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Environmental Statement

Application for the Development of Houghton Main Renewable Energy Centre (REC) comprising a Timber Resource Recovery Centre (TRRC) and Associated Infrastructure

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Land located off Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley

Peel Environmental Management (UK) Limited and Houghton Main Waste Limited

CRM.066.004

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Project:	CRM.066.004
Location:	Land located off Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley
For:	Peel Environmental Management (UK) Limited and Houghton Main Waste Limited
Status:	Final
Date:	February 2015
Author:	Bethany Kington **Planning Consultant**
Reviewer:	Lee Searles **Planning Director**

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1 Chapter 1: Background, Introduction and Context

1.1 Introduction

1.1.1 This Environmental Statement (ES) supports a planning application made by Peel Environmental Management (UK) Limited and Houghton Main Waste Limited (Peel) to develop a Renewable Energy Centre (REC) on land off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley. The proposed REC comprises a 150,000 tonne per annum (tpa) Timber Resource Recovery Centre (TRRC).

1.1.2 The development of the site will create an energy generation facility with the potential to export 20 megawatts (MW) of electricity and provide a direct heat and/or electrical supply to appropriate offtakers in the local area.

1.1.3 In accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (the EIA Regulations), this ES accompanies the planning application. It contains the detailed information required by the Local Planning Authority (LPA) to assist them in their determination of the application. This ES reports the outcome of the Environmental Impact Assessment (EIA).

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1.2 The Site

1.2.1 The application site is 3 hectares (ha). The red line application is shown on the Site Location Plan (PL 002). The site is former colliery land off the Houghton Main area Colliery Roundabout. The land has regenerated naturally with scrub vegetation. The nearest postcode to the site is S71 5EX and the National Grid Reference of the centre of the site is SE 41696 06515.

1.2.2 The site is bound by curved flood defences to the north and west which follow the alignment of a disused rail line. The River Dearne runs in a north south direction to the west of the site. The northern half of the eastern edge is bound by employment land which is the remaining portion of the allocated employment site. Beyond that is the A6195 Park Spring Road. In the southern part of the site (south of the roundabout), the eastern edge is bound by disused land.

1.3 Proposed facility

1.3.1 The TRRC will be developed by Northern Bio Power Limited. The construction and operation of the TRRC will be carried out under contract. The partners involved have recently developed similar facilities in Plymouth and Tyseley, Birmingham.

1.3.2 The REC will receive approximately 150,000tpa of biomass which may include civic amenity, domestic, commercial and industrial waste timber. The TRRC will subject it to a process that recovers clean ferrous and non-ferrous material for recycling, and it will export approximately 20MW of renewable electrical power.

1.4 Proposed development

1.4.1 The Proposed Site Layout Plan (PL003) shows the location of the site.

1.5 Site access

1.5.1 The facility will make use of the existing western access off the Houghton Main Colliery Roundabout. The final design of the access has been determined following the completion of a Transport Assessment as part of this EIA process (the results of which are contained at Chapter 6 of this ES) and is shown on the Proposed Site Layout drawing PL 003.

1.6 Fuel Source

1.6.1 The TRRC will be supplied with a biomass feedstock through a single contract. Northern Bio-Power intends to include provisions within these arrangements for as much waste wood as possible to be supplied from local and sub-regional markets. A single contract provides advantages in terms of improving the ability of the operators to manage heavy vehicle traffic routes to the plant, and to manage and limit delivery hours in accordance with operational, traffic and local amenity considerations. From an operational viewpoint, a single contract also provides more control over the quality and consistency of waste materials and greater security in terms of power generation.

1.7 The Applicant

1.7.1 The applicant is Peel Environmental Management (UK) Limited and Houghton Main Waste Limited (Peel). Peel owns, manages and develops infrastructure in the waste, minerals and environmental sectors. The company identifies sites suitable for development and is at the forefront of developing new infrastructure by working with technology partners to address the energy challenges faced. Peel is seeking to develop a network of energy facilities across England and Scotland, and is currently pursuing opportunities in Yorkshire and Nottinghamshire. Houghton Main Waste Limited is a special purpose vehicle created by Peel to deliver the proposed Houghton Main REC development.

1.8 EIA Regulations

1.8.1 Undertaking an Environmental Impact Assessment (EIA) and the submission of an associated ES alongside a planning application, is the statutory procedure for assessing the likely effects on the environment of new development and ensuring they are fully understood and taken into account before the development is consented. The EIA enables the full consideration of environmental factors when planning applications are being considered.

1.8.2 The EIA Regulations require an EIA to be carried out to support a specific range of major development proposals. The EIA is defined in the Department of the Environment, Transport and the Regions Circular 02/99 as:

> "*a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects, and the scope for reducing them, are properly understood by the public and the relevant competent authority before it makes a decision.*"

1.8.3 The EIA Regulations specify certain types of development for which an EIA is mandatory (Schedule 1 Developments) and categories of development where an EIA may be required (Schedule 2 Developments) "if it is likely to have significant effects on the environment by virtue of factors such as its size, nature or location".

1.8.4 Resource Recovery Facilities are deemed to fall under category 10 of Schedule 1 of the EIA Regulations. This identifies "Waste disposal installations for the incineration or chemical treatment" (as defined in Annex IIA to Council Directive 75/442/EEC under heading D9) of non-hazardous waste with a capacity exceeding 100 tonnes per day as Schedule 1 Development.

1.8.5 The proposed development of the Houghton Main Renewable Energy Centre will require a planning application to be submitted. With an anticipated throughput in excess of 100 tonnes per day, the proposed facility falls under Schedule 1 Development of the EIA Regulations and therefore requires an EIA to be prepared to accompany the planning application.

1.8.6 The EIA must be reported in the form of an ES. The content of the ES is broadly set out in Schedule 4 to the EIA Regulations and can be further refined through a formal scoping process detailed at Section 13 of the EIA Regulations. Schedule 4 contains information which must be included in an ES (at Part II) and information which should be included if relevant (at Part I).

1.8.7 A breakdown of the requirements of Schedule 4, and where within this ES the relevant information can be found, is provided in Table 1.1 below.

Table 1.1 Schedule 4 EIA Requirements

Schedule 4 Reference	Requirement	Location within ES
Part I	Description of the development, including in particular:	
1(a)	A description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases.	Volume 1; Chapters 2-3
1(b)	A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used.	Volume 1; Chapter 3
1(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.	Volume 1; Chapters 5-17
Part I 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.	Volume 1; Chapter 5
Part I 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, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.	Volume 1; Chapters 5-17
Part I	A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:	
4(a)	The existence of the development	Volume 1; Chapters 5-17
4(b)	The use of natural resources	
4(c)	The emission of pollutants, the creation of nuisances and the elimination of waste.	
Part I 4	The description by the applicant of the forecasting methods used to assess the effects on the environment.	
Part I 5	A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.	
Part I 6	A non-technical summary of the information provided under paragraphs 1 to 5 of this Part.	Volume 2
Part I 7	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	Volume 1; Chapters 5-17

Part II 1	A description of the development comprising information on the site, design and size of the development.	Volume 1; Chapters 2-3
Part II 2	A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.	Volume 1; Chapters 5-17
Part II 3	The data required to identify and assess the main effects which the development is likely to have on the environment.	Volume 1; Chapters 5-17
Part II 4	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.	Volume 1; Chapter 5
Part II 5	A non-technical summary of the information provided under paragraphs 1 to 4 of this Part.	Volume 2

1.9 EIA Scoping

1.9.1 The revised proposals which are being submitted through this planning application remove the AD facility as part of the planning application 2014/0559. The application area has been amended to reflect this. All other aspects of the previous proposal remain substantially the same. In accordance with Section 13(1) of the EIA Regulations a scoping request was submitted to Barnsley Metropolitan Borough Council (BMBC) on the 10th February 2014 in relation to application 2014/0559. BMBC issued their Scoping Opinion Response (ref 2014/ENQ/00148) on 10 April 2014. A copy of the scoping request and that opinion is provided at Appendix 1.1 & 1.3 of Volume 3-Technical Appendices. The content of the Scoping Opinion has been taken into account in the undertaking of the revised assessments for, and the preparation of, this ES to support a new planning application for the revised development proposals.

1.9.2 A scoping request to support the current application was submitted to BMBC on the 29th January 2015. In addition to formal scoping processes, a significant amount of general pre-application consultation and discussion has taken place relating to the development of the site including, but not limited to:

- On 6 January 2014, Peel and its planning advisors met with the Leader of BMBC, Sir Stephen Houghton, and senior officers, to discuss the proposal.
- On 29 January 2014 Peel and its planning advisors held a formal pre-application round table meeting with BMBC planning staff and key consultees. The meeting was part of a formal pre-application advice process undertaken for the proposed development. This process included consultation on the proposal with a number of consultees at pre-application stage. The planning process and the proposed development were discussed with the BMBC officers.
- On 10th February a scoping request was made to BMBC on the proposed Renewable Energy Park.

- On 27th February 2014 Peel and its planning advisors held a follow up pre-application meeting with BMBC planning staff.
- On 4 March Peel and its design team presented the design rationale behind the project to the Barnsley Urban Renaissance Design Advisory Panel. The Panel were presented with the design development process undertaken and agreed that the adopted 'form follows function' design approach was appropriate.
- On 10th April BMBC issued their Scoping Opinion on the proposed Renewable Energy Park.
- On 10th April Peel and its planning advisors held a further follow up pre-application meeting with BMBC staff to discuss planning and regeneration issues.

1.9.3 Following submission of the previous planning application, further technical work and technical liaison meetings with council officials and other stakeholders have taken place to address issues of concern related to the development proposals. These include:

- Follow-up surveys were undertaken to demonstrate that ecological impacts from the development would be acceptable and could be successfully mitigated and managed during construction. The results of these ecological surveys have been taken into account in the current application.
- A unilateral undertaking agreement was formulated and agreed based on a financial contribution to the improvement of the Nature Improvement Area in Barnsley Borough. It is anticipated that an agreement will be reached in relation to the revised application.
- The development of a landscape masterplan to provide landscape and ecological benefits as a result of the proposed development. These have been retained in the revised proposals.
- All technical assessment work on the revised application has been undertaken using methodologies previously agreed with the relevant consultees/ stakeholders. These reflect comments made when the previous planning application was considered.

1.10 Community Engagement

1.10.1 The previous planning application was subject to a comprehensive programme of community engagement. Full details of community engagement to support the current planning application are set out in the Statement of Community Involvement which is included at section 4 of the Planning Application.

1.10.2 An addendum to the SCI has been prepared to provide details of our engagement over the development of the revised proposal. This is set out in section 4 of the planning application.

1.11 Environmental Statement Structure

1.11.1 This ES reports the outcome of the EIA process, required by the EIA Regulations. This insures that the planning authority is fully informed of the likely significant effects of the development. As required by the EIA Regulations the document:

- Describes the proposals and the area surrounding the proposed development site;
- Describes the existing environmental conditions in the area of the proposed development site;
- Draws conclusions about any significant effects that the proposals may have on the environment; and
- Explains the measures that Peel has adopted or intends to adopt in order to mitigate any identified significant adverse effects.

1.11.2 This ES follows a standard format and structure as detailed below. This document forms Volume 1 of the ES. It is the Main ES Report which contains an introduction to the proposed development and includes the technical assessments (including baseline studies, assessment methodologies and findings) undertaken to determine the potential likely impacts of the proposal in accordance with the EIA Regulations and national guidance.

1.11.3 Volume 1 is laid out in the chapters detailed in Table 1.2 below.

Table 1.2: ES Structure

Chapter	Heading
1	Background, Introduction and Context (this Chapter)
2	Site Description
3	Proposed Development
4	Planning History and Policy Context
5	Need and Alternatives
6	Transport
7	Hydrology, Flood Risk and SUDS
8	Air Quality
9	Landscape and Visual Amenity
10	Noise and Vibration
11	Ecology and Nature Conservation
12	Hydrogeology and Ground Conditions
13	Archaeology and Cultural Heritage
14	Socio-Economic Impacts
15	Other Amenity Issues
16	Cumulative Impacts
17	Summary

1.11.4 In accordance with the EIA Regulations (Schedule 4, Part I, Section 6) and national guidance, this ES, contains a Non-Technical Summary (NTS) in Volume 2. The NTS sets out the main findings of the ES in accessible (i.e. non-technical) language.

1.11.5 Technical appendices to the Main Report are contained in Volume 3 of the ES. The technical appendices include, for example, consultation responses from relevant consultees, technical data and diagrams, background information and technical terminology.

2 Chapter 2: Site Description

2.1 Introduction

2.1.1 The subject site is 3 ha in area in an approximately triangular shape to the west of the A6195 Park Spring Road, Barnsley. The site is located approximately 1km west of Little Houghton and 6.5km east of Barnsley town Centre.

2.1.2 The site is bound by curved flood defences to the north and west which follow the alignment of a disused rail line. The River Dearne runs in a north south direction to the west of the site. The northern half of the eastern edge is bound by employment land which is the remaining portion of the allocated employment site. Beyond that is the A6195 Park Spring Road. In the southern part of the site (south of the roundabout), the eastern edge is bound by disused land.

2.1.3 The site is brownfield land primarily vegetated with rough restored grassland. Some scattered shrubs and small trees are also present on the site. The site is flat except for bunding at its northern and western boundaries.

2.1.4 The site was subject to open cast colliery workings between 1997 and 2001 which included the removal of any earthworks associated with the former railway lines. The colliery was previously used for deep shaft mining by UK Coal between the 1890's and 1991. Open casting was completed and the land was reclaimed and compacted to provide a platform suitable for industrial development.

2.1.5 There is an ASOS Fulfilment Centre on land adjacent to the east and south east of the site. The warehouse was developed by Prologis and was constructed under Reserved Matters Approval 2005/1441 (which followed Outline Planning Permission B/03/0762/HR granted in 2003 for Class B1, B2 and B8 development of the site). The existing warehouse has recently been granted planning permission for an extension (ref: 2012/1018).

2.1.6 The site is relatively remote from any residential properties. There are a few scattered farms and properties nearby, the closest being Crook Farm located approximately 0.8km to the west, Store Mill Farm located 1.5km to the north west, Tyers Hall Farm located 1.8km to the south west and a housing development located on Doncaster Road, 1.8km south west of the proposed development.

2.2 Access

2.2.1 Access to the site is from a spur off an existing roundabout (known as Houghton Main Colliery Roundabout) on the A6195 Park Spring Road.

2.2.2 The existing spur access will be improved as part of the proposed development and tailored to suit the development proposal. The entry gate and weighbridge off the access road are shown on drawing PL003 Proposed Site Layout which accompanies the planning application.

2.2.3 The site is well connected to the strategic highway network, with the both the A1 (M) and M1 approximately 9km away to the east and west respectively. Access to the motorway network can be gained using the A6195 and other A-class roads linking to it. Similarly, a good class of road (A635) provides connection to Barnsley town centre.

2.3 Sensitive Receptors

2.3.1 The nearest residential properties to the application site are Crook House Farm located approximately 0.8km to the west, Store Mill Farm located 1.5km to the north west, Tyers Hall Farm located 1.8km to the south west and a housing development located on Doncaster Road located 1.8km south west of the site. Potential impacts of the proposal on these and other nearby residential dwellings, including noise and visual, have been taken into account and fully assessed throughout the application. Amenity impacts deriving from the proposed operations (such as noise) have been alleviated through the appropriate design and layout of the site. Mitigation measures will also be implemented including on-site landscaping and planting to address any residual visual impacts.

2.3.2 There is an existing warehouse (ASOS Fulfilment Centre) on land to the east of the site on the opposite side of Park Spring Road.

2.3.3 The site is surrounded by the Barnsley Green Belt on three sides. The impact of the proposal on the setting of the Barnsley Green Belt has been considered in the Landscape and Visual Impact Assessment (Chapter 9) of this Environmental Statement.

2.3.4 A public footpath runs alongside the north east tip of the application site.

2.3.5 The RSPB Dearne Valley Old Moor wetlands nature reserve lies approximately 5km to the south of the site. The reserve is based around several lakes which form marshland and reedbeds. There are also open water and land habitats present at the reserve.

2.3.6 The site lies within the Dearne Valley Nature Improvement Area which covers extensive areas of Barnsley and adjoining Boroughs.

2.4 Nature Conservation

2.4.1 There are a number of designated nature conservation sites, included Local Nature Reserves (LNR) and Sites of Special Scientific Interest (SSSI) within 15km of the application site. The nearest of these is Edderthorpe Ings which lies approximately 0.5km to the north of the site. The potential impacts of the proposed development on these sites are considered in the accompanying Environmental Statement.

2.4.2 There are no European Designated Sites (Ramsar, Special Areas of Conservation or Special Protection Areas) within 15km of the site. The site is located within Landscape Character Area C2 Lower Dearne Lowland River Floor.

2.5 Flood Risk

2.5.1 The majority of the site is located within Flood Zone 1. Part of the site, in the north-west corner, is within Flood Zone 2. The proposed site layout has been designed to minimise the flood risk to the site and surrounding area. The part of the site within Flood Zone 2 is largely free of built form. The Air Cooled Condensers which are in that area are built on stilts and therefore are raised above the flood risk area.

2.5.2 A meeting was held with Environment Agency representatives in the Yorkshire and North East Regional Offices on the 19th February 2014 regarding the location of the site in relation to the current Flood Zone 2 outline. After discussions with the Environment Agency, it was agreed that topographic information for the site illustrates that the Flood Zone 2 outline may not be truly representative and that further modelling work is not required to discount the Flood Zone 2 location of the site.

2.5.3 Enzygo has mapped the modelled flood levels after consultation with the Environment Agency. This modelling work was conducted by JBA Consulting Ltd in May 2014. Using detailed topographical information for the site area and modelled flood levels from the Environment Agency, it can be seen that the flood zone associated with a 1 in 200 year flooding event (0.5% AEP) does not extend to the site area.

2.6 Planning Allocations / Designations

2.6.1 The application site is previously developed land. In the current context, the development plan for the application site comprises:

- The Barnsley Draft Local Plan (Published for consultation in November 2014);
- The Barnsley Core Strategy (Adopted September 2011);
- The remaining Saved Policies of the Barnsley Unitary Development Plan (UDP) (adopted December 2000); and
- Barnsley, Doncaster and Rotherham Joint Waste Plan (adopted March 2012).

2.6.2 The Draft Local Plan proposes the application site as suitable for employment allocation (Site N2-Land west of Park Spring Road, Houghton). Box N2 states that any development at Park Springs, Houghton must consider potential impacts on the nearby Edderthorpe Ings Local Wildlife Site and include appropriate mitigation where necessary. It also states that any development would be expected to retain the marshy grassland areas, or if this is not possible, wetland features should be incorporated into the development as replacement habitat.

2.6.3 The site is allocated in the UDP (Saved Policies) as an 'Area of Investigation for Potential Employment Development' (Policy DA4). The allocation is surrounded by Green Belt and an area of 'Washlands' (Policy DA12) to the south and west.

2.1 Policy DA4 states:

"*The site of the former Houghton Main Colliery is designated as an area of investigation for potential employment development.*"

2.6.4 Policy CSP 19 of the Core Strategy seeks to safeguard existing employment land and land previously used for employment to protect future employment potential.

2.6.5 The subject land was not considered for allocation in the Joint Waste Plan because, as set out in the Site Assessment Report undertaken in October 2008, "Part of the site [was] already developed". As such, the site was not taken any further in the allocation of sites for waste development. It is understood from this statement that the merits of the site for allocation were not considered as part of the process.

2.6.6 The Development Sites and Places Consultation Draft (July 2012) considers the future use of all land within the borough to "Create the conditions for economic growth and greater prosperity through the provision of quality employment sites..." It also contains general and site specific policies which will be used to determine planning applications.

2.6.7 The site is identified in this document as an 'Employment Land Option' (Site N2). Policy EMP1 'Uses on employment land' which relates to allocated employment land states:

"On allocated Employment Sites, or land currently or last used for employment purposes, we will allow the following uses:

- *Research* and *development, and light industry*
- *General industrial*
- *Storage or distribution*

Ancillary uses will be allowed where appropriate in scale.

Other uses may be considered on their merits, particularly their contribution to the borough's economic offer and job density."

2.6.8 The former Houghton Main Colliery site was allocated within the Unitary Development Plan for Major Employment site. A range of potential employment sites were assessed as part of the preparatory process for the Development Sites and Places DPD. The proposed site was selected potentially for Employment development within this DPD.

3 Chapter 3: Proposed development

3.1 Introduction

3.1.1 The proposed Renewable Energy Centre (REC) comprises a 150,000 tonne per annum (tpa) Timber Resource Recovery Centre (TRRC).

3.1.2 The application site is 3 hectares (ha) in area and is located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley. The red line application area is shown on the Site Location Plan (PL 002).

3.1.3 The development of the site will create a renewable energy generation facility with the potential to export 20 megawatts (MW) of electricity, and with the potential to provide a direct heat and/or electrical supply to appropriate offtakers in the local area.

3.2 Timber Resource Recover Centre proposals and process

3.2.1 The TRRC will receive approximately 150,000tpa of biomass which will be subjected to a process that recovers clean ferrous and non-ferrous material for recycling. The facility will source previously used waste wood from the surrounding area to process in the TRRC. The biomass used will include wood products recovered from civic amenity, domestic, and commercial and industrial sources after the removal of other valuable recyclable materials. Other wood-derived fuels such as paper products may also be used in the process.

3.2.2 The proposed TRRC will comprise the following key elements:

- Reception Hall (65.0m X 45.0m X 9.0 to eaves, 11.37 to top of upstand)
- Process Building (102.0m X 30.0m X 30.0m to top of parapet)
- Stack (2.5m diameter X 45m)
- Turbine Hall (25.7m X 18.0m X 17.9m)
- Offices/ workshop (12.3m X 18m X 17.9m to parapet)
- Air Cooled Condensers (53.7m X 13.4m X 23.0m)
- Ash Storage Silos (6.6 diameter X 14.8)
- Fire water tank (13.0m diameter X 7.0m)
- Fuel oil storage tank (13.2m X 2.4m X 2.5m)
- Standby generator (13.2m X 3.2m X 2.0m)
- Fire Water pumps enclosure (4.0m X 3.0m X 2.5m)
- Sub-station
- Weighbridge (2 off);

- Site fencing;
- External Lighting
- Parking spaces
- A cycle shelter

3.3 TRRC Process Description

3.3.1 The feedstock, pre-prepared biomass, will arrive at the facility in a form ready for use in the gasification process. This material may, due to its source, still have some valuable ferrous and non-ferrous metals included in the deliveries. The first stage of the process is to recover these materials from the feedstock using a combination of magnets and eddy current separation. These recovered materials are then removed from the facility and also recycled.

3.3.2 The remaining prepared/cleaned feedstock is then transferred into a gasification chamber where it is heated in a low oxygen environment (gasification) to a point where the material is forced to drive off its valuable gases. These gases are where the process derives most of its energy.

3.3.3 As the gases leave the gasification process they enter a combustion chamber where they are ignited to produce a sustainable and consistent energy level. This energy (heat) is then passed through a boiler to produce steam.

3.3.4 The steam generated is produced at a temperature and pressure sufficient to power a turbine connected to an alternator for the production of renewable electricity which either goes directly to local businesses that can use it or it is sent directly to the National Grid.

3.3.5 Remaining gases from the process pass through an advanced cleaning process to remove any harmful emissions and particulates to regulated levels before exiting the plant via a stack. All emissions are monitored and controlled by the Environment Agency under an Environmental Permit to ensure they do not permit any form of harmful emissions though the facilities operation.

3.3.6 Where possible all residuals (e.g. recycled metals/ash from the gasification process) from the plant with a value to other market sectors are also recovered and reprocessed.

3.3.7 The TRRC will have a stack for the cleaned gases from the gasification process. The height of the stack has been determined through detailed air dispersion modelling as 45m.

3.4 Hours of Construction and Operation

3.4.1 The hours of construction and operation proposed are set out in Table 3.1 below.

Table 3.1 Hours of Construction and Operation of the REC Facility

Construction and Material Deliveries	Monday-Friday	Saturday	Sunday/Public Holidays
Construction	0700-1900	0700-1300	No Deliveries
TRRC Deliveries	0700-1900	0700-1300	No Deliveries

TRRC Power Generation Operations	Monday-Friday	Saturday	Sunday/Public Holidays
TRRC	24 Hour	24 Hour	24 Hour

3.4.2 Although no fuel deliveries are proposed on Sundays or Public Holidays, there may be occasions (e.g. following periods of unplanned outage) where some Sunday working may be required to catch up. In those instances it is proposed to notify BMBC of any such intention in advance.

3.5 Access and Vehicle Movements

3.5.1 The facility will be accessed via an existing spur off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main. This existing roundabout has been designed for industrial use and is a suitable access point for the proposed development.

