most important things each generation can do for the next is to build high quality homes that will stand the test of time. But for decades in Britain we have under-built. By the time we came to office, house building rates had reached lows not seen in peace-time since the 1920s. The economic and social consequences of this failure have affected millions: costing jobs; forcing growing families to live in cramped conditions; leaving young people without much hope that they will ever own a home of their own" (Page v, Ref 6.2).

National Planning Policy Framework

6.9 The National Planning Policy Framework (NPPF) (Ref 6.3) published in March 2012, sets out the Government's statutory planning policies for England. The NPPF is built around a policy commitment to sustainable development, with the planning system expected to play an economic, social and environmental role :

"an economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure"

"a social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being"

"an environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy. (Ref 6.3, Para 7)

National Planning Practice Guidance

6.10 The NPPF is supplemented by the web-based Planning Practice Guidance (PPG) (Ref 6.4), which provides further guidance on Environmental Impact Assessment – as governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 – in order to assess whether a development would have a significant effect on the environment. Statements should primarily focus on main or significant environmental effects, with impacts of little or no significance addressed only briefly to show that they have been considered (Ref 6.4).

6.11 The NPPF and PPG make reference to the five areas of focus in this Chapter: economy; homes; education; health; and open spaces and recreation facilities.

Economy

6.12 The NPPF identifies the Government's vision to build a strong and competitive economy:

"The Government is committed to securing economic growth in order to create jobs and prosperity.

The Government is committed to ensuring that the planning system does everything it can to support sustainable economic growth. Planning should operate to encourage and not act as an impediment to sustainable growth. Therefore significant weight should be placed on the need to support economic growth through the planning system.

To help achieve economic growth, local planning authorities should plan proactively to meet the development needs of business and support an economy fit for the 21st century."(Ref 6.3)

Homes

6.13 The NPPF outlines that in order to achieve sustainable development, improvements of the built environment and the quality of life should include widening the choice and quality of homes. (Ref 6.3, Para. 9)

6.14 One of the core planning principles identified by the NPPF is to:

"Proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs." (Ref 6.3, Para. 17)

6.15 Additionally, local planning authorities should be able to deliver:

"A wide choice of high quality homes, widen opportunities for home ownership and create sustainable, inclusive and mixed communities" (Ref 6.3, Para. 50)

Education

6.16 The NPPF highlights the importance of providing sufficient education facilities and opportunities:

"The Government attaches great importance to ensuring that a sufficient choice of school places is available to meet the needs of existing and new communities. Local planning authorities should take a proactive, positive and collaborative approach to meeting this requirement, and to development that will widen choice in education."(Ref 6.3, Paragraph 72)

Health

6.17 A core planning principle of the NPPF focuses on the health of local communities, stating that plan-making and decision-taking should:

"Take account of and support local strategies to improve health, social and cultural wellbeing for all, and deliver sufficient community and cultural facilities and services to meet local needs" (Ref 6.3, Paragraph 17)

6.18 The Health and Wellbeing section of the PPG highlights that decision making should consider how:

"development proposals can support strong, vibrant and healthy communities and help create healthy living environments which should, where possible, include making

physical activity easy to do and create places and spaces to meet to support community engagement and social capital" (Ref 6.4)

Open Spaces and Recreation Facilities

6.19 Section 8 of the NPPF relates to the contribution that the planning system can make to promoting healthy communities.

"Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and well-being of communities." (Para 73, Ref 6.3)

6.20 The NPPF highlights that in order to deliver the social, recreational and cultural facilities and services the community needs, planning policies and decisions should:

"plan positively for the provision and use of shared space, community facilities (such as local shops, meeting places, sports venues, cultural buildings, public houses and places of worship) and other local services to enhance the sustainability of communities and residential environments" (Para 70, Ref 6.3).

Additional National Supporting Evidence

Planning and Design for Outdoor Sport and Play

6.21 Fields in Trust (FIT), formerly known as the National Playing Field Association (NPFA), recognises the role that outdoor recreational space plays in building healthy neighbourhoods and contributing to the quality-of life and physical, mental and emotional well-being of local residents.

6.22 FIT published the Planning and Design for Outdoor Sport and Play (PDOSP) in 2008 (Ref 6.5), which set out recommended benchmark standards for outdoor sport and play and supersedes all previous editions of 'The Six Acre Standard' published by the NPFA. The document states that quantity, quality and accessibility standards for outdoor playing space and facility provision collectively drive the amount of use of that provision, impacting on the absolute numbers participating and the number of returning visitors (Ref 6.5).

6.23 FIT has recently undertaken a review of these recommendations and in October 2015, FIT published 'Guidance for Outdoor Sport and Play: Beyond the six acre Standard' (Ref 6.6). This document identifies that the PDOSP remains a useful guidance tool and retains the same headline recommendations for provision, but it sets out new recommendations for accessibility and no longer differentiates between urban and rural areas. The latest recommended benchmark guidelines are set out in the table below.

Table 6.1: Formal and Informal Outdoor Space Standards

Type of Open Space	Quantity (hectares per 1,000 people)	Distance (walking distance from dwelling in metres)
Playing Pitches	1.20	1,200

All Outdoor Sports	1.60	1,200
Equipped / Designated Play Areas	0.25	100 – 1,000
Other Formal Outdoor Provision[5]	0.30	700
Parks and Gardens	0.80	710
Amenity Green Space	0.60	480
Natural and Semi-Natural Green Space	1.80	720

Source: (Ref 6.6)

Sub-Regional Strategy

6.24 The PPG identifies the importance of understanding needs and priorities in relation to a functional economic area, and establishes that this geographical definition may well be contiguous with the boundary of the Local Enterprise Partnership (LEP) (Ref 6.4).

Leeds City Region Local Enterprise Partnership (LEP) - Strategic Economic Plan

6.25 The Leeds City Region LEP covers 10 authority areas, including Kirklees and Bradford, and drives economic growth in the LEP area to meet both the current and the future needs of the City Region economy.

6.26 The LEP published an update to the Strategic Economic Plan (SEP) (Ref 6.7) in May 2016, which sets out the LEP vision over the period to 2036:

"To be a globally recognised economy where good growth delivers high levels of prosperity, jobs and quality of life for everyone" (Ref 6.7, Page 9)

6.27 In order to achieve this vision, the SEP highlights four headline targets to achieve by 2036:

- 35,700 net additional jobs
- £3.7 billion annual economic output
- exceed national average on high level skills and become a 'neet-free' city region
- progress on headline indicators of growth and productivity, employment, earnings, skills and environmental sustainability

6.28 The SEP centres around key growth priorities, including boosting business growth, productivity and investment, delivering more jobs and better jobs and increasing skills levels.

6.29 The LEP recognises the link between housing and economic development, with a lack of suitable and affordable homes of all sizes, in the right places can easily restricting growth. Across the LEP area, housing supply is recognised to be increasing at a slower

[5] Other outdoor provision includes Multi Use Games Areas (MUGAs) and skateboard parks (Ref 6.5).

rate than population growth, resulting in an increasing demand for homes and worsening affordability issues.

6.30 The SEP therefore sets out a headline initiative to build 10,000-13,000 new homes per annum, which will support housing and affordability needs whilst also contributing to employment and wider economic growth within the LEP area.

Kirklees Local Policy

6.31 A large part of the Application Site, proposed for residential and employment uses, lies within Kirklees District. The following review of Local Policy for Kirklees is therefore specific to these elements of the Proposed Development.

Kirklees UDP

6.32 The current statutory development plan for Kirklees comprises the 'saved' policies of the Kirklees Unitary Development Plan (UDP) (Ref 6.8) the UDP was adopted in March 1999 and as a result of a Direction issued by the Secretary of State for Communities and Local Government, from 28 September 2007 some of the policies in the UDP continue to have effect ('saved policies').

6.33 The UDP sets out a strategy that seeks to achieve a number of aims, including:

- To accommodate development and land use change to ensure that housing, employment, shopping, education, recreation, waste recycling and disposal and other facilities are commensurate with the needs and demands of Kirklees residents and business now and over the next decade; and

- To meet development needs by recycling previously developed land wherever possible, to minimise the need to develop greenfield sites. (Ref 6.8, Para 1.23)

6.34 Following these aims, the UDP identifies Policy G1, which seeks to strengthen and broaden the District's economic base, increase employment opportunities, improve infrastructure and secure the re-use of land and buildings, amongst other things.

6.35 Providing employment land is essential to strengthening Kirklees' economic base and meeting the District's employment needs. Policy B1 sets out the Council's drive to establish new businesses as an element of meeting the employment needs of the District.

6.36 The UDP also recognises the need to provide new homes to meet the needs of the District. Policy H1 seeks to achieve this by providing land for a range of house types by allocating sites of various sizes and in different types of locations, having regard to local patterns of demand.

Kirklees Draft Local Plan

6.37 Kirklees Council are in the process of producing a new Local Plan, with public consultation on the Draft Local Plan - Strategy and Policies (hereafter 'the Plan') (Ref 6.9) taking place from November 2015 to February 2016. The 2014 Local Development Scheme (LDS) (Ref 6.10) indicates that the Local Plan will be adopted in late 2017.

6.38 The Plan sets out a vision for Kirklees:

"In 2031, Kirklees will be a great place to live, work and invest in, delivered through an integrated approach to housing and employment. Development will have taken place in a sustainable way (balancing economic, social and environmental priorities) and by making efficient and effective use of land and buildings supported by necessary infrastructure and with minimal effect on the environment. Health inequalities will have been reduced, enabling higher standards of health and well-being resulting from improved access to training and job opportunities, a decent and affordable home, access to services and green spaces and opportunities for physical activity and a healthy lifestyle."(Ref 6.9, Para 3.2)

6.39 In order to achieve this vision, the Plan sets out strategic objectives to support the growth and diversification of the Kirklees economy, by increasing skill levels and employment opportunities, and to provide new homes that meet the needs of the community offering a range of size, tenure and affordability, with good access to employment, public transport, shops and services.

6.40 The Plan seeks to deliver 32,200 jobs over the plan period from 2013-31 to meet the objectively assessed jobs needs of local businesses and inward investment opportunities.

6.41 The Plan seeks to deliver 29,340 homes over the plan period from 2013-31 to meet identified needs, equating to 1,630 new homes per annum.

6.42 Through the development of a range of housing and jobs, the plan aims to address the challenge of an ageing population and to attract and retain younger age groups within the district to build sustainable communities.

6.43 Kirklees Council also consulted on the Draft Local Plan - Allocations and Designations alongside the Strategy and Policies. Within both of these documents, the Plan identifies the application site as a potential site for employment uses.

Bradford Local Policy

6.44 A small part of the Application Site, proposed for car park uses, lies within Bradford District. The following review of Local Policy for Bradford therefore identifies key economic objectives in addition to policies relevant to this particular element of the Proposed Development.

Bradford Replacement UDP

6.45 The Replacement Unitary Development Plan (RUDP) (Ref 6.11) sets out Bradford Council's policies and proposals for the use and development of land and buildings. The plan was adopted in October 2005. As a result of a Direction issued by the Secretary of State for Communities and Local Government, from 28 September 2007 some of the policies in the RUDP continue to have effect ('saved policies') and some do not as they were not saved.

6.46 The UDP highlights key objectives to provide adequate housing and community facilities to meet the district's needs and to promote economic success across Bradford

6.47 Policy UDP3 seeks new development to maintain and, where practical, improve the quality of the built and natural environment.

6.48 Policies UR2 and UR3 are permissive of developments that contribute to sustainable development and minimise adverse impacts from the development on the surrounding environment.

6.49 In respect of the highway network, Policy TM2 seeks new development not to adversely affect existing and proposed transport infrastructure. Policy D6 states that development proposals, including highway improvements, should incorporate appropriate facilities to meet the need of pedestrians and people with special needs, with the layout of proposals (amongst other things) ensuring that car parks do not deter pedestrian access and use.

Bradford Core Strategy

6.50 The emerging Bradford Core Strategy development plan document (DPD) (Ref 6.12) is in the final stages of preparation with the Main Modifications consultation undertaken from November 2015 to January 2016, following the submission of the Publication Draft to the Secretary of State in December 2014.

6.51 The Core Strategy sets out key strategic objectives to:

- ensure that the district's needs for housing, business and commerce are met in full in sustainable locations;
- provide a range of quality dwellings, in terms of type and affordability;
- promote the role of the Bradford District in the Leeds City Region economy by creating conditions for housing growth, city living and enterprise where business thrives, generating opportunity, prosperity and jobs; and
- promote and support a successful growing economy with a wide range of high quality employment opportunities, (Ref 6.12, Page 27)

6.52 Based on these objectives the Core Strategy sets out Draft Policy EC1, which seeks to create a more successful and competitive district economy, while Draft Policy EC2 supports the delivery of at least 2,897 new jobs annually in the District in the period to 2030.

6.53 Draft Policy TR2 sets out the parking policy, in particular noting that car parking should help manage travel demand, support the use of sustainable travel modes, meet the needs of disabled and other groups whilst improving quality of place, and also take a design-led approach to parking which is well integrated within the overall layout so that it supports the street scene and local character, and creates a safe and pleasant environment even in parking areas.

Assessment Methodology

Methodology

6.54 Five key factors were considered: economy, homes, education (primary and secondary level), health and open spaces and recreation facilities.

Baseline

- **Economy** - this includes analysis of economic activity, unemployment, occupations, average salaries and number of jobs. This analysis draws on sources including Census 2011 (Ref 6.13), Annual Population Survey (Ref 6.14), Jobseeker's Allowance by Occupation (Ref 6.15) Annual Survey of Hours and Earnings (Ref 6.16) and Business Register and Employment Survey (Ref 6.17).

- **Housing** – evidence on existing housing stock, housing targets, historic and future anticipated delivery rates have been analysed. Information was gathered utilising Census 2011 (Ref 6.13), Kirklees Annual Monitoring Report (Ref 6.18) and Kirklees Draft Local Plan (Ref 6.9).

- **Education** – education provision was gathered using information from the Department for Education (Ref 6.19), Kirklees School Organisation, Planning and Development for 2015-2018 (Ref 6.20), Kirklees Local Plan – Technical Paper: Infrastructure (Ref 6.21) and Bradford District Education Organisation Plan (Ref 6.22).

- **Health** – characteristics of the local population were assessed using national Census 2011 data (Ref 6.13), Public Health England's Active People Survey (Ref 6.23) and NHS information on local GP and dental surgeries (Ref 6.24).

- **Open Space** – the current provision of open space and gaps in existing provision were identified drawing on the Kirklees Local Plan Open Space Study (Ref 6.25).

Impacts

6.55 Economic impacts have been modelled using drawing on national data sets, Government guidance and details of the Proposed Development. The economic impacts of the Proposed Development are divided into demolition and construction impacts and operational impacts.

6.56 The assessment of impacts during the construction phase includes the total Proposed Development, inclusive of the proposed school car park on the smaller part of the Application Site. However, it is not anticipated that significant socio-economic effects will be derived from the operation of proposed school car park. As a result, the operational socio-economic impacts of the car park have not been assessed.

Construction Impacts

6.57 Construction impacts include construction costs and FTE (Full Time Equivalent) construction jobs supported by this spend and the uplift in GVA productivity generated through construction of the Proposed Development. In order to calculate these impacts the following methodology has been used:

- **Employment** - the total cost of construction associated with the Proposed Development was estimated using BCIS Build Cost data (Ref 6.26) which establishes the average build cost per sqm of development in West Yorkshire. The anticipated build cost associated with the proposed car park was estimated based on professional knowledge and experience, The number of employees generated was then derived from the average turnover per employee in the

construction sector in Yorkshire and the Humber, drawn from the Business Population Estimates (BPE) 2015 (Ref 6.27), which is divided by the length of the construction period to identify gross full-time equivalent (FTE) jobs. Considerations of allowances for leakage and displacement are made in line with recognised guidance (Ref 6.28) in order to calculate net FTE jobs generated by the development, and a multiplier is applied to allow for employment indirectly generated from the development during the construction phase, such as supply chain linkages or the value of contracts to local firms.

- **Productivity** - the average GVA per FTE worker is calculated using Experian local market forecasts (Ref 6.29). This is applied to the net FTE construction jobs estimated to be generated by the Proposed Development.

Operational Impacts

6.58 The predicted effects derived from the Proposed Development during the operational phase include:

- **Employment** - In order to calculate the number of jobs generated through the operational phase of the proposed employment units, the floorspace parameters are applied to the relevant employment densities in line with national guidance (Ref 6.30). This calculates the number of direct gross FTE jobs generated. Considerations of appropriate allowances for leakage and displacement are made in line with national guidance (Ref 6.28) in order to calculate a net figure of FTE job creation. A multiplier is also applied to allow for employment generated through indirect and induced effects[6] to be factored in to the assessment.

- **Productivity** - the average GVA per FTE worker is calculated for relevant sectors using Experian local market forecasts (Ref 6.29). This is applied to the net FTE jobs estimated to be generated by the Proposed Development.

- **Business Rate Revenue** - In order to calculate the uplift in non-domestic rates (known as business rates) through the operational phase of the Proposed Development, the net additional floorspace is disaggregated by use. The Valuation Office Agency (VOA) business rates valuation tool (Ref 6.31) is utilised to run comparable analysis of similar units and uses in the area local to the Application Site. The derived indicative rates are subsequently applied to estimated rateable floorspace elements within the Proposed Development, with a national multiplier applied to derive an estimated total business rate payable per annum.

- **Council Tax Revenue** - The potential Council Tax revenues that are attributable to the Proposed Development once occupied are calculated based on an assessment of the likely average current market value of dwellings included within the Proposed Development. These are then rebased to the valuation date of Quarter 2 1991. Dwellings are then assigned to Council Tax valuation bands with

[6] Induced effects relate to the amount of increased income generated via a direct effect that is re-spent on goods and services within the local economy.

a calculation made of the annual Council Tax revenues accruing from the Proposed Development on an annual basis utilising the Kirklees Council Tax Charges (2016/17).

- **New Homes Bonus** - The New Homes Bonus payment calculation represents the amount payable from the Government to the Borough Council as a result of the Proposed Development, and is calculated using an online tool provided by DCLG (Ref 6.32). This generates a total resulting payment over a 1 year and 6 year period.

- **Housing** - The impact of the Proposed Development on housing supply is established by comparing the amount of new housing proposed against the annual housing target set out in the Draft Local Plan (Ref 6.9). The extent to which the Proposed Development can help to meet the housing requirement over the plan period directly informs its significance against this indicator.

- **Labour Force** - The total population that could be accommodated by the Proposed Development is estimated by multiplying the total number of new homes proposed by the average household size for the local impact area (defined in Figure 1.1), as recorded by the 2011 Census (Ref 6.13). Evidence from the Annual Population Survey (APS) (Ref 6.14) sets out the proportion of economically active and employed residents in the local impact area, which is then applied to the uplift in population as a result of the Proposed Development to provide an illustration of population impacts.

- **Incomes and Local Spending** - Additional household income is calculated by multiplying the total additional economically active population (in employment) by average (median) earnings at the local impact area level, utilising the Annual Survey of Hours and Earnings (ASHE) for 2015 (Ref 6.16). This is disaggregated by occupational group. Additional spending power on convenience and comparison goods is calculated by multiplying the additional total population by per capita expenditure for leisure, convenience and comparison goods, utilising expenditure data published by Oxford Economics via Pitney Bowes (Ref 6.33).

- **Education** - the effect of the Proposed Development on the requirement for education provision is dependent upon the number of additional children of school age generated by the delivery of the Proposed Development. This is achieved by considering the location and capacity of local primary and secondary schools in proximity to the Application Site based on recommended distances. The Education Act 1996, section 444(5) (Ref 6.34) which suggests that a distance of 2 miles (3.2km) for a child under 8 years old and 3 miles (4.8km) for a child over 8 years old can be considered to be “walking distance” for a local school. This analysis determines whether the existing facilities can accommodate an increase in school aged children envisaged. The expected increase in school children is calculated based on the pupil yield set out in the Kirklees Local Plan – Technical Paper: Infrastructure (Ref 6.21).

- **Health** - we include consideration of impacts on the health profile of the local population and analyse of the location and capacity of GP and dental facilities in

proximity to the Application Site to establish whether new patients are currently being accepted at existing facilities.

- **Open Space and Recreation Facilities** – impacts are based on applying requirements per 1,000 residents to the estimated population of the Proposed Development and compared to local provision.

6.59 Economic impact estimates are presented as net figures, discounting for leakage and displacement as well as accounting for multipliers to present indirect and induced impacts.

Study Area

6.60 Given the nature of the assessment in this chapter, the impacts upon education, health and open space are assessed across the neighbourhood scale, the impacts upon housing are assessed at the local scale and the impacts upon the economy are assessed across two scales (local and wider),

6.61 The study area varies according to the receptor as follows:

- **Economy –**
  - The local impact area covers the two local authorities of Kirklees and Bradford with the Application Site comprising two parcels of land. The larger parcel proposed for residential and commercial uses is situated within the boundary of Kirklees District and the smaller parcel proposed to provide 36 car parking spaces for Woodlands Primary School within the boundary of Bradford District. The local impact area is especially relevant to economic impacts, including employment, productivity, labour force and expenditure, as the impacts are likely to contribute towards the economies of both Kirklees and Bradford. The 2011 Census (Ref 6.13) shows that around 77.5% of people who work in Kirklees and Bradford also live in the local authority area; suggesting that more than 3 in 4 jobs are being taken by residents of the authority.
  - The wider impact area covers West Yorkshire, which includes the five authorities of Kirklees, Bradford, Calderdale, Leeds and Wakefield. This is especially relevant to economic impacts. The 2011 Census data (Ref 6.13) shows that of all jobs in Kirklees and Bradford, 92.4% are taken by people residing in the wider impact area, suggesting that there is a high level of containment at this level. It is considered, therefore, that the majority of socio-economic effects would be concentrated within the wider impact area.

6.62 The proposed study area for economic impacts is presented spatially at Figure 6.1.

Figure 6.1: Study Area



Source: Turley, 2016

- **Housing** –Kirklees District, within which the proposed housing will be developed and housing targets will be met.
- **Education** – in accordance with the Department for Education guidance on catchment areas and the provided catchment areas by the individual schools, all primary, secondary, and sixth form/further education provision in the neighbourhood impact area is included with a focus of a 2 mile (3.2km) radius for primary provision and 3 mile (4.8km) radius for secondary from the Application site.
- **Health** – a radius of 3.0km is used from the Application Site for GPs, increasing to 4km for dentists.
- **Open Space** – the sub-region of Batley and Spen, in line with the Open Space Study (Ref 6.25).

Surveys

6.63 No surveys were required as part of the research for this chapter.

Consultation

6.64 No specific consultation was required as part of the research for this chapter.

Significance Criteria

6.65 This section describes the framework for assessment of socio-economic effects, particularly in identifying the magnitude of effect, the sensitivity of receptor and the significance of effect.

6.66 The assessment of likely effects refers to the change that is predicted to take place to the existing baseline position as a result of the Proposed Development. There is no set guidance on the technical significance criteria that should be applied when undertaking a socio economic assessment. As a result assessing the significance of socio economic effects ultimately relies on professional judgement.

6.67 The assessment involves estimating the absolute change that is likely to occur in relation to key socio-economic indicators and that is attributable to the Proposed Development. This absolute change is then contextualised by the baseline and an understanding of change in the baseline conditions over time. In most cases the period over which change is observed is the 10 years between the Census of 2001 and 2011 or the Annual Population Survey (APS) of 2004/05 and 2014/15.

6.68 For the purposes of this assessment, the significance of an effect is determined as the combination of the 'magnitude' of the affected receptor and the predicted 'sensitivity' of the impact.

6.69 The sections below summarise the definitions of magnitude and sensitivity, and set out the assessment matrix applied to bring both considerations together.

Magnitude of Effect

6.70 Magnitude is assessed by examining the scale of the impact that is attributable to the Proposed Development. In discerning between different scales of magnitude, the absolute impact attributable to the Proposed Development is benchmarked against the average annual rate of change in the correspondence socio economic characteristics or baseline. This enables a relative assessment of the magnitude of impact that is attributable to the Proposed Development to be undertaken.

6.71 The following table defines the different magnitudes of effect that may arise during the construction and operation of the Proposed Development.

Table 6.2: Defining Magnitude of Effect

Level of Magnitude	Definition of Magnitude
High	Effect will dominate over socio-economic baseline conditions, or will be highly likely to affect large numbers of people and/or businesses over the long term. Considered to be a very important consideration, and likely to be material in the decision-making process
Moderate	Effect can be demonstrated to change baseline socio-economic conditions, and is likely to affect a moderate number of people and/or businesses over a medium duration. Effect may be important, but is not likely to be a key decision-making factor unless the cumulative effects of

	such factors lead to an increase in the overall effect on a particular socio-economic resource or receptor
Low	Effect will result in a perceptible difference in baseline socio-economic conditions, and is likely to affect to a small number of people and/or businesses over a short duration. Effect may be raised as a local factor, but is unlikely to be critical in decision-making process
Negligible	Effect does not result in variation beyond baseline socio-economic conditions, and is unlikely to measurably affect people and/or businesses

6.72 In the absence of published policy or guidance, these definitions draw upon previous experience and professional judgement.

Sensitivity of Receptor

6.73 The sensitivity of receptors has been assessed in relation to the observed change in baseline conditions. Through observation of the scale of change in receptors over this long term period it is possible to discern the extent to which a specific receptor is susceptible to change or alternatively the extent to which it has remained consistent or static over this period.

6.74 Consideration is also given to the priority or weight given to a specific receptor in strategy and policy terms. One such example is the sensitivity of the local population to employment opportunities arising from construction activity in the house building industry, which has a high level of policy and strategy priority from national to local levels.

6.75 A further consideration in discerning the sensitivity of receptors is the capacity of the receptor. A typical example of such a receptor would be the existing capacity of education and healthcare facilities to absorb additional demand arising from the occupation of new homes.

6.76 The following table provides a framework for the definition of different levels of sensitivity in socio-economic receptors associated with the Proposed Development.

Table 6.3: Defining Sensitivity of Receptor

Sensitivity	Definition
Very high	Receptor of international importance, with little or no ability to absorb, adapt to or recover from change
High	Receptor of national importance, with little ability to absorb, adapt to or recover from change
Moderate	Receptor of regional or local importance, with medium ability to absorb, adapt to or recover from change

Low	Receptor of local importance, with some ability to absorb, adapt to or recover from change
Negligible	Receptor of local importance, with ability to absorb, adapt to or recover from change

6.77 In the absence of published policy or guidance, the definitions drawn upon previous experience and professional judgement.

6.78 The following sensitive receptors are associated with the construction and operational phases of the development:

- Local Population
- Local Economy
- Local Businesses
- Local Facilities
- The Local Authority

Duration of Effect

6.79 The duration of effects will be taken into consideration when determining the overall significance of the effects. The following timescales will be used:

- Short term: 0 to 5 years;
- Medium term: 5 to 15 years; and
- Long term: 15 years onwards for the life of the Proposed Development.

Significance of Effect

6.80 Magnitude and sensitivity are combined to determine the overall significance of effects. The significance of effects can be either adverse or beneficial, depending on the receptor assessed. The assessment identifies whether the effects are beneficial or adverse for each receptor along with the significance.

6.81 The following table provides the framework by which the overall significance of socio-economic effects are to be assessed. In the absence of published policy or guidance, the definitions have drawn upon experience and professional judgement.

Table 6.4: Matrix for Assessing Significance of Effect

Assessing Significance of Socio-Economic Effects	
Magnitude of Effect	Sensitivity of Receptors

	Very high	High	Moderate	Low	Negligible
High	Substantial	Substantial	Moderate	Moderate	Minor
Moderate	Substantial	Moderate	Moderate	Minor	None
Low	Moderate	Moderate	Minor	None	None
Negligible	Minor	Minor	None	None	None

6.82 For the purposes of this assessment, any effect that is above minor (i.e. minor or above or moderate or above) is considered to be significant in EIA terms with regard to its socio-economic effects.

Baseline Conditions

Economy

6.83 The following baseline conditions include an assessment of Kirklees and Bradford as the local impact area. The Proposed Development is expected to impact both authorities due to the location of the Application Site close to the administrative boundary.

Population

6.84 An assessment of population can provide a valuable indicator of the socio-economic vitality of an area, highlighting growth or decline over a time period between Censuses of Population. The 2011 Census, for example, allows comparison against the 2001 Census thereby enabling the level of population change to be assessed.

6.85 The population of the local impact area in 2011 stood at 944,910, with this figure increasing by 10.4% - or approximately 88,678 residents – over the previous 10 year period since 2001 (Ref 6.13).

6.86 The population of the local impact area has grown at a faster rate than the wider impact area, at 7.1% and the national average of 7.9%.

Table 6.5: Table 16.4: Population Change 2001 – 2011

	2001	2011	Change 2001 - 2011	% Change
Local Impact Area	856,232	944,910	88,678	10.4%
Wider Impact Area	2,079,211	2,226,058	146,847	7.1%
England	49,138,831	53,012,456	3,873,625	7.9%

Source: Ref 6.13

Age Structure

6.87 Age is an important indicator in determining the number of residents of working age who can potentially contribute to the labour force.

6.88 In 2011 there were 602,888 residents, or 63.8% of the population, in the local impact area aged 16 to 64. This proportion of working age residents is marginally lower than the averages for the wider impact area and England, at 65.1% and 64.8%, respectively. This indicates that just less than two thirds of the population are of working age (Ref 6.13).

Table 6.6: Table 16.5: Age Profile 2011

Area	15 years and under	16 to 44	45 to 64	65 years and over
Local Impact Area	22.1%	39.8%	24.0%	14.1%
Wider Impact Area	20.0%	40.6%	24.5%	14.9%
England	18.9%	39.4%	25.4%	16.3%

Source: Ref 6.13

6.89 The working age population in the local impact area has grown by 12.0% since 2001 – representing an increase of and additional circa 64,453 residents. This is notably higher than the proportional increase in the working age population seen across the wider impact area, at 9.4%, and on average across England, at 9.2%.

Economic Activity and Unemployment

6.90 As shown in the following table, the latest Annual Population Survey (APS) (Ref 6.14), suggests that a lower proportion of working age residents (aged 16 – 64) in the local impact area are economically active, at 73.5%, relative to the average for the wider impact area, at 76.4%, and the level of 77.8% across England as a whole. The employment rate across the local impact area (67.9) is lower than the wider and national averages, of 71.3% and 73.6% respectively, and the unemployment rate in the local impact area, at 7.7% of economically active residents, is higher than the average for the wider impact area (6.7%) and nationally (5.5%).

Table 6.7: Economic Activity (October 2014 - September 2015)

	Local Impact Area	Wider Impact Area	England
Economically active residents (16-64)	442,400	1,102,300	26,618,900
Economic activity rate	73.5%	76.4%	77.8%
Employed residents	408,500	1,028,400	25,164,000
Employment rate	67.9%	71.3%	73.6%
Unemployment rate	7.7%	6.7%	5.5%
% of economically inactive who want a job	17.7%	23.1%	24.2%

Source: Ref 6.14

6.91 Understanding how economic activity rates have changed provides important context on the changing composition of the labour force over recent years. The APS provides time series data to show how economic activity rates have changed over the past decade. In

2004/05, the economic activity rate in the local impact area – at 74.5% – was slightly higher than the 73.5% recorded in 2014/15, suggesting that there has been a decrease in the proportion of the local population who are economically active, whilst the wider impact area and England have seen an increase in the economic activity rate. The employment rate in the local impact area has also decreased – from 71.1% to 67.9% – whilst unemployment in the local impact area has increased by a significant 14,400 residents, equivalent to a 3.0% increase, over the 10 year period. This indicates latent capacity within the labour market, and a potential need for additional jobs.

Latent Labour

6.92 The number of residents claiming Jobseekers' Allowance (JSA) also provides useful context on the number of unemployed residents in the impact area. This measure does not align with the analysis presented above as not all unemployed people claim JSA, and therefore are not recorded by this dataset.

6.93 The claimant count (Ref 6.15) suggests that, as of February 2016, there are a total of 13,030 residents in the local impact area claiming JSA, with the number of JSA claimants across the wider impact area totalling 31,050.

6.94 The proportion of residents claiming Jobseekers Allowance has the potential to be reduced by the jobs created throughout the construction and operation of the Proposed Development.

6.95 In the local impact area a significant proportion of claimants (53.1%) are in search of sales and customer service occupations, with a high proportion (23.8%) seeking employment in elementary occupations. These trends are also reflected at the scale of the wider comparator areas with high proportions of claimants seeking these occupation types (Ref 6.15) and lower proportions seeking employment in higher paid managerial, professional and technical occupations.

Table 6.8: Sought Occupation of JSA Claimants - February 2016

Occupation	Local Impact Area		Wider Impact Area		England
Occupation unknown	375	2.9%	1,075	3.5%	4.5%
Managers and Senior Officials	600	4.6%	1,390	4.5%	8.3%
Professional Occupations	85	0.7%	195	0.6%	0.9%
Associate Professional and Technical Occupations	180	1.4%	415	1.3%	1.8%
Administrative and Secretarial Occupations	585	4.5%	1,795	5.8%	7.0%
Skilled Trades Occupations	340	2.6%	835	2.7%	3.2%
Personal Service Occupation	340	2.6%	745	2.4%	2.5%
Sales and Customer Service occupations	6,920	53.1%	15,905	51.2%	52.0%

Process, Plant and Machine Operatives	505	3.9%	1,035	3.3%	3.2%
Elementary Occupations	3,095	23.8%	7,655	24.7%	16.7%
Total	**13,030**	**100%**	**31,050**	**100%**	**100%**

Source: Ref 6.15

6.96 When JSA claimants are considered by sector, the following points are relevant to consideration of the Proposed Development:

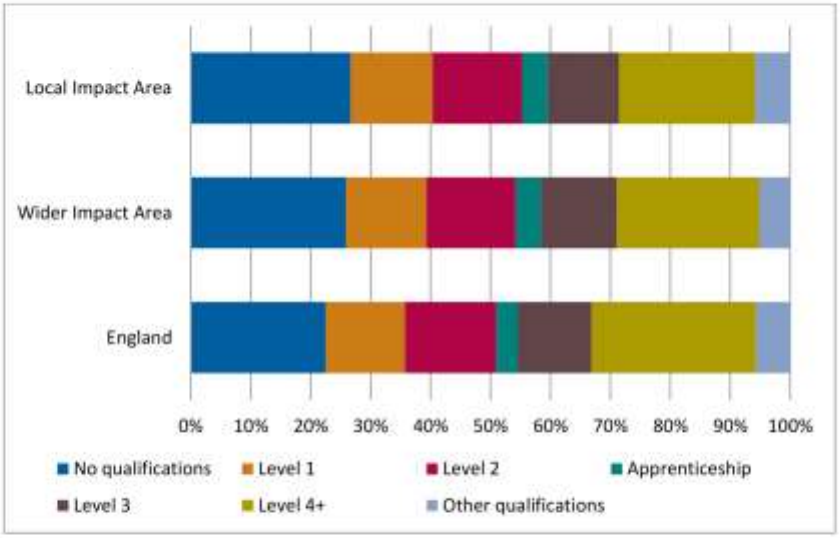
- **Construction Phase -** the latest ONS claimant count statistics (Ref 6.15) demonstrate that there is latent demand for construction employment within the labour force of the local and wider impact areas. In total, there are 385 economically active unemployed working age residents within the local impact area, and an additional 655 residents within the wider impact area, seeking employment within the construction sector.

- **Operational Phase** - the claimant count statistics also demonstrate that there is latent demand for the vast range of types of employment that are expected to be generated through the operation of the Proposed Development within the local and wider labour force. In total, there are 2,465 economically active unemployed working age residents within the local impact area, and an additional 4,570 residents within the wider impact area, seeking employment within the office, warehouse, storage and distribution sectors.

Qualifications and Skills

6.97 The following chart provides an indication of the qualifications and skills profile of residents aged 16 and over in the local and wider impact areas and England. A lower proportion of residents in the local and wider impact areas have level 4+ qualifications, standing at 22.8% and 23.8% of residents aged 16 and over, respectively, compared to 27.4% of residents nationally. Correspondingly, a higher than average proportion of residents aged 16 and over in the local and wider impact areas possess no qualifications, at 26.7% and 25.9%, respectively, compared to 22.5% nationally (Ref 6.13).

Figure 6.2: Qualifications and Skills 2011



Source: Ref 6.13

Employment Profile

6.98 The APS (Ref 6.14) provides a breakdown of the industry of employment for residents. This is summarised in the following table, with data gaps representing where the sample size was zero or disclosive.

6.99 The local impact area has a relatively high proportion of residents working in manufacturing (14.2%); distribution, hotels and restaurants (19.6%) and public administration, education and health at (30.9%), when compared to the national average. The banking, finance and insurance industries and transport and communications industries are proportionately under-represented locally, relative to the national average. In the local impact area, just 5.8% of residents are employed within the construction industry, compared to 6.7% across the wider impact area and 7.3% nationally.

Table 6.9: Industry of Employment (October 2014 - September 2015)

	Local Impact Area	Wider Impact Area	England
Agriculture and fishing	-	-	1.0%
Energy and water	1.6%	1.5%	1.5%
Manufacturing	14.2%	11.7%	9.6%
Construction	5.8%	6.7%	7.3%
Distribution, hotels and restaurants	19.6%	19.4%	18.3%
Transport and communications	7.5%	8.1%	9.2%

Banking, finance and insurance	14.7%	16.2%	17.1%
Public administration, education and health	30.9%	30.3%	29.4%
Other services	5.2%	5.1%	5.9%

Source: Ref 6.14

Socio-Economic Classification

6.100 The National Statistics Socio-economic Classification (NS-SeC) utilised by the 2011 Census (Ref 6.13) categorises resident by social class based on occupation. Analysis of NS-SeC suggests that 26.1% of residents aged 16 – 74 in the local impact areas are employed in managerial, administrative and professional occupations. This is lower than the wider impact area and national averages of 27.6% and 31.3% of residents employed in managerial, administrative and professional occupations, respectively. Across the local and wider impact areas, higher proportions of residents are employed within routine occupations relative to the national average.

Table 6.10: National Statistics Socio-economic Classification 2011

	Local Impact Area	Wider Impact Area	England
Higher managerial, administrative and professional occupations	8.1%	8.9%	10.4%
Lower managerial, administrative and professional occupations	17.9%	18.7%	20.9%
Intermediate occupations	12.1%	12.5%	12.8%
Small employers and own account workers	9.1%	8.3%	9.4%
Lower supervisory and technical occupations	6.9%	7.0%	6.9%
Semi-routine occupations	14.0%	14.3%	14.0%
Routine occupations	13.1%	13.1%	11.0%
Never worked and long-term unemployed	9.5%	7.4%	5.6%
Full-time students	9.3%	9.9%	9.0%

Source: Ref 6.13

Earnings

6.101 Earnings can provide an indication of the strength of the local economy, given their relationship with wider economic factors such as gross value added (GVA) and productivity. Earnings levels also have a relationship with prosperity and as such the economic well-being of residents and their propensity to engage in a range of activities including sports.

6.102 The following table summarises average (median) earnings for full-time workers in the comparator areas of the local and wider impact areas and England, sourced from the Annual Survey of Hours and Earnings (ASHE) (Ref 6.16). Weekly and annual pay for residents in each location and workplace based pay is provided.

6.103 The average resident and workplace based wages in the local impact area are lower than the average wages across the wider impact area and England.

6.104 The average pay for residents in the local impact area is marginally higher than the average workplace pay, suggesting that a proportion of the higher paid residents in the local impact area commute outside of the Kirklees and Bradford for work.

Table 6.11: Average (Median) Earnings 2015

	Resident Analysis		Workplace Analysis	
	Weekly Pay (gross)	Annual Pay (gross)	Weekly Pay (gross)	Annual Pay (gross)
Local Impact Area	£467	£24,200	£466	£23,560
Wider Impact Area	£480	£25,055	£493	£25,344
England	£533	£27,869	£532	£27,872

Source: Ref 6.16

Employment

6.105 The Business Register and Employment Survey (BRES) (Ref 6.17) provides information on the existing types of jobs within the local and wider impact areas and allows an assessment of recent change in the level of employment in each area.

6.106 Evidence presented in the following table suggests that the local impact area has experienced a decline in the number of employees over the period from 2009 – 2014. However, this decline is attributable to part-time employees, which have declined by 9,800 employees over recent years, whilst the number of full-time employees has increased by 4,700 in the local impact area. This suggests that despite a slight decline in the overall number of people employed, the number of hours worked by employees has increased.

Table 6.12: Change in Local Impact Area Employees

	Employees	Full-time Employees	Part-time Employees
2009	344,700	220,300	124,500
2010	337,900	220,300	117,600
2011	341,300	221,600	119,600
2012	332,100	221,700	110,500
2013	332,300	219,700	112,500
2014	339,600	225,000	114,700
Change 2009 - 2014	-5,100	4,700	-9,800

Source: Ref 6.17

6.107 Given this recent change, it is important to establish the current profile of employment, highlighting key sectors in the local economy.

6.108 Evidence shows that the manufacturing sector accounts for the highest proportion of employees in the local impact area, at 15.5%, which is significant relative to the average across the wider impact area (11.3%) and England (8.3%). The health, education and retail industries also play a vital role in the local economy, employing 15.3%, 11.9% and 10.5% of the local workforce, respectively. The professional, scientific and technical and business, administration and support services sectors appear to be underrepresented in the local impact area relative to the wider areas, with just 5.2% and 5.4% of employees working in these sectors locally, respectively, compared to 8.4% and 8.9% across England, respectively.

Table 6.13: Employees by Industry 2014[7]

Industry	Local Impact Area		Wider Impact Area	England
Agriculture, forestry and fishing	-	-	0.0%	0.6%
Mining, quarrying and utilities	4,200	1.2%	1.2%	1.1%
Manufacturing	52,600	15.5%	11.3%	8.3%
Construction	13,900	4.1%	4.1%	4.3%
Motor trades	7,400	2.2%	1.9%	1.8%
Wholesale	15,700	4.6%	4.5%	4.2%
Retail	35,500	10.5%	8.9%	9.9%
Transport and storage	12,500	3.7%	4.5%	4.6%
Accommodation and food services	17,400	5.1%	5.7%	7.0%
Information and communication	8,700	2.6%	3.2%	4.3%
Financial and insurance	10,800	3.2%	4.7%	3.8%
Property	5,300	1.6%	1.6%	1.7%
Professional, scientific and technical	17,500	5.2%	6.8%	8.4%
Business administration and support services	18,200	5.4%	9.5%	8.9%
Public administration and defence	15,100	4.4%	4.6%	4.3%
Education	40,300	11.9%	10.1%	9.3%
Health	52,000	15.3%	13.5%	12.9%
Arts, entertainment, recreation and other services	12,300	3.6%	3.9%	4.4%
Total Employees	**339,600**	**100%**	**100%**	**100%**

Source: Ref 6.17

[7] Due to potentially disclosive data figures of less than 50 do not appear. Figures have been rounded to the nearest 100 and may not appear to sum. Gaps in the table are a result of disclosive data.

Housing

6.109 The housing and housing related impacts, including public revenue resulting from residential development, associated with the Proposed Development will impact the housing market in Kirklees and Kirklees Council only, with the residential elements of the Proposed Development being wholly contained within Kirklees District.

Households

6.110 In 2011, the Census shows that there were 173,525 households in the local impact area, indicating an average household size of 2.4 persons, which reflects the average household size for England (2.4 persons) (Ref 6.13).

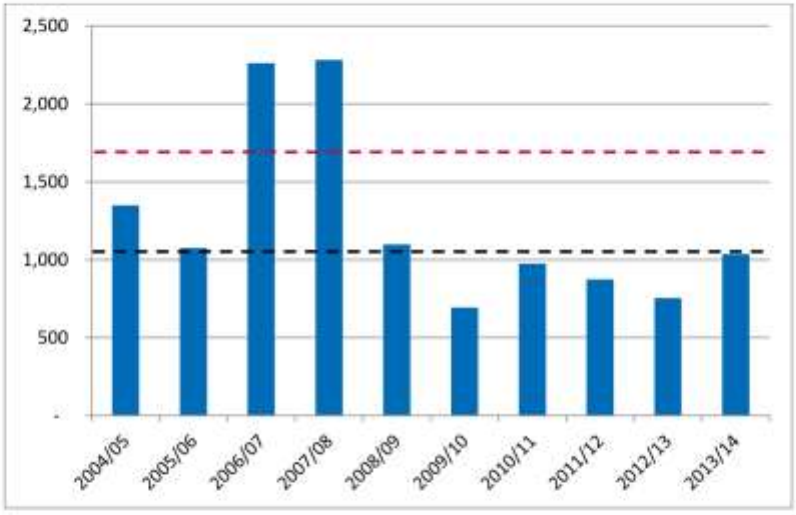
6.111 The number of households in the local impact area increased by 9.1% between 2001 and 2011 with an additional 1,449 households forming on average per annum (Ref 6.13). With the number of households increasing by 8.0% in the wider impact area and 7.9% in England over the same period, it is evident that the number of households in the local impact area has grown at a faster rate than in the wider areas.

Housing Supply and Targets

6.112 Kirklees Council's latest published Annual Monitoring Report (AMR) (Ref 6.18), covering the period from April 2013 – March 2014, identifies the current housing provision in the Borough and the future trajectory in accordance with the Yorkshire and Humber Regional Spatial Strategy (RSS) housing requirement. Although the RSS was revoked in 2013, the RSS proposed annual housing requirement of 1,060 dwellings for 2004-08 and 1,700 for 2008-26 remains the most recent housing figure that has been subject to public examination.

6.113 According to the AMR, there were 1,036 net dwelling completions in the 2013/14 monitoring year, which, despite being 37.6% higher than the number of completions in 2012/13, is lower than the annual delivery target of 1,700 dwellings that is required to deliver the RSS target over the plan period. The average number of completions per annum over the period from 2008/09 to 2013/14, at 904 dwellings, is also notably below the target of 1,700 dwellings per annum (Ref 6.18).

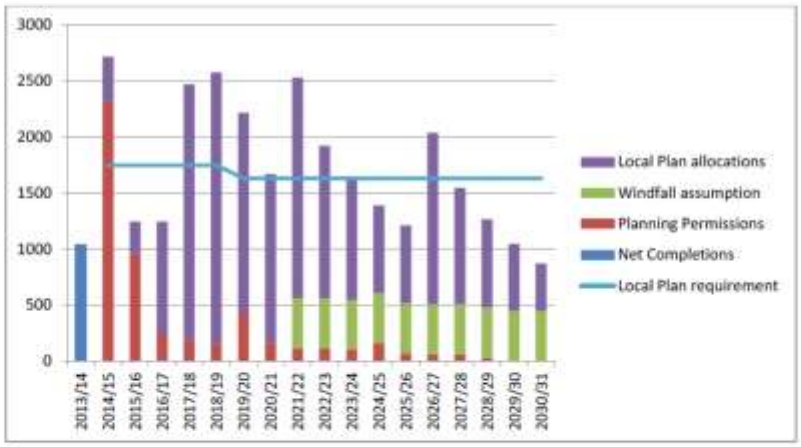
Table 6.14: Historic Net Housing Completions



Source: Ref 6.18

6.114 Although not yet formally adopted, the Draft Local Plan (Ref 6.9), as highlighted in paragraph 6.40 and Chapter 5, identifies a target to deliver 1,630 new homes per annum over the period from 2013 – 2031, which is marginally lower than the RSS target of 1,700 dwellings per annum. Figure 7 in the Plan sets out a housing trajectory for Kirklees, demonstrating the anticipated housing delivery in each year of the plan; this is replicated below.

Figure 6.3: Draft Local Plan Housing Trajectory



Source: Ref 6.9

6.115 The Plan anticipates that completions will increase significantly over the coming years, relative to recent years.

Education

6.116 As a result of the location of the Application Site, the Proposed Development will have an impact upon education provision within both Kirklees and Bradford. Whilst the additional school aged population generated by the Proposed Development will be residing within Kirklees District, some of the nearest schools are located within Bradford to the west. For the purposes of this assessment, it is assumed that the schools situated in Bradford will accommodate pupils residing in the proposed residential dwellings, situated in Kirklees, if there is sufficient capacity, despite being located outside of the catchment area.

6.117 The following section demonstrates the current roll and capacity of existing primary and secondary schools, based on evidence published by the Department for Education (Ref 6.19), and the level of standard achieved at each school based on qualifications and Ofsted ratings.

Primary Schools

6.118 The closest 10 primary schools within 3.2km (2 miles) (Ref 6.34) of the Application Site are presented in the following table. Woodlands CofE Primary School in Bradford is the closest school to the Application Site, located within approximately 0.5km. The following table shows that currently 6 of the 10 schools within proximity of the Application Site have capacity to accommodate new primary aged pupils, including Woodlands CofE Primary School. Overall there is a deficit in capacity equivalent to 38 pupils across all primary education facilities. However, reflecting Audit Commission guidance on any deficit to be taken as 'zero', the true capacity equates to surplus 36 primary school places[8].

6.119 Evidence suggests that 4 out of the 9 primary schools with information available have a higher than average proportion of pupils achieving the expected level at Key Stage 2, with the national average standing at 80% of pupils. Furthermore, 8 out of 10 local primary schools have been graded overall as 'good' or 'outstanding' upon Osfted inspection.

Table 6.15: Primary Schools[9]

School	Approx. Distance (Straight Line) (km)	Total Capacity	No. of pupils on roll (2015)	Surplus / deficit	% of pupils achieving KS2 expected level (2015)	Osfted
Woodlands CofE Primary School, Bradford	0.5	105	101	4	85%	Good

[8] Total figures exclude Appleton Academy - due to the school providing education provision for primary, secondary and sixth form and therefore surplus places are not available solely for primary school aged pupils – and Heaton Avenue Primary School, due to the unavailability of pupil roll data.
[9] *Ibid*

Whitechapel Church of England Primary School, Kirklees	1.8	420	411	9	78%	Good
Worthinghead Primary School, Bradford	1.9	210	198	12	70%	Good
Low Moor CofE Primary School, Bradford	2.1	420	413	7	86%	Outstanding
Scholes Village Primary School, Kirklees	2.3	223	228	-5	79%	Good
Heaton Avenue Primary School, Kirklees	2.4	395	-	-	-	Outstanding
Appleton Academy, Bradford	2.5	1297	1250	47	76%	Requires improvement
Newhall Park Primary School, Bradford	2.5	420	438	-18	72%	Requires improvement
St John's CofE Primary School, Bradford	2.5	492	488	4	88%	Outstanding
Hill Top CofE Primary School, Bradford	2.7	206	257	-51	90%	Good
Total	**-**	**2,496**	**2,534**	**-38**	**-**	-
Total (with deficit as 'zero')	**-**	**2,496**	**2,534**	**36**	**-**	-

Source: Ref 6.19

Kirklees Future Primary Capacity

6.120 Kirklees Council published 'School Organisation, Planning and Development for 2015-2018' (hereafter 'the School Organisation Plan') (Ref 6.20) in October 2015, which identifies various primary planning areas across Kirklees. Part of the Application Site is situated within primary planning area 5 – Cleckheaton, and borders the Birkenshaw and Gomersal planning area to the north east and Liversedge planning area to the south east.

6.121 The School Organisation Plan identifies where primary capacity has been made available to accommodate recent demand. In 2015, additional pupil places that were previously temporary were made permanent at Heaton Avenue Primary School in Cleckheaton. Additional primary school provision was made by the school at the request of the local authority, by admitting 15 pupils above the Published Admission Number (PAN) of 60 pupils in September 2015.

6.122 Future demand for primary provision is also considered, with the School Organisation Plan highlighting that the trend in the number of primary school aged children living in the Cleckheaton planning area is expected to remain broadly static over the period from 2016 – 2018, which is reflective of the expected trend across the neighbouring primary planning area of Birkenshaw and Gomersal. The School Organisation Plan therefore suggests that there is no immediate need for establishing additional places in these planning areas, although demand will need to be kept under review over coming years to ascertain whether additional places are required. Liversedge planning area is expected to see a moderate decrease in the number of children living in this Planning Area, suggesting that there is no immediate need for additional places.

6.123 However, a longer term assessment identified in Kirklees Council's Local Plan Technical Paper: Infrastructure (Ref 6.21) suggests that in the Cleckheaton primary planning area:

- within the next 5 years there is anticipated need to establish up to 10 additional places per cohort group - potential to be met via agreement with local schools to adjust Pupil Admission Number; and

- within the next 10 - 15 years there is anticipated need to establish up to 30 additional places per cohort group – this may require physical expansion of existing school(s) in the planning area.

Bradford Future Primary Capacity

6.124 The City of Bradford Metropolitan District Council published the 'Bradford District Education Organisation Plan' (hereafter 'the Education Organisation Plan') (Ref 6.22) in September 2015. The Education Organisation Plan indicates that part of the Application Site is situated within the primary planning area of South West 1 and is situated within close proximity of South East 1 primary planning area.

6.125 The Education Organisation Plan highlights the current capacity in primary schools and the projected/forecast number of pupils up to 2019 and suggests that the expected pupil numbers in primary schools within the South West 1 and South East 1 primary planning areas will be lower than the primary school capacity. This suggests that there is capacity in local schools in Bradford to accommodate additional pupils up to, and potentially beyond, 2019.

Secondary Schools and Further Education

6.126 There are 10 secondary schools within approximately 4.8km of the Application Site. The closest secondary schools to the Application Site are Appleton Academy in Bradford and Whitcliffe Mount School in Kirklees, located circa 2.5 km and 2.6 km distance. Overall, there is a deficit in capacity of 257 places in existing local secondary schools. Yet, when Audit Commission guidance to treat any deficit as 'zero' is applied, this presents a surplus of 375 secondary school places[10].

6.127 The standard of secondary school provision in the local area is generally below average, with 4 out of 10 schools considered to be inadequate, 2 schools of which are in Osfted special measures (BBG Academy and Buttershaw Business and Enterprise College). Nevertheless, 4 local secondary schools have been graded overall as 'good' by Ofsted and pupils at Dixons City Academy and Whitcliffe Mount School area achieving GCSE results higher than or in line with the national average (53%).

[10] Total figures exclude Appleton Academy - due to the school providing education provision for primary, secondary and sixth form and therefore surplus places are not available solely for secondary school aged pupils – and Bradford Forster Academy, due to the unavailability of pupil roll data.

Table 6.12: Secondary Schools

School	Approx. Distance (Straight Line) (km)	Total Capacity	No. of Pupils on roll (2015)	Surplus/ deficit	GCSE: Pupils achieving 5 or more good passes (2015)	Osfted
Appleton Academy, Bradford	2.5	1297	1250	47	-	Requires improvement
Whitcliffe Mount School, Kirklees	2.6	1,260	1,248	12	53%	Good
BBG Academy, Kirklees	2.7	750	547	203	-	Inadequate
Tong High School, Bradford	3.1	1,620	1,589	31	31%	Inadequate
Bradford Academy, Bradford	3.5	1,250	1,780	-530	-	Good
Bradford Forster Academy, Bradford	3.9	1,050	-	-	-	-
Dixons City Academy, Bradford	4.2	1,085	1,103	-18	65%	Good
Grange Technology College, Bradford	4.3	1,848	1,831	17	41%	Good
Lightcliffe Academy, Calderdale	4.4	1,392	1,475	-83	47%	Inadequate
Buttershaw Business and Enterprise College, Bradford	4.6	1,610	1,499	111	43%	Inadequate
Total	**-**	**10,815**	**11,072**	**-257**	**-**	-
Total (with deficit as 'zero')	**-**	**10,815**	**11,072**	**374**	**-**	-

Source: Ref 6.19

Kirklees Future Secondary Capacity

6.128 Part of the Application Site is situated within the Cleckheaton, Heckmondwike, Liversedge and Mirfield secondary planning area, as identified by the School Organisation Plan (Ref 6.20). Evidence suggests that there will be an increase in the number of children living within this planning area over the period from 2015 – 2023. The growth in pupil population is expected to be the 3rd greatest of the 9 secondary planning areas, with 2 planning areas expecting to see a decline in the number of children.

6.129 Despite this anticipated growth, the School Organisation Plan suggests that there is no immediate need for additional places in the Cleckheaton, Heckmondwike, Liversedge and Mirfield secondary planning area. However, new housing provision and internal and external migration, patterns of parental preference, cross boundary movements are

likely to change, which may influence a future need for additional secondary school capacity.

6.130 However, Kirklees Council's Local Plan Technical Paper: Infrastructure (Ref 6.21) suggests that in the Cleckheaton, Heckmondwike, Liversedge and Mirfield secondary planning area:

- within the next 5 years there is a high level of anticipated need for establishing up to 3 additional places per cohort group;
- within the next 10 years there is a high level of anticipated need for establishing up to 34 additional places per cohort group; and
- within the next 15 years there is a high level of anticipated need for establishing up to 7 additional places per cohort group.

Kirklees Future Secondary Capacity

6.131 The Education Organisation Plan (Ref 6.22) suggests that part of the Application Site is situated within the Bradford South secondary planning area. Evidence of future anticipated secondary pupil figures indicates that the demand for school places will increase each year over the period from 2016 – 2021, with forecast pupil figures being somewhat greater than secondary school capacity. By 2021 it is expected that there will be a need for an additional 640 secondary school places in Bradford South, which is equivalent to 6.9% of school capacity.

Health

General Health Rates of Population

6.132 The 2011 Census (Ref 6.13) provides evidence on the health of all residents in the local and wider impact areas, and England. The data suggests that just less than half of the population (45.1%) in the local impact area have very good levels of health, which is lower than across the wider impact area, at 45.9%, and the national average of 47.2%. A total of 5.8% of local residents are identified as having bad or very bad health, which is slightly lower than the average for the wider impact area (5.9%) and slightly higher the national level on average, at 5.4% of residents (Ref 6.13).

Table 6.13: General Health (2011)

	Local Impact Area	Wider Impact Area	England
Very Good Health	45.1%	45.9%	47.2%
Good Health	35.3%	34.5%	34.2%
Fair Health	13.7%	13.6%	13.1%
Bad Health	4.5%	4.6%	4.2%
Very Bad Health	1.3%	1.3%	1.2%

Source: Ref 6.13

6.133 According to the Census, 82.5% of residents in the local impact area are not limited in their day-to-day activities. This is slightly higher than for the wider impact area (82.0%) and broadly in line with the national average, at 82.4% of residents.

Table 6.14: Long-Term Health Problem or Disability (2011)

	Local Impact Area	Wider Impact Area	England
Day-to-day activities limited a lot	8.4%	8.6%	8.3%
Day-to-day activities limited a little	9.1%	9.3%	9.3%
Day-to-day activities not limited	82.5%	82.0%	82.4%

Source: Ref 6.13

6.134 Further evidence from Public Health England (Ref 6.23) shows the prevalence of underweight, healthy weight, overweight, obesity and excess weight in adults across the local and wider impact areas, with England also presented for comparison. This is presented in the table below, showing that a high proportion of local residents, at 67.8%, carry excess weight, which is greater than the average for the wider impact area (66.0%) and England (64.6%), yet lower than.

Table 6.15: Prevalence of Weight (2012-2014)

	Local Impact Area	Wider Impact Area	England
Underweight	1.8%	1.4%	1.2%
Healthy Weight	30.4%	32.6%	34.2%
Overweight[11]	41.1%	40.5%	40.6%
Obese	26.8%	25.5%	24.0%
Excess Weight[12]	67.8%	66.0%	64.6%

Source: Ref 6.23

Health Care Facilities Provision

6.135 There are 8 GP surgeries within 3km of the Application Site (Ref 6.24). At approximately 2.4km, Sunnybank Medical Centre is the closest practice to the Application Site.

6.136 All of the GP practices within 4km of the Application Site are currently accepting new patients, with 43 GPs and 69,063 patients registered. Based on the Royal Academy of General Practitioners GP to patient ratio (1 GP per 1,800 people), there is a requirement for 38 GPs to serve the number of patients currently registered at existing practices. This suggests that there is sufficient provision of GPs within existing healthcare facilities local to the Application Site.

[11] Excluding obese.
[12] Overweight combined with obese.

Table 6.16: Local GP Practices

GP Practice	Approx. Distance (km)	No. of GPs	Patients on roll	GPs required to serve patients on roll	Accepting New Patients?
Sunnybank Medical Centre	2.4	7	10,913	6	Yes
Low Moor Medical Centre	2.6	5	9,212	5	Yes
Birkenshaw Health Centre	2.9	7	11,552	6	Yes
Tong Medical Practice at Highfield Health Centre	2.9	5	8,178	5	Yes
Dr Mills G A and Partners at Highfield Health Centre	2.9	5	7,220	4	Yes
St Johns House	2.9	4	7,440	4	Yes
Bowling Hall Medical Practice	2.9	6	7,470	4	Yes
Rooley Lane Medical Centre	2.9	4	7,078	4	Yes
Total within 3 km	-	**43**	**69,063**	**38**	-

Source: Ref 6.24

6.137 There are 10 dental practices within 4 km of the Application Site, 3 of which are accepting new patients. There are a total of 37 dental practitioners operating in the area, as summarised in the following table.