3.5.2 The anticipated vehicle movements generated by the proposed development are set out in Table 3.2.

Table 3.2 TRRC Heavy Vehicles Daily Movement Summary

	TRRC Heavy Vehicle Traffic		
	IN	OUT	TOTAL
AM	3	3	6
PM	0	1	2
Daily	30	30	60

3.5.3 The TRRC will employ a total of 25 members of staff. The operator has advised that a maximum of 4 shift staff will be on site at any one time and that the facility will operate 24 hours a day with two 12 hour shifts (7am-7pm, 7pm-7am). In addition 4 management staff will work normal office hours 8am-5pm

3.5.4 The total forecast of peak hour deliveries in and out of the REC is shown in Table 3.3 below.

Table 3.3. Total Site Traffic (in vehs)

	HV Traffic			Shift Staff Car Traffic			Management Staff Car Traffic			Total Traffic		
	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
AM Peak Hour	3	3	6	0	0	0	3	0	3	6	3	9
PM Peak Hour	0	1	2	0	0	0	0	3	3	0	4	5
Daily	30	30	59	6	6	11	3	3	6	38	38	76

3.6 Employment

3.6.1 The proposed scheme will generate 25 full time equivalent (FTE) jobs during operation of the facility and an estimated 200 FTE jobs during the peak of construction activities.

4 Chapter 4: Planning History and Policy Context

4.1 Introduction

4.1.1 This chapter provides details of the planning history of the Application Site and sets the context of the planning policy documents relevant to the site and the proposed development.

4.2 Site History

4.2.1 The site is part of the former Houghton Main Colliery which has been subject to both deep shaft mining and, more recently, opencast working. Following opencast working the site was backfilled and restored to original levels.

4.2.2 The South Yorkshire Mining Advisory Service, in its pre-application consultation response of 6 January 2014, confirmed that:

> "*The site predominantly lies in an area which used to form part of Houghton Main Colliery which operated from the late 1800s and closed in the early 1990s. Previous land use included* railway *sidings associated with the colliery and opencast coal extraction. Opencast operations began in 1997 and were completed in 2001, which involved working the Shafton, Highgate and Highgate Rider Coal Seams. The site was restored to original levels using earthwork compaction methods; however, according to past site investigations for this site (White Young Green Environmental) areas of the fill material will require further compaction/improvement in order to* minimise the potential for ongoing creep settlement."

4.2.3 The Coal Authority, in its pre-application consultation response of 19 December 2013, confirmed that:

> "*The site was subject to underground mining in 10 seams at depths from 316m to 851m, which were* last *worked in 1991. The site has also been subjected to surface coal mining which has subsequently been restored. The site also has recorded probable historic shallow coal workings and thick coal outcrops."*

4.2.4 The site is therefore considered to be brownfield, previously developed land suitable for redevelopment. Since restoration the site has been the subject of a planning application, granted in 2008 and extended in 2012, for 19 light industrial units using the existing site access.

4.3 Planning History

4.3.1 A search of the BMBC's Planning Explorer database reveals the planning permission history for the site and surrounding area set out in Table 4.1 below.

Table 4.1: Planning History of the site and surrounding land (as at January 2015)

Application Number	Site Address	Development Description	Status	Date Registered	Decision
2014/0559	Land off Houghton Main Colliery Roundabout, Park Springs Road, Little Houghton, Barnsley	Development of a Renewable Energy Park comprising a 150,000 tonnes per annum Timber Resource Recovery Centre and a 60,000 tonnes per annum Anaerobic Digestion Facility, and associated infrastructure	Final Decision	30 May 2014	Refuse
2013/0860	Park Spring Road, Little Houghton, Barnsley	Erection of 3 no. turbines wind farm with a height of 80m to hub and 126.5m to blade tip, including substation building and ancillary infrastructure. (Environmental Impact Assessment)	Final Decision	9-09-2013	Approved with conditions
2012/1018	ASOS, Park Spring Road, Little Houghton, Barnsley, S72 7GX	Erection of extensions to southern and western elevations of existing distribution warehouse and extension to existing surfaced car parking area	Final Decision	13-09-2012	Approve with Conditions
2011/1443	Land off Park Spring Road, Houghton Main, Little Houghton, Barnsley	Erection of 19 industrial units with associated external works and landscaping (Extension to time limit of application 2008/1426)	Final Decision	20-12-2011	Approve with Conditions
2011/0951	Land off Park Spring Road, Little Houghton, Barnsley, S72	Installation of a 70m high meteorological data gathering mast (Temporary for 2 Years).	Final Decision	08-08-2011	Approve for a Temporary Period
2008/1426	Land off Park Spring Road, Houghton	Erection of 19 industrial units with associated	Final Decision	11-09-2008	Approve

	Main, Grimethorpe Barnsley	external works and landscaping			
2005/1441	Park Springs, off Park Spring Road, Little Houghton, Barnsley.	Erection of a distribution warehouse and associated offices, car parking, service areas and landscaping (Reserved Matters).	FINAL DECISION	22-08-2005	Approve with Conditions
B/03/0762/ HR	S/O Houghton Main Colliery, Middlecliffe Ln, Little Houghton	Outline for modification of Condition No. 1 of planning consent B/99/1064/HR for use of land for industrial/employment uses	Final Decision	14-05-2003	

Orange highlighting indicates permissions covering the subject site.

5 Chapter 5: Needs and Alternatives

5.1 Introduction

5.1.1 This section of the ES details the need for the development in terms of planning policy, and also outlines the alternative sites and methods considered for the development. A detailed need assessment for the proposed development, in relation to feedstock arisings and the Development Plan, is provided at Chapter 6 of the Planning Statement.

5.1.2 It is worth noting that the National Planning Policy Framework, at paragraph 98, states:

> *"When determining planning applications, local planning authorities should:*
>
> *not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy..."*

5.2 Need for the Development

5.2.1 The need assessment for the development of a Renewable Energy Centre (REC) at land located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley, has been undertaken using all relevant national, regional, and local policy documents relating to waste management and land use. In addition, a review of the energy demands and renewable energy targets set out national, regional and local levels has been undertaken. As already detailed, a full need assessment is provided in the Planning Supporting Statement.

5.3 Alternatives

5.3.1 The EIA Regulations provide guidance on the need for and content of an EIA. With regards to alternatives, Schedule 4 (Part II) of the EIA Regulations states that Environmental Statements should include:

> "*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*".

5.3.2 DETR Circular 02/99 provides further guidance on the need for alternative site assessment and how this should be incorporated into an ES. Paragraph 83 of the Circular states that:

> "*Where alternative approaches to development have been considered, paragraph 2 of Part II of Schedule 4 now requires the developer to include in the ES an outline of the main* ones*, and the main reasons for his choice. Although the Directive and the Regulations do not expressly require the developments and their location may take the consideration of alternative sites a material consideration...In such cases, the ES must record this consideration of alternative sites. More generally, consideration of alternatives (including alternative sites, choice of process and the phasing of construction) is widely regarded as good practice, and resulting in a more robust application for planning permission*".

5.3.3 The consideration of alternatives is a key consideration in the EIA process. In many cases, adverse environmental effects can best be avoided through consideration of alternative means of achieving a development proposal, such as different sites, layouts, and/or access arrangements.

5.3.4 This section of Chapter 5 provides details of the alternatives considered as part of this EIA process.

5.4 Justification For Alternatives Considered

Alternative Sites

5.5 Introduction

5.5.1 An Alternative Site Assessment (ASA) is required to examine whether there are sites potentially available which would perform better than the site selected for the proposed development. Enzygo undertook a review of potential alternative sites as part of the planning application 2014/0559. The ASA has been updated to reflect the changed site size required for the revised proposal. The updated ASA is set out in Section 5 of the Planning Application.

5.6 Methodology

5.6.1 The methodology used to update the ASA is the same as previously agreed with Barnsley Metropolitan Borough Council (BMBC) officers. This is still considered to be robust and commensurate with the scale of the development proposed. The methodology also ensures the relevant policy matters at national and local level are considered and covered in the ASA.

5.7 Geographical Extent of Search

5.7.1 The preliminary consideration in setting the parameters for the ASA was to set the geographical extent of the area from which alternative sites will be considered. For the ASA update it is still considered that the Barnsley Borough is an appropriate area within which to undertake the site search update. The exception remains that sites in Doncaster and Rotherham boroughs that have been identified in Barnsley, Doncaster and Rotherham Adopted Joint Waste Plan (JWP) will also be considered.

5.8 Site Size Threshold

5.8.1 The minimum site area requirement for the development proposal was calculated in consultation with the developers and the project architects. It was calculated that the proposed development has a minimum site are requirement of 3ha.

5.9 Sources of Site Information

5.9.1 Using the above geographical extent and site size criteria, the following sources were used to find potentially suitable sites:

- Identified existing waste sites the Barnsley, Doncaster and Rotherham JWP;

- New sites allocated in the Barnsley, Doncaster and Rotherham JWP;
- Sites allocated for employment of industrial use in the Barnsley Unitary Development Plan (UDP).
- Sites allocated as employment sites in the Local Plan Consultation Draft (2014)

5.10 Site Assessment Approach

5.10.1 Identified sites have been subjected to a two-stage assessment. In stage 1 of the assessment, a high-level sieving of sites has been undertaken to remove any site that has fundamental constraints that would preclude them from further consideration as a potentially suitable alternative site. Following the Stage 1 sieving, the remaining sites have been subjected to a more detailed Stage 2 site assessment.

5.11 Stage 1 – High Level Site Sieving

5.11.1 The criteria adopted for the Stage 1 high level sieving are set out below. These criteria are considered to be sufficiently fundamental to preclude any site that does not meet them.

1. **Does the site offer sufficient available land?** Potential sites must have adequate land available (3ha), as detailed above, to accommodate the proposed development.
2. **Is the site commercially available and vacant?** This is especially important for sites identified for employment uses in the UDP as this identification process was undertaken almost 15 years ago. Commercial property agents and other local sources will be used to remove sites that are either commercially unavailable and/or already developed.
3. **Is the site covered by a European conservation designation?** Sites with European conservation designations (including Special Protection Areas (**SPAs**), Special Areas of Conservation (**SACs**) and Ramsar sites) covering all or part of the site area are considered to be unsuitable for the proposed development activities.
4. **Does the site have a fundamental, irresolvable access problem?** Sites that have access problems that could not be reasonable mitigated (*e.g.* access to the site is only available via a weak bridge which could not carry an HGV; access to the site is only available via built up and heavily pedestrianised areas) are considered to be unsuitable for the proposed development activities.

5.11.2 Any sites that did not meet the requirements of the above criteria were eliminated from the assessment and did not proceed to the Stage 2 Site Assessment.

5.12 Stage 2 – Site Assessment

5.12.1 Sites brought forward following the Stage 1 High Level Sieving process were subjected to a more detailed Stage 2 Site Assessment. The criteria used in the Stage 2 Site Assessment have been developed using previous experience and the guidance in Annex E (Locational Criteria) to Planning

Policy Statement (PPS) 10: Planning for Sustainable Waste Management. The criteria adopted are as follows:

1. Is the site previously developed land or in active use for waste management?
2. Is development of the site likely to lead to significant visual impact?
3. Is development of the site in accordance with the policies of the Barnsley, Doncaster and Rotherham Joint Waste Plan?
4. Is the site in Flood Zone 2 or 3?
5. What is the site's standard of access?
6. What is the likely impact on residential amenity?
7. Is the site in the Green Belt?
8. What distance is the site from designated (i.e. environmentally sensitive) areas?
9. How proximate is the site to waste sources?

5.12.2 Following consideration of sites against each of the above criteria, each site was placed into one of the following categories:

a. **Suitable** – The site may be allocated for the proposed activity or a very similar activity. Such sites may not be totally without constraints to development but constraints could be mitigated through incorporated measures.

b. **Constrained** – The site is fettered by more significant environmental and/or technical constraints that would require the proposed development to be subject to a high level of adaption to be adequately mitigated.

c. **Strongly Constrained** – The site is likely to be strongly constrained by environmental or technical factors or is at the lower end of the land suitability spectrum (e.g. Greenfield land).

d. **Not Suitable** – The site is fettered by environmental or technical constraints that could not reasonably be mitigated or the site characteristics are such that accommodating the development within the site would not be practical.

5.12.3 Categorisation of sites as above is an inherently subjective process. The categorisation has been carried out by a chartered planner with significant experience in the waste management sector, in consultation with a qualified landscape architect and transport planner as appropriate. It is considered this approach is adequately robust to ensure a fair assessment of a site's attributes and suitability can be made.

5.12.4 Following the above categorisation, sites were given a final ranking.

5.13 Site Search

5.13.1 Eleven sites have been allocated for waste management use in the Barnsley, Doncaster and Rotherham Joint Waste Plan. Four of these are new sites, and seven are existing sites that have

been safeguarded. 78 sites over 3ha have been identified as employment sites in the UDP and Local Plan Consultation Draft.

5.14 Stage 1 Site Assessment

5.14.1 Two of the four new sites identified from the Joint Waste Plan have been discounted. Sandall Stones Road is 2ha in size and is too small to accommodate the proposed Renewable Energy Centre. Bolton Road is not available and is being developed for another waste management use. The remaining two sites have been taken forward to Stage 2. All of the seven existing sites are reserved for different types of facilities, and therefore are not suitable for the proposed development.

5.14.2 The Stage I Site Assessment has therefore been carried out on all 78 employment sites found through the site search process. The results for each site have been set down on individual site assessment sheets in Section 5 (Alternative Site Assessment). 47 of the 78 sites fail to meet the stage 1 criteria, mainly because they have an insufficient site area and are too small for the proposed aggregated development.

5.14.3 31 sites (including Houghton Main) have been considered potentially suitable and have been subjected to the Stage 2 assessment process.

5.15 Stage 2 Site Assessment

5.15.1 The Stage 2 Site Assessment has involved a detailed assessment of each individual site's suitability as a potential alternative location for the development proposal. The assessment results for each site assessed at Stage 2 are set out section 5 of the Planning Application.

5.15.2 Two sites identified for waste management use in the Joint Waste Plan are included in Stage 2 along with 31 employment sites of sufficient size.

5.15.3 The two waste sites are Aldwarke Steel Works, Parkgate, Rotherham (which is 5 ha in size) and Hatfield Power Park (which is 16ha in size). These sites have already been assessed against a basket of similar criteria through the Joint Waste Plan Process and so have not been subject to the assessment criteria in this assessment.

5.15.4 The status of each site has been checked with the relevant local planning authority. Aldwarke Steel Works remains vacant and available and so is considered suitable in terms of this assessment. According to officers at Doncaster MBC, Hatfield Power Park is no longer the subject of interest in delivering the local Barnsley, Doncaster, Rotherham PFI waste management contract. Significant public investment has been made into the delivery of Bolton Road, Manvers for this purpose. The significant infrastructure investment required to deliver the site's development potential (The Joint Waste Plan (Table 9) identifies the need for a road link to the M18 and improvements in flood defences as well as other development constraints) remains to be delivered. For the purposes of viable development of the proposed REC at this time, this would render this site strongly constrained.

5.15.5 Table 5.2 below shows the results of the assessment of each of the sites progressed to Stage 2. Vacant employment sites of sufficient size to accommodate the proposed REC are situated in a wide variety of locations and development contexts. Key factors which have influenced the performance of each site in this assessment have included access, topography, visual impacts, amenity impacts (noise and air quality considerations as far as they can be considered in this assessment), and proximity to waste markets.

5.15.6 As might be expected given the number of sites available for employment and industrial use in the area, there are a number of sites that perform relatively well in the assessment against the criteria. Numerous sites are potentially suitable but are constrained by uncertainties over potential impacts which would need to be evaluated through appropriate studies. This is explained in more detail below against the criteria adopted for the stage 2 assessment.

5.15.7 In transport terms, most of the allocated employment sites are generally well located on the strategic road network. However, some have less suitable access in terms of heavy vehicle access for the proposed use. For example, site 27 is located on a B-road and access routes to the site from the strategic road network pass through nearby villages. Site 8 is in a busy urban setting with complex access shared with adjoining retail uses and egress directly on to a busy roundabout. There is uncertainty over the local access to site 23 for heavy vehicles. Some sites are located in the far west of Barnsley on the Strategic Road Network, but routes to the sites would mean passing through urban areas of Barnsley from other parts of Barnsley, Doncaster and Rotherham. These constraints apply to site 20.

5.15.8 In relation to the visual impact criteria, the allocated employment sites have the potential to perform in differently. Only a full landscape and visual impact assessment would be able to determine the suitability of each site in the light of design and landscape mitigation. However, based on an on-site assessment, it can be said that some sites are located in undulating topography, with employment sites located prominently (sites 27, 50), or on development platforms mid-way down hillsides (Sites 23, 49) or in valley bottoms (Sites 8, 20, 44, 51).

5.15.9 Several sites have residential developments nearby, either overlooking the employment sites or overlooked by them. Some sites are located within business parks and the relationship with existing business uses needs to be considered in terms of the scale of development (i.e. existing uses would be at a lower scale). In these cases (sites 8, 20, 23, 34, 44, 48, 49, 50, 51), it is judged that there are sensitive receptors in visual terms which would need to be carefully considered in LVIA terms. For the purposes of this assessment, they are judged to be constrained in these terms.

5.15.10 The criteria which judges proximity to waste markets are more subjective in nature since the proposed REC will take in materials from a local and sub-regional market, giving the potential for waste to be transported from a variety of locations. Nevertheless, some site are more centrally located for the waste arising in Barnsley, Doncaster and Rotherham and some are less so. The site in the north west of the area (site 20) are less well located in these terms, when access routes to these locations from that area are considered. These are judged to be constrained in these terms.

5.15.11 Other amenity issues are likely to arise from the proximity of sites to sensitive human or ecological receptors. Consideration of amenity issues which would affect residential areas or nearby business users would include traffic impacts, noise impacts and air quality impacts. Determination of the suitability of sites in these terms would be evaluated through appropriate technical assessments. However, this assessment concludes that the proximity of sensitive receptors to these sites has the potential to create impact on project design, and so they are regarded as constrained. This applies to sites 20, 23, 34, 44, 48, 49, 50 and 51.

5.15.12 Finally, one site is regarded as constrained as a result of potential technical factors and some have been discounted on the grounds of availability (based on site assessment) e.g. site 36.

5.15.13 A summary of the Stage 2 assessment results for each site are presented in Table 5.2 below:

Table 5.2: Site Categorisation

Site	Main Constraints	Conclusion
(8) Bleachcroft Way Industrial Estate	The site is strongly constrained as a potential alternative location for the proposed aggregated Renewable Energy Centre. First, access to the site is potentially difficult in an urban traffic setting, with complex access arrangements shared with existing retail developments. Second, the development would sit beneath extensive residential areas, which results in uncertainty regarding site suitability in relation to the mitigation of air quality, noise and visual impacts. At 30 metres building height for the TRRC associated with the proposed REC, the scale of development would be more than double that of the surrounding commercial developments.	Strongly Constrained
(20) Birthwaite Business Park, Huddersfield Road	Three factors render this site strongly constrained as a potential alternative location for the aggregated Renewable Energy Centre. First, the site is remote from key transport routes (it sits alongside the M1 but has no junction access to it) likely to be used to transfer waste arising in Barnsley, Doncaster and Rotherham and main routes through and from those areas are likely to suffer from congestion. Second, the proximity of residential areas and topography raise uncertainty over potential visual impact, air quality and noise constraints. Third, the site is divided by the site access road and is therefore less efficient in terms of accommodating the proposed aggregated development.	Constrained
(23) Junction 37 Employment Site	The site is capable of hosting a significant commercial development but there are a number of factors which work to make this site strongly constrained as a potential alternative location for the Renewable Energy Centre. Whilst there is access to the M1 at Junction 37, there is uncertainty over the suitability of access to it for heavy vehicles via a series of small roundabouts off which other large developments are located. Also other potential access routes have constraints, such as the level crossing on the B6099. Second, there is uncertainty over the ability to mitigate potential amenity impacts on neighbouring high quality office and hotel developments. Third, whilst the development would take place within a wider commercial development setting, there is uncertainty over the mitigation of potential visual impacts, noise impacts and air quality.	Constrained
(27) Former Royston Drift	The site lies adjacent to a working coking plant and opencast mine. A modern, high quality development for renewable energy could have some benefits in landscape and visual terms. However, the site is constrained as an alternative location for the	Constrained

Mine, Dunhill Lane	Renewable Energy Centre owing to the less suitable access to the surrounding strategic road network which would potentially create significant traffic impacts in nearby villages including Royston from the proposed HGV traffic movements associated with the aggregated development.	
(31) Land at the Former Grimthorpe Colliery, Coalite Plant and Ferry Moor, West of Grimethorpe	The site lies in a location nearby Houghton Main on Park Spring Road and is regarded as suitable, subject to evaluation studies which would be required to support development. The site benefits from the same good quality strategic road network access. There is a large distribution development on the site, again similar to the relationship between the Houghton Main site and the nearby ASOS development. The site lies within a slightly more open landscape setting.	Suitable
(33) Houghton Main	The site is located on the A6195 Park Springs Road and has good access to the Strategic Road Network. There are few sensitive ecological receptors in the vicinity and the nearest settlement is 1km distant. The site is adjacent to a major ASOS fulfilment centre development. The planning statement with supporting appendices, and the Environmental Statement supported by technical assessments, show that the site is suitable for the proposed Renewable Energy Centre.	Suitable
(34) Thurnscoe Business Park	The site is regarded as strongly constrained as a potential alternative location for the proposed Renewable Energy Centre. The site lies in close proximity to residential areas and a countryside park recreational resource. There is considerable uncertainty over the ability of design approaches to address visual impacts and amenity impacts (in terms of noise and air quality).	Strongly Constrained
(36) Extentions to Goldthorpe Industrial Estate, Goldthorpe	Upon visual inspection it appears that the site is being developed as an Aldi regional distribution centre and so is not available as an alternative site to Houghton Main. The site is therefore not suitable.	Not Suitable
(44) Valley Business Park	This site sits in between two developed sites which form the business park. The site is on lower lying land which lies adjacent to a watercourse and a field used for rough grazing of horses. The commercial developments adjoining the site generally consist of single or two storey buildings (maximum of 15 metres). The height of buildings associated with the proposed Renewable Energy Centre would be up to 30 metres. To the north of the site, there are residential areas close by. There are uncertainties over visual and amenity impact related to the proximity of residential areas near to the site, which render the site as constrained for this assessment.	Constrained
(48) Wentworth Industrial Park, Tankersley	The main factor on this site, which renders it constrained as an alternative location for the Renewable Energy Centre, is the uncertainty over visual and amenity impacts arising from the scale of the development in relation to existing business users (adjacent to the southern boundary of the site) and upon residential properties (adjacent to the northern boundary of the site).	Constrained

(49) Rockingham Employment Site	The site has a complex topography, with individual land parcels located on different levels. Residential properties directly overlook the site. Uncertainties over the potential for adverse visual impacts and associated environmental mitigation associated with potential site operations could be potentially be significant. For this reason, the site is regarded as constrained in this assessment.	Constrained
(50) Platts Common Industrial Estate	The site is prominent on a ridge above the Dearne Valley Parkway. It sits at the rear of an established industrial estate. The scale of the proposed Renewable Energy Centre would be substantially greater than the existing development and would be considerably more prominent on the surrounding landscape.. The site is also located close to residential areas. Overall, uncertainties over the ability to mitigate landscape and visual impacts and amenity impacts on adjoining businesses and nearby residents render this site constrained in terms of this assessment.	Constrained
(51) Shortwood	The heights of buildings associated with the proposed Renewable Energy Centre would potentially create visual and amenity impacts on existing business park users as it is out of context in terms of lower scale commercial business related nature of the existing developments throughout the site. The site is constrained in these terms.	Constrained
BDR JOINT WASTE PLAN SITE, Aldwarke Steel Works	The site is of sufficient size and remains available. The site is considered suitable in terms of this assessment.	Suitable
BDR JOINT WASTE PLAN SITE, Hatfiled Power Park	The site is of sufficient size and has been assessed through the joint waste plan process. However, significant infrastructure requirements remain to be resolved, including provision of a road link to the M18 and improvements to flood defences. Whilst the site is suitable in planning terms for long term development, it is strongly constrained in terms of delivery at this time to accommodate the proposed Renewable Energy Centre.	Strongly Constrained
Birthwaite Business Park	The site is divided into two smaller sites via an access road, and is therefore less efficient in terms of accommodating the proposed development. Part of the site is adjacent to the Green Belt, and it is also on the edge of the urban area and in close proximity to residential areas. This is likely to present noise and visual impacts. The site is remote from key transport routes, as although the M1 runs alongside it, there is no junction here.	Strongly constrained
Capitol Park Extension	The site has good access to the M1 motorway network. However it is close to an Air Quality Management Area, and this could be exacerbated by the development. The site is surrounded by Green belt on two sides.	Constrained
Capitol Park	The site is divided into two sections, however this should not present an issue as the development could fit within one of the sections. The site has good access to the M1 motorway. The site is surrounded on two sides by Greenbelt.	Suitable
Bleachcroft Way Industrial Estate	The site is on the edge of the urban area and in close proximity to residential, educational and community areas resulting in potential visual and noise concerns. The site is relatively isolated from major transport networks and would require vehicles to travel on minor roads to access the site. The site has ecologically	Strongly Constrained

	important habitats on/ around it which would need retaining. The current site is Greenfield, whereas development on a Brownfield site is preferred.	
Land South Of Barugh Green Road	The site is designated as mixed use, including for housing. It would require extensive works including improved links to the M1 J37, diverted/relocated PRoW etc. This is beyond the scope of the development, which would only require a small portion of the site.	Strongly Constrained
Land Off Ferrymoor Way	The site is reasonably close to the motorway network with good access to the A1 and M1. Parts of the site are within Flood Zone 2 and 3, and there are ecologically valuable habitats on site. This would constrain the timing of construction. The site is in close proximity to residential areas which could result in visual and noise concerns. Parts of the site are adjacent to the Green Belt.	Strongly Constrained
Land South Of Dearne Valley Parkway	The site has reasonably good access to both the A1 and M1. The site lies in the edge of the urban area and is in close proximity to residential areas resulting in visual and noise impacts. The site is also close to ecologically important habitats, and it is considered that development of the site could have detrimental impacts. Parts of the site are adjacent to the Green belt.	Strongly Constrained
Thurnscoe Business Park	The site is divided into two sections by a road. However the development would fit into one section of this site. The site has reasonably good access to both the A1 and M1. The site is on the edge of an urban area and is surrounded by residential areas and a park. Therefore the development is likely to have significant visual and noise impacts.	Strongly Constrained
Land West Of Sheffield Road	The site has good access to the M1 motorway network. However it is in close proximity to a residential area and woodland, and is surrounded by Green belt on two sides. The development could create significant visual and noise concerns. The site has been identified as potentially requiring noise attenuation measures. This site is also in or close to an AQMA. The proposed development could exacerbate this.	Strongly Constrained
Rockingham	The site is split into two sections, however the proposed development would fit into one of these sections. The site has good access to the M1 motorway network. However the site is in close proximity to residential areas resulting in visual and noise constraints.	Constrained
Shortwood Extension	The site has good access to the M1 network. Parts of the site are in close proximity to residential areas and there are views to the wider landscape which must be protected. There is also a Green Way and Public Footpath that cross the site that must be protected, and Green belt to one side. There is a major geological fault passing through the site which could present a hazard given the proposed development.	Strongly Constrained
Shortwood Business Park	The site has good access to the M1 motorway network and is reasonably removed from residential developments. There are a number of mature trees on site which need protecting, and this could present difficulties depending on their location. The site is adjacent to the Green Belt on two sides.	Suitable