Table 6.17: Dentist Services

Dental Service	Approx. Distance (km)	No. Dentists	Accepting New Patients?	
			Adults	Children
Bedford and Associates	2.3	3	No	No
57 Dental Care	2.7	4	No	No
Northgate Dental Practice	2.9	5	No	No
Greenside Dental Care	3.1	3	No	No
Dentistry@BD4	3.1	6	No	No
Buttershaw Lane Dental Practice	3.5	2	Yes	Yes
Parkside Road Dental Care Unit	3.5	3	No	No
Olney Dental Care	3.5	3	No	No
Wakefield Road Surgery	3.7	6	Yes	Yes
Bailiff Bridge Dental Practice	3.9	2	Yes	Yes
Total within 4 km	-	**37**	-	-

Source: Ref 6.24

Open Spaces and Recreation Facilities

6.138 In November 2015, Kirklees Council published an Open Space Study (hereafter 'the Study') (Ref 6.25). The Study provides an assessment of existing open space and recreation facilities and evidences current supply and demand issues and the needs of local people.

6.139 The Study analyses the current level of open space provision and demand across Kirklees in addition to more specifically across the Batley and Spen sub-area, within which a large part of the Application Site lies.

6.140 The Study assesses 7 different types of open space provision and demand. The provision of amenity greenspace is of particular relevance to this socio-economic assessment, with this type of open space including grassed areas in housing estates that provides opportunities for informal activities close to home or work, or enhances the appearance of residential or other areas. This type of open space, in the form of structural landscaping, is expected to be provided as part of the Proposed Development.

6.141 Across Kirklees, the Study found that there are 290 sites classified as providing amenity greenspace, covering 117.03 ha and equating to 0.29 ha per 1,000 people. Of this District wide provision, 39.86 ha of amenity greenspace is contained within Batley and Spen, equivalent to provision of 0.36 ha per 1,000 people, which is greater than the district average.

6.142 Table 4.5 of the Study sets out the quantity standard for amenity greenspace of 0.3 ha per 1,000, indicating that provision in Batley and Spen and the wider Kirklees District is sufficient.

6.143 The Study also identifies the current level of provision of other types of open space and recreational facilities in Batley and Spen. According to the Study, the neighbourhood impact area provides greater provision of parks and recreation grounds relative to the Kirklees quantity standard, but lower than average provision of natural and semi-natural greenspace. In the neighbourhood impact area there is currently 13 multi-use games areas (MUGAs) and a total of 93 sites that provide facilities for children and young people. Evidence suggests that across Kirklees residents have a good level of satisfaction about the current availability of provision for children and young people.

Predicted Significant effects

6.144 This section of the chapter assesses the potential effects of the Proposed Development, during both the construction and operational phases.

Effects during the construction phase: short term

6.145 The employment effects estimated to be generated by investment in the Proposed Development during the construction phase are summarised below.

6.146 The assessment indicates that the construction phase could generate 186 net additional full-time equivalent (FTE) temporary positions per annum in the wider impact area, of which 125 FTE jobs could be supported within the local impact area. Of this total, it is

estimated that 124 net FTE positions would be directly created across the wider impact area, inclusive of 100 net direct FTE jobs within the local impact area. A further 25 net FTE positions generated through indirect and induced effects in the local impact area, increasing to 62 net FTE jobs across the wider impact area. This will include contracts with the supply chain, salaries and onward expenditure.

Table 6.18: Construction Phase – Employment Effects

Net FTE Employment Generation	Local Impact Area	Wider Impact Area
Person-years of Employment	400	400
Construction Period (years)	3	3
FTE Employment	133	133
Direct Employment	100	124
Indirect / Induced Employment	25	62
Net Additional Employment (Total)	**125**	**186**

Source: Turley, 2016

6.147 The impact on the population and economy of increases in construction related employment at the scale of the local and wider impact areas is beneficial, due to the potential for employment generation and wealth creation. The benefits will also extend beyond the wider impact area.

6.148 At the local scale, the magnitude of the employment impacts during the construction phase is substantial, when benchmarked against the historic rate of growth in employment in the construction industry over the last decade. Therefore, there is likely to be a direct, temporary, short-term effect of **substantial beneficial** significance on the population arising from the construction phase of the Proposed Development within the **local impact area**.

6.149 At the scale of the wider impact area, the magnitude of the employment impacts during the construction phase is negligible. Therefore, there is likely to be a **negligible** effect on the population arising from the construction phase of the Proposed Development within the **wider impact area**.

Productivity

6.150 The uplift in annual productivity – measured in GVA – in the local impact area economy as a result of construction of Proposed Development is estimated to be circa £7.7 million per annum. This effect increases to circa £11.0 million per annum when assessed across the wider impact area. This is summarised in the following table.

Table 6.19: Construction Phase – Productivity Effects

Net GVA Generation	Local Impact Area	Wider Impact Area
Direct GVA Impact	£6,400,000	£7,900,000
Indirect / Induced GVA Impact	£1,300,000	£3,100,000

Net Additional Impact (Total)	£7,700,000	£11,000,000

Source: Turley, 2016

6.151 The impact on the population of increases in construction related GVA uplift is beneficial, with wealth creation in the local and wider impact areas. The magnitude of the impact is substantial when benchmarked against the marginal annual increase in productivity in at the scale of the local impact area, with a minor impact at the wider impact area.

6.152 Therefore, there is likely to be a direct, temporary short-term effect of **substantial beneficial significance** at the **local level** and **minor beneficial significance** at the **wider level**.

Effects during operational phase: medium-term to long-term

6.153 This section assesses the significant socio-economic effects of the Proposed Development during the operational phase.

Employment

6.154 The employment effects estimated to be generated by the proposed employment units during the operational phase are summarised below.

6.155 The assessment indicates that the operational phase could generate 1,041 net additional full-time equivalent (FTE) temporary positions per annum in the wider impact area, of which 525 FTE jobs could be supported within the local impact area. This is presented in the following table.

Table 6.20: Operational Phase – Employment Effects

Net FTE Employment Generation	Local Impact Area	Wider Impact Area
Gross Employment (FTE)	746	746
Leakage	187	52
Displacement	140	0
Direct Employment	420	694
Indirect / Induced Employment	105	347
Net Additional Employment (Total)	**525**	**1,041**

Source: Turley, 2016

6.156 The impact on the population and economy of increases in operation related employment at the scale of the local and wider impact areas is beneficial, due to the potential for employment generation and wealth creation. The benefits will also extend beyond the wider impact area.

6.157 At the scale of the local and wider impact areas, the magnitude of the employment impacts during the operational phase is minor. Therefore, there is likely to be a direct,

temporary, long-term effect of **minor beneficial significance** on the population arising from the operational phase of the Proposed Development within the **local and wider impact areas**.

6.158 If the effect of the employment generated during the operational phase was to be assessed using a smaller local impact area than Kirklees and Bradford combined, the magnitude would be greater. For example, at the Kirklees scale only, the magnitude of the employment impacts during the operational phase is of major beneficial significance and at the Bradford scale only, the impacts are of moderate beneficial significance.

Productivity

6.159 The uplift in annual productivity – measured in GVA – in the local impact area economy as a result of the operation of Proposed Development is estimated to be circa £21.1 million per annum. This effect increases to circa £43.4 million per annum when assessed across the wider impact area. This is summarised in the following table.

Table 6.21: Operational Phase – Productivity Effects

Net GVA Generation	Local Impact Area	Wider Impact Area
Direct Employment (GVA) Impact	£15,600,000	£25,900,000
Indirect / Induced Employment (GVA) Impact	£5,500,000	£17,500,000
Net Additional Impact (Total)	**£21,100,000**	**£43,400,000**

Source: Turley, 2016

6.160 The impact on the population and economy of increases in operation related GVA is beneficial, with wealth creation in the local and wider impact areas. However, the magnitude of the impact is negligible when benchmarked against the forecast annual increase in productivity in at the scale of the local and wider impact areas.

6.161 Therefore, there is likely to be a **negligible** effect at the **local and wider levels**.

Business Rate Revenue

6.162 Businesses pay non-domestic rates to contribute to the cost of the local authority providing public services within which the business property is situated. The Government has introduced a Business Rate Retention Scheme (BRRS), which became operational in April 2013. It provides a direct link between business rates growth and the amount of money local authorities have to spend on local people and local services.

6.163 Local authorities are now able to keep 50% of the growth in business rates revenue that is generated in their administrative area. The Government's intention is that this will provide a strong financial incentive for local authorities to promote economic growth, as well as providing a greater degree of discretion in terms of expenditure of this additional revenue.

6.164 The Government has recently announced that, from 2020, local authorities will retain 100% of their business rates. This will provide local authorities with an increasingly important source of income over this period, to enable them to effectively plan, budget and reinvest in growing their economies.

6.165 The Proposed Development includes commercial uses that will be liable for payment of business rates to Kirklees Council. The Council's latest Statement of Accounts (Ref 6.35) indicates that, in 2014/15, approximately £104.0 million of Council income was collected through business rates. Over the 10 year period from 2004/05 to 2014/15, the income collected from business ratepayers has increased by 11.6%, equivalent to an average annual increase of 1.2% (Ref 6.36).

6.166 The Proposed Development could generate circa £750,000 business rate revenue per annum, of which under current arrangements 50% or £375,000 could be retained by the Council, until 2020 when 100% could be retained.

6.167 The impact of business rates revenue arising directly from the Proposed Development is assessed as beneficial when considering the sensitivity on local public budget and expenditure for Kirklees Council. The magnitude of the impact of the Proposed Development compared to the recent change in business rates collected is moderate. Therefore, there is likely to be an indirect, permanent, long-term effect of **moderate beneficial significance** to the Council's revenue at the **local impact area** scale.

6.168 There will be no significant effect on the wider scale public budget and expenditure arising from business rates revenue generated by the operational phase of the Proposed Development.

Council Tax Revenue

6.169 The Proposed Development includes residential dwellings that will be liable for payment of council tax to Kirklees Council. The Council's latest Statement of Accounts (Ref 6.35) indicates that, in 2014/15, approximately £165.0 million of Council income was collected through council tax. Over the 10 year period from 2004/05 to 2014/15, the income collected from council tax has increased by 40.3%, equivalent to an average annual increase of 4.0% (Ref 6.36).

6.170 Upon completion and full occupation, the Proposed Development could generate Council Tax payments of circa £130,000 per annum, equivalent to approximately £1.3 million over an indicative ten year period. This will increase revenue available to Kirklees Council to invest in local services.

6.171 The impact of Council Tax revenue for Kirklees Council is assessed as beneficial. The magnitude of the impact of the Proposed Development is assessed as negligible. Therefore, there is likely to be a **negligible** effect upon the council tax revenues of Kirklees Council.

New Homes Bonus

6.172 In 2016/17, approximately £1.2 million in New Homes Bonus payments was allocated to Kirklees Council (Ref 6.37), which is lower than the average annual payment of £1.5 million over the past 6 years. The Proposed Development could generate circa £860,000 per annum in New Homes Bonus payments for Kirklees Council, payable over a six year period.

6.173 The impact of increases in New Homes Bonus revenue for Kirklees Council is beneficial. The magnitude of the Proposed Development on New Homes Bonus payment levels within the local impact area is assessed as moderate. Therefore, there

is likely to be an indirect, temporary, medium-term effect of **moderate beneficial** significance on local authority revenues.

Housing

6.174 Kirklees Council's Draft Local Plan (Ref 6.9) has identified the requirement and need to build an additional 1,630 dwellings annually in order to reach the overall target of 29,340 homes over the plan period from 2013-31. The Proposed Development is for 101 dwellings that are expected to be delivered over an approximate 3 year period. This is equivalent to 2.1% of the 1,630 homes that need to be delivered in Kirklees annually until 2031. It is expected that it will result in a **negligible** effect.

Labour Force

6.175 The Proposed Development has the potential to provide accommodation for a range of households, some of which will contain economically active residents. Economically active individuals are a valuable resource in terms of the labour force that is available to local employers, as well as a potential source of competitive advantage in attracting new business investment. This aligns with priorities of the LEP (Ref 6.7) and local government (Ref 6.9 and 6.12) to ensure support the economy and employment growth.

6.176 The assessment indicates that the delivery of up to 101 dwellings could increase the resident population by circa 253 residents upon completion and occupation of new homes. Based on prevalent economic activity rates across the local impact area, the Proposed Development could house circa 121 economically active residents of working age. Of this total, based on employment rates in the local impact area, circa 112 residents on the Application Site could be in employment.

6.177 The effect of increasing the economically active population is assessed as beneficial. The magnitude of the effect of the Proposed Development on the overall level of economic activity across the local and wider impact areas is negligible, relative to the absolute scale of change and benchmarked against the annual increase in the economically active population over the last 10 years. The effect is therefore **negligible** at the **local and wider levels**.

Household Expenditure

6.178 Household expenditure has been estimated as part of the assessment undertaken. It is estimated that new residents of the Proposed Development that are in employment could have gross earnings potential of at least £2.5 million per annum based on earnings data provided by ASHE (Ref 6.16). Earnings fund purchases in relation to housing, food shopping, comparison goods, leisure and other forms of discretionary expenditure. This can help to support local businesses and associated employment.

6.179 Based on approximate spending trends in the local impact area, the Proposed Development has the potential to generate circa £1.2 million in convenience and comparison retail expenditure per annum through residents living on the scheme, with a further circa £730,000 potentially being spent per year on leisure goods and services. This will provide a valuable source of trade for local businesses and will help to sustain employment in the local retail and leisure industries.

6.180 The impact of changes in household expenditure on local businesses is assessed as beneficial. The magnitude of the impact of the Proposed Development on expenditure

levels across the local and wider impact areas is negligible. Therefore, there is likely to be a **negligible** effect on local businesses.

Education

6.181 According to the Kirklees Council's Local Plan Technical Paper: Infrastructure (Ref 6.21) new developments will generate 3 children per 100 houses per primary school year group and 2 children per 100 houses per secondary school year group. Based on the provision of up to101 new dwellings, the Proposed Development is estimated to generate a total of 31 primary and secondary pupils, as set out in the following table.

Table 6.22: Pupil yield

	Number of Dwellings	Pupil Yield	No. of Year Groups	Additional Places Required
Primary School	101	0.03	7	21
Secondary School	101	0.02	5	10
Total	**-**	**-**	**-**	**31**

Source: Ref 6.21; Turley2016;

Primary schools

6.182 Reflecting on the capacity of primary schools identified in the Baseline, there are 36 surplus places within primary schools in the local impact area, yet evidence suggests that there is anticipated future primary education need. Based on the requirement for 21 additional pupils, the Proposed Development will result in a **minor adverse**, direct, permanent and long-term impact at the **neighbourhood level**.

Secondary schools

6.183 Reflecting on the capacity of secondary schools identified in the Baseline, there are 374 surplus places within secondary schools in the local impact area, yet evidence suggests that there is anticipated future secondary education need. Based on the requirement for 10 additional pupils, the Proposed Development will result in a **minor adverse**, direct, permanent and long-term impact at the **neighbourhood level**.

Health

6.184 Based on the Royal Academy of General Practitioners GP to patient ratio (1 GP per 1,800 people), it is calculated that the expected households from the development will require 0.13 GPs. The analysis earlier in this chapter noted that there is capacity to accommodate new patients within existing facilities, with all GP surgeries and 3 dental practices accepting new patients, and that there is current surplus provision of 5 GPs within existing healthcare facilities. This suggests that the increased population can be accommodated within existing local health facilities. Therefore, impact of the Proposed Development on local facilities is assessed as **negligible** at the **neighbourhood level**.

Open Space and Recreation Facilities

6.185 The Kirklees Open Space Study (Ref 6.25) provides evidence of the quantity of open space and recreation facilities by hectare across the neighbourhood and local impact areas. This evidence suggests that there is sufficient provision of amenity greenspace within the sub-region of Batley and Spen, in addition to adequate provision of parks and

recreation grounds and provision for children and young people. Currently there is insufficient provision of natural and semi-natural greenspace in the neighbourhood impact area.

6.186 The Proposed Development will deliver up to 2,848sqm, or up to 0.28ha, of structural landscaping on-site, contributing to the level of amenity greenspace. When benchmarked against national quantity standards (Ref 6.6) this is expected to provide a surplus provision of amenity greenspace than required.

6.187 Nevertheless, through the development of up to 101 new homes and the generation of circa 253 new residents, the Proposed Development will generate additional demand in the neighbourhood area for other types of open space and recreation facilities that will not be provided by the Proposed Development. These are presented below:

Table 6.23: Additional Requirement for Open Space and Recreation Facilities

Type of Open Space	Quantity (hectares per 1,000 people)	Hectares Required
Playing Pitches	1.20	0.29
All Outdoor Sports	1.60	0.39
Equipped / Designated Play Areas	0.25	0.06
Other Formal Outdoor Provision	0.30	0.07
Parks and Gardens	0.80	0.19
Amenity Green Space	0.60	0.15
Natural and Semi-Natural Green Space	1.80	0.44

Source: Ref 6.6; Turley 2016;

6.188 As a result, it is expected that the Proposed Development will have a **negligible** effect on open space and recreation facilities at the **neighbourhood level**.

Scope of Mitigation

Construction

6.189 There are no significant adverse socio-economic effects identified, and hence no mitigation is required during the construction phase.

Completed Development

6.190 The adverse impacts on education and open space are below moderate and so no significant adverse socio-economic effects are identified, hence no mitigation is required during the operational phase.

Residual Effects Assessment

6.191 The following table presents the residual impacts for the Proposed Development. As only moderate or above effects are considered significant, significant effects relate to:

- Construction employment;
- Construction productivity;
- Operational business rates; and
- New Homes Bonus.

Table 6.24: Residual Effects Summary

Construction / Operational	Impact	Impact				Mitigation	Residual			
		Impact Significance	Adverse / Beneficial	Neighbourhood, Local, Wider	Direct/Indirect (D/I) Permanent/temporary (P/T) Period (ST/MT/LT)		Impact Significance	Adverse / Beneficial	Local, Regional, National	Direct/Indirect (D/I) Permanent/temporary (P/T) Period (ST/MT/LT)
Construction	Employment	Substantial	Beneficial	Local	D/I, T, ST	None required	Substantial	Beneficial	Local	D/I, T, ST
	Employment	Negligible	-	Wider	-	None required	Negligible	-	Wider	-
	Economic Productivity	Substantial	Beneficial	Local	D/I, T, ST	None required	Substantial	Beneficial	Local	D/I, T, ST
	Economic Productivity	Minor	Beneficial	Wider	D/I, T, ST	None required	Minor	Beneficial	Wider	D/I, T, ST
Operational	Employment	Minor	Beneficial	Local and Wider	D/I, P, LT	None required	Minor	Beneficial	Local and Wider	D/I, P, LT
	Economic Productivity	Negligible	-	Local and Wider	-	None required	Negligible	-	Local and Wider	-
	Business Rates	Moderate	Beneficial	Local	D/I, P, LT	None required	Moderate	Beneficial	Local	D/I, P, LT
	Council Tax	Negligible	-	Local	-	None required	Negligible	-	Local	-
	New Homes Bonus	Moderate	Beneficial	Local	D/I, T, MT	None required	Moderate	Beneficial	Local	D/I, T, MT

Construction / Operational	Impact	Impact				Mitigation	Residual			
		Impact Significance	Adverse / Beneficial	Neighbourhood, Local, Wider	Direct/Indirect (D/I) Permanent/temporary (P/T) Period (ST/MT/LT)		Impact Significance	Adverse / Beneficial	Local, Regional, National	Direct/Indirect (D/I) Permanent/temporary (P/T) Period (ST/MT/LT)
	Housing	Negligible	-	Local	-	None required	Negligible	-	Local	-
	Labour Force	Negligible	-	Local and Wider	-	None required	Negligible	-	Local and Wider	-
	Household Expenditure	Negligible	-	Local and Wider	-	None required	Negligible	-	Local and Wider	-
	Primary Education	Minor	Adverse	Neighbourhood	D, P, LT	None required	Minor	Adverse	Neighbourhood	D, P, LT
	Secondary Education	Minor	Adverse	Neighbourhood	D, P, LT	None required	Minor	Adverse	Neighbourhood	D, P, LT
	Health	Negligible	-	Neighbourhood	-	None required	Negligible	-	Neighbourhood	-
	Open Space and Recreation Facilities	Negligible	-	Neighbourhood	-	None required	Negligible	-	Neighbourhood	-

Cumulative Effects Assessment

6.192 The following development proposals are other committed or potential developments within the vicinity of the Application Site:

- **Land at Slipper Lane, Mirfield -** Outline application for erection of commercial floorspace (B1c, B2, B8) including details of engineering operations to form serviced employment plots and full application for the erection of 166 dwellings.

- **Peat Pond Farm, Lindley Moor Road, Lindley Moor -** Demolition of existing buildings, Outline application for Industrial Development (Class B1c B2 or B8) Plot A - (160,000sq ft./14,864 sqm). Erection of industrial unit. Plot B - (50,000sqft/ 4648 sqm) unit access from Crosland Road Detailed application (Plot C) for residential development of 252 dwellings, provision of open space and landscaping.

6.193 The wider growth of the area in terms of homes and jobs as set out above will generate employment and productivity impacts during construction. The indicators that are expected to be impacted as a result of the committed developments during the operational phase include:

- Employment – additional jobs will be created through direct employment during the construction and operation of the schemes and indirect/induced employment will also be generated. The expenditure impact of new residents will generate employment through direct and indirect multipliers.

- Productivity – the construction and operation of the schemes will generate an increase in Gross Value Added (GVA). GVA measures the value of output created (i.e. turnover) net of inputs purchased, and is used to produce a good or service (i.e. production of the output).

- Business rates – businesses pay non-domestic rates (known as business rates) to contribute to the cost of the local authority providing public services within the area that the business property is situated. The new businesses will generate an uplift in business rate revenue.

- Retail and service provision – new residents will increase the demand for shops and services, in turn ensuring that sufficient provision is maintained in the local area.

- Housing – new homes developed will contribute to the local housing targets and will meet local housing needs, including affordable housing needs.

- Labour force – new residents will be economically active and employed, therefore enhancing the size and structure of the local labour force.

- Household income and expenditure – additional household income will be generated by employed residents living in the new homes and the household expenditure generated by the additional new homes will contribute significantly to

sustaining local shops and businesses, which in turn are an important source of local employment.

- Education – new residents will increase the demand for education provision within local schools.
- Health – new residents will increase the demand for health provision within local facilities.
- Open spaces and recreation and facilities – the provision of open spaces and recreation facilities can contribute to the health and well-being of communities.
- Council Tax revenue – the new homes will generate an uplift in Council Tax revenue that could provide an important source of revenue funding for the relevant Council.
- New Homes Bonus – the new homes will generate an uplift in New Homes Bonus funding that could provide an important source of revenue funding for the relevant Council.

6.194 Based on an assessment of the committed development proposals set out above, the delivery of employment floorspace will have a major beneficial cumulative impact upon employment and productivity levels, during both the construction and operational phases. The delivery of new homes will also generate beneficial cumulative impacts upon the local labour force with associated increased levels of household expenditure and resident income. Based on the scale of the committed development proposals, mitigation measures may be required to offset any significant adverse cumulative effects upon education and open space provision. As a result of any required mitigation, the potential significant adverse cumulative impact upon education and open space provision will be negligible to minor, and is therefore not considered to be significant in EIA terms.

Monitoring

6.195 No mitigation measures are required and hence monitoring regimes are not necessary.

References

Ref 6.1 HM Government (July 2015) 'Fixing the Foundations'

Ref 6.2 HM Government (July 2015) 'Laying the Foundations: A Housing Strategy for England'

Ref 6.3 HM Government (2012) 'National Planning Policy Framework'

Ref 6.4 HM Government (2014) 'National Planning Policy Guidance'

Ref 6.5 Fields in Trust (2008) 'Planning and Design for Outdoor Sport and Play'

Ref 6.6 Fields in Trust (2015) 'Guidance for Outdoor Sport and Play: Beyond the six acre Standard'

Ref 6.7 Leeds City Region Local Enterprise Partnership (May 2016) 'Strategic Economic Plan 2016 – 2036'

Ref 6.8 Kirklees Council (2007) 'Kirklees Unitary Development Plan'

Ref 6.9 Kirklees Council (November 2015) 'Draft Local Plan - Strategy and Policies'

Ref 6.10 Kirklees Council (2014) 'Local Development Scheme'

Ref 6.11 City of Bradford Metropolitan District Council (October 2005) 'Replacement Unitary Development Plan for the Bradford District'

Ref 6.12 City of Bradford Metropolitan District Council (November 2015) 'Core Strategy DPD Proposed Main Modifications'

Ref 6.13 ONS (2011) 'Census 2011 & 2001'

Ref 6.14 ONS (2015) 'Annual Population Survey'

Ref 6.15 ONS via Nomis (2016) 'Jobseeker's Allowance by Occupation'

Ref 6.16 ONS via Nomis (2015) 'Annual Survey of Hours and Earnings'

Ref 6.17 ONS via Nomis (2014) 'Business Register and Employment Survey'

Ref 6.18 Kirklees Council (2015) 'Annual Monitoring Report 2013-2014'

Ref 6.19 http://www.education.gov.uk/edubase

Ref 6.20 Kirklees Council (October 2015) 'Securing Sufficient High Quality Learning and Childcare Places - School Organisation, Planning and Development for 2015-2018'

Ref 6.21 Kirklees Council (November 2015) 'Kirklees Local Plan – Technical Paper: Infrastructure'

Ref 6.22 City of Bradford Metropolitan District Council (September 2015) 'Bradford District Education Organisation Plan'

Ref 6.23 Public Health England (2014) 'Active People Survey: excess weight data for the Public Health Outcomes Framework (2012 –2014)'

Ref 6.24 http://nhs.uk

Ref 6.25 Kirklees Council (November 2015) 'Kirklees Local Plan Open Space Study: Open Space Assessment Report'

Ref 6.26 Building Cost Information Service (2016) 'Average Prices '

Ref 6.27 Department for Business, Innovation and Skills (BIS) (2015) 'Business Population Estimates'

Ref 6.28 HCA (2014) 'Additionality Guide 4th Edition'

Ref 6.29 Experian (2016) 'Local Market Forecast Quarterly' (March 2016)

Ref 6.30 HCA (2015) 'Employment Density Guide 3rd Edition'

Ref 6.31 Valuation Office Agency (2015) 'Business Rates Valuation Tool'

Ref 6.32 DCLG (2016) 'New Homes Bonus Calculator'

Ref 6.33 Oxford Economics, via Pitney Bowes (2015) 'Household Expenditure'

Ref 6.34 Government Legislation (1996) 'Education Act 1996'

Ref 6.35 Kirklees Council (2015) 'Statement of Accounts 2014/2015'

Ref 6.36 Kirklees Council (2015) 'Statement of Accounts 2004/2005'

Ref 6.37 DCLG (2015) 'New Homes Bonus Final Allocations for 2016/2017'

7. Landscape and Visual

Purpose of the Assessment

7.1 This chapter of the ES, prepared by TGP Landscape Architects (North) Ltd assesses the potential landscape and visual impacts of the Proposed Development An assessment of effects follows and considers whether mitigation measures are required to prevent, reduce or offset the impact. Residual impacts are then considered.

7.2 This chapter is supported by Figures 7.1 – 7.16, Photomontages Viewpoint 7.1 – 7.4 and **Tables 7.1 – 7.9** provided at the end of the chapter

Legislative and Policy Framework

7.3 This LVIA has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2011 (Ref 7.1), and best practice, as outlined in the following documents:

7.4 A full and detailed consideration of national and local planning policy is contained in the accompanying Planning Statement. However, the following section reviews the policies of particular relevance to landscape and visual issues.

Legislative Framework

7.5 This section provides a brief review of existing planning policies or extracts from policies which are directly relevant to landscape issues relating to the Proposed Development.

European Landscape Convention (March 2007)

7.6 The European Landscape Convention (ELC), created by the Council of Europe, promotes landscape protection, management and planning, and European co-operation on landscape issues. Signed by the UK government in February 2006, the ELC became binding from March 2007. It applies to all landscapes, towns and villages, as well as open countryside; the coast and inland areas; and ordinary or even degraded landscapes, as well as those that are afforded protection.

7.7 The ELC defines landscape as: "An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors." (Council of Europe 2000).

7.8 It highlights the importance of developing landscape policies dedicated to the protection, management and creation of landscapes, and establishing procedures for the general public and other stakeholders to participate in policy creation and implementation. Natural England is leading the implementation of the ELC in England and has worked with Defra and English Heritage to produce European Landscape Convention: A Framework for Implementation in England, published in October 2007.

Policy Framework

7.9 The policy documents are:

- National Planning Policy Framework (March 2012) (Ref 7.2)
- Kirklees Unitary Development Plan (1999) (Ref 7.3x)
- Bradford Council Replacement Unitary Development Plan (2005) (Ref 7.4)
- Calderdale Unitary Development Plan (2006) (Ref 7.5)

National Planning Policy Framework (March 2012) as amended

7.10 At the heart of the National Planning Policy Framework (NPPF) is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.

7.11 Paragraph 17 of the NPPF sets out 12 key principles of planning and states that it should:

'always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings' (bullet point number 4);

'take account of the different roles and character of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it' (bullet point number 5); and

'encourage the effective use of land by reusing land that has been previously developed brownfield land) provided that it is not of high environmental value.' (bullet point number 8)

7.12 Paragraphs 79-89 (Protecting Green Belt) provide the national approach to development in the Green Belt pertinent to the Proposed Development.

7.13 Paragraphs 109,111, 113-115 set out the national approach to the reuse of brownfield land, use of agricultural land and protecting important landscapes. Paragraph 111 states that 'planning policies and decisions should encourage the effective use of land by re-using land that has been previously been developed (brownfield land), provided that it is not of high environmental value'. The NPPF is support by a Planning Practice Guide which provides further guidance on the approach to be taken to the implementation of the NPPF.

Kirklees Unitary Development Plan (1999)

7.14 The majority of the application site is within Kirklees District, and, as such, the relevant development plan comprises the 'saved' policies of the Kirklees UDP, (refer to Figure 7.2 Kirklees Unitary Development Plan extract), which was adopted in March 1999. As a result of a Direction issued by the Secretary of State for Communities and Local Government, from 28 September 2007 some of the policies in the UDP continue to

have effect ('saved policies'). Those policies not covered by the Direction are not "saved" and no longer form part of the development plan.

Policy G1

7.15 Regeneration will be secured through developments which:

(i) Strengthen and broaden the economic base and increase employment opportunities

(ii) Improve infrastructure and secure the reuse of land and buildings and the improvement of their surroundings

(iii) Benefit the economically deprived parts of the district, and

(iv) Improve the district's image

Policy G4

7.16 New development should achieve a high standard of design

Policy G5

7.17 Development proposals should have regard to equality of opportunity in terms of access to buildings and open space facilities and other relevant aspects of design, including the provision of ancillary facilities

Policy D1

7.18 Development proposals which would lead to a loss of valuable open land within towns or urban countryside will not normally be permitted

Policy BE1

7.19 All development should be of good quality design such that it contributes to a built environment which:

(i) Create or retains a sense of local identity

(ii) Is visually attractive

(iii) Promotes safety, including crime prevention and reduction of hazards to highway users;

(iv) Promotes a healthy environment, including space and landscaping about buildings and avoidance of exposure to excessive noise or pollution;

(v) Is energy efficient in term of building design and orientation and conducive to energy efficient modes of travel, in particular walking, cycling and use of public transport

Policy BE2

7.20 New development should be designed so that:

(i) It is in keeping with any surrounding development in respect of design, materials, scale, density, layout, building height or mass;

(ii) The topography of the site (particularly changes in level) is taken into account;

(iii) Satisfactory access to existing highways can be achieved; and

(iv) Existing and proposed landscape features (including trees) are incorporated as an integral part of the proposal.

Policy DL1

7.21 Derelict and neglected land will be brought into beneficial use to assist in the regeneration of the district.

7.22 Landscape Character Assessment

7.23 Kirklees Council Landscape Architects have prepared a landscape character assessment (2015) for the Former North Bierley Wastewater Treatment Works (Ref. 712), refere to 7.90.

Bradford Replacement Unitary Development Plan (2005)

7.24 The Replacement Unitary Development Plan (RUDP) sets out Bradford Council's policies and proposals for the use and development of land and buildings. The plan was adopted in October 2005. As a result of a Direction issued by the Secretary of State for Communities and Local Government, from 28 September 2007 some of the policies in the RUDP continue to have effect ('saved policies'). Those policies not identified in the Direction are not saved and no longer form part of the development plan.

7.25 The pertinent saved policies within the Bradford RUDP can be identified and summarised as:

- Policies UDP 1-3 (location of development and quality of the environment) – focus development in the urban areas on brownfield land in sustainable locations and away from areas of restraint such as Green Belt. Development should seek to maintain and improve the built and natural environment

- Policies UR3 (impact on adjacent land) – permit development that has no adverse effect on the surrounding environment or occupants of adjoining land;

- Policies D1 and D5 (good quality design including landscaping) – ensure that development makes a positive contribution including enhancing important landscape features;

- Policy GB1 (Green Belt) – development will not be supported in the Green Belt except in very special circumstances, and unless it is for agriculture/forestry, essential facilities for sports and leisure, and cemeteries or for uses that preserve the openness of the Green Belt or the purposes of including land within it ;

- Policies NE3 - the site lies within the South Bradford Character Area as identified by NE3,

- Policy NE3a sets the criteria against which applications will be assessed, having regard to the relevant landscape character area.

"Within the landscape character areas identified in Policy NE3 development likely to affect the appearance of the landscape will be assessed having regard to the extent to which it would:

- *cause unacceptable visual intrusion;*
- *introduce or remove incongruous landscape elements;*
- *cause the disturbance or loss of or help to maintain:*
  - *landscape elements that contribute to local distinctiveness;*
  - *historic elements which contribute significantly to landscape character and quality, such as field, settlement or road patterns, and landform;*
  - *semi-natural vegetation which is characteristic of that landscape type;*
  - *the visual condition of landscape elements"*

7.26 The policies in the RUDP as identified above will eventually be replaced by policies within the Core Strategy.

Bradford Emerging Core Strategy

7.27 Bradford Council is in the latter stages of preparing a new development plan. At the end of 2015/early 2016 the Council consulted on the Proposed Main Modifications to the Core Strategy. The new plan was the subject to further Examination in Public in the Spring of 2016. The Inspector will issue their report later in 2016, and the Council will adopt the Plan later in 2016/early 2017.

7.28 Whilst the policies within the emerging Core Strategy have not been adopted, they have been reviewed by an Inspector so have some weight in the consideration of any planning application.

7.29 In terms of landscape issues, Policy EN4 sets out the Landscape character Areas for the district. The Application Site lies within the South Bradford Area, refer to Figure 7.3 Bradford Unitary Development Plan extract (**Technical Appendix 7.1**). This Policy also sets out the criteria against which a planning application will be considered, including the impact on landscapes and/or visual effects, the importance of cultural or historic elements in the landscape and the setting of settlements, the opportunity to improve a landscape through positive restoration and improving habitat connectivity.

7.30 Policy DS2 is also of relevance and requires consideration to be given to the ability of a development to be accommodated within a landscape, take advantage of existing features and create quality places.

Calderdale Unitary Development Plan

7.31 The Statutory Development Plan for Calderdale is the Replacement Calderdale Unitary Development Plan (RCUDP) which was adopted in 2006, the Metropolitan Borough of Calderdale is located some 3km to the west of the Proposed Development site and is

therefore included in the study area for the LVIA, refer to Figure 7.4 Calderdale Unitary Development Plan extract.

Assessment Methodology

Methodology

7.32 The methodology for this LVIA is based on the 'Guidelines for Landscape and Visual Impact Assessment', Third Edition: 2013 (GVLIA 3, 2013) (Ref 7.6.), edited by the Landscape Institute and the Institute of Environmental Management and Assessment. This document is regarded as the industry standard and sets out the principles for the assessment process. Other guidance and landscape character assessments considered in this chapter include:

- Green Infrastructure An Integrated Approach to Land Use (Landscape Institute Position Statement 2013) (Ref 7.7)
- Photography and Photomontage in Landscape and Visual Impact Assessment Landscape Institute Advice Note 01/2011. (Ref 7.8)
- An Approach to Landscape Character Assessment 2014 (Natural England) (Ref. 7.9)
- Landscape Character Assessment: Guidance for England and Scotland 2002 (The Countryside Agency and Scottish Natural Heritage) Ref. 7.10
- The Character of England: Landscape, Wildlife and Natural Features 1996 (Countryside Commission and English Nature). Ref. 7.11.
- Land Use Consultants *South Pennines Landscape Character Assessment*, report to Standing Conference of South Pennines Authorities (SCOSPA) (1999) (Ref 7.12)

7.33 This LVIA adopts the European Landscape Convention definition of landscape which is inclusive of, among others, seascape, townscapes, cityscapes as well as all forms of rural landscape.

7.34 Professional judgement is a critical part of LVIA with regard to gauging the significance of identified effects. While there is some scope for quantitative measurement, much of the assessment relies on qualitative judgement. It is important that such professional judgement is based on a logical and transparent methodology. This section of the LVIA sets out the framework upon which the assessment has been made.

Landscape and Visual Effects

7.35 As recommended in the GVLIA, in this assessment the term 'impact' is defined as the action being taken, and the term 'effect' is defined as the change resulting from that action.

7.36 It is the purpose of this LVIA to give detailed consideration to the landscape and visual effects.

7.37 Assessment of **landscape effects** is defined by the GVLIA as "assessing effects on the landscape as a resource in its own right". Components of the landscape that are likely to be affected by a Proposed Development are referred to as *landscape receptors* and can include individual elements, specific aesthetic or perceptual qualities and the character of the landscape. Landscape effects derive from changes in the physical landscape which may give rise to changes in its character and how this is experienced. This may in turn affect the perceived value of the landscape.

7.38 Assessment of **visual effects** is defined by the GVLIA as "assessing effects on specific views and on the general visual amenity experienced by people." People who will be affected by changes in views or visual amenity are referred to as *visual receptors* and visual effects relate to the changes that arise in the composition of available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.

7.39 Landscape and visual effects can be negative (adverse) or positive (beneficial) in their consequences for landscape or for views and visual amenity. They can be direct, indirect, secondary, cumulative, short-, medium- and long-term, permanent or temporary.

7.40 The level of significance ascribed to landscape and visual effects depends primarily on the interaction between, and combination of, the sensitivity of the landscape/visual receptor and the scale, or magnitude of the predicted effect of the development.

7.41 To assess levels of **sensitivity**, both the **susceptibility** of the receptor to the type of change arising from the Proposed Development and the **value** attached to the receptor, need to be considered. In assessing the landscape value, a measure of the physical state of the landscape may be made in terms of its intactness from a visual, functional or ecological perspective. It also 'reflects the state of repair of individual features and elements which make up the character in any one place' (Countryside Agency and Scottish Natural Heritage, 2002). (Ref 7.10)

7.42 In considering the **magnitude of change**, judgements need to be made about the size and scale, geographical extent, duration and reversibility of the effect identified. Once levels of receptor sensitivity and the magnitude of change resulting from a specific effect have been determined, a judgement can be made about the overall **significance** of that effect.

7.43 In order to establish transparency of the assessment process used in the LVIA, tables below show the criteria for the classification of:

- Criteria for Assessing Landscape Value
- Criteria for Assessing Magnitude of Change for Landscape Receptors
- Criteria for assessing the susceptibility of visual receptors to change
- Criteria for assessing magnitude of change for Visual Receptors

- Correlation of Sensitivity & Magnitude of Change to determine Significance of Effects.

Study Area

7.44 The location and extent of the application site is shown in Figure 7.1: Location Plan (**Technical Appendix 7.1**).

7.45 The Application Site covers two areas. The larger is approximately 23ha, including land associated with the former waste water treatment works and adjacent agricultural land. The site of the proposed car park is approximately 0.3 ha and is currently an area of damp pasture used for grazing.

7.46 The extent of the study area (refer to figure 7.5: 5km Study Area) is based on a 5km radius from the centre of the application site in all directions, as determined by the initial Zone of Theoretical Visibility (ZTV). This was prepared with the initial baseline desk studies and field evaluation. The context of the Proposed Development is shown in Figure 7.6 Aerial Photograph (**Technical Appendix 7.1**).

7.47 This assessment is based on KPP Architects Parameters Plan 1773-01-207 and Masterplan/Highways Implication Plan 1773-01-206Rev A and the landscape masterplan produced by TGP Landscape Architects (Refer to Figure 7.7 Landscape Masterplan, **Technical Appendix 7.1**). The iterative design process involved all members of the design team along with public consultation and sensitive design approach. The proposed car park for the school is illustrated on KPP Architects drawing 1773-01-203 and Figure 7.5 Proposed School Parking Layout.

7.48 While the Outline Planning Application is for development as shown on the Parameters Plan, the Masterplan and 3D model supplied by KPP Architects has been used for the purpose of this LVIA An initial ZTV was run using indicative development plateau levels supplied by KPP Architects and based on the maximum height of the commercial units of 13.0 metres. This ZTV was later added to with the inclusion of the residential houses based on a maximum height of 8.5 metres (refer to Figures 7.9 – 7.11 Zones of Theoretical Visibility, **Technical Appendix 7.1**). The ZTV is based entirely on the effects of topography and does not take into account the screening effects of adjacent settlements and vegetation. The ZTV indicates that the Proposed Development may be seen in places along the valley that runs northwest to southeast. Depending on the form of the development it is unlikely that the site will be seen from Bradford and most of Oakenshaw.

7.49 The Zone of Visual Influence (ZVI) takes into account the screening effects of intervening vegetation and urban form (refer to Figures 7.12 – 7.14 Zones of Visual Influence, **Technical Appendix 7.**1). The ZVIs and field observations have shown the site cannot be seen from the M606 until after the Euroways trading estate, on the M62 slip road (travelling south). The site is seen from the M62 (junction 26 area) but the motorway embankment will also act as a barrier to views from the south. It is likely that the Proposed Development will be seen from higher ground to the northeast with some isolated properties along Cliff Hollins Lane forming the main likely residential receptors. Individual and combined ZTVs and ZVIs were produced for the proposed commercial and residential developments.

Surveys

7.50 Site visits were carried out in April and May 2014. These were used to identify current features of the landscape within and surrounding the site, and how these elements contribute to and combine to establish the landscape's character of the area. Subsequent site visits were carried out in August 2014 and June 2015 as the Masterplan was developed and later the inclusion of a residential development and a car park was included in the assessment (refer to Figure 7.7: Landscape Masterplan, **Technical Appendix 7.1**).

Consultation

7.51 Photomontage locations were agreed with Mr S Hopwood of Kirklees Council in 2014 (refer to Figure 7.23 Photomontage Viewpoint Location Plan). An additional photomontage was requested by Mr Hopwood in 2015, refer to Viewpoint 7.4.

Significance Criteria – Assessment of Landscape Effects

7.52 Assessing the Landscape Effects requires methodical consideration of each effect identified and, for each one, assessment of the sensitivity of the landscape receptors and the magnitude of the effect of the landscape.

7.53 The initial landscape appraisal began with a baseline study, which included data collection and a desktop review of information relating to the components, character and scenic quality of the townscape, and landscape, including:

- Ordnance Survey maps
- Aerial photographs
- Relevant planning policy and guidance
- Landscape, historic and environmental designations; and
- National, regional and local scale landscape character assessments.

7.54 To assist the understanding of landscape value, landscape designations over a study area defined by a 5km radius from the centre of the site were identified using Defra's 'MAGIC' web-based data base.

7.55 Plans of the Proposed Development produced by KPP Architects were used to determine the impacts of the scheme on landscape features and character. A number of masterplan options were then developed for discussion.

7.56 The objective of the baseline study for the landscape is to provide an understanding of the landscape in the area that may be affected – its constituent elements, its character, spatial patterns, its geographic extent, its history, its condition, the way in which landscape is experienced and the value attached to it. This information is then reviewed alongside the description of the Proposed Development to form the basis for the identification and description of the changes that will result in the landscape effects of the proposal.

Landscape Sensitivity

7.57 In order to assess landscape receptors in terms of their sensitivity, judgements of their susceptibility to the proposed development and the value attached to the landscape are combined and assessed.

7.58 The susceptibility to change is the ability of the landscape receptor to accommodate the Proposed Development without undue consequences for the maintenance of the baseline conditions. Judgements on the susceptibility are recorded as High, Medium or Low and include assessment of the following:

- Landscape character and quality – the main consideration, based on collective landscape characteristics.
- Individual elements or features within the landscape.
- Landscape scale – the relative size of the main landscape elements and components.
- Particular aesthetic and perceptual aspects.

7.59 Value of the landscape receptors is established in the baseline conditions and covers the value of the Landscape Character Types and Areas that may be affected, based on review of any designations at both national and local level. Where there are no designations judgement is based on the value of individual contributors to landscape character, especially the key characteristics, which may include individual elements of the landscape, particular landscape features, notable aesthetic and perceptual or experiential qualities.

7.60 **Table 7.1** below sets an indicator of the values attached to landscape designations when assessing landscape value. It should be noted that the presence or absence of designations does not dictate the value assessment and are only indications of likely value judgements.

Table 7.1: Criteria for Assessing Landscape Value

Value		Typical Criteria	Typical Scale	Examples
High	Exceptional	High Importance and rarity. No/very limited potential for substitution.	International, National.	World Heritage Sites, AONB, National Park, National Scenic Area
	High	High Importance and rarity. Limited potential for substitution.	National, regional, local	AONB, National Park, National Scenic Area
Moderate	Moderate	Medium importance and rarity. Limited potential for substitution.	Regional, local.	Regional Scenic Area.

Value		Typical Criteria	Typical Scale	Examples
	Moderate-low	Medium importance and rarity. Some/good potential for substitution.	Regional, local.	Undesignated but value expressed in demonstrable use.
Low	Low	Low importance and rarity.	Local.	Area identified as having some aspect of local value but with scope for improvement.
	Very low	Low importance and rarity.	Local.	Area identified for recovery/enhancement.

7.61 The sensitivity of the landscape receptors is then calculated by combining the susceptibility to change and the landscape value. If the susceptibility to change is high and the landscape value is high, then the sensitivity of the landscape would be judged as high. If the susceptibility to change is low and the landscape value is low, then the sensitivity of the landscape receptor would be judged as low.

Magnitude of Change for Landscape Receptors

7.62 The magnitude of change for landscape receptors arising from the Proposed Development is classified as substantial, moderate, slight or negligible, again dependent on interpretation of a number of factors, but unlike assessments of sensitivity, these are largely quantifiable. Each effect of the Proposed Development on landscape receptors then needs to be assessed in terms of its size or scale, the geographical extent or the area influenced and its duration and reversibility. This will determine the magnitude of landscape effects. The Proposed Development is considered to be permanent and non-reversible throughout this report.

Table 7.2: Criteria for assessing magnitude of change for Landscape Receptors

Level	Typical Criteria
Substantial	Total loss of or major alteration to key elements/features/characteristics of the baseline landscape. Introduction of elements considered to be totally uncharacteristic in the context of the baseline landscape altering the aesthetic or perceptual aspects of the landscape. Removal of elements considered to be important aesthetic or perceptual aspects of the landscape. Landscape effects felt over a large geographical scale, influencing several landscape types or character areas.

Level	Typical Criteria
Moderate	Partial loss of or alteration to key elements/characteristics of the baseline landscape. Introduction of elements that may be prominent but may not necessarily be considered substantially uncharacteristic in the context of the baseline landscape and moderately altering the aesthetic or perceptual aspects of the landscape. Removal of elements considered to contribute to aesthetic or perceptual aspects of the landscape. Landscape effects at the scale of the landscape type or character area within which the proposal lies.
Slight	Minor loss of or alteration to key elements/features/characteristics of the baseline landscape. Landscape effects within the immediate setting of the site and at site level.
Negligible	Very minor loss of or alteration to key elements/features/characteristics of the baseline landscape.

Assessment of Visual Effects

7.63 The assessment of visual effects compares the quality of the existing situation (i.e. the quality pertaining without the scheme), to that which would result if the development were constructed, and the degree of change. A new development can cause deterioration, no change or improvement in visual amenity.

7.64 Following the establishment of the Study Area, detailed site surveys were carried out to establish an accurate visual envelope and to assess the likely impact on properties, footpaths and public open spaces. A visual envelope defines the area of land from which there is a view of any part of the Proposed Development and takes into account intervening vegetation and urban form (refer to Figures 7.12 – 7.14 : Zone of Visual Influence, **Technical Appendix 7.1**).

7.65 The assessment of visual impact was undertaken by way of site visits in April, May & August 2014 and June 2015 as well as desk studies including the production of photomontages following agreement of viewpoints with Kirklees Council.

7.66 The viewpoints selected for the photomontages represent different views and viewer types. The viewpoints are in different directions from the site and are at varying elevations.

7.67 All of the viewpoints were visited by TGP and photographed by a professional photographer. A wireframe model was generated and photomontages produced for each of the viewpoints to identify the scale, arrangement and visibility of the development. The photomontages were reviewed to assess how natural and built screening would affect the visibility of the development and the sensitivity of each viewpoint or viewer (refer below).

Visual Sensitivity

7.68 Visual receptors are all people, meaning the particular person or group of people likely to be affected at a specific viewpoint. As in the landscape assessment the visual sensitivity is assessed in terms of the susceptibility to change in views and visual amenity as well as the value attached to particular views.

7.69 The susceptibility of different visual receptors to changes in views and visual amenity depends upon the occupation or activity of people experiencing the view at different locations and the extent to which their attention or interest may therefore be focused on the views.

7.70 As in the landscape assessment, visual receptor susceptibility to change is defined as high, medium, low or negligible as follows:

Table 7.3: Criteria for assessing the susceptibility of visual receptors to change

High	• Residents at home • Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience • Beauty spots, public viewing areas and picnic areas • People, whether residents or visitors, who are engaged in outdoor recreation, including the use of public rights of way, whose attention or interest is focused on the landscape and on particular views • Communities where views contribute to the landscape setting enjoyed by residents in the area
Medium	• Residential properties with less significant views from living rooms/gardens • Walkers using local networks of footpaths and tracks • Transport users of local roads, train lines, rivers and canals
Low	• Those engaged in outdoor sports or recreation which does not involve or depend upon appreciation of views of the landscape • Those using major roads and motorways in the region • People at their place of work whose attention may be focussed on their work or activity, not on their surroundings, and where the setting is not important to the quality of working life
Negligible	• Views from towns, conurbations and heavily industrialised areas

7.71 Judgements are also made about the value attached to the views experienced. This takes into account the following:

- Recognition of the value attached to particular views, for example in relation to heritage assets, or though planning designations

- Indicators of the value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature or art.

7.72 The sensitivity of the visual receptors is then calculated by combining the susceptibility to change and the visual value. If the susceptibility to change is high and the visual value is high, then the sensitivity of the visual receptor would be judged as high. If the susceptibility to change is low and the visual value is low, then the sensitivity of the visual receptor would be judged as low.

Magnitude of Change for Visual Receptors

7.73 The magnitude of change for visual receptors arising from the Proposed Development is classified as substantial, moderate, slight or negligible, again dependent on interpretation of a number of factors, but unlike assessments of sensitivity, these are largely quantifiable. Each effect on visual receptors then needs to be assessed in terms of its size or scale, the geographical extent or the area influenced and takes into account:

- Distance of viewpoint from the development;
- Proportion of the field of view occupied by the development (measured as a percentage of the views presented in the photomontages);
- Orientation or angle of view to the centre of the development;
- Background to the development;
- Extent of other built development, especially vertical elements.

Table 7.4: Criteria for assessing magnitude of change for Visual Receptors

Level	Typical Criteria
Substantial	A large number of sensitive receptors experiencing a major or fundamental change in nature of the baseline view, particularly in near views with the baseline urban skyline substantially changed.
Moderate	A moderate, but not fundamental, change in nature of view affecting a notable number of sensitive receptors. Open, uninterrupted views with some middle distance obstruction of part of that view resulting from the Proposed Development; baseline urban skyline not adversely infringed in view typically seen over medium/long distance,
Slight	Minor but non material change in nature of view; long distance views across urban landscape panorama, or restricted views (upstairs bedroom windows only) with relatively few receptors affected.
Negligible	Changes unlikely to be perceived by the majority of visual receptors.

Significance of Effects for Landscape and Visual Receptors

7.74 The purpose of an LVIA in the context of an EIA is to identify any significant effects on landscape and visual amenity arising from the Proposed Development. In this LVIA the level of effect on landscape and visual amenity arising from the combined effects of sensitivity and magnitude are assessed and then professional judgement applied to assess whether the effect is significant or not.

7.75 Thresholds determining significance are not provided in the EC Directive 2011/12/EU or the Town and Country Planning (England and Wales) (Environmental Impact Assessment) Regulations 2011 (Ref 7.1).

7.76 **Table 7.5** provides a guide to correlating sensitivity to change and magnitude of change, in order to determine the significance of effects. However, professional judgement using the combined criteria of sensitivity and magnitude is used to determine the overall level of effects. The level of landscape and visual effects has been assessed as major, moderate, minor or none. As is now common practice, these categories have been determined by considering the combination of landscape or visual sensitivity with the predicted magnitude of change.

Table 7.5: Correlation of Sensitivity & Magnitude of Change to determine Significance of Effects.

Landscape & Visual Sensitivity	High	**Moderate/ Minor**	**Moderate**	**Major/ Moderate**	**Major**
	Medium	**Minor**	**Moderate/ Minor**	**Moderate**	**Major/ Moderate**
	Low	**Minor/ None**	**Minor**	**Moderate/ Minor**	**Moderate**
	Negligible	**None**	**Minor/ None**	**Minor**	**Moderate/ Minor**
		Negligible	Slight	Moderate	Substantial
		Magnitude of Change			

7.77 In this LVIA, those effects described as Major and Major/Moderate are considered to be significant effects as required by the Town and Country Planning (England and Wales) (Environmental Impact Assessment) Regulations 2011 (Ref 7.1). These are the effects that the assessor considers to be material in the decision making process.

Baseline Conditions

7.78 This section provides an objective and factual description of the existing landscape features and character of the landscape within and immediately surrounding the application site and the study area defined by the ZTV. The landscape context and photographs of the site are illustrated in Figure 7.15: Landscape Context, Figure 7.16: Wider Landscape Context, Figure 7.17: Photograph Location Plans and Plates 7.1-7.16, **Technical Appendix 7.1**.

7.79 The North Bierley Wastewater Treatment Works lies between Bradford and Cleckheaton at the M606 and M62 junction. The village of Oakenshaw is northwest of the site but is separated from the site by the M606. The Euroways Trading Estate is located directly to the north of Oakenshaw and the site. The suburbs of Bradford extend along major roads (including the A641, A650 and M606) out of the city into the study area. Between these 'fingers' of urban character are areas of green open space that extend towards the M62. The site is located at the end of corridor formed by the M606 and the Euroways Trading Estate.

7.80 The former Wastewater Treatment Works (WwTW) occupies almost half of the Proposed Development's total area. There are two disused buildings associated with the WwTW within the site boundary. These buildings are located at the end of the access road and at the entrance of the WwTW (Plate 7.1). There is disused infrastructure from the WwTW south of the buildings including fifteen circular settlement tanks, eight smaller rectangular tanks and four linear tanks at the southernmost end of the site (Plates 7.2&7.3). These tanks contain filter media with some plants growing through (Plate 4). The WwTW includes concrete, tarmac and gravel near the buildings at the northern end with gravel and rough grass further south (Plate 7.5 & 7.6). There are a number tracks within the site which is currently enclosed by perimeter security fencing (Plates 7.7, 7.8 & 7.9).

7.81 Beyond this perimeter fencing and west of the WwTW are small gently sloping fields used for rough grazing with former hedgerows and isolated areas of hawthorn hedging (Plate 7.10). Hanging Wood runs along the eastern boundary comprising of mature Oak, Sycamore, Ash, Poplar and Birch. This wooded area is continued beyond the M62 to the east by Hunsworth Little Wood and Hunsworth Great Wood. Further east of Hanging Wood and north of the access road there is a resemblance to a parkland landscape with small copses of oak trees and open rolling fields.

7.82 Other buildings within the immediate vicinity of the site are a disused textile mill (Oak Mills) and small conglomerations of residential properties to the north including a six bungalows, three 2-storey houses, the village of Lower Woodlands and Woodlands Primary School at the northern end of the site on Mill Carr Hill Road. The site for the proposed car park adjacent to the school is illustrated in Figure 7.8 and Plate 7.16. The site is characterised by damp grassland used for grazing. Along Cliff Hollins Lane the topography rises and there are several farms and associated outbuildings ascending the lane.

7.83 Access to the site is from Bradford road, west of the M606, into Oakenshaw and right under the motorway after the Church of St Andrew. This underpass leads to Mill Carr Hills Road before turning right on Cliff Hollins Lane to reach the access road.

7.84 To the west and south of the site the strong linear features of the M606 and M62 and their associated structure planting define the site boundary. The M62 passes the southern end of the site and the M606 runs along the western edge. The Motorway junction is elevated with wooded embankments, preventing views from the south. However, the site can be seen from the slip road of the M606 and the bridge of the M62. Other roads include Bradford Road to Oakenshaw but views to the site from here are blocked by the M606 and associated tree planting.

7.85 A public footpath passes through the northern end of the site along the access road before ascending into Hanging Wood east of the site.

7.86 The local topography (refer to Figure 7.18: Topography) is rolling with some steeply sided hillsides. The site is low lying, settled between the motorway and the wooded hillside of Hanging Wood to the east. This is likely to screen some views of the Proposed Development. The site is located at between 90 and 110m Above Ordnance Datum (AOD). The local topography rises to the north east to East Bierley at 215m AOD, to the west at Wyke to 165m AOD and to the north west towards Buttershore to 270m AOD. The Proposed Development is associated with the valley formed by Hunsworth Beck which runs from the north west to the south east. Hunsworth Beck is a deeply incised, narrow water course within the woodland edge along the eastern site boundary. This is joined by Cockleshaw Beck that runs from Chatts Wood

Sensory Experience

7.87 On entering the site an immediate feeling of unease is experienced with large derelict industrial buildings in various states of disrepair blocking the view to the rest of the site. Beyond this the structures associated with the Wastewater Treatment Works are mostly at ground level allowing for an open landscape bordered by sloping fields, the occasional hedge, busy roads and woodland. The noise from the road is at odds with the empty and abandoned site and the noise from Hunsworth Beck offers a reassuring presence of life in this disused space. The sensory experience as one walks through the site is mixed, there is a combined sense of unease but also interest. The remains of the circular settling tanks offer an interesting back drop to nature's reclamation of the land.

Published Landscape Character Areas

7.88 A review of the following landscape character assessments and landscape capacity studies was undertaken:

- Natural England National Character Areas (Updated 2014) (Ref 7.11)
- Kirklees Council Landscape Architects Former North Bierley Waste Water Treatment Works, Cliff Hollins Lane, Cleckheaton Landscape Character Assessment (2015) (Ref.7.12)
- Land Use Consultants *South Pennines Landscape Character Assessment*, report to Standing Conference of South Pennines Authorities (SCOSPA) (1999) (ref 7.13)
- City of Bradford MDC Local Development Framework for Bradford, Landscape Character Supplementary Planning Document (ref. 7.14)

National Landscape Character Areas

7.89 Natural England has divided England into 159 National Character Areas (NCAs) (Ref. 7.11), which classify similar landscape characteristics into broad character areas at a national scale. Each profile includes a detailed description of the natural and cultural features that shape landscapes, discussion on landscape change (how landscape has

evolved over time and key drivers for ongoing change), suggested opportunities, key facts and figures, and broad analysis of each area's characteristics and ecosystems.

7.90 The site is within in the National Character Area 37: Yorkshire Southern Pennine Fringe described by Natural England as 'a transitional landscape from the upland areas of the Southern Pennines NCA in the west through to the low-lying land of the Nottinghamshire, Derbyshire and Yorkshire Coalfield NCA to the east' (Ref. 7.11). On a more local scale the area has been classified into Local Authority level Landscape Types. Within this framework the Site is located within 'Wooded Rural Valley'. It is flanked by 'Coalfield Edge Urban Field Farmland' to the northeast and southwest filling the gap between the M62 and the 'Urban' Bradford.

7.91 Within the 5km study area NCA 37 is the only National Character Area. Relevant key characteristics of this character area include:

- A transitional landscape dissected by steep-sided valleys, dropping from the high gritstone hills in the west to lower land in the east, and thus creating an important backdrop to the many industrial towns and villages within and beyond the NCA.
- Sandstones and gritstone beds of Millstone Grit (Namurian) age underlying smooth hills and plateaux in the west. These are overlain in the east by beds of sandstone, siltstone and mudstone of Coal Measures age.
- Rivers creating a deeply dissected landscape, with high plateaux cut by steep-sided valleys, and fanning out in 'fingers' across valleys of the NCA.
- Treeless hill tops with tracts of rough grazing and extensive areas of enclosed pasture to the west, but with broadleaved woodland on steeper valley sides, giving the impression of a well-wooded landscape, especially to the north and west of Sheffield.
- Predominantly pastoral farming, especially in western areas, with a shift to more arable land in the drier eastern areas.
- Boundary features that change from distinctive patterns of drystone walls on the upland hills, to hedgerows becoming the predominant field boundary in the east.
- Close conjunction between rural landscapes and the rich industrial heritage of the urban areas, including settlements associated with the textile industry, with large mills and tall chimneys, and large factories and forges associated with the iron, steel and manufacturing industries
- Urban development constrained within valley floors and upside slopes, with location and layout strongly influenced by the landform.
- Industrial wealth revealed in magnificent civil architecture in town centres, notably Bradford, Halifax, Huddersfield and Sheffield, and several stately homes with designed parklands.

- Evidence of bronze-age and Roman habitation still present on uplands, and old pack-horse routes that once joined settlements across the Pennines still in place, or now forming modern major road routes.

- Extensive and dramatic views from higher land out over lower-lying land to the east, even from within urban areas.

- Several reservoirs contained within narrow valleys contributing a distinct character as well as providing popular places to visit.

- Small patches of fragmented priority habitats providing important refuges locally for wildlife. Grassland mosaics are particularly important in supporting waders and the twite that breeds on adjacent moorland areas; lowland woodland is also an important feature.

- In places a dense network of roads and urban development, with many road, rail and canal routes crossing the NCA, and a high density of footpaths throughout.

Local Landscape Types within the Study Area

7.92 Kirklees Council Landscape Architects Landscape Character Assessment for North Bierley (Ref 7.12) identifies two landscape types: 1 Fringe farming and 2 Industrial. Two visual character areas are identified, 'one of a poor degraded site with empty buildings now barely used; and the pastoral land adjacent to it dominated by the former treatment plant'. The landscape character of the Fringe farming landscape Type 1 is described as weak and its condition is declining due to the pressures of the motorway and industrial dereliction nearby. The study states that the site will be strengthened by sensitive development Landscape Type 2 Industrial is described as 'a struggling area of abandoned industrial land heavily affected by dereliction and motorway noise. The landscape character of Landscape Type 2 is identified as 'weak and its condition poor due to the industrial dereliction and abandoned usage of this site, and is declining fast. The site will benefit by the creation of new and sensitive development'.

7.93 The Landscape Character Types are illustrated in Figure 7.19 based on the South Pennines Landscape Character Assessment (Ref. 7.13). On a more local scale the landscape has been classified into Local Authority level landscape types and areas. Within this framework the Site is located within type G Wooded Rural Valley and area G11 Batley Fringe Incised Valleys. It is flanked by Coalfield Edge Urban Field Farmland to the northeast and southwest filling the gap between the M62 and the 'Urban' Bradford.

7.94 Bradford Metropolitan District Council's Landscape Character Supplementary Planning Document (Ref 7.14) Volume 5 South Bradford identifies two landscape types Industrial corridor and Enclosed pasture to the north of the application site. The proposed car park is contained within Enclosed pasture. The study describes south Bradford as an urban fringe landscape where motorway traffic and massive brightly coloured distribution centres abut traditional stone farmsteads and hedgerow bound pasture. The policy guidelines for Enclosed pasture states that 'the south and eastern areas are under pressure for development and any proposals for this area require careful consideration n to ensure that there is a strong landscape content, particularly tree planting, to strengthen the edge of that development and to screen adjacent industrial

land uses and more distant views. The Industrial Corridor landscape policy guidelines states that the industrial corridor has a weak character, low historic continuity and is visible and enclosed by the urban and industrial core, which means that it is not sensitive to change.

7.95 Local landscape types within the study area are based on the South Pennines Landscape Character Assessment (Ref. 7.13) and described below:

E – Rural Fringes

7.96 The rural fringes form a lower lying domesticated landscape surrounding the uplands. Rarely more than 200 metres above sea level the conditions are less harsh with gentler slopes and a milder climate. These sheltered, more hospitable fringes are settled and intensely farmed creating a small scale, complex landscape, or more varied landform and vegetation cover than is typical of the higher areas. Trees thrive and are a distinguishing feature of this landscape type occurring around farmsteads, along stone wall boundaries and in small – medium sized woodland blocks. Farming appears more profitable and the majority of the fields are improved grassland grazed by a mix of both cattle and sheep and managed for a silage crop. Settlement includes scattered farmhouses, which often include a range of modern outbuildings, dispersed rural dwellings as well as numerous small groups of houses/villages frequently with newer suburban infill and edge developments. An intricate network of lanes and roads crosses the area and links to the adjacent towns and cities which surround the South Pennines. The proximity of the urban centres exerts an influence on landscape character with urban fringe land uses evident in many areas and pressures for development.

G – Wooded Rural Valleys

7.97 The steep-sided wooded valleys, which dissect the high South Pennine moorland, are a special feature of the area. They have a secluded, intimate character derived from the deeply incised topography and abundant woodland which clothes the valley sides often blocking the sky from view. Although they exist in close proximity to the densely urbanised and industrial valleys, these side valleys are largely hidden and inaccessible except by foot. Their depth and extent is surprising and creates the sense of a hidden, secret landscape. The swift-flowing streams which tumble over the hard gritstone rocks are edges with a luxuriant carpet of mosses and ferns. These waters once provided the power for the early industrialisation of the region and the side valleys are lined with the remains of former mill sites.

K – Coalfield Edge Urban Fringe Farmland

7.98 The farmland of the coalfield edge forms part of the long eastern dip slope of the Pennines, which slopes gently form the high moorland towards the extensive urban conurbations of West Yorkshire. The slope is divided into a series of undulating ridges by small streams. The ridge top summits provide the location for a number of settlements including Denholme, Queensbury, Thornton and Shelf. Outward expansion of these settlements, which are not constrained by topography, has imposed a more suburban landscape. This 'urban fringe character' is reinforced but the dense network of roads that connect areas of development, as well as the long views of the industrial areas of Leeds and Bradford. The gritstone walls that subdivide the intervening farmland into medium large pasture fields provide one of the few unifying characteristics with the wider South Pennine area. Elsewhere the countryside character of this eastern

edge is being eroded by a combination of modern housing, pylons, communications infrastructure, mineral extraction. Landfill sites and other non-agricultural and urban fringe land uses.

O – Industrial/Business Parks

7.99 This urban type includes Victorian industrial development associated with coal mining and woollen mills as well as more recent large scale commercial sheds, distribution buildings and business or retail parks. The former developments are often built of local stone or brick and have a unity of design and scale. The latter are built of a range of materials and may form discrete and sometimes extensive areas of development on the outskirts of major settlements or along river valleys (where they occur in lowland river valleys they are classified under the Industrial Lowland Valley type). Occasionally they may be located in isolated elevated locations or along motorway corridors where communications are good. Buildings are large in scale and development as a whole may also cover an extensive area.

U – Urban

7.100 The historic urban cores that can be found within the South Pennines typically are small, characterful areas at the heart of the larger settlements. A historic church and market place are often sited at the central convergence point of the principal radial route. Most historic urban cores have a denser urban fabric that other parts of the town, with tall red brick or stone buildings and angular streets. There is a general lack of open space and vegetation, although market squares do survive in some towns. In some cases the historic core appears as an isolated island within later development. This may result from the demolition and re-planning of town centres, or from the fusion of isolated small towns by expansion of nearby settlements….. Overall, the most enduring feature of the historic urban cores is the organic, winding arrangement of streets and alleys and the distinctive character of historic public buildings.

7.101 In surrounding residential and suburban areas, the townscape includes a wide variety of architectural styles and layouts. Areas dating from the Victorian and Edwardian periods may have a unity or architectural character associated with stone or brick terraces or tree lined streets. In the central part of the South Pennines local gritstone is the main building material, while to the south and west, especially in Rochdale, there is a predominance of red brick.

7.102 More modern residential and suburban areas tend to be characterised by a spacious pattern of streets, low buildings, garages and gardens, although there are also examples of high-rise tower block estates, with communal amenity grassland and extensive parking.

Landscape areas within the Study Area

- K1 – Only found in one geographical area (refer to type K Coalfield Edge Urban Fringe Farmland for description)
- U – See above description
- O – See above description

E8 Batley – Dewbury Rural Fringes

7.103 This area comprises elevated farmland which forms a fringe to the urban area of Batley and Dewbury. The area has a fragmented character including land uses such as

country parks, golf courses, landfill and past mining, pony paddocks and pasture fields defined by stone wall enclosures creating a medium scaled pattern. The area is traversed by minor lanes as well as major roads and rail corridors. Overall it has a settled character and the most elevated areas can be open and afford views over adjoining developed areas.

G11 Batley Fringe Incised Valleys

7.104 This area comprises the small stream valleys which penetrate the urban fringes or Batley forming shallow depressions in the surrounding fringe farmland. These valleys support a mixture of pasture and woodland and can have an enclosed, rural, secluded character despite their proximity to urban areas. They are generally unsettled and often inaccessible by road but particularly valued for recreation and contain numerous footpaths and the Oakwell Country Park.

G13 Clifton Beck

7.105 Clifton Beck is a north-south orientated river valley which drains the upland coalfield edge to the north. It comprises steep wooded valley sides with areas of woodland pasture and pasture fields defined by stonewalls and hedges. Overall it is a small scale landscape which feels deeply historic. To the south of Bailiff Bridge settlements become more prevalent.

Landscape Character & Quality Assessment of the Study Area

7.106 A comprehensive assessment of the existing landscape character and quality of the study area was undertaken, by reference to existing landscape character studies and through field observation, to identify and evaluate significant environmental considerations for landscape assessment. In particular the landscape appraisal has been used to determine the capacity of the landscape to withstand change and disturbance. This assessment identifies various landscape character types and awards grades to each area based on a visual appraisal and analysis of survey data, refer to Figure 7.19: Landscape Character Types and Figure 7.20 Landscape Quality, **Technical Appendix 7.1**).

A five point scale has been adopted for the qualitative assessment of the landscape:

- Highly Attractive
- Very Attractive
- Good Landscape
- Ordinary Landscape; and
- Poor Landscape

7.107 Acknowledgement is made of those features which enhance and detract from the landscape quality. As landscape quality classifications are ranked relative to one another within the limits of the study area only, they are not intended to imply any comparability with areas beyond, in either a regional or national context.

Landscape Sensitivity

Sensitivity of Landscape Character (within approximately 1km)

7.108 The landscape in the immediate vicinity of the site is a combination of medium scale pastoral farmland, ancient woodland, residential housing and the road corridors/motorway junction. Users of this area will include those using the major roads, commuters to the business parks and into and out of nearby urban areas, residents to the north of the site, school pupils attending the local school north of the site and walkers using the local footpath networks. Based on this the site's landscape character is considered to be of low sensitivity.

7.109 The Rural Fringe is a low lying domesticated landscape. It is considered to be of ordinary quality, low value and of Medium susceptibility to change when considering the Proposed Development. The overall sensitivity of this character area is therefore considered to be Low/Medium.

7.110 The G11 Wooded Rural Valleys are a special feature of the area. They are narrow valleys with abundant woodland and largely inaccessible except by foot despite being adjacent to densely urbanised areas. This character area is considered to be of good quality, moderate value and of Medium susceptibility to change when considering the Proposed Development. The overall sensitivity is therefore considered to be Medium.

7.111 The G13 Wooded Rural Valleys are a special feature of the area. They are narrow valleys with abundant woodland and largely inaccessible except by foot despite being adjacent to densely urbanised areas. This character area is considered to be of good quality, moderate value and of Medium susceptibility to change when considering the Proposed Development. The overall sensitivity is therefore considered to be Medium.

7.112 The Coalfield Edge Urban Fringe Farmland is an area of undulating ridges and streams and is home to a number of settlements whose expansion is not limited by topography. Farmland of medium to large scale pasture fields provide an intervening landscape between suburban settlements and more industrialised Leeds and Bradford. The quality of this landscape is considered good. This is a fairly common landscape and is of low importance and there its value is considered low. The Susceptibility to change is considered to be Medium and therefore the overall Sensitivity is Low.

7.113 The characteristics of the Industrial/Business Parks are typically large scale, of variable quality, busy traffic and large car parks with some landscape corridors. Some large scale developments dominate the horizon to the north and west of the Proposed Development.

7.114 The Urban Character Area is characterised by linear settlements which tend to coalesce along the major road corridors e.g. Bradford Road. Local settlements e.g. Oakenshaw have a strong vernacular characterised by stone terraces and cottages, local features e.g. the spire of the Church of St Andrew, interspersed with more modern detached properties.

7.115 The following table summarises the Landscape Character Units, their quality, sensitivity and susceptibility to change:

Table 7.6: Landscape Character Units Sensitivity

Character Area	Approx. distance from site	Quality	Value	Susceptibility to change	Sensitivity
E8 Rural Fringe	0.8km	Ordinary	Low	Medium	Low/Medium
G11 Wooded Rural Valley	0km	Good	Moderate	Medium	Medium
G13 Wooded Rural Valley	3.5km	Attractive	Moderate	High	Medium/High
K1 Coalfield Edge Urban Fringe Farmland	0.3km	Good	Low	Medium	Low
O Industrial/ Business Parks	1km	Poor	Low	Medium	Negligible
U Urban	0.75km	Ordinary	Moderate/ Low	Low	Negligible

Landscape Designations

7.116 Landscape and other designations are shown in Figure 7.21: Landscape Designations, **Technical Appendix 7.1**.

Registered Parks and Gardens

7.117 There is one Registered Park and Garden within the 5km study area, Bowling Park, approximately 4km north of the Proposed Development.

Country Parks

7.118 Oakwell Hall Country Park lies some 2km east of the Proposed Development.

Ancient Woodland

7.119 There are nine areas of Ancient Woodland within the study area including:

- Odsal Wood
- Kit Wood
- Park/Shackleton Wood
- Chatts Wood
- Hanging Wood
- Great and Little Hunsworth Woods
- Fusden Wood
- Old Hanna/Low Woods

- Gannerthorpe Woods

Other Designations

7.120 The study area includes a total of six Conservation areas (refer to Figure 7.21: Landscape Designations, **Technical Appendix 7.1**).

- Birstall
- East Bierley
- Gomersal
- Hartshead Moor Top
- Little Gomersal
- Scholes

7.121 There is one Scheduled Monument within 5km of the Proposed Development south of Cleckheaton. This is the Anglian high cross fragment known as Walton Cross.

7.122 There are some four Grade 1, 19 Grade 2* and 233 Grade 2 Listed Buildings within 5km of the Proposed Development. These are scheduled in **Technical Appendix 7.1**.

7.123 There are three Local Nature Reserves in the 5km study area including:

- Railway Terrace
- Tong Moor
- Oakwell Park

Baseline Visual Receptors

7.124 Visual receptors are viewpoints from which people may obtain a view to the development. Factors which increase the potential numbers of receptors to the Proposed Development are:

- The proposed masterplan, used for the purpose of this LVIA includes large building and residential area footprints which are indicative of style. They represent the scale of the development and the context of the surrounding landscape. The number and form of the buildings may increase or decrease their visibility to receptors
- The Proposed Development is situated between two major roads that are busy commuter corridors.

7.125 Potential visual receptors include:

- Walkers and cyclists

- Road-users
- Residential properties
- Commercial properties
- People who work in the area
- Users of Cleckheaton & District Golf Course

7.126 Figure 7.22 Key connections illustrates the road network, national trails, cycle network and footpaths associated with the study area.

7.127 The ZTV indicates that the Proposed Development may be visible along the M606 corridor to the north west, further west of the M606 into the outer urban area of Bradford, south west of the site towards Scholes and from the Golf Course, north east of the across the farmland the East Bierley and south east of the Proposed Development along the A638 around Cleckheaton and Gomersal.

7.128 Following the ZTV a Zone of Visual Influence was modelled after inputting the heights of buildings and blocks of woodland within a 2km radius of the site. This indicates reduced visibility of the proposed to the south east, leaving potential views from Brontë Way between Cleckheaton and Gomersal and areas within the business park to the south east of the M62. Other areas highlighted in the ZVI include the land between the A58 and Scholes, the Golf Course and area between the M606 and Wyke, a few areas of farmland north and north east of the Proposed Development towards Bierley and East Bierley and parts around Odsal, north west of the Proposed Development. Site visits to evaluate the views from these areas were then carried out.

Recreational Walking/Cycling Routes
(Refer to Figure 7.22: Key Connections)

7.129 Kirklees Way, a National Trail, passes just north of the site along Cliff Hollins Lane and through Chatts Wood to the north east of the site.

7.130 Spen Valley Heritage Trail follows the path of the Kirklees Way from the west and north of the site before branching off south at Chatts Wood and then north from Hunsworth Lane at Upper Park House Farm

7.131 Brontë Way, a national trail, passes through the southern part of the study area from west to east.

7.132 NCN 66, a National Cycle Route, enters the study area in the south east at Heckmondwike, travels north west through Cleckheaton and follows the dismantled railway across Cleckheaton Golf Course before circumnavigating Oakenshaw and passing under the M606 to travel north towards Bierley.

Public Rights of Way (PRoW)
(Refer to Figure 7.22: Key Connections)

7.133 The Proposed Development site has a public footpath passing through the northern end of the site along the access road before heading into Hanging Wood east of the site. The study area has a network of footpaths and bridleways most of which a located in areas of farmland around East Bierley, Gomersal and Scholes. There is also a footpath running through Cleckheaton Golf Club

Roads and Networks

(Refer to Figure 7.22 Key Connections)

7.134 The M62 passes the southern end of the site and the M606 runs along the western edge. The Motorway junction sits higher than the site with wooded embankments, preventing views form the south. However, the site can be seen from the slip road of the M606 and the bridge of the M62. A network of main roads extend from the motorway junction. Other minor roads include the local road to Oakenshaw from the M606/M62 junction and Cliff Hollins Lane to the north of the site.

7.135 There is a dismantled railway that runs south east to north west through the study area that now forms part of the NCN 66 cycleway.

Important Vantage Points

7.136 There are no important vantage points identified within the study area. However, the footpath climbing up to Hanging Wood provides good views and the higher ground associated with Cleckheaton and District Golf Club and Kirklees Way/Oakenshaw Lane provide wide views of the landscape of the area.

Assessment Viewpoints

(Refer to Figure 18: Photomontage Viewpoint Location Plan)

7.137 Site visits were carried out in April 2014 to determine views, in winter/spring conditions (i.e. before leaf out) to be included in the Landscape and Visual Impact Assessment (LVIA).

7.138 The following table summarises views illustrated in the LVIA:

Table 7.7: Viewpoint Location and Selection Criteria

Ref.	Viewpoint Location	O.S. Grid Reference	Selection Criteria
VP1	Footpath at Cliff Hollins Farm	417875, 428057	To assess the potential impact on footpath users and properties located on the higher ground along Cliff Hollins Lane
VP2	M62 Slip road	418178, 426938	To assess the potential impact on road users

Ref.	Viewpoint Location	O.S. Grid Reference	Selection Criteria
VP3	Junction of Cliff Hollins Lane and access road to the site	417682, 427842	To assess the potential impact on views from properties along Cliff Hollins Lane and along the field that forms part of the strategic green belt gap
VP4	Footpath to the north of Hanging Wood	418155, 427609	To assess views experienced by walkers using the footpath on higher ground to the north east of the proposed development.

Predicted Significant Effects

7.139 A description of the main effects of the Proposed Development is described followed by a comment on the significance of the effect. All of the effects are direct as these result directly from the development itself.

Construction Phase

7.140 During construction there will be clearance of existing vegetation within the site. This is mostly scrub and grasses. There would also be clearance of the disused buildings and settling tanks and other structures associated with the WwTW on the site. In landscape terms it is considered that the value of the landscape of the site is low. Therefore it has been classified as **Low** value.

7.141 There would be temporary cabins and car parking within the compound. Use of cranes and other heavy plant including earth moving equipment would also be expected throughout construction

7.142 As a whole the magnitude of change on landscape features during the construction phase would be **Substantial**, the landscape associated with the site is of **Low** sensitivity therefore the significance of the effect will be **Moderate** adverse.

After Completion

7.143 It is the intention for the Proposed Development to be contained in a landscape setting which compliments the scale and pattern of the surrounding landscape. A substantial new landscape structure will be established as part of the new development, this would therefore increase the landscape value of the site. It is considered that the site is of **Low** sensitivity and the magnitude of change is **Substantial**, the effect on the landscape features within the site is therefore considered to be **Moderate** adverse.

Effects on Landscape Character

7.144 Using the classification criteria set out in **Table 7.5** the landscape character sensitivity and magnitude of the study area is summarised in **Table 7.7** below. Significant thresholds can be determined from different combinations of sensitivity and magnitude e.g. major effects are a combination of substantial sensitivity and substantial magnitude; moderate effects can result from medium sensitivity and moderate magnitude or low

sensitivity and substantial magnitude; and minor effects can be a product of low sensitivity and slight magnitude.

Construction Phase

7.145 It is recognised that there would be some additional temporary effect during construction over and above those assessed as permanent effects under the heading of After Completion below. The effects on landscape character would therefore increase incrementally as construction progresses and more building units are erected.

7.146 During the construction period there would be earthworks associated with the establishment of levels, construction of building foundations, access routes and underground cable routes. These activities would result in soil disturbance and have an effect on landscape character arising from temporary stockpiling of soil, exposure of bare earth and movement of construction vehicles. The site compound will also consist of cabins, car parking and storage areas.

7.147 Cranes will be used during the construction phase and will temporarily alter the existing skyline within this character area.

7.148 The construction phase will result in a **Moderate** magnitude of change within a landscape character area of **Medium** sensitivity. The effect of the site compound on landscape character will be **Moderate** adverse.

Operational Phase

E8 Batley – Dewsbury Rural Fringes

7.149 The Proposed Development will not affect the landscape character of Dewbury Rural Fringes. The sensitivity of this character area is considered to be **Low**/**Medium**, the magnitude of change is considered to be **Negligible**, and therefore the overall effect on Dewbury Rural Fringes will be **Minor** /**None** adverse.

G11 Batley Fringe Incised Valleys

7.150 The Proposed Development will alter the landscape character of Batley Fringe Incised Valleys, the character area in which the site sits. The sensitivity of this character area is considered to be **Medium**, the magnitude of change is considered to be **Substantial**, and therefore the overall effect on Batley Fringe Incised Valleys (in the vicinity of the site) will be Major/**Moderate** adverse. This is a significant effect under the EIA Regulations.

G13 Clifton Beck

7.151 The Proposed Development will not affect the landscape character of Clifton Beck. The sensitivity of this character area is considered to be **Medium**/**High**, the magnitude of change is considered to be **Negligible**, and therefore the overall effect on Clifton Beck will be **Minor** adverse.

K: Coalfield Edge Urban Fringe Farmland

7.152 The Proposed Development will alter the landscape character of *Coalfield Edge Urban Fringe Farmland*. The sensitivity of this character area is considered to be **Low**, the magnitude of change is considered to be **Moderate**, and therefore the overall effect on *Coalfield Edge Urban Fringe Farmland* will be **Moderate**/**Minor** adverse**.**

O: Industrial/Business Parks

7.153 The Proposed Development will not affect the landscape character of *Industrial/Business Parks*, the character area in which the site sits. The sensitivity of this character area is considered to be **Negligible**, the magnitude of change is considered to be **Negligible**, and therefore the overall effect on *Industrial/Business Parks* will be **None.**

U: Urban

7.154 The Proposed Development will alter the landscape character of *Urban*, the character area in which the site sits. The sensitivity of this character area is considered to be **Negligible**, the magnitude of change is considered to be **Slight**, and therefore the overall effect on *Urban* will be **Minor/None** adverse.

Table 7.8: Summary of effects on Landscape Character

Landscape Units	Approx. Distance From Site (closest)	Sensitivity	Magnitude	Significance
E8	0.8km	Low/Medium	Negligible	Minor/None
G11	0km	Medium	Substantial	Major/Moderate
G13	3.5km	Medium/High	Negligible	Minor
K1	0.3km	Low	Moderate	Moderate/Minor
O	1km	Negligible	Negligible	None
U	0.75km	Negligible	Slight	Minor/None

Effects on Landscape Designations

Registered Parks and Gardens

7.155 The ZTV (refer to Figures 7.11 Zone of Theoretical Visibility – Combined Development) indicates that the Proposed Development will have no effect on Bowling Park, a Registered Park or Garden some 4km to the north.

7.156 Oakwell Hall Country Park lies some 2km east of the Proposed Development. The ZTV indicates that the Proposed Development will not be seen from the Country Park.

Ancient Woodland

7.157 There are nine areas of Ancient Woodland within the study area. Of these only the following have been identified (utilising the ZTV, refer to Figure 7.11 Zone of Theoretical Visibility) as being potentially impacted upon by the Proposed Development:

- *Odsal Wood* – This wood is located approximately 2km north west of the Proposed Development. The sensitivity of the designation is **Medium** and the magnitude of change is **Negligible,** therefore the effect will be **Minor** adverse. However, there is no direct effect on the designated area and given the distance

the Proposed Development is unlikely to have an effect on the context and setting of the designation.

- *Chatts Wood* – This wood is located approximately 0.5km north east of the Proposed Development. The sensitivity of the designation is **Medium** and the magnitude of change is **None**, therefore the effect will be **Minor** adverse. There is no direct effect on the designated area but the Proposed Development may have a minor effect on the context and setting of the designation.

- *Great and Little Hunsworth Wood* – This wood is located approximately 0.75km south west of the Proposed Development. The ZVI indicates that the Proposed Development is not likely to be visible from this designation or have an effect on the setting of the woodlands.

- *Hanging Wood* – This wood is located adjacent to the Proposed Development along Hunsworth Beck to the east. The Proposed Development is visible from the edges of this block of ancient woodland. The sensitivity of the designation is **High** and the magnitude of change will be Slight to Negligible provided that the woodland is well protected during construction in accordance with BS 5837 Trees in Relation to Design, Demolition and Construction. Therefore the effect will be **Minor to Minor/None** adverse. However long term mitigation may have a beneficial effect due to increasing tree cover associated with the new landscape masterplan and improvement of the wildlife corridor.

Conservation Areas

7.158 The study area includes a total of six **Conservation areas**. Of these only the following have been identified, utilising the ZTV mapping, refer to Figure 7.11 Zone of Theoretical Visibility and Figure 7.14 Zone of Visual Influence – Combined Development as being potentially impacted upon by the Proposed Development:

- *Little Gomersal* is located approximately 2.5km to the south east of the Proposed Development. The ZVI indicates that the Proposed Development may be visible from the outer limits of this designation. The sensitivity of the designation is **Medium** and the magnitude of change is **Negligible** therefore the effect will be **Minor** adverse.

- *Scholes* (refer to Plate 7.11) is located approximately 2km to the south west of the Proposed Development. The ZVI indicates that the Proposed Development may be visible from the outer limits of this designation. The sensitivity of the designation is **High** and the magnitude of change is **Negligible** therefore the effect will be **Moderate/Minor** adverse.

Scheduled Monuments

7.159 There is one **Scheduled Monument** within 5km of the Proposed Development south of Cleckheaton. This is the Anglian high cross fragment known as Walton Cross. The ZTV (mapping, refer to Figure 7.11 Zone of Theoretical Visibility and Figure 7.14 Zone of Visual Influence – Combined Development), indicates that this will not be impacted upon.

Listed Buildings

7.160 There are many **Listed Buildings** within 5km of the Proposed Development (refer to **Technical Appendix 7.1**. Through desk-based research, use of the ZTV (refer to Figure 7.11) and professional judgement six Listed Buildings were identified which may potentially be impacted upon, the following section considers the effect on the landscape setting of the Listed Building.

- *The Old Vicarage* - The Golf Clubhouse approximately 0.3km west of the Proposed Development, the other side of the M606 motorway. This building is screened form the Proposed Developments by structure belt planting and the M606 but rooftops may be seen. The sensitivity of the designation is **Medium** and the magnitude of change is **Slight** therefore the effect will be **Moderate/Minor** adverse.

- *Church of St Andrew* – This church at Oakenshaw lies approximately 0.5km from the Proposed Development. There is some screening by the motorway and landform but some views are likely. The context of the listed building is separated from the proposed development by the motorway corridor, it is therefore considered that there will be no effects on the designation.

- *Lower Woodlands Farmhouse & Barn to the East of Lower Woodlands Farmhouse* - Farm buildings north of Oakenshaw approximately 1km from the Proposed Development. Views are unlikely due to screening effect of planting and the raised motorway. The sensitivity of the designation is **Medium** and the magnitude of change is **Negligible** therefore the effect will be **Minor** adverse**.**

- *Cow Close Cottages* - Farm buildings west of Kirklees Way approximately 1.2km from the Proposed Development, Views may be possible from higher ground over golf course and motorway. The sensitivity of the designation is **Medium** and the magnitude of change is **Slight** therefore the effect will be **Moderate/Minor** adverse.

- *Lockwood Farmhouse* – This farm building lies approximately 1.8km from the Proposed Development. Views are unlikely due to screening from vegetation. The sensitivity of the designation is **Medium** and the magnitude of change is **Negligible** therefore the effect will be **Minor** adverse.

Effects on Visual Receptors

Table 7.9 provides a summary of the effects at each of the assessment viewpoints:

Table 7.9: Summary of Visual Effects on Viewpoints

Ref	Viewpoint Location	O.S. Grid Ref.	Distance to Proposed Development (nearest building)	Sensitivity of View	% of View Occupied by Proposed Development	Magnitude of Change	Significance of Effect
VP1	Footpath at Cliff Hollins Farm	417875, 428057	307 metres	Medium	27.8	Substantial	Major/ Moderate
VP2	M62 Slip road	418178, 426938	179 metres	Low	12.9	Moderate	Moderate/ Minor
VP3	Junction of Cliff Hollins Lane and access road to the site	417682, 427842	42 metres	Medium	32	Substantial	Major/ Moderate
VP4	Footpath to the north of Hanging Wood	418155 427609	154 metres	Medium	60	Substantial	Major /Moderate

Viewpoint 1 – Footpath by Cliff Hollins Farm

(Refer to Figure 7.23: Photomontage Viewpoint Location Plan & Photomontage Viewpoint 1)

7.161 This viewpoint is located on the footpath south of Cliff Hollins Farm on Cliff Hollins Lane. The viewpoint is situated on elevated land at the very beginning of the footpath before it heads east towards Chatts Wood and it sits approximately 18m above the level of the site which is 300m to the south. It represents views experienced by users of the footpaths and residents on Cliff Hollins Lane.

Existing View

7.162 The view is a largely rural scene with pastoral fields in the fore to middle ground broken up by scattered deciduous trees. The edge of Chatts Wood can be seen behind the hill to the left. Pylons break the skyline across the full view and in the distance a more dense setting of woodland and urban conglomerations is seen.

Predicted View

7.163 The predicted view is illustrated by the Photomontage Viewpoint 1 and shows that the majority of the buildings within the Proposed Development will be visible from this

viewpoint. There will be partial screening by existing vegetation. The development occupies 27.8% of the view. The magnitude of change is considered to be **Substantial.**

Effects on Landscape Character & Quality

7.164 The viewpoint is located within *Batley Fringe Incised Valleys* landscape character area. The sensitivity of this landscape considered to be **Medium**. The magnitude of change is considered to be **Substantial**, therefore the overall effect on the landscape would be **Major/Moderate.** A **Major/Moderate** effect is considered significant under the Environmental Impact Regulations 2011.

Effects on Visual Amenity

7.165 This viewpoint is located on a footpath leading to Chatts Wood, a designated ancient woodland. The sensitivity of this view is considered to be **Medium**. The magnitude of change is considered to be **Substantial**, therefore the overall effect on the visual amenity would be **Major/Moderate.** This is considered to be a significant effect under the Environmental Impact Regulations 2011.

Viewpoint 2 – M62 Slip Road

(Refer to Figure 7.23: Photomontage Viewpoint Location Plan & Photomontage Viewpoint 2)

7.166 This viewpoint is located at Junction 26 of the M62 motorway on the slip road from the M606. Situated at the southern end of the site close to the site boundary this viewpoint represents travellers using the slip road onto the M62.

Existing View

7.167 The majority of the view is taken up by the land associated with the disused Wastewater Treatment Works. Due to the topography of the site the filter beds and other low lying infrastructure is largely hidden, therefore the view is principally of open pasture flanked by Hanging Wood to the right and slip road to the left. Vertical elements include Pylons running across the view, lamp posts along the roadside and the church spire of the Church of St Andrew, Oakenshaw. In the distance one can see the disused buildings of the WwTW and the large warehouse-like buildings of the Euroways Trading Park.

Predicted View

7.168 The predicted view is illustrated by the Photomontage Viewpoint 2 and shows the end of Unit 3 (refer to Figure 7.4: Landscape Masterplan) will be seen with parts of Units 1,2 and 4and the roof lines of some of the residential development shown behind. The development occupies 12.9% of the view, the nearest proposed building is some 179 metres from the viewpoint. The magnitude of change is considered to be **Moderate.**

Effects on Landscape Character & Quality

7.169 The viewpoint is located within *Batley Fringe Incised Valleys* landscape character area. The sensitivity of this landscape considered to be **Low**. The magnitude of change is considered to be **Moderate**, therefore the overall effect on the landscape would be **Moderate/Minor.**

Effects on Visual Amenity

7.170 This viewpoint is located at Junction 26 of the M62 motorway on the slip road from the M606. The sensitivity of this view is considered to be **Low**. The magnitude of change is

considered to be **Moderate**, therefore the overall effect on the visual amenity would be **Moderate**/**Minor** adverse.

Viewpoint 3 – Junction of Cliff Hollins Lane and access road to the site

(Refer to Figure 7.23: Photomontage Viewpoint Location Plan & Photomontage Viewpoint 3)

7.171 This viewpoint is located on the access road to the site where it meets Cliff Hollins Lane.

Existing View

7.172 The foreground of the view is associated with the dilapidated access road to the disused WwTW. The road is flanked by fenced pastoral fields on both sides, the field to the south rises gently to the south with the properties on Cliff Hollins Lane and spire of the Church of St Andrew visible on the skyline. In the distance pylons break the skyline above Hanging Wood and small groups of trees and single trees are scattered over the pastoral fields.

Predicted View

7.173 The predicted view is illustrated by the Photomontage Viewpoint 7.3 and shows that there will be views of the northern edge of the proposed residential developments, which are set on the hillside above the access road, and of Unit 5. Most of the commercial units and residential development will be screened by the proposed properties at the northern edge of the proposed development. . These will be partially screened by the proposed planting and landscape associated with the development. The development occupies 32% of the view, the nearest proposed residential building is 42 metres from the viewpoint. The magnitude of change is considered to be **Substantial.**

Effects on Landscape Character & Quality

7.174 The viewpoint is located within *Batley Fringe Incised Valleys* landscape character area. The sensitivity of this landscape considered to be **Medium**. The magnitude of change is considered to be **Substantial**, therefore the overall effect on the landscape would be **Major**/**Moderate.** This is considered to be a significant effect under the EIA Regulations

Effects on Visual Amenity

7.175 This viewpoint is located on the access road to the site which is also a footpath leading to Hanging Wood, a designated ancient woodland. The sensitivity of this view is considered to be **Medium**. The magnitude of change is considered to be **Substantial,** therefore the overall effect on the visual amenity would be **Major**/**Moderate** adverse**.** This is considered to be a significant effect under the EIA Regulations

Viewpoint 4 – Footpath to the north of Hanging Wood

(refer to Figure 7.23: Photomontage Viewpoint Location Plan & Photomontage Viewpoint 4)

7.176 This viewpoint is located on the footpath which climbs the hillside to the north of Hanging Wood and to the north east of the Proposed Development.

Existing View

7.177 The disused water treatment works are evident in the foreground of the view and characterised by concrete retaining structures, rectangular and circular settling tanks and disused buildings. Beyond the WwTW green pasture climbs towards the partially treed corridor of the M606 with Bradford Road beyond. The road corridor is characterised by linear development of detached houses. The spire of the Church of St Andrew is prominent on the horizon as are electricity pylons which march over the horizon of the hills above Oakenshaw. Large scale industrial buildings are also prominent on the horizon. The landscape is a mix of rural landscape, suburban/urban form and industrial/business development set amongst gently undulating hillsides.

Predicted View

7.178 The predicted view is illustrated by the Photomontage Viewpoint 4 and shows that there will be prominent views of both the business and residential developments. Units 1, 4 and 5 are prominent with Unit 2 partially screened. The development occupies 60% of the view, the nearest proposed commercial building is approximately 155 metres from the viewpoint. The magnitude of change is considered to be **Substantial.**

Effects on Landscape Character & Quality

7.179 The viewpoint is located within *Batley Fringe Incised Valleys* landscape character area. The sensitivity of this landscape considered to be **Medium**. The magnitude of change is considered to be **Substantial**, therefore the overall effect on the landscape would be **Major/Moderate** adverse. This is considered to be a significant effect under the EIA Regulations.

Effects on Visual Amenity

7.180 This viewpoint is located on a footpath adjacent to Hanging Wood, a designated ancient woodland. The sensitivity of this view is considered to be **Medium** (walkers using local networks of footpaths and tracks). The magnitude of change is considered to be **Substantial**, therefore the overall effect on the visual amenity would be **Major /Moderate** adverse. This is considered to be a significant effect under the EIA Regulations.

Effects on Receptor Groups

7.181 From analysis of the 4 assessment viewpoints, ZTV and ZVI plans and field observations the significance of visual effects on different receptor groups (people) has been assessed. Each group of receptors is described in a clockwise direction starting in the north.

7.182 From analysis of the 4 assessment viewpoints, ZTV and ZVI plans and field observations the significance of visual effects on different receptor groups (people) has been assessed. Each group of receptors is described in a clockwise direction starting in the north.

Effects on Residential Receptors

(Refer to Figure 7.24: Location of Properties Assessed in LVIA)

7.183 The ZVI combined with site visits indicates that the following towns and settlements, working in a clockwise direction from north are not affected by the Proposed Development:

- Bowling
- Most of the properties in Bierley, with the exception of some located at the very southern end of the town.
- Dudley Hill
- Holme Wood
- East Bierley
- Westgate Hill
- Birkenshaw
- Swincliffe
- Hunsworth
- Birstall
- Gomersal
- Birstall Smithies
- Heckmondwike
- Liversedge
- Cleckheaton
- Brighouse
- Hartshead Moor Top
- Wyke & Lower Wyke
- Norwood Green
- Low Moor
- Buttershaw
- Wibsey
- West Bowling

7.184 The ZVI combined with field work indicates that some of the properties within the following towns and settlements will experience some level of visual impact:

7.185 *Properties at the southern end of Bierley* – approximately 1.6km to the north of the Proposed Development, the ZVI indicates that some properties on the elevated land at the northern end of Greenfield Lane and Spen View Lane may have views of the Proposed Development. These properties include the farm at Mill Carr Hill, Lockwood Farm and some houses on Fieldhurst Court and Meadowcroft Rise. Views are likely to be oblique and vegetation and buildings will screen most of the Proposed Development. The sensitivity of the views from these properties is considered **Low** and the magnitude of change is **Negligible**, the Proposed Development is therefore considered to have a **Minor**/**None** adverse effect.

7.186 *Spen* – approximately 2.7km to the south east of the Proposed Development, the ZVI indicates that some properties on Gomersal Lane in Spen may experience views of the Proposed Development from 1st floor windows. A site visit to this area indicates that views will be oblique and screened by woodland in most cases. The sensitivity of the views from these properties is considered **Low** and the magnitude of change is **Negligible**, the Proposed Development is therefore considered to have a **Minor**/**None** adverse effect.

7.187 *Scholes* – Scholes is situated approximately 1.5km south west of the site. The ZVI indicates that some properties situated on the northern side of Whitechapel Road and Westfield Lane may have views of the Proposed Development. Plate 11 shows the view

from Scholes Cemetery on Whitechapel Road. The Proposed Development can be seen but is partially screened by woodland and planting. The sensitivity of the views from these properties is considered **Medium** and the magnitude of change is **Slight**, the Proposed Development is therefore considered to have a **Moderate**/**Minor** adverse effect.

7.188 *Okenshaw* – One of the closest settlements to the site, situated on the western side of the M606 approximately 0.5km from the Proposed Development, the ZVI indicates that parts of Oakenshaw may have views of the Proposed Development. Site visits have shown that the motorway and the associated vegetation screening will restrict most views. The sensitivity of receptors in Oakenshaw is considered to be **Low** and the magnitude of change is **Slight**, the Proposed Development is therefore considered to have a **Minor** adverse effect.

7.189 *Odsal* – Located approximately 2km to the north west of the Proposed Development, the ZVI indicates that properties on Greenville Drive, adjacent to Bradford Gold Course, may have oblique views of the Proposed Development. Given that the views will be from gardens and rear windows that face north east onto the Golf Course and views south east towards the Proposed Development are likely to be screened by woodland, industrial buildings and the M606, it is unlikely that there will be views from these properties. The sensitivity of receptors in Oakenshaw is considered to be **Low** and the magnitude of change is **Negligible**, the Proposed Development is therefore considered to have a **Minor**/**None** adverse effect.

7.190 *Properties around Euroways Trading Estate* – Properties located east of Euroways Trading Estate on Greenfield Lane may experience views of the Proposed Development. These properties include Hag Hall Farm, Hills Side Cottage and Cheesecake Farm. Cheesecake Farm is assessed separately below. The sensitivity of these receptors is considered **Low** and the magnitude of change is **Moderate**, the Proposed Development is therefore considered to have a **Moderate**/**Minor** adverse effect.

7.191 Lower Woodlands is the closest settlement to the Proposed Development situated at the northern end of the site and populating the area between and around Cliff Hollins Lane and Mill Carr Hill Road. A number of Properties in the this area have been assessed below including the six bungalows on Cliff Hollins Lane, the property at Grid Reference 417665, 427954 opposite Oak Mills, the two properties at Grid Reference 417862,428084, the two properties at Grid Reference 417755, 428114, Cliff Hollins Farm, Chatts Farm, Clifford House Farm, Lower Chats Farm and Upper Chatts Farm. Other properties within this settlement are on elevated land and those on the southern edge of the village are more likely to experience views of the Proposed Development. The properties on Mill Carr Road will also experience views of the proposed car park for Woodlands Primary School (refer to Fig. 7.5). Therefore these properties on the southern edge of the village have **Medium** sensitivity and the magnitude of change is considered to be **Moderate** and therefore the overall effect on these properties will be **Moderate** adverse. Properties behind these have **Low** sensitivity, the magnitude of change is considered to be **Slight** and therefore the overall effect on these properties will be **Minor** adverse.

Assessment of Individual properties over 1km from the Proposed Development

Cheesecake Farm

(Refer to Plate 7.12)

7.192 This farm is approximately 1.0km north of the Proposed Development on Mill Carr Hill Road. The elevated position of the farm means that it affords views of the Proposed Development to the south. The sensitivity of this view is considered **Low** and the magnitude of change is **Moderate**, the Proposed Development is therefore considered to have a **Moderate**/**Minor** adverse effect.

Upper Chatts Farm

7.193 This property is located in an elevated position up Cliff Hollins Lane approximately 1.1km north east from the centre of the Proposed Development. The farm is located on the north western side of Cliff Hollins Lane. The view towards the proposed development is screened by roadside vegetation, trees, part of Chatts Wood and the topography. The sensitivity of this property is considered to be **Medium** and the magnitude of change is **Negligible**, the Proposed Development is therefore considered to have a **Minor** adverse effect.

Copley House Farm

(Refer to Plate 7.13)

7.194 This farm is approximately 1.1km north east of the Proposed Development, the property sits on the brow of a hill and has principal views towards the development from the patio/veranda. Much of the view is blocked by local topography, however, the northern, residential, end of the development may be seen. The sensitivity of this property is considered M**edium** and the magnitude of change is Moderate, the Proposed Development is therefore considered to have a **Moderate** adverse effect.

Chatts Farm

7.195 This farm is approximately 0.8km north east of the proposed development on elevated land. The Proposed Development will be screened partially by landform and Chatts Wood. The sensitivity of this view is considered **Medium** and the magnitude of change is **Moderate**, the Proposed Development is therefore considered to have a **Moderate** adverse effect.

Assessment of Individual properties less than 1km from the Proposed Development

Clifford House Farm

7.196 This farm is located approximately 0.6km north east of the Proposed Development on elevated land. The Proposed Development will be screened partially by landform and existing and proposed planting. The sensitivity of this view is considered **Medium** and the magnitude of change is **Moderate**, the Proposed Development is therefore considered to have a **Moderate** adverse effect.

Lower Chatts Farm

7.197 This farm is approximately 0.4km from the Proposed Development. The property is on the north side of Cliff Hollins Lane and views are partially screened by properties and roadside vegetation. The sensitivity of this view is considered to be **Low** and the magnitude of change is **Moderate**, the Proposed Development is therefore considered to have a **Moderate/Minor** adverse effect.

Two Properties at Grid Reference 417755, 428114

7.198 These properties are approximately 0.8km north of the Proposed Development. They are located in an elevated position on the north side of Cliff Hollins Lane. Hedgerows and hedgerow trees will partially screen the development and it will be more visible in winter. The sensitivity of this view is considered to be **Medium**. The magnitude of change is considered to be **Moderate**, therefore the overall effect on the visual amenity would be **Moderate** adverse..

Two properties at Grid Reference 417862,428084

7.199 These properties are approximately 0.3km north of the Proposed Development. They are represented by viewpoint 1 (refer to Photomontage Viewpoint 1). The sensitivity of this view is considered to be **Medium**. The magnitude of change is considered to be **substantial**, therefore the overall effect on the visual amenity would be **Major/Moderate** adverse**.** This is considered to be a significant effect under the Environmental Impact Regulations 2011.

Cliff Hollins Farm

7.200 This property is located further up Cliff Hollins Lane approximately 0.45km north east of the Proposed Development. The property occupies an elevated position with views of the Proposed Development from the garden and rear windows. The sensitivity of this view is considered to be **Medium** and the magnitude of change is **Substantial**, the Proposed Development is therefore considered to have a **Major/Moderate** adverse effect. This is considered to be a significant effect under the Environmental Impact Regulations 2011.

Property at Grid Reference 417665, 427954 opposite Oak Mills on Cliff Hollins Lane

7.201 This property lies approximately 0.2km to the north of the Proposed Development. Views from the ground floor and the garden are likely to be screened by the existing planting and Oak Mills across Cliff Hollins Lane. There may be views from the first floor. Planting of extra trees will help to screen views towards the development. The sensitivity of this property is considered to be **Medium** and the magnitude of change is **Moderate**, the Proposed Development is therefore considered to have a **Moderate** adverse effect.

Bungalows on Cliff Hollins Lane

7.202 These are the closest properties to the Proposed Development with the northern boundary of the Proposed Development running along the rear garden fence line. The views towards the Proposed Development will be from the rear windows and gardens. Views are oblique and partially screened by existing and proposed fences and planting. The Proposed Development will be further screened by landform and the 'benching' of the buildings in the landform. Strategic tree planting will also screen views of the

proposed buildings. The sensitivity of the view is considered to be **Medium**, the magnitude of change is considered to be **Substantial,** and therefore the overall effect on these properties will be **Major/Moderate** adverse. This is a significant effect under the EIA Regulations.

Effect on the Primary School

7.203 Woodlands Church of England Primary School is located approximately 170m from the northern end of the site. The School is on Mill Carr Lane and faces east. The views are from the ground floor and playground and there is likely to be a view from one room on the 1st floor. The view towards the Proposed Development will be partially screened by existing and proposed trees. Views from the playground are screened by vegetation, though there may be views in winter. The Proposed Development will be further screened by landform and the 'benching' of the buildings in the landform. The sensitivity of the view is considered to be **Medium**, the magnitude of change is considered to be **Moderate**, and therefore the overall effect on these properties will be **Moderate** adverse.

Effect on Long Distance Trails

7.204 There are three long distance trails within the study area, Kirklees Way, Bronte Way and Calderdale Way. Of these only Kirklees Way and Bronte Way are likely to have views of the Proposed Development.

7.205 *Kirklees Way*, a National Trail, runs from Harthead Moor Top, through Scholes then west of the M606 alongside the Golf Course, through Okenshaw and then passes just north of the site along Cliff Hollins Lane and through Chatts Wood to the north east of the site towards Birkenshaw. The ZVI indicates that the Proposed Development can be seen from the trail where it runs from Scholes to just past Copley House Farm. From fieldwork investigations it is unlikely that the Proposed Development will be seen from the part of the path running west of the golf course, most of this path is lined with tall hedgerows with very few gaps. The Proposed Development will be seen from the path where it runs from Cliff Hollins Lane to Copley House farm. In some areas this will be blocked by Chatts Wood and other mature trees. The views are limited to the northern end of the Proposed Development at Copley House Farm. The sensitivity of this view is considered Medium and the magnitude of change is Moderate, the Proposed Development is therefore considered to have a Moderate adverse effect.

7.206 *Spen Valley Heritage Trail* follows the path of the Kirklees Way from the west and north of the site before branching off south at Chatts Wood and then north from Hunsworth Lane at Upper Park House Farm. The views to the Proposed Development are the same as described above along the Kirklees Way. The sensitivity of this view is considered Medium and the magnitude of change is Moderate, the Proposed Development is therefore considered to have a Moderate adverse effect.

7.207 *Bronte Way* (refer to Plate 7.14), a National Trail, runs around the southern side of the site through Gomersal, Cleckheaton and Brighouse. At Spen, just south of Gomersal, there is a small section of the trail from which the development may be visible. Views are blocked in part by the motorway junction, woodland and local topography. There may be views of the northern end of the site. The sensitivity of this view is considered

Medium and the magnitude of change is **Negligible**, the Proposed Development is therefore considered to have a **Minor** adverse effect.

7.208 *NCN 66*, a National Cycle Route, enters the study area in the south east at Heckmondwike, travels north west through Cleckheaton and follows the dismantled railway across Cleckheaton Golf Course before circumnavigating Oakenshaw and passing under the M606 to travel north towards Bierley. The ZVI indicates there may be glimpsed views towards the Proposed Development from the part of the cycleway that passes through Cleckheaton and District Golf Club. These views will be partially screened by planting within the Golf Course landscape and the M606 and associated structure planting. The sensitivity of this view is considered **Medium** and the magnitude of change is **Slight**, the Proposed Development is therefore considered to have a **Moderate**/**Minor** adverse effect.

Effects on Public Rights of Way (PRoW)

7.209 Working in a clockwise direction from the north, the ZVI and field work indicates there is no visual impact from the following

- PRoW within and north of Bierley
- PRoW in and east of East Bierley
- PRoW South east of the M62
- PRoW south of Scholes
- PRoW in and west of Wyke
- PRoW in and west of Low Moor
- PRoW west of A641

7.210 The ZVI and field work indicates that the Proposed Development will impact visually on some PRoWs

7.211 *Footpath within the site* – This footpath passes through the northern end of the site along the access road before crossing the Hunsworth Beck at the north east corner of the existing site and ascending into the Hanging Wood, the ancient woodland east of the site. This is the closest footpath to the Proposed Development. As one ascends the path towards Hanging Woodland, the woodland will help to partially screen the buildings. The sensitivity of this footpath is considered to be **Medium**, the magnitude of change is considered to be **Substantial**, therefore the overall effect on the footpaths will be **Moderate**/**Major** adverse. This is considered to be a significant effect under the Environmental Impact Regulations 2011.

7.212 *Footpaths around Chatts Wood and Copley House Farm* (Refer to Plate 7.15) - These are a few small footpaths branching off from the Kirkless Way and are approximately 0.5km to the north east of the Proposed Development. Field work has shown that views of the northern half of the site will be visible from some of these footpaths. The sensitivity of this footpath is considered to be **Medium**, the magnitude of change is considered to be **Moderate**, therefore the overall effect on the footpaths will be **Moderate** adverse.

7.213 *Footpath running through Cleckheaton Golf Club* – This footpath runs from Oakenshaw to the A58 through Cleckheaton Golf Club. Field work along this footpath has shown that the formal planting within the golf course, combined with the structure planting

associated with the motorway prevents views of the Proposed Development. In some areas there may be glimpsed views. The sensitivity of this footpath is considered to be **Medium,** the magnitude of change is considered to be **Slight**, therefore the overall effect on the footpaths will be **Moderate**/**Minor** adverse.

7.214 *Footpath at Odsal & South Bradford Golf Course* – This footpath, also an off road cycle track, runs from Odsal Top through South Bradford Golf Course. The views are mostly screened by vegetation and views of the Proposed Development are unlikely. The sensitivity of this footpath is considered to be **Medium,** the magnitude of change is considered to be **Negligible**, therefore the overall effect on the footpaths will be **Minor** adverse.

Visual Effects on Major Roads

7.215 *M62* – This runs from the east of the study area, passing the southern boundary of the site and out of the study area to the south. The ZVI indicates that there is approximately 1km of road from which the development can be seen. Field work has shown that a lot of these views are blocked by structure planting and the M606 bridge overhead. Travelling south, the views of the Proposed Development are oblique, travelling north the views will be more prominent through gaps in the structure planting. Given the speed at which users will be travelling, the sensitivity of this road is considered to be **Low,** the magnitude of change is considered to be **Slight**, therefore the overall effect on the M62 will be **Minor** adverse.

7.216 *M606* – This major road runs from the M62 junction just south of the site north towards Bradford along the western boundary of the site. The ZVI indicates that there is approximately 2.2km of road from which the development can be seen. Field work has shown that the structure planting associated with the motorway will block views to the site for most of this stretch of road. The Proposed Development will become visible on the slip road to the M62. This is covered by Viewpoint 2. The sensitivity of this road is considered to be **Low** given the speed at which users will be travelling**,** the magnitude of change is considered to be **Moderate**, therefore the overall effect on the M62 will be **Moderate**/**Minor** adverse.

Scope of Mitigation

7.217 Mitigation is not a term used in the EIA Regulations, although it is a term used in some specific legislation, such as the Electricity Act 1989, and in guidance. The GLVIA 3rd Edition states that '*measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and where possible remedy identified effects), including landscape and visual effects, should be described*'.

Mitigation Measures

7.218 Landscape mitigation will be through development of a full landscape scheme delivered by Reserved Matters. However, landscape and visual mitigation measures for the Proposed Development were developed in principle as an integral part of the design process associated with the project including consideration of potential unit numbers, size and locations. The design process associated with the Proposed Development includes consideration of environmental and technical constraints. The landscape

principles developed as part of the design process for the site are shown in the Landscape Masterplan (Figure 7.4: Landscape Masterplan) and include:

Designed Mitigation

- Creation of a series of plateaux to enable development and to use topography to accommodate and screen the proposed buildings. Preliminary landform design has used 1:3 slopes to avoid retaining structures but these will depend on ground conditions.

- Breaking the site down into compartments, these are in part dictated by the building form but also reflect the historical field pattern associated with the site and remnant field patterns seen in the adjacent landscape. Mitigation measures therefore aim to re-establish, where possible, the structure of the landscape.

- Use of strong linear hedgerows to define the compartments. These together with hedgerow trees will have a partial screening function and reflect the pattern of the surrounding landscape.

- It is difficult to fully mitigate views from the higher ground to the north, therefore breaking up the site into compartments will help to accommodate potential development.

- Use of blocks of deciduous woodland to further screen views from the road system and higher ground.

- Use of 'parkland' trees reflecting the landscape to the north of Hanging Wood.

- Use of roadside trees providing some areas of formality in the development.

- Use of native tree and hedgerow species including Oak, Ash (depending on current hold on nursery stock due to Ash Dieback), Birch, Willow, Poplar, Field Maple, Cherry, Hawthorn, Blackthorn, Elder etc.

- The embankments associated with the proposed car park for Woodlands Primary School also provide an opportunity for native tree planting and understorey.

Management Control Mitigation

- Use and management of naturalistic planting schemes associated with the lower, wetland parts of the site, including wildflower grasslands and meadows.

- Grassland areas left as paddocks reflecting surrounding landscape.

Physical Mitigation

- The use of mounding and landform at the northern end of the site to screen views from the higher properties where possible.

- Hunsworth Beck is a feature of the site (of possible amenity value for site users) as well as major drainage element, the Proposed Development includes a supplementary SUDS approach utilising swales, balancing ponds, wetland and damp meadow.

Residual Effect Assessment

7.219 This is a second assessment and takes the initial conclusions of the of the Predicted Significant effects, applies the mitigation described above and draws final conclusions. In this LVIA, effects that are described as Major or Major/Moderate are considered to be significant effects as defined by the Environmental Impact Regulations 2011. It should be noted that significant effects need not be unacceptable or negative. A summary table of the significant effects only is set out below (Table 7.10).

7.220 The LVIA shows that the following significant adverse effects which are based on both construction and operation. These are listed below:

- **Major/Moderate** adverse effect on Batley Fringe Incised Valleys Landscape Character Area designation. The Proposed Development will change the character of the site in the vicinity of the former WwTW. A strong landscape masterplan, design brief and underlying green infrastructure will contribute to the new landscape character of the site and vicinity.

- **Major/Moderate** adverse visual effect on Viewpoints 1, 3 and 4.

- **Viewpoint 1** represents the view from the footpath by Cliff Hollins Farm some 300 m to the north of the Proposed Development. The landscape framework and emerging tree and woodland structure will in part mitigate the development, particularly as the vegetation matures. However, it is considered that the Proposed Development will have a **Major/Moderate** adverse effect on the landscape and visual amenity.

- **Viewpoint 3** represents the view from the junction of Cliff Hollins Lane and site access road, the closest proposed residential building is some 40 metres from the viewpoint. Substantial planting to the landform at the eastern end of the development will help to mitigate the development over time as the vegetation matures. However it is considered that the Proposed Development will have a **Major/ Moderate** adverse effect on landscape character and effects on visual amenity will be reduced to **Moderate** within 10 – 15 years as the landscape infrastructure matures.

- **Viewpoint 4** represents the view from the public footpath to the north of Hanging Wood, the nearest commercial development is approximately 155 metres to the south. The viewpoint provides wide elevated, panoramic views of the Proposed Development. While the landscape mitigation measures will provide a context for the development it is considered that the effects on the landscape and visual amenity will remain Major/Moderate adverse.

- **Major/Moderate** adverse visual effect on Cliff Hollins Farm, this property is adjacent to Viewpoint 1. The residual effect after mitigation is considered to remain as Major/Moderate.

- **Major/Moderate** adverse visual effect on two properties at Grid Reference 417862, 428084. These properties are 300 m to the north of the Proposed Development and will experience views similar to Cliff Hollins Farm and

Viewpoint 1. The residual effect after mitigation is considered to remain as Major/Moderate.

- **Major/Moderate** adverse visual effect on the bungalows on Cliff Hollins Lane. These are the closest properties to the Proposed Development with the northern boundary of the Proposed Development running along the rear garden fence line. Views are oblique and partially screened by existing and fencing as well as further screening by proposed landform and establishment of woodland structure planting. It is considered that effects on visual amenity will be reduced to Moderate within 10 – 15 years as the landscape infrastructure matures.

- **Major/Moderate** adverse visual effect on the footpaths within the site**.** A public footpath passes through the northern end of the site along the access road before crossing the Hunsworth Beck. The footpath will be associated with the entrance road to the Proposed Development and will be taken into consideration as part of the design development of the site. The character of the footpath will change from a low key access road to a dedicated access route leading to the Hunsworth Beck and will be an important part of the infrastructure of the development. Careful design may mitigate the effects on the footpath.

Table 7.10: Summary of Significant Residual Landscape and Visual Effects

Effect	Location	Phase	Significance associated with embedded mitigation	Significance after mitigation	Period	Impact
Landscape Character	Batley Fringe Incised valleys Landscape Character Area	Construction & operation	Major/ Moderate	Major/ Moderate	Long term	Adverse
Landscape Visual Amenity	Viewpoint 1	Construction & completion	Major/ moderate	Major/ moderate	Long term	Adverse
Visual Amenity	Viewpoint 3	Construction & completion	Major/ moderate	Moderate	Long term	Adverse
Visual Amenity	Viewpoint 4	Construction & completion	Major/ moderate	Major/ moderate	Long term	Adverse
Visual Amenity	Cliff Hollins Farm	Construction & completion	Major/ moderate	Major/ moderate	Long term	Adverse
Visual Amenity	Properties at Grid Reference 417862 428084.	Construction & completion	Major/ moderate	Major/ moderate	Long term	Adverse
Visual Amenity	Bungalows on Cliff Hollins Lane	Construction & completion	Major/ Moderate	Moderate	Long term	Adverse
Visual Amenity	Footpath within site/along existing access road	Construction & completion	Major/ Moderate	Major/ moderate	Long term	Adverse

Cumulative Effect Assessment

7.221 The cumulative assessment considers the combined effects of the Proposed Development and other committed projects. While not committed Highways England have indicated that consideration is being given to reconfiguration of Junction 26 of the

M62/M606. The potential road realignment is shown on KPP plan 1773-01-206-A. The proposed junction will be directly adjacent to the southern end of the Proposed Development site and is likely to be elevated in the form of an embankment. The road is likely to have an effect on landscape character and visual effects. The potential road re-alignment and associated embankment is likely to screen the southern end of the Proposed Development. The embankment provides further opportunity for roadside tree planting which will benefit the Proposed Development and roads. It is likely that there will be views from the new road junction into the site.

References

7.1 The Town and Country Planning (Environmental Impact Assessment) Regulations 2011

7.2 National Planning Policy Framework (March 2012)

7.3 Kirklees Unitary Development Plan (2007)

7.4 Bradford Unitary Development Plan (2005)

7.5 Calderdale Unitary Development Plan (2006)

7.6 Landscape Institute/Institute of Environmental Management and Assessment 2013 Guidelines for Landscape and Visual Impact Assessment, Third Edition

7.7 Landscape Institute 2013 Position Statement Green Infrastructure and Integrated Approach to Land Use

7.8 Landscape Institute Advice Note 01/2011 Photography and Photomontage in Landscape and Visual Impact Assessment

7.9 Natural England 2014 An Approach to Landscape Character Assessment

7.10 The Countryside Agency and Scottish Natural Heritage 2002 Landscape Character Assessment; Guidance for England and Scotland

7.11 Countryside Commission English Nature 1996 The Character of England: Landscape, Wildlife and Natural Features

7.12 Kirklees Council Landscape Architects 2015 Former North Bierley Waste Water Treatment Works, Cliff Hollins lane, Cleckheaton Landscape Character Assessment

7.13 Land Use Consultants 1999 *South Pennines Landscape Character Assessment*, report to Standing Conference of South Pennines Authorities (SCOSPA)

7.14 City of Bradford Metropolitan District Council 2008 Local Development Framework for Bradford Landscape Character Supplementary Planning Document.