Land South Of Dearne Valley Parkway	The site is in good proximity to the M1 network. However it is also close to ecologically important habitats, listed buildings and residential developments. The site is in close proximity to the Green belt and wider countryside, and has a Green way, Public Footpaths and Bridleways cutting through and along the periphery of the site. These would present a difficult given the nature of the proposal. The proposed development, especially the size of the stack would have significant visual impacts. Furthermore, there is concern that vehicles would have to use routes within existing AQMAs to access the site.	Strongly Constrained
Ashroyds	The site is split into two sections. However the proposed development could fit into one of these. The site has good links to the M1 network but would need to be accessed via estate roads. The site is on the edge of the urban area and is in close proximity to residential properties on two sides. This could result in visual and noise impacts.	Strongly Constrained
Land North Of Sheffield Road	The site is reasonably isolated from the motorway network and would require access via B-roads. The site requires a buffer strip left between the development and the woodland. This reduces the size of the site which is already only just large enough. The site lies on the edge of the urban area and is adjacent to residential properties on two sides, which would create visual and noise issues. The site is surrounded by Green belt.	Strongly Constrained
Everill Gate Lane	The site is close to residential developments which would result in visual and noise impacts. The site is reasonably isolated from the motorway network and would require transportation on A roads. There is a Nature Reserve Local Wildlife Site nearby which must be considered. The site is close to, but not adjacent to Green belt.	Strongly Constrained
Wentworth Industrial Park, Tankersley	The site is split into two sections divided by a main road. This would restrict the ability to construct the proposed development on the site. The site has good access to the M1 network, however access would be required on estate roads. The site is adjacent to the Green belt, and parts of the site are vegetated. The site has been identified as having detrimental ecological impacts if developed.	Strongly Constrained
Land East Of Park Springs Road, Houghton	The site is adjacent to Green belt on three sides. Part of the site is vegetated, and this would need to be removed prior to the development. The site is in close proximity to a small number of residential properties which could present noise and visual impacts.	Suitable

5.16 Summary and Conclusions

5.16.1 This alternative site assessment has been undertaken following a methodology previously agreed with BMBC planning officers. The ASA has used a wide range of methods to identify potential sites for assessment. A total of 78 employment sites were considered in the Stage 1 assessment process and 31 employment sites in the Stage 2 assessment.

5.16.2 The suitability of potential alternative sites has been considered based on a range of factors including site suitability and availability. The main conclusion from the assessments is that whilst

there are a number of suitable sites available, no site performs any better than the proposed Houghton Main site, the proposed development of which has been fully evaluated through an Environmental Impact Assessment

5.16.3 Constraints were identified for most of the other Stage 2 sites assessed of varying levels of significance. For the majority of the alternative sites identified, the potential for visual and amenity impacts would need to be fully assessed. If required, the suitability of mitigations to reduce to an acceptable level the visual and amenity impacts on sensitive receptors in the proximity to the alternative sites would need to be carefully evaluated.

5.16.4 Some sites experience access constraints for the heavy vehicle traffic associated with the proposed development. Other sites are more remote from waste sources in the Barnsley, Doncaster and Rotherham area. On three sites, the site is either unavailable or there is concern about the technical operational aspects of the site's ability to accommodate the proposed development.

5.16.5 In the light of these factors and within the constraints set by the assessment, no potential alternative sites were identified that are considered to be more suitable for proposed aggregated development than the Houghton Main Site, which is the subject of this application.

6 Chapter 6: Transport

6.1 Introduction

6.1.1 This chapter reports on the assessment of potential traffic and transport impacts associated with the proposed development of a renewable energy centre at the Houghton Main colliery site in Barnsley.

6.2 Background

6.2.1 A full Transport Assessment has been undertaken in relation to the proposed development. This is reported in Appendix 6.1.

6.2.2 The scope of the Transport Assessment was discussed with the local highway authority, Barnsley Metropolitan Borough Council (BMBC), in relation to the previous application for a larger renewable energy centre. The current proposal will result in a lower level of traffic generation and thus the previously agreed scope provides a robust means of assessing impact of the revised proposal.

6.2.3 The scope of the assessment accords with the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG). This chapter draws on the findings of the Transport Assessment and should be read in conjunction with the full transport document.

6.2.4 A Framework Travel Plan is proposed for implementation at the site. The framework for this is attached as an appendix to the Transport Assessment. The framework provides details of the recommended policy measures, management and monitoring mechanisms, and targets to be used promote sustainable access and reduce the number of single occupancy car trips generated by the site. The measures proposed have been drawn from UK best practice, and acknowledge the future operational requirements and staff numbers at the site.

6.2.5 The type of development proposed, whilst not generating substantial volumes of traffic, will include heavy vehicle (HV) traffic required for the transport of materials to the site, and to a lesser extent, exports from the site. The operator has control over these movements and, although the Transport Assessment shows that the HV movements will not be significant, has agreed to institute management strategies to minimise the impact of HV movements on residential amenity and highway operation during critical periods.

6.2.6 The Transport Assessment shows that the development will have a minimal impact on surrounding highway network and will generate less traffic than that associated with the permitted site use. The Transport Assessment considers the impact of the proposal on the A1695 Park Spring Road and site access. At the request of BMBC the traffic impact at the Broomhill and Cathill Roundabouts are also included within the Transport Assessment.

6.2.7 To summarise, the Transport Assessment considers the following study area:

- Site Access/Park Spring Road

- A6195 Park Spring Road
- A6195/A635 'Broomhill Roundabout'
- A6195/Manvers Way/Highgate 'Cathill Roundabout'

6.2.8 The junctions and links shown above are not necessarily locations where environmental impact from the proposals will cause a rise of between 10% and 30% in traffic. More details of the ES assessment criteria are provided later in this ES chapter.

6.2.9 In line with DfT guidance, the Transport Assessment examines the impact of the proposed development for an opening year period of 2017 and a future year of 2019. This ES chapter provides details of both background traffic flows (excluding permitted industrial use site traffic flows) and base traffic flows (including permitted industrial use site traffic flows). This allows it to be demonstrated that the proposal will result in a reduction in future traffic site flows, when compared to the situation that would occur with the permitted development.

6.2.10 The use of the background traffic flow scenario also allows it to be shown that if the permitted use is ignored and the effects of the new proposal isolated, the proposal will have a minimal environmental impact in traffic terms. The background traffic comparisons provided are very much a worst-case scenario.

6.2.11 BMBC has not advised of any other development schemes that need to be taken into account.

6.2.12 This chapter sets out the assessment methodology for reviewing potential impacts arising from the transport requirements of the development proposals; the baseline conditions against which this is assessed; any mitigation measures and the residual effects of the proposals.

6.3 Legislation and Policy

6.3.1 This section outlines the local, regional and national policy guidelines that will govern future development of the site. This section also details environmental guidance against which the transport impact has been assessed.

National Transport Policy

6.3.2 In 2011 Government published a new transport White Paper ('Creating Growth, Cutting Carbon'). This White Paper outlines the Government's vision for sustainable local transport systems that support local economic growth, whilst achieving a reduction in carbon emissions. The document sets out where transport fits in the localism agenda and changes proposed to direct support and central government funding, including details of the new Local Sustainable Transport Fund and the Regional Growth Fund.

6.3.3 The White Paper echoes the findings of recent DfT studies and research, which concluded that significant behavioural change could be achieved through localised smart travel planning. The Paper hails the success of the Sustainable Towns initiative and suggests that local transport measures should be based on these proven measures.

6.3.4 The National Planning Policy Framework (NPPF), published in 2012, consolidates previous national planning policy guidance into one document. The document sets the 12 principles of planning, including the need to:

> *'actively manage patterns of growth to make the fullest possible use of public transport…*
>
> *and focus significant developments in locations which are or can be made sustainable'*

6.3.5 The NPPF refers to the threshold criteria in deciding whether a Transport Assessment should be undertaken. The document states that consideration should be given to both sustainable access and safety, and that developments should be located where the need to travel can be minimised and sustainable transport can be maximised. The NPPF outlines a commitment to the use of Travel Plans to reinforce the sustainable credentials of a development.

6.3.6 The NPPF document also states that refusal on transport grounds should only be made when residual cumulative impacts are severe.

6.3.7 Planning Practice Guidance (PPG) published in 2014 provides guidance on the application of NPPF principles for local authorities and developers. In terms of transport, PPG states where and when the assessment of transport impacts and the production of a travel plan will be required. PPG states, in line with NPPF, that assessment of the transport implications of development will be required for proposals that are of a scale that will generate a significant volume of traffic or will have a severe impact on the local highway network. PPG also outlines government commitment where accessibility is or can be made good.

6.3.8 NPPF replaces planning policy advice in planning policy guidance notes, including PPG13.

6.3.9 In line with NPPF and PPG, the site is located in an accessible location with highway infrastructure suitable for the use proposed already in place. The Transport Assessment demonstrates that the residual traffic generated by the proposal can be safely accommodated on the local highway network and will not cause a severe change from baseline operational characteristics.

6.3.10 The Transport Assessment shows that the proposal site meets all required national transport policy.

Local Transport Policy

6.3.11 Local transport policy is outlined in the third South Yorkshire Local Transport Plan (known as the 'Sheffield City Region Transport Strategy: 2011-2026). The document outlines transport strategy and investment priorities for Barnsley, Doncaster, Rotherham and Sheffield for the 15 year period. The document underpins local planning policy, including the Core Strategy, and aims to:

- Support economic growth
- Enhance social inclusion and health
- Reduce emissions from vehicles
- Maximise safety and security

- Provide excellent road, rail and air links to/from South Yorkshire

6.3.12 LTP3 seeks to influence land use planning by locating development so that the need to travel is reduced, accessibility is maximised and local infrastructure is appropriate to the needs of the development type.

6.3.13 The South Yorkshire Passenger Transport Executive (SYPTE) document 'Land Use Planning and Public Transport: A Developer Guide' seeks to:

6.3.14 Support developers in designing a sustainable site

6.3.15 Highlight public transport interventions and incentives available

6.3.16 The SYPTE guidance aims to:

> *'…prevent dependency on the private car, it is important that attractive public transport as well as walking and cycling links are in place, supported by incentives to use them.'*

6.3.17 SYPTE promotes developments that provide good connections to existing sustainable route corridors. SYPTE guidance states to be deemed accessible a development must be within 400m (5-minute walk) of public transport facilities.

6.3.18 The development proposal meets relevant adopted local and national policy requirements.

Relevant Environmental Guidance

6.3.19 As a matter of best practice, this assessment has been undertaken based on the relevant guidance for the assessment of road traffic. This includes:

> *'Guidelines on the Environmental Assessment of Road Traffic' published in 1993 by The Institute of Environmental Management and Assessment (IEMA). (These guidelines have been used to gauge the significance of the changes in environmental conditions caused by road traffic).*
>
> *'Guidelines on Transport Assessment' published in March 2007 by the Department for Transport*
>
> *'Environmental Impact Assessment, A Guide to Procedures' DETR (2000).*

6.4 Methodology

6.4.1 The scope of the Transport Assessment was discussed with BMBC at a meeting on 29th January 2014. The ES Transport scoping study was issued in February 2014 and a full Transport Assessment scoping study was issued in March 2014.

6.4.2 The scope of the Transport Assessment is in line with DfT guidance and requests made by BMBC at the meeting in January.

6.4.3 This assessment has taken account of the 'Guidelines for the Environmental Assessment of Road Traffic' (Guidance Note No. 1) prepared by The Institute of Environmental Assessment (IEA) (now

The Institute of Environmental Management & Assessment). The IEMA Guidelines recommend two rules to be considered when assessing the impact of development traffic on a highway link:

- Rule 1: Include highway links where traffic flows will increase more than 30% (or the number of HVs will increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows have increased by 10% or more.

6.4.4 The above guidance is based upon knowledge and experience of environmental effects of traffic and also acknowledges that traffic forecasting is not an exact science. The 30% threshold is based upon research and experience of the environmental effects of traffic, with less than a 30% increase generally resulting in imperceptible changes in the environmental effects of traffic. At a simple level, the guidance considers that projected changes in traffic flow of less than 10% create no discernible environmental effect, hence the second threshold as set out in Rule 2.

6.4.5 Column 3 in table 2.1 of the IEMA Guidelines sets out a list of environmental effects that should be assessed for their significance.

6.4.6 Definitions of each of the potential effects identified in the IEMA Guidelines are set out below along with explanatory text relating to assessment criteria. It is on this basis that the assessment in this chapter has been undertaken. It is acknowledged at paragraph 2.4 of the IEMA Guidelines that not all the effects listed in column 3 of table 2.1 would be applicable to every development.

6.4.7 **Noise and Vibration:** The environmental implications of noise and vibration arising from changes in traffic flow have been separately assessed in this ES.

6.4.8 **Visual Effects:** The visual effect of traffic is complex and subjective and includes both visual obstruction and visual intrusion. The IEMA Guidelines acknowledge that in the majority of situations the changes in traffic resulting from a development will have little effect.

6.4.9 **Severance:** Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. Severance is difficult to measure and by its subjective nature is likely to vary between different groups within a single community. In addition to the volume, composition and speed of traffic, severance is also likely to be influenced by the geometric characteristics of a road, the demand for movement across a road and the variety of land uses and extent of community located on either side of a road. All these factors are considered when determining the likely severance effect. In general terms according to the IEMA guidelines a 30% change in traffic flow is likely to produce a 'slight' change in severance, with 'moderate' and 'substantial' changes occurring at 60% and 90% respectively.

6.4.10 **Driver Delay:** Delay to drivers generally occurs at junctions where opposing vehicle manoeuvres are undertaken with vehicles having to give or receive priority depending upon the type of junction arrangement. A number of traffic modelling computer programs are available which are able to predict the average vehicle delay at junctions. Assessments have, where appropriate, been undertaken on the adjoining road network to establish the existing average vehicle delay during the weekday peak hour periods when traffic flows are at their greatest. Development

traffic flows have then been added and further operational assessments undertaken to establish the average vehicle delay following development. The change in average vehicle delay as a result of the proposed development is then identified and its significance assessed. Details of these assessments are set out in the Transport Assessment.

6.4.11 **Pedestrian Delay:** The delay incurred by pedestrians is generally a direct consequence of their ability to cross roads. Thus the provision of crossing facilities, the geometric characteristics of the road, and the traffic volume, composition and speed are all factors that can affect pedestrian delay and have been considered when assessing this effect. It should be noted that the IEMA guidelines advise that in assessing levels of, and changes in, pedestrian delay, assessors do not attempt to use quantitative thresholds. Instead, the Guidelines recommend the use of professional judgement to determine whether pedestrian delay is a significant effect.

6.4.12 **Pedestrian Amenity:** The term pedestrian amenity is broadly defined as the relative pleasantness of a journey. Pedestrian amenity is affected by traffic flow, speed and composition as well as footway width and the separation/protection from traffic. Pedestrian amenity encompasses the overall relationship between pedestrians and traffic, including fear and intimidation, which is the most emotive and difficult effect to quantify and assess. There are no commonly agreed thresholds for quantifying the significance of changes in pedestrian amenity, although where traffic flow (or its HV component) doubles significant effect is likely to arise. All the above factors are considered in reaching a professional judgement when assessing this effect.

6.4.13 **Accidents and Safety:** To establish the effect on the road safety record of the adjoining road network the latest available Personal Injury Accident (PIA) statistics have been obtained from BMBC. These statistics provide information on the location and severity of PIAs. The data obtained covers the three-year period up to winter 2012. Assessments have considered the statistical incidence of accidents and assessed the likely change in the frequency of accidents as a result of the proposed development. In addition, consideration has been given to the local circumstances prevailing in particular traffic speed, flow and composition as well as vehicle conflict and pedestrian activity. A combination of these assessments enables a professional judgement to be made regarding the significance of the effect.

6.4.14 **Hazardous Loads:** 'The Guidelines for the Environmental Assessment of Road Traffic' acknowledge, in paragraph 2.4, that most developments would not result in an increase in the number of movements of hazardous or dangerous loads. These are specific to certain development types.

6.4.15 **Air Pollution:** The potential air quality effects of the traffic generated by the proposed development are considered in separately in this ES.

6.4.16 **Dust and Dirt:** Potential dust and dirt arising from traffic is mainly associated with HV traffic. The extent of any impact of dust and dirt arising from the construction and post construction phase would be dependent upon the management practices adopted on site. Specifically procedures such as washing down of wheels and sheeting of HVs likely to shed debris would prevent the

occurrence of dust and dirt spreading from the site to the adjoining road network. It is considered such procedures would ensure that dust and dirt are managed and do not impact on local people.

6.5 Magnitude of Impact

6.5.1 The methodology used in assessing the significance of any particular effect is set out in the paragraph above. A description of the terminology used is set out below.

Negligible: No significant effects.

Minor: Not noteworthy or material – impacts are of low magnitude and frequency and will not exceed relevant quality standards, residual effects will be negligible.

Moderate: Noteworthy, material – impacts are of moderate magnitude and frequency. Relevant quality standards may be exceeded to limited extent. Possible secondary impacts, residual effects will be minimal.

Major: Impacts are likely to be of a high magnitude and frequency with quality standards being exceeded, at times considerably. There may be secondary impacts of some magnitude, residual effects will be of some significance.

Substantial: Impacts will be of a consistently high magnitude and frequency of standards exceeded by a significant margin. Secondary impacts also likely to have a high magnitude and frequency.

6.6 Sensitivity of Receptors

6.6.1 The sensitivity of receptors is set below:

High: Over 200 properties per day affected by increased traffic flow. Over 45% increase in traffic flow past properties on single carriageways.

Moderate: 100-200 properties per day affected by increased traffic flow. 30% increase in traffic flow past properties on single carriageways.

Low: Under 100 properties per day affected by increased traffic flow. 10% to 15% increase in traffic flow past properties on single carriageways.

Negligible: No discernible change in conditions or properties affected.

6.7 Assessment of Significance

6.7.1 The assessment of significance of transport effects of the development is guided by the sensitivity of the receptor points. Thus the significance is directly related to the sensitivity of the receptor and the level at which the receptor will be affected.

6.7.2 The guidance cross tabulates the receptor sensitivity and impact magnitude, shown in Table 6.1.

Table 6.1- Impact of Significance

Significance		Sensitivity of Receptor			
		High	Moderate	Low	Negligible
Impact	Substantial	HIGH	HIGH/MODERATE	MODERATE	-
	Major	HIGH/MODERATE	MODERATE	LOW/MODERATE	-
	Moderate	MODERATE	MODERATE/LOW	LOW/NEGLIGIBLE	-
	Minor	LOW	LOW/NEGLIGIBLE	NEGLIGIBLE	-
	Negligible	-	-	-	-

6.8 Cumulative Impact Assessment

6.8.1 BMBC has not advised of any other development schemes that need to be taken into account.

6.9 Baseline Conditions

Site Location & Characteristics

6.9.1 The site is located on the south side of the A6195 Park Spring Road just over 1km west of the settlements of Little Houghton and Great Houghton, some 6.5km east of the centre of Barnsley and 1.5km north of Darfield.

6.9.2 Vehicle access to the site is available via an existing roundabout on Park Spring Road, known as Houghton Main Colliery Roundabout. The junction also provides access to the ASOS Fulfilment Centre on the northern side of Park Spring Road.

6.9.3 The site forms part of the Houghton Main Colliery site (disused) and benefits from a live planning consent for the development of 19 industrial units with 208 parking spaces (application ref. 2008/1426). The planning consent, originally granted in 2008, was renewed in 2011.

Accessibility by Vehicles

6.9.4 The A6195 Park Spring Road is a single carriageway road subject to the national speed limit. The road is of relatively recent construction and is of a high standard. The route is a bus corridor with typical service provision of two buses per hour in each direction during the day. Bus stops with good standard shelters are located on Park Spring Road adjacent to the site, footway connections to these are provided from the Houghton Main Colliery Roundabout.

6.9.5 The site relates well to the strategic highway network, with both the A1(M) and M1 approximately 9km to the east and west of the site, respectively. Access to strategic routes and the local area can be gained via the A6195 and other A class routes including the A635 which routes east-west between the M1 and A1(M) via Barnsley town centre, and meets the A6195 at the Cathill Roundabout some 2.5km south-east of the site.

6.9.6 The Transport Assessment shows that the proposal will generate considerably less traffic than that already permitted for the site, and also that the new proposal will have an insignificant impact when compared to baseline traffic conditions.

6.9.7 The Cathill Roundabout connects the A6195 with the A635, the Broomhill Roundabout is the next junction to the south on the A6195, 2km south of the Cathill Roundabout, and provides access to Broomhill via Highgate and areas of Brampton and Wath Upon Dearne via Manvers Way.

Existing Daily Traffic Flows & Vehicle Speeds

6.9.8 Automatic Traffic Count (ATC) data was collected on Park Spring Road to the north and south of the site access. Additional daily traffic data has been taken from the DfT database for the wider area. The existing daily link flow data is provided in the table below.

Table 6.2 – Existing Daily Link Flows

Link Flows	Daily Total Traffic Flows (AADT)	Daily HV Flows (AADT)	% HV
A6195 N Park Spring Road	8946	1086	12%
A6195 S Park Spring Road	9171	1175	13%
A635 W Doncaster Road	16095	515	3%
A635 E Doncaster Road	12445	1113	9%
A6195 S	22163	1033	5%

6.9.9 The Transport Assessment should be referred to for details of existing AM and PM peak hour traffic flows.

6.9.10 Traffic speeds on Park Spring Road to the north and south of the site access junction are shown in the table below. The surveyed speeds, collected by ATC, are commensurate with the existing road class and speed restriction.

Table 6.3 – Existing Vehicle Speeds

	Speed Limit (mph)	Mean Speed (mph)	85%ile Speed (mph)
A6195 N (northbound)	60	39.7	45.4
A6195 N (southbound)	60	45.5	52.7
A6195 S (northbound)	60	46.0	53.0
A6195 S (southbound)	60	39.7	45.3

6.9.11 The site benefits from planning consent for the development of 19 industrial units totalling 10,607m2 GFA and 208 car parking spaces (application ref 2008/1426). The planning permission was renewed in 2012 and remains a live consent that could be brought forward.

6.9.12 Extant site traffic flows have been forecast in line with the 2013 'TRICS Good Practice Guide'. The trip forecast (output attached to this letter) uses TRICS land use 02 – employment/d (industrial estate). Guidance states that this is the land use to be used for industrial sites with more than one building/operator. The extant forecast removes sites in London and Ireland, and only includes industrial estates that sit in edge of town/suburban areas.

6.9.13 The vehicle traffic flows permitted by the current site consent are summarized in the table below, with full forecast output provided in the Transport Assessment.