8. Ground Conditions

Purpose of the Assessment

8.1 This chapter assesses the subsurface ground conditions beneath the Application Site that may potentially impact upon and be impacted by, the Proposed Development. This includes an assessment of general ground conditions, the presence of contamination and the possibility of mining instability. The significance of these impacts is then assessed and appropriate mitigation measures for reducing these potential impacts are proposed where relevant. Figure 1.1 shows the location of the Application Site.

8.2 The Chapter is prepared by Wardell Armstrong and should be read in conjunction with the associated **Technical Appendices 8.1- 8.5.**

Legislative Framework

National Policy

8.3 National Policy is set out within the National Planning Policy Framework (NPPF 2012) (Ref 8.1). National Planning Practice Guidance was published in March 2014 and includes guidance for land affected by contamination and land stability.

8.4 NPPF Paragraph 109: The planning system should contribute to and enhance the natural and local environment by:

- Protecting and enhancing valued landscapes, geological conservation interests and soils;
- Recognising the wider benefits of ecosystem services;
- Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

8.5 Paragraph 120: "To prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner" (NPPF, 2012).

8.6 Paragraph 121: "Planning policies and decisions should also ensure that":

- "the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation";
- "after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990"; and
- "adequate site investigation information, prepared by a competent person, is presented" (NPPF, 2012).

8.7 The NPPF makes reference to the Environmental Protection Act 1990 Part IIA (para. 121). Part IIA was introduced into the EPA by the Environment Act 1995 to help deal with the substantial legacy of contaminated land. Part IIA, its accompanying regulations and Statutory Guidance contained in DETR Circular 02/2000 Contaminated Land came into force in England on 1 April 2000. Part IIA included the first statutory definition of "contaminated land" and conferred new responsibilities and powers on local authorities and the Environment Agency to identify contaminated land and ensure that it is dealt with. Defra published updated guidance in April 2012 (Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance) (Ref. 8.2).

8.8 Within Part IIA, contaminated land is defined as: "any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land that:

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

8.9 Part IIA addresses "unacceptable risk". The approach is based upon the principles of risk assessment, including the concept of a contaminant, a receptor and a pathway, which, if combined, form a pollutant linkage. These and other key terms are defined in Part IIA and in the statutory guidance (DETR Circular 02/2000). A significant pollutant linkage forms the basis of a formal determination that land is contaminated land.

8.10 For each receptor, a description of the harm that is to be regarded as significant harm for the purposes of the regime is contained in the statutory guidance. Receptors include human beings, ecological systems in certain protected locations (e.g. sites of special scientific interest), property such as crops, livestock, domesticated animals, and buildings and their services. Significant harm includes in appropriate cases death, disease, serious injury, specified ecological system effects, substantial diminution of crop yield and structural building failure. Pollution of controlled waters arising from the contaminated condition of land is also included in the regime.

Local Policy

Kirklees Unitary Development Plan

8.11 The Kirklees Unitary Development Plan (UDP) (2007) forms the current development plan for Kirklees. The (UDP) sets out the council's policies and proposals for the use and development of land and buildings and was adopted on 1 March 1999. Current UDP policies are "saved" and where the UDP conforms to the National Planning Policy Framework (Ref. 8.1) will continue to form the basis for planning decisions until the adoption of the Local Plan. When adopted, the local plan will replace the UDP. The emerging Kirklees Local Plan was the subject of a six week public consultation period which closed in early 2016, the Plan is due to be formally adopted in late 2017. The following UDP policies have been retained or "saved" and relate to ground conditions:

Policy G6 - Development proposals will be considered having regard to available information on the contamination or instability of the land concerned.

Policy DL1 - Derelict and neglected land will be brought into beneficial use to assist in the regeneration of the district.

8.12 Other policies relating to ground conditions have not been "saved" as they repeat national policy and policies elsewhere in the document.

Bradford Unitary Development Plan (2005)

8.13 The City of Bradford Council Replacement Unitary Development Plan (RUDP) was adopted in October 2005 and sets out their policies and proposals for the use and development of land and buildings. Those policies which have been 'saved' and are relevant to ground conditions include: UDP8 (Use of Natural Resources and Renewable Energy); UDP9 (Management of Pollution, Hazards and Waste), NR17 (groundwater protection); NR17A (water courses and water bodies) and P6 Unstable Land.

8.14 Policy UDP9 states that development must "*contribute to the management of pollution, hazards and waste through relevant control measures risk minimisation and the encouragement of reuse and recycling".*

8.15 "Policy P6 planning permission for development on land known or suspected to be Potentially Unstable only will be granted, if the following provisions are made:-

(1) A full site investigation has been carried out by the developer to determine whether instability may occur or not, and

(2) If any instability is found, the developer shall carry out any measures required to adequately overcome the problem, on the commencement of development".

8.16 The RUDP is due to be replaced by the Council's new Core Strategy and whilst these policies have not yet been adopted, they are relevant to consideration of planning applications as they have been reviewed by an Inspector. This includes Policy EN2 relating to geodiversity and Policy EN8 relating to environmental protection:

8.17 Policy EN2 policy states that *"development likely to have an adverse effect on a site of ecological/geological importance (SEGIs and RIGS) or a site of local nature conservation value (Bradford Wildlife Areas) will not be permitted unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the substantive nature conservation value of the site".*

8.18 Policy EN8: Environmental Protection states that *"in order to protect public health and the environment the Council will require that:*

8.19 *Proposals which are likely to cause pollution or are likely to result in exposure to sources of pollution (including noise, odour and light pollution) or risks to safety, will only be permitted if measures can be implemented to minimise pollution and risk to a level that provides a high standard of protection for health, environmental quality and amenity. The following issues require particular attention:*

B. Land

8.20 *Proposals for development of land which may be contaminated or unstable must incorporate appropriate investigation into the quality of the land. Where there is evidence of contamination, remedial measures must be identified to ensure that the development will not pose a risk to human health, public safety and the environment. Investigation of land quality must be carried out in accordance with the principles of best practice.*

8.21 *D. Water Environment*

8.22 *The Council will work with partner organisations to safeguard ground and surface water resources and to protect and improve water quality. Proposals for development will only be acceptable provided there is no adverse impact on water bodies and groundwater resources, in terms of their quantity, quality and the important ecological features they support. In the longer term, the aim will be to improve the ecological status of water within Bradford.*

Assessment Methodology

8.23 Available reports and published information have been reviewed with the aim of identifying the ground conditions within and surrounding the proposed commercial and residential development. This data review has established the geological situation beneath the site, identified areas of potentially contaminated land and of potential land instability and made an assessment of the engineering properties of the soils and rocks. It also identified potential pollutant linkages, and facilitated a risk assessment for each of the identified pollutant linkages.

8.24 This following section provides an explanation of how the likely significant effects of the Proposed Development on the environment have been assessed, both in relation to the construction and operational phases.

Methodology

8.25 This assessment is based upon a review of current and historical data, site walkovers and site investigations. The residential and commercial areas have been considered

following appropriate guidance for these proposed land uses. The school parking area in the north west of the site has been considered as a commercial land use.

8.26 Primary sources of information are listed below and these provide reference to statutory and other environmental information. They are provided in full in Appendices 8.1 to 8.4:

- URS, Environmental Site Assessment at North Bierley Water Pollution Control Works, Report Reference 44320048, dated November 2006 (Appendix 8.1);
- Wardell Armstrong LLP, Phase II Environmental Assessment, Report Reference SH10534-RPT-002B, dated May 2015 (Appendix 8.2);
- Wardell Armstrong LLP, Mining Remediation Strategy, Letter Report Reference SH10534-REP-003, dated June 2015 (Appendix 8.3); and
- Wardell Armstrong LLP, Soils and Agricultural Land Desk Study, Report Reference SH10534-REP-004, dated July 2015 (Appendix 8.4).

8.27 The methodology for the assessment is based on a combination of sensitivity and magnitude to determine the significance of the impact. The sensitivity and magnitude criteria for ground conditions are set out in **Tables 8.1 and 8.2** below.

Table 8.1: Ground Conditions Sensitivity Classification

	Substantial	Moderate	Low
Geology and soils	Site of Special Scientific Interest (pa). Regionally Important Geological Site (RIGS). Best and Most Versatile agricultural land.	Outcropping bedrock. Soils capable of supporting arable agriculture. Thin upland soils. Peat deposits.	Soils capable of supporting grazing pasture. Thicker lowland soils. Soils within urban / developed areas.
Ground stability and geotechnical properties	Areas of former mine workings Steep / unstable sloping ground Areas of deep peat.	Lesser sloping ground. Peat deposits and other loosely consolidated deposits.	Level and well consolidated ground.
Contaminated land	Highly contaminated sites with shallow contamination.	Contaminated sites with shallow contamination.	Sites with low levels of contamination and/or contamination at depth.

Table 8.2: Ground Conditions Magnitude Classification

Impact magnitude	Guideline Criteria
Substantial	Total loss of, or alteration to, the baseline resource such that post development characteristics or quality would be fundamentally and irreversibly changed
Moderate	Loss of, or alteration to, the baseline resource such that post development characteristics or quality would be partially changed
Low	Small changes to the baseline resource, which are detectable but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions
Negligible	A very slight change to the baseline conditions, which is barely distinguishable, and approximates to a 'no change' situation

Significance Criteria

8.28 The following series of 'significance criteria' have been developed to help in ascertaining the scale of effect (i.e. substantial, moderate, minor) and the type of effect (i.e. beneficial, negligible, or adverse) and to provide a transparent and auditable decision making process to the reader.

Table 8.3: Significance Criteria

Significance Criteria	Description of Criteria
Substantial beneficial	A significant improvement to both the on-site and off-site ground conditions.
Moderate beneficial	Significant improvement to the on-site ground conditions.
Minor beneficial	Improvement to the on-site ground conditions.
Negligible	No change to soil or water quality or harm caused to identified receptors.
Minor adverse	Non-permanent effects on human health (easily prevented by standard personal protective equipment). Minor pollution of non-sensitive controlled water receptors. Non-significant harm to buildings, structures and services but may result in financial loss or expenditure to resolve. Minor harm caused to RIGS Statutory designated sites. Sterilisation of low quality mineral resource.

Study Area

8.29 The study area is as set out in Chapter 3 of the Environmental Statement and as shown on Figure 3.1.

Surveys

8.30 The surveys outlined below have been undertaken and have been used to inform the Environmental Statement.

Phase II Environmental Assessment, Former North Bierley WWTW, Wardell Armstrong, May 2015

8.31 An intrusive site investigation was carried out to further identify and examine the potential contamination issues identified in a previous environmental assessment, carried out by URS Corporation Ltd (report ref. 44320048, November 2006**, report attached as Technical Appendix 8.1**), that may arise in connection with present use or proposed use of the Application Site and to determine geotechnical information of relevance to the proposed use of the Application Site. This report is attached at **Technical Appendix 8.2**.

North Bierley Mining Remediation Strategy (letter report), Wardell Armstrong, June 2015

8.32 This report aimed to identify areas of potential surface instability associated with both shallow abandoned mine workings and mine shafts. This report is attached at **Technical Appendix 8.3**.

Soils and Agricultural Land Desk Study, Wardell Armstrong, July 2015

8.33 This study assessed the soil type and agricultural land quality of the Application Site and commented on the potential impacts of the proposed redevelopment of the land for mixed residential and commercial uses. This report is attached at **Technical Appendix 8.4**.

Consultation

8.34 **Table 8.3** below lists the consultation activities that have been undertaken with regard to the proposed development and the full responses can be seen at **Technical Appendix 8.5**.

Table 8.4: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
8 August 2014	Nasir Dad (ND) – Senior Environmental Health Officer, Kirklees Council. Jo Shaw (JS) of Wardell Armstrong LLP (WA) emailed Nasir Dad of Kirklees Council on 3 July 2014 to request that he review the Phase II Site Investigation report conclusions and recommendations and to inform WA as to whether, in his opinion, the works carried out at the site were sufficient to support the planning application which was current at the time.	This matter is expected to be addressed as a condition of planning and will be resolved with further gas monitoring

Date	Consultee and Issues Raised	How/ Where Addressed
	ND advised that he had looked through the site investigation conclusions and recommendations and confirmed that the report appeared comprehensive. He added however, that given the high methane levels, in addition to the fluctuating groundwater issues, that the gas regime will in all likelihood be conditioned with a requirement for further site investigation works.	being undertaken at the Application site.
4 August 2014	Mark Harrison (MH), Planning Liaison Manager for The Coal Authority – Planning & Local Authority Liaison Nick Tovey (NT) of WA wrote to The Coal Authority on 21 July 2014 requesting comments on the draft remediation strategy for the Proposed Development. MH confirms that The Coal Authority considers the remedial measures proposed to treat the mine entries and shallow mine workings as appropriate. He notes that development appears to be proposed over and close to mine entries and states their policy which seeks to avoid new development over or too close to recorded mine entries. He finishes by explaining that if the proposed site layout seeks to build over, or close to, recorded mine entries, that The Coal Authority would require evidence as to the planning or practical reasons why the layout could not be amended to avoid this hazard. He suggests that it may prove beneficial to undertake intrusive site investigations to locate the mine entries prior to finalising the layout.	To be addressed at the detailed design stage.
2 December 2010	Leigh Sharpe (LS), Mining Property Manager for the Coal Authority NT of WA wrote to LS to seek approval for the Mining Remediation Strategy for the Application Site. LS wrote back attaching the signed permit certificate and supporting documentation which allows WA to carry out the works to the specifications submitted. LS requests that a final report is submitted when the works are complete, as required by the permit certificate terms and conditions.	This will be addressed after the mining remediation works have been carried out with a final report being sent to the relevant parties.

Limitations of Site Investigation

8.35 It should be noted that the interpretation of the results of the physical site investigation is based on a limited number of investigation points. The locations and numbers of the investigation locations were governed by the physical state of the site and the location of known services at the time of the investigation. Although reasonable inferences have been made during the interpretation, it is possible that variances in the thickness, distribution and physical/chemical characteristics of the strata present will exist.

Baseline Conditions

8.36 In order to inform this assessment a desk study report has been reviewed and an intrusive investigation (**Technical Appendix 8.2**), a mining remediation assessment (**Technical Appendix 8.3**) and a soils and an agricultural land desk study (**Technical Appendix 8.4**) were undertaken in order to obtain baseline data.

8.37 The desk study information is summarised below:

- At the time of the writing of the report in 2006, the Application Site was an operational WWTW. Historical plans show that a sewage works was present on part of the Application Site in 1893. The Valley Pit Coal and Ironstone workings were also present in the west of the Application Site at this time along with an Old Coal pit in the south. A tramway is reported extending across the western part of the Application Site. By 1908 the pits were reported to be closed and the sewage works had expanded. Subsequent maps show further expansion and changes to the layout up until 2004;

- The Application Site is situated on Lower Coal Measures which are considered a minor aquifer. Alluvium drift deposits are indicated as likely to be present along the eastern boundary associated with the Hunsworth Beck. It is also likely that made ground of an unknown nature and thickness will be present on the Application Site associated with the collieries and former layouts;

- The Hunsworth Beck is located adjacent to the eastern site boundary. This was given a quality grading of Grade E (poor) in 2000.

- The conceptual model identifies sources of contamination from former on-site operations (contamination resulting from settlement tanks, sludge beds, organic matter, fuels), nearby off-site operations (chemical works, rope works, cotton mill, mills, garages, coal pits etc) and made ground;

- A preliminary conceptual site model was presented in the Phase I Environmental Site Assessment. The conceptual model identifies sources of contamination from former on-site operations (contamination resulting from settlement tanks, sludge beds, organic matter, fuels), nearby off-site operations (chemical works, rope works, cotton mill, mills, garages, coal pits etc) and made ground; and

- The report concludes that there are likely to be pollutant linkages present at the Application Site. However, the report allocates a low to moderate risk of

significant harm based on a continued land use. The report indicates that should the use of the Application Site change a higher risk may be applicable.

Site Investigation

8.38 A site investigation was carried out to determine the ground conditions beneath the Application Site for geotechnical and mining purposes and also to assess levels of any potential contamination. The site investigation is reported in full in the Phase II Site Investigation Report at (**Technical Appendix 8. 2**) and is summarised below.

Geology

8.39 The assessment of the geology of the Application Site is based on the published geological mapping sheet (Sheets Yorkshire 231NE and 232NW, Solid and Drift Editions, 1:10,560 scale) supplemented by the geological memoir, topographical plans and site visit. A typical summary section is provided in **Table 8.5** below along with other geological data.

Table 8.5: Geological Summary

Strata	Description
Made ground	Made ground of an unknown nature and thickness associated with past site uses is likely to be present across the Application Site.
Natural superficials	An unknown thickness of alluvium may be present to the east of the Application Site adjacent to Hunsworth Beck.
Solid strata	Sandstones, mudstones and shales of the Lower Coal Measures.
Dip and dip direction	Sub-horizontal.
Evidence of faulting	Two faults trending NE-SW are located to the north of the Application Site; the north is the downthrow side.

Hydrogeology

8.40 Hydrogeological information from the Environment Agency changed in April 2010 in order to comply with the Water Framework Directive. Where possible, this report considers both the old and new information obtained from:

- Groundwater Protection Policy and Groundwater Vulnerability maps published by the Environment Agency;
- Hydrogeological maps published by the British Geological Survey; and
- Groundwater Protection: Policy and Practice (Environment Agency, 2006).

8.41 This information indicates the Application Site to be underlain by sandstones, mudstones and shales of the Lower Coal Measures which are classified as a Secondary A Aquifer.

8.42 Secondary A aquifers are generally fractured or potentially fractured formations and do not have a high primary permeability. Although not producing large quantities of water for abstraction, they are important for local supplies and may supply base flow to rivers.

8.43 The Application Site does not lie within a source protection zone.

Hydrology

8.44 The nearest graded surface watercourse is Hunsworth Beck, which forms the eastern boundary of the Application Site. The Environment Agency has given Hunsworth Beck a General Quality Assessment (Chemistry) rating of E (Poor). Flood and drainage information is presented in Chapter 10.

Mining

General

8.45 Research of the mining setting is based on examination of the published topographical and geological information along with other mining archive information. A Coal Authority report for the Application Site has been obtained, dated 23 November 2010 and is attached at Appendix II of **Technical Appendix 8.2** a visit was also made to the Coal Authority abandoned mine records office at Mansfield on 25 November 2010.

Surface Workings

8.46 Research of topographical, geological and other archive mining records has indicated no evidence of surface workings within the vicinity of the Application Site.

Shallow Underground Workings

8.47 From the enquiries made and examination of the geological information there is evidence of shallow underground mining activity beneath the Application Site. Reference to the abandonment plans indicate that these shallow workings are likely to be in the Shertcliffe Bed.

Potential Surface Instability

8.48 Most of the ancient and frequently unrecorded mining activity of the nineteenth and earlier centuries was carried out by the room and pillar system. The problems of potential surface instability over such old mine workings arises when the process of upward collapse under gravity penetrates through the solid strata, either to the surface sub-soil, to superficial deposits and/or tipped material above.

8.49 The height above the working to which the collapse process can take place before total choke-filling occurs, is generally governed by the volume of the original tunnel or roadway, and by the change in volume of the collapsed material. The greater the volume of the tunnel or void (i.e., the greater its height and width), or the smaller the change in volume of the collapsed material, the higher the process of collapse is likely to take place. The change in volume of the collapsed materials may be as little as 10% and as much as 50%. Therefore, the ultimate height of collapse through solid strata is not likely to be less than twice or more than ten times the thickness of the seam mined.

8.50 The above leads directly to a definition of "shallow" old mine workings and to the delineation of problem areas. Research of existing records, an appreciation of the

caving or collapse, and the characteristics of the solid strata overlying such old workings, allows the evaluation of problems and appropriate action.

Deep Mining

8.51 The Coal Authority report indicates evidence of deep underground mining activity beneath the Application Site in the Blocking and Better Bed Coal seams.

8.52 Deep mining is generally defined as that mining undertaken at depths greater than about 30m below rockhead.

8.53 Whilst ground movements would have occurred due to the mining of any deeper seams, surface subsidence effects should have been largely contemporaneous with the mining. The Application Site is considered stable in respect of any past deep mining.

8.54 There are no current mining activities affecting the Application Site and the Application Site does not lie within influencing distance of any presently known planned future workings.

Mine Entries

8.55 The Coal Authority report has indicated that there are ten recorded mine entries on or within influencing distance of the Application Site. Only one of the mine entries is noted to have had any treatment; entry 417427-005 (to the north west of the Application Site) was treated on behalf of the Coal Authority with mass concrete following its collapse in 1997.

Mine Shafts

8.56 In old abandoned mining areas, it was common practice to backfill the abandoned shafts either completely or, to a staging built at some level above the shaft bottom with loose colliery refuse. In many cases such old mine shafts have subsequently been covered over and have become overgrown and visually indistinguishable. Where no special plugging precautions were taken to seal off the shaft fill material from old workings or, where a shaft was filled on to staging in the shaft, the fill material can run into the old workings or into the empty shaft space beneath the staging. In both cases, the result is the sudden appearance of a collapse hole in the ground the diameter of which may be considerably greater than that of the original shaft.

8.57 In addition to the recorded mine entries at or near the Application Site, the possibility of there being additional unrecorded mine entries cannot be entirely discounted. During development a careful watch should be maintained for any feature which may represent an unrecorded mine entry, such as circular brickwork or anomalous areas of fill/timber. Should any such feature be identified it should be reported, investigated and acted upon as necessary.

Coal Mine Gas

8.58 Examination of the mining and geological information indicates that it is possible that gases migrating from now abandoned coal mine workings may affect the Application Site.

Phase II Intrusive Site Investigation

8.59 The current investigation was designed around the preliminary conceptual site model that identified all potential sources, pathways and receptors. This allowed a targeted sampling approach to be undertaken and provide general coverage of the Application Site. Results of the investigation are used to revise the conceptual site model, establish whether linkages identified are plausible and establish the level of risk associated with the Application Site.

8.60 The site investigation was also carried out to assess the geotechnical nature of the ground. The site investigation comprised of seven cable percussion boreholes, three of which had rotary follow-on, ten window sample boreholes and nineteen trial pits across the Application Site area. Locations were positioned to provide complete coverage of the whole Application Site. Site investigation locations are shown on Drawing SH10534-008 which is contained within the Drawing section at the back of the report comprising **Technical Appendix 8.2**.

8.61 The investigation including sampling techniques was carried out in accordance with BS10175:2001 Investigation of potentially contaminated sites – code of practice (Ref. 8.3).

Scope

8.62 The investigation was designed as a series of tasks that are summarised below in **Table 8.6**.

Table 8.6: Summary of Tasks

Task	Summary	Date(s)
Preparatory Work	Setting up site investigation contract, including services enquiries, contractor health & safety document and site meeting with contractor/client.	November 2010-May 2011
Intrusive site investigation	7 Cable percussion boreholes to a nominal depth of 10m with rotary open-hole follow-on in 3 boreholes to 30mbgl, 10 window sample boreholes to a nominal depth of 5m and 19 trial pits to a nominal depth of 4m. Installation of monitoring wells for groundwater and gas.	16th May- 20th May 2011
Laboratory analysis	Chemical / geotechnical testing in accredited laboratory – 34 soil and 5 groundwater samples.	20th May – 24th June 2011
Monitoring	Gas and water level monitoring.	19th May 2011-17th May 2012

8.63 A total of seven cable percussion boreholes (to a maximum depth of 10.7mbgl), three of which had rotary follow-on (to a maximum depth of 30mbgl), ten window sample boreholes (2.0m to 5.0mbgl) and nineteen trial pits (1.4m-3.6mbgl) were completed as part of this Phase II investigation. Observations from the intrusive work have confirmed the presence of 0.15m and 8.3m thick over the majority of the Application Site, underlain by soft to stiff, orange-brown mottled grey, locally cobbly with rare boulders, sandy, gravelly clay and mudstone bedrock of the Middle Coal Measures geology.

8.64 Thirty soil and six groundwater samples from across the Application Site were tested for a suite of potential chemicals of concern comprising: volatile and semi-volatile organic compounds; aliphatic, aromatic and polyaromatic hydrocarbons; metals and other inorganic elements.

Contamination Assessment

Human Health

8.65 Analytical results were analysed using CLEA methodology to assess the risk to human health in both a residential and a commercial/industrial scenario.

- Residential Area

8.66 The mean concentrations of the majority of the determinands across this area are below screening criteria and should not pose a risk to human health for a residential end use. However, elevated concentrations of arsenic were recorded in several hotspots in this area and may pose a risk to human health in residential land use.

- Commercial Area

8.67 The mean concentrations of all determinands across this area are below screening criteria and should not pose a risk to human health for a commercial/industrial end use.

- Car Park

8.68 The proposed car park is considered to have a low sensitivity as it is greenfield and covered by hardstanding. No source-pathway-receptor linkages are identified and this area is not considered further within the risk assessment.

Surface Water and Groundwater

8.69 The risk to surface water and groundwater is considered to be low to moderate. The recorded concentrations of medium to long chain petroleum hydrocarbons are elevated with respect to the UKDWS in the southern part of the Application Site, particularly BH6. However, concentrations of petroleum hydrocarbons in groundwater across the Application Site are generally below the LOD and/or UKDWS, therefore the risk to surface water and groundwater can be considered more towards low than moderate.

Preliminary Remediation Options

8.70 Further site investigation and testing is required to constrain the slightly elevated concentrations of potential contaminants identified in the residential area of the Application Site. At this early stage it is considered that mitigation/remediation of the residential area is likely to include:

- Further sampling and testing in the north western portion of the Application Site with elevated arsenic concentrations;
- Removal of shallow soil from the residential development area with elevated arsenic concentrations; or
- Capping of the arsenic hotspot areas with a clean material which may be sourced from elsewhere on the Application Site.

Buildings and Property

8.71 Results from sulphate (2:1 extract) testing indicate that a worst case design sulphate class of DS-2 and Aggressive Chemical for Concrete (ACEC) class of AC-2 may be appropriate for the Application Site.

Ground Gas - Residential

8.72 Low concentrations of methane, up to 1.6%, and low concentrations of carbon dioxide, up to 1.4% have been reported in one borehole in this area.

8.73 For a CIRIA Situation A development type, a gassing regime of Characteristic Situation 1 (CS1) can be attributed to this area and no special ground gas protection measures are required.

8.74 For a CIRIA Situation B development type, a gassing regime of Amber 1 can be attributed to this area which requires low-level gas protection measures, comprising a membrane and ventilated sub-floor void to create a permeability contrast to limit the ingress of gas into buildings. Gas protection measures should be as prescribed in BRE Report 414 (Johnson, 2001). Ventilation of the sub-floor void should facilitate a minimum of one complete volume change per 24 hours.

Ground Gas - Commercial

8.75 High concentrations of methane, up to 34.6%, have been reported in one borehole, BH5, and moderate concentrations of carbon dioxide, up to 3.7%, have been reported across the remainder of the Application Site. Through reference to CIRIA C665 a gassing regime of Characteristic Situation 1 (CS1) can be attributed to the commercial area due to low flow rates. However, given the high levels of methane recorded in the south of the Application Site, we would recommend increasing the classification in this area (BH's 4, 5 and 6) to Characteristic Situation 2 (CS2) as a precaution.

8.76 The majority of the Application Site can be considered as CS1 and no specific gas protection measures would be required. The southern end of the Application Site should be considered to be CS2 and the following protective measures will be required:

- Reinforced concrete cast in-situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM;
- Beam and block or precast concrete slab and minimum 2000g DPM/reinforced gas membrane;
- Possibly underfloor venting or pressurisation in combination with a) and b) depending on use;

- All joints and penetrations sealed; and

- An initial assessment for radon gas has been carried out. The determination follows the two-stage procedure outlined in BR211 Radon: Guidance on protective measures for new dwellings (2007). The assessment indicates that no specific radon protection measures are required.

Ecology

8.77 The phytotoxic metals arsenic, copper, lead and zinc were analysed against the ECO-SSL threshold values for risk to plants. The results displayed numerous samples to have elevated metals considered likely to hinder the growth of sensitive plants in planned areas of landscaping and residential gardens. These samples were widespread across the Application Site. This is based on an overly conservative assessment using generic criteria and plants have been observed growing on site. Therefore this is not considered to be a significant concern.

Coal Mining

8.78 As noted above, a Coal Authority report for the Application Site has been obtained, dated 23 November 2010, a visit was also made to the Coal Authority abandoned mine records office at Mansfield on 25 November 2010. The following points are of note:

- Shallow Underground Workings - From the enquiries made, examination of the geological information and site investigation observations there is evidence of shallow underground mining activity beneath the south of the Application Site. Reference to the abandonment plans indicate that these shallow workings are likely to be in the Shertcliffe Bed;

- No intact coal seams were encountered during the investigation. However, there was evidence of broken/soft ground accompanied by loss of flush which may indicate the presence of workings. This broken/soft ground was observed at depths of between 11.3m and 16.7mbgl in borehole BH6. Due to collapse of the borehole, drilling was terminated at 16.7mbgl. Further investigation and stabilisation of the underground conditions with respect to mining is likely to be necessary in this area of the Application Site; and

- Mine Entries - The Coal Authority report has indicated that there are ten recorded mine entries on or within influencing distance of the Application Site. Only one of the mine entries is noted to have had any treatment; entry 417427-005 (to the north west of the Application Site) was treated on behalf of the Coal Authority with mass concrete following its collapse in 1997. Prior to development the mine entries will require location, investigation and stabilisation.

Revised Conceptual Model

8.79 In line with current Environment Agency guidance, plausible source, pathway and receptor linkages have been identified for the Application Site. The plausible linkages are indicated in the conceptual site model outlined and discussed below. This conceptual site model is based on the findings of the intrusive site investigation works and associated geochemical testing.

Contamination Sources

8.80 There are potentially elevated concentrations of arsenic in soil in the north western part of the Application Site in the residential area. No significant elevated contaminant concentrations in soil were identified outside of the residential area. There are minor elevated concentrations of petroleum hydrocarbons in groundwater at the Application Site.

Pathways

8.81 In terms of human health the main pathways are considered to be dermal contact, ingestion and inhalation. Future occupiers and construction workers are likely to be at risk from all three potential pathways whilst working on the Application Site.

8.82 The main pathway by which contaminants are likely to reach the saturated zone beneath the Application Site is through infiltration of rainwater causing vertical movement through the unsaturated zone.

Receptors

8.83 A number of sensitive receptors have been identified in close proximity to the Application Site. These receptors are:

- Future human receptors (site occupiers and construction workers);
- Shallow groundwater;
- Surface water in the Hunsworth Beck.

Summary

8.84 Based on the land use history and identified sources of contamination, a conceptual site model has been developed. This is shown in **Table 8.7** and details the potential sources, pathways and receptors and the inter-relationship of these factors.

8.85 It is considered that the risks to the Proposed Development for residential use without any mitigation are as follows.

Table 8.7: Contamination sources, pathways and receptors

Source	Pathway	Receptor	Risk
Arsenic in soil	Ingestion, dermal contact and inhalation of soil and dust	Construction workers and future occupiers	Low to Moderate
Ground gases (carbon dioxide, methane)	Lateral and vertical migration of gases and inhalation	Construction workers and future occupiers	Low to Moderate
Petroleum hydrocarbons in groundwater	Infiltration, advection, diffusion and dispersion	Groundwater and Surface water	Low to Moderate

Geotechnical and Foundation Design

8.86 The geology of the Application Site is relatively homogenous and comprises made ground (up to 8.4m bgl to the south of the Application Site) underlain by sandy, gravelly clay with occasional layers of very sandy, very clayey gravel of weathered Coal Measures which is in turn underlain by weak to moderate strong mudstone and sandstone of the Coal Measures.

Residential Area

8.87 An area in the north west of the application site is proposed for residential redevelopment. It is assumed that the residential units will be of standard construction on the Application Site. Provided that some degree of settlement can be accommodated within the structure, strip or raft foundations should be satisfactory for structures on the Application Site, founded on the weathered coal measures or on the made ground after ground improvement.

8.88 Standard Penetration Tests (SPTs) were carried out in all borehole locations at 1m centres. The results obtained from the made ground are highly variable due to the impact that large particles can have on the test results. The tests indicate that the made ground would be unsuitable as a founding medium in its current condition due to this variability and the loose nature of some of the fill materials. Therefore some form of ground improvement would be required, either by excavation and recompaction or dynamic compaction, where foundations cannot be placed on the solid Coal Measures.

8.89 The weathered Coal Measures are described as firm to very stiff with undrained shear strength values in the range 112kPa to 183kPa and SPT n-values ranging from 20 to Refusal (>50). The tests indicate that the weathered Coal Measures across the north west of the Application Site would be suitable as a founding medium in their current condition.

8.90 The shear strength of the weathered Coal Measures suggests Cu values for firm to very stiff clay which may be suitable for allowable bearing pressures up to 125kPa-250kPa. The results of consolidation testing suggest that these materials demonstrate low to medium compressibility and that, at the allowable bearing pressure above, settlement should be restricted to less than 25mm. Detailed analysis of foundations should be carried out to ensure that the design loads for a particular building can be accommodated and that both total and differential settlements at design loads can be tolerated by the proposed structure.

Commercial Area

8.91 The majority of the Application Site is proposed for commercial redevelopment. It is assumed that the commercial units constructed on the Application Site will be steel framed structures with clad walls. These structures typically apply pressure to the ground at the end points of the steel columns and the foundations should be constructed to minimise the effect of applying localised pressure to the ground. Provided that some degree of settlement can be accommodated within the structure, pad or raft foundations should be satisfactory for structures on the Application Site founded on the weathered coal measures or on the made ground after ground improvement. Ground bearing floor slabs should be constructed to allow for some differential movement of the ground where pad foundations are employed.

8.92 Standard Penetration Tests (SPTs) were carried out in all borehole locations at 1m centres. The results obtained from the made ground are highly variable due to the impact that large particles can have on the test results. The tests indicate that the made ground would be unsuitable as a founding medium in its current condition due to this variability and the loose nature of some of the fill materials. Therefore some form of ground improvement would be required, either by excavation and recompaction or dynamic compaction, where foundations cannot be placed on the solid Coal Measures.

8.93 The weathered Coal Measures are described as firm to very stiff with undrained shear strength values in the range 32kPa to 161kPa and SPT n-values ranging from 30 to Refusal (>50). The tests indicate that the weathered Coal Measures across the majority of the Application Site would be suitable as a founding medium in their current condition.

8.94 The shear strength of the weathered Coal Measures suggests Cu values for firm to very stiff clay which may be suitable for allowable bearing pressures up to 125kPa-250kPa. The results of consolidation testing suggest that these materials demonstrate low to medium compressibility and that, at the allowable bearing pressure above, settlement should be restricted to less than 25mm. Detailed analysis of foundations should be carried out to ensure that the design loads for a particular building can be accommodated and that both total and differential settlements at design loads can be tolerated by the proposed structure.

8.95 Monitoring of boreholes on the Application Site indicates that groundwater is approximately 2m to 9m below ground level. Based on the site topography the groundwater level is fairly consistent across the Application Site and is considered to be the natural groundwater level in the weathered Coal Measures. Caution may be required where foundations are constructed close to the water table.

8.96 As an alternative, piled foundations might be suitable to the south of the Application Site where made ground thicknesses are up to 8.3m but consideration should be given to ground settlement around the structures if no other ground treatment was carried out. There would also likely be negative skin friction loads on piles caused by this settlement and these should be considered in any design.

North Bierley Mining Remediation Strategy

8.97 A comprehensive site investigation was completed by Wardell Armstrong LLP and detailed in a report entitled, "Phase II Environmental Assessment, North Bierley WWTW, June 2012" and presented in **Technical Appendix 8.3**. This report identified:

- Potential shallow mine workings beneath the southern portion of the Application Site potentially in the Shertcliffe Bed; and
- Potentially up to 12 mine shafts at the Application Site (10 Coal Authority plots and 2 BGS plots). A number of these are considered to be duplicates of the same shaft but for the present all shafts need consideration. It is considered likely that investigation works will identify between 5 and 7 actual shafts.

Mine Shafts

8.98 There are twelve potential mine shafts at the Application Site. Details of each shaft along with an indication of the shafts relationship with the Proposed Development areas are provided in the report comprising **Technical Appendix 8.3**. Drawing No. SH10534-003 in the Mining Remediation Strategy letter report included at **Technical Appendix 8.3**, indicates the:

- Best plot location of the mine shaft from Coal Authority records;
- A zone of 15.0 metres around each shaft which relates to the "Zone of uncertainty" relating to the shaft position; and
- A further zone of up to 7.0 metres around each shaft will be required. This relates to a worst case zone of potential surface instability should the shaft catastrophically collapse. This varies depending on the type and depth of estimated made ground and natural superficial in the area of the shaft.

8.99 Until the shafts are located and treated each overall zone should be regarded as requiring investigation and treatment prior to development.

Mine Workings

8.100 From the results of researches and site investigations it is anticipated that part of the Application Site will be underlain by shallow abandoned coal mine workings. Our researches have indicated that this is related to potential historic working in the Shertcliffe bed.

8.101 The drilling works carried out to date have indicated some evidence of broken or soft ground indicative of old workings between 11.3m and 16.7m below ground level in BH6. Mine workings are primarily anticipated beneath the southern part of Unit 3 in the south of the site.

Soils and Agricultural Land Desk Study, Wardell Armstrong, July 2015

8.102 A Soils and Agricultural Land Desk Study, included as **Technical Appendix 8.4**, was carried out to describe soils present at the Application Site and assess the agricultural land quality. The sources of information were:

- Met Office 1989 Climatological Data for Agricultural Land Classification: Gridpoint datasets of climatic variables at 5km intervals for England and Wales;
- MAFF 1993 1:250,000 Provisional Agricultural Land Classification Sheet, Northern Region;
- Soil Survey of England and Wales 1984 Soils and their Use in Northern England and accompanying 1:250,000 map Sheet 1; and
- Wardell Armstrong LLP, 2015, Phase II Environmental Assessment (Report number RPT-001B).

8.103 The Agricultural Land Classification (ALC) is a standardised method for classifying agricultural land according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b), ranked from excellent (Grade 1) to very poor (Grade 5). ALC is determined using MAFF's 'Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land, 1988'.

8.104 Paragraphs 111 and 112 of The National Planning Policy Framework (Ref. 8.1) (Department for Communities and Local Government, 2012) promote the sustainable management and protection of soils and agricultural land consistent with the economic, social and environmental needs of England. Consequently, impacts to the soil resources and best and most versatile (BMV) agricultural land are to be considered.

8.105 The soil map shows that soils at the Application Site belong to Dale association which are surface-water gley soils (typically slowly permeable and seasonally waterlogged). The geotechnical investigation found that restored or disturbed (restored) soils are frequent at the Application Site. The texture of the subsoil of undisturbed profiles was classed as clay, which matches the description of the Dale series. The texture of made ground was also generally clay, which indicates that the original soils were also likely to be of the Dale series.

8.106 According to the provisional 1:250,000 ALC map the agricultural land within the Application Site is classed as Grade 3 (good and moderate quality agricultural land). However, it does not provide distinction between Subgrades 3a and 3b (good and moderate); and the scale of the mapping cannot be used to identify the ALC grade of the land at field scale. The soil series characteristics combined with agroclimatic data for the Application Site indicates that wetness is likely to limit the land quality to Subgrade 3b (moderate quality agricultural land).

8.107 The Proposed Development would result in permanent loss of approximately 12ha of non-BMV agricultural land. It would also result in disturbance to soil resources due to earthworks. There is a potential to retain the majority of soil resources at the Application Site and reuse them in the creation of gardens and public greenspaces. Should the soil resources be exported from the Application Site appropriate Environment Agency permits will be required as waste regulations would apply to surplus soil. It is recommended that Defra's 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites is followed to minimise disturbance to soil resources and ensure suitable land quality for non-agricultural uses within the Proposed Development.

Predicted Significant Effects

8.108 This assessment discusses the potential key impacts of the Proposed Development on the existing site conditions. In addition, the assessment considers the effects of the identified sources of contamination, mining and geotechnical issues in relation to the Proposed Development. The assessment considers impacts during both the construction and operational phases.

Assessment of Construction Effects

8.109 The impacts of the construction phase of the Proposed Development have been assessed on ground conditions without the mitigation measures in the form of the Remediation Strategy in place. The assessment has concluded that the environmental impacts brought about by the construction phase range from minor to major adverse and also short and long term.

Table 8.8: Assessment of Significance of Potential Impacts during Construction

Potential Impact	Applicable Part of Site/Receptor	Temporary / Permanent Direct/Indirect Effect	Period	Significance of Unmitigated Impact
[1] Permanent loss of soils/natural strata through construction/ excavation	Whole site	Permanent/Direct	Long term	Minor adverse
[2] Introduction of additional contamination into soil/ground water/Hunsworth Beck during construction phase as a result of accidental spillages i.e. Fuels, construction materials	Whole site	Temporary/Direct	Short term	Minor adverse
[3] Impact on construction workers as a result of excavations into contaminated soils/groundwater (arsenic, gas, petroleum hydrocarbons).	Construction workers	Temporary/Direct	Short term	Moderate adverse
[4] Impact on construction workers as a results of excavations into and treatment of unstable mining features i.e. shafts/bell pits	Construction workers	Temporary/Direct	Short term	Major adverse

Assessment of Operational Effects

8.110 The impacts of the operational phase of the Proposed Development have been assessed on ground conditions without the mitigation measures in the form of the Remediation Strategy in place. The assessment has concluded that the environmental impacts brought about by the operational phase are both short and long-term in nature and range from minor to major adverse.

Table 8.9: Assessment of Significance of Potential Impacts during Operation

Potential Impact	Applicable Part of Site/Receptor	Direct/Indirect Effect	Period	Significance of Unmitigated Impact
[5] Introduction of contamination into soil/groundwater as a result of accidental spillage/leakage from vehicles (site users and delivery vehicles) during the operational phase.	Whole site and surrounding area	Temporary / Direct	Short term	Minor adverse
[6] Degradation of building materials over time as a result of contact with sulphates within soils and low pH.	Proposed buildings	Permanent / Direct	Short term	Minor adverse
[7] Impact on buildings/development as a result of unstable ground (mining features, proposed slopes, cut and fill groundworks).	Proposed buildings	Permanent / Direct	Short term	Major adverse
[8] Impact on future occupiers as a result of ground gas.	Future occupiers/site users	Permanent / Direct	Short term	Moderate adverse

Scope of Mitigation

8.111 The following mitigation measures are proposed in order to reduce potentially adverse effects and enhance beneficial effects caused by the Proposed Development. They will be incorporated into the Remediation Strategy, controlled by planning condition, or a CEMP, again controlled by condition.

8.112 Further site investigation and testing is required to constrain the slightly elevated concentrations of potential contaminants identified in the residential area of the Application Site. At this early stage it is considered that mitigation/remediation of the residential area is likely to include:

- Further sampling and testing in the north western portion of the Application Site with elevated arsenic concentrations;
- Removal of shallow soil from the residential development area with elevated arsenic concentrations; or

- Capping of the arsenic hotspot areas with a clean material which may be sourced from elsewhere on the Application Site. This material will not extend above existing ground levels.

Construction Phase

Measures to mitigate the permanent loss of soils/natural strata through construction/excavation

8.113 In order to provide levels suitable for the Proposed Development, groundworks will be required and will include cut/fill.

8.114 It is unlikely that the solid strata will be affected by the groundworks. In order to mitigate any loss of soils/strata, any cut material will be used in other areas of the Application Site where filling is required to obtain the required formation level. Therefore, there will be no overall loss of material from the Application Site. In the event that solid strata does require excavation as part of the cut works (should the ground be found to be locally variable) this material would also be incorporated into other areas of the Application Site.

8.115 There is a potential to retain the majority of soil resources at the Application Site and reuse them in creation of gardens and public greenspaces. Should the soil resources be exported from the Application Site, appropriate Environment Agency permits will be required as waste regulations would apply to surplus soil. It is recommended that Defra's 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites is followed to minimise disturbance to soil resources and ensure suitable land quality for non-agricultural uses within the Proposed Development.

Measures to mitigate the introduction of additional contamination into soil/ground water during construction phase as a result of accidental spillages i.e. fuels, construction materials

8.116 During the construction works, there is a low risk of accidental spillage/leakage of materials and/or liquids. The overall significance is assessed as minor adverse.

8.117 To mitigate the adverse effects of leaks and spillages to soil and groundwater from construction plant and operations, all fuel, oils and chemicals should be contained within a bunded compound or in bunded, double skinned tanks. Spill control and clean up facilities will be provided and on-site vehicle maintenance will be prohibited. Tried and tested good site practices will also be implemented and all measures controlled through standard planning conditions including a Construction Environmental Management Plan (CEMP).

Measures to mitigate the impact on construction workers as a result of excavations into contaminated soils/groundwater

8.118 The Phase II Assessment has indicated that there are elevated levels of some contaminants and the sensitivity of the receptor (construction workers) is considered to be high. The significance of any unmitigated effect is assessed as moderate adverse.

8.119 Measures will be implemented during construction to protect construction workers from any contamination identified. All construction workers and site visitors will adhere to the relevant health and safety measures so as to minimise exposure to potentially

contaminated ground. Measures will include the use of Personal Protective Equipment (PPE) such as gloves, dust masks and overalls. These measures will be incorporated in to the Remediation Strategy or CEMP.

Measures to mitigate the impact on construction workers as a result of excavations into and treatment of unstable mining features i.e. shafts/bell pits

8.120 Construction works in and around mining features carries a risk as the features can be unstable, particularly when disturbed. In order to mitigate this risk, all mining features which are likely to be impacted by the Proposed Development will be investigated and treated to stabilise them at the beginning of the construction works. This process would comprise:

- Excavation as part of the main earthworks to the undisturbed natural superficial / rock;
- Careful visual inspection both during and post excavation to identify the features;
- Each feature would then be individually investigated by excavation to reasonably shallow depth to clarify if the feature is mining related and if it is its size and infilling; and
- Where features are proved these will then require a combination of either / or stabilisation by drilling and stage pressure grouting and capping with a concrete reinforced cap.

8.121 The construction works will be carried out to agreed method statements and a watching brief for any other unrecorded mining features will be maintained throughout the works. Should the groundworks come across any previously unidentified features, these will be investigated and treated as necessary.

8.122 Standard planning conditions can secure an agreed method of working.

Operational Phase

Measures to mitigate the introduction of contamination into soil/groundwater as a result of accidental spillage/leakage from vehicles (site users and delivery vehicles) during the operational phase

8.123 Any accidental spillages/leakage from vehicles using the Application Site could potentially be transmitted into soil and groundwater via infiltration and run off.

8.124 Infiltration into the ground will be limited by hardstanding cover across the majority of the Application Site. Infiltration is likely to be limited to the areas of landscaping and vehicular access is unlikely in these areas. Therefore the probability of occurrence via infiltration can be considered to be unlikely.

8.125 Rainwater run off over the Application Site could potentially carry any substances which are leaked or spilt from vehicles on the Application Site. As part of the drainage system, all surface water run-off will be intercepted via surface water drains and stored temporarily in order to release to the watercourse at a slower rate. To mitigate the risk

of substances being carried within the run-off, fuel interceptors will be incorporated within the drainage design to remove any hazardous substances which might be present. The interceptors will be subject to regular maintenance and inspections to ensure they are functioning correctly. The Drainage Strategy comprising these measures is controlled by planning condition.

Measures to mitigate the degradation of building materials over time as a result of contact with sulphates within soils and low pH

8.126 The site investigation has identified that some of the areas of the Application Site where the soil contain sulphates at levels which may pose a degradation risk to concrete and foundations.

8.127 To mitigate any risk of chemical attack on building materials, selection of foundations and concrete should consider the site investigation results and be designed accordingly. Buried concrete structures will be designed taking account of pH and sulphate concentrations in the ground and placed in accordance with current good practice and the requirements of Building Research Establishment (BRE) Special Digest 1.

8.128 In order to mitigate against any adverse effects to buried pipes and water supplies, pipes which are composed of suitably resistant material will be used in construction. The Phase II report has indicated that Wrapped Ductile Iron or Barrier Pipe is the most suitable material for underground services at the Application Site. This will be detailed within the Remediation Strategy.

Measures to mitigate the impact on buildings/development as a result of unstable ground (mining features, made ground)

8.129 The site investigation has obtained geotechnical and mining data to enable the assessment of unstable ground at the Application Site. Final layouts will be assessed using the data obtained to ensure ground stability for the Proposed Development. Any mitigation measures required will be incorporated into the ground works. Mitigation measures are likely to comprise ground engineering for made ground and the areas where filling is required to ensure a suitable founding medium.

8.130 It is anticipated that mine workings (shafts, bell pits and shallow coal workings) will require stabilisation beneath the Proposed Development area. This will comprise the following:

- Excavation as part of the main earthworks to the horizon of undisturbed natural superficial / or rock;
- Careful visual inspection both during and post excavation to identify the features;
- Each feature would then be individually investigated by excavation to reasonably shallow depth to clarify size and infilling;
- Where features are proved these will then require a combination of either/or stabilisation by drilling and stage pressure grouting and capping with a concrete reinforced cap; and

- Areas identified as having potential surface instability from shallow abandoned coal workings will be investigated and stabilised by grid drilling and grout injection boreholes over the areas of the Proposed Development footprint.

8.131 It is anticipated that ground stability issues can be mitigated with appropriate design during the construction works. Therefore the overall significance of impact can be reduced to negligible/none.

Measures to mitigate the impact on future occupiers as a result of ground gas

Residential

8.132 Low concentrations of methane and low concentrations of carbon dioxide have been reported in one borehole in this area.

8.133 For a CIRIA Situation A development type, a gassing regime of Characteristic Situation 1 (CS1) can be attributed to this area and no special ground gas protection measures are required.

8.134 For a CIRIA Situation B development type, a gassing regime of Amber 1 can be attributed to this area which requires low-level gas protection measures, comprising a membrane and ventilated sub-floor void to create a permeability contrast to limit the ingress of gas into buildings. Gas protection measures should be as prescribed in BRE Report 414 (Johnson, 2001). Ventilation of the sub-floor void should facilitate a minimum of one complete volume change per 24 hours. This can be controlled by planning condition through adherence to the Remediation Strategy.

Commercial

8.135 High concentrations of methane have been reported in one borehole, BH5, and moderate concentrations of carbon dioxide have been reported across the remainder of the site. Through reference to CIRIA C665 a gassing regime of Characteristic Situation 1 (CS1) can be attributed to the commercial area due to low flow rates. However, given the high levels of methane recorded in the south of the site, we would recommend increasing the classification in this area (BH's 4, 5 and 6) to Characteristic Situation 2 (CS2) as a precaution.

8.136 The majority of the site can be considered as CS1 and no specific gas protection measures would be required. The southern end of the site should be considered to be CS2 and the following tried and tested protective measures will be required which will be secured through standard planning conditions:

- Reinforced concrete cast in-situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM
- Beam and block or precast concrete slab and minimum 2000g DPM/reinforced gas membrane
- Possibly underfloor venting or pressurisation in combination with a) and b) depending on use
- All joints and penetrations sealed.

Residual Effect Assessment

8.137 There are expected to be no significant residual impacts as a result of the Proposed Development in respect of the ground conditions assuming that the mitigation measures identified, are implemented. This is summarised in **Table 8.10** below.

Table 8.10: Residual Effect Assessment Summary

Potential Impact	Impact Area	Phase	Period and Permanent / temporary	Significance of unmitigated impact	Mitigation Measures	Residual Significance
Permanent loss of soils/natural strata through construction/ excavation.	Local	Construction	Long term Permanent	Minor adverse	Cut material from site used elsewhere on Application Site. EA permit to be obtained should soil resources need to be removed from site. Defra's 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction sites to be followed.	Negligible
Introduction of additional contamination into soil/ groundwater during construction phase as a result of accidental spillages i.e. fuels, construction materials.	Local	Construction	Short term Temporary	Minor adverse	All fuel, oil and chemicals should be contained within a bunded compound or in bunded, double skinned tanks. Spill control and clean up facilities will be provided and on-site vehicle maintenance will be prohibited.	Negligible
Impact on	Local	Construction	Short term	Moderate	All construction	Negligible

Potential Impact	Impact Area	Phase	Period and Permanent / temporary	Significance of unmitigated impact	Mitigation Measures	Residual Significance
construction workers as a result of excavations into contaminated soils/ groundwater (arsenic, gas, petroleum hydrocarbons)			Temporary	adverse	workers and visitors will adhere to relevant health and safety measures including the use of PPE.	
Impact on construction workers as a result of excavations into and treatment of unstable mining features i.e. shafts/bell pits.	Local	Construction	Short term Temporary	Major adverse	All mining features which are likely to be impacted by the proposed development will be investigated and treated to stabilise them. Construction works will be carried out to agreed methods statements and a watching brief will be maintained for unrecorded features.	Negligible
Introduction of contamination into soil/groundwater as a result of accidental spillage/ leakage from vehicles (site users and delivery	Local	Operation	Short term Temporary	Minor adverse	Fuel interceptors will be incorporated within the drainage design to remove any hazardous substances which might be present.	Negligible

Potential Impact	Impact Area	Phase	Period and Permanent / temporary	Significance of unmitigated impact	Mitigation Measures	Residual Significance
vehicles).					Interceptors will be subject to regular maintenance inspections.	
Degradation of building materials over time as a result of contact with sulphates within soils.	Local	Operation	Short term Permanent	Minor adverse	Selection of foundations and concrete should consider the results of the site investigation and be designed accordingly. Buried concrete structures will be designed taking into account the pH and sulphate concentration in the ground. Water supply pipes and buried pipes will be composed of a suitably resistant material.	Negligible
Impact on buildings/ development as a result of unstable ground (mining features, cut and fill groundworks).	Local	Operation	Short term Permanent	Major adverse	Made ground and areas where filling is required may require ground engineering to ensure a suitable founding medium. Mine workings will require	Negligible

Potential Impact	Impact Area	Phase	Period and Permanent / temporary	Significance of unmitigated impact	Mitigation Measures	Residual Significance
					stabilisation beneath the Proposed Development.	
Impact on future occupiers as a result of ground gas.	Local	Operation	Short term Permanent	Moderate adverse	<u>Residential</u> Low level gas protection measures, comprising a membrane and ventilated sub-floor void to create a permeability contrast to limit the ingress of gas into buildings. Gas protection measures should be as prescribed in BRE Report 414. <u>Commercial</u> Majority of site does not require gas protection measures. The southern end of the site should be considered CS2 and will require the following protection: • Reinforced concrete cast in-situ floor slab with at least 1200g DPM;	Negligible

Potential Impact	Impact Area	Phase	Period and Permanent / temporary	Significance of unmitigated impact	Mitigation Measures	Residual Significance
					• Beam and block or precast concrete slab and minimum 2000g DPM/ reinforced gas membrane; • Possibly underfloor venting or pressurisation in combination with a) and b) depending on use; and • All joints and penetrations sealed.	

Cumulative Effect Assessment

8.138 Cumulative effects have been considered for other developments within the vicinity of the Application Site. There are no committed developments in the area that are likely to affect either the construction or operational phase of the Proposed Development with regard to the ground conditions.

8.139 Impacts on ground conditions are however, closely related to hydrogeology, hydrology and flood risk. The excavation of materials and the construction of roads and buildings has the potential to alter and impact upon the localised drainage regime at the Application Site. The cumulative effect has therefore been considered and is of negligible significance due to the low sensitivity of the potential receptor (shallow groundwater and the Hunsworth Beck).

Monitoring

8.140 Monitoring regimes are not required to ensure effective mitigation is maintained due to the measures being designed into the construction process.

References

8.1 National Planning Policy Framework (March 2012)

8.2 Kirklees Unitary Development Plan (2007)

8.3 Bradford Unitary Development Plan (2005)

8.4 Department for Communities and Local Government, National Planning Policy Framework, March 2012

8.5 DEFRA (2012) Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance

8.6 BSI, (2011) BS 10175:2011, Investigation of potentially contaminated sites. Code of practice

9. Ecology

9.1 This Chapter of the ES assesses the likely significant impacts of the Proposed Development with respect to Ecology. It describes the methods used to assess the impacts; the baseline conditions currently experienced at the application site and in the surrounding area; likely future conditions; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these tried and tested measures have been adopted.

9.2 This Environmental Statement (ES) Chapter has been prepared by Brooks Ecological Ltd. Brooks Ecological has been appointed to carry out ecological assessment to support the planning application for the Proposed Development. This Chapter should be read in conjunction with the accompanying **Technical Appendices 9.1**

Legislation, Policy & Guidance

Legislative Framework

9.3 The applicable legislative framework is summarised below:

- Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) (Ref. 9.2);
- Council Directive 79/409/EEC on the Conservation of wild birds (EC Birds Directive) (Ref. 9.3);
- The Conservation of Habitats and Species Regulations 2010 (Ref. 9.4);
- The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979 (Ref. 9.5);
- The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1983 (Ref. 9.6);
- Convention on Biological Diversity 1992 (Ref. 9.7);
- The Ramsar Convention on Wetlands of International Importance 1971 (Ref. 9.8)
- The Wildlife and Countryside Act 1981 (WCA) (Ref. 9.9);
- The Countryside and Rights of Way Act 2000 (CRoW) (Ref. 9.10); and
- Natural Environment and Rural Communities Act 2006 (NERC) (Ref. 9.11).
- The Hedgerow Regulations 1997 (Ref. 9.12)

9.4 An introduction to legally protected species and designated sites relevant to this assessment is provided below:

Protected Sites

9.5 Local Nature Reserves (LNRs); National Nature Reserves (NNRs); Sites of Special Scientific Interest (SSSIs); Special Areas of Conservation (SAC); and Special Protection Areas (SPAs) contain examples of some of the most important natural and semi-natural ecosystems in the United Kingdom and Europe and receive strict protection under both UK and European legislation. In addition, Ramsar sites receive International protection under the Ramsar Convention.

9.6 There are three categories of sites of nature conservation value included in the Kirklees UDP, which are afforded specific protection; Sites of Special Scientific Interest (SSSI's), Sites of Scientific Interest (SSI's) and Kirklees - Sites of Wildlife Significance (SWS's).

9.7 Kirklees - Sites of Wildlife Significance (SWS) are sites which have been identified by local conservation groups. None are currently managed in the interest of nature conservation but they should be taken into consideration when development is proposed which would adversely affect an SWS.

9.8 An SWS can also be given the status of Local Nature Reserve (LNR), which offers a mechanism for the management of sites of nature conservation importance. LNR's can be established by the Council, with the co-operation of landowners. Local authorities have to consult Natural England about establishing LNR's and various bylaws may be used to protect them.

Protected Species

9.9 Under European and UK legislation, a number of species (including bats) are strictly protected from killing, injury, disturbance and damage or destruction of their resting places etc. Certain species such as reptiles and some birds receive partial protection under UK legislation, e.g. protection from killing/injuring only or protection at certain times of the year only.

Invasive weeds

9.10 The Wildlife and Countryside Act (1981) (as amended) makes it an offence to plant or otherwise cause to grow in the wild species listed on Schedule 9 of the Act.

Planning Policy

The National Planning Policy Framework (NPPF)

9.11 The National Planning Policy Framework was published in 27 March 2012 (Ref. 9.14), coming into immediate effect and replacing the majority of previous Planning Policy Guidance notes (PPGs) and Planning Policy Statements (PPSs). As such the relevant paragraphs from the NPPF are set out below.

9.12 The general approach to assessing the natural environment is now embedded within the definition of what a sustainable development is.

9.13 Paragraph 7 (P7) of the NPPF states that sustainable development should "contribute to protecting and enhancing our natural environment" and "help to improve biodiversity". There is also a need for positive inclusion of the natural environment in development design and "moving from a net loss of bio-diversity to achieving net gains for nature" (P9].

9.14 The natural environment is stated within the NPPF core principles: development should "*recognise the intrinsic character and beauty of the countryside*" and contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should "*prefer land of lesser environmental value, where consistent with other policies in this Framework*" [P17].

9.15 Section 11 of the NPPF details the approach to the natural environment. The Framework states that development should "minimise impacts on biodiversity and provide net gains in biodiversity, where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures" [P109].

9.16 The Framework sets out ways to minimise the impacts on biodiversity through "promoting the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets" [P117].

9.17 The NPPF requires the consideration of the impacts of development on the natural environment and the mitigation or compensation to reduce the impacts. The Framework also encourages "opportunities to incorporate biodiversity in and around developments" [P118].

Local Planning Policy

Kirklees Unitary Development Plan – The Natural Environment Strategy (as amended 2007)

9.18 The Unitary Development Plan (UDP) (Ref. 9.13), which was saved in 2007, forms the development plan and is used as a basis for making decisions regarding land use and planning applications.

9.19 Within the UDP, the following saved policies are relevant to the assessment:

- Policy NE3;
- Policy NE4;
- Policy NE5; and
- Policy NE9.

9.20 Policy NE3 states that development proposals within or in the vicinity of a site of scientific interest will not normally be permitted unless there is an exceptional requirement for the development and measures will be taken to minimise any detriment to the site.

9.21 Policy NE4 development proposals which would affect a site of wildlife significance will not normally be permitted unless provision can be made to maintain the site's role for nature conservation.

9.22 Policy NE5 development proposals involving land identified on the proposals map as part of a wildlife corridor should make provision for the retention of the corridor and the protection of the wildlife value of the land.

9.23 Policy NE9 states that development proposals should normally retain any mature trees within the application site. Where development is approved on sites containing mature trees no construction, including changes in levels, drainage works and the formation of access roads will be permitted within the crown spread of the trees unless it can be demonstrated that satisfactory precautions will be taken to ensure their continued viability.

Local Plan for the Bradford District Core Strategy Development Plan Document Publication DraftEN2 Biodiversity and Geodiversity

9.24 North and South Pennine Moors A. Any development that would be likely to have a significant effect on a European Site either alone or in combination with other plans or projects will be subject to assessment under the Habitat Regulations at project application stage. If it cannot be ascertained that there will be no adverse effects on site integrity then the project will have to be refused.

9.25 Locally Designated Sites B. Development likely to have an adverse effect on a site of ecological/ geological importance (SEGIs and RIGS) or a site of local nature conservation value (Bradford Wildlife Areas) will not be permitted unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the substantive nature conservation value of the site. Proposals that are likely to have an impact on such sites will be assessed according to the following criteria; 1. Whether works are necessary for management of the site in the interests of conservation. 2. Whether adequate buffer strips and other mitigation has been incorporated into the proposals to protect species and habitats for which the Local Site has been designated. 3. The development would be expected to result in no overall loss of habitat and mitigation could be expected to include compensatory habitats adjacent to or within the vicinity of any losses proposed. Existing habitats and proposed mitigation should be quantified.

9.26 Habitats and Species outside Designated Sites C. Proposals that may have an adverse impact on important habitats and species outside designated sites need to be assessed according to the following criteria:- 1. The potential for adverse impact on important/priority habitats that occur outside designated sites 2. The potential for adverse impact on species of international, national and local importance 3. The extent to which appropriate measures to mitigate any potentially harmful impacts can be identified and carried out The assessment needs to take account of: West Yorkshire Local Site Selection Criteria and Where relevant developers will be expected to submit (European) Protected Species surveys and other ecological assessment related information with their application. Development which would cause serious fragmentation of habitats, wildlife corridors or have a significantly adverse impact on biodiversity networks or connectivity will be resisted.

9.27 Enhancement D. Plans, policies and proposals should contribute positively towards the overall enhancement of the District's biodiversity resource. They should seek to protect and enhance species of local, national and international importance and to reverse the

decline in these species. The Council will seek to promote the creation, expansion and improved management of important habitats within the district and more ecologically connected patchworks of grasslands, woodlands and wetlands. Opportunities for specific habitat creation within development proposals will be sought, including provision for future management. Habitats of the moorland will be enhanced and landowners or occupiers will be actively encouraged to manage important areas for bird foraging to ensure continued provision of suitable habitat.

Other Guidance

The UK Biodiversity Action Plan (BAP) (Ref 9.15);

9.28 In 1993, the UK government consulted over three hundred organisations throughout the UK and held a two day seminar to debate the key issues raised at the Convention of Biological Diversity. The product of this was the launch of Biodiversity: the UK Action Plan in 1994 which outlined the UK Biodiversity Action Plan for dealing with biodiversity conservation in response to the Rio Convention. The UK Biodiversity Steering Group was created in 1994 and published Biodiversity: the UK Steering Group Report – meeting the Rio challenge. This established the framework and criteria for identifying species (1250 in number) and habitat types of conservation concern. From this list, action plans for 391 species and 45 broad habitat types were produced. As well as having national priorities and targets, action was also taken at a local level. The Steering Group drew up a set of guidelines that were discussed with the Local Authority Association and the Local Government Board. Today there are 162 Local Biodiversity Action Plans (LBAPs) in England, Scotland and Wales. The NERC Act 2006 clarified the responsibilities of Local Authorities (Biodiversity Duty) to priority species and habitats and the delivery of Action Plans.

Local Biodiversity Action Plan

9.29 Consideration is given to the Local Biodiversity Action Plan (LBAP), which is the 'Kirklees Biodiversity Action Plan' (Ref 9.15) for this Site.

Assessment Methodology and Significance Criteria

9.30 The studies informing this assessment comprise a full suite of surveys carried out in 2013 and 2014. These consist of:

- Extended Phase 1 Habitat Survey
- Full Desk Study
- Bat Survey
- Riparian Mammal & White Clawed Crayfish Survey
- Reptile Survey

9.31 The Phase 1 Habitat Survey and Desk Study were used to scope the level of survey required to identify receptors of significant value, or demonstrate their absence.

9.32 All of the above surveys of the Sitefollowed published and accepted methodologies and are fully reported in R-1623-01 to R-1623-06 presented as a technical appendix (**Technical Appendix 9.1**) to this chapter.

Scope of Assessment

9.33 The key ecological issues, which this chapter addresses, are the potential effects of the Proposed Development upon any statutory or non-statutory nature conservation sites, areas of valuable semi-natural habitat and protected or otherwise notable species within its Ecological Zone of Influence. It also considers the need to mitigate potential short, medium and long term effects and sets out how best to maximise potentially beneficial effects. The structure of this chapter reflects the need to consider the various ecological resources relevant to the Site and then assesses the effects of the Proposed Development in relation to each feature. It is therefore presented in terms of:

- The policies for the protection of nature conservation features;
- The general ecological resources of the area (baseline description);
- The value of ecological resources;
- The key impacts and potential effects of the proposals;
- The significance of these effects / impacts during construction and operation;
- Cumulative Effects; and
- Mitigation measures and habitat creation opportunities.

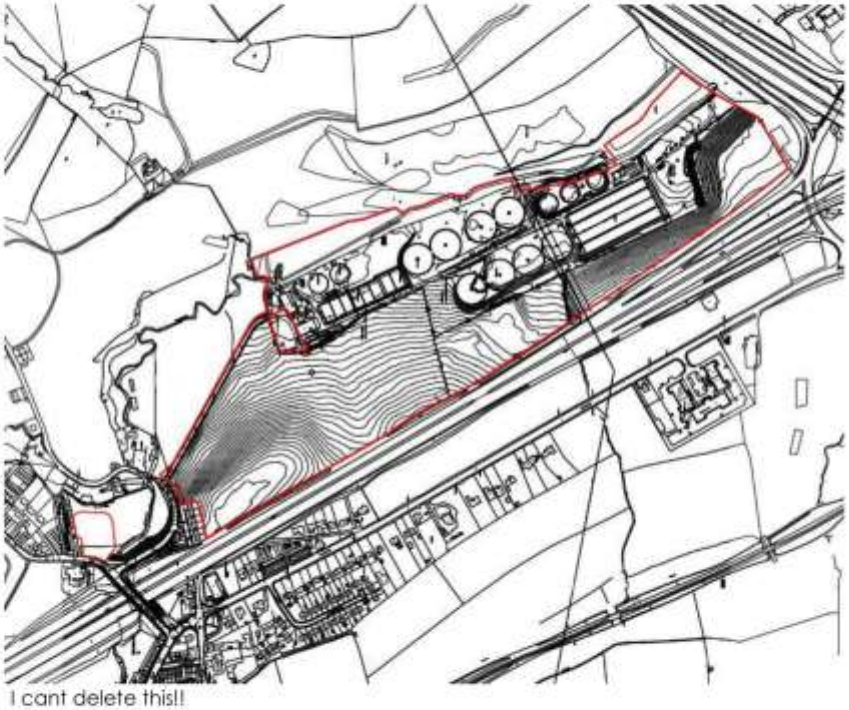
Extent of Study Area

9.34 The extent of the survey area with regards to ecological assessment is defined in **Figure 9.1** below.

9.35 In terms of the desk study for the Site, records from a two kilometre external search radius are considered to help define the local context of appropriate species or groups and a search radius of five kilometres has been used in assessment of nationally or internationally designated sites, as recommended in the Institute of Environmental Assessment's (IEA's) Guidelines for Baseline Ecological Assessment (IEA, 1995) (Ref. 9.16).

9.36 Following a review of the initial baseline data, any ecological features that are identified as having only limited ecology value are scoped out of the assessment and not considered in detail. Those features that are identified as having higher ecological value are considered in the assessment taken through as valued receptors.

Figure 9.1: Site boundary

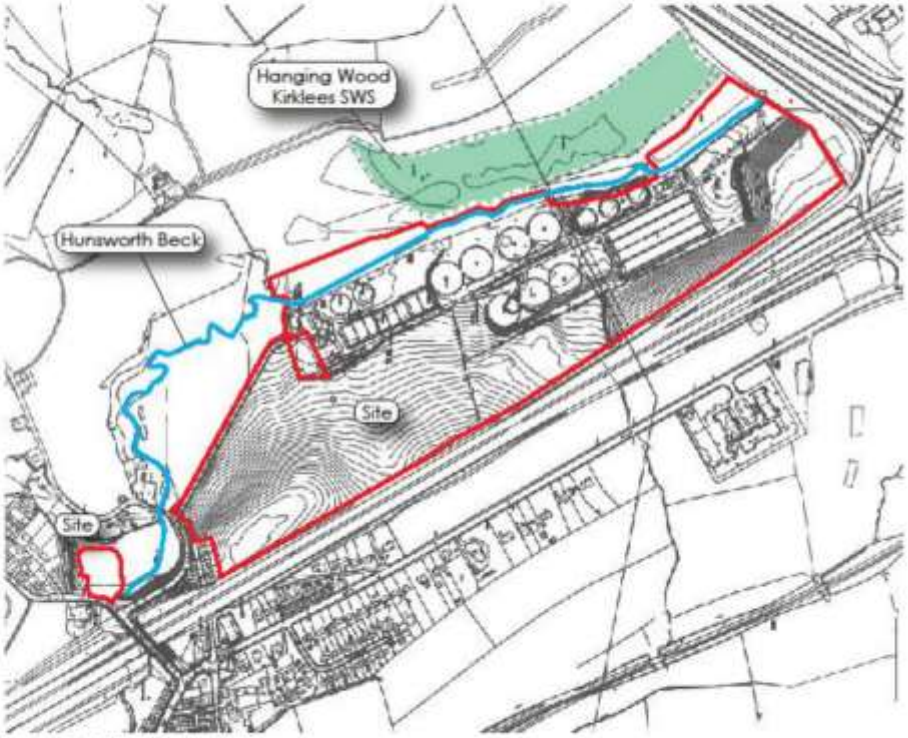


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9.37 CIEEM's approach to Ecological Impact Assessment (**Ref 9.1 para. 2.14**) seeks to establish what the 'Ecological Zone of Influence' (EZoI) of the Proposed Development is likely to be. This is obviously a difficult and inevitably imprecise exercise, dependant on the nature of the development and the ecological, geographical and sociological context of the local area. **Figure 9.2** illustrates our approach to establishing the zone of influence at this Site.

9.38 Being relatively isolated within built development and in close proximity to major barriers of large roads and the M62 motorway, potential ecological effects outside of the Site would be limited to the development's influence on local watercourses and the network of woodland sites.

Figure 9.2: Potential Ecological Zone of Influence based on factors apparent at this stage



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Consultation

9.39 Consultation with the relevant Statutory Authorities is undertaken when appropriate. Natural England (NE) is consulted in reference to important issues and significant effects relating to identified receptors. NE will not issue opinions in relation to development generally and due to the lack of identified receptors of above parish value their specific consultation has not been appropriate in this case.

9.40 The Environment Agency (EA) was consulted during the process of applying for a licence to trap crayfish from Hunsworth Beck. During this consultation, we were informed that the likelihood of finding crayfish within the beck was very low due to a recent major pollution event that had occurred at an upstream location.

9.41 West Yorkshire Ecology (WYE) hold the biological records for the area and collate information from a variety of sources. They have been consulted in relation to records for the area and local designations – the results of which are presented below.

9.42 Kirklees Council has been consulted via the EIA screening and scoping process. Jeff Keenlyside the Environment Unit has also been approached directly to agree the scope of survey effort required, in particular bat survey.

Method of Baseline Data Collection

Desk Study

9.43 The desk study involved contact with the key local data holders (WYE) to look for records of protected or otherwise notable species, and a search on the MAGIC website (Ref. 9.31). The MAGIC site contains all statutory (e.g. Sites of Special Scientific Interest [SSSI's]) as well as most non-statutorily protected habitats (e.g. Local Nature Reserves [LNRs]) and is a valuable tool for assessing the relationship of a potential development site with nearby important habitats.

9.44 WYE was contacted for all biological records relating to LBAP, protected & red data book species within a 2 km search radius of the Site.

9.45 **Table 9.1** lists the local Species Actions Plans and, with reference to the field study presented later in this report, assesses a) whether the species potentially have any degree of dependence on the Site, and b) if so whether development would be likely to have a significant bearing on the objectives of the UK/LBAP.

Table 9.1: Species Action Plans

Species/group	Potentially on Site	Could development impact significantly on LBAP objectives
Water Vole	No – dedicated survey has proven (likely) absence	No
White-clawed Crayfish	No – dedicated survey has proven (likely) absence	No
Great-crested newt	No	No
Red Wood Ant	No	No
Floating Water Plantain	No	No
Pillwort	No	No
Marsh Helleborine	No	No

9.46 **Table 9.2** lists local Habitat Action Plans and assesses a) whether habitats on Site could represent valuable examples of the habitat type within the spirit of the BAP and b) whether loss of the habitat would have a significant bearing on the objectives of the BAP.

Table 9.2: Habitat Action Plans

Habitat	Valuable examples present on Site?	Could development impact significantly on BAP objectives
Blanket Bog	No	No
Upland Heath	No	No
Upland Oak Woodland	No	No
Upland Mixed Ash Woodland	No	No
Ancient Woodland	No	No
Lowland Acid Grassland	No	No
Species-rich Hedgerows	No	No
Species-rich Grassland (Hay Meadows)	No	No
Lowland Heath	No	No
Reedbed	No	No
Cereal Field Margins	No	No
Scrubland	Yes	No
Semi Natural Grassland	No	No
Riverine habitats	No	No

Aerial Photography and Detailed Map Study

9.47 Aerial photographs published on commonly used websites were studied to place the Site in its wider context and to look for ecological features that would not be evident on the ground during the walkover survey. This approach can be very useful in determining if a site is potentially a key part of a wider wildlife corridor or an important node of habitat in an otherwise ecologically poor landscape. It can also identify potentially important faunal habitat (in particular ponds) which could have a bearing on the ecology of the Site. Ponds may sometimes not be apparent on aerial photographs so we also refer to close detailed maps that identify all ponds issues and drains. Promap Street + scale maps are used for this purpose (Ref. 9.32). Findings from this study are incorporated within the Site survey description in the baseline conditions section of this chapter.

Natural England Natural Area

9.48 The Site falls within Natural Area 24 Coal Measures: based on shale and sandstone deposits natural area 24 is characterized by dense population centres such as Sheffield, Leeds and Wakefield. The area is typified by mixed agriculture, acidic / ancient woodlands, valley wetlands and acidic / neutral grasslands. There are no nationally important conservation priorities. Local Conservation priorities for the area are;

- Acid Grassland
- Fen, Marsh and Swamp
- Lowland Heathland
- Neutral Grassland
- Rivers and Streams
- Standing and open water
- Wet Woodland

9.49 Rivers and streams (Hunsworth Beck) intersect the site and fall within the EZoI; this habitat is taken forward as a Valued Receptor.

Extended Phase 1 Survey

9.50 The survey followed a Phase 1 Habitat Survey methodology (JNCC, 1993) **(**Ref 9.18) and was extended to assess faunal potential. This involves walking the Site, mapping and describing different habitats (for example: woodland, grassland, scrub). Evidence of fauna and faunal habitat is also recorded (for example droppings, tracks or specialist habitat such as ponds for breeding amphibians). This modified approach to the Phase 1 survey is in accordance with the approach recommended for scoping ecological assessments by the Guidelines for Baseline Ecological Assessment (IEA, 1995) (Ref 9.16).

9.51 Survey of the former WWIP was carried out by Anne Proud BA (Hons) MSc ACIEEM during July 2013. The full survey report is provided as **Technical Appendix 9.1**.

9.52 Survey of the smaller plot of land to the north was carried out by Karl Fisher BSc (Hons) Grad CIEEM during June 2015. The full survey report is provided as **Technical Appendix 9.1**.

Bat Surveys

9.53 Surveys were carried out with reference to the methodology set out in The Bat Surveys Good Practice Guidelines (Bat Conservation Trust) (Ref 19a & b), The Bat Worker's Manual (Joint Nature Conservation Committee, 2004) (Ref 9.23) and Bat Mitigation Guidelines (English Nature 2004) (Ref 9.24).

9.54 A bat scoping survey was carried out as part of the initial Extended Phase 1 Habitat Survey to assess the potential impacts on bats' roosting habitat of the outline proposals. This assessed a single on-site building as having moderate potential to support bats and emergence surveys were recommended.

9.55 Emergence surveys were duly commissioned and undertaken in August and September 2013. Survey work was directed by Jane Liddle BSc (Hons), who has over 5 years experience of carrying out bat surveys in a professional capacity, is registered to use the Class Survey Licence WML CL18 (Bat Survey Level 2) and is an active

member of the West Yorkshire Bat Group, Bat Care Scheme and is a Natural England Roost Warden.

9.56 Updating emergence surveys, combined with a summer transect and remote monitoring, was carried out in June 2015. Survey and assessment was directed by Peter Brooks BSc (Hons) MA, MIEEM CEnv. Peter has over 15 years experience of carrying out bat surveys in a professional capacity and holds a Natural England license in respect of bats and is a Natural England Roost Warden.

Riparian Mammal Surveys

9.57 Survey looked for evidence of water vole and otter. The method used follows Strachan (1998 and more recently updated as Strachan and Moorhouse 2006).

9.58 The surveys were carried out in March and April 2014 during the optimum period for water vole survey [April-October (Strachan 2006)]. Therefore the water vole survey is considered to be a reliable reflection of water vole presence or absence at the Site.

White clawed Surveys

9.59 Surveys were carried out in conjunction with the riparian mammal survey in March and April 2014 and followed methodology adapted from 'Standardised Survey and Monitoring Protocol for White-Clawed Crayfish Austropotamobius pallipes' (Peay 2002). This protocol favours manual searching for crayfish and uses five patches of favourable habitat within a sampling site of 600m. Within each of these five patches 10 suitable refuge stones are turned, limiting surveys to 100 stones per sampling site. Evaluation of the population is based upon the average number of crayfish found per 10 refuges.

Reptile Surveys

9.60 Reference was made to The Herpetofauna Worker's Manual (Gent and Gibson, 2003) for the survey methodology with seven official survey visits (plus four extra surveys during other Site visits) being made between March and August 2014.

9.61 In order to increase the chance of finding any reptiles, artificial refuges were placed across the Site in locations likely to support reptiles in line with guidelines set out in the Froglife Advice Sheet 10. (Ref 9.33).

9.62 On each survey visit both the artificial and 'natural' refugia such as rock piles or dead wood were approached quietly to observe any basking reptiles. These then were lifted to observe any reptiles that may be sheltering beneath. Additionally, the Site was systematically walked (transect surveys) looking for reptiles that may be basking or foraging away from the refugia.

Impact Assessment and Significance Criteria

Impact Assessment

9.63 This impact assessment determines which ecological features or resources (receptors) within the Ecological Zone of Influence (EZoI) of the Proposed Development are both of

sufficient value to be included in the assessment and likely to be vulnerable to significant effects arising from the Proposed Development.

9.64 The zone of influence is defined as the areas/resources that may be affected by the biophysical changes caused by activities associated with the Proposed Development. This includes all land within the Site and any land off Site which could be impacted, such as designated sites within close proximity or linked to the Site. Our approach to the Ezol is illustrated in **Figure 9.2** above.

9.65 The value or potential value of receptors is determined by reference to their importance in terms of biodiversity conservation and their legal status. Values are defined within a geographical context. The following frame of reference recommended by CIEEM is used:

- International;
- UK;
- National;
- Regional;
- County;
- District;
- Local; or
- Site

Table 9.3: Criteria for Evaluation of Ecological Receptors

Value/Importance	Criteria
International (*European*)	Habitats An internationally designated Site or candidate Site (Special Protection Area [SPA]), provisional SPA, Special Areas of Conservation (SAC), candidate SAC, Ramsar Site, Biogenetic/Biosphere Reserve, World Heritage Site or an area that would meet the published selection criteria for designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat, which are essential to maintain the viability of a larger whole. Species Any regularly occurring population of internationally important species, threatened or rare in the UK (i.e. a UK Red Data Book species categories 1& 2 of UK BAP) or, of uncertain conservation status or, of global conservation concern in the UK BAP. A regularly occurring, nationally significant population/number of an internationally important species.

Value/Importance	Criteria
National (*England*)	Habitats A nationally designated Site (Site of Special Scientific Interest [SSSI], National Nature Reserve [NNR], Marine Nature Reserve [MNR] or a discrete area), which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a priority habitat identified in the UK BAP or, of smaller areas of such habitat essential to maintain wider viability. Species A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. Any regularly occurring population of a nationally important species, threatened or rare in the region or county (see local BAP). A feature identified as of critical importance in the UK BAP.
Regional (*Yorkshire and Humber*)	Habitats Sites that exceed County-level designations, but fall short of SSSI selection criteria. Viable areas of key habitat identified in the Regional BAP or, smaller areas of habitat essential to maintain wider viability. Species Any regularly occurring, locally significant population of a species listed as being nationally scarce, which occurs in 16 of 100 10km2 squares in the UK or in a Regional BAP. A regularly occurring, locally significant population/number of a regionally important species. Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.
Authority Area (e.g. County or District) (*West Yorkshire*)	Habitats Sites recognised by local authorities, e.g. Natural Heritage Sites (NHS). County/District Sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR). A viable area of habitat identified in County/District BAP. A diverse and/or ecologically valuable hedgerow network. Semi-natural ancient woodland greater than 0.25ha. Species Any regularly occurring, locally significant population of a species listed in a County/District BAP due to regional rarity or localisation. A regularly occurring, locally significant population of a County/District important species. Sites supporting populations of internationally/nationally/regionally important species that are not

Value/Importance	Criteria
	threatened or rare in the region or county, and not integral to maintaining those populations. Sites/features scarce in the County/District or that appreciably enrich the County/District habitat resource.
Local *(Kirklees)*	Habitats Areas of habitat that appreciably enrich the local habitat resource (e.g. species-rich hedgerows, ponds etc). Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution within the local area are not considered for the above classifications. Semi-natural ancient woodland smaller than 0.25 ha. Species Populations/assemblages of species that appreciably enrich the biodiversity resource within the local context. Sites supporting populations of County/District important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations.
Site level (*Limited ecological importance*)	Sites that retain habitats and/or species of limited ecological importance due to their size, species composition or other factors.

Assigning a Threshold Value

9.66 In the process of an Ecological Impact Assessment (EcIA) it is important to select the appropriate features for inclusion in the assessment. A threshold value of Local value has been set and all ecological receptors within the zone of influence that are of local value or higher have been included for consideration within the EcIA.

Significance Criteria

9.67 The assessments of potential effects have taken into account both the site preparation, demolition, earthworks and remediation; construction and operational phases. The significance level attributed to each effect has been based on the CIEEM guidelines. These guidelines have been followed for the assessment criteria, in addition to those set out within Chapter 2 – Overall Approach. They have also been endorsed by the statutory consultees such as Natural England and the Association of Local Government Ecologists (ALGE).

9.68 Significant effects have been assessed with reference to the ecological structure and function of the feature in question, for instance the fragility/stability of an ecosystem and its connectivity to other features or available resources (territory/foraging habitat) for the species.

9.69 The following parameters have been referred to in assessing effects on ecological structure and function:

- Beneficial or adverse;
- Magnitude: refers to the 'size' or 'amount' of an effect determined on a quantitative basis e.g. total or partial;
- Extent: the area over which the effect occurs;
- Duration: the period over which the effect is expected to last prior to recovery or replacement of the resource or feature e.g. short-term or long-term;
- Reversibility: whether recovery from the effect is possible or not e.g. irreversible (permanent) effects or reversible (temporary) effects; and
- Timing and frequency.

9.70 To assess the likelihood that a change/activity will occur as predicted and also the degree of confidence in the assessment of the effect on the ecological structure and function; the following confidence levels are used:

- Certain (near-certain): probability estimated at 95% chance or higher;
- Probable: probability estimated above 50% but below 95%;
- Unlikely: probability estimated above 5% but less than 50%; or
- Extremely unlikely: probability estimated at less than 5%.

9.71 This system follows guidelines issued by CIEEM and is applied appropriately to the effects related to this application. Parameters are highlighted where they have a bearing on the particular effect assessed. Where possible it is useful to use quantitative measures for these parameters – however in practice this may not be possible and a more descriptive terminology is required, terms used in this assessment are summarised in **Table 9.4** below.

Table 9.4: Terminology relating to impact prediction

Parameter	Terms	Definition
Magnitude / Extent	Large Scale	An effect which will affect populations or habitats occupying an area larger than the Site.
	Medium Scale	An effect confined to the application but which will affect most of (over 50% of the Site or population within the Site).
	Small Scale	An effect which will affect discrete areas of the Site or less than 25% of a population within the Site.

Parameter	Terms	Definition
Duration	Short term	Only present during certain stages of development (for instance Site clearance)
	Medium Term	Present during the construction phase of the Site.
	Long Term	Persisting on the Site post development into operation and beyond.
Reversibility	Reversible	Effects which can be redressed or from which recovery is possible.
	Non-Reversible	Effects which cannot reasonably be redressed or from which recovery is not possible.
Timing / Frequency		Sometimes the specific timing of an event or the fact that it will be repeated determines it significance, e.g. repeated disturbance of some species may lead to their loss while a single disturbance event would have no effect. If appropriate specific reference will be made to this.
Confidence	Certain Probable /likely Unlikely Very unlikely	Terms refer to the probability of an effect/ impact at a particular Site, this can depend on a variety of factors e.g. the likelihood that soil stripping will lead to siltation of water courses is dependent on factors such as climate, topography, timing and soil type.
Overall or total magnitude of impact	Major Intermediate Minor Negligible (Beneficial or Adverse)	Terms used to define the overall extent, importance or relevance of the effect. At this stage a subjective approach is applied by the ecologist to draw together the different strands of assessment into a summary magnitude.

9.72 Consideration of these parameters and their effects on specific receptors is carried out within the relevant sections of both the main text and the technical appendices. This consideration is provided at the end of this chapter, where the ecologist's assessment

of the above parameters is measured against the receptors' assessed value, to establish the effect's significance in its unmitigated and mitigated forms.

9.73 **Table 9.5** below illustrates how the magnitude of an effect is cross referred with the value of the receptor it acts on to provide a description of the significance of the effect on that receptor.

Table 9.5: Significance of Effect* (adjusted from CIEEM Guidance)

Value of Receptors		Magnitude of potential effect				
		Major	Intermediate	Minor	Negligible	No change
Very high	National +	Substantial	Substantial	Moderate/ Substantial	Minor	Negligible
High	County/ Regional	Substantial	Moderate/ Substantial	Minor / Moderate	Minor	Negligible
Medium	District/ Authority	Moderate/ Substantial	Moderate	Minor	Negligible / Minor	Negligible
Low	Local	Minor / Moderate	Minor	Negligible / Slight	Negligible / Slight	Negligible
Negligible	Site	Minor	Negligible/ Minor	Negligible / Minor	Negligible	Negligible

**Significance can either be beneficial or adverse*

Baseline Conditions

Desk Study

9.74 A full description and appraisal of the Site is provided in the detailed report provided as technical appendices (**Technical Appendix 9.1**) to this assessment, these are:

- R-1623-01.1 – Ecological Appraisal, Former Bierley Treatment Works, Oakenshaw. Brooks Ecological September 2013
- R-1623-02 – Bat Emergence Survey, Former Bierley Treatment Works, Oakenshaw. Brooks Ecological September 2013
- R-1623-03.1 – Reptile Survey, Former Bierley Treatment Works, Oakenshaw. Brooks Ecological August 2014
- R-1623-04 – Riparian Mammal & Crayfish Survey, Former Bierley Treatment Works, Oakenshaw. Brooks Ecological August 2014
- R-1623-05 – Bat Survey, Former Bierley Treatment Works, Oakenshaw. Brooks Ecological October 2015
- R-1623-06 – Preliminary Ecological Appraisal, Land off Mill Carr Hill Road, Brooks Ecological October 2015

Statutory and non-statutory designated sites

9.75 The results of the 'MAGIC' search show that there is one statutory designated site within 2km of the application Site; Railway Terrace LNR, is located 1.5km north west of the site boundary. This is a former railway yard with areas of wildflower meadow and lowland heath. Additional sites just beyond the search area include Oakwell Park LNR 2.8km northwest and Tong Moor LNR 2.9km to the north east.

9.76 All these sites are separated from the proposed development by broad areas of open countryside, housing and major road networks. Development is highly unlikely to have any impact on these locally designated sites.

9.77 Not all locally listed (non-statutory) sites are available on MAGIC. Those not found are normally held at local Biological Record Centres. A request for locally listed sites has been made to the record holder, which in this case is West Yorkshire Ecology. These include:

- Odsal Wood Local Wildlife Site (LWS); this is located on the opposite side of the M606 approximately 1.8km to the north west of the site.
- Four Bradford Wildlife Areas (BWA); three of these sites, Odsal Woods, Railway Terrace and Toad Holes Beck are located around 1.5km to the north west on the far side of the M606. Bierley Woods is found 1.4km to the north on the far side of an industrial estate.
- Hanging Wood is a Kirklees Site of Wildlife Significance (SWS) and is located directly to the east of the site boundary. In planning development, care will need to be taken to provide a buffer between this SWS and any works.

Protected and Notable Species Records

9.78 West Yorkshire Ecology has been contacted for records of specially protected and locally important species within 2km of the site. Records returned include:

- Records for common toad, common frog and smooth newt. A single record for great crested newt is held from 1970 located 1.6km to the north west of the site on the opposite side of the M606.
- A number of bat records for mainly pipistrelle or indeterminate species. The closest records is for a single bat within buildings 241m north of the site, with an additional roost 306m north. A roost of up to 50 bats is located 438m south east, on the far side of the M62 motorway, while another roost is found 936m south east. All these records are for indeterminate species of bats.
- Records for a range of common bird species as well as a number of records for Bird groups targeted nationally or locally and which feature on the BOCC red or amber lists such as redwing or tree sparrow. There are no bird records for the site itself and none of these species are likely to find important habitats within the site.
- There are no notable plants recorded for the site.

Field Survey

The Site's Habitats

9.79 The Site encompasses the Former Bierley Water Treatment Works and a large area of pasture, located on the outskirts of Cleckheaton between the M606 and M62. The Site also takes in a smaller plot of pasture to the north of the former water treatments plant. The Treatment Works have stood derelict for a number of years now, allowing a typical range of pioneer and secondary vegetation to establish across the site. Pasture is still in use, with the fields comprising of species-poor semi-improved grassland, or MG6 under the National Vegetation Classification system.

9.80 Hunsworth Beck passes along much of the site's eastern boundary, and intersects the site to the northeast. The beck is tree lined for most of its length offering links for bats and other wildlife across the local landscape. Additional watercourses include Cockleshaw Beck 320m to the north east and High Royds Beck which flows into Hunsworth Beck around 30m from the site's northern boundary.

9.81 Two ponds are located within 500m of the application site; the first located within Chatts Wood 300m from the north eastern boundary and an attenuation pond c.250m north.

9.82 The Site supports the following habitat types, all of which are described in detail in the Ecological Appraisal report R-1623-01.1 and R-1623-06 and identified on plans D-1623-01.1 and D-1623-06.1. These are provided at **Technical Appendix 9.1** to this ES.

- Improved grassland
- Hard-standing
- Buildings
- Rough neutral grassland
- Trees/shrubs
- Hedgerows
- Tall herbs/scrub
- Watercourse

9.83 A brief summary of each and their potential value in relation to the site's assessment is provided below.

Improved grassland

9.84 This constitutes the largest habitat on site and runs the along the western side of the treatment works, bordering the M606 and within the smaller plot of land to the north. The northern section is currently managed as hay meadow, whilst the south is used as paddock land. Both of these areas are of very limited ecological value and are <u>not taken forward in the assessment</u>.

Hard standing & buildings

9.85 The treatment works is accessed by a long tarmac drive, which has been in regular use and supports little in terms of vegetation. Within the works, there are large areas of hard standing functioning as car parking, pathways and vehicle access to a series of tanks. Many areas of the former treatment area remain free of vegetation although the crushed limestone paths on and around some former tanks have been colonised by a common range of opportunistic species. The site contains a number of industrial buildings which were used as part of the sewage treatment on site. These areas are of very limited ecological value and are not taken forward in the assessment.

Rough grassland

9.86 Grassed margins are present along the edge of the access roads within the treatment works and at the eastern edge of the site adjoining the Beck. These appear to have been left unmanaged for some time and now form bands of rough grassland. These areas are of very limited ecological value and are not taken forward in the assessment.

Trees

9.87 Within the treatment works are a number of immature trees, predominantly elder, which has become established along the margins and within areas of hard standing. Hawthorn trees are also located along the western fence of the works, perhaps indicating the location of a former hedgerow.

9.88 Along Hunsworth Beck at the south eastern corner of the site, are a number of mature trees including oak, ash, alder, elder, hawthorn and sycamore. Additional trees are located along the section of Hunsworth Beck at the north eastern edge of the site, though these are largely limited to immature elder and willow. These trees are of very limited ecological value and are not taken forward in the assessment.

Tall herb/scrub

9.89 The site contains frequent pockets of this habitat, chiefly along the margins of the treatment works, close to the boundary fence and in less grazed areas at the southern end of the horse paddock. A large spoil heap is located on grassland at the southern end of this site and this has been colonised by dense vegetation. Land adjoining Hunsworth Beck at the north eastern corner of the site, is also covered by a mosaic of scrub. These areas are of very limited ecological value and are not taken forward in the assessment.

Hedgerows

9.90 Along the western boundary of the meadow, is a hedgerow, which separates the field from the embankment of the motorway. This does not show signs of recent trimming being around 3m in height, but still offers a continuous dense line. As the hedgerow extends southwards, it is replaced by a post and rail fence, with a line of outgrown hedgerow and semi-mature trees on the opposite side outside the site boundary.

9.91 There are also two hedgerows which run across the site, from east to west, supported in places by a wooden fence. These are outgrown and very gappy in places, particularly the hedge line at the southern end of the site. Species in these areas are limited to hawthorn and elder. These features are of very limited ecological value and are not taken forward in the assessment.

Watercourse

9.92 Located along the eastern edge of the site is a section of Hunsworth Beck. To the northeast, where the beck first passes close to the site, the water is seen to flow through a deep tree lined gully approximately 1.5m wide with a depth of at least 5cm. The steep banks were rocky while the beck had a substrate of silt and cobbles.

9.93 An additional watercourse is located within the horse paddock and appears to issue from a spring close to the edge of the motorway to flow east across the site. At the time of the survey, this held very little water, being a series of small muddied pools with heavy poaching caused by horses.

9.94 Although there was no obvious flowing water, a line of damp ground extended eastwards towards the treatment works, marked by more lush vegetation including meadow sweet and willowherbs.

9.95 Hunsworth Beck in itself does not represent a valuable example of its habitat type; however, running water is a valuable resource to local fauna, and impacts on this feature can have far reaching consequences of higher value habitats down stream. For these reasons the watercourse is taken forward in the assessment as a Valued Receptor.

Invasive species

9.96 Three invasive species listed under Schedule 12 of the Wildlife & Countryside Act (1981) are found on, or immediately adjacent to the site. These are Himalayan Balsam, Japanese knotweed and Cotoneaster. Their long term management and removal from site is recommended and so these species will be taken through as a Valued Ecological Receptor.

The Site's Faunal Value

9.97 Dedicated surveys have been carried out for roosting bats, reptiles, white clawed crayfish and riparian mammals (water vole and otter), which have determined likely absence (or any form of dependence) of all of these groups / species. These groups / species are therefore not considered further in the assessment.

Wildlife sites

9.98 There is one statutory designated site within 2km of the application Site; Railway Terrace LNR, is located 1.5km north west of the site boundary. Found outside the EZoI this site will not be taken forward in this assessment.

9.99 Five locally designated sites are located within the search area, only one of which is considered to be within the sites Zone of Influence; this being Hanging Wood Kirklees SWS. As such this feature will be taken forward as a Valued Ecological Receptor.

Legal Compliance / Obligations

9.100 The Site has either been shown to support, or has significant potential to support, the following legally protected species (also summarised in **Table 9.6** below) and precautions will need to be put in place so that any potential offences can be avoided.

- A range of bird species will use the Site's vegetation for nesting. Ground nesting birds can move into a site during construction.
- No evidence of currently used badger setts is present, although there is evidence of the presence of badger in the area and the potential that they could use the Site's woodland to establish setts.

Table 9.6: Precautions Required in respect of Legal Compliance

Species/ Group	Precaution required
Nesting birds	Clearance of vegetation from the Site should be preceded by a nesting bird survey, or be carried out during the period September - February to avoid nesting season. A plan for the management of nesting bird issues during construction should be produced as part of the Sites Biodiversity Enhancement and Management Plan (BEMP).
Badger	A precautionary approach should be applied, involving: - detailed badger survey prior to the start of any ground works. - provision of escape routes to any deep excavations

9.101 Further detail and the rationale for these precautions are presented in the Ecological Appraisal for the Site presented as the **Technical Appendix 8.1** to this chapter.

9.102 Beyond their lending value to the identified receptors, it has not been necessary to consider the issue of protected species further in this assessment and they have been scoped out

Future Baseline

9.103 If the current regime were to continue the areas of worked pasture would remain largely unchanged, whereas the area of derelict land formerly used as a water treatments works would continue to naturally acquire pioneer and secondary vegetation, ultimately succeeding to scrubland and then eventually woodland.

Nature Conservation Evaluation

9.104 All of the identified ecological receptors within the Site that have the potential to be affected by the Proposed Development have been valued according to the criteria outlined in **Table 9.3**.

9.105 **Table 9.7** below, summarises the receptors which have been identified for the Site, these are taken forwards into the next section where the potential effects to these receptors in the absence of mitigation are considered. All other habitats on site have been scoped out as they are not considered of sufficient ecological value.

Table 9.7: Value of Habitats and Species

Ecological	Nature Conservation	Comments

Receptor	Value	
Within the site		
Hunsworth Beck	District Value	A short section of this beck passes through northeast corner of the site, constrained within an open culvert. see plan D-1623-01.1 (Technical Appendix 9.1)
Invasive species	Local (adverse)Value	Three Schedule 9 species are recorded on site; concentrated along the western boundary and Hunsworth Beck. see report R-1623-01 and R-1623-04 (Technical Appendix 9.1)
Outside the site		
Hunsworth Beck	District Value	After flowing through the site, the beck continues southwards along the western boundary. see plan D-1623-01.1 (Technical Appendix 9.1)
Hanging Wood	District Value	An area of broadleaf woodland, locally designated as a Kirklees – Site of Wildlife Significance (SWS), located along the sites western boundary. see report R-1623-01 (Technical Appendix 9.1)
Invasive species	Local (adverse) Value	Two Schedule 9 species are noted along the banks of Hunsworth Beck, immediately bordering the site. see report R-1623-01 and R-1623-04 (Technical Appendix 9.1)

Assessment of Effects, Mitigation and Residual Impacts

9.106 The **impact assessment** is based on the Parameters Plan shown later in Figure 9.3. Developing this layout has been an iterative process and has taken into account feedback from ecological surveys of the Site and has balanced this against other disciplines and requirements.

9.107 The Ecological Impact Assessment (EcIA) first looks at the potential impacts stemming from the Parameters Plan in an unmitigated form. Development of the Site for residential purposes is therefore considered without regard, beyond legal compliance, for ecological issues.

9.108 The masterplan can be seen in **Chapter 4 Proposed Development.** This provides a basis to the consider what elements of mitigation are already present within the Parameters Plan and what could be considered or required in terms of delivering suitable detailed proposals.

Predicted Significant Effects in Construction Phase

9.109 This involves the clearance of grassland and remediation of hard-standing, accompanied by large scale soil stripping and movement. The Site would be re-profiled and access routes, drainage, services and pilings revetment and foundations installed. Finally plots would be built out and landscaping installed through a phased process.

9.110 Woodlands and watercourses occupy valleys within and adjacent to the Site and are not suitable locations for development and not included in the Parameters Plan. Whilst they are unlikely to be directly impacted, there is potential for them to be indirectly impacted through some of the processes outlined below.

9.111 Levels of noise, visual and physical disturbance during construction will mean that during the construction stage of the project (in the short to medium term) parts of the Site will be effectively lost to local wildlife.

9.112 Construction may produce pollution in a number of forms; through release of contamination or sediment already present within the Site, through processes or accidental spillages associated with operations, or through the creation of dust or other airborne pollution.

9.113 Consideration of the potential effects on identified receptors is presented below:

Hunsworth Beck

Proposed Activity

9.114 Site clearance, ground preparation and general construction activities in close proximity to the beck.

Effect of Activity

9.115 There is potential for the release of sediment or chemical pollution into the beck from the Site during construction. This could lead to impacts on aquatic and riparian habitat /

fauna within or surrounding the watercourse beck, both within the site and at down stream locations.

Prediction of Impacts

9.116 The impact is assessed as large scale, as construction activities could affect off site habitats / fauna. These impacts could persist into the 'long term' if local extinction of riparian / aquatic fauna occurs, but is reversible if the water course is re-colonised naturally or through re-introduction; such impacts are 'worst case' and can be considered to be unlikely. The overall or total magnitude of the impact is assessed as intermediate and adverse. The significance of this impact is assessed as Moderate Adverse

Hanging Wood

Proposed Activity

9.117 Site clearance and construction of Proposed Development – no direct effects on areas of woodland.

Effect of Activity

9.118 Indirect effects of noise, light and particulate pollution would be felt throughout immediately adjacent habitats.

Prediction of Impacts

9.119 The impact is assessed as large scale, as construction activities could affect off site habitats. These impacts are only likely to persist in the 'short term' whilst construction works are undertaken and is reversible. Such impacts can be considered to have a confidence of unlikely. The overall or total magnitude of the impact is assessed as intermediate and adverse and a moderate adverse effect is predicted

Invasive Species

Proposed Activity

9.120 Site clearance and ground preparation in areas supporting Himalayan Balsam, Cotoneaster and Japanese knotweed.

Effect of Activity

9.121 Vegetation clearance and ground works in areas supporting invasive species could cause the spread of these species throughout the Site. Construction activities could also cause the distribution of seeds / vegetation off site, most likely via the beck running along the western boundary.

Prediction of Impacts

9.122 The impact is assessed as large scale, as construction activities could allow the spread of invasive species within the Site. These impacts will persist into the 'long term' as the species continues to spread naturally, but is reversible. Such impacts can be considered to have a confidence of probable / likely. The overall or total magnitude of the impact is assessed as intermediate and adverse and due to the low value (local) value of the habitats likely to be affected, a minor adverse effect is predicted

Table 9.8: Predicted Effects of the Construction Phase in the Absence of Mitigation

Receptor	Value	Impact(s)	Magnitude	Significance
Hunsworth Beck	District	Indirect impacts on watercourse resulting from adjacent construction site	Intermediate	Moderate Adverse
Hanging Wood	District	Indirect impacts on woodlands resulting from adjacent construction site	Intermediate	Moderate Adverse
Invasive Species	Local	Spread of Invasive species across Site	Intermediate	Minor Adverse

Predicted Significant Effects of the operational phase

9.123 This phase will see occupation of areas of the Proposed Development. Much of the Site will be occupied by built infrastructure as defined by the Parameters Plan. Roads within the Site will be regularly trafficked. Disturbance from this traffic, human activity, lighting and noise will be felt by adjacent habitats (although it is noted that there is no lighting plan on which to base the assessment and the assumption is made that the lighting will take place within the developable areas defined in the Parameters Plan)

9.124 Consideration of the potential effects on identified receptors is presented below:

Hunsworth Beck

Proposed Activity

9.125 Indirect impacts could arise from poor management of the beck and artificial lighting.

Effect of Activity

9.126 Inappropriate management of the beck and bank side vegetation (i.e. through the spraying of herbicides, pesticides and fertilisers) could degrade on site or downstream aquatic / riparian habitats, or impact on aquatic / riparian species.

Prediction of Impacts

9.127 The impact is assessed as large scale, as management could degrade off site habitat or species. These impacts would persist into the 'short term' and are reversible. Such impacts can be considered to have a confidence of unlikely. The overall or total magnitude of the impact is assessed as minor and adverse and therefore minor adverse significance

Hanging Wood

Proposed Activity

9.128 Mixed development in close proximity to woodland.

Effect of Activity

9.129 Indirect effects of noise and light pollution and an increase in human presence and littering. The woodlands function in terms of habitat would be compromised and there would be increased potential for threats from invasive species.

Prediction of Impacts

9.130 The impact is assessed as large scale, as impacts affect off site habitats. These impacts would persist for the life of the development (long term) and could be reversible. Such impacts can be considered to have a confidence of probable / likely. The overall or total magnitude of the impact is assessed as minor and adverse. and therefore minor adverse significance

Invasive Species

Proposed Activity

9.131 Management of the beck and surrounding open space.

Effect of Activity

9.132 Inappropriate (including lack of) management of the beck and surrounding green space could cause invasive species (in particular Himalayan balsam and Japanese knotweed) to spread through the Site and colonise off site habitats.

Prediction of Impacts

9.133 The impact is assessed as large scale, as management could allow the spread of this species within the Site. These impacts will persist into the 'long term' as the species continues to spread naturally, but is reversible. Such impacts can be considered to have a confidence of probable / likely. The overall or total magnitude of the impact is assessed as intermediate and adverse and due to the low value (local) value of the habitats likely to be affected, a minor adverse effect is predicted

Table 9.9: Predicted Effects of the Operational Phase in the Absence of Mitigation

Receptor	Value	Impact(s)	Magnitude	Significance
Hunsworth Beck	District	Potential risk of pollution	Minor	Minor Adverse
Hanging Wood	District	Disturbance resulting from adjacent commercial units	Minor	Minor Adverse

Invasive species	Local	Spread of Invasive species across Site	Intermediate	Minor Adverse

Mitigation

9.134 The current Masterplan has been developed in the knowledge of the 'Mitigation Hierarchy' now promoted in Paragraph 118 of the NPPF (Ref 9.14). Hence they have centred on (i) avoiding impacts on ecologically valuable parts of the site where possible (ii) where impacts are unavoidable, creating space and a means of mitigating impacts within the development (iii) as a last resort providing compensation off site.

9.135 In this case the need to off-set effects off site has been avoided and mitigation centres on the retention and enhancement as well as creation of habitat in key areas of the Site. This work will allow the following key mitigation principles to be achieved as embedded mitigation whilst allowing the development of parts of the Site:

- Retaining and protecting the watercourse in its current channel;
- Protecting the adjacent woodland through the location of built form;
- Enter invasive species into long-term management with an aim to contain their spread and ultimately remove them from site;
- Creation of new high value woodland grassland and standing water habitats, managed in perpetuity.

9.136 In addition a Biodiversity Enhancement and Management Plan (BEMP)has been prepared to present the themes for significant potential enhancements which can be controlled though planning condition

9.137 This plan picks out retained, created and enhanced habitat on the Site in relation to potential habitat in the wider area, the intention being to show how this retains and enhances wider connectivity and allows the Site to contribute to networks for wildlife alongside the proposed development.

9.138 Mitigation in relation to individual receptors and how this would be secured and implemented is discussed in the following section.

Hunsworth Beck

9.139 The beck will remain in its current channel as defined in the Parameters Plan and no direct impacts from either the constructional or operational phases are envisaged. The following measures will be implemented to reduce or avoid indirect impacts on Hunsworth Beck.

During construction

9.140 Indirect impacts on the beck, such as the release of pollutants into the watercourse, can be managed during the construction phase by erecting exclusion fencing between the construction zone and watercourse.

9.141 Fencing will be positioned a minimum of 10m from the banks of the watercourse. Fencing will be installed prior to the start of any work on site, and left in place until all work surrounding the watercourse has been completed. Signs will be fitted to this fencing, prohibiting access into fenced off areas to all contractors, with the exception of ecologists and landscapers.

9.142 To avoid pollutants damaging these habitats, the site compound and any hazardous chemicals will be placed/stored a minimum of 10m from the exclusion fencing. To reduce the amount of air born pollutants entering the watercourse, dust screens will be fitted to the exclusion fencing.

9.143 Indirect impacts on nocturnal wildlife using the watercourse will be avoided or reduced through the careful positioning of lighting. All artificial lighting used during the constructional phase will be directed towards the ground and away from the beck; this can be achieved through the use of hoods or louvres.

9.144 In addition to the BEMP, where relevant these tried and tested mitigation measures can be provided within a standard Construction Environmental Management Plan (CEMP) to be secured through standard planning condition attached to a future planning permission.

During operation

9.145 To reduce the potential indirect impact of disturbance, a green buffer will be created between the development and Hunsworth Beck.

9.146 To avoid pollutant entering the watercourse during the operational phase; the prohibition of the use of any potentially damaging chemicals, including herbicide, pesticide and fertilisers, within a 10m radius of Hunsworth Beck will be written into the contract of any Landscape Management Company appointed by the client to manage the site post-development.

9.147 Again, indirect impacts on nocturnal wildlife using the watercourse will be avoided or reduced through the careful positioning of lighting. All new artificial lighting installed within the development (street lights and security lighting) will be directed towards the ground and away from the beck; this can be achieved through the use of hoods or louvres.

9.148 These measures will be incorporated into CEMP and conditions. can be attached to any future planning permission to secure the implementation of the green buffer and the positioning and detailed design of external lighting.

Hanging Wood

9.149 Given the wood's off-site location and separation from the site by Hunsworth Beck, no direct impacts from the proposed development are envisaged. The following measures will be implemented to reduce or avoid indirect impacts on Hanging Wood.

During construction

9.150 Protection of the woodland from indirect impacts of construction activities will be secured through the same mechanism as protection of Hunsworth Beck. This will involve erecting exclusion fencing along the northern boundary, fitted with dust sheets and directing all artificial lighting away from the woodland; this will be secured through the conditioning of a Biodiversity Enchantment and Management Plan.

During operation

9.151 Again, protection of the woodland from indirect impacts during the operational phase will be secured through the same mechanism as protection of Hunsworth Beck.

9.152 To reduce the potential indirect impact of disturbance, a green buffer will be created between the development and Hanging Wood.

9.153 Indirect impacts on nocturnal wildlife using the woodland will be avoided or reduced through the careful positioning of lighting. All new artificial lighting installed within the development (street lights and security lighting) will be directed towards the ground and away from the wood; this can be achieved through the use of hoods or louvres; this will be secured through the conditioning of a Biodiversity Enchantment and Management Plan.

Invasive species

9.154 Himalayan balsam, Japanese knotweed and cotoneaster are all found growing on site and along the eastern boundary (along the Hunsworth Beck corridor). To prevent this species spreading further through the Site during the construction and operational phases, a specialist invasive species management company will be contracted to treat and ultimately eradicate this species from the site. This will need to be carried out in a sensitive manner to avoid impacts on non target species and would be best delivered by a Specialist Ecological Management Company. This can be secured through an appropriately worded condition of planning or through the BEMP

Table 9.10: Proposed Mitigation Measures

Effect / Impact	Mitigation Measure(s)	Extent to which effects mitigated	Monitoring requirements	Mechanism by which mitigation may be secured
Construction Phase				
Indirect impacts on watercourse resulting from adjacent construction site	Physical barriers / protection measures	Substantially	Yes - construction and integrity of physical protection measures.	Conditioning of a detailed BEMP and CEMP
Indirect impacts on woodlands resulting from adjacent construction site	Physical barriers / protection measures	Substantially	Yes - construction and integrity of physical protection measures.	Conditioning of a detailed BEMP
Spread of Invasive species across Site	Treatment / management	Completely	Yes Monitoring standards would be provided in the BEMP.	Conditioning of a BEMP and invasive species management plan and contract.
Operation Phase				
Potential risk of pollution to Hunsworth Beck	Green buffer and suitable lighting plan	Substantially	Yes – habitat quality. Monitoring standards would be provided in the BEMP.	Conditioning of a BEMP and approved landscape management plan and contract.
Disturbance to Hanging wood resulting from adjacent commercial units	Green buffer and suitable lighting plan	Substantially	Yes – habitat quality. Monitoring standards would be provided in the BEMP.	Conditioning of a BEMP and approved landscape management plan and contract.
Spread of Invasive species across Site and onto adjacent	Treatment / management	Completely	Yes Monitoring standards would be provided in	Conditioning of a BEMP and invasive species management plan

Effect / Impact	Mitigation Measure(s)	Extent to which effects mitigated	Monitoring requirements	Mechanism by which mitigation may be secured
habitats			the BEMP.	and contract.

Residual Impacts

9.155 Residual Impacts can be largely eliminated by enactment of the proposed mitigation, this is summarised in **Table 9.11**.

Table 9.11: Residual Predicted Impacts of the Construction Stage with Mitigation

Receptor	Value	Phase	Significance	Period	Impact
Hunsworth Beck	District	Construction	Negligible	Temporary	N/A
Hanging Wood	District	Construction	Negligible	Temporary	N/A
Invasive species	Local	Construction	Minor / Moderate	Temporary	Beneficial
Hunsworth Beck	District	Operational	Negligible	Permanent	N/A
Hanging Wood	District	Operational	Negligible	Permanent	N/A
Invasive species	Local	Operational	Minor / Moderate	Temporary	Beneficial

Cumulative Effects

9.156 Other large scale schemes set out in section ? have been assessed and there will be no cumulative effects.

9.157 Development, has been mindful of these receptors and has allowed for the connectivity of habitats through the Site and the retention and protection of key habitats and features.

9.158 This results in a layout which interfaces the development and occupation of the Site with its continued provision of habitat connectivity.

9.159 The impact assessment carried out on the basis of the Proposed Development suggests that residual effects after mitigation has been applied will primarily be **negligible**, with one receptor being **minor / moderate beneficial.**

References

9.1 Guidelines for Ecological Impact Assessment in the United Kingdom (CIEEM, 2006) http://www.cieem.net/ecia-guidelines-terrestrial-

9.2 European Commission (EC) (1992), Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (EC Habitats Directive)

9.3 EC (1979), Council Directive 79/409/EEC on the Conservation of wild birds (EC Birds Directive)

9.4 HMSO (2010), Conservation of Habitats and Species Regulations http://www.legislation.gov.uk/uksi/2010/490/contents/made

9.5 EC (1979), Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

9.6 EC (1983), The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention);

9.7 EC (1992), Convention on Biological Diversity http://www.cbd.int/default.shtml

9.8 UN (1971) Treaty Series No. 14583 on the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).

9.9 HMSO Wildlife & Countryside Act 1981 (as amended). http://www.legislation.gov.uk/ukpga/1981/69

9.10 HMSO Countryside and Rights of Way Act 2000 http://www.legislation.gov.uk/ukpga/2000/37/contents

9.11 HMSO (2006), Natural Environment and Rural Communities Act http://www.legislation.gov.uk/ukpga/2006/16/contents

9.12 HMSO (1997) The Hedgerow Regulations http://www.legislation.gov.uk/uksi/1997/1160/contents/made

9.13 Kirklees Unitary Development Plan (2007) http://www.kirklees.gov.uk/business/regeneration/udp/UDP.aspx

9.14 National Planning Policy Framework (2012) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

9.15 Kirklees Biodiversity Action Plan http://www.ukbap.org.uk/lbap.aspx?ID=505

9.16 Institute of Environmental Assessment (1997) Guidelines for Baseline Ecological Assessment.

9.17 Mitchell-Jones, AJ (2004) Bat Mitigation Guidelines. English Nature

9.18 JNCC, (2007). Handbook for Phase 1 Habitat Survey: A technique for environmental audit (reprint). Joint Nature Conservation Committee, Peterborough.

9.19a Bat Conservation Trust (2007) Bat Surveys Good Practise Guidelines, Bat Conservation Trust, London.

9.19b Bat Conservation Trust (2012) Bat Surveys Good Practise Guidelines, Bat Conservation Trust, London.

9.20 Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. 2010. Valuing Bats in Ecological Impact Assessment. In Practice – December 2010. Pp. 23-25. Institute of Ecology and Environmental Management, Winchester.

9.21 EA Pollution Prevention Guidelines https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/290145/pmho1107bnkg-e-e.pdf

9.22 English Nature Great Crested Newt Mitigation Guidelines (2001) Natural England, Peterborough

9.23 The Bat Worker's Manual (Joint Nature Conservation Committee 2004)

9.24 Bat Mitigation Guidelines (English Nature 2004)

9.25 Rodwell J.S. et al British Plant Communities Volume 3 (1998) Joint Nature Conservation Committee, UK

9.26 Stace C. (2010) New flora of The British Isles Third Edition Cambridge University Press

9.27 Gent, T., Gibson S (2003) Herpetofauna Workers Manual

9.28 Gilbert G, Gibbons D, Evans J; 1998; Bird Monitoring Methods; RSPB

9.29 West Yorkshire Local Wildlife Site Selection Criteria, West Yorkshire Local Sites Partnership 2011

http://www.ecology.wyjs.org.uk/documents/ecology/WestYorkshireLocalWildlifeSiteSelectionCriteria.pdf

9.30 Higher Level Stewardship: Farm Environment Plan (FEP) Manual (NE264) http://publications.naturalengland.org.uk/publication/32037?category=45001

9.31 Multi-agency Geographic Information for the Countryside (MAGIC) website - www.magic.gov.uk

9.32 Promap - http://www.promap.co.uk

9.33 Froglife Advice Sheet - www.froglife.org/documents/FroglifeAdviceSheet10.pdf

Appendices

10. Flood Risk and Drainage

Introduction

10.1 This Chapter assesses the potential impacts of the Proposed Development on water resources and flood risk. Consideration is given to the potential effects of the development upon surface water discharge, groundwater flood risk, water supply and wastewater disposal capacities. Mitigation measures required to prevent, reduce or offset the impacts, and the residual impacts are also considered.

10.2 This Chapter provides an overview of relevant legislation and planning policies. The methodology used to establish baseline conditions to facilitate an impact assessment are also described. The Chapter also provides a summary of the Flood Risk Assessment (FRA) and Drainage Strategy report included at **Appendix 10.1.**

10.3 The Chapter should be read with its associated figures and Technical Appendix **10.1,** and the site investigation reports provided in **Technical Appendix** .

10.4 This assessment has been carried out by Curtins, with assistance from Turley.

Legislation and Planning Policy Context

Legislation

10.5 The Water Resources Act, 1991 relates to the control of the water environment. The principal aspects of the Act which are relevant to the development include provisions concerning land drainage and flood mitigation.

10.6 The Water Industry Act, 1991 covers a wide-range of activities of the privatised water companies that were created in 1989. The main relevant provisions relate to trade effluent discharges to sewers for which the privatised companies act as the regulatory authorities.

10.7 Under the Water Industry Act, 1991, discharge of effluent to the public sewer can only take place with the agreement or consent of the sewerage undertaker, that is, the water company. The water companies control the nature and composition of the effluent, the maximum daily volume permitted, the maximum flow rate and the sewer into which the effluent is discharged.

National Planning Policy

10.8 Technical Guidance to the National Planning Policy Framework (NPPF), March 2012, addresses the potential for Proposed Development to be affected by flooding, and the potential for new development to exacerbate flood risk elsewhere. This document is supported by the National Planning Policy Guidance (NPPG).

10.9 The NPPF aims are to ensure that flood risk is considered at all stages of the planning process to avoid inappropriate development in high flood risk areas, and to direct development away from areas of highest risk.

10.10 NPPF advocates the use of the risk based sequential test, in which new development is directed towards the areas of lowest probability of flooding, which are identified by Flood Zones. The NPPG (Table 1) sets out the Flood Zones as follows:

- Flood Zone 1: Low probability of flooding;
- Flood Zone 2: Medium probability of flooding;
- Flood Zone 3a: High probability of flooding; and
- Flood Zone 3b: The functional floodplain.

10.11 The NPPG (Table 2) also sets out the Flood Risk Vulnerability Classification for the different types of land use based as follows:

- Essential Infrastructure – essential transport or utility infrastructure which has to be located in a flood risk area for operational reasons, and wind turbines
- Highly Vulnerable – police stations/ambulance stations, fire stations and command centres and telecommuncations required during flooding, emergency dispersal points, basement dwellings, caravans/mobile homes/park homes intended for permanent residence
- More Vulnerable – hospitals, residential institutions (is care homes/children's homes, social services homes, prisons and hostels), buildings used for dwellings, student halls of residence, drinking establishments, nightclubs and hotels, non-residential uses for health services, nurseries and educational establishments, landfill and sites used for waste management for hazardous waste, sites used for holiday or short let caravans and camping subject to specific warning and evacuation
- Less Vulnerable – police stations/ambulance stations/fire stations not required to be operational during flooding, buildings used for shops, financial, professional services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" category, assembly and leisure, land and buildings used for agriculture and forestry, waste treatment (except landfill/hazardous waste facilities), mineral working and processing (except for sand and gravel), water treatment works which do not need to remain operational during flood, sewage treatment works if adequate pollution control measures in place)
- Water compatible development – flood control development, water transmission infrastructure and pumping stations, sewage transmission infrastructure and pumping stations, sand and gravel workings, docks/marinas and wharves, navigation facilities, MOD defence installations, ship building/repair and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterwise location, water-based recreation, lifeguard and coastguard stations, amenity open space, nature conservation and biodiversity, outdoor sports/recreation and essential facilities such as changing rooms, essential

ancillary sleeping or residential accommodation for staff required by uses in this category subject to specific warning and evacuation plan.