Table 6.4 – Permitted Site Traffic

	ALL VEHICLES (LV + HV)			HV ONLY			TOTAL TRAFFIC (PCU)		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
AM Peak Hour	55	25	80	1	3	4	56	28	84
PM Peak Hour	13	47	60	1	0	1	13	47	60
DAILY (12HR)	378	389	768	26	26	53	405	416	820

6.9.14 The permitted development flows have been distributed onto the study area network in line with existing patterns of movement, as shown in the table below.

Table 6.5 – Distributed Permitted Site Traffic

			Total Permitted Traffic (LV + HV)			Permitted HV Traffic		
Route Name	2017 AADT	Distribution	AM	PM	Daily	AM	PM	Daily
A6195 N Park Spring Road	9349	49%	40	29	379	2	0	26
A6195 S Park Spring Road	9583	51%	41	30	389	2	1	27
A635 W Doncaster Road	17077	16%	13	10	123	1	0	8
A635 E Doncaster Road	13204	12%	10	7	95	1	0	7
A6195 S	23515	22%	18	13	170	1	1	12

Road Safety Levels

6.9.15 Latest available road collision data for the local study area was requested from BMBC in March 2014. BC has provided data for the three year period ending 31st December 2012. Data has been analysed that has occurred in the agreed TA study area, namely the A6195 adjacent to the site (including the site access), and accidents occurring at Broomhill and Cathill Roundabouts. The full data is provided in the Transport Assessment.

6.9.16 The data shows that there have been a total of 20 collisions in the study area, the causes and contributing factors to the accidents have been fully reviewed using DfT Stats20.

6.9.17 Of the 20 accidents a number were caused by occurrences of non-standard driver behaviour, for example: an accident caused by horses roaming in the carriageway at 4am; a tire blow-out; and, a driver with cramp. Seven of these anomalous accidents have been removed.

6.9.18 A number of the remaining accidents were caused by illegal or irregular driver behaviour noted by the attending police officer, such as speeding and aggressive behaviour. However, these accidents have been retained in the analysis for robustness.

6.9.19 Following adjustment of the data to remove the declared anomalies, the total number of accidents in the study area is 13, of which three were classed as serious and the rest as slight.

Site Access & A6195 North & South

6.9.20 A total of five accidents have occurred in the immediate local highway network, defined as the Park Spring Road from Springvale, north of the site, to and including the junction with Rotherham Road in south-east.

6.9.21 There have been no recorded collisions at or on immediate approach to the site access roundabout in the preceding three years.

6.9.22 Three accidents have occurred at on the A6195 Park Spring Road to the north and south of the site, of which two were classified as slight and one was classified as serious.

6.9.23 The serious accident occurred on Park Spring Road (N) at 7am and was the result of a head-on collision of two vehicles travelling in opposite directions. The attending police officer noted that the cause of the accident was 'unknown at this time', but the officer did note that contributory factors to the accident included aggressive driving behaviour.

6.9.24 The slight accident also occurred on Park Spring Road (N), further north on the link than the serious collision. This accident was the result of a vehicle trying to overtake a vehicle travelling in front and the vehicle in front pulling out into the first vehicle's path. The attending officer attributed the accident to aggressive driving.

6.9.25 The other slight accident occurred at Park Spring Road (S). The accident was caused by a vehicle suddenly braking due to traffic conditions and the vehicle behind failing to stop.

6.9.26 Further to the north of the site, one slight accident has occurred at the junction of Park Spring Road/Springvale. A driver losing control and hitting an oncoming vehicle in the roundabout caused this collision.

6.9.27 Further to the south of the site, one slight accident has occurred at the junction of Park Spring Road/Rotherham Road. This collision was caused by a driver overtaking another vehicle at speed and failing to see an oncoming vehicle.

6.9.28 The number and severity of accidents in the highway network immediately adjacent to the site is below that typically expected of a road of the A6195's character, speed and traffic volume. None of the accidents have occurred at the same location and none of the accidents have been caused by the highway layout.

Broomhill & Cathill Roundabouts

6.9.29 Although the development proposal will not have a significant impact at Broomhill and Cathill Roundabouts, BMBC has requested that consideration is given in the TA to traffic conditions at these junctions. For completeness, accidents occurring at, or on immediate approach, to these junctions are included within the safety analysis.

6.9.30 One slight accident occurred at the Broomhill Roundabout during the assessment period. A driver failing to stop at the give-way and entering the roundabout without looking caused this accident.

6.9.31 Seven slight accidents occurred at the Cathill Roundabout. The Cathill Roundabout is a busy junction with frequent incidence of queuing traffic at peak periods. Most of the accidents (six) at

this location relate to rear shunts and stationary traffic conditions. In a number of cases, these accidents included drivers failing to drive appropriately for prevailing conditions, drivers travelling too close and drivers failing to look.

6.9.32 The remaining accident was caused by a vehicle travelling in excess of the speed limit and resulted in the driver losing control at the roundabout.

6.9.33 Although all accidents are regrettable, the number, nature and severity of collisions at Broomhill and Cathill Roundabouts are typical of busy roundabout junctions with queuing traffic at key periods.

Accessibility by Non-Car Modes

6.9.34 The opportunities for walking, cycling and public transport for access to the site have been considered. Use of these modes offers the opportunity to reduce the amount of traffic generated by the proposal thereby minimising the negative effects of traffic associated with the scheme.

Access on Foot

6.9.35 Walking offers a realistic alternative to car trips of up to 2km. The settlements of Little Houghton, Great Houghton & Middlecliffe lie within the accepted maximum walking distance of 2km for commuting trips and footpath connections exist between Middlecliffe Lane and the A6195, just north of the proposal site, and to Great Houghton via Chapel Lane.

6.9.36 The northern part of Darfield is also within 2km of the site and footpath connections are again present between Darfield and the A6195 via Ings Lane, to the south of the proposal site.

6.9.37 Given the limited population within an acceptable walking distance of the site it is considered that walking is unlikely to make a significant contribution to travel to the site, but routes are available from the nearest settlement areas.

Access by Cycle

6.9.38 Cycling offers a realistic alternative to car trips up to 5km. The area from which employees could reasonably be expected to cycle extends to the residential areas of Darfield, Cudworth and Grimethorpe and includes areas of Goldthorpe, Thurnscoe and the eastern fringe of Barnsley,

6.9.39 The section of Park Spring Road between the site access junction and Ings Lane is designated as part of the local cycle network with a cycle connection available to Middlecliffe Lane. To the north of the site further off-road cycle connections are available from the A6195 to Great Houghton and Cudworth.

6.9.40 National cycle network routes 62 and 67 run to the west and south of the site.

Public Transport

6.9.41 Bus stops are available on both sides of Park Spring Road adjacent to the site. These are of a good standard with shelters, timetable information and footway connections.

6.9.42 A number of bus services currently use the stops adjacent to the site. These are summarised in the table below:

Table 6.6 – Existing Bus Services (25.01.15 Updated Service Timetables)

Stop	Service No.	Route	First Bus	Last Bus	Frequency
Both	26/X26	Barnsley – Cudworth – Grimethorpe – Great Houghton – Middlecliff – Darfield – Wombwell – Brampton	05.52	23.14	Hourly in each direction
Both	28/28A	Barnsley – Shafton – Grimethorpe – Park Spring Road	05.36	23.18	Hourly
Southbound	29/29A	Barnsley – Shafton – Park Spring Road – Grimethorpe – Hemsworth – South Elmsall – Upton	14.25	23.18	Limited service
Northbound	30A	Barnsley – Cudworth – Grimethorpe – Brierley	-	-	One service to each terminus 22.40 to Barnsley & 23.26 to Brierley
Both	216	Wombwell – Wath upon Dearne – Goldthorpe – Thurnscoe – Little Houghton – Grimethorpe	06.38	23.15	3 per day in each direction
Both	X27	Barnsley – Cudworth – Shafton – Grimethorpe – Goldthorpe	06.15	17.22	Hourly in each direction

6.9.43 The existing bus services offer a good level of coverage and timings for access to the site by bus. Services are available between the site and the major local centres of population. The timings of the services will cover the proposed shift patterns at each facility and regular services are available during the day, with two buses per hour between the site and Barnsley and one bus per hour towards Darfield/Brampton. The number and frequency of existing bus services currently available offer a realistic option for travel to the site.

Existing Commuter Mode Share

6.9.44 Mode share information for work trips undertaken in the area around the site has been obtained from the 2011 Census. The Census data is shown in the table below.

Table 6.7- Existing Barnsley Mode Share

Single Occupancy Car	71%
Sustainable Modes	29%

6.9.45 The existing travel pattern suggests there are opportunities in relation to the proposal site to build on bus use, cycle use and car sharing in order to minimise car trips for staff. This opportunity is

borne out by a staff travel survey undertaken at the adjacent ASOS Fulfilment Centre as part of the recent expansion proposals. The ASOS survey showed that staff travel by single occupancy car is 51%, rather than the 71% Barnsley authority average.

6.10 Evaluation

Modelling Scenarios

6.10.1 In this ES Chapter the following development impact test scenarios have been undertaken:

2017 background

2017 background with development

2017 base

2017 base with development

2019 base

2019 base with development

6.10.2 Full details of the AM and PM peak hour assessments are provided in the Transport Assessment.

Assessment Years

6.10.3 The development opening year for each facility is scheduled to be late 2016/early 2017. For robustness 2017 has been used in the Transport Assessment as the opening year. In line with DfT guidance, the future assessment year is set at five years post planning permission, e.g. 2019.

6.10.4 Surveyed traffic flows have been growthed to the opening and future years using TEMPRO adjusted NTM. Full details of the growth factors are provided in the Transport Assessment. The background traffic flows are existing traffic and TEMPRO adjusted NTM growth only. The daily background link flows are shown in the table below.

Table 6.8 – Forecast Background Traffic Flows

	2017 Background AADT			2019 Background AADT		
Link Location	**Total**	**HV**	**%HV**	**Total**	**HV**	**%HV**
A6195 N Park Spring Road	9349	1134	12%	9697	1177	12%
A6195 S Park Spring Road	9583	1228	13%	9941	1274	13%
A635 W Doncaster Road	17077	546	3%	17705	567	3%
A635 E Doncaster Road	13204	1181	9%	13690	1224	9%
A6195 S	23515	1096	5%	24379	1136	5%

6.10.5 The base traffic flows include growthed existing traffic and the permitted site traffic. The daily base link flows are shown in the table below.

Table 6.9 – Forecast Base Traffic Flows

	2017 Base AADT			2019 Base AADT		
Link Location	**Total**	**HV**	**%HV**	**Total**	**HV**	**%HV**
A6195 N Park Spring Road	9728	1161	12%	10076	1203	12%
A6195 S Park Spring Road	9972	1255	13%	10330	1301	13%
A635 W Doncaster Road	17200	555	3%	17828	575	3%
A635 E Doncaster Road	13300	1187	9%	13785	1231	9%
A6195 S	23685	1108	5%	24549	1148	5%

6.11 Development Overview

6.11.1 The development seeks to deliver a renewable energy centre comprised of a Timber Resource Recovery Centre which will treat up to 150,000tpa of waste wood and virgin timber through the gasification process and will export over 20MW of renewable electrical power.

6.11.2 Vehicle access will be taken from the existing spur on the Houghton Main Colliery Roundabout.

6.12 Traffic Forecast

6.12.1 The facility will have the capability to deal with 150,000tpa of waste (import material). The facility will generate export material as ash (up to 11,133tpa) and fly ash (up to 4,500tpa). The facility will operate continuously throughout the year.

6.12.2 The vehicle fleet for the facility will be made up of 20t payload vehicles for import, 25t payload vehicles for ash export and 20t payload vehicles for fly ash export.

6.12.3 The resulting annual and daily HV loads and resulting daily HV movements for the facility as advised by the future operator are summarised in the table.

Table 6.10– Operation

	TPA	Average Payload (t)	Annual HV	Working Days	Daily Load	Daily Trips
Deliveries	150000	20	7500	275	27	55
Ash Export	11133	25	445	275	2	3
Fly Ash Export	4500	20	225	275	1	2
					30	60

6.12.4 The HV movements will occur throughout the day. The daily profile for a typical landfill facility has again been used as the basis for forecasting typical HV arrival and departure profiles. The resulting movements are summarised in the table.

Table 6.11– HV Trips

	Heavy Vehicle Traffic		
	IN	OUT	TOTAL
AM Peak Hour	3	3	6
PM Peak Hour	0	1	2
Daily	30	30	60

Note that the forecast data has not been adjusted for rounding errors.

6.12.5 The facility will employ a total of 25 members of staff. The operator has advised that a maximum of 4 shift staff will be on site at any one time and that the facility will operate two 12-hour shifts per day (7am – 7pm and 7pm – 7am). Managerial staff will work between 8am and 5pm, the traffic forecast for the assessment is based on 4 managerial staff on site during this period.

6.12.6 Typical mode shares for travel to work in Barnsley are again used to complete the analysis of traffic movements associated with the facility. These are shown in the table.

Table 6.12–Total Site Traffic (in vehs)

	HV Traffic			Shift Staff Car Traffic			Management Staff Car Traffic			Total Traffic		
	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT	IN	OUT	TOT
AM Peak Hour	3	3	6	0	0	0	3	0	3	6	3	9
PM Peak Hour	0	1	2	0	0	0	0	3	3	0	4	5
Daily	30	30	59	6	6	11	3	3	6	38	38	76

Note that the forecast data has not been adjusted for rounding errors.

6.12.7 The table below shows the total development traffic flows converted to passenger car units (pcu) in line with TRR67 conversion, where the HV value is 2.0 and LV value is 1.0. Note that the forecast has not been adjusted for rounding errors.

Table 6.13– Total Site PCU

	Total Traffic		
	IN	OUT	TOTAL
AM Peak Hour	9	5	14
PM Peak Hour	1	6	6
Daily	68	68	136

6.13 Development Traffic Distribution

6.13.1 The operator has confirmed that the routing of trips will follow general population/settlement distributions. The Automated Traffic Count (ATC) at the site roundabout approaches and DfT link flows on the wider network have therefore been used to distribute the HV and staff traffic.

6.13.2 The table shows the distribution of traffic from the site. In the peak hours there will be minimal change in traffic flows at junctions/links away from the development site. The table shows a worst-case scenario, as in reality the proposed heavy vehicle management strategy will remove heavy vehicle movements from the peak periods.

Table 6.14– Development Trip Distribution (in veh)

		Total Traffic (LV + HV)			HV Traffic		
Route Name	**Distribution**	**AM**	**PM**	**Daily**	**AM**	**PM**	**Daily**
A6195 N Park Spring Road	49%	4	2	38	3	1	29
A6195 S Park Spring Road	51%	4	2	39	3	1	30
A635 W Doncaster Road	16%	1	1	12	1	0	10
A635 E Doncaster Road	12%	1	1	9	1	0	7
A6195 S	22%	2	1	17	1	0	13

6.14 Assessment Of Impact & Significance

Quantification of Impact

6.14.1 The table below shows a comparison of total daily traffic associated with permitted industrial use and REP.

6.14.2 The table shows that the new proposal for the site will generate significantly less total traffic than currently permitted for the site.

6.14.3 HV movements are higher with the current proposals, but spread over the day and distributed across the wider network this increase from consented and base flows is unlikely to be perceptible.

Table 6.15– Comparison of Permitted & New Site Trips (in veh)

	Total Daily Traffic (LV+HV)	Total Daily HV
Extant	768	53
Proposal	76	59
Change	*-691*	*6*

6.14.4 Further, the pcu conversion in the table below shows that although there will be greater proportion of HV traffic associated with the new proposal, the total pcu flow is still significantly less than permitted.

Table 6.16– Comparison of Permitted & New Site PCU

	Total Daily PCU
Extant	873
Proposal	136
Change	*-737*

6.14.5 The table below shows the percentage increase in traffic on key access links as a result of the development proposal. This scenario compares the development flows with the background traffic flows in 2017 and 2019.

Table 6.17– Change in Background Traffic (in veh)

Link Location	2017 Impact	2019 Impact
A6195 N Park Spring Road	0.40%	0.39%
A6195 S Park Spring Road	0.40%	0.39%
A635 W Doncaster Road	0.07%	0.07%
A635 E Doncaster Road	0.07%	0.07%
A6195 S	0.07%	0.07%

6.14.6 The table shows that even when no consideration is given to the reduction in traffic associated with the new proposal when compared to the permitted development on site, the increase in traffic on the highway network is below 1% on all links.

6.14.7 The change in composition of traffic is negligible at all links, with HV proportions remaining as forecast in the background in 2017.

Table 6.18– Change in HV Proportion of Background Traffic

	Background	With Dev	Change in HV %
Link Flow	2017 HV %	2017 HV %	
A6195 N Park Spring Road	12%	12%	0.27%
A6195 S Park Spring Road	13%	13%	0.26%
A635 W Doncaster Road	3%	3%	0.03%
A635 E Doncaster Road	9%	9%	0.09%
A6195 S	5%	5%	0.05%

6.14.8 The table below shows the impact of the proposal when compared to the future base traffic situation (i.e. including the impact of removing the permitted traffic), in 2017 and 2019.

Table 6.19– Change in Base Traffic (in veh)

Link Location	2017 Impact	2019 Impact
A6195 N Park Spring Road	-3.51%	-3.39%
A6195 S Park Spring Road	-3.51%	-3.39%
A635 W Doncaster Road	-0.65%	-0.62%
A635 E Doncaster Road	-0.65%	-0.62%
A6195 S	-0.65%	-0.62%

6.14.9 The table above shows that the new development proposal leads to a reduction in traffic when compared to the future forecast situations that would occur if the permitted development on site came forward. This includes a reduction in traffic, from that permitted, on key links feeding the Cathill and Brownhill Roundabouts.

6.14.10 The IEMA Guidelines recommend two rules to be considered when assessing the impact of development traffic on a highway link:

6.14.11 Flows have increased by 10% or more.

Rule 1: Include highway links where traffic flows will increase more than 30% (or the number of HVs **will** increase by more than 30%); and

Rule 2: Include any other specifically sensitive areas where traffic

6.14.12 As can be seen in both tables, the development proposal will not result in an increase in total daily traffic flows above 1%, even when excluding consideration of the permitted site use. The change in HV traffic proportions is negligible with a maximum increase in proportion of 0.3% occurring adjacent to the site access.

6.14.13 The development proposal impact is considerably below the rule 1 and rule 2 significance thresholds of 10% and 30%.

6.14.14 BMBC has identified the Cathill and Broomhill Roundabouts as sensitive locations. The change in total daily traffic on the links approaching these junctions is forecast to be a maximum of 0.07%. This level of increase in flows will not be perceptible to other drivers on the network and will have no impact on highway operation or safety. When the permitted use of the site is included in the analysis (the base scenario) the net change in traffic at this location is negative.

6.14.15 The level of change in proportion of HV traffic on links approaching the roundabouts is also minimal and will not cause an environmental impact. Despite this the proposal includes a commitment to restricting HV movements in peak periods to assist with enhancing network operation at this location.

6.14.16 It is concluded that the development proposal will not have an environmental transport impact on the surrounding area. Despite this, consideration is still given to the individual impact on the ES transport elements, as outlined below.

6.15 Visual Effects

6.15.1 The Transport Assessment, and the tables above, demonstrate that the change in traffic resulting from the development is insignificant at all locations.

6.15.2 The development traffic will access the site via existing highway routes, which contain LV and HV traffic. The access routes are all of sufficient standard and design to accommodate the development flows.

6.15.3 The development proposals will not significantly alter the composition of traffic already on the local road network. The table below shows that the proportion of HVs will remain of the same magnitude as shown in the background forecasts, even with the inclusion of the development traffic.

Table 6.20– Change in HV Proportion of Background Traffic

	Background	With Dev	Change in HV
Link Flow	**2017 HV %**	**2017 HV %**	
A6195 N Park Spring Road	12%	12%	0.27%
A6195 S Park Spring Road	13%	13%	0.26%
A635 W Doncaster Road	3%	3%	0.03%
A635 E Doncaster Road	9%	9%	0.09%
A6195 S	5%	5%	0.05%

6.15.4 It is concluded that the development proposals will have a low significance impact on visual effects.

6.16 Severance

6.16.1 Severance is only likely to occur on heavily trafficked roads and result from the perceived division the road and traffic creates between either side of the carriageway.

6.16.2 IEMA guidance states that severance changes area often difficult to detect and require changes in flows above 90% for it to be classified as 'substantial' and over 60% for it to be classified as 'moderate'.

6.16.3 The development will not result in changes in traffic flow of a significant magnitude, with the highest offsite impact being 0.4% increase in total traffic and 0.3% increase in HV proportions at the site access junction.

6.16.4 The impact of the proposal on severance is below the thresholds defined by IEMA and the development will not have a significant impact on this element.

6.17 Driver Delay

6.17.1 Delays to drivers are generally caused at junctions. The impact of the development proposal on driver delay has been fully assessed in the Transport Assessment. This assessment shows that the addition of the development traffic on the highway network will have an insignificant impact on driver delay at most junctions within the study area, when compared to the baseline situation.

6.17.2 The Broomhill and Cathill Roundabouts are identified by BMBC as sensitive locations with existing delay issues. The Transport Assessment shows that the traffic impact of the proposal will be minimal at these locations and will not impact on baseline operation. Despite this, the proposal includes measures to restrict HV site movements in the peak periods to assist with reducing impact at this location.

6.18 Pedestrian Delay & Amenity

6.18.1 The delay incurred by pedestrians is generally a direct consequence of their ability to cross roads. Thus the provision of crossing facilities, the geometric characteristics of the road and traffic volume, composition and speed are all factors that can impact on pedestrian delay.

6.18.2 The Transport Assessment demonstrates that the development site is well located to allow access to existing pedestrian routes connecting to local bus stops.

6.18.3 Guidance states that a doubling of traffic or HV has to occur for significant impact on pedestrians to be experienced. The maximum change in traffic is well beneath the defined significance levels.

6.19 Accidents & Safety

6.19.1 The Transport Assessment includes full analysis of historic collision records on key routes close to the proposal site. This analysis shows that there are no accident hot spots in the adjacent to the site.

6.19.2 The net change in traffic as a result of the development proposal is shown to be insignificant on the network with a maximum of 0.37% and the impact on road safety is forecast to be negligible.

6.19.3 The development will be accessed from an existing roundabout that meets geometric design standards. The junction is shown in the Transport Assessment to operate within accepted capacity levels.

6.19.4 The Cathill Roundabout is a heavily trafficked route with frequent incidence of queuing traffic leading to rear shunts and irregular driver behaviour. Despite this the magnitude and severity of accidents at this location are typical of the character and type of traffic levels present. The Transport Assessment and daily traffic flows presented in this chapter show that the proposal will result in a very low increase in traffic and consequently low road safety impact at this location.

6.19.5 The operator is committed to restricting access to the site by HV during peak periods to assist in optimising network operation.

6.20 Dust & Dirt

6.20.1 Dust and dirt arising from traffic is mainly associated with HV traffic undertaking particular activities, such as construction. The extent of any impact of dust and dirt will be dependent upon management practices during construction. Specific procedures, such as washing down wheels and sheeting HV, will stop incidence of dust and dirt spreading on to the adjoining highway network.

6.20.2 All vehicular routes on site will be surfaced and so it is unlikely that any dust or dirt will arise from traffic generated by the completed proposal. The development will have a negligible impact on dust and dirt.

6.21 Cumulative Impact

6.21.1 BMBC has not advised of any additional developments that require consideration in the Transport Assessment.

6.22 Mitigation

6.22.1 The Transport Assessment shows that the development will have a minimal impact on surrounding highway network and will generate less traffic than that associated with the permitted site use. The Transport Assessment also shows that even without consideration of the permitted site traffic flows, the volumes of traffic associated with the renewable energy centre will not cause a significant increase in traffic or change in proportion of HV traffic.

6.22.2 The Transport Assessment considers the traffic impact of the proposal on the A1695 Park Spring Road, site access, Cathill Roundabout and Broomhill Roundabout. The Transport Assessment shows that the proposal will not have a material impact on AM or PM peak operation at these locations.

6.22.3 The Transport ES chapter shows that the proposal will have a minor impact when considered against IEMA significance thresholds.

6.22.4 The Transport Assessment shows that the development can be safely accommodated without a requirement to provide significant mitigation measures. Despite these findings the development proposals identify measures to enhance accessibility to the site and to promote efficient HV management.

6.22.5 The Transport Assessment and ES transport chapter do not include consideration of the impact of removing HV traffic from the assessments in the peak hour. The Transport Assessment and ES transport chapter use a worst-case staff car mode share and do not consider the reductions in single occupancy car use that will result when the Travel Plan is adopted. Both of these elements

will reduce development traffic and will further mitigate the environmental effects of the proposal.

6.22.6 The ES assessment shows that the proposal for which outline consent is sought will not have a perceptible environmental impact on local transport conditions, even when the proposed mitigation measures are not considered in the assessment.

6.23 Residual Effects

6.23.1 The traffic generated by the development proposals has been clearly shown to have an insignificant impact upon future traffic and transport conditions. This is despite the use of worst-case traffic assumptions and no account made of mitigation measures.

6.23.2 The proposal identifies infrastructure and sustainable policy interventions that, if considered in the traffic generation, would further reduce residual traffic flows.