10.12 **Table 10.1** below summarises the NPPG approach to the flood risk vulnerability classifications against each the flood zones to determine where development is appropriate, where development may be appropriate subject to the exceptions test, or where it might be inappropriate.

Table 10.1: Extract from the NPPG Table 2

		Flood Risk Classification				
		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Flood Zone 1	✓	✓	✓	✓	✓
	Flood Zone 2	✓	✓	Exceptions test Required	✓	✓
	Flood Zone 3a	Exceptions test Required	✓	x	Exceptions test Required	✓
	Flood Zone 3b	Exceptions test Required	✓	x	x	x

10.13 NPPF also provides advice on the definition of a functional floodplain and the allowance that should be made for the potential effects of climate change on development.

10.14 NPPF reinforces the Government's commitment to Sustainable Urban Drainage Systems (SUDS).

Local Planning Policy

10.15 As set out in Chapter 6, the majority of the site lies within the administrative boundary of Kirklees Council, whilst the school car park lies within the administrative boundary of the City of Bradford Metropolitan District Council (CBMDC).

Kirklees Council Planning Policy

10.16 The statutory development plan for Kirklees Borough Council's (KBC) comprises the adopted Unitary Development Plan (1999) saved policies.

10.17 There are no specific policies with the Kirklees UDP (saved policies) relating to flood risk or drainage.

10.18 Kirklees Council commenced preparation of a Core Strategy, however this document was withdrawn in 2013 due to the requirement for further evidence relating to housing needs.

10.19 The Council has been preparing further evidence, and consulted on a draft Local Plan in November 2015-February 2016. This Plan includes Strategy and Policies, and Allocations and Designations documents which were subject to public consultation at the end of 2015/early 2016. The Plan is therefore at the early stages of preparation and therefore has very limited weight in the determination of any planning application.

10.20 The Draft Local Plan Strategy and Policies includes draft Policy DLP4 (Masterplanning sites) and DLP25 (Design) which both include a requirement for development proposals to include flood risk mitigation measures.

10.21 This draft plan does include numerous draft planning policies relating to drainage and flood risk which set more detailed criteria. Specifically, draft Policy DLP28 (Flood Risk) sets out the sequential approach to developing land avoiding those areas of highest risk of flooding and directing development to the areas with the lowest risk. Draft Policy DLP29 (Drainage) presumes that SuDs will be used and then sets out the run off rates depending upon whether the site is greenfield or brownfield and the development proposals. No run-off rates are provided in the policy, although it does advise that for brownfield sites a 30% reduction in surface water run-off should be achieved where positive surface water drainage connections are proven.

10.22 It is noted that Figure 5 Batley and Spen Area identifies those areas which are at potential risk of flooding. The former North Bierley WWTW is not identified as such an area.

Bradford Council Planning Policy

10.23 Bradford Council Replacement Unitary Development Plan (RUDP) 2005, saved policies are based on the previous national guidance provided by PPG25. Those policies relevant to flood risk include: NR15B (flood risk); NR16 (surface water run-off and sustainable drainage; NR17 (groundwater protection); and NR17B (water courses and water bodies). In essence, Policy NR16 requires that development does not add to the risk of flooding from surface water. No run-off rates are provided.

10.24 The RUDP is due to be replaced by the Council's new Core Strategy in the coming months. The Publication Draft Core Strategy (2014) includes Policy EN7 relating to flood risk. This policy seeks to direct development to areas with a lower risk of flooding from all sources, and requires schemes on Flood Zone 2 and 3 to include storage measures on site, and all schemes to minimise surface water run-off and include SUDs where feasible. Following the initial Inspectors Report, the Council produced its Main Modifications and additional Modifications in November 2015. There are no changes proposed to Policy EN7, although some amendments are proposed to the supporting text to reflect national policy.

Assessment Methodology and Significance Criteria

Surveys and Baseline Data Collection

10.25 To facilitate a desk based qualitative impact assessment of the potential impacts of the development on water resources and flood risk, current baseline conditions were established using readily available published information. The following sources of information have been reviewed to inform the assessment:

- Environment Agency online flood mapping
- Environment Agency detailed flood mapping (no flood levels available)
- Site specific hydrological and hydraulic modelling of the Hunsworth Beck
- Yorkshire Water pre-development enquiry responses and sewer mapping
- Site topographical, gpr and utility survey drawings
- Site geo-environmental Phase 1 and Phase 2 studies
- British Geological Survey (BGS) map;

Study Area

10.26 The study area is the application site, as defined in Chapter 3.

Assessment Methodology

10.27 This qualitative impact assessment regarding flooding issues was undertaken on the basis of the findings of the Flood Risk Assessment (FRA) and Drainage Strategy report (Technical Appendix 10.1). The FRA assesses the flood risk posed to the development, and whether the development may potentially increase risk elsewhere through surface water runoff. The FRA was undertaken in accordance with the requirements of the NPPF and its technical guidance in the form of the NPPG, and guidance outlined in correspondence from the Environment Agency (see Appendix D of the FRA).

10.28 As part of the FRA, a Drainage Strategy for foul and surface water was developed. Consideration is given in the Drainage Strategy to foul water disposal and the feasibility of implementing SUDS to control surface water runoff. The Drainage Strategy confirms that ground conditions would not facilitate the implementation of infiltration. The drainage strategy for surface water for the employment and residential part of the Application Site will involve discharge from the main drainage system into Hunsworth Beck using attenuation basins. The Drainage Strategy has also been used to inform the qualitative impact assessment.

Consultation

10.29 Consultation with the Environment Agency, Yorkshire Water and the Lead Local Flood Risk Authority (KBC and BMDC) was carried out regarding the scope and the key issues to be addressed as part of the FRA and Drainage Strategy. Yorkshire Water was also consulted regarding the drainage of the site and to confirm any restrictions in the water run-off from the site. Copies of the relevant correspondence are presented in the appendices of the FRA and Drainage Strategy report, **Technical Appendix 10.1** .

Significance Criteria

10.30 There are no definitive significance criteria for assessing the significant impacts of a development on water resources and flood risk. Significance criteria have therefore been developed on the basis of professional judgement. The criteria used in this assessment are given below in **Table 10.2**.

Table 10.2: Significance Criteria for Assessing Flood Risk, Water Supply and Foul Infrastructure

Impact Significance	Description of Criteria
Major beneficial	Significant local scale / moderate to significant regional scale reduction in flood risk. Major permanent reduction in demand on surface and/or foul water infrastructure. Major permanent reduction in water supply demand.
Moderate beneficial	Moderate local scale reduction in flood risk. Minor permanent reduction in demand on surface and/or foul water infrastructure. Minor permanent reduction in water supply demand
Minor beneficial	Minor local scale reduction in localised flood risk.
Negligible	Development would result in no appreciable effect on flood risk. No appreciable impact on capacity of water supply, surface and/or foul water infrastructure.
Minor adverse	Increase in surface and/or foul water which would require modifications to existing infrastructure. Increases in water supply demand which would place additional pressure on existing supplies.
Moderate adverse	Minor to moderate local scale increase in flood risk. Severe temporary flooding or change to flow characteristics of watercourses. Minor to moderate local scale change in flow of groundwater. Increase in surface and/or foul water which would place undue pressure on existing infrastructure. Increases in water supply demand which would place undue pressure on existing supplies.
Major adverse	Moderate to severe increase in flood risk. Permanent flooding or change to flow characteristics of watercourses. Moderate to severe local scale change in flow of groundwater underneath the Site and/ or modest changes in off-site groundwater flow. Increase in surface and/or foul water supply which would require new infrastructure. Increase in water supply demand which would lead require a new sources e.g. re-application of abstraction licence.

10.31 Those impacts identified as Moderate or Major (beneficial/adverse) are considered to be significant . All other impacts are not significant.

Assumptions and Limitations

10.32 There are no limitations.

10.33 A copy of the plans are appended to the FRA and Drainage Strategy report, **Technical Appendix 10.1**, and the Site Investigation Reports provided in **Technical Appendix** .

Baseline Conditions

Topography

Main Application Site

10.34 The main site is at its highest point in the north western corner sloping down towards Hunsworth Beck in the east. Ground levels vary between 110-112 m Above Ordnance Datum (AOD) in the north western corner of the site and 89-91m AOD in the south eastern corner of the site. The land in the southern part of the site was remodelled as part of the works to the M606 and M62 junction, and drops in level from west to east.

Proposed School Car Park Site

10.35 For the school car park area, this sits at above the remainder of the field which is outside of the application area.

10.36 A copy of the topographic survey is presented in Appendix A of the FRA and Drainage Strategy report at **Appendix 10.1.**

Hydrology

Application Site – Residential and Commercial Area

10.37 Hunsworth Beck lies partially within and partially adjacent to the eastern boundary area of the main site. This water body is not classed as a main river until after it passes the M62 to the south.

10.38 Cockleshaw Beck lies to the north east of the Application Site but does not lie within its boundaries.

10.39 An unnamed beck from Oakenshaw in the west is understood to be culverted at the M606 immediately west of the main application site. This is outside of the Application Site boundary.

Application Site - Proposed School Car Park Site

10.40 Immediately south of the proposed school car park is where High Royds Beck and Low Moor Beck meet before heading south and becoming Hunsworth Beck.

Existing Drains and Foul Water Infrastucture

10.41 The main site comprises greenfield farmland to the west and the former waste water treatment works (WWTW) to the east and south.

10.42 The WWTW was decommissioned in 2011. Incoming public sewer flows from the north are piped by public sewer from Cliff Hollins Lane towards a reception chamber in the north-west corner of the current boundary. From the chamber a large dimeter transfer pipe conveys all incoming sewerage to the east along the western bank of the

Hunsworth Beck. To the south another new structure with overflow to the river, drops the flows into a syphonic system, which takes the flows beneath the M62 motorway and onwards to the current WWTW at Spen Valley.

10.43 It is noted that whilst the incoming pipe is a public sewer, the pipe from the reception chamber to the south is a Yorkshire Water asset and is not a public sewer.

Geology and Groundwater

10.44 The site history indicates that part of the site has been occupied by a sewage works since 1893. The Valley Pit Coal and Ironstone workings were also present in the west of the site at this time. along with an Old Coal pit in the south. A tramway was recorded as extending across the western part of the site. The coal pits were closed in 1908 and the WWT works extended and altered up until 2004.

10.45 The 'Made Ground' which extends across the majority of the site varies in depth between 0.15m and 8.3m below ground level (bgl). The nature and composition of Made Ground is typically cobbly, sandy, gravelly clay sandy gravel and mudstone bedrock of Middle Coal Measures geology.

10.46 The measured groundwater levels across the site vary between 1.61m bgl and 9.60m bgl.

10.47 The site is underlain by sandstones, mudstones and shales of the Lower Coal Measures which are classified as a Secondary A Aquifer. Secondary A Aquifers are generally fractured or potentially fractured formations and do not have a high primary permeability. These aquifers do not produce large quantities of water for abstraction, although they are important for local supplies and may supply base flow to rivers.

10.48 The site does not lie within a source protection zone.

10.49 The preliminary infiltration tests undertaken as part of the site investigation proved the underlying geology of the site is such that infiltration is not appropriate in this instance.

Flood Risk

10.50 The FRA indicates that the majority of the Application Site lies within Flood Zone 1 where there is no risk of fluvial or tidal flooding. However, it is recognised that owing to the proximity to Hunsworth Beck the eastern area of the main site lies partially within Flood Zone 2 and 3. The line of Hunsworth Beck is also a flood alert area.

10.51 Following discussions with the Environment Agency, it is noted that as this water body is not classed as a river until much further south, consideration of potential flood risk from this Beck lies within the jurisdiction of KMBC rather than the EA. Discussions with KMBC resulted in detailed hydraulic assessment of Hunsworth Beck being undertaken to establish the potential flood risk arising from this source. The results of this assessment are provided in the FRA, **Technical Appendix 10.1**, and confirm that the proposed development lies primarily with Flood Zone 1, with only a minor encroachment on Flood Zone 3 along the line of Hunsworth Beck on the eastern boundary.

10.52 There is also some potential for surface water flood arising from the nearby Becks, and Sugden and Stubs Becks to the south. It is understood that these Becks are culverted

below the M62/M606 motorway junction where there is a risk of overland flooding, which backflows northwards into the site. It is noted that further improvement works are expected to this motorway junction including the widening of the carriageway adjacent to the main application site. It is expected that drainage will be improved in this area as a consequence of the roadworks.

Water Supply

10.53 The Yorkshire Water Resources Management Plan, 2014 (WRMP) (ref 10.1) assesses the supply demand balance for a 25 year period from 2015/16 to 2039/2040. The development site lies within the Grid SWZ water resource zone which makes up circa 99% of the total supply area. There is an integrated network within this Grid SWZ, which enables Yorkshire Water to manage resources and minimise shortfalls.

10.54 The WRMP advises that within this grid SWZ there would be a deficit in the supply demand balance from 2018/19 due to loss of yield arising from climate change. However, the WRMP seeks to address this deficit through a range of measures including leakage reduction, use of an existing river abstraction licence, three groundwater schemes and customer water efficiency.

Effects During Demolition and Construction Phase

10.55 Demolition, remediation and construction within the site has the potential to have an impact on the water resources through the mobilisation of contaminants and soils which could enter the controlled water receptors and through the interruption of groundwater and surface water movement. Without mitigation there is the potential for remediation to have a moderate adverse effect on a high receptor, Hunsworth Beck.

10.56 During this phase it will be necessary to provide a Construction Environmental Management Plan which will set out the temporary measures to manage surface water run-off and on site drainage. A These tried and tested measures can be conditioned on any planning permission are likely to include settlement/attenuation ponds and the controlled removal of contaminated material to ensure that watercourses are not polluted.

10.57 A **moderate adverse** effect has been identified during the construction phase.

Predicted Significant Effects during the Operational stage

Change in Flood Risk from Groundwater

10.58 Since shallow groundwater was not recorded on site during site investigation, the risk of groundwater flooding during the completed development phase is considered to be low. This is supported by the fact that there are no known historical records of surface and groundwater flooding pertaining to the site.

10.59 Given the nature of development and site conditions, the impact of the completed development from groundwater flooding is considered to be **negligible**.

Change in Flood Risk from Surface Water Runoff

10.60 The site is a mix of greenfield and brownfield. As outlined in the FRA and Drainage Strategy report ground conditions on the Application Site for the residential and

commercial development would support the management of surface water through attenuation basins before release into the site main drainage system. Whilst some storage volume will be provided within the main pipe runs, the main storage volume will be provided in landscaped attenuation basins within the Application Site. This is ?? within the parameters plan and is considered embedded mitigation.

10.61 It is envisaged the residential and commercial areas will each discharge into Hunsworth Beck in different locations. In both cases surface water runoff rates will be reduced to greenfield rates as required by the LLPA. Specifically, a rate of 42.5l per sec for the commercial development and 23.5l per second for the residential development. The detail of this can be controlled through a detailed drainage strategy to be controlled by planning condition to take forward the strategy defined by the parameters plan.

10.62 The drainage strategy for the proposal school car park includes the provision of a small diameter outfall direct to Hunsworth Beck. The discharge rate will be 2litres per second for this area of the Application Site.

10.63 As the drainage strategy has been designed to accommodate surface water runoff to the satisfaction of Yorkshire Water and the two LLPA's, it is considered that the overall impact from development would be long-term, local and of **negligible beneficial significance** through the introduction of landscaped areas and surface water treatment devices.

Increased Demand for Water Supply

10.64 The Proposed Development could increase the demand for water supply. The Yorkshire Water Resource Management Plan indicates that whilst the forecast identifies a deficit from 2018/19, the Plan includes a number of actions that Yorkshire Water are putting in place to ensure there is an adequate water supply across the Grid SWZ up to 2040, which includes the additional population to accommodate the Proposed Development up to at least 2040.

10.65 However, the impact of the development on available water supply is considered to be a long term **minor adverse** impact.

Increased Pressure on Foul Water Infrastructure Capacity

10.66 The proposed residential and commercial elements of the Proposed Development have the potential to increase pressure on the existing foul water infrastructure. Initial discussions with Yorkshire Water's Technical Sewage Team have not identified any capacity issues with the existing infrastructure.

10.67 The Yorkshire Water "Water Resources Plan" (2013) (Ref 10.2) confirms that the planned investment in the existing infrastructure has taken into account a growth in population up to 2040. This investment includes both waste water treatment as well as water supply.

10.68 The Proposed Development includes separate drain systems for foul and surface water. The residential development element of the Proposed Development will connect to the public sewer by gravity. In addition, the properties can be located to avoid the existing public sewer easements within this area of the site.

10.69 Foul water from the commercial development area of the Proposed Development will be collected via a Section 104 Adoptable foul sewer within the new access road which will flow southwards. An adoptable foul water pump station will be located in the southern corner of the Application Site to lift foul water back to the proposed discharge point upstream of the former inlet structure.

10.70 With appropriate detailed design the development is considered to have a **negligible significance** on the capacity of foul water infrastructure.

Mitigation Measures

Demolition and Construction

10.71 A Construction Environmental Management Plan will be prepared to minimise the potential for the water environment to be affected by contaminants or earthworks. This document will set out tried and tested methods which can be secured by planning conditions.

Completed Development

Change in Flood Risk from Surface Water Runoff

10.72 Due to the incorporation of SUDS (which is considered to be 'designed in' mitigation as defined on the parameters plan), the development should not result in an increase in the rate and volume of surface water runoff from the site. As noted above, full details of the strategy will be provided to the Local Planning Authority through the submission of Reserved Matters applications, and will be controlled by planning condition.

Increased Demand for Water Supply

10.73 The incorporation of water efficiency measures into the design of the development to promote the reuse of water is likely to reduce the residual impact on the demand for water supply. The details of this will be delivered as part of future reserved matters planning applications and can also be controlled by planning condition. No additional mitigation measures are considered necessary.

Increased Pressure on Foul Water Infrastructure Capacity

10.74 The mitigation measures required in respect of foul water capacity relate only to the new pumping station, which will be delivered as part of the detailed design, to be secured though future reserved matters applications.

Residual Effects Assessment

10.75 A summary of the residual effects is provided at **Table 10.3** below.

10.76 In summary, a negligible impact is predicted on all areas, other than the change in flood risk from surface water run off which will be a **negligible beneficial** impact as a result of the introduction of SUDS and increase in the areas of landscaping. As only effects above moderate)adverse/beneficial) are considered significant, there are no significant water resources effects

Table 10.3: Summary of Residual Effects

Construction / Operational	Impact	Impact Significance	Adverse / Beneficial	Impact Local, Regional, National	Direct/Indirect (D/I) Permanent/temporary (P/T) Period (ST/MT/LT)	Mitigation	Residual Impact Significance	Adverse / Beneficial	Local, Regional, National	Direct/Indirect (D/I) Permanent/temporary (P/T) Period (ST/MT/LT)
Construction	Contamination of water recourses	Moderate	Adverse	Local	D/T/ST	CEMP	Negligible			
	Change in Flood Risk from Groundwater	Minor	Adverse	Local	D/T/ST	-	Negligible	-	-	-
Operational	Change in Flood Risk from Groundwater	Negligible	-	-	-	-	Negligible	-	-	-
Operational	Change in Flood Risk from Surface Water Runoff	Negligible	-	-	D/P/LT		Negligible	-	-	-
Operational	Increase Demand for Water Supply	Minor	Adverse	Regional	D/P/LT	Use of Water Efficient Systems	Negligible	-	-	-
Operational	Increased Pressure on Foul Water Infrastructure capacity	Negligible	-	-	-		Negligible	-	-	-

Cumulative Effect Assessment

10.77 A review of committed developments for the area has been undertaken. In light of the assessment above, no significant cumulative effects are identified.

Monitoring

10.78 No further monitoring is expected to be required.

REFERENCES

10.1 The Yorkshire Water Resources Management Plan, 2014 (WRMP)

10.2 The Yorkshire Water "Water Resources Plan" (2013)

11. Transportation

Purpose of the Assessment

11.1 This chapter has been prepared to assess the environmental impact of the traffic generated by the Proposed Development on the Application Site. It considers the potential significant effects of development traffic on the operation of junctions within the study area, which was subject to scoping discussions with Kirklees Council and Bradford Council.

11.2 This chapter sets out the methodologies adopted in the assessments undertaken and identifies how the baseline conditions have been established. It then considers the impact of the proposed development traffic on the surrounding network and identifies any appropriate mitigation that is required.

11.3 This Chapter has been prepared by AECOM and should be read in conjunction with the associated **Technical Appendices 11.1 and 11.2**. The Transport Assessment and Travel Plan have been produced for the proposed development which sets out in detail the methodologies adopted for establishing baseline conditions and identifying the development impact. This chapter should be read in conjunction with these documents.

Legislative and Policy framework

11.4 The following policy documents, which relate to Traffic & Transportation, have been considered in the preparation of the TAs and Environmental Statement Chapter:

- The National Planning Policy Framework (NPPF), March 2012 (ref 11.1);
- West Yorkshire Local Transport Plan 2011-2026 (Ref 11.2);
- Kirklees UDP (Saved Policies) (Ref 11.3
- Kirklees emerging Local Plan (Ref 11.4); and
- Bradford Replacement Unitary Development Plan (RUDP).- Saved Policies (2005) (Ref 11.5)
- Bradford MDC Emerging Core Strategy (Ref 11.6).
- IEMA EIA Guidelines (Ref 11.7)

National Planning Policy Framework (NPPF, March 2012)

11.5 The NPPF (Ref 11.1) states that there is a presumption in favour of sustainable development, with sustainable development being defined as including (but not limited to):

- Making it easier for jobs to be created in cities, towns and villages;
- Moving from a net loss of bio-diversity to achieving net gains for nature;

- Replacing poor design with better design; and
- Improving conditions in which people live, work, travel and take leisure.

11.6 Furthermore the NPPF provides additional guidance on promoting sustainable transport as follows, contained within NPPF sections 29-37:

- 'NPPF 29. Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives.
- 'NPPF 30. Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion.
- 'NPPF 31. Local authorities should work with neighbouring authorities and transport providers to develop strategies for the provision of viable infrastructure necessary to support sustainable development, including large scale facilities such as rail freight interchanges, roadside facilities for motorists or transport investment necessary to support strategies for the growth of ports, airports or other major generators of travel demand in their areas.
- NPPF 32. All developments that generate significant amounts of movement should be supported by a Transport Statement or TA. Plans and decisions should take account of whether:

  (i) The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;
  (ii) Safe and suitable access to the site can be achieved for all people; and improvements can be undertaken within the transport network that cost effectively limits the significant impacts of the development.
  (iii) Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.'
- 'NPPF 34. Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised.
- 'NPPF 35. Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people.
- 'NPPF 36. A key tool to facilitate this will be a TP. All developments which generate significant amounts of movement should be required to provide a TP.'
- 'NPPF 37. Planning policies should aim for a balance of land uses within their area so that people can be encouraged to minimise journey lengths for employment, shopping, leisure, education and other activities.'

West Yorkshire Local Transport Plan 2011 – 2026 (2012)

11.7 The LTP 2011-2026 (Ref 11.2) is the statutory plan for transport in West Yorkshire and sets out the needs, ambitions and strategy over a relatively long period of time as well as detailed spending proposals in the first three years. The LTP takes two approaches:

- 15-year strategy for 2011 to 2026; and
- A first implementation Plan for 2011 to 2014.

11.8 The 15-year My Journey strategy is designed to improve the four key themes of the journey:

- Transport Assets (such us the roads, traffic lights and bus stops that make up the network);
- Travel choices (helping employees to make the most sustainable choice about when and how they travel);
- Connectivity (providing an integrated, safe, reliable transport journey); and
- Enhancements (improving the overall system to provide more capacity four journeys in the future).

Kirklees Unitary Development Plan (UDP) – Saved Policies

11.9 The Kirklees UDP (ref 11.3) was adopted in 1999 and the majority of policies were saved to 2007 or until replaced by a new plan. According to the UDP, in terms of transport priority would be given to:

11.10 Satisfying the travel needs of all sections of the community through an effectively integrated transport system, with emphasis on improving public transport and encouraging a modal shift away from travel by private car;

11.11 Promoting a transport network on which it is safe to travel and which causes minimal disturbance through danger, noise and air pollution; and

11.12 Co-ordinating land use change with transport provision so as to minimise the need to travel and locating new development where it can best be served by public transport and where it minimises the need for expansion of the highway network.

Kirklees Local Plan

11.13 The Council recently consulted on a new local plan including Allocations and Policies (Ref 11.4). The consultation closed in February 2016. The application site is identified as a draft allocation for new employment site (under 30 hectares).

11.14 The draft Local Plan documents are currently under consideration by the Cabinet. In the interim period the Unitary Development Plan (UDP) remains the basis for making planning decisions and the site is currently unallocated in the UDP.

Bradford Replacement Unitary Development Plan (RUDP) - Saved Policies

11.15 The RUDP (11.5) for the Bradford District was adopted by the Council on the 18th of October 2005. Under Government legislation relating to the transition between the old UDP system and the new LDF system, the RUDP policies were 'saved' for 3 years. The Council received a Direction from the Secretary of State which saved the vast majority of RUDP policies beyond this 3 year period. A summary of the relevant saved policies is provided below:

- TM1 Transport Assessment;
- TM2 Impact of traffic and its mitigation;
- TM8 New pedestrian and cycle links;
- TM10 National and local cycle network;
- TM11 Parking standards for non-residential developments;
- TM12 Parking standards for residential developments;
- TM19A Traffic management and road safety; and
- TM20 Transport and highway improvements.

City of Bradford MDC Core Strategy

11.16 Bradford Council is progressing with a new development plan which will include a Core Strategy (Ref 11.6). The Core Strategy sets the key development requirements an location strategy for the district. It is in the latter stages of preparation, with the final EIP taking place in May 2016. Adoption of the plan should take place later in 2016.

11.17 In terms of Transport and Accessibility the Core Strategy sets out that a key aim is to reduce the need to travel with Policy TR1 setting out how this aim will be realised.

11.18 It is also recognised that strengthening public transport, pedestrian and cycle links is also essential for the delivery of the Local Plan with Policy TR3 which sets out the required accessibility criteria as well as requiring new development to be set out such that these alternative modes can be encouraged.

Assessment Methodology

11.19 The scope of the Transport Assessment (**Technical Appendix 11.1-2**) has identified the extent of the network to be included in the assessment of both the main development site accessed from Cliff Hollins Lane as well as the proposed car park for the use of the school which is accessed from Mill Carr Hill Road.

11.20 Methodologies detailed in the DfT's TA Guidance document recommend that environmental impact assessments undertaken in respect of large developments should be undertaken in accordance with the IEMA guidelines (Ref 11.7) noted above.

11.21 The IEMA's 'Guidelines for the Environmental Assessment of Road Traffic' (Ref 11.7) sets out the method for assessing potential significant environmental impacts where a proposed development is likely to give rise to changes in traffic flows.

11.22 The IEMA guidelines suggest that, in order to determine the scale and extent of the assessment and the level of effect which a given development will have on the surrounding road network, the following two rules should be followed:

- Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGV's is predicted to increase by more than 30%); and
- Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

Significance Criteria

11.23 The potential impacts on the baseline conditions and geographical receptors arising from the proposed development are then identified and a magnitude of scale and impact determined. The general methodology of this can be summarised as follows:

- Set out baseline conditions;
- Identify impact by type in relation to traffic flows;
- Identify impact receptors by geographical area affected;
- Consider impact severity;
- Consider mitigation; and
- Identify residual impact remaining.

11.24 The significance of each impact is considered against the criteria within the IEMA guidelines where possible. However, the IEMA guidelines state that:

'For many effects there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed up by data of quantified information wherever possible.'

11.25 In the absence of established significance criteria for traffic and transport impacts, professional judgement has been used to assess whether the impacts of traffic and transport are considered significant. The significance of an effect is judged by comparing the extent of the change with particular standards and criteria. It is estimated as a combination of the magnitude of the effect and the sensitivity of the receptor. The process is described in the following tables.

Table 11.1: Sensitivity / Value of Receptor

Sensitivity / Value of	Description

Receptor	
Very High	Sections of highway close to schools and colleges or accident black-spots
High	Congested junctions, community facilities, conservation areas
Medium	Public open space, nature conservation areas, residential areas with adequate footways
Low	Areas of low sensitivity to traffic flows

Table 11.2: Magnitude of Impact

Magnitude of Impact	Description
High	Where the Development could be expected to have a substantial impact on Transport and Access (90% or more change in traffic flow)
Medium	Where the Development could be expected to have a noticeable impact on existing vehicular flows (60-89% change in traffic flow)
Low	Where the Development could be expected to result in a small, barely noticeable impact existing vehicular flows (31-59% change in traffic flow)
Negligible	Negligible: where no discernible impact is expected as a result of the Development on Transport and Access (30% or less change in traffic flow)

Table 11.3: Impact Significance Matrix

Sensitivity / Value of Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
Very High	Substantial	Substantial	Moderate	Minor
High	Substantial	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Low	Minor	Negligible	Negligible	Negligible

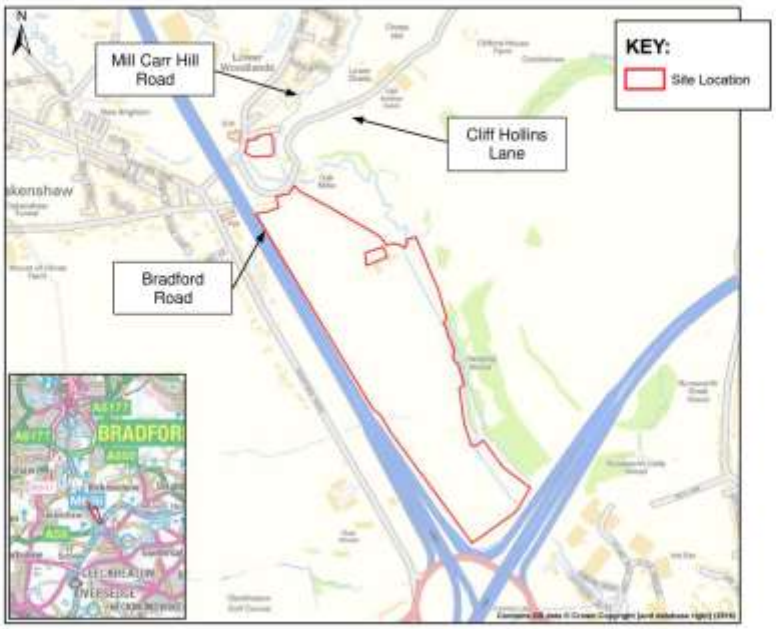
11.26 The impacts will also be described as being either Beneficial or Adverse as part of the assessment. It is considered that only the effects above are significant for the purposes of the assessment.

11.27 Where a highway link is identified as having an increase in traffic levels over 30%, the following environmental elements will be considered when assessing the significance of the impact:

- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian Amenity;
- Fear and Intimidation; and
- Accidents and Safety.

Study Area

11.28 For the purposes of consistency and robustness, the local road network assessed for this ES chapter has included the same geographical road network that is presented within the TA. A location plan is provided in **Figurexx**.



Surveys

11.29 The existing baseline conditions have been evaluated to enable a measurement and comparison of the effects of the development through an assessment of the additional travel demand generated and the resultant changes in traffic conditions. This information can be found in the Transport Assessment (**Technical Appendix 11.1**).

11.30 Site visits have been undertaken in order to observe the existing conditions on the road network, particularly with regard to parking. These observations have informed the vehicle tracking assessments considered within the Transport Assessment (**Technical Appendix 11.1**).

11.31 In order to quantify the existing traffic flow conditions on the road network in the vicinity of the site, traffic counts were undertaken on Tuesday 12th November 2013, between the hours of 07:00 – 10:00 and 16:00 – 19:00. Traffic counts were conducted at three junction locations; Cliff Hollins Lane / Mill Carr Hill Road, Mill Carr Hill Road / Bradford Road and the M62 Chain Bar roundabout. For the purposes of environmental assessment, traffic flows have been derived from the peak hour traffic data to produce estimates of Average Annual Daily Traffic (AADT) flows.

11.32 Personal Injury Accident data for the most recent seven-year period has been sourced from Kirklees Council for the agreed study area in order to inform the assessment of road safety effects. The data includes details of accident severity, details of casualties, accident descriptions and accident location. The accident analysis for the Application Site can be found in the Transport Assessment (**Technical Appendix 11.1**).

11.33 The assessment of the highway impact considers the change in conditions between the Baseline scenario (2016 and 2021) and 'with' Development scenario (2016 and 2021).

The 2013 surveyed traffic data has been factored up to the above years using industry standard methods, which is considered a robust approach and was also agreed with the Local Highway Authority. Within the assessment, no committed scheme scenarios are to be considered, as agreed with the Local Highway Authority. A further description of these methods is provided in the Transport Assessment (**Technical Appendix 11.1**).

Consultation

11.34 During the preparation of this chapter and the production of the associated Transport Assessment and Travel Plan (**Technical Appendix 11.1-2**), AECOM has held consultations with Kirklees Council and Bradford Council. The comments have been duly considered and addressed during the pre-application process. Further details of the outcome of the consultation process are provided within the Transport Assessment document.

Kirklees Council and Bradford Council

- Scope of TA and Framework TP; Proposed Site Access Arrangements; Proposed internal site layout; and Person Injury Accident Data.

Baseline Conditions

11.35 The baseline conditions for the Application Site have been set out in full in the Transport Assessment (**Technical Appendix 11.1**). The purpose of this section is to provide a summary assessment of the existing conditions in the vicinity of the Application Site. This includes the use of traffic count data in order to establish baseline conditions in the proposed development area.

11.36 Operational assessments of the junctions on the surrounding network have been undertaken; the full results of these operational assessments are summarised in Section 6 of the Transport Assessment (results in Appendix E, **Technical Appendix 11.1**).

11.37 The 2016 baseline assessments demonstrate that all of the junctions on the network currently operate within capacity in the base scenario, as indicated in **Technical Appendix 11.**1.

11.38 Vehicular access to the site will be taken via an access from Cliff Hollins Lane.

Pedestrian & Cycle Access

11.39 The pedestrian network in the vicinity of the Application Site is generally accepted as good quality. A continuous footway is provided along both sides of the carriage way on Cliff Hollins Lane and Mill Carr Hill Road. Footway is also provided along Bradford Road towards Low Moor to the north and Cleckheaton to the south.

Public Transport

11.40 The Application Site is served by a number of bus services. Bus stops are located on Bradford Road within 400m of the site access, for northbound and southbound travel. These bus stops are served by the 268 service. The 268 route runs from Dewsbury to Bradford via Heckmondwike, Cleckheaton and Oakenshaw. It is a frequent service operating every 12 minutes through the day, reducing to every 60 minutes at night. This service also operates on a Sunday, at the frequency of every 30 minutes. A summary of the accessible bus services from the Application Site is provided below.

Table 11.4: Accessible Bus Services

Service number	Route	Mon-Fri		Sat		Sun	
		Day	Eve	Day	Eve	Day	Eve
268	Dewsbury-Heckmondwike-Cleckheaton-Oakenshaw-Bradford	12 mins	60 mins	12 mins	60 mins	30 mins	60 mins

11.41 Bradford Interchange Railway Station is located approximately 4 miles to the north of the site, and although it is unlikely to be a popular mode of travel to the site, it could make up part of a wider multimodal journey, particularly as the interchange is served by Route 268. The station provides regular links to Leeds.

On-Street Parking

11.42 During detailed site observations, it was identified that there was significant on-street parking relating to Woodlands C of E Primary School along the length of Mill Carr Hill Road from the school gates to the M606 underbridge during school AM drop-off and PM pick-up periods. During site construction it is thought that this could lead to potential conflict with HGV movements and could potentially increase the risk of accidents. This issue was also identified at the Public Consultation event in November 2014.

Accident Data

11.43 On the Local Road Network, a total of 11 incidents were reported between 2011 and 2015, of which 8 were slight in severity, 3 was serious and none were fatal. It was observed that one of the accidents involved an HGV. Through analysis of the data is it concluded that the majority of incidents were as a results of human error and poor judgement on behalf of drivers pulling out of junctions.

11.44 On the Chain Bar Roundabout, the majority of incidents were as a result of human error in manoeuvring on the multiple arm roundabout and poor judgement on behalf of drivers pulling out of junctions. Given the scale of existing flows on the junction, it considered that the addition of proposed development traffic on the Chain Bar Roundabout would not result in an impact in terms of road safety.

Predicted significant effects (the assessment)

11.45 This section identifies the likely significant impacts that could potentially be generated by the proposed development. Consideration has been given to the demolition, construction and operational phases of the development.

Effects during construction phase

11.46 During the construction phase it is possible that certain impacts are likely, such as an increase in HGV trips, an increase in car trips (construction workers) or the spread of mud onto the local road network.

11.47 Due to the length and complexity of the anticipated construction programme (such as the potential for the construction of certain phases to overlap), it is difficult to define precisely the volumes of traffic that would be generated during the construction phase.

11.48 Construction materials would be delivered from a range of sources and as such, a range of haulage routes is therefore anticipated, although all vehicles will ultimately arrive via Bradford Road and would not pass the existing school.

11.49 Generally, the flow of construction traffic would be spread evenly over the working day, with occasional peaks resulting from operational requirements for materials and stock-piling on site. In practice, it is likely that the contractor will choose to limit traffic flows during the background peak hours. It is likely that there will not be an increase in traffic greater than 30% and any increase would be managed through a Construction Traffic Management Plan (CTMP).

11.50 It is therefore concluded that the construction phase of the Development would have a low to negligible effect on highway flows, severance, driver stress and delay, pedestrian amenity and delay, cyclist amenity and delay, fear and intimidation and accidents and safety. It should be noted that this would only be a temporary impact.

Traffic Flows

Effects during operational phase

11.51 Peak hour trip generation associated with the residential and commercial elements of the Proposed Development is set out in the accompanying TA, as agreed with Kirklees Council and Bradford Council. The peak hour traffic flows have been factored to 24 hour AADT flows using the 24 hour flows provided by Kirklees Council.

11.52 As per the IEMA guidelines, an exercise has been undertaken to identify links, within the previously identified and agreed geographical study area, where development trips represent an increase of total vehicles of 30% or more. **Table 11.5 and 11.6** summarise links that have been identified and considers the magnitude of the impact whilst **Table 11.7** sets out the sensitivity of the receptor and **Table 11.8** summarises the significance of the impact. **Figure 11.1** shows the location of the links.

Figure 11.1: AADT Count Locations

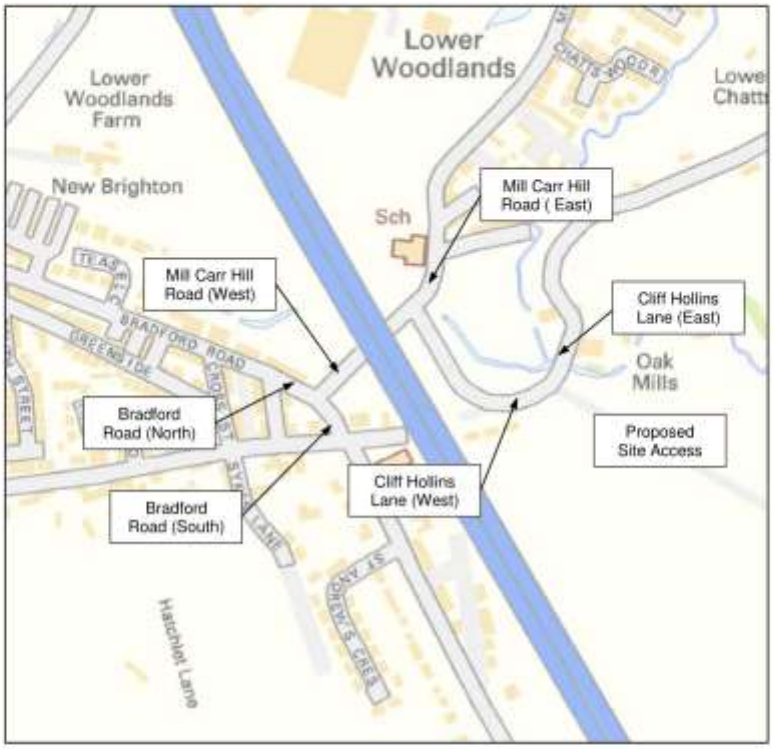


Table 11.5: Magnitude of Impact (2016)

Link Name	2016				Magnitude of Impact
	Base	Base + Dev	Difference	% Change	
Cliff Hollins Lane (east)	2505	2505	0	0%	Negligible
Cliff Hollins Lane (west)	2505	4058	1553	62%	Medium
Mill Carr Hill Road (east)	3668	3800	132	4%	Negligible
Mill Carr Hill Road (west)	5802	7222	1420	24%	Negligible
Bradford Road (north)	15835	16634	799	5%	Negligible
Bradford Road (south)	15037	15658	621	4%	Negligible

Table 11.6: Magnitude of Impact (2021)

Link Name	2021				Magnitude of Impact
	Base	Base + Dev	Difference	% Change	
Cliff Hollins Lane (east)	2717	2717	0	0%	Negligible
Cliff Hollins Lane (west)	2717	4270	1553	57%	Low
Mill Carr Hill Road (east)	3978	4111	132	3%	Negligible
Mill Carr Hill Road (west)	6293	7713	1420	23%	Negligible
Bradford Road (north)	17173	17972	799	5%	Negligible
Bradford Road (south)	16308	16929	621	4%	Negligible

It should be noted by the above tables that there is not predicted to be any increase in traffic on Cliff Hollins Lane (east). This is because all traffic from the site will approach from Cliff Hollins Lane (west).

Table 11.7: Sensitivity of Receptor

Link Name	Sensitivity of Receptor	Description
Cliff Hollins Lane	Low	Area of low sensitivity to traffic flows
Mill Carr Hill Road	Very High	Woodlands C of E Primary School located on Mill Carr Hill Road to the east of the junction with Cliff Hollins Lane
Bradford Road	Medium	Surrounded by residential properties.

Table 11.8: Significance of Impact

Link Name	Significance of Impact
Cliff Hollins Lane	Negligible
Mill Carr Hill Road	Minor adverse
Bradford Road	Negligible

11.53 These links will be considered further against the environmental factors identified earlier.

Severance

11.54 Severance is a perception that a road is more difficult or possibly less safe to cross. Increased severance can result in the isolation of areas of a settlement or individual properties. The impact is largely a function of traffic volumes.

11.55 IEMA guidelines set out a range of indicators for determining the significance of the relief from severance. For example, changes in traffic flows of 30%, 60% and 90% are considered as producing 'slight', 'moderate' and 'substantial' changes in severance respectively.

11.56 Whilst it has been shown that traffic flows on Cliff Hollins Lane are anticipated to increase in excess of 30%, it is considered that the development will avoid severance of the road for pedestrians. However, the increase in traffic will result in an adverse impact in terms of severance, combined with the fact the school also lies close by and could also be affected. Based on this assumption, the worst case effects would be considered as Moderate Adverse.

Driver Delay

11.57 Driver delay is that experienced by non-development related road users on the surrounding roads and particularly as a consequence of slow moving traffic associated with construction.

11.58 The IEMA guidelines suggest that delays are only likely to be of significance when the traffic on the surrounding network is at, or close to full capacity. The only link with a minor adverse significance of impact, Mill Carr Hill Road, currently operates within capacity.

11.59 Operational assessments have been undertaken, and are detailed within the accompanying Transport Assessment (**Technical Appendix 11.1**), at the Site Access / Cliff Hollins Lane, Cliff Hollins Lane / Mill Carr Hill Road, and Mill Carr Hill Road / Bradford Road junctions.

11.60 As part of the operational assessments, highway capacity driver delay is considered. It was shown at all of the above junctions, with the addition of development traffic to the network, that the junctions are anticipated to continue to operate within capacity, therefore resulting in minimal driver delay. A summary of the junction operational assessments is provided in **Tablexx**, including details of the predicted overall operation and queue lengths.

Table 11.9: Operational Assessment Summary (Including Development Traffic)

Junction	2016		2021	
	AM	PM	AM	PM
	Capacity (Queue)	Capacity (Queue)	Capacity (Queue)	Capacity (Queue)
Site Access / Cliff Hollins Lane	✓ (0)	✓ (0)	✓ (0)	✓ (0)
Cliff Hollins Lane / Mill Carr Hill Rd	✓ (2)	✓ (0)	✓ (2)	✓ (0)
Mill Carr Hill Rd / Bradford Rd	Only 2021 Design Year Assessed	Only 2021 Design Year Assessed	It should be noted that there would be increased queuing compared with existing conditions due to the introduction of a pedestrian crossing on the northern arm of Bradford Road.	

Table 11.10: Key to Operational Assessment Terms

Reference	
Under Capacity	✓
Over Capacity	✗

11.61 It is noted that the AM peak hour for development traffic coincides with the observed hours of school drop off at the school on Mill Carr Hill Road, but the development PM peak hour does not coincide with school pick up times.

11.62 Based on the increase in traffic, the predicted effect will be Moderate Adverse.

Pedestrian Delay

11.63 Pedestrian delay is affected by changes in traffic volume, HGV movements and traffic speed. Pedestrian delay also depends on the existing level of pedestrian activity, visibility and current infrastructure provision. There is no threshold on which pedestrian delay is assessed.

11.64 The IEMA guidelines indicate that a lower threshold for pedestrian delay could occur when a two way threshold of 1,400 vehicles per hour were present on the network. On Cliff Hollins Lane and Mill Carr Hill Road the peak hour traffic will be below this level with the addition of development traffic to the network.

11.65 It is considered that although Mill Carr Hill Road has a very high sensitivity rating, therefore the pedestrian delay effect would be Moderate Adverse.

Pedestrian Amenity

11.66 Pedestrian amenity can be affected by traffic volumes and the distance between pedestrians on a footway and passing traffic. However, the existing links that have been identified, Cliff Hollins Lane, Mill Carr Hill Road and Bradford Road, benefit from wide footways, that are separated from the road by grass / pebbled verges. The speed limits on these roads are 30mph.

11.67 The proposed Site Access Road has a 2m footway on the southeast side of the carriageway and a 3m pedestrian / cycle route on the northwest side.

11.68 Whilst there will be an increase in the volume of traffic, pedestrian movements in the vicinity are not likely to be significantly impacted, therefore the effect would be negligible.

Fear and Intimidation

11.69 The IEMA guidelines state that the degree of fear and intimidation experienced by pedestrians is affected by the volume of passing traffic, the proportion of HGV traffic and its proximity to pedestrians. It is noted that there are no commonly agreed thresholds for estimating levels of danger, or fear and intimidation; however parameters including average traffic flow, HGV traffic flow and average speed can be used as indicators.

11.70 It is considered that, due to the increase in HGV movements on the network in the vicinity of the site, there may be a minor level of fear and intimidation. Despite this, the IMEA guidelines state that where verges are present between the carriageway and footways this can reduce the levels of fear and intimidation felt by pedestrians. The effect would therefore be negligible.

Road Safety

11.71 The IEMA guidelines state that road accidents are attributable to a variety of local factors and as such do not provide a threshold to determine significance but relies more on the assessor to use their own judgement.

11.72 Analysis of accident data for the most recent five-year period has established that the majority of accidents occurred as a result of driver error and lack of awareness of other road users, rather than highway design issues. Due to the additional vehicles attributed to the development, the potential for future accidents could increase, which when combined with the fact that a school lies nearby, the effect is Moderate Adverse.

11.73 The following information in **Table 11xx** summarises the pre-mitigation effects describes above.

Table 11.11: Significant Environmental Effects (pre-mitigation)

Nature of Effect	Impact Area	Period	Significance of Effect
Severance	Local / Neighbourhood	Permanent	Moderate Adverse
Driver Delay	Local / Neighbourhood	Permanent	Moderate Adverse
Pedestrian Delay	Local / Neighbourhood	Permanent	Moderate Adverse
Pedestrian Amenity	Local / Neighbourhood	Permanent	Negligible
Fear and Intimidation	Local / Neighbourhood	Permanent	Negligible
Road Safety	Local / Neighbourhood	Permanent	Moderate Adverse

Scope of mitigation

11.74 The key objective of mitigation is to avoid, offset or reduce the significant adverse effects of the development. The information in **Table 11xx** sets out the mitigation embedded within the scheme, **Table 11xx** outlines the construction phase mitigation and **Table 11xx** outlines the operational phase mitigation, which seeks to address any significant effects generated by the scheme.

Table 11.12: Embedded Designed Mitigation Measures

Category	Mitigation Measure	Description
Design	Dedicated School Parking Area	In order to reduce the impact of the school drop off / pick up, it is proposed that a dedicated car park will be provided opposite to the school accessed from Mill Carr Hill Road.

Table 11.13: Construction Phase Mitigation Measures

Reference	Category	Mitigation Measure	Description
CM1	Demolition and Construction Management	Contractor Management	Management of the demolition and construction works will be delivered through the appointed contractor.
CM2	Construction Traffic	Management of construction vehicles	Develop a Construction Traffic Management Plan (CTMP) to manage construction vehicles arriving / departing the site. This would require agreement with the contractor and Local Highway Authority prior to construction, however measures could include management of delivery times, wheel wash facilities and close liaison with local residents.

Table 11.14: Operational Phase Mitigation Measures

Reference	Category	Mitigation Measure	Description
OM1	Offsite Highway Works	Improvement to junction of Cliff Hollins Lane / Mill Carr Hill Road	As a result of the addition of the Proposed Development traffic, particularly the HGVs associated with the site, appropriate mitigation has been proposed in order to allow two HGVs to pass towards / away from the site at the junction. Preliminary drawing **60345322-002** indicates highway mitigation which is included in the TA within Appendix A, Technical Appendix 11.2. These works would be required to be delivered through a Section 278 agreement.
OM2	Offsite Highway Works	Improvement to junction of Bradford	Introduction of a pedestrian crossing on Bradford Road to improve the accessibility of the site to the west.

		Road / Mill Carr Hill Road	Preliminary drawing **60345322-003** indicates this improvement. These works would be required to be delivered through a Section 278 agreement.
OM3	Operational Management	Travel Plan for the main development	The development is subject to the implementation of a TP, which will contribute to the overall accessibility of the site. It will further the aims and objectives of both Central and Local Government Sustainable Transport Policies by promoting the use of alternative modes of transport and hence reducing the need for travel by private car. The TP seeks to achieve a modal shift from private to public transport and is envisaged to result in fewer private car journeys. Ref Technical Appendix 11.3
OM4	Design	Internal Network Design	As outlined in the TA, the internal site layout has been designed upon Manual for Streets (MfS) principles and so far as possible, designed to accommodate the movements of pedestrians and cyclists.

Residual effect assessment

11.75 The section provides a summary of the residual impacts remaining after mitigation and a summary of the cumulative effects as relevant. The significant residual environmental effects resulting from traffic generation associated with the proposed development are assessed in **Table 11xx**. The reduction in significance of effects, pre and post mitigation, are also shown along with reference to the particular mitigation measure that results in the reduction.

Table 11.15: Summary of Residual Significant Environmental Effects (pre and post mitigation)

Nature of Effect	Impact Area	Period	Significance of Effect (Pre-Mitigation)	Significance of Effect (Post-Mitigation)	Mitigation Measure
Severance	Local / Neighbourhood	Permanent	Moderate Adverse	Negligible	OM1, OM2, OM3
Driver Delay	Local / Neighbourhood	Permanent	Moderate Adverse	Minor Adverse	OM1, OM2, OM3, OM4

Nature of Effect	Impact Area	Period	Significance of Effect (Pre-Mitigation)	Significance of Effect (Post-Mitigation)	Mitigation Measure
Pedestrian Delay	Local / Neighbourhood	Permanent	Moderate Adverse	Minor Beneficial	OM1, OM2, OM4
Pedestrian Amenity	Local / Neighbourhood	Permanent	Negligible	Negligible	OM1, OM2, OM4
Fear and Intimidation	Local / Neighbourhood	Permanent	Negligible	Negligible	OM1, OM2
Road Safety	Local / Neighbourhood	Permanent	Moderate Adverse	Negligible	CM2, OM1, OM2, OM4

11.76 There are not expected to be cumulative effects relating to transportation, primarly due to the fact that no committed developments have been considered as part of the assessment. Monitoring of the development traffic will be undertaken within the Travel Plan.

11.77 As confirmed in the methodology section, only the effects shown in the previous table are considered significant. Therefore, there are no significant transportation effects expected as part of the development.

REFERENCES

11.1 The National Planning Policy Framework (NPPF), March 2012

11.2 West Yorkshire Local Transport Plan 2011-2026

11.3 Kirklees UDP (Saved Policies)

11.4 Kirklees emerging Local Plan

11.5 Bradford Replacement Unitary Development Plan (RUDP).- Saved Policies (2005)

11.6 Bradford MDC Emerging Core Strategy

11.7 IEMA EIA Guidelines

12. Noise and Vibration

Purpose of the assessment

12.1 This Chapter of the ES assesses the likely significant impacts of the Proposed Development with respect to noise and vibration. It describes the methods used to assess the impacts; the baseline conditions currently experienced at the application site and in the surrounding area; likely future conditions; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these tried and tested measures have been adopted.

12.2 This Environmental Statement (ES) Chapter has been prepared AECOM acoustics team. AECOM has been appointed to carry out a noise and vibration assessment to support the planning application for the Proposed Development. This Chapter should be read in conjunction with the accompanying **Technical Appendices 12.1 and 12.2.**

Legislative framework

National Policy

12.3 The National Planning Policy Framework (NPPF) (0) was published on 27 March 2012 and replaced the previous Planning Policy Statements (PPS) including Planning Policy Guidance 24 Planning and Noise (PPG 24) (0). The National Planning Policy Framework advises that:

- Paragraph 109: "The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."

- Paragraph 123: "Planning policies and decisions should aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development; mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions; recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and, identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

12.4 Also of relevance is the Noise Policy Statement for England (NPSE) (0). This document sets out a strategic vision for the management of noise issues. Two key policies are:

- Policy 1.2: "The Government recognises that the effective management of noise requires a co-ordinated and long term approach that encompasses many aspects of modern society."
- Policy 1.3: "The aim of this document is to provide clarity regarding current policies and practices to enable noise management decisions to be made within

the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion."

12.5 NPSE describes the following levels at which noise impacts may be identified:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

12.6 In defining the SOAEL, NPSE states the following:

- Paragraph 2.22: "It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

12.7 The Planning Practice Guidance: Noise (PPGN) (0) was updated on 6th March 2014 and references both the NPPF and NPSE. It defines when noise is relevant to planning stating: "*Noise needs to be considered when new developments may create additional noise...*" and provides guidance for determining noise impacts.

Local Policy

12.8 Kirklees Council is currently development their Local Plan which is expected to be adopted in late 2017. While the Local Plan is being developed, the Council will continue to have regard to the remaining saved policies from the Kirklees Unitary Development Plan (2007) (0):

- Policy BE1: "All development should be of good quality design such that it contributes to a built environment which: (iv) Promotes a healthy environment, including space and landscaping about buildings and avoidance of exposure to excessive noise or pollution."
- Policy EP4: "Proposals for noise sensitive development in proximity to existing sources of noise, or for noise generating uses of land close to existing noise sensitive development, will be considered taking into account the effects of existing or projected noise levels on the occupiers of the existing or proposed noise sensitive development."
- Policy EP6: "Existing and projected noise levels will be taken into account in considering applications for developments which are, or have potential to be,

noise generators. Predictions of corrected noise levels at the boundaries of the application site should be submitted with the application."

- Saved Policy EP30: "Planning permission for development proposals which involve prolonged construction work will normally be subject to conditions:. (i) Requiring details of the location of contractors' compounds to be agreed before development commences where development is near existing noise sensitive uses."

12.9 Part of the Application Site lies in the Bradford District, the RUDP (2005) saved policies relating to noise include:

- Policy UR3 development will not be permitted where it has an adverse effect on the surrounding area or occupants of adjoining land
- Policy P7 where development will result in unacceptable noise effects developers will be required to provide mitigation measures, where the noise effect cannot be mitigated planning permission will be refused.

12.10 BMDC is due to adopt its Core Strategy by the end of 2016. The Publication Draft (2014) includes policy EN8 (Pollution). That part of the policy relating to nuisance, including noise, is not subject to Main Modifications (2015). Policy EN8 requires that developers to identify potential noise impacts and address any effects on the development from existing uses.

Assessment methodology

Methodology

Perception of Noise

12.11 Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure (measured in pascals, Pa). Because of this wide range a noise level scale based on logarithms is used in noise measurement called the decibel (dB) scale. Audibility of sound covers a range of approximately 0 to 140 dB.

12.12 The human auditory system does not respond uniformly to sound across the detectable frequency range and consequently instrumentation used to measure noise is weighted to represent the performance of the ear. This is known as the 'A weighting' and annotated as dB(A).

12.13 **Table 12.1** lists the sound pressure level in dB(A) for common situations.

Table 12.1: Noise Levels for Common Situations

Noise Level dB(A)	Example
0	Threshold of hearing
30	Rural area at night, still air
40	Public library

Noise Level dB(A)	Example
50	Quiet office (no machinery)
60	Normal conversation
70	Passenger car (60 km/h at 7m distance)
80	General factory noise level
90	Pneumatic drill (unsilenced); 7m distance
120	Threshold of pain

Note: All values are A-weighted sound pressure levels in dB re 20 µPa

12.14 The noise index $L_{A90,T}$ is widely used for assessing background noise levels. This describes the noise level exceeded for 90% of the measurement period, T, and generally reflects the noise level in the lulls between individual noise events. Over a 1-hour period, the $L_{A90,1h}$ will be the noise level exceeded for a total of 54 minutes during that period.

12.15 In the UK the noise index traditionally used to assess the impacts of road traffic noise is the $L_{A10,18h}$. This is the arithmetic average of the 18-one hourly noise indices $L_{A10,1h}$, i.e. the arithmetic average of the noise level exceeded for 10% of each hourly period from 06:00 to 24:00.

12.16 The average or ambient noise at a location during a specific period is usually measured using the equivalent continuous A-weighted sound pressure level, L_{Aeq}, (as recommended by BS 7445-1 'Description and measurement of environmental noise. Part 1: Guide to quantities and procedures'). This is a single number that represents the sound energy measured over a given time period, T. The $L_{Aeq,T}$ is the sound level of a notionally steady sound, having the same energy as a fluctuating sound over a specified measurement period, T. It is commonly used to express the energy level from individual sources that vary in level over their operational cycle.

12.17 The $L_{Amax,FAST,T}$ measurement parameter is the maximum instantaneous sound pressure level attained during the measurement period T, measured on the 'FAST' response setting of the sound level meter. It is generally used to assess the likelihood of night-time sleep disturbance.

12.18 Human subjects, under laboratory conditions, are generally capable of noticing changes in steady levels of about 1 dB(A) or more. It is generally accepted that a change of 10 dB(A) in an overall, steady noise level is perceived to the human ear as a doubling (or halving) of the noise level. (These findings do not necessarily apply to transient, non-steady or intermittent noise sources).

Ambient Noise Affecting the Proposed Residential Zone

12.19 British Standard (BS) 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (0) gives recommendations for the control of noise in and around buildings, and suggests appropriate criteria and limits for indoor ambient noise levels for different

situations. The relevant criteria applicable to proposed residential situations is provided in Table 4 of BS 8233 and reproduced in **Table 12.2** below.

Table 12.2: Indoor Ambient Noise Levels for Dwellings When They Are Unoccupied

Activity	Location	07:00-23:00 hours	23:00-07:00 hours
Resting	Living Room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$ 45 dB L_{Amax}

12.20 Note noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low frequency content, in which case lower noise limits might be appropriate.

12.21 Note that the 2014 version of BS 8233 no longer provides maximum internal noise criteria for dwellings. The 45 dB L_{Amax} criterion is based on guidance from the WHO 'Guidelines for Community Noise' (1999) (0). For night-time noise sources the WHO guidelines provide a precautionary night-time (23.00-07.00) noise level of 45 dB $L_{Aeq,8h}$ 'outside bedroom windows' (for a reasonably steady noise source) and on a sleep disturbance basis (for intermittent or impulse noise) the guidelines state that: *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night.'*

Ambient Vibration Affecting the Proposed Residential Zone

12.22 The assessment of vibration affecting humans in buildings has considered the Vibration Dose Value (VDV) levels in $m/s^{1.75}$ following guidance from BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting' (0). VDV levels take into account both the level and duration of vibration events, allowing both continuous and intermittent vibration events to be accounted for.

12.23 **Table 12.3** sets out the criteria values given in BS 6472 for the effects of vibration on occupants of office spaces.

Table 12.3: VDV Ranges Which Might Result in Adverse Comment within Offices

Place and time	Low probability of adverse comment $m/s^{1.75}$	Adverse comment possible $m/s^{1.75}$	Adverse comment probable $m/s^{1.75}$
Residential 16-hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential 8-hour	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

night

Construction Works Noise

12.24 Construction noise is regulated by guidelines and subject to local authority control. Advice is provided by BS 5228 'Noise and vibration control on construction and open sites' and whilst there is a 2009 version of the standard (with amendments, 2014), the 1997 version has statutory status by way of section 60, part 4 of the Control of Pollution Act 1974 (0).