6.23.3 A summary of the environmental impact of the proposal is provided in the table below.

Table 6.21– Significance after Mitigation

Description of Impact	Nature of Impact	Mitigation Measure(s)	Significance after Mitigation
Increase in traffic flows	Change in traffic flows	None required, below threshold of significance. However, development proposes: Travel Plan measures & HV Management Strategy	Negligible
Visual effects	Change in traffic composition/movements	None required, below threshold of significance. However, development proposes: HV Management Strategy	Negligible
Severance	Change in traffic flows	None required, below threshold of significance. However, development proposes: Travel Plan measures & HV Management StrategY	Negligible
Driver delay	Change in junction operation	None required, below threshold of significance. However, development proposes: Travel Plan measures & HV Management Strategy	Negligible
Pedestrian delay/amenity	Change in traffic flows	None required, below threshold of significance. However, development proposes:	Negligible

Description of Impact	Nature of Impact	Mitigation Measure(s)	Significance after Mitigation
		Travel Plan measures & HV Management Strategy	
Accidents and safety	Change in traffic flows	None required, below threshold of significance. However, development proposes: Travel Plan measures & HV Management Strategy	Negligible
Hazardous loads	Construction only	Subject to management plan if required	Negligible
Dust and dirt	Construction only	Subject to construction practice methods identified in Operation Method Statement	Negligible

6.24 Summary & Conclusions

6.24.1 This chapter reports on the assessment of potential traffic and transport impacts associated with the proposed development a Renewable Energy Centre at the Houghton Main colliery site in Barnsley.

6.24.2 The proposal site benefits from planning consent for employment use The approved scheme comprises 19 industrial units with a total GFA of 10,607sqm and 208 parking spaces.

6.24.3 A Framework Travel Plan is proposed for implementation at the site. The framework for this is attached as an appendix to the Transport Assessment. The framework provides details of the recommended policy measures, management and monitoring mechanisms, and targets to be used promote sustainable access and reduce the number of single occupancy car trips generated by the site. The measures proposed have been drawn from UK best practice, and acknowledge the future operational requirements and staff numbers at the site.

6.24.4 The type of development proposed, whilst not generating substantial volumes of traffic, will include heavy vehicle (HV) traffic required for the transport of materials to the site, and to a lesser extent, exports from the site. The operator has control over these movements and has agreed to institute management strategies to minimise the impact of HV movements on residential amenity and highway operation during critical periods.

6.24.5 A full Transport Assessment has been produced for the proposal. The Transport Assessment shows that the development will have a minimal impact on surrounding highway network and will generate less traffic than that associated with the permitted site use. The Transport Assessment considers the impact of the proposal on the A1695 Park Spring Road and site access.

6.24.6 At the request of BMBC the impact at the Broomhill and Cathill Roundabouts is also included within the Transport Assessment. The effects of the development proposal are detailed in full in the Transport Assessment.

6.24.7 The Transport Assessment demonstrates that changes in traffic movements arising from the proposed development can be accommodated on the local highway network and that changes in traffic flow will be insignificant.

6.24.8 The Transport Assessment and ES transport chapter show that the traffic impact of the proposal is well below the IEMA significance threshold at all highway links in the study area. Despite this, the impacts of proposed development in relation to the key environmental criteria as set out in IEMA guidance have still been considered in this report. The assessment shows that the proposal will have a negligible transport impact in all criteria. The Transport Assessment still identifies infrastructure and sustainable policy interventions that will accompany the proposal to reduce single occupancy car use and manage HV movements.

6.24.9 It is concluded that the proposal will not have a significant environmental transport impact.

7 Chapter 7: Hydrology, Flood Risk and SUDS

7.1 Introduction

7.1.1 The aim of this chapter is to provide an assessment of the development proposals for a REC comprising a Timber Resource Recovery Centre (TRRC) in terms of hydrology and flooding.

7.2 Background

The Development

7.2.1 The development proposals are fully described in Section 3.2 of the ES.

7.2.2 This chapter should be read in association with the Flood Risk Assessment (FRA) which was produced by Enzygo during January 2015.

7.3 Aims and Objectives

7.3.1 This chapter describes the policy context, input data and methods used to assess the Development in terms of the baseline hydrology and flood risk at the site, and the potential impacts of the Development taking into account the measures which have been adopted to prevent, reduce, mitigate or offset the identified impacts. Potential impacts generally relate primarily to flood risk and management of surface water, which in turn would manage water quality.

7.3.2 This assessment covers the Site Development and operation of the proposed Development and identifies the aspects of the proposals, which have the potential to affect the existing baseline situation. It addresses the following:

- Changes to the natural drainage patterns;
- Effects on baseflows;
- Effects on runoff rates and volumes;
- Effects on erosion and sedimentation;
- Effects surface water quality;
- Effects on water resources (both private and public water supplies);
- Effects on flooding and impediments to flow; and
- Pollution risk.

7.4 Methodology

Guidance Documents

7.4.1 As a matter of best practice, this assessment has been undertaken based on the relevant guidance on hydrology, flood risk, water quality and drainage. This includes:

- National Planning Policy Framework 2012;
- Planning Practice Guidance ID: 7, Flood Risk and Coastal Change;
- Land Drainage Act 1991;
- Water Resources Act 1991;
- Flood and Water Management Act 2010;
- The Water Framework Directive (WFD), 200/60/EC;
- Freshwater Fish Directive 2006/44/EC;
- Barnsley Strategic Flood Risk Assessment (Level 1), Barnsley Council, September 2010;
- WRC (2012) Sewers for Adoption, 7th Edition;
- Office of the Deputy Prime Minister, The Building Regulations, 2010;
- Office of the Deputy Prime Minister, Nation SuDS Working Group, 2004 – Interim Code of Practice for Sustainable Drainage Systems;
- CIRIA (2004) Report C609, Sustainable Drainage Systems – Hydraulic, Structural and Water Quality Advice;
- CIRIA (2004) Funders Report CP/102 Development and Flood Risk – Guidance for the Construction Industry; and
- British Water Code of Practice, Flows and Loads – 3, 2009.

Assessment Methodology

7.4.2 This assessment has involved the following:

- Consultation with the relevant statutory bodies to obtain details on the existing hydrological conditions of the site and surrounding areas;
- Detailed desk study and site visits to establish the existing baseline conditions;
- Evaluation of the potential effects of the proposals;
- Evaluation of the significance of these effects by consideration of the site, the potential magnitude of these effects and the probability of these effects occurring; and,
- Identification of possible measures to avoid and mitigate any potential adverse impacts resulting from the proposed Development.

Approach Methodology

7.4.3 The approach followed during the assessment considered the degree (or the "significance") of the potential impacts upon the hydrological characteristics of the Site.

7.4.4 The significance has been defined taking into account the sensitivity of the receiving environment and the potential magnitude of the impact.

7.4.5 The sensitivity of the receiving water environment, i.e. its ability to absorb the impact without perceptible change, is defined in Table 7.1.

Table 7.1 – Definition of Sensitivity of the Receiving Environment

Sensitivity	Definition
Very High	High quality and rarity, regional or national scale and limited potential for substitution/replacement • Site of Special Scientific Interest (SSSI) or Special Area of Conservation (SAC) • Excellent water quality • Large scale industrial agricultural abstractions >1000m3/day within 2 km downstream, or abstractions for public drinking water supply • Designated salmonid fishery and/or salmonid spawning grounds present • Watercourse widely used for recreation, directly related to watercourse quality (e.g. swimming, salmon fishery etc.) within 2km downstream • Conveyance of flow and material, main river >10m wide • Active floodplain area (important in relation to flood defence)
High	Receptor with a high quality and rarity, local scale and limited potential for substitution/replacement or receptor with a medium quality and rarity, regional or national scale and limited potential for substitution/replacement • Good water quality • Large scale industrial agricultural abstractions 500-1000m3/day within 2km downstream • Surface water abstractions for private water supply for more than 15 people • Designated salmonid fishery and/or cyprinid fishery • Watercourse used for recreation, directly related to watercourse quality (e.g. swimming, salmon fishery etc.) • Conveyance of flow and material, main river >10m wide • Active floodplain area (important in relation to flood defence)

Sensitivity	Definition
Moderate	Receptor with a medium quality and rarity, local scale and limited potential for substitution/replacement or receptor with a low quality and rarity, regional or national scale and limited potential for substitution/replacement • Fair water quality • Industrial/agricultural abstractions 50-499m3/day within 2km downstream • Designated cyprinid fishery or undesignated for fisheries - Occasional or local recreation (e.g. local angling clubs) • Conveyance of flow and material, main river <10m wide or ordinary watercourse 5m wide • Existing flood defences, may be subject to improvement plans • Groundwater abstractions 50-499m3/day - Private water supplies present • Designated cyprinid 1 fishery, salmonid species may be present and catchment locally important for fisheries • Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality
Low	Receptor with a low quality and rarity, local scale and limited potential for substitution/replacement • Environmental equilibrium stable and resilient to changes that are greater than natural fluctuations, without detriment to its present character • Polluted/poor water quality • Industrial/agricultural abstractions < 50m3/day within 2 km downstream • Fish sporadically present or restricted, no designated fisheries; not used for recreation • Watercourse < 5m wide • Area does not flood • Receptor heavily engineered or artificially modified and may dry up during summer months

7.4.6 The magnitude of the effect includes the timing, scale, size and duration of the potential effect. For the purposes of this assessment the magnitude criteria are defined in Table 7.2.

Table 7.2 – Magnitude of Effect

Magnitude	Criteria	Description and Example
Major	Results in loss of attribute	Fundamental (long term or permanent) changes to the hydrology or water quality • Loss of EC designated Salmonid fishery • Loss of designated species/habitats • Change in water quality status of river reach • Compromise employment source • Loss of flood storage/increased flood risk • Pollution of potable source of abstraction
Moderate	Results in effect on integrity of attribute or loss of part of attribute	Material but non-fundamental and short to medium term changes to the hydrology or water quality • Loss in productivity of a fishery • Contribution of a significant proportion of the effluent in the receiving water, but insufficient to change its water quality status • Reduction in the economic value of the feature
Minor	Result in minor effect on attribute	Detectable but non-material and transitory changes to the hydrology or water quality • Measurable change in attribute, but of limited size and/or proportion
Negligible	Results in an effect on attribute but of insufficient magnitude to affect the use / integrity	No perceptible changes to hydrology or water quality • Discharges to watercourse but no loss in quality, fishery productivity or biodiversity • No significant effect on the economic value of the receptor • No increase in flood risk

7.4.7 The sensitivity of the receiving environment together with the magnitude of the effect defines the significance of the effect prior to application of mitigation measures as outlined in Table 7.3.

Table 7.3 – Significance Criteria

Magnitude	Sensitivity			
	Very High	**High**	**Medium**	**Low**
Major	Major	Major	Moderate	Minor
Moderate	Moderate	Moderate	Moderate	Minor
Minor	Minor	Minor	Minor	Not Significant
Negligible	Not Significant	Not Significant	Not Significant	Not Significant

7.4.8 Potential effects are therefore concluded to be of major, moderate, minor or not significant. The shaded boxes in Table 7.3 represent effects considered to be significant.

7.4.9 This assessment concludes whether the residual significance of the resultant impacts of the operation of the site will be major, moderate, minor, negligible, or there will be no change once appropriate mitigation measures have been implemented. This assessment relies on professional judgment to ensure that the impacts are appropriately assessed. Impacts of moderate significance or greater are considered significant in terms of the EIA regulations and should be taken into account during the decision making process.

7.4.10 There are a number of potential impacts that could have a direct or an indirect impact on the local hydrology, flood risk and drainage

7.4.11 These potential impacts may be transitional but could also be of a more permanent nature.

7.5 Consultation

7.5.1 Consultation has been undertaken with the following organisations:

- Environment Agency;
- Barnsley Council (Lead Local Flood Authority); and
- Yorkshire Water.

Environmental Agency

7.5.2 Information regarding the current flood risk at the site, local watercourses, local flood defences, water levels and water quality has been obtained from the Environment Agency. In addition, the Environment Agency was consulted regarding the methodology for the Flood Risk Assessment (FRA) (see Appendix 7.1), which has been undertaken for the proposed development.

7.5.3 Environment Agency Standing Advice and NPPF have been consulted and reviewed as part of the FRA. This confirmed the level of FRA required and following a meeting held with the Environment Agency on 19th February 2014, it was determined that additional hydrological modelling was not required.

Barnsley Metropolitan Borough Council (BMBC)

7.5.4 BMBC are the Local Planning Authority for the area in which the site is located. The Barnsley Strategic Flood Risk Assessment (SFRA) was reviewed as part of the FRA (see 'Desk Study' below).

Yorkshire Water

7.5.5 Yorkshire Water is responsible for the disposal of waste water and supply of clean water for the site. Yorkshire Water provided information in relation to capacity problems and DG5 sewer flooding within the local sewer network, as well as copies of sewer asset plans within the study area.

7.5.6 Information with regards to sewer and water main flooding, contained within the SFRA, has been consulted as part of this Environmental Statement. All Water Companies have a statutory obligation to maintain a register of properties/areas which are at risk of flooding from the public sewerage system, and this is shown on the DG5 Flood Register.

7.6 Desk Study

7.6.1 As part of this study, a site visit was undertaken during February 2014. This included a site walkover survey, and the identification of hydrological features and flood risk sources located on the Site and within the surrounding area. This included the assessment of surface water features, land use, hydrological regime and to understand the site topography, the identification of the site existing/potential drainage network, discharge locations and local flood defence measures. Access and egress routes from the site were also investigated.

7.6.2 The desk study included the following:

- Collation of hydrological data – including rainfall and flow data;
- Compilation of soils, geological and groundwater information; and
- Compilation of surface water quality data

7.6.3 General information regarding the site setting and hydrology of the application site has been obtained from the:

- Ordnance Survey Explorer Map 278: Sheffield & Barnsley;
- British Geological Survey Map;
- Environment Agency Source Protection Zones, Flood Zone Maps, Abstraction licenses, WFD status information;
- CEH National River Flow Archive – Flow data;

- Met Office rainfall averages; and
- Barnsley SFRA.

Flood Risk Assessment

7.6.4 The FRA (provided as Appendix 7.1) has been undertaken in accordance with the NPPF. The key components of the FRA are as follows:

- An assessment of flood risk at the proposed development site;
- Hydrological analysis of the River Dearne catchment;
- A hydrological assessment of the surface water flows for the site;
- Development of a surface water management strategy for the construction and operation phases of the development;
- The flood risk to the existing and proposed development;
- The Site drainage and any potential impacts of the proposed development on surface water drainage; and
- The risk management and mitigation measures available to reduce and manage the flood risk at the Site.

7.7 Planning Policy

Introduction

7.7.1 A detailed review of the relevant planning and development plan documents in relation to the development proposals is provided within THE Planning Statement within Chapter 5 of this Environmental Statement. This section summarises those policies that are directly relevant to hydrology, flood risk and drainage/water quality issues.

7.8 National Policy & Legislation

7.8.1 At a national level, the central government strategy document 'A Better Quality of Life – A Strategy for Sustainable Development for the United Kingdom' recognises the fundamental importance of good water quality to health and the environment and identifies the major challenges to water quality which it states are; growing demand for water supplies, pollution pressures from the new Development, diffuse pollution inputs, changed weather patterns and loss of habitats.

7.8.2 These have been taken into consideration in assessing the hydrological impacts of the proposed Development.

National Planning Policy Framework

7.8.3 The National Planning Policy Framework (NPPF) was adopted in March 2012 and sets out the Government's planning policies and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant,

proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

Planning Practice Guidance, ID: 7

7.8.4 Provides additional guidance to local planning authorities to ensure effective implantation of the planning policy set out in the National Planning Policy Framework on Development in areas of flooding. This replaced the Technical Guidance to the NPPF in March 2014.

Making Space for Water

7.8.5 In March 2005 the Department for Environment Food and Rural Affairs (DEFRA) published 'Making Space for Water'. The overarching theme of this document is the management of flood risk and the identification of a strategic direction to control it. The document also identifies the influence of the changing coast together with the uncertain impacts of climate change in terms of the management of processes and flood risk. It underlines that planning policy should be designed to minimise flood risk and states that the preparation of Catchment Flood Management Plans (CFMPs) and Shoreline Management Plans (SMPs) should provide a broad management matrix.

The Pitt Review

7.8.6 In June 2008 Sir Michael Pitt published his final report into the summer 2007 flooding across the UK. The report examined both how to reduce the risk and impact of floods, and the emergency response to the floods in June and July 2007.

Flood and Water Management Act 2010

7.8.7 The Flood and Water Management Act 2010 provides better, more comprehensive management of flood risk for people, homes and businesses. It gives the Environment Agency an overview of all flood and coastal erosion risk management and unitary and county councils the lead in managing the risk of all local flood and introduce an improved risk based approach to reservoir safety. The Act also encourages the uptake of sustainable drainage systems (SUDS) by removing the automatic right to connect to sewers and providing for unitary and county councils to adopt SUDS for new Developments and redevelopments.

Land Drainage Act and Water Resources Act 1991

7.8.8 In addition to the national planning policy the application is liable for consideration by the Environment Agency under the Land Drainage Act (1991) and the Water Resources Act (1991). Consent from the Environment Agency is required for any proposed discharges to controlled waters. Consent would also be required for any Development within 8m of a designated main river under the Environment Agency's Land Drainage Byelaws.

CIRIA Report C624 – Development and Flood Risk – Guidance for the Construction Industry

7.8.9 This report provides practical guidance to assist the construction industry meet the challenge of achieving sustainable communities that give proper consideration to flood risk. It recommends a tiered approach to flood risk assessment. Three levels of assessment are defined:

- Level 1: Screening study to identify whether there are any flooding issues related to the Development site which need further consideration.
- Level 2: Scoping study to be undertaken if the Level 1 assessment indicates that the site may lie within an area which is at risk of flooding or may increase flood risk elsewhere. A level 2 assessment is also used to confirm possible sources of flooding that may affect the site.
- Level 3: Detailed study to be undertaken if the Level 2 assessment concludes that quantitative analysis is required to assess fully the flood risk issues related to the Development site.

7.8.10 CIRIA Environmental Good Practice on Site (C502) (1999), CIRIA Control of Water Pollution from Construction Sites (C532) (2001).

7.8.11 These provide guidance on hydrology, flood risk and water quality for consultants and contractors.

Barnsley Council Level 1 Strategic Flood Risk Assessment

7.8.12 The Level 1 SFRA was produced by Barnsley Council during September 2010 in support of the production of the Local Development Framework.

7.8.13 The guidance provided in this document requires local authorities and those responsible for development decisions to demonstrate that they have applied a risk based, sequential approach in preparing development plans and consideration of planning through the application of a sequential test.

7.8.14 The underlying objective of the risk based sequential allocation of land is to reduce the exposure of new development to flooding and reduce the reliance on long-term maintenance of built flood defences.

7.8.15 The SFRA is essential to enable a strategic and proactive approach to be applied to flood risk management.

7.9 Baseline Conditions

7.10 Site Description and Topography

Site Description

7.10.1 The development site is approximately 3.00 hectares (ha) in area.

7.10.2 The site is currently a brownfield site which is largely grassland with limited areas of a mixture of young and mature tree cover located towards the westernmost boundary of the site, with a number of hedgerows around the site perimeter. Its brownfield classification is related to the sites former use as mine pithead location with disused railway lines bounding the southern and western extents of the site with a former rail junction at the southern and western boundary intersection. The rails have been removed; however, much of the ballast remains.

7.10.3 The site is bounded by agricultural land on the western boundary. The east is bounded by a large distribution warehouse with agricultural land beyond. To the South, there is a small industrial

development (Alkane) and an area of scrub land narrowing towards Park Springs Road. To the north lies the curve of another disused railway, bunding and scrub woodland leading to the River Dearne. Beyond this lies Edderthorpe Ings Local Wildlife Site.

7.10.4 The existing site is largely permeable and is currently accessed via an exit off the Houghton Main Colliery roundabout on Park Spring Road. A de facto access track leads from the roundabout in westerly direction linking up to the southern disused railway heading west.

Topography

7.10.5 A topographic survey of the site has been undertaken by SLR Consulting in May 2011 and a further topographic survey by QuicSurv in March 2014.

7.10.6 The site generally slopes in a south-westerly direction towards the River Dearne, falling from approximately 33.77mAOD in the northern corner of the site to approximately 30.17mAOD in the westernmost corner of the site closest to the River Dearne. This equates to a fall of 3.6m over a distance of approximately 320m.

7.10.7 There are some constructed mounds on the southernmost boundary close to the access track from Houghton Main roundabout with a peak of 34.83m AOD. These are not representative of the overall slope of the site.

7.11 Hydrology, Surface Water and Drainage

Watercourses

7.11.1 Regionally, the site lies within the catchment of the River Dearne; a 'Main River' which flows in a south-easterly direction along the western boundary of the site (see FRA Drawing 5).

7.11.2 Ordnance Survey mapping (see FRA Drawing 5) shows that an unnamed tributary of the River Dearne flows in a south-westerly direction joining the River Dearne adjacent to the northern boundary of the site a short distance upstream of the Network Rail owned bridge over the River Dearne.

7.11.3 The River Dearne is a 'Main River' and is maintained by the Environment Agency. The unnamed tributary watercourse is an 'Ordinary Watercourse' and maintained by the Local Authority, Barnsley Council. Table 7.4 sets out the descriptors for the study catchment area of the River Dearne and the smaller unnamed tributary.

Table 7.4 – FEH CD-ROM V3 Catchment Descriptors of relevant watercourses

FEH Descriptor	Value		Explanation
	River Dearne	Unnamed Watercourse	
Catchment Descriptors			
Grid Reference	**SE 41650 06200**	**SE 41500 06600**	---
Area (km²)	173.29	14.52	Unnamed watercourse has a much
PROPWET	0.32	0.32	---
BFI HOST	0.542	0.621	High baseflow
SAAR (mm)	724	618	Medium Annual Average Rainfall
URBEXT 2000	0.1044	0.1076	Some Urbanisation for Barnsley township
SPR HOST	24.7	18.5	Low soil runoff potential
FEH 1 km point DDF Design Rainfall Parameters			
C	-0.025	-0.025	---
D1	0.347	0.345	---
D2	0.414	0.421	---
D3	0.246	0.246	---
E	0.300	0.300	---
F	2.362	2.364	---

Water Bodies

7.11.4 Two flood storage reservoirs (FSRs) are located within the vacinity of the site. One such FSR is located 220m to the north of the northern boundary of the site (Cudworth FSR). This reservoir is currently occupied by water and serves as a wetland and conservation area. The second (Houghton FSR) is located beyond a spillway within a constructed flood defence levee on the right bank of the river Dearne. This is located 125m to the west of the western corner of the site and is currently used as agricultural land when not in flood.

Surface Water Drainage

7.11.5 Yorkshire Water has provided a copy of their sewer record plans of public adopted sewers in the vicinity of the site.

7.11.6 Yorkshire Water sewer records show that there are no sewer assets located within the site boundary. The nearest sewer asset is foul only and located 380m to the south-east of the southernmost boundary of the site on the northern end of Ings Lane.

Flow Data

7.11.7 There is no published data for the site at Houghton Main. However, flow data is available for the River Dearne from station number 27023 Barnsley Weir (located at SE 34995 07266) for the period

1960 and 2012. The Dearne Weir is located approximately 6.5km upstream of the site in Barnsley. The weir gauge covers a catchment of approximately 118.9 km2.

7.11.8 The gauged daily flow from the most recent period available from the CEH National River Flow Archive is shown in Figure 7.1 and the flow duration curve is shown in Figure 7.2.

Figure 7.1 – CEH NRFA Gauged Daily flow on River Dearne at Barnsley Weir

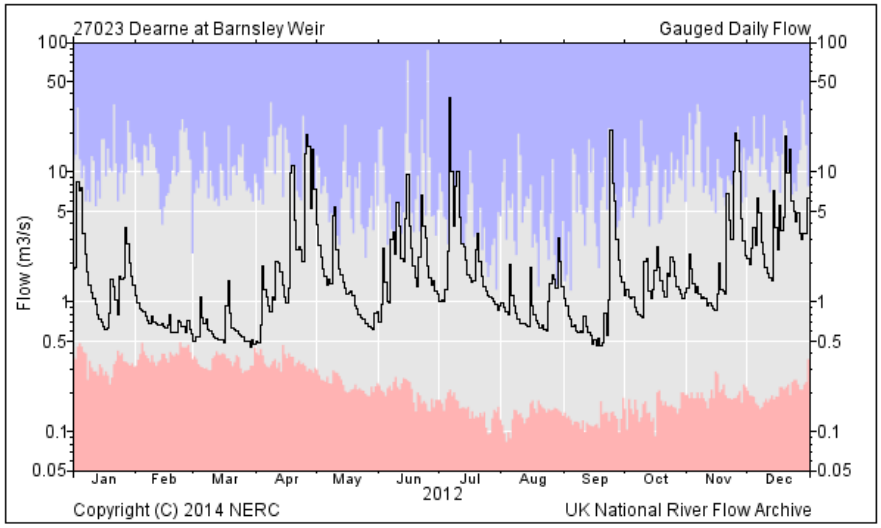
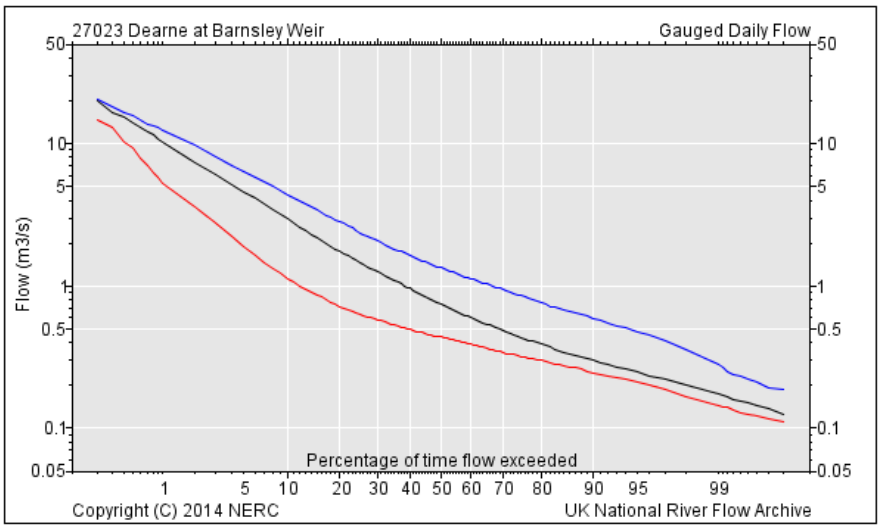


Figure 7.2 – CEH NRFA Flow Duration for the River Dearne at Barnsley Weir



7.11.9 Mean flow is 1.393 m3/s and the 10 percentile flow (flow exceeded 10% of the time) has been calculated to be 2.94 m3/s.

7.11.10 No flow data is available for the unnamed tributary of the River Dearne at Houghton Main.

7.12 Rainfall

7.12.1 There is no published rainfall for the site at Houghton Main. Data is available from the Met Office for Sheffield (Cdl) which is the most local station to the site. Average and annual monthly rainfall data between 1981 and 2010 is shown in Table 7.5. This indicates an annual average of approximately 834.6mm.

7.12.2 The FEH CD-ROM v3 Standard Average Annual Rainfall (SAAR) values for the sites two local watercourse catchments is provided below for comparison:

- River Dearne catchment – 724mm
- Unnamed tributary catchment – 618mm

7.12.3 The data demonstrates that the River Dearne is the dominant watercourse and catchment in the site area and will affect the development to a greater level than the unnamed tributary.

Table 7.5 – Met Office Average Rainfall for Sheffield (Cdl)

Month	1981 – 2010
January	83.4
February	60.4
March	63.4
April	65.5
May	53.8

Month	1981 – 2010
June	75.6
July	56.0
August	65.3
September	63.8
October	81.2
November	79.4
December	86.7
Annual	834.6

7.13 Flood Risk

7.13.1 A detailed FRA has been carried out by Enzygo during January 2015 (see Appendix 7.1). The FRA has been undertaken in accordance with the NPPF and using Environment Agency Standing Advice. This has confirmed the level of FRA required and that a surface water drainage assessment is to be undertaken.

7.13.2 The flood risk has been demonstrated to be 'low' to this site with the probability of flooding from fluvial sources being a 1 in 1000 annual probability of flooding or a <0.1% annual exceedance probability.

7.13.3 This risk is related to the River Dearne only and no other fluvial risks are presented to the site.

7.13.4 The FRA has also demonstrated that there are two secondary sources of flooding to the site:

- Flooding from rising / high groundwater; and
- Overland flow flooding.

7.13.5 The development will be designed in accordance with principles of NPPF and NPPF T&G whereby it will not increase flood risk either on or off the site.

7.13.6 The development has been assessed as having no detrimental impact on flood levels upstream or downstream of the development. There will be no negative impact on floodplain storage or conveyance.

7.14 Surface Water Quality

Water Framework Directive

7.14.1 The aim of the Water Framework Directive (WFD) is to ensure that all surface water and groundwater bodies are of good chemical and ecological status by 2015. There are, however, certain exemptions as set out in the WFD. The Humber River Basin Management Plan (RBMP)

outlines that the River Dearne at Houghton Main reach is expected to be at moderate quality in both ecological and chemical status by 2015. The unnamed tributary to the north of the site (Grimethorpe Dike) is expected to be at moderate ecological status by 2015. Due to its classification as a heavily modified water body, it is not expected to reach a specified chemical standard.

7.14.2 Good ecological status of a water body will be achieved when a series of criteria, including good chemical status, is achieved. The achievement of good chemical status is dependent on meeting agreed Environmental Quality Standards (EQS), including EQS for Priority Substances defined by the WFD.

7.14.3 The Environment Agency classifies rivers in accordance with the Water Framework Directive (WFD) ecological status classification scheme under the Humber RBMP.

7.14.4 The results of the most recent assessments for the River Dearne in the area of the proposed development at Houghton Main are presented in Table 7.6 and para 7.5.32. These results are taken from the 2009 River Quality statement for the site on the Environment Agency website, where full details of each water body classification and proposed improvement measures can be viewed. The Water Framework status classification of the River Dearne for the reach flowing through Houghton Main is also shown in Table 7.6.

Table 7.6 – Environment Agency 2009 River Quality and EU WFD status (2009) for the River Dearne at Houghton Main

EA River Quality (2009)		EU Water Framework Directive Status (2009)	
Parameter	**EA River Quality Grade**	**Parameter**	**RMDB WFD Status**
Chemistry	B	**Ecological Quality**	Moderate
Biology	D	**Chemical Quality**	Not required as heavily modified waterbody
Nitrates	6	**2015 Predicted Ecological Quality**	Moderate
Phosphates	6	**2015 Predicted Chemical Quality**	Not required as heavily modified waterbody

Note: Chemistry and Biology graded A to F (very good to bad). Nitrates and Phosphates graded 1 to 6 (very low levels to very high levels)

Water Quality Sampling

7.14.5 There is an EA water quality sampling point for the reach of the unnamed tributary (From Grimethorpe Dike to Billingley Dyke in the EA description). This reach is stated to be located between 439349, 407043 and 441478, 406495.

7.14.6 The general quality of the River Dearne according to the EA River Quality survey conducted in 2009 is summarised in the mean average parameter values below:

- Ammonia (mgN/l) - 0.318
- Dissolved Oxygen (% saturation) - 89.69
- No. Taxa - 19
- Average Score Per Taxon (ASPT) - 4.21
- Nitrates (mg/l) - 45.32
- Phosphates (mg/l) - 1.33

Drinking Water Abstractions

7.14.7 The nature of the development during construction and operation phase should not affect local ground levels or sources for abstraction in the local area. There is one known abstraction point for drinking water located downstream of the site approximately 3.5km to the south. This is a groundwater abstraction point and details regarding this abstraction are given as follows:

- Licence (2/27/08/135) - Expires in 31/03/2017 after which it is expected the license will be renewed. User is Trustees of the Doncaster and Bassetlaw Hospitals NHS Trust

Surface Water Abstractions

There is one authorised surface water abstraction point within 3km of the site related to agricultural uses. The details for these are as follows:

- License 2/27/08/090 – No Expiry date – Used for spray irrigation at max annual rate of 180,000 m3 of water per annum. User is J & E Dickinson.

Groundwater Abstractions

7.14.8 There is one authorised groundwater abstraction point within 3km of the site related to agricultural uses. The details for these are as follows:

- License NE/027/0008/011 – Expires 31/03/2029 – Used for general agriculture at max rate of 30,000 m3 of water per annum. User is J & E Dickinson.

Recreation and Fisheries

7.14.9 The reach of the River Dearne at Houghton Main (Grimethorpe Dike to Billingley Dyke) is classified as a Cyprinid fishery according to the Environment Agency Humber RMDB report published in 2009 and specified according to the Freshwater Fish Directive (2006/44/EC). Surface water

discharge from the site will be required to meet standards set out in any discharge license granted by the Environment Agency to permit discharge from the site.

7.14.10 The imperative standards as stated in the Freshwater Fish Directive are shown in Table 7.7.

Table 7.7 – Freshwater Fish Directive Imperative Standards – Cyprinid

Sampling Parameter	Units	Guideline Value	Imperative Value
Temperature	**°C**	**-**	**No more than 3 °C above background temperatures**
Dissolved Oxygen	**mg/l**	**50% ≥ 8** **100% ≥ 5**	**50% ≥ 7**
pH	**-**		**6 to 9**
Suspended Solids	**mg/l**	**≤ 25**	**-**
Biological Oxygen Demand	**mg/l**	**≤ 6**	**-**
Nitrites	**mg/l**	**≤ 0.03**	**-**
Phenolic Compounds	**-**	**-**	**Quantities must not affect the flavour of fish**
Petroleum Compounds	**-**	**-**	**Must not be sufficient quantities to form a film on the surface**
Non-ionized Ammonia	**mg/l**	**≤ 0.005**	**≤ 0.025**
Total Ammonium	**mg/l**	**≤ 0.2**	**≤ 1**
Total Residual Chlorine	**mg/l**	**-**	**≤ 0.005**
Total Zinc	**mg/l**	**-**	**≤ 1**
Dissolved Copper	**mg/l**	**≤ 25**	**-**

Nature Conservation

7.14.11 Within 5km of the site are the following statutory and non-statutory nature conservation sites:

- Carlton Brick Works Site of Special Scientific Interest (Statutory-SSSI);
- Stairfoot Brick Works Site of Special Scientific Interest (Statutory-SSSI);
- West Haigh Wood Local Nature Reserve;

- Carlton Marsh Local Nature Reserve;
- Dearne Valley Park Local Nature Reserve; and
- Edderthorpe Ings Local Wildlife Site.

7.14.12 In respect of potential impact from the development proposal, it is noted that discharge from the Houghton Main development will be either downstream from, or to a different catchment from, all of the above sites save Dearne Valley Park Local Nature Reserve (RSPB) which is situated 3.5km downstream of the site.

Sensitivity of Hydrological Receptors

7.14.13 The baseline assessment has identified a single receptor which may be vulnerable to impacts from the proposed Development. A summary of the relative sensitivities of this receptor (according to the criteria listed in Table 7.1) is given in Table 7.8 below.

Table 7.8 – Sensitivity of Identified Receptors using the criteria within Table 7.1

Receptor	Comment	Sensitivity
River Dearne	• Potential flood risk to the site in a 1 in 1000 year event	Low

7.15 Proposed Mitigation Incorporated in Proposal

Mitigation with the Design
On/Off-site Surface Water Management System

7.15.1 The following impacts will be mitigated by the design:

- Sediment loading of watercourses;
- Changes to flow rates and alterations in discharge volume; and
- Other contaminants entering watercourses.

7.15.2 The removal of soil and vegetation will modify the area of the local surface water catchment and could result in fine silt and clay particulate matter washing from excavations and disturbed areas during site construction and operation of the proposed development.

7.15.3 Suspended solids can increase the turbidity in watercourses, leading to:

- Damage to fish spawning areas during sedimentation;
- The smothering of benthic species during sedimentation;
- Damage to fish gills; and
- Reductions in flood storage capacity within watercourses.

7.15.4 Any sediment or spilt material brought in from HGV vehicles delivering to site may inadvertently enter the surface water drainage system in suspension. This may provide a pathway for other pollutants to enter the surface water system thus pollution interceptors will be installed on the upstream side of the surface water storage facility. This will ensure that pollutants cannot leave the site via the surface water drainage system.

7.15.5 This surface water storage facility will have an outfall into the River Dearne, 180m at the southern end of the application site. The flow from the outfall will not be in excess of 140 l/s/ha; the recommended brownfield runoff rate. The runoff will be reduced by 30% as betterment as per recommendations from the pre-application advice letter received 12th March 2014. The detailed drainage design can be viewed in the appendices to the FRA supporting this ES chapter and reproduced in Section 8 of the Planning Application.

7.15.6 In accordance with EA pollution prevention guidelines, the fuel-oil tank on site shall have a double-skin bunded containment of a minimum of 110% fuel tank capacity. There will be no drainage point from the bunded containment area; tamperproof taps and valves will be installed and all empty fuel containers or drums will be stored within a containment area prior to their removal or disposal from the site.

7.15.7 Oil traps will be incorporated in pertinent drainage systems to prevent accidental spillage being discharged into surface runoff. Spill kits will be stored at refuelling areas and will include sand or other suitable containment and absorbent material.

7.15.8 Where fuelling of large machinery is required, drip trays and absorbent mats and pellets will be used to contain or absorb accidental spillages. Plant maintenance will also be undertaken in a designated area and will adopt similar contamination prevention measures.

7.15.9 Site discharge parameters for water quality and water quantity will be designed to attenuate runoff to the brownfield runoff rate with betterment to maintain flows and ensure no detrimental impact on water quality.

7.15.10 Water quality monitoring will continue to ensure that the site discharge parameters agreed through the water quality consent licensing process are being met.

Construction Environmental Management Plan

7.15.11 The maintenance and management of the Site during the construction phase will be essential in preventing surface water flooding of the site and surrounding areas.

7.15.12 To control environmental issues during the construction process a Construction Environmental Management Plan (CEMP) will be developed. The CEMP will form part of the project management plan, which will integrate the core arrangements for health and safety, quality and environmental management for the construction phase. This integrated approach ensures that environmental aspects are considered at all stages of the design and construction process.

7.15.13 The construction phase will be undertaken in accordance with the following good practice guidelines:

- CIRIA Environmental Good Practice on Site (C502) (1999);
- CIRIA Control of Water Pollution from Construction Sites (C532) (2001); and
- Environment Agency Pollution Prevention Guidelines.

7.1.1 These provide guidance on hydrology, flood risk and water quality for consultants and contractors.

7.16 Potential Cumulative Impacts

Relevant Proposals

7.16.1 The following known applications to Barnsley Council within the local ward to the site have been identified for cumulative assessment:

- Park Spring Wind Farm (2013/0860); and
- ASOS Extension to Warehouse and Parking Area (2013/1250).

7.16.2 The Park Spring Wind Farm was granted planning permission (2013/0860) on 9th April 2014, .It is to be located to the north of the site on a land parcel which abuts the A6195 from which the site is accessed. Though the catchment for the 3 turbines is drained by the unnamed tributary to the River Dearne to the north of the site, the drainage strategy for this development likely involves soakaway, or discharge to local drainage ditches with less than 1ha of impermeable ground contributing to the overall runoff. Therefore the flow of surface water and incidental suspended contaminants from ground disturbance should be minimal and not readily enter the watercourses passing the site as a consequence. There is therefore no perceived cumulative impact from this development should it be approved.

Summary

7.16.3 There are no perceived cumulative impacts from the developments listed above should they be approved.

7.17 Residual Effects

7.17.1 The residual effects associated with the hydrology, flood risk and drainage represent those effects that have not been assessed and mitigated against as part of the development plan.

7.17.2 Given the nature of the Development and the surface water management strategy then with the appropriate design and management of the construction phase, then overall the site poses no significant risk to surface water resources within the area.

7.17.3 It has been concluded that there are no residual effects.

7.18 Conclusions

Introduction

7.18.1 This chapter has assessed the existing hydrological characteristics of the site, the potential impacts of the proposed development, and has recommended mitigation measures to minimise any adverse impacts identified.

7.18.2 Mitigation measures will be implemented through:

- A surface water management system with interceptors to reduce the possibility of contaminants in suspension being released to the River Dearne
- A Construction Environmental Management Plan to ensure the construction phase is carried out in accordance with CIRIA and Environment Agency recommended practice in preventing the conveyance of pollutants to the watercourse for the protection of biota and chemical status of the River Dearne in light of the progress being made for the WFD aims for 2015 and beyond.

Statement of Significance

7.18.3 It is considered that the proposed mitigation measures will reduce the significance of potential impacts of the proposals on the hydrology of the Site to "negligible". These are summarised in Tables 7.9 and 7.10.

Table 7.9- Significance of Impacts on Hydrology – Construction Phase

Impact	Receptors	Sensitivity (from Table 7.1 and Table 7.6)	Magnitude of Effect before mitigation (see Table 7.2)	Magnitude of Effect following Mitigation Measures (see Table 7.2)	Significance of Impact (see Table 7.3)
Sediment loading of watercourses	River Dearne	Moderate	Moderate	Negligible	Not Significant

Impact	Receptors	Sensitivity (from Table 7.1 and Table 7.6)	Magnitude of Effect before mitigation (see Table 7.2)	Magnitude of Effect following Mitigation Measures (see Table 7.2)	Significance of Impact (see Table 7.3)
Changes to flow rate and water volume	River Dearne	Moderate	Moderate	Negligible	Not Significant
Pllution	River Dearne	Moderate	Moderate	Negligible	Not Significant

Table 7.10 – Significance of Impacts on Hydrology – Developed

Impact	Receptors	Sensitivity (from Table 7.1 and Table 7.6)	Magnitude of Effect before mitigation (see Table 7.2)	Magnitude of Effect following Mitigation Measures (see Table 7.2)	Significance of Impact (see Table 7.3)
Sediment loading of watercourses	River Dearne	Moderate	Moderate	Negligible	Not Significant
Changes to flow rate and water volume	River Dearne	Moderate	Moderate	Negligible	Not Significant
Pollution	River Dearne	Moderate	Moderate	Negligible	Not Significant

7.19 Conclusions

7.19.1 This chapter has assessed the hydrological characteristics of the proposed Timber Resource Recovery Centre (TRRC), its surroundings, and the impacts of the proposals on hydrology, flood risk and drainage and accompanying mitigation measures.

7.19.2 The baseline assessment has identified one potential receptor which may be vulnerable to impacts from the proposed Development. This is classed as having a moderate sensitivity to environmental impacts.

7.19.3 Even so, proposed mitigation and enhancement measures have been incorporated within the design to reduce the potential effects on hydrology, flood risk and surface water runoff both to the site and to the surrounding environment.

7.19.4 It is considered that the proposed mitigation measures will reduce the significance of potential impacts of the proposals on the hydrology of the site to negligible.

7.19.5 It is concluded that the proposed mitigation measures will ensure that the proposed Development will have no significant impacts on hydrology, flood risk, drainage, water quantity and quality. A series of comprehensive mitigation measures have been integrated into the design of the Development to ensure that impacts on the hydrological environment are minimised.

7.19.6 Mitigation measures at the site will need to ensure that water quantity and quality is controlled to acceptable levels. Surface water runoff from the site will be discharged, subject to settlement and flow controls.

7.19.7 Surface water runoff will represent betterment to the current runoff conditions as existing conditions are uncontrolled and the proposed SuDS system will attenuate surface runoff to 30% less than the standard permissible brownfield runoff rate of 140 l/s/ha. Therefore, this ensures that the development will not increase flood risk and pollution risk elsewhere.

7.19.8 It is proposed that the detailed design of the final scheme would be agreed with the Environment Agency and LPA prior to works commencing.

7.19.9 No cumulative impacts or residual effects have been assessed to affect areas local to the site in relation to changes in hydrology on the site following development.

8 Chapter 8: Air Quality

8.1 Introduction

8.1.1 This report describes the potential air quality impacts associated with the proposed development of a Timber Resource Recovery Centre (TRRC) at Houghton Main in Barnsley. The assessment has been carried out by Air Quality Consultants Ltd on behalf of Peel Environmental Management (UK) Ltd.

8.1.2 The proposed TRRC will process up to 150,000 tpa of waste timber by biomass gasification. The technology produces a combustible gas (syngas) which will be combusted to generate electricity. The TRRC will process commercial and industrial waste timber, which will be pre-processed to remove ferrous and non-ferrous material prior to gasification. The TRRC will export approximately 20 MW of renewable electrical power.

8.1.3 The proposed TRRC is located to the east of Barnsley within the Barnsley Metropolitan Borough boundary. The Council has declared a number of Air Quality Management Areas (AQMAs) due to concentrations of nitrogen dioxide identified to be in breach of national air quality objectives. All the AQMAs are in Barnsley town centre and the proposed TRRC site is more than 5 km from the nearest AQMA.

8.1.4 During the construction phase, dust emissions have the potential to impact upon local receptors and this has been assessed. The main pollutants of concern related to construction activities are dust and PM10. Emissions from on-site plant and vehicles have not been assessed, as experience suggests they are unlikely to have a significant impact (Institute of Air Quality Management, 2014).

8.1.5 During the operational phase, emissions to air from the TRRC stack have been assessed. These emissions have potential air quality impacts in terms of human health and ecosystems.

8.1.6 In relation to human health, consideration has been given to a comprehensive range of pollutants that may be emitted. The list is taken from the Industrial Emissions Directive (IED), to which the TRRC will have to conform for environmental permitting purposes. The pollutants that have been assessed are:

- nitrogen oxides
- total dust (as PM10 and PM2.5)
- carbon monoxide (CO)
- TOC;
- sulphur dioxide (SO2);
- hydrogen chloride (HCl);
- hydrogen fluoride (HF);
- trace metals; and

- dioxins and furans.

8.1.7 In addition to the assessment of impacts to human health, the potential air quality impacts on sensitive ecosystems have also been addressed. There are no European designated sensitive ecosystems (Special Protection Areas (SPAs), Special Areas of Conservation (SCAs) or Ramsar sites) within 10 km of the proposed TRRC; however, there is a nationally designated Site of Special Scientific Interest (SSSI), a local nature reserve (LNR) and a number of Local Wildlife Sites (LWS), Ancient Woodland (AW) and Restored Ancient Woodland (RAW) sites that have been identified within 2 km of the development, which have the potential to be affected by emissions from the proposed TRRC. The Carlton Main Brickworks SSSI has been designated for its geological interest, and is therefore not sensitive to air pollution, however, the LWSs, AW and RAW may be sensitive to changes in air pollutant concentrations brought about by the operation of the proposed TRRC. These sites are shown in Figure 8.1 and define the extent of the study area. The relevant pollutants with the potential to affect sensitive ecosystems are:

- nitrogen oxides (NOx);
- ammonia (NH3);
- sulphur dioxide (SO2);
- hydrogen fluoride (HF);
- nutrient nitrogen deposition (which is contributed to by NOx and NH3 emissions); and
- acid deposition (which is contributed to by NOx, NH_3, SO_2 and HCl emissions).

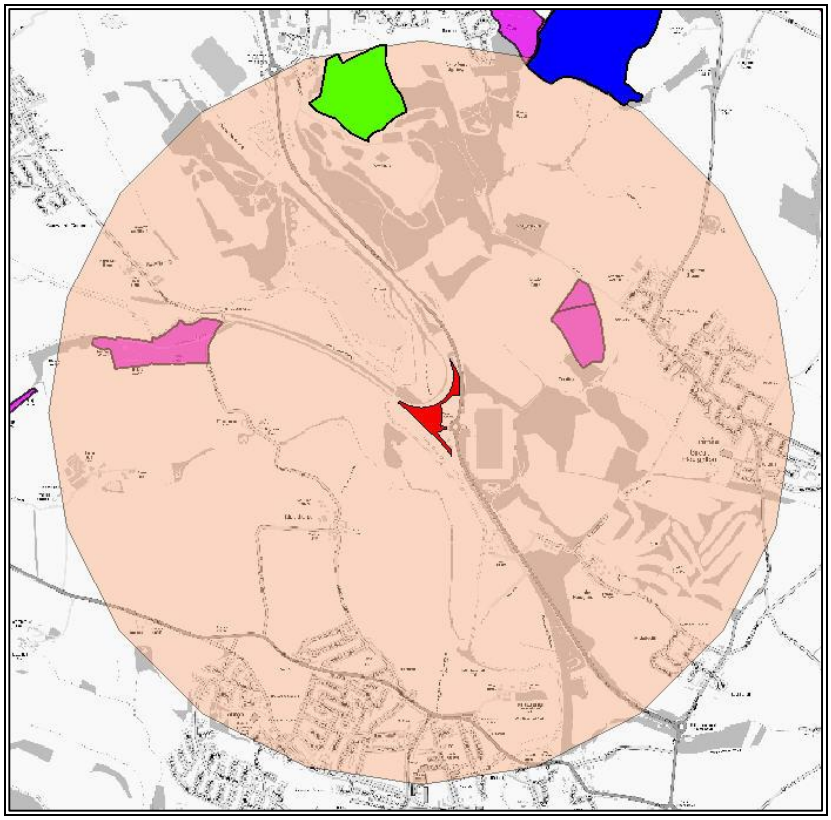


Figure 8.1: Ecological Sites within 2 km of the Development site (Red area). SSSI (Green Area), AW and RAW (Purple Area), LNR (Blue Area) and Study Area - 2 km buffer (Orange Area).