12.25 BS 5228-1:2009+A1:2014 (Part 1: Noise) (0) provides practical information on construction noise reduction measures, and promotes a 'Best Practice Means' approach to noise control. The calculation method provided in BS 5228-1 is based on the number and types of equipment operating, their associated sound levels, operational times, and the distance to receptors, together with the effects of any screening.

12.26 Annex E of BS 5228-1 provides example criteria for the assessment of potential significance of construction noise effects. 'Example Method 1 – The ABC Method' has been adopted for the purposes of this assessment and the methodology is outlined in **Table 12.4**.

Table 12.4: BS 5228-1 ABC Method

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,\ T}$)		
	Category A [A)]	Category B [B)]	Category C [C)]
Night-time (23.00–07.00)	45	50	55
Evenings and weekends [D)]	55	60	65
Daytime (07.00–19.00) and Saturdays (07.00–13.00)	65	70	75

NOTE 1 A potential significant effect is indicated if the $L_{Aeq,\ T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,\ T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3 Applied to residential receptors only.

[A)] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

[B)] Category B: threshold values to use when ambient noise levels (when rounded to

the nearest 5 dB) are the same as category A values.

[C)] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

[D)] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

Construction Works Vibration

12.27 Vibration generated from construction activities has the potential to impact on adjacent buildings. The criteria used in this assessment relate to the potential for cosmetic damage, not structural damage. The principal concern is generally transient vibration due to piling. The likelihood of effect depends on the piling method, the distance to the closest building and the ground conditions. Cosmetic damage has the greatest potential to occur within the first 20 metres of piling activities; at greater distances damage is less likely to occur. Likely levels of vibration at given distances can be estimated from existing piling vibration data, as provided in BS 5228-2 (Part 2: Vibration).

12.28 Recommended Peak Particle Velocity (PPV) vibration limits for transient excitation for different types of buildings are provided in BS5228-2 and presented in **Table 12.5**. Where vibration experienced at structures do not exceed the values shown, this would be considered to be a non-significant effect. Where construction vibration exceeds the criteria, cosmetic damage to buildings is considered to be likely and the effect would be significant with no further scale.

Table 12.5: PPV Limits for Cosmetic Damage to Structures

Type of Building	Peak PPV in Frequency Range of 4 Hz to 15 Hz	Peak PPV in Frequency Range of 15 Hz and Above
Reinforced or framed structures	50 mm/s at 4 Hz and above	
Industrial and heavy commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz.	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

12.29 **Table 12.6** details PPV levels and their potential effects on humans as per BS5228-2. This provides a simple method of determining annoyance associated with vibration. A semantic scale for determining the magnitude of effects has also been provided.

Table 12.6: PPV Limits for Human Response to Vibration

PPV Level	Impact	Magnitude of Effect
0.14 to < 0.3 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible
0.3 to < 1	Vibration might be just perceptible in residential	Minor Adverse

PPV Level	Impact	Magnitude of Effect
mm/s	environments.	
1.0 to <10 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	Moderate Adverse
>=10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major Adverse

Building Services, Site Activity and Fixed Plant Noise

12.30 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' (0) provides guidance as to the likely community response to new fixed noise sources (e.g. building plant or services) affecting NSRs. Note that the 2014 version of BS 4142 came into effect in October 2014 and has superseded the previous 1997 version of BS 4142.

12.31 BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The method compares the 'rating level' with the 'background noise level'.

- The 'rating level' is the specific noise level due to the noise source under investigation plus an adjustment for any features of the character of the noise that would be likely to increase its impact.
- The 'background noise level' is the L_{A90} value (noise level exceeded for 90% of the time) measured at the receptor, in the absence of the specific noise.

(a) The rating method detailed within this standard is widely accepted by Local Authorities as a means of assessing building plant noise and represents nationally accepted guidance. BS4142 requires separate analysis for day and night time periods. BS4142 states the following regarding the assessment of impacts, comparing the 'rating level' of the new noise source with the existing 'background noise level':

(b) "Typically, the greater this difference, the greater the magnitude of the impact.

(c) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

(d) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

(e) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

12.32 **Table 12.7** presents a semantic scale for the evaluation of the magnitude of effect for building services and plant noise.

Table 12.7: Semantic Scale for the Evaluation of Effects from Building Services and Plant Noise

Difference between Rating Level and Background Level	Magnitude of Effect
-10 dB(A) or less	No change
-10 dB(A) to 0 dB(A)	Negligible
0 dB(A) to +5 dB(A)	Minor Adverse
+5 dB(A) to +10 dB(A)	Moderate Adverse
+10 dB(A) or more	Major Adverse

Operational Traffic Noise

12.33 Changes in road traffic noise as a result of additional traffic associated with the development has been assessed by considering the increase in traffic flows following completion of the proposed scheme in line with the principles described in 'Calculation of Road Traffic Noise' (CRTN) (0) and 'Design Manual for Road and Bridges Volume 11 Section 3 Part 7' (DMRB) (0).

12.34 The criteria for the assessment of traffic noise changes arising from the proposed scheme have been taken from Table 3.1 and 3.2 of DMRB and are provided in **Table 12.8**.

Table 12.8: Operational Traffic Noise Criteria

Short Term (e.g. when a project is opened) Noise Change dB $L_{A10,18h}$	Long Term (e.g. 15 years after project opening) Noise Change dB $L_{A10,18h}$	Magnitude of Effect
0 dB	0 dB	No change
0.1 – 0.9 dB	0.1 – 2.9 dB	Negligible
1 – 2.9 dB	3 – 4.9 dB	Minor Adverse
3 – 4.9 dB	5 – 9.9 dB	Moderate Adverse
5 dB or more	10 dB or more	Major Adverse

12.35 As part of the Proposed Development, new parking provision for the Woodlands Church of England Primary School is proposed to the west of the Application Site along Mill Carr Hill Road. It is proposed that there will be 36 spaces for school drop off and pick up

parking. Currently cars dropping off at, and picking up from, the school park on the roadside.

12.36 While there is no guidance specific to the assessment of noise from car parks, noise emissions from the proposed car parks will be assessed following guidance from the WHO 'Guidelines for Community Noise' which advises noise threshold values of 50 to 55 dB L_{Aeq} during the daytime (07:00 – 23:00) and 60 dB L_{Amax} during the night-time (23:00 – 07:00).

12.37 The impact of noise from car parks can include noise generated by vehicles access the parking area, approaching a parking bay, door slamming and vehicles leaving. Based on Sound Exposure Levels/Single Event Levels (L_{AE}) for a car arriving/departing and door slams, measured previously by AECOM at another car park facility, it has been possible to predict the potential noise levels from the car park. An L_{AE} value represents the L_{Aeq} of a given activity corrected to a time of 1 second and is the noise level that will be produced if the acoustic energy of a given event was released in one second. This can be used to calculate the L_{Aeq} resulting from a number of discrete events over a longer period. Although it is expected that the car park is only used for school drop offs, access won't be restricted, therefore for car parking activities which may occur before 07:00 hours and after 23:00 hours the L_{Amax} from door slams has also been considered at the closest car parking spaces to the NSR.

Sensitivity of Receptors

12.38 In accordance with EIA assessment methodology, the significance of noise effects is determined by consideration of both magnitude and sensitivity of the NSR. The criteria used to classify the sensitivity of receptors are defined in **Table 12.9**.

Table 12.9: Criteria used to Define Noise Sensitive Receptors

Sensitivity	Description	Examples of Receptor Usage
High	Receptors where people or operations are particularly susceptible to noise. Sensitive ecological receptors known to be vulnerable to the effects of noise.	Residential Quiet outdoor areas used for recreation Conference facilities Auditoria/studios Schools in daytime Hospitals/residential care homes Ecologically sensitive areas for example Special Protection Areas (SPAs)
Medium	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance	Offices Restaurants Sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf)

		Residences and other buildings not occupied during working hours.
Low	Receptors where distraction or disturbance from noise is minimal	Factories and working environments with existing high noise levels.
		Sports grounds when spectator or noise is a normal part of the event

Study Area

12.39 For the purposes of this assessment, the following NSRs have been considered:

- Residential properties along Cliff Hollins Lane (high sensitivity), approximately 200m north of the Application Site boundary;
- Residential properties along Bradford Road (high sensitivity), approximately 100m west of the Application Site boundary on the opposite side of the M606 motorway; and
- Future occupants of the proposed residential zone (high sensitivity), located within the Application Site boundary.

Surveys

12.40 A baseline noise survey was originally undertaken in March/April 2014 to support an outline planning application for a masterplan comprised of warehouse units with associated business and light industrial uses. The masterplan has since been revised with the introduction of a residential zone; an additional baseline noise survey was undertaken in July 2015 to inform the additional assessments to support the revised application. Noise surveys have been undertaken to establish the current background noise levels at the nearest NSRs to the Application Site, as well as ambient noise levels at the proposed residential zone. Photographs of the monitoring positions are presented in **Appendix 12.1**

12.41 The survey data has been used in this assessment of the outline application, for consideration of the noise impact on current noise sensitive receptors from operational noise and to determine outline glazing/ventilation requirements for the proposed residential units.

12.42 The following monitoring equipment was used for the baseline noise surveys. Calibration certificates are presented in **Appendix 12.2.**

Table 12.10: Noise Monitoring Equipment

Survey Date	Supplier	Model	Serial Number
Daytime short term attended	Rion	NA 28 Type 1 Sound Level Meter	00570400

Survey Date	Supplier	Model	Serial Number
26/03/2014	Bruel & Kjaer	4231 Acoustic Calibrator	2326978
Night-time short term attended 09/04/2014	Norsonic	118 Type 1 Sound level Meter	31509
	Norsonic	1251 Acoustic Calibrator	27485
Long-term unattended 09/07/2015 – 10/07/2015	Norsonic	140 Type 1 Sound Level Meter	1403909
	Gras	40HL Lownoise Microphone System	123948
	Norsonic	1251 Acoustic Calibrator	34393

12.43 The noise monitoring was undertaken following the principles of BS 7445-1:2003 'Description and Measurement of Environmental Noise. — Part 1: Guide to quantities and procedures' (0) and BS 4142:2014.

12.44 The calibration of the equipment was checked before and after each set of measurements and there was no drift in calibration levels.

12.45 Attended daytime measurements were conducted on 26th March 2014. Night-time measurements were conducted on 9th April 2014. A long-term unattended measurement was undertaken from 12:25 hours on 9th July 2015 to 11:00 hours on 10th July 2015.

12.46 The attended measurements were undertaken at positions representative of nearby existing NSRs (i.e. residential properties along Cliff Hollins Lane and Bradford Road). The unattended noise monitoring was undertaken on the Application Site boundary along Cliff Hollins Lane, considered to be representative of ambient noise levels at the proposed residential zone.

12.47 Measurements were conducted with the microphone positioned at a height of 1.2m from local ground level. Measurements were taken under free-field conditions (i.e. to minimise the influence of reflections, the survey locations were at a minimum of 3.5 metres from any reflecting surface, other than the ground).

12.48 The baseline surveys comprised of various A-weighted sound level indicators including the equivalent continuous noise level (L_{Aeq}), maximum (L_{Amax}), and statistical indices (L_{A90} and L_{A10}).

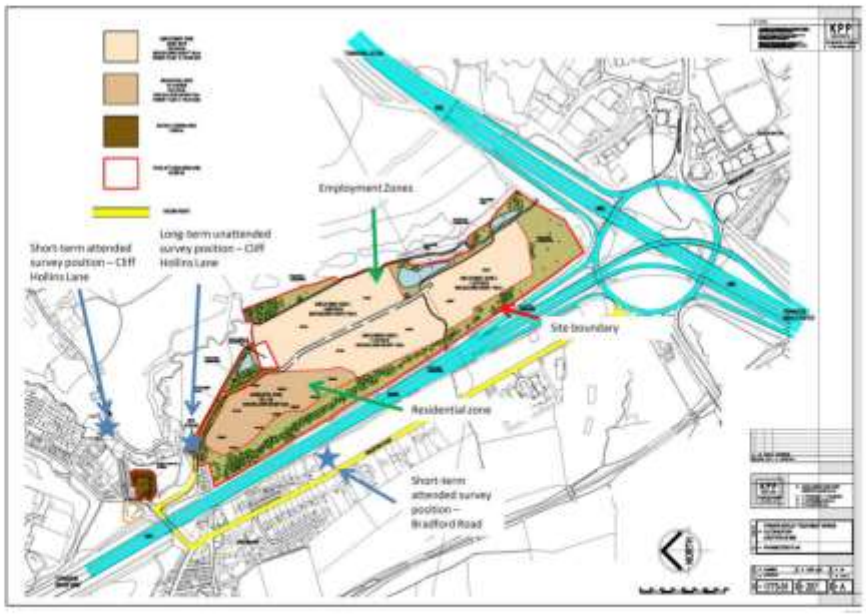
12.49 Measurement durations (T) during the attended daytime survey on 26th March 2014 were 45 minutes. Measurement durations (T) during the attended night-time survey on 9th April 2014 were 30 minutes. Measurement durations (T) during the long-term

unattended survey on 9th to 10th July 2015 consisted of continuous 15 minute duration samples.

12.50 Weather conditions during the monitoring surveys were conducive to environmental noise measurements as per guidance in BS7445 and BS4142 (i.e. wind speeds less than 5 m/s and no precipitation).

12.51 Figure 12.1 presents the Application Site location and noise monitoring positions.

Figure 12.1: Application Site Location and Noise Monitoring Locations



Consultation

12.52 AECOM has sought consultation with Kirklees Council regarding any relevant noise and vibration criteria and had been referred to Kirklees Council's 'Noise Design Advice' document (May 2007) (0) which sets out the Council's environmental noise criteria for various development types.

12.53 For 'new industrial or commercial use near to residential use' the Council's Noise Design Advice document advises that the rating level (as defined by BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' which is discussed in further detail below) of operational noise emissions should be designed to be 5 dB below background levels during both daytime and night-time periods. It is understood that this may also apply to industrial/commercial noise from the proposed office and employment uses which may affect the proposed residential zone.

12.54 The Council's Noise Design Advice document also provides internal ambient noise criteria for residential dwellings; these are in line with the requirements of BS 8233:2014 which is discussed in further detail below.

12.55 It is understood that these further recommendations may also apply to industrial/commercial noise from the proposed office and employment uses which may affect the proposed residential zone.

Significance Criteria

12.56 By combining the sensitivity of receptor with the predicted magnitude of change, the significance of effect can be determined, which can be either beneficial or adverse. The significance matrix is presented in **Table 12.11**. The italicised cells indicate a level of significance where mitigation should be considered for adverse impacts. For example, where an increase in noise level of 3 dB(A) or more is expected at residential properties, it is recommended that mitigation should be considered. On this basis, moderate or above is considered to be significant.

Table 12.11: Significance of Noise and Vibration Effects

Sensitivity of Receptor	Magnitude of Effect				
	Major	Moderate	Minor	Negligible	No changes
High	***Substantial***	***Substantial***	***Moderate***	Negligible	Neutral
Medium	***Substantial***	***Moderate***	Minor	Negligible	Neutral
Low	***Moderate***	Minor	Negligible	Neutral	Neutral

Assumptions and Limitations

12.57 As detailed information about the construction programme and methods of working are not currently available, a qualitative construction noise assessment has been undertaken.

12.58 The end users of the employment areas are not known, however it has been assumed that there will be some HGV movements and reversing alarms within the development site. The number of HGVs and Other Goods Vehicles (OGVs) have been taken from the transport assessment. For a conservative assessment it has been assumed that the sound power level of the HGVs and OGVs is the same. For the assessment a sound power of L_{wA} 99dB has been used for HGV/OGV and maximum sound power level L_{wA} 105 dB for reversing alarms.

12.59 At this stage of the development, there is no specific information available related to fixed mechanical plant at the site. Therefore the specific noise impacts associated with these noise sources should be addressed at a later stage in the planning process when more detailed information is available. However, as a part of this assessment, noise limits have been determined based upon criteria agreed by Kirklees Council. These

noise limits will need to be taken into consideration when choosing and specifying individual items of plant to ensure that they will not result in an unacceptable adverse impact at noise sensitive receptors.

12.60 For the car park assessment it has been assumed that 36 cars will arrive and depart within a 30 minute period.

Baseline Conditions

12.61 The Proposed Development is located on the Former Bierley Treatment Works, Cleckheaton. The M606 motorway is located to the west of the Application Site, and the M62 motorway is located to the south-east of the Application Site.

12.62 The nearest NSRs are residential dwellings and schools along Bradford Road to the west of the Application Site, and along Mill Carr Hill Road/Cliff Hollins Lane to the north of the Application Site.

12.63 There are additional NSRs on the opposite side of the M62 to the east, however it is considered for the purposes of this assessment that road traffic noise from the M62 will mask operational noise emissions from the Application Site such that they are indistinguishable from the existing levels of ambient noise.

12.64 During both attended surveys, the dominant source of noise affecting the Application Site was observed to be road traffic noise from the M606 motorway, as well as road traffic noise on the M62 roundabout to the south of Application Site. At the Bradford Road monitoring location, traffic volumes were noted to comprise of lorries, vans and cars. Traffic flows tended to be bunched together due to the signalised M62 junction roundabout and traffic lights on the Oakenshaw junction. Additional noise sources included occasional aircraft flyovers.

12.65 No noticeable levels of ambient vibration were observed by the attending acoustic consultant during the site visits. As such, the effect of ambient vibration is considered to be **Negligible**.

12.66 A summary of the attended baseline measured noise levels monitored during March/April 2014 are presented in **Table 12.12** and **Table 12.13**. Note that all values are in dB re. 20µPa, free-field, fast time-weighting.

Table 12.12: Summary of Attended Noise Monitoring, Daytime

Location	Date	Start Time (hh:mm)	Duration, T	Measured Sound Levels (dB)			
				$L_{Aeq(T)}$	L_{Amax}	$L_{A10(T)}$	$L_{A90(T)}$
Bradford Road	26/03/2014	14:47	0h 45min	74.5	89.1	76.3	69.4
Cliff Hollins Lane	26/03/2014	15:57	0h 45min	62.3	78.9	63.4	52.7

Table 12.13: Summary of Attended Noise Monitoring, Night time

Location	Date	Start Time (hh:mm)	Duration, T	Measured Sound Levels (dB)			
				$L_{Aeq(T)}$	L_{Amax}	$L_{A10(T)}$	$L_{A90(T)}$
Bradford Road	09/04/2014	01:38	0h 30min	65.6	85.8	63.4	47.7
Cliff Hollins Lane	09/04/2014	00:57	0h 30min	55.9	67.6	57.7	48.7

12.67 The results of the unattended noise survey during July 2015 are presented in Figure 12.2 and in **Table 12.14**. Note that all values are in dB re. 20µPa, free-field, fast time-weighting. Figure 12.2 shows that there are 2 'spikes' in the L_{Aeq} values due to some Ad Hoc L_{max} levels.

Figure 12.2: Chart of Unattended Noise Monitoring Results

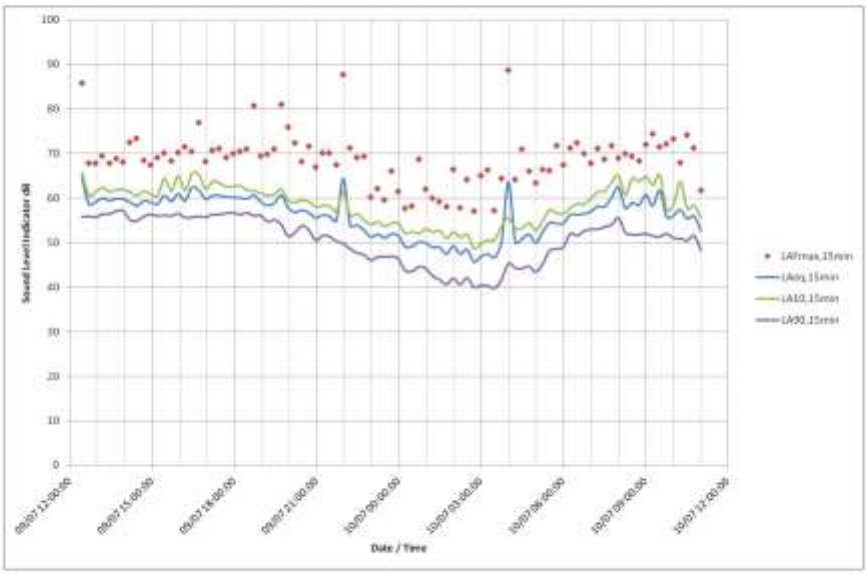


Table 12.14: Summary of Unattended Noise Monitoring

Location	Date	Start Time (hh:mm)	Duration - T	Measured Sound Level (dB)			
				$L_{Aeq(T)}$	L_{Amax}	$L_{A10(T)}$	$L_{A90(T)}$
Western Application Site boundary along Cliff Hollins Lane	09/07/2015	12:25	10h 35min	59.6	76.7	61.0	49.9
	09 – 10/07/2015	23:00	8h 0min	53.6	71.3	53.8	40.4
	10/07/2015	07:00	11h 0min	58.7	73.8	61.6	50.7

Note: The average L_{Aeq} and L_{A10} levels were determined from the logarithmic average of the continuous 15-minute measurements. The representative lowest background L_{A90} level was determined from the 10th percentile of the continuous 15-minute measurements. The representative typical highest maximum L_{Amax} level was determined from the 90th percentile of the continuous 15-minute measurements.

12.68 Based on the survey results presented in **Table 12.14**, external noise levels at the western boundary of the proposed residential zone were measured as 59 to 60 dB $L_{Aeq,T}$ during the daytime and 54 dB $L_{Aeq,T}$ / 71 dB L_{Amax} during the night-time. For dwellings towards the centre of the proposed residential zone, the introduction of building massing will result in reductions of noise levels due to screening. The level of noise at facades of proposed residential units will be dependent on their proximity to existing noise sources (e.g. surrounding roads) and future noise sources (e.g. the proposed office and warehouse facilities). Actual noise levels at building facades across the Application Site will be dependent on their location and orientation.

Predicted significant effects

Effect during demolition and construction phase: short to medium term

Construction Works Noise

12.69 Following the BS 5228-1 ABC Method criteria, threshold values for significant noise effects at the NSR locations have been derived from the survey results. It has been assumed that construction works would only take place during daytime hours on weekdays and Saturdays as per typical Kirklees Council requirements. No evening or night-time works have been assessed. The ABC Method threshold values during daytime periods have been summarised in **Table 12.15**.

Table 12.15: BS 5228-1 ABC Method Threshold Values (Daytime)

Location	BS 5228-1 ABC Method Threshold Values			
	Measured Ambient Daytime Level L_{Aeq}	Ambient Level L_{Aeq} Rounded to Nearest 5 dB	ABC Category	Threshold Value
Dwellings along Bradford Road	75	75	C	75
Dwellings along Mill Carr Hill Road/Cliff Hollins Lane	62	60	A	65

12.70 A significant effect has been deemed to occur if construction works noise levels exceeds the threshold level for the Category appropriate to the ambient noise level. Where construction noise levels are deemed to have a significant effect then where possible the appointed contractor shall adopt measures to reduce noise levels at source of through appropriate mitigation.

12.71 In the absence of detailed information on construction programming and methods of working, the temporary construction noise effects have been assessed qualitatively and advice on construction noise effects has been provided.

12.72 Construction work of any type that involves heavy plant activity will generate noise, which may result in complaints if sensitive scheduling and control of works is not exercised. The noise levels generated by construction activities and experienced by nearby sensitive receptors, such as residential properties, depends upon a number of variables, the most significant of which are:

- The noise generated by plant or equipment used on site, generally expressed as sound power levels (Lw);
- The periods of operation of the plant on the site, known as its 'on-time';
- The distance between the noise source and the receptor; and
- The attenuation of sound due to ground absorption, air absorption and barrier effects.

12.73 In order to evaluate noise effects during the construction phase it is necessary to have knowledge of the various activities that will be undertaken. Site preparation and construction contractors may use different working methods and plant to achieve the same ends. An accurate construction noise and vibration impact assessment is not normally possible until appointment of the approved contractor with knowledge of the exact working routine and plant schedule.

12.74 However, during the construction phase the use of plant, and the likely noise impact thereof, should be determined following the guidance detailed in BS 5228 and, where necessary, mitigation should be provided. Moreover, should complaints be received from local residents, the Local Authority would determine whether the best practicable means is being applied. Should this not be the case, action under the Control of Pollution Act 1974 may be taken. Therefore, best practicable means will need to be employed to ensure that noise levels are minimised.

12.75 Clearly noise levels will vary at the nearest NSRs depending on the location of the construction plant and the construction phase. It is considered that noise impacts are likely to be greatest during the early stages of construction in particularly ground works when heavier plant is likely to be used. In practice, construction noise levels and resulting impacts are likely to vary during the different construction phases of the project depending upon the location of work sites and proximity of receptors. Furthermore, best practicable means of mitigation will further assist in minimising construction noise effects.

12.76 The nature of construction work means that a worst-case scenario with the plant working at closest approach may exist for only a matter of days or even hours and there would be regular periods, even during the course of a single day, when the assumed noisy plant would not be in operation during breaks or changes of working routine. However, until the contractor is appointed and the actual (rather than assumed) method of working is specified, detailed recommendations to reduce the predicted worst-case construction noise to the closest residential and other noise sensitive buildings cannot be formulated. The matter can be reserved for management and control as necessary via a Construction Environmental Management Plan (CEMP) or if necessary, a Section 61 Control of Pollution Act 1974 agreement. However the construction noise has been assessed without this mitigation in place.

Construction Noise

12.77 Based on the distances between the Application Site and existing NSRs (residential properties along Cliff Hollins Lane approximately 200m north of the Application Site boundary, and residential properties along Bradford Road approximately 100m west of the Application Site boundary on the opposite side of the M62 motorway) it is considered that construction works noise would not exceed the ABC threshold values presented in **Table 12.15**. As such it is considered that construction noise effects would be limited to temporary, short term effects of Negligible magnitude. For receptors of high sensitivity (e.g. residential dwellings) noise from construction works is considered to be equivalent to **Negligible** significance.

Construction Traffic Noise

12.78 Information regarding construction related traffic movements is yet to be confirmed, and site related construction vehicles and HGV movements are likely to be spread across the construction programme. It is considered that the effect will be of Negligible magnitude on trunk and main roads due to the dilution with regular traffic on these roads. Individual HGV movements, when accessing the site, have the potential to cause disturbance to nearby noise sensitive receptors along Cliff Hollins Lane. It is considered these temporary effects would be of Minor/Moderate Adverse magnitude, if

there were no restrictions on the routing and timing of vehicle movements. However routing and timings will be carefully managed and addressed within the CEMP. For receptors of high sensitivity (e.g. residential dwellings) noise from construction works traffic is considered to be equivalent to a **Negligible to Moderate/Substantial Adverse** significance.

Construction Works Vibration

12.79 BS 5228-2 makes reference to the Transport Research Laboratory (TRL) report 429 'Groundborne Vibration Caused by Mechanised Construction Works' (2000) (0). Figure 50 of the TRL report indicates that ground vibration from miscellaneous vehicle operations on construction sites (including scrapers, rollers, dumpers, breakers, dozers, HGVs) are in the region of 1mm/s at approximately 10m, decreasing to the region of 0.1 mm/s at approximately 50m. However, note that actual vibration levels from construction works are dependent on a number of factors including ground conditions, plant or vehicle size, the nature of the works, in particular piling methods, speed of HGV movements and the quality of surface of haul or other temporary roads.

12.80 Based on the separation distance between the proposed construction works areas and the locations of existing residential NSRs, it is considered that vibration from construction vehicles experienced at existing residential NSRs will be less than 1 mm/s and as such limited to Negligible magnitude as per the criteria in **Table 12.6**. Cosmetic damage to structures (as per the criteria in **Table 12.5**) is unlikely and as such is considered to be of Negligible magnitude.

12.81 In addition, BS 5228-2 indicates that piling activities generally only generate vibration effects when they are located less than 20 m from sensitive locations. The effect depends on the type of piling, ground conditions, and receptor distance. Based on the Application Site layout and location of existing NSRs, it is considered that vibration from any potential piling works will be of Negligible magnitude.

12.82 For receptors of high sensitivity (e.g. residential dwellings) vibration from construction works is considered to be equivalent to a Negligible significance.

Summary of construction effects (no mitigation)

12.83 **Table 12.16** summarises the potential construction effects (without mitigation) on receptors as a result of the Proposed Development.

Table 12.16 Construction Effects (without Mitigation) Assessment Summary Table

Effect	Impact Area	Phase	Significance	Period	Permanent/ Temporary	Effect
Construction works noise	Local: Nearby NSRs e.g. residential dwellings	Construction	Negligible	Short Term	Temporary	Negligible

Effect	Impact Area	Phase	Significance	Period	Permanent/ Temporary	Effect
Construction works vibration	Local: Nearby NSRs e.g. residential dwellings	Construction	Negligible	Short Term	Temporary	Negligible
Construction traffic noise	Local: Nearby NSRs e.g. residential dwellings	Construction	Negligible to Moderate/ Substantial	Short Term	Temporary	Adverse

Effect during operational phase: long term

Noise from Operational Site Activities

12.84 AECOM has predicted potential levels of noise emissions from typical site operations associated with the proposed employment uses, in order to assess the impacts of operational noise affecting nearby NSRs.

12.85 The assessments have been carried out for the following operational scenarios:

(i) HGV movements during a daytime period (between 07:00 to 23:00 hours, assessed over a 1-hour period as per BS 4142 guidance);
(ii) HGV movements during a night-time period (between 23:00 to 07:00 hours, assessed over a 15-minute period as per BS 4142 guidance); and
(iii) HGV reversing alarms during a night-time period (between 23:00 to 07:00 hours, maximum noise levels assessed against the WHO 60 dB L_{Amax} criterion).

12.86 The assumed operations comprise Heavy Goods Vehicles (HGV) movements and reversing alarms within the Application Site. It is considered that this provides a reasonable representation of likely site activities based on the development proposals. Both day and night time scenarios have been considered; based on the assumption that operations may be on a 24 hour basis. Typical sound power levels representative of the operations activities have been used for the assessment.

12.87 Sound source data (sound power levels, L_w) used to assess the operating noise from the proposed development are listed in **Table 12.17** below. These source levels are considered representative because they have been obtained from other AECOM studies for light industrial facilities/ unrestricted employment areas

Table 12.17: Sound Source Data

Sound Source	Source Height (metres)	Sound Power Level L_{wA} (dB)
HGV Movement	2	99 (average level)

HGV Reversing Alarm	4	105 (maximum level)

12.88 Site activity was calculated by assuming that there will be up to 115 Other Goods Vehicles (OGV) movements during a 24-hour period (based on the traffic data provided as part of the Transport Assessment). For the purposes of this assessment OGV and HGV sound source data has been assumed to be equivalent. This averages at approximately 5 HGV/OGV movements during a 1-hour daytime assessment period, and approximately 1 HGV/OGV movement during a 15-minute night-time assessment period.

12.89 As a worst-case, it has been assumed that each HGV movement will occur for 5 minutes in duration. For the BS4142 assessment, a sound power level L_{wA} 99 dB has been used as the source level for HGV movements.

12.90 As a conservative approach, it has been assumed that the HGV reversing alarm will occur once during a 15-minute night-time assessment period. For the maximum noise level assessment, a maximum sound power L_{wA} 105 dB has been used as the source level for HGV reverse alarms.

12.91 While actual operations and associated sound emissions are yet to be finalised, AECOM has included corrections tonal and impulsive sound characteristics following guidance from Section 9.2 'Rating level – Subjective method' of BS 4142:2014. For sound which may have tonal characteristics 'just perceptible at the noise receptor' a +2 dB correction has been applied. For sound which may have impulsive characteristics 'just perceptible at the noise receptor' a +3 dB correction has been applied.

12.92 **Tables 12.18 to 12.21** present the assessments of operational noise affecting nearby NSRs, including the proposed residential zone. **Table 12.22** presents the assessment of maximum noise levels due to HGV reversing alarms during night-time periods affecting nearby NSRs, including the proposed residential zone.

Table 12.18: BS4142 Assessment – Dwellings along Bradford Road

Assessment Scenario	Number of HGVs/OGVs	Sound Power Level L_{wA} (dB)	Total time of operation (minutes)	Time correction (dB)	Distance to Receptor (m)	Distance / Propagation Correction (dB)	Partial Attenuation by Building Screening and Land Features (dB)	Sound characteristic correction (dB)	Predicted rating level at NSR (dB)	Background level (dB L_{A90})	Difference (dB)
1-hour period, daytime	5	99	25	-4	200	-54	-10	5	36	69	-33
15-minute period, night-time	1	99	5	-5	200	-54	-10	5	35	48	-13

Table 12.19: BS4142 Assessment – Dwellings along Mill Carr Hill Road/Cliff Hollins Lane

Assessment Scenario	Number of HGVs/OGVs	Sound Power Level L_{wA} (dB)	Total time of operation (minutes)	Time correction (dB)	Distance to Receptor (m)	Distance / Propagation Correction (dB)	Partial Attenuation by Building Screening and Land Features (dB)	Sound characteristic correction (dB)	Predicted rating level at NSR (dB)	Background level (dB L_{A90})	Difference (dB)
1-hour period, daytime	5	99	25	-4	300	-58	-10	5	32	53	-21
15-minute period, night-time	1	99	5	-5	300	-58	-10	5	31	49	-18

Table 12.20: BS4142 Assessment – Proposed Residential Zone (Nearest Approach to Office/Warehouse Units, Eastern Boundary)

Assessment Scenario	Number of HGVs	Sound Power Level L_{wA} (dB)	Total time of operation (minutes)	Time correction (dB)	Distance to Receptor (m)	Distance / Propagation Correction (dB)	Partial Attenuation by Building Screening and Land Features (dB)	Sound characteristic correction (dB)	Predicted rating level at NSR (dB)	Background level (dB L_{A90})	Difference (dB)
1-hour period, daytime	5	99	25	-4	50	-42	-10	5	48	50	-2
15-minute period, night-time	1	99	5	-5	50	-42	-10	5	47	40	7

Table 12.21: BS4142 Assessment – Proposed Residential Zone (Furthest Approach to Office/Warehouse Units, Western Boundary)

Assessment Scenario	Number of HGVs	Sound Power Level L_{wA} (dB)	Total time of operation (minutes)	Time correction (dB)	Distance to Receptor (m)	Distance / Propagation Correction (dB)	Partial Attenuation by Building Screening and Land Features (dB)	Sound characteristic correction (dB)	Predicted rating level at NSR (dB)	Background level (dB L_{A90})	Difference (dB)
1-hour period, daytime	5	99	25	-4	250	-56	-10	5	34	50	-16
15-minute period, night-time	1	99	5	-5	250	-56	-10	5	33	40	-7

Table 12.22: Maximum Level Assessment

NSR	Sound Power Level L_{wA} (dB)	Distance to Receptor (m)	Distance / Propagation Correction (dB)	Partial Attenuation by Building Screening and Land Features (dB)	Predicted maximum level at NSR (dB L_{Amax})	WHO criteria (dB L_{Amax})	Difference (dB)
Bradford Road	105	200	-54	-10	41	60	-19
Cliff Hollins Lane	105	300	-58	-10	37	60	-23
Proposed Residential Zone - nearest approach, eastern boundary	105	50	-42	-10	53	60	-7
Proposed Residential Zone - farthest approach, western boundary	105	250	-56	-10	39	60	-21

HGV Movements (Average Noise Level) BS 4142 Assessment Results

12.93 **Tables 12.18 to 12.21** present the assessments of operational noise affecting nearby NSRs, including the proposed residential zone. In summary:

- At existing dwellings along Bradford Road, predicted rating levels are 33 dB below background levels during the daytime, and 13 dB below background levels during the night-time.
- At existing dwellings along Mill Carr Hill Road/Cliff Hollins Lane, predicted rating levels are 21 dB below background levels during the daytime, and 18 dB below background levels during the night-time.
- At future dwellings along the eastern boundary of the proposed residential zone, predicted rating levels are 2 dB below background levels during the daytime, and 7 dB above background levels during the night-time.
- At future dwellings along the western boundary of the proposed residential zone, predicted rating levels are 16 dB below background levels during the daytime, and 7 dB below background levels during the night-time.

12.94 During daytime periods, HGV movement rating levels are predicted to be sufficiently below background levels at nearby NSRs such that there is a '*low impact*' per BS 4142 guidance. Effects due to HGV movements during the daytime affecting nearby NSRs are considered to be equivalent to Negligible magnitude / Negligible significance.

12.95 During night-time periods, HGV movement rating levels are predicted to be sufficiently below background levels at NSRs along Bradford Road, Cliff Hollins Lane, and the western boundary of the proposed residential zone such that there is a '*low impact*' per BS 4142 guidance. Effects due to HGV movements during the night-time affecting these NSRs are considered to be equivalent to Negligible magnitude / Negligible significance.

12.96 During night-time periods, HGV movement rating levels are predicted to be 7 dB above background levels at NSRs along the eastern boundary of the proposed residential zone such that there is between an '*adverse impact*' and a '*significant adverse impact*' per BS 4142 guidance. Effects due to HGV movements during the night-time affecting these NSRs are considered to be equivalent to Moderate Adverse magnitude / Substantial Adverse significance.

Reversing Alarm (Maximum Noise Level) WHO L_{Amax} Assessment Results

12.97 **Table 12.22** presents the assessment of maximum noise levels due to HGV reversing alarms during night-time periods affecting nearby NSRs, including the proposed residential zone. In summary:

- At existing dwellings along Bradford Road, predicted night-time maximum levels are 41 dB L_{Amax}.
- At existing dwellings along Mill Carr Hill Road/Cliff Hollins Lane, predicted night-time maximum levels are 37 dB L_{Amax}.

- At future dwellings along the eastern boundary of the proposed residential zone, predicted night-time maximum levels are 53 dB L_{Amax}.

- At future dwellings along the western boundary of the proposed residential zone, predicted night-time maximum levels are 39 dB L_{Amax}.

12.98 Maximum noise levels due to HGV reversing alarms during night-time periods are predicted to be 7 to 23 below the WHO 60 dB L_{Amax} criterion. This is considered to be equivalent to Negligible magnitude / Negligible significance.

Building Services and Fixed Plant Noise

12.99 BS 4142 provides a method of rating industrial and commercial noise affecting residential areas. In order to provide an indication of a sound source having a '*low impact*', BS 4142 recommends that the noise levels at a noise sensitive receptor due to any fixed plant and building services be designed to not exceed the background levels for both daytime and night-time periods.

12.100 In order to control plant and activity noise emissions, any proposed installations will be subject to meeting suitable operational noise limits. **Table 12.23** presents recommended operational limits for proposed building services plant and site activity rating levels affecting NSRs. Limits have been determined using the summary of background noise levels presented in **Tables 12.12 to 12.14** and to achieve Kirklees Council's requirements (i.e. rating levels 5 dB below background levels), such that building services plant will be limited to a Negligible magnitude; for receptors of high sensitivity (e.g. residential dwellings) this is equivalent to a Negligible significance. Note that specific plant noise assessments and mitigation requirements if necessary will be undertaken during detailed design. These will be controlled by planning conditions and as it is standard practice, is considered as 'imbedded mitigation'.

Table 12.23: Recommended Operational Noise Limits

Location	Operational Noise Limit as to not Exceed Background Levels (Rating Level, dB)	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Dwellings along Bradford Road	64	43
Dwellings along Mill Carr Hill Road/Cliff Hollins Lane	48	44
Proposed Residential Zone	45	35

12.101 There are no known operational vibration sources associated with the proposed scheme. Operational vibration impacts are therefore considered to be of Neutral significance.

Operational Traffic Noise

12.102 Relative changes in 18-hour traffic noise levels along the road network have been calculated using methodologies in line with CRTN guidance. This has been carried out for the 2016 Baseline year scenario (Do-Minimum) and the 2021 Baseline + Development future year scenario (Do-Something). AECOM has been provided with road traffic data in the form of 18-hour Annual Averaged Weekly Traffic (AAWT) for each road link.

12.103 The relative change in road traffic noise levels based on the overall increase in traffic volume have been assessed using the long term criteria specified **Table 12.8**. **Table 12.24** presents the operational traffic noise assessment.

Table 12.24: Operational Traffic Noise Assessment

Link Name	2016 Base (Do-Minimum) 18-hr AAWT	2021 Base + Development (Do-Something) 18hr AAWT	Difference 18hr AAWT	% Change	Relative change in road traffic noise level dB	Magnitude of Effect	Significance (High Sensitivity Receptors)
Cliff Hollins Lane (east)	2720	2951	230	8%	0.4	Negligible	Negligible
Cliff Hollins Lane (west)	2720	4637	1917	70%	2.3	Negligible	Negligible
Mill Carr Hill Road (east)	3983	4465	481	12%	0.5	Negligible	Negligible
Mill Carr Hill Road (west)	6301	8376	2075	33%	1.2	Negligible	Negligible
Bradford Road (north)	17197	19518	2321	13%	0.5	Negligible	Negligible
Bradford Road (south)	16330	18385	2055	13%	0.5	Negligible	Negligible

12.104 Changes in road traffic noise levels are predicted to be between 0.4 and 2.3 dB which is equivalent to a Negligible magnitude. For receptors of high sensitivity (e.g. residential dwellings) along affected road links this will be equivalent to a long-term Negligible significance. As such no mitigation measures are considered necessary.

Car Parking

12.105 As part of the development there will be 36 parking spaces for school drop off and pick up for the existing primary school. As previously described, the impact of noise from the car park requires consideration of noise generated by cars approaching parking spaces, stopping, and doors closing, when vehicles arrive and depart the spaces. In order to

provide a conservative assessment, any partial acoustic screening afforded by building structures between the car park and nearby NSR has been excluded from the calculations of car park noise emissions.

12.106 Table 12.25 provides the L_{AE} levels of typical car park activities which have been used in this assessment. All values are in dB re 20µPa, free-field.

Table 12.25: Measured Sound Exposure Levels for car park noise sources at 3m

Vehicle Movement Type	Manoeuvring	Passing By	Accelerating Away	Door Closing
Sound Exposure Level, L_{AE} dB	71	71	75	63

12.107 A noise impact assessment has been undertaken to predict noise levels at the closest NSR to the car parks, which are the properties on Commercial Buildings off Mill Carr Hill Road. The shortest distance between the car park and the closest NRS on Commercial Buildings Road is approximately 20 m.

12.108 The assessment has been based on 36 cars arriving and departing over a 30 minute period. The sound exposure levels given in Table 12.25 have been used to predict $L_{Aeq,30\text{-}mins}$ noise levels at the closest NSR.

12.109 The distances of the car parking spaces to the NRS range from 20 to 40 m. Table 12.26 shows the predicted noise levels.

Table 12.26 Predicted noise level from car park activities

NSRs	Predicted Noise Level $L_{Aeq,30mins}$ dB		
	Arriving	Departing	Arriving & Departing
Closest NSRs on Commercial Buildings	41	41	44

12.110 The maximum predicted noise levels at NSRs from vehicles arriving and departing the proposed car park within a 30 minute period are 40dB $L_{Aeq,30\ mins}$. Within the WHO 'Guidelines for Community Noise' report, the following precautionary statement is made regarding external daytime environmental noise levels (in a garden, for example);

'During the daytime, few people are seriously annoyed by activities with L_{Aeq} levels below 55 dB; or moderately annoyed with L_{Aeq} levels below 50 dB.'

12.111 It can be seen that the predicted noise levels are at least 6 dB below the lower 50 dB L_{Aeq} threshold criteria for external daytime noise levels stated in WHO Guidelines for Community Noise.

12.112 Current measured ambient daytime noise levels on Cliff Hollins Lane, which are representative of the nearest NSRs on Commercial Buildings, are 62 dB $L_{Aeq,45min}$. This level is significantly higher than the predicted noise levels from car parking activities for the school drop off. Therefore noise from the proposed car park will not have a significant adverse effect on the local NSR.

12.113 As cars may access the car park 24 hours a day the L_{max} levels have been predicted to assess the potential sleep disturbance during the night time period. The L_{AFmax} of a door slamming has been predicted at the existing residential NSR using the closest proposed parking space, and the results are summarised in Table 12.27. The calculations have been based upon the L_{AFmax} of a car door slamming of 78 dB at 2 m measured at a similar site.

Table 12.27 Predicted L_{Amax} noise levels due to car doors slamming

Location	Predicted L_{Amax} Car Door Slamming
Closest NSRs on Commercial Buildings	58

All values are in dB re 20µPa, Free-field.

12.114 The predicted L_{AFmax} noise levels due to a car door slamming are significantly lower than the existing L_{AFmax} level of 67.6 dB, measured at the location representative of existing NSR in the area during the night-time period, and below the L_{AFmax} level of 60 dB stated in WHO Guidelines for Community Noise.

12.115 Therefore the effects of car park activity noise are expected to be limited to Negligible significance.

Summary of operational effects (no mitigation)

12.116 **Table 12.28** summarises the potential operational effects (without mitigation) on receptors as a result of the Proposed Development.

Table 12.25: Operational Effects (without Mitigation) Assessment Summary Table

Effect	Impact Area	Phase	Significance	Period	Permanent / Temporary	Effect
Operational Site Activities	Local: Nearby NSRs e.g. residential dwelling	Operation	Negligible	Long Term	Permanent	Negligible
	Local: Occupants of Proposed Development residential zone	Operation	Negligible (Daytime) Substantial (Night-time)	Long Term	Permanent	Adverse
Building services and plant noise*	Local: Nearby NSRs e.g. residential dwelling Occupants of Proposed Development residential zone	Operation	Negligible	Long Term	Permanent	Negligible
Operational traffic	Local: Nearby NSRs e.g. residential dwellings	Operation	Negligible	Long Term	Permanent	Negligible
Car parking	Local: Nearby NSRs e.g. residential dwellings	Operation	Negligible	Long Term	Permanent	Negligible

*Assuming operational noise limits are met.

Scope of mitigation

Mitigation during construction phase: short to medium term

Construction Works Noise and Vibration

12.117 The following text sets out the best practice methods of working which will be employed to mitigate construction noise levels as far as practicable. These best practice methods can be incorporated into a CEMP.

12.118 Construction works noise and vibration effects have been assessed qualitatively and identified to be of **Negligible significance**, however at this stage finalised construction

schedules and programmes have not yet been determined so it is unable to determine the exact scale of effects.

12.119 Mitigation measures will help to further reduce the scale of the effects on the environment. BS 5228 does not state criteria for acceptable levels of construction noise; therefore the preferred approach is to reduce noise levels (where possible), but with due regard to practicality. Sometimes, a greater noise level may be acceptable if the overall construction time and therefore length of disruption is reduced.

12.120 Below are some example tried and tested mitigation measures from BS 5228:

- Unnecessary revving of engines will be avoided and equipment will be switched off when not in use;
- Internal haul routes will be kept well maintained;
- Rubber linings in, for example, chutes and dumpers will be used to reduce impact noise;
- Drop heights of materials will be minimised;
- Plant and vehicles will be sequentially started up rather than all together;
- Use of effective exhaust silence systems or acoustic engine covers as appropriate;
- As far as reasonably practicable, sources of significant noise will be enclosed;
- Plant will always be used in accordance with manufacturers' instructions. Care will be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading will also be carried out away from such areas;
- Regular and effective maintenance by trained personnel will be undertaken to keep plant and equipment working to manufacturers specifications; and
- Screening e.g. noise barriers and blinds will be used as appropriate.

12.121 A risk assessment identifying the probability of vibration from any piling activities will also be carried out prior to commencement of construction activities, to determine the need for periodic or continuous vibration monitoring. The contractor will use techniques least likely to cause vibration or effect damage to the surrounding residential and commercial properties. Should the need arise, additional means of mitigating potential effects will be considered as the construction arrangements are developed further. It is likely that the magnitude of the potential vibration effects can be reduced, if not avoided altogether, as a result of these further considerations.

12.122 Working hours on the Application Site will be agreed with Kirklees Council. However, it is understood that typical approved hours of work within Kirklees Council are:

- 07.30 and 18.30 hours Mondays to Fridays

- 08.00 and 13.00 hours Saturdays
- With no working Sundays or Public Holidays

12.123 All work outside these hours will be subject to prior agreement of, and/or reasonable notice to Kirklees Council. Night-time working will be restricted to exceptional circumstances, and work internally with buildings.

12.124 Construction works noise and vibration will be managed through implementation of the mitigation measures documented within the CEMP and controlled by planning conditions

Construction Traffic Noise

12.125 Construction traffic noise effects have been assessed qualitatively and identified to be of up to Moderate Adverse significance when HGVs accessing the site are in proximity to residential dwellings along Cliff Hollins Lane, however at this stage finalised construction schedules and programmes have not yet been determined so it is unable to determine the exact scale of effects.

12.126 Consideration should be given to traffic routing, timing and access points to the site so as to minimise noise impacts at existing NSRs following contractor appointment, and as construction working methods are developed. However, increases in road traffic noise levels during works will be temporary, relatively short term, and although the effect will be dependent on the actual number of HGV deliveries, it is considered that significant effects can be managed and avoided.

12.127 Contractors will issue a project route map and delivery schedule to control construction traffic. Traffic management will be employed to guide and control both public and construction traffic during deliveries. Construction traffic noise will be managed through implementation of the mitigation measures documented within a Traffic Management Plan (TMP) which can be controlled by planning conditions.

Mitigation during operation phase: long term

Ambient Noise affecting the Residential Zone

12.128 The layout of the proposed residential zone has yet to be determined; however, the acoustic climate of future occupiers of the scheme can potentially be enhanced and potential requirements for costly noise mitigation measures reduced through the careful consideration of building layouts, property design, orientation and internal, for example positioning habitable rooms such that they face onto internal courtyards. The use of noise barriers, bunds or screens can be employed to provide further noise reductions if required, for outdoor amenity spaces.

12.129 For residential dwellings across the Application Site the following initial recommendations for glazing and ventilation schemes have been prepared in order to demonstrate that the BS 8233:2014 internal noise level criteria (as per **Table 12.2**) can be achieved using typical glazing and ventilation configurations. Final building facade configurations, including glazing and ventilation specifications, will be finalised during the detailed design.

12.130 Where industrial/commercial noise from the proposed employment uses may affect the proposed residential zone, specific requirements for glazing and ventilation schemes in order to meet the Noise Rating (NR) criteria set out in Kirklees Council's Noise Design Advice document can only be determined during detailed design once the proposed site activities are finalised.

Glazing

- Standard thermal double glazing units (e.g. 6 mm glass/6-16 mm air gap/4 mm glass, providing a minimum airborne sound insulation performance R_w 31 dB).

Ventilation

- For habitable rooms (e.g. bedrooms) in close proximity to surrounding roads or the proposed office and warehouse facilities, windows would be required to be closed to achieve internal noise criteria; therefore an alternative form of ventilation will be required (e.g. acoustic trickle ventilation).
- For habitable rooms (e.g. bedrooms) facing away from, or farther away from surrounding roads or the proposed office and warehouse facilities, internal ambient noise criteria can be achieved with ventilation provided by partially open windows.

External garden areas

- The BS 8233:2014 and WHO guideline values for external noise in garden areas can be achieved, although garden areas in close proximity to surrounding roads or the proposed office and warehouse facilities may require the using of acoustic screening. This could take the form of continuous brick walls or well built high quality impervious close boarded fencing around garden areas. These would be required to be a minimum of 1.8 m high.

12.131 Windows and ventilation systems should be acoustically sealed and fitted with high standards of workmanship. Poorly fitting windows and build quality can decrease sound insulation performance significantly.

12.132 It should be noted that the glazing specifications provided above are for acoustic purposes only and, therefore, any structural, safety, thermal or other issues will require to be addressed separately by the appropriate specialists.

12.133 Alternative ventilation could be provided by acoustic trickle ventilation (such as the type of acoustic ventilator specified in the Noise Insulation Regulations). However, the attenuation performance of any alternative ventilation system must be specified to achieve a value of no less than that provided by the glazed element of the façade.

12.134 It is considered that through the use of appropriate design measures such as glazing specifications and façade insulation design (which will be finalised during detailed design phases) ambient noise affecting future occupants of the proposed residential zone can be controlled in order that the Application Site is suitable for the proposed uses.

Noise from Operational Site Activities

12.135 Night-time HGV movements may result in significant adverse effects at dwellings located in proximity to the site (i.e. the eastern boundary of the proposed residential

zone). Therefore if 24 hour HGV movements are required, additional mitigation such as barriers along the eastern boundary and careful routing of HGVs will have to be considered during the detailed design stage once the end users of the employment areas are known.

12.136 Best practice should be followed in the operation of the proposed facility including minimising the time vehicle engines are left idling.

12.137 The use of broadband HGV reversing alarms is recommended as these can reduce the potential for noise disturbance as these are generally less obtrusive in comparison to tonal reversing alarms. The type of HGV reversing alarms shall be confirmed prior to the site being operational, however these will be controlled as to ensure there will be no adverse effects on nearby residential dwellings.

12.138 Once further details are known regarding site activities, at the reserved matters stage, and prior to the site being operational, it is recommended that a further noise assessment is carried out including predictions of corrected noise levels at the boundaries of the Application Site (as per Saved Policy EP6 of the Kirklees UDP) and to confirm that the proposed operational noise limits can be achieved and if necessary assess the requirements for any specific noise mitigation measures.

Building Services and Fixed Plant Noise

12.139 The specification of plant machinery with low noise emission and properly attenuated supply and extract terminations will help to ensure that noise emissions are minimised. The use of enclosures, local screening, mufflers and silencers will also be used as appropriate. All plant will be mounted in a way as to minimise structure borne vibration to occupants of the proposed scheme.

12.140 Building services and fixed plant will be designed to achieve appropriate operational noise limits and controlled by planning conditions. Noise emissions from building plant will be considered during detailed design phases to ensure that operational noise does not adversely affect nearby residents.

Residual effect assessment

Residual effect during construction phase: short to medium term

12.141 As with any large scale construction programme in an urban/suburban context, there will be temporary impacts on local NSRs. However, construction noise and vibration, mitigated through Best Practicable Means (as defined by Section 72 of the Control of Pollution Act 1974) and careful management as detailed in the CEMP, it would be anticipated to result in temporary, short term impacts, such that it is considered that noise and vibration effects during construction works can be limited to an effect of **Negligible significance**.

Residual effect during operation phase: long term

Ambient Noise and Vibration affecting the Residential Zone

12.142 It is considered that through the use of appropriate design measures such as careful development layout, glazing specifications and façade insulation design (which will be determined during detailed design phases) ambient noise affecting future occupants of

the proposed scheme can be controlled in order that the Application Site is suitable for the proposed uses. It is considered that ambient noise affecting future occupants of the proposed scheme will be of **Negligible significance.**

12.143 It is considered that ambient vibration affecting future occupants of the proposed scheme will be of **Negligible significance.**

Noise from Operational Site Activities

12.144 If 24 hour HGV deliveries are required, additional mitigation will be determined during the detailed design stage once the end users of the employment uses are known. With appropriate mitigation in place noise from operational site activities can be limited to an effect of **Negligible significance**.

Building Services and Fixed Plant Noise

12.145 Through the use of appropriate noise control measures in order to achieve appropriate operational noise limits, it is considered that noise and vibration from operational building services and plant noise can be limited to an effect of **Negligible significance**.

Operational Traffic and Car Park Noise

12.146 No mitigation measures are considered necessary for operational traffic and car park noise and as such, long-term effects are expected to be limited to **Negligible significance**.

Summary of residual effects

12.147 **Table 12.29** summarises the potential impacts, mitigation measures, residual effects and significance of effects on receptors as a result of the Proposed Development.

Table 12.26: Residual Effect Assessment Summary Table

Effect	Impact Area	Phase	Significance of Effects without Mitigation	Mitigation	Residual Significance of Effects with Mitigation	Period	Permanent/ Temporary	Residual Effect
Construction works noise	Local: Nearby NSRs e.g. residential dwellings	Construction	Negligible	CEMP and follow guidance in BS 5228	Negligible	Short Term	Temporary	Negligible
Construction works vibration	Local: Nearby NSRs e.g. residential dwellings	Construction	Negligible	CEMP and follow guidance in BS 5228	Negligible	Short Term	Temporary	Negligible
Construction traffic noise	Local: Nearby NSRs e.g. residential dwellings	Construction	Negligible to Moderate/Substantial	Routing and timing of construction traffic as detailed in CEMP	Negligible	Short Term	Temporary	Negligible

Effect	Impact Area	Phase	Significance of Effects without Mitigation	Mitigation	Residual Significance of Effects with Mitigation	Period	Permanent/ Temporary	Residual Effcet
Operational site activities noise	Local: Nearby NSRs e.g. residential dwelling Occupants of Proposed Development residential zone	Operation	Negligible Negligible (daytime) Substantial (night time)	Additional screening or barriers, careful routing of HGVs on site.	Negligible	Long Term	Permanent	Negligible
Building services and plant noise	Local: Nearby NSRs e.g. residential dwelling Occupants of Proposed Development residential zone	Operation	Negligible*	Plant noise limits set based on existing background noise levels and Kirklees Council criteria	Negligible	Long Term	Permanent	Negligible
Operational traffic	Local: Nearby NSRs e.g. residential dwellings	Operation	Negligible	none	Negligible	Long Term	Permanent	Negligible
Car Park- school drop off/pick up	Local: Nearby NSRs e.g. residential dwellings	Operation	Negligible	none	Negligible	Long Term	Permanent	Negligible
External noise affecting internal ambient noise environment	Local: Occupants of Proposed Development residential zone	Operation	N/A	Layout and orientation of dwellings, glazing specifications, fencing/ barriers for external areas.	N/A	Long Term	Permanent	N/A

12.148 As set out in the methodology, as significant effects are those at moderate or above, there are no significant noise effects predicted.

Cumulative effect assessment

12.149 This section summarises the impact of the Proposed Development in addition to that of other nearby developments that may have an additive impact on the surrounding area.

It has been identified that there are Highway improvement works proposed for Junction 26 of the M62.

Construction Noise

12.150 It is considered that any overlapping of construction phases between the Proposed Development and any other consented schemes with 500m will have the greatest potential to contribute to in-combination cumulative effects. During the construction phases, potential effects exist for the NSRs within the immediate local surroundings.

12.151 The introduction of site hoardings, use of Best Practice Methods, adherence to pre-determined HGV traffic routes, and compliance with the mitigation measures detailed within this Chapter will reduce these interactions as far as possible.

12.152 The contractors will liaise with the relevant Local Authorities in order to establish working guidelines to reduce the effects of cumulative construction works noise and vibration. Where necessary, the Contractor will seek to undertake regular liaison meetings and reviews with neighbouring construction sites to plan works so that they do not cause unnecessary disruption. A negligible effect is therefore predicted.

Operational Noise

12.153 The inclusion of other committed development has not been requested by the Local Authority and therefore is not included in the traffic data provided for the noise assessment. As no significant committed development is assumed, no significant cumulative effects are expected at the Proposed Development or surrounding area.

12.154 It is expected that building services noise from surrounding developments will be designed to achieve appropriate operational noise limits so as to not attribute additional noise to the area i.e. 'background creep', which would avoid any adverse effects to noise-sensitive receptors in the area. Note that control and mitigation of noise effects from surrounding development will be the responsibility of the individual operator.

12.155 Provided services plant from development are designed to achieve appropriate operational noise limits, it is considered that cumulative operational building services noise would be of **Negligible significance**.

References

12.1 Department for Communities and Local Government, (2012); National Planning Policy Framework

12.2 Department of the Environment/Welsh Office, (1994): 'Planning Policy Guidance 24 – Planning and Noise (PPG24)', TSO, London.

12.3 Department for Environment, Food and Rural Affairs, (2010); Noise Policy Statement for England.

12.4 Planning Practice Guidance: Noise (2014): http://planningguidance.planningportal.gov.uk/blog/guidance/noise/

12.5 Kirklees Council, (2007): Kirklees Unitary Development Plan.

12.6 British Standards Institute, (2014); BS 8233 – Guidance on sound insulation and noise reduction for buildings, BSI, London.

12.7 World Health Organization, (1999): Guidelines for community noise, World Health Organization, Geneva.

12.8 British Standards Institute, (2008); BS 6472 - Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting, BSI, London.

12.9 Her Majesty's Stationery Office (HMSO), (1974): 'The Control of Pollution Act 1974', HMSO, London.

12.10 British Standards Institute, (2009); BS 5228 - Noise and vibration control on construction and open sites, BSI, London.

12.11 British Standards Institute, (2014); BS 4142 - Methods for rating and assessing industrial and commercial sound, BSI, London.

12.12 Department of Transport/Welsh Office, (1988); Calculation of Road Traffic Noise.

12.13 Highways Agency, (2011); Design Manual for Road and Bridges Volume 11 Section 3 Part 7 HD213/11 Revision 1-Noise and Vibration.

12.14 British Standards Institute, (2003); BS 7445 - Description and measurement of environmental noise. Part 1: Guide to quantities and procedures, BSI, London.

12.15 Kirklees Council, (2007): Noise Design Advice.

12.16 Hiller, D. M., and G. I. Crabb, (2000): Groundborne Vibration Caused By Mechanised Construction Works. TRL Report 429.

13. Air Quality

Purpose of the assessment

13.1 This Chapter of the ES assesses the likely significant impacts of the Proposed Development with respect to air quality. It describes the methods used to assess the impacts; the baseline conditions currently experienced at the application site and in the surrounding area; likely future conditions; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these tried and tested measures have been adopted.