8.1.8 The development will increase the traffic flows on local roads, emissions from which may impact on air quality in the local area. The air quality impacts associated with these changes in traffic flows have, however, been screened out as *insignificant* using the criteria presented within the EPUK guidance on planning for air quality (Environmental Protection UK, 2010). This guidance states that air quality impacts of traffic related sources should be considered if:

- *The proposals give rise to a significant change in traffic volumes on roads with an annual average daily traffic (AADT) flow of more than 10,000 vehicles. A change in AADT or peak traffic flows of greater than 5% are considered significant for roads within an AQMA and changes greater than 10% are considered significant in other locations.*
- *The proposals would significantly alter traffic composition on local roads. Typically this is considered to be the case if an increase in daily HDV movements of 200 or more is predicted.*
- *The proposals would include significant car parking. Significant parking provision is considered to be 50 or more spaces within an AQMA.*

8.1.9 Traffic flows were provided by SK Transport Planning Ltd. The greatest increase in traffic due to the proposed TRRC on any local road (including those with AADTs less than 10,000 vehicles) is less 40%, this is well below the criterion of 10%. The TRRC is not predicted to increase HDV flows on local roads above the threshold of 200 movements per day; the greatest increase in HDVs on any

local road is 66 vehicles. As these screening criteria have not been exceeded, a quantitative assessment of the impacts of the changes in traffic flows has not been carried out. It can be concluded that the road traffic impacts will be insignificant.

8.1.10 This report describes baseline local air quality conditions (2012), and the predicted air quality in the future (2017) assuming that the proposed development does, or does not proceed. The assessment of construction dust impacts focuses on the anticipated duration of the works.

8.1.11 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Barnsley Metropolitan Borough Council.

8.2 Policy Context and Assessment Criteria

European Legislation

European Framework Directive on Ambient Air Quality and Cleaner Air for Europe, May 2008

8.2.1 The European Union has set limit values (concentrations which must not be exceeded) for seven key air pollutants, nitrogen dioxide, particulates (as PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), benzene, carbon monoxide (CO), and lead (Pb). These limit values are set out in the EU Framework Directive (2008/50/EC, 2008). Achievement of these values is a national obligation and was required by 2010 for nitrogen dioxide and benzene, and 2005 for all other pollutants apart from $PM_{2.5}$, which will not apply until 2015.

European Waste Framework Directive, November 2008

8.2.2 The Waste Framework Directive (2008/98/EC, 2008) sets out the EU member state obligations to the planning, operation and management of waste sites and processes. With respect to air quality, the Directive states:

a) *"Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:*

b) *without risk to water, air, soil, plants or animals;*

c) *without causing nuisance through noise or odours; and*

d) *without adversely affecting the countryside or places of special interest."*

European Industrial Emissions Directive, December 2010

8.2.3 The Industrial Emissions Directive (IED) (2010/75/EU, 2010) brings together seven existing directives, including the Waste Incineration Directive, into one piece of legislation. The IED outlines total emission limit values (ELVs) for a number of pollutants typically emitted during waste incineration. These are nitrogen oxides and nitrogen dioxide, NO, total dust, HCl, HF, SO_2, organic substances, trace metals, and dioxins and furans. The design and operation of all new waste incinerations facilities must ensure compliance with the ELVs, which are summarised in Table 8.1 below.

Table 8.1: IED Emission Limit Values (mg/Nm^3)

Pollutant	Daily Average	Half-Hourly Average	
		100th percentile	97th percentile
Total dust	10	30	10
Total Organic Carbon (TOC)	10	20	10
Hydrogen chloride (HCl)	10	60	10
Hydrogen fluoride (HF)	1	4	2
Sulphur dioxide (SO_2)	50	200	50
Nitrogen Oxides (NOx)	200	400	200
Carbon monoxide (CO)	50	100 [a]	150 [b]
Group 1 metals [c d]	0.05		
Group 2 metals [c e]	0.05		
Group 3 metals [c f]	0.5		
Dioxins and furans [g]	1×10^{-7}		

[a] 100th percentile of half-hourly average concentrations in any 24-hour period

[b] 100th percentile of ten-minute average CO concentrations

[c] Average over a sample period between 30 minutes and 8-hours

[d] Cadmium (Cd) and Thallium (Tl)

[e] Mercury (Hg)

[f] Antimony (Sb), Arsenic (As), Lead (Pb), chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni) and Vanadium (V)

[g] I-TEQ (Toxic Equivalent)

8.3 Protection of Sensitive Ecosystem

8.3.1 European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "Habitats Directive") requires member states to introduce a range of measures for the protection habitats and species. The Conservation of Habitats and Species Regulations (The Air Quality Standards Regulations 2010 (No. 1001), 2010), transposes the Directive into law in England and Wales. The Regulations require the Secretary of State to provide the European Commission with a list of sites which are important for the habitats or species listed in the Directive. The Commission then designates worthy sites as Special Areas of Conservation (SACs). The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs); with these classified under the Council Directive

79/409/EEC on the Conservation of Wild Birds (Directive 2009/147/EC of the European Parliament and of the Council, 2009). These sites form a network termed "Natura 2000".

8.3.2 The Regulations primarily provide measures for the protection of European Sites and European Protected Species, but also require local planning authorities to encourage the management of other features that are of major importance for wild flora and fauna.

8.3.3 In addition to SACs and SPAs, some internationally important UK sites are designated under the Ramsar Convention. Originally intended to protect waterfowl habitat, the Convention has broadened its scope to cover all aspects of wetland conservation.

8.3.4 The Habitats Directive (as implemented by the Regulations) requires the competent authority, which in this case will be the planning authority, to firstly evaluate whether the development is likely to give rise to a significant effect on the European site. Where this is the case, it has to carry out an 'appropriate assessment' in order to determine whether the development will adversely affect the integrity of the site.

8.4 National Legislation

The Environmental Permitting Regulations in England and Wales, March 2010

8.4.1 The Environmental Permitting Regulations (2010) set the legislative background for environmental permitting in England and Wales. The regulations include a commitment to minimising emissions to air from permitted processes, and include obligations of compliance with all legislated emissions limits for permitted processes, including the IED emission limits for waste incineration processes.

The Environmental Permitting Regulations in England and Wales (Amendment) Regulation (2013)

8.4.2 The requirements of the IED were transposed into UK law on 27th February 2013 by the Environmental Permitting (England and Wales) (Amendment) Regulations (2013). This makes any new installation seeking a permit after 28th February 2013 subject to the IED.

The Waste (England and Wales) Regulations 2011, March 2011

8.4.3 The Waste Framework Directive (2008/98/EC, 2008) and its obligations, including those on air quality, are transposed in English law by The Waste (England and Wales) Regulations (2011).

The UK Air Quality Strategy, 2007

8.4.4 The Air Quality Strategy published by the Department for Environment, Food, and Rural Affairs (Defra) provides the policy framework (Defra, 2007) for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has

to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality (England) Regulations, 2000 and Air Quality (England) (Amendment) Regulations 2002

8.4.5 Some of the objectives are for the use of local authorities as part of the LAQM regime, and these are set out in regulations.

Air Quality Standards Regulations, 2010

8.4.6 The air quality limit values set out in EU Directive (2008/50/EC, 2008) are transposed in English law by the Air Quality Standards Regulations (2010). This imposes duties on the Secretary of State relating to achieving the limit values.

Protection of Sensitive Ecosystems

8.4.7 Sites of national importance may be designated as Sites of Special Scientific Interest (SSSIs). Originally notified under the National Parks and Access to the Countryside Act (1949), SSSIs have been re-notified under the Wildlife and Countryside Act (1981). Improved provisions for the protection and management of SSSIs (in England and Wales) were introduced by the Countryside and Rights of Way Act (2000) (the "CROW" act). If a development is "*likely to damage*" a SSSI, the CROW act requires that a relevant conservation body (i.e. Natural England) is consulted. The CROW act also provides protection to local nature conservation sites, which can be particularly important in providing 'stepping stones' or 'buffers' to SSSIs and European sites. In addition, the Environment Act (1995) and the Natural Environment and Rural Communities Act (2006) both require the conservation of biodiversity.

8.5 National Planning Policies

National Planning Policy Framework, March 2012

8.5.1 The National Planning Policy Framework (NPPF) (2012) sets out planning policy for the UK in one place. It places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. One of the twelve core planning principles notes that planning should *"contribute to…reducing pollution"*. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location. The NPPF states that the effects of pollution on health and the sensitivity of the area and the development should be taken into account.

8.5.2 More specifically the NPPF makes clear that: *"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."

8.5.3 The NPPF also sets out the National planning policy on biodiversity and conservation. This emphasises that the planning system should seek to minimise effects on biodiversity and provide net gains in biodiversity wherever possible as part of the Government's commitment to halting declines in biodiversity and establishing coherent and resilient ecological networks.

8.5.4 PPS10 on Planning for Sustainable Waste Management (ODPM, 2011), which has not yet been replaced by the NPPF (although a consultation draft of the updated national waste planning policy document: *Planning for sustainable waste management* was issued in July 2013), sets out the several objectives for 'sustainable' waste management. The overall objective of the Government policy on waste is to protect human health and the environment by producing less waste and by using it as a resource wherever possible. PPS10 contains Annex E, for consideration of local environmental impacts, including dust and litter. In considering planning applications for waste management facilities waste planning authorities should consider the likely impact on the local environment and on amenity, i.e. through consideration of the proximity of sensitive receptors and the extent to which adverse emissions can be controlled through the use of appropriate and well-maintained and managed equipment.

8.5.5 The NPPF is now supported by Planning Practice Guidance (PPG) (DCLG, 2014), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that *"Defra carries out an annual national assessment of air quality using modelling and* monitoring *to determine compliance with EU Limit Values."* and *"It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit".* The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans "*identify measures that will be introduced in pursuit of the objectives*". The PPG makes clear that *"Air quality can also affect biodiversity and may therefore impact on our international obligation under the Habitats Directive".* In addition, the PPG makes clear that *"Odour and dust can also be a planning concern, for example, because of the effect on local amenity"*.

8.5.6 The PPG states that *"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)".*

8.5.7 The PPG sets out the information that may be required in an air quality assessment, making clear that *"Assessments* should *be proportional to the nature and scale of development proposed and the level of concern about air quality"*. It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear

that *"Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".*

Protection of Sensitive Ecosystems

8.5.8 National planning policy on biodiversity and conservation is set out in the NPPF (National Planning Policy Framework, 2012). This emphasises that the planning system should seek to minimise impacts on biodiversity and provide net gains in biodiversity wherever possible as part of the Government's commitment to halting declines in biodiversity and establishing coherent and resilient ecological networks.

8.5.9 Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife sites will be judged, making distinctions between different levels of site designation. If significant harm from a development cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.

8.6 Local Planning Policies

Barnsley Local Development Framework Core Strategy

8.6.1 The Barnsley Local Development Framework (LDF) is a portfolio of documents that ties together all planning policy and the spatial planning strategy for the borough, up to 2026. The key document within the LDF is the Core Strategy (Barnsley MBC, 2011), which sets out the key elements of planning framework for Barnsley and includes a series of core policies to guide development proposals in the borough. The Core Strategy includes two policies relevant to air pollution; CSP 40 pertains to pollution control and states:

"CSP40 Pollution Control and Protection

8.6.2 Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water *and groundwater, noise, smell, dust, vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people. We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against. Developers will be expected to minimise the effects of any possible pollution and provide mitigation measures where appropriate."*

Core policy CSP 41 also relates to air quality specifically within Air Quality Management Areas:

"CSP 41 Development in Air Quality Management Areas

8.6.3 Development in air quality management areas will be expected to demonstrate that it will not have a harmful effect on the health *or living conditions of any future users of the development in terms of air quality (including residents, employees, visitors and customers), or that any such harmful effects can be mitigated against. We will only allow residential development in air quality management areas, where the developer provides an assessment that shows living conditions will*

be acceptable for future residents. We will only allow development in air quality management areas which could cause more air pollution, where the developer provides an assessment that shows there will not be a significantly harmful effect on air quality."

Barnsley, Doncaster and Rotherham Joint Waste Plan

8.6.4 The Barnsley, Doncaster and Rotherham Joint Waste Plan (Barnsley MBC, 2012) sets out the overall approach to managing waste across Barnsley, Doncaster and Rotherham for 15 years from publication in 2012. The Waste Plan provides guidance to waste management development, sets out a strategic approach to waste management in the boroughs, and incorporates a number of planning policies relating to waste management, which are integrated in the Barnsley Local Development Framework. One such policy (WCS6) relates to emission of dust and odour and states:

"Policy WCS6: General Considerations for All Waste Management Proposals

A. Proposals for waste development will only be permitted within Barnsley, Doncaster and Rotherham provided they can demonstrate how they:

…

9) provide adequate means of controlling noise, vibration, glare, dust, litter, odour and vermin and other emissions (e.g. greenhouse gases and leachate) so as to avoid adverse effects on the amenity of the immediate and surrounding environment and human health, both during and after operations;"

Protection of Sensitive Ecosystems

8.6.5 Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife sites will be judged, making distinctions between different levels of site designation. If significant harm from a development cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.

Air Quality Action Plan

8.6.6 The Barnsley Air Quality Action Plan (Barnsley MBC, 2013) details measures to be taken to improve air quality in the borough. This is targeted at the boroughs 6 AQMAs. The borough's AQMAs are declared along busy roads where road traffic emissions are the principal pollution source. The Action Plan measures are therefore focussed upon reducing road traffic emissions, and only contains a two measures relevant to industrial pollution sources:

"14 – Barnsley MBC will continue to provide comprehensive control over emissions from Part B and A2 processes, and act as consultees to the Environment Agency for part A1 processes."

"16 – Barnsley MBC will continue to enforce the provisions of the Clean Air Act 1993 with regards to industrial smoke."

8.7 Guidance Notes

Environment Agency H1 Environmental Risk Assessment Guidance Note, 2011

8.7.1 The Environment Agency's (EA's) H1 Environmental Risk Assessment Guidance Note (2010) provides methods for quantifying the environmental effects of emissions to all media; Annex F of H1 covers Emissions to Air. It contains long- and short-term Environment Assessment Levels (EALs) for releases to air derived from a number of published UK and international sources.

8.7.2 In addition, the EA's Interim Guidance Note for Metals provides guidance for applicants for environmental permits, on how to consider the air quality effects from Group III metals in stack emissions from incineration and co-incineration plant (including Energy from Waste) (Environment Agency, 2012).

Health and Safety Executive, Workplace Exposure Limits, 2005

8.7.3 The Health and Safety Executive's EH40/2005 Workplace exposure limits (HSE, 2005) document contains a list of the workplace exposure limits for substances hazardous to health. For pollutants assessed in this report which have no AQO or EALs, the occupational exposure emissions limits in EH40 have been used, following the advice set out in the EA's H1 guidance.

8.8 Assessment Approach

8.9 Existing Conditions

8.9.1 Existing sources of emissions within the study area have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (The Air Quality Standards (Wales) Regulations (No. 1433), 2010) and the Environment Agency's website 'what's in your backyard' (Environment Agency, 2014). Local sources have also been identified through discussion with Barnsley Metropolitan Borough Council, as well as through examination of the Council's Air Quality Review and Assessment reports.

8.9.2 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. This covers both the study area and nearby sites, the latter being used to provide context for the assessment. The background concentrations across the study area have been defined using the national pollution maps published by Defra (2014a). These cover the whole country on a 1x1 km grid. Current exceedances of the annual mean EU limit value for nitrogen dioxide have been identified using the maps of roadside concentrations published by Defra (2014e)[2]. These are the maps, currently based on 2012 data, used by the UK Government, together with the results from national AURN monitoring sites that operate to EU data quality standards, to report exceedances of the limit value to the EU.

[2] There are no exceedences of the PM_{10} objectives.

8.10 Construction Impacts

8.10.1 The construction dust assessment considers the potential for impacts within 350 m of the site boundary; or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by the IAQM (Institute of Air Quality Management, 2014). This is based around a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A1 explains the approach in more detail.

8.11 Assessment Criteria and Significance

Construction Dust Criteria

8.11.1 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management[3] (IAQM) (2014) has been used. Full details of this approach are provided in Appendix A1

Construction Dust Significance

8.11.2 Guidance from the IAQM (Institute of Air Quality Management, 2014) is that, with appropriate mitigation in place, the impacts of construction dust will not be significant. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that impacts will normally be not significant.

8.12 Operational Impacts

Sensitive Locations

8.12.1 In terms of the potential air quality impacts of emissions from the proposed TRRC gasifier main stack, pollutant concentrations have been modelled for a number of discrete receptor locations which represent human health exposure, including the nearest residential properties, as well as for local sensitive ecosystems. The modelling has been carried out for the opening year 2017.

8.12.2 Thirteen existing residential properties have been identified as receptors for the assessment. An additional six receptor locations have been identified as receptors which represent the local nearby sensitive ecosystems. These locations are shown Figure 8.2. Receptors 1-10 are residential properties and are considered relevant exposure to both long-term and short-term objectives/EALs. Receptors 11-13 are considered relevant exposure to short-term objectives/EALs only. The sensitive ecological sites are represented by receptors A-F.

[3] The IAQM is the professional body for air quality practitioners in the UK.

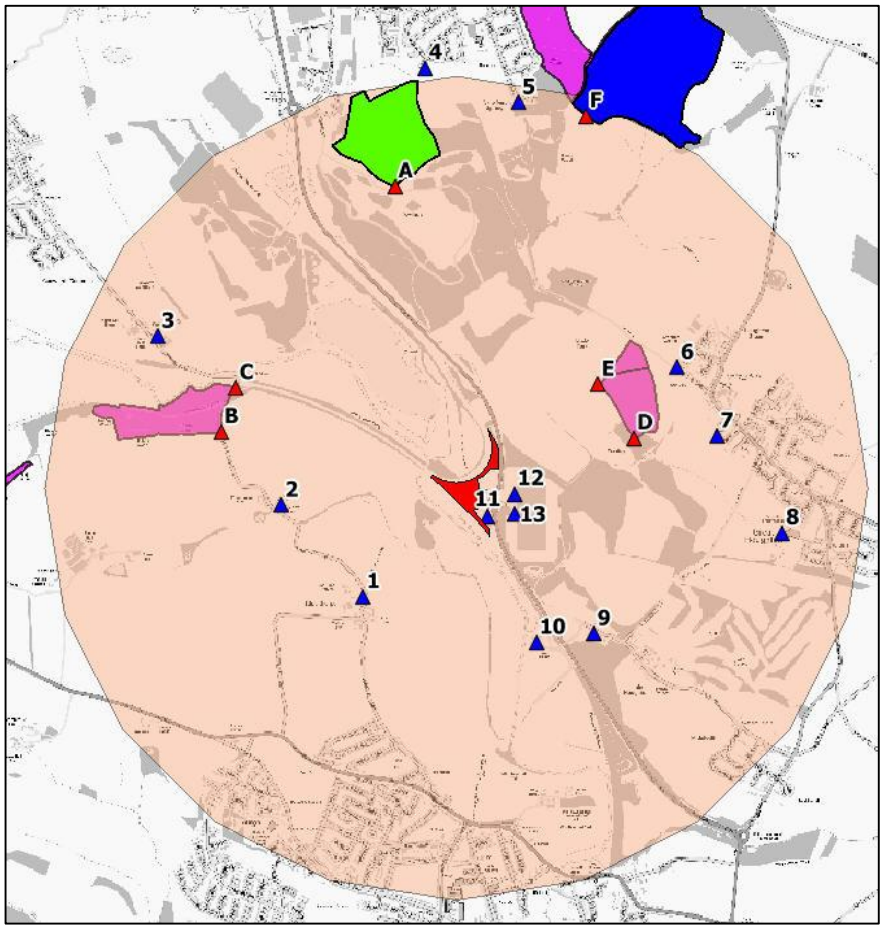


Figure 8.2: Human Health Receptor Locations (Blue Triangles), Ecological Receptor Locations (Red Triangles), Study Area – 2 km buffer (Orange Area).

8.13 Modelling Methodology

8.13.1 The dispersion of emissions from the proposed TRRC stack has been modelled using the ADMS-5 dispersion model. ADMS-5 is a new generation model that incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer. Entrainment of the plume into the wake of the building has been simulated within the model (see the section on Assessment Scenarios for further details).

8.14 TRRC Stack Emissions

8.14.1 The model input parameters for the TRRC gasifier stack have been provided by O-Gen UK. O-Gen UK has provided data on volumes flow rates, as well as the stack exit velocity at actual release conditions. This information has been provided for 'normal' operating conditions. The information provided by the operator and values calculated are set out in the top section of Table8.2.

8.14.2 The emission rates used in the modelling have been calculated using the IED emission limits presented in

8.14.3

8.14.4 Table 8.1. Where there are multiple emission rates for different time-averaging periods, the worst-case emission rate for any of the time-averaging periods has been used.

8.14.5 The bottom section of Table8.2 shows how the emission rates entered into the dispersion model have been calculated from these emission limits.

8.14.6 For the group I metals (Cadmium and Thallium), emissions have been based on the worst-case assumption that each metal is emitted at 100% of the IED group I metal emission limit.

8.14.7 For most of the group III metals shown in Table8.2, when assessing against the EALs for each metal in turn, it has been assumed that the total group III metals emission rate is made up entirely of that metal. This is a worst-case approach. Where it is not possible to screen out the potential for significant impacts using this method, the more detailed approach set out by the EA in its Interim Guidance Note for Metals (Environment Agency, 2012) has been used. This includes the following three steps, with each subsequent step assuming that each relevant metal makes up a successively smaller proportion of total group III metal emissions:

- Step 1: assumes each metal makes up 100% of total group III metal emissions;
- Step 2: assume that each metal makes up 1/9th of total group III metal emissions (there are 9 group III metals in total); and
- Step 3: allows the user to use a metal-specific emission rate, provided this is appropriately justified.

8.14.8 To assist in Step 3, the Guidance Note contains group III metals emissions data for a number of municipal waste incinerators in the UK. For those metals requiring assessment using Step 3 of the Guidance Note, the measured municipal waste incinerator emissions presented in the note have been used as emission rates for this assessment. This is deemed to be a conservative assumption, because the proposed TRRC gasifier will process waste biomass which is pre-processed to remove ferrous and non-ferrous metals contamination and, is therefore highly likely to contain a considerably lower metallic component that mixed municipal solid waste typically does.

Table8.2: Emission Parameters for the Proposed TRRC Gasifier

Stack Parameters	Annual Average Conditions	
Actual Exit Velocity (m/s)	15	
Efflux Actual Volume Rate (Nm^3/s)	66.1	
Exhaust Temperature (^oC)	130	
Water volume (%)	10.0%	
Oxygen by dry volume (%)	7.8%	
Efflux Normalised Volume Rate (Nm^3/s): 273K, 1 Atmosphere, dry gas, 11% O_2.	53.4	
Stack Internal Diameter (m)	2.37	
Stack Height Above Ground-Level (m)	45	
Stack Location (O.S. x,y)	441548.8, 406442.8	
Pollutant	**Calculation**	**Emissions (g/s) [a]**
Nitrogen Oxides	400 x 53.4 / 1,000	21.4
PM_{10}	10 x 53.4 / 1,000	1.6
SO_2	200 x 53.4 / 1,000	10.7
CO	50 x 53.4 / 1,000	8.0
TOC	10 x 53.4 / 1,000	1.1
HCl	60 x 53.4 / 1,000	3.2
HF	4 x 53.4 / 1,000	0.2
Cd and TI	0.05 x 53.4 / 1,000	0.003
Hg	0.05 x 53.4 / 1,000	0.003
Group III metals [b]	0.5 x 53.4 / 1,000	0.03
NH_3	10 x 53.4 / 1,000	0.5
Dioxins and furans	0.0000001 x 53.4 / 1000	$5.3x10^{-9}$

[a] rounded numbers are presented here but unrounded numbers were input into the model.

[b] Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V

8.15 Post-Processing

8.15.1 ADMS-5 has been run to predict the contribution of the proposed facility to annual mean concentrations of the pollutants for which there are annual mean objectives and EALs in Table 8.4 as well as to the maximum 1-hour mean for the pollutants with 1-hour objectives, 99.79th percentiles of 1-hour mean nitrogen oxides concentrations, 90th percentiles of 24-hour mean PM_{10} concentrations, 99.7th percentiles of 1-hour mean sulphur dioxide concentrations, 99.9th percentiles of 15-minute sulphur dioxide concentrations and 99.18th percentiles of 24-hour mean sulphur dioxide concentrations. The approach recommended by the EA (Environment Agency, 2005) has been used to predict annual mean nitrogen dioxide concentrations and 99.79th percentiles of 1-hour mean nitrogen dioxide concentrations. This assumes that:

- Annual mean nitrogen dioxide = Annual mean nitrogen oxides process contribution (PC) x 0.7; and
- 99.79th percentiles of 1-hour mean nitrogen dioxide concentrations = 99.79th percentiles of 1-hour mean nitrogen oxides PC x 0.35.

8.15.2 Deposition has not been included within the dispersion model because the principal depositing component of concern is nitrogen dioxide and this is calculated from nitrogen oxides outside of the model. Instead, deposition has been calculated from the predicted ambient concentrations using the following deposition velocities provided by the EA (Environment Agency, 2004):

- NO2 – 0.003 m/s
- NH3 – 0.03 m/s
- SO2 – 0.024 m/s
- HCl – 0.06 m/s

8.15.3 These velocities are for deposition to forest, which is considered appropriate for the predominantly woodland habitats in the ecologically sensitive areas included in this assessment. The velocities are applied simply by multiplying the predicted pollutant concentration ($\mu g/m^3$) by the velocity (m/s) to predict a deposition flux ($\mu g/m^2/s$). Subsequent calculations required to present the data as kg/ha/yr of nitrogen or sulphur and as keq/ha/yr for acidity follow basic chemical and mathematical rules[4].