13.2 During demolition and construction works potential impacts will be associated mainly with dust emissions. Potential operational impacts will be associated with increased traffic emissions associated with the proposed development.

13.3 This Chapter has been prepared by AECOM and is accompanied by **Technical Appendix 13**.

Legislative framework, policy and guidance

National and European Air Quality Legislation and Policy

Local Air Quality Management

13.4 The provisions of Part IV of the Environment Act 1995 establish a national framework for air quality management, which requires all Local Authorities to conduct local air quality reviews. Section 82(1) of the Act requires these reviews to include an assessment of the current air quality in the area and the predicted air quality in future years. Should the reviews indicate that the objectives prescribed in the UK Air Quality Strategy (AQS) (Defra, 2007)(Ref 13.8) and the Air Quality Standards Regulations 2010 (Defra, 2010)(Ref 13.10) (henceforth referred to as the "Air Quality Regulations") will not be met, the Local Authority is required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level to ensure that air quality in the area improves.

13.5 The UK AQS (AQS) (Defra, 2007)(Ref 13.8) identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem. Similarly, the Air Quality Regulations set objectives, but for just seven of the pollutants that are associated with local air quality. These objectives aim to reduce the health effects of the pollutants to negligible levels.

13.6 The air quality objectives and limit values currently applicable to the UK can be split into two groups. Each has a different legal status and is therefore handled differently within the framework of UK air quality policy. These are:

- UK air quality objectives set down in regulations for the purposes of local air quality management; and

- European Union (EU) limit values transcribed into UK legislation for which compliance is mandatory.

European Air Quality Directives

13.7 The Air Quality Framework Directive (96/62/EC)(Ref 13.2) on ambient air quality assessment and management defines the policy framework for 12 air pollutants known to have a harmful effect on human health and the environment. Ambient concentration limit values for the specific pollutants are set through a series of Daughter Directives.

13.8 Following the Daughter Directives, Council Directive 2008/50/EC (Ref.13.7) on ambient air quality and cleaner air for Europe came into force in 2008, and was transposed into national legislation in 2010 (The Air Quality Standards Regulations 2010 (Defra, 2010))(Ref 13.10). It consolidated existing air quality legislation and made provisions for Member States to postpone limit value attainment deadlines and allow an exemption from the obligation to limit values for certain pollutants, subject to strict conditions and assessment by the European Commission (EC).

Air Quality Criteria

13.9 The pollutants of concern for this assessment are NO_2 and PM_{10}. The Government's Air Quality Strategy objectives and EU limit values for NO_2 are:

- an annual mean concentration of 40 $\mu g/m^3$; and
- a one-hour mean concentration of 200 $\mu g/m^3$, not to be exceeded more than eighteen times per year

13.10 The Government's Air Quality Strategy objectives and the EU limit value for PM_{10} are:

- an annual mean concentration of 40 $\mu g/m^3$ (gravimetric); and
- a 24-hour mean concentration of 50 $\mu g/m^3$ (gravimetric) to be exceeded no more than 35 times per year.

Construction Dust

13.11 Dust is defined as all particulate matter up to 75 µm in diameter and comprising both suspended and deposited dust, whereas PM_{10} is a mass fraction of airborne particles of diameter of 10 µm or less. The health effects associated with dust include eye, nose and throat irritation in addition to the nuisance caused by deposition on cars, windows and property. Dust and PM_{10} emissions arise from a number of sources, so demolition and construction activities and emissions from vehicles associated with the development should be considered.

Planning Policy

National Planning Policy Framework

13.12 The following National Planning Policy Framework (NPPF)(Ref 13.14) paragraphs / policies are considered relevant to this assessment:

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual

sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

13.13 The NPPF was supplemented by Planning Practice Guidance (Ref 13.14) in March 2014. The guidance about air quality states:

"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)."

and

"When deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.

Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;

Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.

Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.

Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites."

13.14 The Air Quality Planning Practice Guidance also indicates that with regard to the development management process, should a development (following mitigation) lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or national objectives for pollutants or fail to comply with the requirements of the Habitats Regulations, then consideration should be given to how the proposal could be

amended to make it acceptable, or where not practicable, to whether planning permission should be refused.

13.15 With respect to dust emissions, the NPPF states that:

"The National Planning Policy Framework makes it clear that unavoidable dust emissions are controlled, mitigated or removed at source. A dust assessment study should be undertaken..."

Local Planning Policy

13.16 KMBD is currently in the process of developing its new Local Plan. Policies from their Unitary Development Plan (1999) as saved, relating to air quality include policy T1;

"Priority will be given to:

(i) satisfying the needs of all sections of the community through an effectively integrated transport system with emphasis on improving public transport and encouraging a modal shift away from travel by private car;

(ii) promoting a transport network on which it is safe to travel and which causes minimal disturbance through danger, noise and air pollution"

13.17 The current development plan for the Bradford District is the Replacement Unitary Development Plan, as adopted in October 2005. Saved policies Policy P1 and P2 relate to air quality:

Policy P1:

"Development will not be permitted where it is likely to have an unacceptable effect on air quality. In determining whether or not an unacceptable effect will result, particular consideration will be given to the following issues:

(i) (1) the likelihood of emissions which are likely to have a significantly unacceptable effect on the amenity of the local area;

(ii) (2) where there is the significant risk that public health may be adversely affected;

(iii) (3) where there is a significant possibility that any proposed development will lead to a breach of national air quality objectives.

An air quality impact assessment may be required before determining applications with a potential to significantly contribute to air pollution."

Policy P2:
"Development will not be permitted near to potentially polluting sources, where the proposed development is likely to be subject to unacceptable risk."

13.18 Kirklees Council and Bradford Council are both part of the West Yorkshire Low Emissions Strategy Group (WYLES). This air quality assessment has been undertaken in accordance with the draft West Yorkshire Air Quality and Emissions Technical

Planning Guidance (WYLEG, 2014) (Ref 13.24) as prepared by WYLES. The guidance document forms part of an overarching Low Emissions Strategy and provides a template for integrating air quality considerations into land-use planning and development management policies that can influence the reduction of road transport emissions in West Yorkshire. It is aimed at helping regional authorities deliver national air quality objectives through cost effective service planning, brought about by the joint working and individual mandates adopted as part of each authority's policy.

13.19 BMDC is in the process of developing a new local plan. The Core Strategy is in the latter stages of adoption. The Publication Draft (2014) includes Policy EN8 relating to potential pollution controls. Air quality is included within this policy, however this part of Policy EN8 is currently the subject of Main Modifications and therefore requirements of this policy are not confirmed.

Assessment Methodology

13.20 The potential for air quality impacts have been assessed for two distinct phases:

- The 'construction' phase (including demolition works): during which the greatest impact is expected to be from dust; and
- The 'operational' phase: when the impacts will be primarily associated with vehicle emissions.

Construction Phase Methodology

13.21 In accordance with the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24), the impacts associated with the construction phase of the proposed development have been qualitatively assessed with reference to the IAQM published 'Guidance on the assessment of dust from demolition and construction' (IAQM, 2014) (Ref 13.19).

13.22 According to the IAQM, the main air quality impacts that may arise during demolition and construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM_{10} concentrations, as a result of dust generating activities on site; and
- An increase in concentration of airborne particles and NO_2 due to exhaust emissions from diesel powered vehicles and equipment on site and vehicles accessing the site.

13.23 Activities on construction sites are classified into four types to reflect their different potential impacts:

- Demolition;
- Earthworks;
- Construction; and

- Track-out (The transportation of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network).

13.24 The steps followed to determine the risk of impacts, appropriate mitigation measures to be adopted, and significance of residual impacts are as defined by the IAQM and included in **Technical Appendix 13.1.**

Operational Phase Methodology

13.25 The operational phase assessment follows the methodology outlined in the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014). In addition, the Environmental Protection UK and Institute of Air Quality Management, 'Land-use planning and development control: planning for air quality' (May 2015) (Ref 13.17) was also followed to determine the magnitude and significance of the impacts.

Stage 1: Development Type Classification.

13.26 Developments should be classified as minor, medium or major based on the Department for Transport (DfT) threshold criteria for Transport Assessments and Travel Plans and anticipated changes in traffic associated with the development (**Table 13.1**).

Table 13.1: Development Classification

Development Classification	Criteria
Minor	Development proposals that do not meet the requirement for a Transport Assessment
Medium	Development proposals that meet the requirements for a Transport Assessment
Major	Development proposal that meet the requirements for a Transport Assessment and where one or more of the following is true: Where the proposed development falls within the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 and includes air quality and/or transport as a specific likely impact. Proposals located within an Air Quality Management Area (AQMA). Proposals that could increase the existing traffic flow on roads of > 10,000 AADT by 5% or more. Proposals that increase traffic 5% on road canyons with >5000AADT. Proposals that could introduce or significantly alter congestion (DfT Congestion) and includes the introduction of substantial road infrastructure changes. Proposals that reduce average speeds by more than 10kph Proposals that include additional HGV movements by more than 10% of total trips. Where significant demolition and construction works are proposed.

Requirement for Transport Assessments and Travel Plans

13.27 According to the DfT (DfT, 2015a) (Ref 13.16), a Transport Assessment and Travel Plan would be required if the proposed development meets the criteria in **Table 13.2**.

Table 13.2: DfT Criteria for Transport Assessments and Travel Plans

Land Use	Description	Transport Assessment Required
Residential Dwellings (C3)	Residential	>50units
General Industrial (B2)	General industry (other than B1)	>4000 m^2
Storage or Distribution (B8)	Storage or distribution centres – wholesale warehouses, distribution centres & repositories	>5000 m^2

13.28 The proposed development comprises of B2/B8 units, covering an area of up to 38,091 sq m, and up to 101 residential units and therefore exceeds the criteria in **Table 13.2**.

Traffic Data

13.29 Data were supplied by AECOM Transportation, the project transportation consultants, in the form of AADT flows and HGV % for a base year and future year with and without the development in place. Peak hour flows were derived from traffic counts undertaken on Thursday 7th November 2013 and then factored to AADT flows using the Automatic Traffic Count (ATC) on Bradford Road, Oakenshaw, operated by Kirklees Council. The exception to this was the flows on the M606, which were obtained from traffic counts undertaken by the DfT (DfT, 2015b) (Ref 13.16).

13.30 Over 1,500 daily movements are associated with the proposed development. All vehicles are anticipated to gain access to and from the site from Cliff Hollins Lane, west of the proposed site access, after which, the majority of vehicles turn left onto Mill Carr Hill Road. At the junction of Mill Carr Hill Road and Bradford Road, slightly more vehicles are anticipated to turn right towards Oakenshaw than will turn left onto Bradford Road to gain access to the M62 and the wider road network.

13.31 With reference to the criteria described in **Table 13.1**, a proposal is considered to be 'Major' if the development is anticipated to result in an increase of 5% on roads of > 10,000 AADT flows. Bradford Road, north of Mill Carr Hill Road and Bradford Road, north of Junction 26 are the only roads which meet this criterion.

13.32 Similarly, a proposal is considered to be 'Major' if the development results in additional HGV movements of more than 10% of total movements. According to the traffic data, due to the nature of the proposed development, approximately 12.5% of the development flow will be HGVs, which equates to approximately 220 additional HGV movements per day on the local road network.

13.33 Speed data for all roads was based on national speed limits but adjusted to take account of slower speeds at junctions and roundabout.

13.34 As part of the proposed development there is provision of a car park for Woodlands Church of England Primary School. The car park is considered to be small, with approximately 36 spaces and an area <2000m^2. Traffic flows are likely to be insignificant in comparisons to local flows; therefore the car park has been scoped out of this assessment.

13.35 The data used in the modelling assessment and the corresponding roads are shown in **Technical Appendix 13.2**.

13.36 With reference to the criteria in **Table 13.1** and taking the traffic flows into consideration, the proposed development was considered to be 'Major'.

Stage 2: Air Quality Impact Assessment

Major Classified Proposals

13.37 According to the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24), the scale and nature of a 'Major' development is such that a formal air quality assessment will be required to determine that impact on public health and the local environment. The air quality assessment should clearly establish the likely change in pollutant concentrations at relevant receptors resulting from the proposed development.

Scenarios

13.38 The local air quality assessment was undertaken using the AAQuIRE detailed dispersion modelling software to predict concentrations of the road transport derived pollutants, NO_2 and PM_{10}, at selected existing sensitive receptors. The assessment was undertaken for the following scenarios:

- Base year, 2014, to allow comparison with 2014 pollutant monitoring data;
- 2019 DM (DM, Do-Minimum), without the proposed development; and
- 2019 DS (DS, Do-Something), with the proposed development.

13.39 The draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24) states that in addition to the above scenarios, a sensitivity test should be undertaken which assumes that there will be no reduction in traffic related emission factors from the base year to the future year.

AAQuIRE

13.40 The AAQuIRE dispersion modelling software, developed by AECOM, was used to predict the local air quality effect of the development once operational. AAQuIRE uses the CALINE4 model for the dispersion of road-traffic emissions. The model is fully validated and has been extensively used worldwide. Further details are provided in **Technical Appendix 13.3**.

13.41 The modelling study uses the most recent version of the Emission Factor Toolkit (EFT) published by Defra (Defra, 2014a) (Ref 13.11). The EFT specifically incorporates updated NO_X emissions factors and vehicle fleet information based on current measurements and projections.

Conversion of NO_X to NO_2

13.42 The proportion of NO_2 in NO_X varies greatly with location and time according to a number of factors including the amount of oxidant available and the distance from the emission source. NO_X concentrations are expected to decline in future years due to falling emissions, therefore NO_2 concentrations will not be limited as much by ozone and consequently it is likely that the NO_2/NO_X ratio will in the future increase. In addition, a trend has been noted in recent years whereby roadside NO_2 concentrations have been increasing at certain roadside monitoring sites, despite emissions of NO_X falling. The 'direct NO_2' phenomenon is having an increasingly marked effect at many urban locations throughout the UK and must be considered when undertaking modelling studies.

13.43 In this study modelled NO_X values were converted to NO_2 using version 4.1 of the 'NO_X to NO_2' calculator, released in June 2014, and available online at http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc (accessed July 2015) (Ref 13.13). The year and region for which the modelling has been undertaken are specified and local factors, such as an appropriate factor of NO_X emitted as NO_2, are used in the calculation. The road type used was 'All UK traffic'.

Receptors

13.44 Air quality receptors susceptible to changes in air quality typically include residential properties, schools, care homes, hospitals and designated ecological sites.

13.45 Ten existing receptors were selected at which pollutant concentrations were modelled for the scenarios described in paragraphs 13.36 and 13.37 and are presented in **Table 13.3**, and **Technical Appendix 13.2**. The receptors were selected as those anticipated to experience the largest impacts based on the traffic data provided and include receptors located adjacent to Bradford Road, to the west of the M606, where the existing traffic flows are >10,000 and the development is anticipated to result in a change in AADT of >5%. In addition, NO_2 concentrations were predicted over a 10m grid of receptors so that impacts were modelled across the proposed residential zone.

13.46 No ecological receptors of concern with regards air quality were located near to the proposed site.

Table 13.3: Modelled Receptors

ID	Location	X	Y
1	Cliff Hollins Lane east	417630	427813
2	Cliff Hollins Lane west	417592	427804
3	Woodlands Primary School	417540	427966

ID	Location	X	Y
4	Wyke Lane	417437	427815
5	Bradford Road, north of Mill Carr Road	417423	427852
6	Bradford Road, opposite Cross Street	417328	427896
7	Bradford Road, opposite St Andrew's Crescent	417527	427697
8	Bradford Road, south	417817	427129
9	Bradford Road, centre	417711	427294
10	Bradford Road, north	417622	427468

Meteorological Data

13.47 The meteorological dataset used in the assessment was recorded at the Church Fenton meteorological station, which is approximately 25 km to the east of the site. This site is considered to be representative of regional meteorological conditions and sufficient to satisfy the requirements of this assessment.

13.48 The wind rose for this site and further details are provided in **Technical Appendix 13.4.**

Model Verification

13.49 When using modelling techniques to predict concentrations, it is necessary to make a comparison between the modelling results and the monitoring data, to ensure that the model is reproducing actual observations. The accuracy of the future year modelling results are relative to the accuracy of the base year results, therefore greater confidence can be placed in the future year concentrations if good agreement is found for the base year.

13.50 Kirklees Council operates an extensive network of automatic and passive monitoring techniques. Two sites (RS2 and DT8) are located on Bradford Road, south of Junction 26 (**Technical Appendix13.2**). However, due to the complex nature of Junction 26, consisting of several slip roads onto and off of the M606 and M62, each at varying heights, it was not considered appropriate to use the monitoring data to generate a verification factor, particularly considering the locations of the modelled receptors.

13.51 Instead, an adjustment factor of 2.0 was applied to the modelled concentrations. This factor was based on numerous studies undertaken by AECOM, using AAQuIRE, several of which were performed in environments similar to the study area (i.e. in the vicinity of motorways). The use of this factor ensured that a robust assessment was undertaken.

Damage Costs

13.52 The environmental damage cost associated with the development, due to traffic emissions' health and environmental impacts, was required to be estimated by the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24). The guidance stipulates that the damage cost should help determine the amount (value) of mitigation that is expected to be spent on measures to reduce the impacts. The calculation utilises the Defra Emissions Factor Toolkit (Defra, 2015a,

accessed July 2015) (Ref 13.11) to estimate the additional pollutant emissions from a proposed development and the Inter Government Department on Costs and Benefits (IGCB) Air Quality Damage Costs (Defra, 2015b) (Ref 13.12) for the specific pollutant of interest, to calculate the resultant damage costs. The following calculation was used to determine the damage cost of the proposed development over a five year period for the pollutants NO_X and PM:

Road Transport Emission Increase = Σ (Estimated trip rate for 5 years X Pollutant emission rate per 10 km per vehicle type X Damage Cost)

Stage 3: Mitigation and Compensation

13.53 The outcome of Stage 2 identifies the damage cost of air emissions impacts associated with the development. Suggested mitigation measures are provided in the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24).

Study Area

13.54 The Site is located at the North Bierley decommissioned Wastewater Treatment Works and surrounding land located to the north of Junction 26 of the M62 and its intersection with the M606. The site is bounded by the M606 to the west, M62 to the south, Hanging Wood to the east and Cliff Hollins Lane to the north. A Location Plan can be found included in Chapter 1 of the ES. The area within 500 m of the Site could be affected by the Proposed Development so this area has been identified as the study area for local air quality. No designated ecological sites have been identified within 500 m of the site, therefore there are no ecological receptors which need to be considered as part of this assessment. Whilst Hanging Wood is a Kirklees Site of Wildlife Significance (SWS), SWS, in accordance with relevant guidance (IAQM, 2014 (Ref 13.19); IAQM, 2015 (Ref 13.17), and WYLEG, 2014 (Ref 13.24)) do not require consideration in terms of local air quality effects.

13.55 **Technical Appendix13.2**, Figure 1 shows the site location in the context of the surrounding road network.

Surveys / Method of Baseline Data Collation

Desk Study

13.56 Local Air Quality Management (LAQM) reports and information provided by KMBC has been reviewed to summarise the baseline situation.

Site Visit / Other Assessment

13.57 No monitoring surveys were carried out for this assessment.

Consultation Undertaken to Date

13.58 Andrew Jameson, KMBC, was contacted on the 14th July 2015. He did not provide comment on the proposed methodology (which was closely based on a methodology that he had confirmed as satisfactory in April 2014 when he had been consulted regarding the same development site), but did provide the Council's latest Air Quality Progress Report, and he did also provide a copy of the latest draft of the West Yorkshire Low Emission Strategy Air Quality & Emissions Technical Planning Guidance (WYLEG, 2014).

Significance Criteria

13.59 Air quality impacts may be considered to be significant if a development leads to significant impacts on air quality at existing sensitive receptors or if air quality objectives / EU limit values are predicted to be exceeded at proposed sensitive receptors. Updated guidance published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) on land-use planning and development control (May, 2015) (Ref.13.17) suggests that a two-stage approach should be adopted to determine whether or not a proposed development will have a significant impact on local air quality. Firstly, qualitative descriptions are applied to the predicted impacts on local air quality at individual receptors, which is then followed by a professional judgement on the overall significance of the effects of any identified impacts. These two stages are described in more detail in the following sections.

Long-Term Impact Descriptors

13.60 In order to assess the potential impacts of a proposed development on local air quality EPUK and IAQM suggest assigning a description of the impact based on the magnitude of change as a percentage of a relevant Air Quality Assessment Level (AQAL). Account also needs to be taken of predicted pollutant concentrations and their relationship to the AQAL. In most assessments the AQAL will correspond to the Air Quality Objective / EU Limit Value for the pollutant(s) of concern summarises the impact descriptors derived from the guidance for annual mean NO_2 and PM_{10} concentrations.

13.61 Whilst the impact descriptors presented in the guidance are based on annual mean concentrations and changes in concentrations relative to the Air Quality Assessment Level, as a percentage, annual mean concentrations and changes in concentrations on a mass basis have been added to the table for ease of reference. It should be noted that the impact descriptors may be adverse or beneficial depending upon whether concentrations are predicted to increase or decrease.

Table 13.4: Air Quality Impact Descriptors for Sensitive Receptors (Annual Mean Concentrations)

Annual Mean Concentration at Receptor in Assessment Year		% Change in Concentration Relative to AQAL				
		0	1	2 – 5	6 – 10	>10
As % of AQAL	NO_2 / PM_{10} ($\mu g/m^3$) [a]	≤0.2	0.2 – 0.6	0.6 – 2.2	2.2 – ≤4.0	>4.0
≤75%	≤30.2	Negligible	Negligible	Negligible	Minor	Moderate
76% - 94%	30.2 – 37.8	Negligible	Negligible	Minor	Moderate	Moderate
95% - 102%	37.8 – 41.0	Negligible	Minor	Moderate	Moderate	Substantial
103% - 109%	41.0 – 43.8	Negligible	Moderate	Moderate	Substantial	Substantial
≥110%	≥43.8	Negligible	Moderate	Substantial	Substantial	Substantial

				a)

Notes:

AQAL = Air Quality Assessment Level, which will usually be an Air Quality Objective or EU Limit Value (e.g. for NO_2 / PM_{10} the relevant AQAL is the annual mean air quality objective / EU Limit Value of 40 µg/m^3).

[a] The values below and to the right represent the concentrations proposed by the IAQM for assessment purposes with regard the annual mean NO_2 and PM_{10} objective / EU Limit Value of 40 µg/m^3.

Short-Term Impact Descriptors

13.62 The EPUK and IAQM guidance indicates that changes in short-term (i.e. hourly or less) concentrations of less than 10% of the relevant AQAL are sufficiently small in magnitude to be regarded as having an insignificant effect. Furthermore, where such peak short term concentrations are in the range 10-20% of the relevant AQAL, EPUK and IAQM indicates this impact can be described as slight, those in the range 20-50% moderate and those above 50% as substantial. It should be noted that these impacts descriptors are applied without reference to background or baseline concentrations in the study area.

13.63 **Table 13.5** summarises the impact descriptors derived from the guidance for hourly mean NO_2 concentrations expressed as the 99.8th percentile.

Table 13.5: Air Quality Impact Descriptors for Sensitive Receptors (Hourly Mean Concentration)

Proposed Criteria as % of AQAL	Predicted 99.8th Percentile Hourly Mean NO_2 Process Contribution	Impact Descriptor
<10%	< 20 µg/m^3	Negligible
10 – 20%	20 – 40 µg/m^3	Minor
20 – 50%	40 – 100 µg/m^3	Moderate
>50%	> 100 µg/m^3	Substantial

Assessment of Significance

13.64 The descriptors presented in **Table 13.4** and **Table 13.5** are ascribed to impacts likely to be experienced at individual sensitive receptor locations, however they are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. The EPUK / IAQM guidance makes it clear that the assessment of significance of the overall effect should be based on professional judgement. Whilst it may be that there are 'minor', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily therefore be judged as being significant in some circumstances. Impacts may also be adverse, beneficial or negligible,

13.65 One of the relevant factors in the judgement of the overall significance of effect may relate to the potential for cumulative impacts, especially where it is proving difficult to

reduce concentrations of a pollutant. Conversely, a 'moderate' or 'substantial' impact may not have a significant effect if it is confined to a very small area.

13.66 Where a single development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'minor' impact will not have a significant effect, but such judgements are always more likely to be valid at the two extremes of impact severity.

13.67 Any judgement on the overall significance of effect of a development will need to take into account such factors as:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the overall balance between the number of receptors experiencing adverse impacts and those experiencing beneficial impacts; and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Assumptions and Limitations

13.68 A future year of 2019 was chosen for the purposes of the operational phase assessment. Should the development be fully occupied prior to 2019 it is feasible that the impacts may be underestimated. However, this was accounted for through the sensitivity test by assuming no improvement in emissions.

13.69 The traffic data used in the modelling assessment and the corresponding roads are shown in **Technical Appendix 13.2**. It should be noted that the data reported are slightly different to the data presented in the Transport Chapter. The data used in the air quality modelling represent a worst case approach as the impact of the development is greater; therefore this limitation will not have resulted in the impact of the development being underrepresented.

13.70 No suitable monitoring data exists for the purposes of model verification, as described in the section titled. 'Model Verification'. Therefore, based on studies undertaken at AECOM for numerous projects an assumed verification factor was applied. It is deemed that this provided a robust approach that should not result in impacts being underrepresented.

13.71 The assessment uses advanced dispersion modelling software to predict pollutant concentrations at sensitive receptor locations. The software uses algorithms to predict the dispersion of emissions from the source, to the receptor, as carried by the meteorological conditions included. Some of the potential error associated with dispersion modelling is accounted for within the dispersion model verification process.

Baseline Conditions

Summary of Local Air Quality Management

13.72 The Local Air Quality Management (LAQM) responsibilities in the vicinity of the proposed development site are undertaken by Kirklees Council. The proposed site is located in close proximity to Kirklees Council's northern border with Bradford Metropolitan District Council (BMDC). Kirklees Council has declared two Air Quality Management Areas (AQMAs), neither of which are near to or will be affected by the development. BMDC has declared four AQMAs for the annual mean NO_2 objective. The nearest (AQMA 1: At the junction of Manchester Road and Mayo Avenue, Bradford) is located approximately 3 km to the north west of the site and therefore is very unlikely to experience significant impacts due to the proposed development.

Local Air Quality Monitoring

13.73 Kirklees Council undertakes monitoring of NO_2 using continuous monitoring and passive diffusion tubes near to the proposed site, while BMDC undertakes no monitoring in the vicinity of the proposed site.

Nitrogen Dioxide

Continuous Monitoring

13.74 Kirklees Council operates a network of six continuous monitors as well as a mobile trailer unit. The nearest to the proposed site is RS2 located approximately 360 m to the south of the proposed site next to Junction 26 of the M62 (**Technical Appendix 13.2**, Figure 1). According to **Table 13.6**, annual mean NO_2 concentrations were above the objective in 2009 and 2010, although decreased significantly between 2010 and 2011 to be below the objective. Annual mean NO_2 concentrations then remained stable between 2011 and 2012 and dropped in 2013.

Table 13.6: Continuous Monitored Concentrations

ID	Location	Type	Annual Mean NO_2 Concentrations ($\mu g/m^3$)					
			2009	2010	2011	2012	2013	2014
RS2	Bradford Road	Roadside	**41.1**	**47.2**	37.7	37.4	32.4[a]	33.1[b]

Note: Concentrations above the objective indicated in bold. [a] Source of data: 2014 Air Quality Progress Report for Kirklees Council (Ref 13.22). [b] Source of data: Kirklees Updating and Screening Assessment 2015 (Ref 13.23).

Passive Monitoring

13.75 Kirklees Council operates an extensive network of diffusion tubes across the district. The nearest to the proposed site is DT8, located approximately 420 m to the south of the proposed site, on Bradford Road, Cleckheaton, near to the continuous monitor, RS2 (**Technical Appendix 13.2**, Figure 2). According to **Table 13.7**, annual mean NO_2 concentrations significantly increased between 2009 and 2010, before decreasing in 2011 and remaining stable in 2012. The annual mean NO_2 concentrations recorded at this site have been slightly lower than those recorded at the continuous monitor, RS2.

The reason for this is due to the location of DT8, which is situated approximately 60 m further from Junction 26 than RS2. DT8 was removed in January 2014.

Table 13.7: Monitored NO_2 Concentration

ID	Location	Type	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
			2009	2010	2011	2012	2013
DT8	Cleckheaton, Bradford Road	Roadside	27	**40**	34	33	30

Notes: Concentrations above the objective indicated in bold. Prior to the 2014 Progress Report. DT8 was numbered DT10. DT8 was removed in January 2014.

Particulate Matter

13.76 Monitoring of PM_{10} is undertaken at six sites across the district, the nearest of which to the proposed site is RS2, located on Bradford Road, south of the M62. According to **Table 13.8**, annual mean PM_{10} concentrations have been stable between 2009 and 2013 and well below the objective.

Table 13.8: Monitored PM_{10} concentrations

ID	Location	Type	Annual Mean PM_{10} Concentrations ($\mu g/m^3$)				
			2009	2010	2011	2012	2013
RS2	Bradford Road	Roadside	21.4	19.1	18.6	19.1	19.1*

*Note: *2013 data has been annualised*

Background Concentrations

13.77 A large number of sources of air pollutants exist which individually may not be significant, but collectively, over a large area, need to be considered. The concentrations calculated by the model due to vehicle emissions can then be added to these background concentrations to give the total concentration at a receptor.

Monitored Background Concentrations

13.78 Kirklees Council currently undertakes monitoring at four background sites, the nearest of which to the proposed site are provided in **Table 13.9**. Of these, the nearest monitoring location to the proposed site is DT37, located approximately 2.8 km to the south west. Annual mean NO_2 concentrations recorded at this site were significantly higher that background sites elsewhere in the district and higher than many of the roadside sites. DT37 is located less than 80 m from the M62 and therefore concentrations at this site will be influenced by road traffic emissions. The site exceeded the annual mean NO_2 objective in 2010. DT75 is located approximately 4.2 km south east of the proposed site. Annual mean NO_2 concentrations at this site were well below the objective. The site was removed in November 2012.

Table 13.9: Background Monitored NO_2 Concentrations

ID	Location	Approximate	Annual Mean NO_2 Concentrations ($\mu g/m^3$)

		Distance to Proposed Site (km)	2009	2010	2011	2012	2013
DT37	Hartshead, Highmoor Lane	2.8	32	**42**	37	36	31
DT75	Liversedge, Vernon Rd	4.2	28	34	26	25	N/A

*Notes: Concentrations above the objective indicated in bold. *Prior to the 2014 Progress Report, diffusion tube DT37 was numbered DT49. DT75 was removed in November 2012.*

Mapped Background Concentrations

13.79 Modelled estimations of background air quality concentrations are provided by Defra (Defra, 2015c) (http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011) (Ref 13.13) for each 1 km square in the UK for each year between 2010 and 2030. For the purpose of modelling, the road sources must be discounted from the total background pollutant concentrations, to give 'adjusted' values. Estimated background concentrations for the grid square containing the majority of the development (417500, 427500) are provided in **Table 13.10** for 2014 and 2019. These data were downloaded in October 2015.

Table 13.10: Defra Estimated Background Pollution Concentrations

Pollutant	2014		2019	
	Total	Adjusted	Total	Adjusted
NO_x	32.0	26.1	25.9	21.6
NO_2	21.9	18.3	18.2	15.5
PM_{10}	17.8	17.7	17.0	17.0

Summary

13.80 The 2014 and 2019 mapped background concentrations for the grid square 417500,427500 were considered to be the most appropriate background concentrations to use in this assessment. This is because the closest monitoring sites were situated in more urban environments and were likely to be influenced by local major roads. The contribution from modelled roads was removed from the mapped background concentrations to avoid double counting as outlined in Defra's LAQM.TG(09) (Ref 13.9).

13.81 As no background monitoring of PM_{10} is undertaken near to the proposed site, the adjusted mapped background concentrations were applied to the model.

13.82 The background concentrations used in the assessment are provided in **Table 13.11**.

Table 13.11: Background Pollutant Concentrations applied to the Assessment (µg/m^3)

Pollutant	2014	2019
NO^2	18.3	15.5
PM_{10}	17.7	17.0

Predicted Significant Effects

Effect during construction phase: short to medium term

13.83 As discussed in the assessment methodology, and detailed in**Technical Appendix 13.1**, a four step process was followed to determine the risk of potential impacts during the construction phase.

STEP 1: Screen the Requirement for a more Detailed Assessment

13.84 The proposed site is located at the decommissioned North Bierley Wastewater Treatment Works and surrounding arable land. The nearest sensitive receptors to the proposed site are the residential properties adjacent to the northern boundary of the site on Cliff Hollins Lane. These properties are located approximately 300 m from the proposed demolition works associated with the existing wastewater treatment works.

13.85 Woodlands Primary School is located approximately 170 m from the proposed main site boundary and within 50m of the proposed car park.

13.86 There are no designated ecological sites of concern with regards air quality, as defined by the IAQM Guidance (2014) (Ref 13.19), located within 50 m of the site.

STEP 2: Assess the Risk of Dust Impacts

Step 2A – Define the Potential Dust Emission Magnitude

Demolition

13.87 As part of the proposal, the buildings and structures associated with the decommissioned wastewater treatment works will be demolished. The volume of these buildings and structures is 25,288 m^3 and therefore the dust emission class is considered to be 'Medium'.

Earthworks

13.88 The residential and employment areas of the development site total approximately 13.2 hectares and therefore the magnitude of the dust emission class is considered to be 'Large'. The car park to be constructed is considered to be 'small'.

Construction

13.89 The proposal comprises up to 38,091 sq m of employment uses and up to 101 residential units. The potential dust emission classification was considered to be 'Large'.

Track-out

13.90 With regard to the criteria for the dust-generating potential of the surface material and the length of unpaved road, it is considered to be a conservative approach to classify the potential dust effects as 'Medium'.

13.91 A summary of the dust emission magnitude for each activity is provided in **Table 13.2**.

Table 13.12: Summary of the Dust Emission Magnitude

Source	Dust Emission Classification
Demolition	Medium
Earthworks	Large
Construction	Large
Track-out	Medium

Step 2B – Define the Sensitivity of the Area

13.92 The following were taken into consideration when determining the sensitivity of the area to dust soiling and health effects of PM_{10}:

- The site is located near to a residential area with dwellings located adjacent to the site and therefore the receptors are considered to be high sensitivity.
- The car park to be constructed is within 50m of Woodlands C. of E. Primary School and therefore the sensitivity of the area is considered to be high.
- There are < 10 properties within 20m of the site boundary and <10 properties within 350 of the proposed demolition works.
- The site is not within 50 m of a designated ecological site of concern with regards air quality.
- PM_{10} monitoring undertaken near to the proposed site, recorded an annual mean concentration of 19 $\mu g/m^3$ in 2013.

13.93 Taking the above into consideration, in general the sensitivity of the site is Medium to dust soiling effects and Low for health effects. This excludes the proposed car park area, which is considered to be of high sensitivity to dust soiling effects due to its proximity to the school. The proposed demolition works are also considered an exception, as due to the distance of the nearest sensitive receptors, the sensitivity of the area is considered to be Low to dust soiling and to human health effects.

Step 2C – Define Risk of Impacts

13.94 Taking into consideration the conclusion from Steps 2A and 2B, the risk of dust impacts for each activity are provided in **Table 13.13**.

Table 13.13: Risk of Unmitigated Dust Impacts

Source	Dust Soiling	Human Health
Demolition	Medium	Low
Earthworks	Medium	Low
Construction	Medium	Low
Track Out	Low	Low

13.95 Overall demolition and construction phase impacts may have a minor to moderate adverse effect without mitigation.

Effect during operational phase: long term

13.96 Local air quality concentrations have been predicted for the following scenarios:

- Base year, 2014.
- 2019 DM (Do-Minimum), without the proposed development; and
- 2019 DS (DS, Do-Something), with the proposed development.

13.97 In addition, in accordance with the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24), a sensitivity test was also undertaken which assumes that there will be no reduction in traffic related emission factors between the base year (2014) and the future year (2019).

Nitrogen Dioxide

13.98 Annual mean concentrations of NO_2 were predicted at the selected receptor locations for each scenario described above. The results are presented in **Table 13.14**. The impact of the development at the sensitive receptors is presented as the absolute change in annual mean NO_2 concentration. Impact descriptors are calculated as described in **Table 13.4**.

Table 13.14: Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)

Receptor ID		Annual Mean NO_2 Concentration ($\mu g/m^3$)			Impact ($\mu g/m^3$)	Impact descriptor
		2014	2019DM	2019DS		
1	Cliff Hollins Lane east	30.2	23.5	23.9	0.4	Negligible
2	Cliff Hollins Lane west	34.8	26.7	27.1	0.4	Negligible
3	Woodlands Primary School	30.1	23.4	23.7	0.2	Negligible

Receptor ID		Annual Mean NO_2 Concentration ($\mu g/m^3$)			Impact ($\mu g/m^3$)	Impact descriptor
		2014	2019DM	2019DS		
4	Wyke Lane	35.0	26.1	26.7	0.5	Negligible
5	Bradford Road, north of Mill Carr Road	39.0	28.8	29.4	0.6	Negligible
6	Bradford Road, opposite Cross Street	32.8	24.7	25.0	0.3	Negligible
7	Bradford Road, opposite St Andrew's Crescent	37.9	27.8	28.2	0.4	Negligible
8	Bradford Road, south	34.0	24.9	25.0	0.2	Negligible
9	Bradford Road, centre	30.3	22.9	23.1	0.2	Negligible
10	Bradford Road, north	32.7	24.6	24.8	0.1	Negligible

13.99 According to **Table 13.14**, annual mean NO_2 concentrations were predicted to decrease in the future at all modelled receptors due to anticipated improvements to vehicle emission rates and background pollutant concentrations, regardless of whether the proposed development goes ahead or not. No exceedences of the annual mean objective were predicted at any of the receptors. The highest concentration of 39.0 $\mu g/m^3$ was predicted at a residential property located on Bradford Road, near the junction with Mill Carr Hill Road, and a concentration of 37.9 $\mu g/m^3$ was predicted at a residential property on Bradford Road, opposite St Andrew's Crescent. The reason for this is due to the proximity of these receptors to Bradford Road and the M606. By 2019, annual mean concentrations at both receptors decrease.

13.100 Comparisons between the DS and DM scenarios indicated that detrimental impacts were predicted at all receptors. The largest impact, of 0.6 $\mu g/m^3$, was predicted at receptor 5 on Bradford Road, near the junction with Mill Carr Hill Road. As discussed earlier in this Chapter, a change in traffic flow of > 5% was predicted on this road, due to the proposed development. According to **Table 13.14** the impact at this receptor can be described as '**Negligible**'. At all other sensitive receptors, the impacts were also described as '**Negligible**'.

13.101 As discussed earlier in this Chapter, a verification factor of 2.0 was applied, based on factors derived at similar sites in studies undertaken by AECOM when using the AAQuIRE detailed dispersion model, which was considered to be appropriate for the type of roads included in the assessment.

NO_2 Concentrations at Proposed Receptors

13.102 NO_2 concentrations were modelled for 2019 at 10m grid resolution across the proposed residential zone, both with and without the development. Contours are displayed in **Technical Appendix13.5**, (Do Minimum and Do Something). All predicted NO_2

concentrations were found to be well below the annual mean objective and overall effects are therefore considered to be '**not significant**'.

PM_{10}

13.103 Annual mean concentrations of PM_{10} were predicted at the selected receptor locations for each scenario described earlier in this Chapter. The results are presented in **Table 13.15**. The impact of the development at existing sensitive receptors is presented as the absolute change in annual mean PM_{10} concentration.

Table 13.15: Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)

Receptor ID		Annual Mean PM_{10} Concentration ($\mu g/m^3$)			Impact ($\mu g/m^3$)	Impact Descriptor
		2014	2019DM	2019DS		
1	Cliff Hollins Lane east	19.6	18.6	18.8	0.1	Negligible
2	Cliff Hollins Lane west	20.4	19.3	19.4	0.1	Negligible
3	Woodlands Primary School	19.6	18.7	18.7	0.0	Negligible
4	Wyke Lane	20.3	19.4	19.4	0.1	Negligible
5	Bradford Road, north of Mill Carr Road	21.0	20.0	20.2	0.2	Negligible
6	Bradford Road, opposite Cross Street	19.9	19.1	19.1	0.1	Negligible
7	Bradford Road, opposite St Andrew's Crescent	20.8	19.8	19.9	0.1	Negligible
8	Bradford Road, south	20.1	19.2	19.2	0.1	Negligible
9	Bradford Road, centre	19.5	18.6	18.7	0.0	Negligible
10	Bradford Road, north	19.9	19.0	19.0	0.1	Negligible

13.104 According to **Table 13.15**, all concentrations were predicted to be below the annual mean objective at all modelled existing sensitive receptors in all scenarios. The highest concentration of 21.0 $\mu g/m^3$ was predicted in 2014 at a residential property on Bradford Road, near the junction with Mill Carr Hill Road.

13.105 Comparisons between the DS and DM scenarios indicated that the change in annual mean PM_{10} concentrations were predicted to be < 0.2 $\mu g/m^3$ at all modelled sensitive receptors. Therefore the impacts at existing receptors were considered to be 'Negligible' and can be described as '**not significant**'.

PM_{10} Concentrations at Proposed Receptors

13.106 PM_{10} concentrations were also modelled for 2019 at 10m grid resolution across the 3.25 ha proposed residential zone, both with and without the development. Contours are displayed in **Technical Appendix 13.5** (Do Minimum and Do Something). All predicted PM_{10} concentrations were found to be well below the annual mean objective and overall effects are therefore considered to be '**not significant**'.

Sensitivity Tests

NO_2

13.107 A sensitivity test was undertaken which assumed that there will be no reduction in traffic related emissions between 2014 and 2019. The results for NO_2 are presented in **Table 13.16** for existing receptors and **Technical Appendix 13.5** for proposed receptors.

Table 13.16: Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$) Sensitivity Test

Receptor ID		Annual Mean NO_2 Concentration ($\mu g/m^3$)			Impact ($\mu g/m^3$)	Impact Descriptor
		2014	2019DM	2019DS		
1	Cliff Hollins Lane east	30.2	28.2	29.0	0.8	Negligible
2	Cliff Hollins Lane west	34.8	33.0	33.6	0.5	Negligible
3	Woodlands Primary School	30.1	28.0	28.5	0.5	Negligible
4	Wyke Lane	35.0	33.2	34.1	0.9	Minor Adverse
5	Bradford Road, north of Mill Carr Road	39.0	37.4	38.6	1.2	Moderate Adverse
6	Bradford Road, opposite Cross Street	32.8	31.0	31.5	0.5	Negligible
7	Bradford Road, opposite St Andrew's Crescent	37.9	36.2	36.8	0.6	Minor Adverse
8	Bradford Road, south	34.0	32.2	32.5	0.3	Negligible
9	Bradford Road, centre	30.3	28.1	28.4	0.3	Negligible
10	Bradford Road, north	32.7	30.8	31.2	0.4	Negligible

NB: Exceedences of the annual mean objective are highlighted in bold

13.108 According to **Table 13.16**, if there were no reductions in traffic related emission factors from 2014 (base year) to 2019, then the annual mean NO_2 concentrations were higher

than those provided in **Table 13.14**. However, all of the receptors were still predicted to experience annual mean NO_2 concentrations below the objective in 2019 with or without the development in place.

13.109 The impacts can be described as '**Minor Adverse**' at receptors 4 and 7, whilst a '**Moderate Adverse**' impact was predicted at receptor 5 on Bradford Road. The impacts at all other receptors were considered to be **negligible**. Impacts of greater magnitude and higher absolute concentrations were predicted compared to the results in **Table 13.14**. Contours are displayed in **Technical Appendix 13.5** (Do Minimum and Do Something).NO_2 concentrations in the North East of the site increase slightly in with the development due to traffic increases at the site access.

13.110 It should be noted that this is considered to be a worst case scenario in terms of the emission factors applied, as whilst concerns have been raised regarding the accuracy of NO_x emission factors for vehicles (particularly diesel cars) under urban driving conditions (i.e. stop-start traffic at low speeds), the published emission factors are considered to be more accurate for vehicles under motorway driving conditions (i.e. free-flowing traffic at high speeds). It is also notable that NO_2 concentrations at the two nearest monitoring sites (**Tables 13.6 and 13.7**) have declined year on year between 2010 and 2013.

13.111 Taking account of the sensitivity test, the overall effect of the development on air quality is described as **Not Significant**.

Damage Costs

13.112 In accordance with the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24), the damage costs associated with of the proposed development were calculated. The proposed development is anticipated to result in an additional 1,553 movements per day (refer to **Table 11.5**), of which approximately 12.5% will be HGV movements. Emissions of NO_x and PM_{10} associated with the development movements were derived from the EfT (Defra, 2015a), which determined that an additional 2,247 kg/year (2.25 tonnes/year) of NO_x and 250 kg/year (0.25 tonnes/year) of PM_{10} would be released once the development is operational. As stated earlier this is based on each movement being 10 km.

13.113 According to the IGCB (Defra, 2015b) (Ref 13.12), the air quality damage cost per tonne of NO_x is £955 and per tonne of PM_{10} is £48,517. With reference to the additional NO_x and PM_{10} emissions associated with the development, derived from the EfT, the damage cost of the development was calculated over a five year period (**Table 13.17**).

13.114 The damage cost of the proposed development over a five year period was considered to be £71,370

Table 13.17: Air Quality Damage Costs

Pollutant	Annual Emissions (kg/yr)	Annual Emissions (tonne/yr)	IGBG damage costs per tonne (£)	Damage cost (tonne/yr)	Damage cost (tonne/5yr)
NO_x	2,247	2.25	£955	£2,146	£10,730

PM_{10}	250	0.25	£48,517	£12,128	£60,640
				Total	**£71,370**

13.115 It should be noted that the local air quality assessment, which determines the change in concentration at sensitive receptors, concluded that the proposed development would result in 'Negligible' impacts at the modelled sensitive receptors. Overall the impacts are considered to be 'not significant'. This assessment takes into consideration existing local air quality as well as the magnitude of change in pollutant concentrations due to the proposed development. In contrast, the assessment of the air quality damage costs associated with the proposed development determined that the cost of the development would be £71,370; however, this assessment is based on emissions not concentrations and fails to take into consideration existing air quality, the location, or the dispersion of pollutants.

Scope of Mitigation

Construction phase:

13.116 Determining appropriate mitigation measures corresponds to Step 3 of the assessment methodology.

13.117 A number of mitigation measures can be adopted to reduce the production and/or dispersal of dust to lessen the nuisance and limit the human health impacts. Ideally dust should be controlled at the source as once airborne it is difficult to suppress.

13.118 Appropriate mitigation measures are provided in the IAQM 'Guidance on the assessment of dust from demolition and construction' (IAQM, 2014) (Ref 13.19). However, additional mitigation measures are provided in the following guidance documents:

- BRE (2003a): Guidance on the Control of Dust from Construction and Demolition Activities (Ref 13.4);
- BRE (2003b): Controlling Particulates, Vapours and Noise Pollution from Construction Sites (Ref 13.5); and,
- Greater London Councils (2014): The control of dust and emissions from construction and demolition: Supplementary Planning Guidance (Ref 13.18).

13.119 According to the IAQM Guidance (IAQM, 2014) (Ref 13.19), the dust risk for each of the activities determined in Step 2C should be used to define the appropriate site specific mitigation measures to be adopted.

13.120 Appropriate mitigation measures, taking into consideration the risk of dust impacts determined in Step 2C, are provided in **Table 13.18**. Mitigation should be implemented through a site-specific Construction Environmental Management Plan (CEMP); these tried and tested measures can be secured through the CEMP and standard planning conditions on any future planning permission. Contractors should also carry the 'Considerate Contractors' registration.

Table 13.18: Potential Site Operations and Possible Methods of Controlling Dust

Activity	Possible Dust Control Methods
Communication	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. Display the head or regional office contact information.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken. Make the complaints log available to the local authority when asked. Record any exceptional incidents that cause dust and/or air emissions, either on or off site and the action taken to resolve the situation in the log book.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windows sills within 100m of site boundary, with cleaning to be provided. Carry out regular site inspections, record inspection results and make an inspection log available to the local authority when asked. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Preparing and maintaining the site	Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles Avoid site runoff of water or mud Keep site fencing, barriers and scaffolding clean using wet methods Remove materials that have a potential to produce dust from site as soon as possible Cover, seed or fence stockpiles
Operating vehicle/machinery and sustainable travel	Ensure all vehicles switch off engines when stationary – no idling vehicles. Avoid the use of diesel or petrol powered generators and use

Activity	Possible Dust Control Methods
	mains electricity or battery powered equipment where practicable. Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on un-surfaced haul roads
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation Use enclosed chutes and conveyors and covered skips Minimise drop heights Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable
Waste Management	Avoid bonfires and burning of waste materials
Demolition	Soft strip inside buildings before demolition. Ensure effective water suppression is used during demolition works.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable. Only remove the cover in small areas during work and not all at once.
Construction	Avoid scabbling, if possible Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems.
Track-out	Use water-assisted dust sweepers on access and local roads. Avoid dry sweeping large areas Ensure vehicles entering and leaving sites are covered to prevent escape of material during transport Inspect and record on-site haul routes for integrity and instigate necessary repairs on surfaces Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned Implement wheel wash facilities Access gates to be located at least 10 m from receptors where possible

Operational Phase Mitigation

13.121 The assessment of the impact of the development upon pollutant concentrations at sensitive receptors concluded that any impacts would be '**not significant**'. Nevertheless, following the draft West Yorkshire Air Quality and Emissions Technical Planning Guidance (WYLEG, 2014) (Ref 13.24), determining appropriate operational phase mitigation measures corresponds to Stage 3 of the assessment methodology. According to the guidance the outcome of Stage 2 identifies the level of emissions impacts, in terms of damage costs, which should then be used to determine the level of mitigation required to negate the potential effects upon health and the local environment.

13.122 For 'Major' proposals, the pollution damage costs attributed to the proposal emission changes will determine the level of mitigation compensation required to negate the impact. The damage costs associated with the proposed development were calculated to be £71,370, in total, over five years.

13.123 A Travel Plan (**Technical Appendix 11.2**) has been prepared for the development which aims to reduce the number of single occupancy car trips associated with the development, and encourage alternative and more sustainable means of travel. To achieve this, the following objectives have been identified:

- To minimise the number of single occupancy car trips to the site;
- To encourage the use of alternatives modes of travel by promoting the benefits of these in terms of cost savings, health benefits etc;
- To encourage safe and viable alternatives to single occupancy car trips (wherever possible) for trips generated by the site;
- To enable the development to protect and enhance the environment; and
- To ensure the on-going development and implementation of sustainable travel practices in the longer term.

13.124 The Travel Plan includes 18 measures to meet these objectives, including:

- End occupiers will be required to develop and implement bespoke unit Travel Plans and appoint Travel Plan responsibilities to assist with their delivery.
- The results of the surveys from each individual occupier shall be collated by the Travel Plan Coordinator, who will update the Travel Plan and Action Plan accordingly on an annual basis.
- The Travel Plan Coordinator will encourage occupiers to register with the West Yorkshire Travel Plan Network www.wytravelplan.com.
- All new employees will be provided with a new starter induction pack, detailing how they can travel to work by means other than the private car.
- The Travel Plan Coordinator will promote national and local sustainable travel events, including the Bike Week, Walk to Work Week and National Liftshare Day.

- The Travel Plan Coordinator will promote the benefits of walking in relation to general health and well being and will promote walking to work for staff and residents identified as 'living close by'

- Consideration will be given in providing personal attack alarms to staff and residents as well as setting up a walking group with 'walking buddies'

- The site wide Travel Plan Coordinator will encourage the implementation of the Cycle 2 Work salary sacrifice scheme.

- The Travel Plan Coordinator will establish and chair a Bicycle User Group for employees and residents.

- Public Transport timetable information will be communicated to new staff and residents by the Travel Plan Coordinator and will be provided on the Induction Pack.

- The site wide Travel Plan Coordinator will encourage occupiers to offer discounted MetroCards to employees and residents.

- The site wide Travel Plan Coordinator will encourage all employees and residents to register with www.WYcarshare.com.

- 10% of parking will be reserved for car sharers for each unit.

13.125 The draft West Yorkshire Air Quality and Emissions Technical Planning Guidance recommends a suite of mitigation which can be adopted, where appropriate, for 'major' schemes to negate the impact. Several of these measures are already included in the Travel Plan discussed above, and so are considered to be designed mitigation. The Travel Plan will be conditioned on any future planning permission to secure its implementation and monitoring.

Residual Effect Assessment

Construction Phase

13.126 Should effective dust mitigation measures be enforced and implemented within a Dust Management Plan and/or CEMP then the residual impact of the construction phase will be **not significant** for all the activities, with respect to dust soiling and PM_{10} effects.

Operational Phase

13.127 Taking account of uncertainties in air quality projections, the residual local air quality impacts of the proposed development are predicted to range from '**Negligible**' at most receptors to a worst case '**Moderate Adverse**' at one receptor. However, overall the effects are considered to be '**not significant**'.

13.128 The degree to which the measures identified in the Travel Plan will reduce the calculated damage costs cannot readily be quantified, nevertheless, the amount (value) of the designed mitigation contained within the Travel Plan is significant and should be offset against the calculated damage cost.

Table 13.19: Summary Table

Effect	Impact Area	Phase	Significance	Period	Impact
Dust and emissions from demolition and construction related activities causing a nuisance and affecting public health	Local	Construction	Negligible	Short Term (temporary)	-
Increase in emissions due to development traffic	Local	Operational	Negligible	Long Term (permanent)	-

Cumulative effect assessment

13.129 The inclusion of other committed development has not been requested by the Local Authority and therefore is not included in the traffic data provided for the air quality assessment. As no significant committed development is assumed, there is not expected to be a significant cumulative impact at the Proposed Development or surrounding area.

References

13.1 Air Quality Archive (2012) http://www.defra.gov.uk/environment/quality/air/air-quality/laqm/ (accessed July 2015)

13.2 Air Quality Framework Directive (96/62/EC) on ambient air quality assessment and management

13.3 Bradford Metropolitan Borough Council (2012) 2012 Updating and Screening Assessment

13.4 BRE (2003a) Guidance on the Control of Dust from Construction and Demolition Activities

14. Inter-active and Cumulative Effects

14.1 This Chapter outlines the inter-active and cumulative effects which may arise during the construction and operational stage of the development.

Inter-active effects

14.2 An inter-active effect is one where one effect (ie an increase in traffic) impacts in different topic areas as set out in the technical Chapters may act in conjunction to either beneficial or detrimental effect. The only Chapters where interactive effects are identified are assessed in each topic Chapter, where appropriate.

14.3 The greatest potential for inter-active effects is during the site demolition and construction phase. The greatest potential for the combination of effects is on existing sensitive receptors in terms of a combination of noise, air quality (including dust) and construction traffic. However, these are considered to be only of minor significance due to their relatively short and intermittent nature. Furthermore, tried and tested mitigation measures can be secured through standard planning conditions to reduce any impacts.

Cumulative effects

14.4 A cumulative effect occurs between developments, which are those effects of the development that may interact in a beneficial or negative manner with the effects of other committed schemes that are not currently in existence but may be by the time the Proposed Development is implemented.

14.5 The cumulative effects are considered in each topic Chapter where appropriate, the identified cumulative effects can be summarised as follows:

Table 14.1: Summary of Cumulative effects

Topic Chapter	Committed Scheme	Potential Cumulative Effects
Chapter 6 Socio-economic	Lindley Moor employment site and Slipper Lane employment site	**Major beneficial** Employment Productivity Business Rates Retail and service provision Housing Labour force Household income and expenditure **Minor adverse/Negligible** Education Open space and recreation Council tax revenue

		New Homes Bonus
Chapter 7 Landscape and Visual Impact	Highways improvements to Junction 26 M62, Chainbar roundabout – as set out in the KMBC UDP	Visual impact
Chapter 8 Ground Conditions	No committed schemes of relevance identified	
Chapter 9 Ecology	No committed schemes of relevance identified	
Chapter 10 Flood risk and drainage	No committed schemes of relevance	
Chapter 11 Highways	No committed schemes of relevance identified	
Chapter 12 Noise	No committed schemes of relevance identified	
Chapter 13 Air Quality	No committed schemes of relevance identified	

14.6 Chapter 7 – Landscape and Visual Impact considered the possible effect of the highway improvements to the Junction 26 of the M62 as set out in the Kirklees Councils Local Plan. These proposals have not been confirmed, and therefore it is difficult to assess the potential effect. Based on the potential line as set out in the Kirklees Plan it is considered that this would affect views into the site and provide additional planting. Apart from Chapter 6 – Socio-economics, there were no committed schemes of relevance to the other Chapters within the ES.

14.7 No significant adverse effects are identified from the cumulative assessment.

15. Summary of Mitigation Measures and Residual Effects

15.1 The preparation of the ES has been undertaken in parallel with the design process. As a consequence, many measures to mitigation likely significant adverse environmental effects have been incorporated into the Proposed Development design in order to avoid, reduce or offset such effects. As such, many mitigation measures, have been "designed in" and these are set out in Chapter 4 Proposed Development, and addressed throughout the ES.

15.2 Additional mitigation measures have been proposed in relation to both construction and operation and these have been set out in each of the preceding technical chapters. These have been defined and clear and binding methods set out to ensure they are secured. A summary of these additional measures is set out below, **Table 15.1**.

Table 15.1: Summary of Additional Mitigation Measures

Topic Area	Measures	How it can be secured
Ground conditions, Air quality, Transport, Noise, Flood Risk and Drainage, Ecology	Construction Environmental Management Plan (CEMP)	Planning condition
Flood risk and drainage, and Ground Conditions	Drainage Strategy to secure detail of SUDs and foul drainage, with water efficiency measures to be included in detailed design	Planning condition
Ground conditions	Adherence to Remediation Strategy	Planning condition
Highways and Transport	Framework Travel Plan	Planning condition
Ecology	BEMP, lighting scheme and detailed design	Planning condition
Noise	Operational noise limits, traffic management plan, detailed design and detailed glazing design, noise assessment for 24hr operations including mitigation in detailed design	Planning condition
Air Quality	Framework Travel Plan	Planning condition
Landscape and visual	Securing landscape scheme	Planning condition

15.3 The residual effects of the Proposed Development have been assessed in the technical chapters, as outlined in the summary tables. **Table 15.2** summarises the main residual effects of the Proposed Development. To provide further clarification on the nature of the effects, each as been identified as:

- Local, regional or national in scale (L,R,N)
- Direct or indirect (D/I)
- Permanent or temporary (P/T)
- Short, medium or long term (ST,MT,LT)
- Reversible or Irreversible (R/I)

Topic	Stage	Description	Significance	Extent (L/R)	Nature (D/I, T/P, ST/MT/LT, R/I)
Socio-economic	Construction	Employment – Local	Substantial beneficial	L	D\I, T,ST
		Economic Productivity - Local	Substantial beneficial	L	D\I, T,ST
	Operational	Business rates	Moderate beneficial	L	D\I, P,LT
		New homes bonus	Moderate beneficial	L	D\I, P,MT
Landscape and Visual	Construction	Batley Fringe Incised Valleys – Landscape Character area	Major/Moderate adverse	L	D,T,LT,I
		Viewpoint 1 – Footpath by Cliff Hollins Farm	Major/Moderate adverse	L	D,T, LT, I
		Viewpoint 3 – Junction Cliff Hollins Lane and access to site	Moderate adverse	L	D,T,LT,I
		Viewpoint 4 – Footpath north of Hanging Wood	Major/moderate adverse	L	D,T,LT,I
		Cliff Hollins Farm	Major/moderate adverse	L	D, T, LT, I
		Two properties at grid refs 417862 and 428084	Major/moderate adverse	L	D, T, LT,I
		Bungalows at Cliff Hollins Lane	Moderate adverse	L	D, T, LT,I
		Footpaths within the site	Major/moderate	L	D,T,LT,I
	Operational	Batley Fringe Incised Valleys – Landscape Character area	Major/Moderate adverse	L	D,T,LT,I

Topic	Stage	Description	Significance	Extent (L/R)	Nature (D/I, T/P, ST/MT/LT, R/I)
		Viewpoint 1 – Footpath by Cliff Hollins Farm	Major/Moderate adverse	L	D,T, LT, I
		Viewpoint 3 – Junction Cliff Hollins Lane and access to site	Moderate adverse	L	D,T,LT,I
		Viewpoint 4 – Footpath north of Hanging Wood	Major/moderate adverse	L	D,T,LT,I
		Cliff Hollins Farm	Major/moderate adverse	L	D, T, LT, I
		Two properties at grid refs 417862 and 428084	Major/moderate adverse	L	D, T, LT,I
		Bungalows at Cliff Hollins Lane	Moderate adverse	L	D, T, LT,I
		Footpaths within the site	Major/moderate adverse	L	D,T,LT,I
Ground conditions		No Significant effects identified			
Ecology		Invasive Species	Minor/moderate beneficial	L	D,T
		Invasive species	Minor moderate beneficial	L	D,P
Flood Risk and Drainage		No significant effects identified			
Highways and Transport		No significant effects identified			
Noise		No significant effects identified			

Topic	Stage	Description	Significance	Extent (L/R)	Nature (D/I, T/P, ST/MT/LT, R/I)
Air Quality		No significant effects identified			

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