8.16 Assessment Scenarios

8.16.1 Predictions of pollutant concentrations have been carried out assuming that the plant is operational in 2017.

Meteorology

8.16.2 Five years of hourly-sequential meteorological data (2009 to 2013 inclusive) from the meteorological station located at Robin Hood Airport have been used in the assessment as a

[4] For example, 1 kg N/ha/yr = 0.071 keq/ha/yr

sensitivity test to account for the variable effects of meteorology on pollutant dispersion. Appendix A4 provides a wind-rose for each meteorological dataset, and outlines the other meteorological parameters required for the modelling (such as surface roughness etc.). The maximum predicted PCs during any year have been reported in the results section of this report.

Building Wake Effects

8.16.3 ADMS-5 has the ability to simulate the entrainment of exhaust plumes into the wake of nearby buildings. In order to ensure that the worst-case building configuration was covered, modelling has been carried out for two alternative building configurations: 1) no buildings included in the model; and 2) all buildings over 2 m high included in the model, with the main gasifier building included as the main building.

8.16.4 The results of the worst-case impacts from either scenario have been used within this report. Figure 8.3 shows the buildings that were included in the modelling.

Figure 8.3: Buildings Modelled (Green Areas), Point Source (Red Dot).

8.17 Assessment Criteria and Significance

Human Health Criteria

8.17.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual

pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002).

8.17.2 The objectives for nitrogen dioxide and the 15-minute mean objective for sulphur dioxide were to have been achieved by 2005. The objectives for PM_{10} and the 1-hour and 24-hour objectives for sulphur dioxide were to have been achieved by 2004. The objective for CO was to have been achieved by 2003. All objectives continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. The UK objectives for nitrogen dioxide and PM_{10} are the same as the EU limit values. The EU limit value for $PM_{2.5}$ is the same as the UK objective, but is to be met by 2015.

8.17.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Where there is no air quality objective, the Environment Agency's Environmental Assessment Levels (EALs) have been applied. Defra explains where the objectives apply in its Local Air Quality Management Technical Guidance (Defra, 2009) and the same rules have been applied to the EALs. Annual mean objectives and EALs are considered to apply anywhere with residential exposure. The 24-hour objective for PM_{10} is taken to apply at residential properties as well as the gardens of residential properties. The 1-hour mean objective for nitrogen dioxide, and those EALs for shorter time periods than the annual mean, are taken to apply anywhere where people may spend one hour or more. In practice, this has been taken to be anywhere within the model domain.

8.17.4 Where there is no EAL quoted in Environment Agency guidance, one has been derived from the Health and Safety Executive's workplace exposure limits. This applies to the short term EAL for chromium VI, and the short- and long-term EALs for thallium and cobalt.

8.17.5 The IED specifies a maximum emission of Total Organic Carbon (TOC). In order to assess the potential emissions of TOCs, a worst-case approach has been taken of assuming that all TOCs are Volatile Organic Compounds (VOCs); and that all VOCs are benzene with respect to annual mean concentrations, and that all VOCs are dimethyl sulphate with respect to short-term EALs. This situation would not happen in practice and provides an extremely conservative assessment.

8.17.6 There are no assessment criteria for dioxins and furans. The World Health Organisation (WHO, 2000) provides an indicator on the air concentrations above which WHO consider it necessary to identify and control local emission sources; this value is 0.3 pg/m^3 (300 fg/m^3). In the absence of suitable criteria, the PCs have been compared against the relevant background concentration, as well as the WHO indicator concentration for which it is considered necessary to identify and control emission sources.

8.17.7 The relevant air quality criteria for this assessment are provided in Table 8.4.

Table 8.4: Relevant Air Quality Objectives and Environmental Assessment Levels for the Protection of Human Health

Pollutant	Averaging Period	Concentration (µg/m^3)	Number of periods allowed to exceed per year	AQO	EAL
Nitrogen dioxide	Annual	40	n/a	X	
	1 hour	200	18	X	
PM_{10}	Annual	40	n/a	X	
	24 hours	50	35	X	
$PM_{2.5}$ [a]	Annual	25	n/a	X	
SO_2	24 hours	125	3	X	
	1 hour	350	24	X	
	15 minutes	266	35	X	
CO	8 hour rolling mean	10 (mg/m^3)	n/a	X	
HF	Annual	16	n/a		X
	1 hour	160	n/a		X
HCl	Annual mean	20			X [c]
	1 hour	750	n/a		X
Benzene	Running annual mean	16.25	n/a	X	
	Annual mean	5 [b]	n/a	X	
Cadmium	Annual	0.005	n/a	X	
Thallium	Annual	1	n/a		X [c]
	1hour	30	n/a		X [c]
Mercury	Annual	0.25	n/a		X
	1hour	7.5	n/a		X
Antimony	Annual	5	n/a		X
	1hour	150	n/a		X
Arsenic	Annual	0.003	n/a		X
Chromium (III)	Annual	5	n/a		X

Pollutant	Averaging Period	Concentration (µg/m³)	Number of periods allowed to exceed per year	AQO	EAL
	1hour	150	n/a		X
Chromium (VI)	Annual	0.0002	n/a		X
	1hour	15	n/a		X [c]
Cobalt	Annual	1	n/a		X [c]
	1hour	30	n/a		X [c]
Copper	Annual	10	n/a		X
	1hour	200	n/a		X
Lead	Annual	0.25	n/a	X	
Manganese	Annual	0.15	n/a		X
	1hour	1,500	n/a		X
Nickel	Annual	0.02	n/a	X	
Vanadium	Annual	5	n/a		X

[a] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. The EU limit value is the same, but is to be met by 2015.

[b] TOC assessed against the AQO for benzene.

[c] Long- and short-term EALs for thallium and cobalt, the long-term EAL for HCl and the short-term EAL for chromium (VI) has been calculated from the exposure limits in EH4024, and converted to the respective EAL using guidance in H1 (Environment Agency, 2010).

Descriptors for Air Quality Impacts on Human Health and Assessment of Significance

8.17.8 There is no official guidance in the UK on how to describe air quality impacts, nor how to assess their significance. The approach developed by the IAQM[5] (Institute of Air Quality Management, 2009), and incorporated in Environmental Protection UK's (EPUK's) guidance document on planning and air quality (Environmental Protection UK, 2010), has therefore been used. This approach includes elements of professional judgement. Full details of this approach are provided in Appendix 2, with the professional experience of the consultants preparing the report set out in Appendix A3.

Vegetation and Ecosystem Criteria

8.17.9 Objectives for the protection of vegetation and ecosystems have been set by the UK Government. They are the same as the EU limit values. The limit values and objectives only apply a) more than 20 km from an agglomeration (about 250,000 people), and b) more than 5 km from Part A

[5] The IAQM is the professional body for air quality practitioners in the UK.

industrial sources, motorways and built up areas of more than 5,000 people. Critical levels and critical loads are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur. Some of the critical levels are set at the same concentrations as the objectives, but do not have the same legal standing. Typically, the potential for exceedances of the critical levels and critical loads is considered in the context of the level of protection afforded to the ecological site as a whole. For example, the level of protection afforded to an internationally-designated site (such as an SAC) is significantly greater than that afforded to a local nature reserve; reflecting the relative sensitivity of the sites as well as their perceived ecological value. The critical levels and critical loads relevant to this assessment are set out in Table 8.5.

8.17.10 The Air Pollution Information System (APIS) database (APIS, 2014) has been searched to obtain critical levels and critical loads. Where APIS does not provide critical levels for a given pollutant, they have been taken from Table 8.7 of the EA's H1 guidance (Environment Agency, 2010). For ammonia and sulphur dioxide, there are more stringent critical levels which only apply for sensitive lichen communities and bryophytes and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity. In order to provide a worst-case assessment, these more stringent critical levels have been used even though they may not apply. Different critical loads are available for different habitats; and in the case of acidity, different locations. For the local sites, no detailed information about the types of habitats present is available and so critical loads for the full range of different habitats that might be present have been reviewed. The relevant critical levels and critical loads are set out in Table 8.5. The approach currently recommended by APIS for assessing acid deposition only refers to nitrogen and sulphur. In order to account for the acidifying input from hydrogen chloride, the sum of nitrogen, sulphur and chlorine acidity has been assessed directly against the 'S_{max}' values from APIS. This provides a conservative assessment.

Table 8.5: Vegetation and Ecosystem Critical Levels [ab]

Pollutant and Averaging Period	Species / Habitat	EAL
Annual Mean NH_3	All higher plants	3 µg/m^3
	Sensitive lichen communities	1 µg/m^3
Annual Mean NOx	All sensitive communities	30 µg/m^3
24-hour Mean NOx	All sensitive communities	75 µg/m^3
Annual Mean SO_2	All higher plants	20 µg/m^3
	Sensitive lichen communities	10 µg/m^3
Daily Mean HF	All sensitive communities	5 µg/m^3

Pollutant and Averaging Period	Species / Habitat	EAL
Weekly Mean HF	All sensitive communities	0.5 µg/m^3
Nutrient Nitrogen Critical Loads	Restored Ancient Woodland [c]	10 kg-N/ha/yr
	Local Wildlife Sites [d]	20 kg-N/ha/yr
Acid Critical Loads [e]	Ancient Woodland and Restored Ancient Woodland and Local Nature Reserve [c]	1.17 keq/ha/yr

[a] Taken from www.apis.ac.uk and from Table B4 of the EA's H1 (Environment Agency, 2010).

[b] No data available for Hayes Point to Bendrick Road SSSI and therefore the critical loads for Neutral Grassland have been applied to this habitat.

[c] Based on Broadleaved, Mixed and Yew Woodland habitats.

[d] Based on Neutral Grassland habitats.

[e] APIS advises that where the total acid nitrogen deposition is greater than the N_{min}, the sum of acid nitrogen and sulphur deposition should be compared against the N_{max} value. In this assessment, the sum of acid nitrogen, sulphur and chlorine deposition has been compared with the N_{max} value. This is more conservative than the approach recommended by APIS.

Descriptors for Air Quality Impacts on Ecosystems and Sensitive Habitat and Assessment of the Significance

8.17.11 The Environment Agency, in its H1 guidance (Environment Agency, 2010), explains that regardless of the baseline environmental conditions, a process can be considered as insignificant if:

- The long-term (annual mean) PC is <1% of the long-term environmental standard.
- The short-term (15-minute, 1-hour, 24-hour mean) PC is <10% of the short-term environmental standard.

8.17.12 It should be recognised that this criterion determines when an impact can be screened out as insignificant. It does not imply that impacts will necessarily be significant above this criterion, merely that there is a potential for significant impacts to occur that should be considered using a detailed assessment methodology, such as a detailed dispersion modelling study (as has been carried out for this project in any event).

8.17.13 This criterion is also used in guidance issued by the Environment Agency and Joint Nature Conservation Committee (JNCC) on applying the Habitats Regulations in relation to air quality impacts (COMAH, 2005). This states that:

"*Where the concentration within the emission footprint in any part of the European Site is less than 1% of the relevant benchmark, the emission is unlikely to have a significant effect irrespective of the background levels.*"

8.17.14 Although this statement specifically relates to European sites, it has been applied to all sensitive ecosystems in this assessment. The 1% (long-term) and 10% (short-term) criteria are thus

routinely used to screen out the potential for significant impacts on sensitive habitats from a range of sources, including road traffic. For the purposes of this assessment, wherever the detailed modelling shows that concentrations and fluxes are below the critical level or critical load, it is considered that there will be no significant impacts. Furthermore, where the proposed development will increase concentrations or fluxes by less than 1% (long-term) or 10% (short-term) of the relevant critical level or critical load, the potential for significant impacts can be discounted. Those locations in which the proposed development will cause a change of more than 1% (long-term) or 10% (short-term) of the critical level or critical load have been highlighted.

8.17.15 For the assessment of trace metals, the Environment Agency's Interim Guidance Note for Metals (Environment Agency, 2012) has been used. The guidance note strictly only applies to Group III metals in stack emissions, but the approach has been used for all metals. It provides a three step approach to the assessment, which is outlined below:

- Step 1 – Screening Scenario: Model predictions assume each metal is emitted at the maximum IED Emission Limit Value (ELV) of 0.5 mg/Nm3 as a worst-case. Assessment of the impact is then made against the following parameters:
  - Long-term PC <1% or short-term PC <10% of the AQO or EAL; or
  - Long-term and short-term Predicted Environmental Concentration (PEC)[6] < 100% of the AQO or EAL (taking likely modelling uncertainties into account).
- Step 2 – Worst Case Scenario Based on Currently Operating Plant: Where the Step 1 screening criteria set out in the guidance are not met, an emission concentration equal to 1/9th of the ELV has been assumed and assessment made against the same criteria specified for Step 1.
- Step 3: If the screening criteria are not met in Step 2, typical emission concentrations for energy from waste plants have been used, as specified in the guidance.

8.17.16 In terms of the potential for ecological impacts on local (as opposed to national or European) wildlife sites/local nature reserves/ancient woodlands, the EA discounts as insignificant, any impacts where the PC is less than 100% of the long-term or short-term environmental standard (Environment Agency, 2013).

8.18 Site Description and Baseline Conditions

8.18.1 The Houghton Main REC site is in a rural setting on land adjacent to the A6195 approximately 4 km east of Barnsley. There is an existing ASOS distribution warehouse facility to the east of the application site, and a small industrial unit to the south.

8.19 Industrial sources

8.19.1 A search of the UK Pollutant Release and Transfer Register (Defra, 2014d) and Environment Agency's 'what's in your backyard' (Environment Agency, 2014) websites did not identify any

[6] PEC = PC + Background Concentration

significant industrial or waste management sources that are likely to affect the study area, in terms of air quality.

8.20 Air Quality Review and Assessment

8.20.1 BMBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. The Council has declared a number of AQMAs within the borough for exceedances of the nitrogen dioxide objective. The AQMAs are associated with busy arterial roads and junctions close to Barnsley town centre. The declared AQMAs are shown in Figure 8.4. The development site is not near to any of these AQMAs.

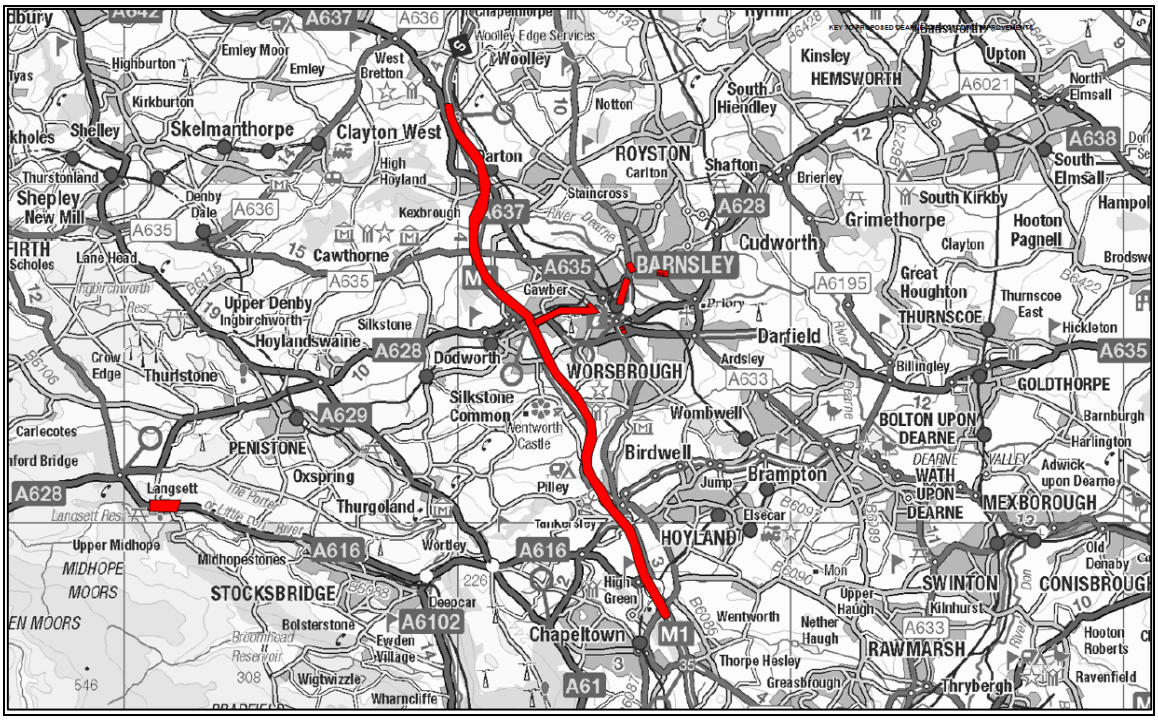


Figure 8.4: Declared AQMAs shown in Red (Barnsley Metropolitan Borough Council, 2013)

8.21 Local Air Quality Monitoring

8.21.1 BMBC operates a total of six automatic monitoring sites within its area. Four of the automatic monitoring stations measure nitrogen dioxide, three measure sulphur dioxide and one measures PM_{10}. These are either within Barnsley or Royston and none are in close proximity to the proposed development site. BMBC also operates a large number of nitrogen dioxide monitoring sites using diffusion tubes. These are shown in Figure 8.5. None of these locations are close to the site.

8.21.2 Examination of the local authorities review and assessment report has shown that there are no clear trends in monitoring results for the past few years.

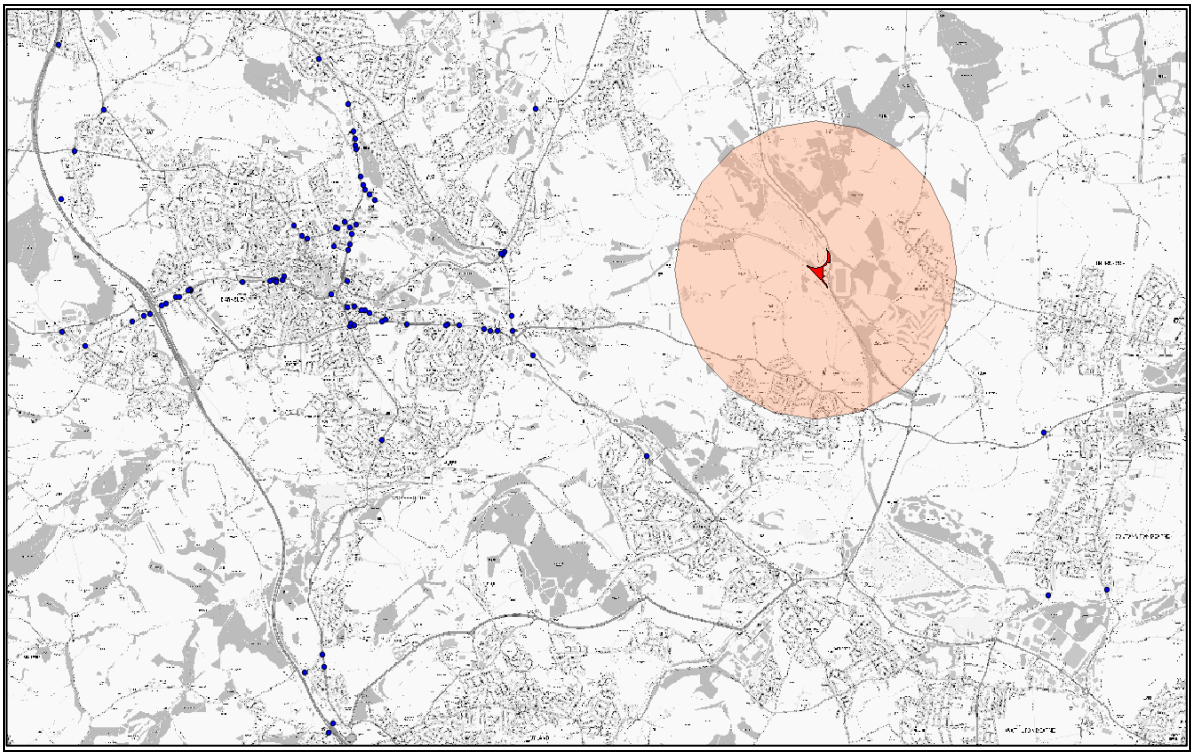


Figure 8.5: Diffusion Tube Monitoring Locations – Blue Dots. Development Site – Red Area. Study Area (2 km buffer) – Orange Area.

8.22 Exceedances of EU Limit Value

8.22.1 There are no AURN monitoring sites within 2 km of the development site with which to identify exceedances of the annual mean nitrogen dioxide limit value. The national map of roadside annual mean nitrogen dioxide concentrations, used to report exceedances of the limit value to the EU (Defra, 2014e), does not identify any exceedances within 2 km of the development site. This map shows 2012 exceedances. Detailed maps of predicted future year exceedances are not available.

8.23 Background Concentrations and Fluxes

National Background Pollution Maps

8.23.1 In addition to these locally measured concentrations, estimated background concentrations in the study area have been determined for the opening year 2017 (Table 8.9). The derivation of background concentrations for nitrogen oxides and nitrogen dioxide is described in Appendix A5. The background concentrations are all well below the objectives.

Table 8.9: Estimated Annual Mean Background Pollutant Concentrations in 2017 (µg/m^3)

Year	2017	Objective
NOx [a]	17.2-19.2	30
NO_2 [a]	12.8-14.1	40
PM_{10}	14.9	40
$PM_{2.5}$	9.5	25
SO_2	5.8	20
CO	0.3	10,000

[a] This assumes that road vehicle emission factors reduce between 2012 and 2017 at the current 'official' rates.

Trace Metals

8.23.2 Defra has undertaken monitoring of trace elements at a number of locations in the UK since 1976 as part of the UK Urban and Rural Heavy Metals Monitoring Networks. To provide an indication of trace metal concentrations in the study area, measured concentrations at the two nearest rural monitoring sites (Beacon Hill and Monkswood), in 2012 are summarised in Table 8.10.

Table 8.10: Trace Metal Background Concentrations, 2012 (ng/m^3) [a]

Monitoring Location	Beacon Hill	Monkswood	Average [c]
Location Type	**Rural**	**Rural**	**n/a**
Antimony	0.94	0.95	0.95
Arsenic (As)	0.58	0.59	0.59
Cadmium (Cd)	0.09	0.09	0.09
Chromium (Cr)	0.24	0.24	0.24
Cobalt (Co)	0.04	0.04	0.04
Copper (Cu)	2.59	3.05	2.82
Lead (Pb)	4.92	4.90	4.91
Manganese (Mn)	2.16	2.14	2.15
Mercury[b] (Hg)	2.86	2.31	2.59
Nickel (Ni)	0.45	0.61	0.53
Thallium (TI)	Not Measured		
Vanadium (V)	0.55	0.76	0.66

[a] 1,000 ng = 1 μg

[b] Data presented is 'Total Gaseous' mercury

[c] The average background concentration has been derived from the two rural background sites located nearest to the proposed development site.

Dioxins and Furans

8.23.3 Monitoring of PCDD/Fs (dioxins and furans) is currently carried out by Defra at seven locations in the UK (Hazelrigg, High Muffles, London, Manchester, Auchencorth Moss, Middlesbrough and Weybourne). To provide an indication of the range of PCDD/Fs concentrations that occur in the UK, a summary of the annual mean concentrations measured between 2008 and 2010 is presented in Table 8.11. The average concentration measured in Manchester, the nearest monitoring site to the application site, from 2008 to 2010 is 27.3 fg/m^3. This average is assumed to be representative of the baseline dioxin and furan concentration at the site.

Table 8.11: UK PCDD/Fs Concentrations (fg/m^3)[a]

Metal	2008	2009	2010
Manchester	19.0	14.2	48.7
Hazelrigg	3.7	13.5	8.0
London	10.9	41.4	38.6
High Muffles	1.7	9.4	2.8
Auchencorth	6.4	0.6	5.0
Middlesborough	24.0	-	-
Weybourne	-	22.8	2.5

[a] 1,000,000,000 fg = 1 μg

Benzene, HCl, HF and Ammonia

8.23.4 Defra monitors benzene at a site in Barnsley Gawber, which is operated as part of the Non Automatic Hydrocarbon Network (NAHN). The measured benzene concentration for 2013 from the Barnsley Gawber site has been used in this assessment.

8.23.5 Defra measures background HCl concentrations at a number of UK sites as part of the Acid Gas and Aerosols Network (AGANET). The three nearest sites are: Caenby, Sutton Bonnington and Ladybower, which have been used to obtain background HCl for this assessment. Data from these sites for 2012-2013 has been obtained for use in this assessment.

8.23.6 There is currently no UK monitoring of HF. Therefore no background data is available.

8.23.7 Defra also monitors background ammonia concentrations at a number of UK sites as part of the National Ammonia Monitoring Network (NAMN). The nearest are: Ladybower, Sheffield 2, Tadcaster and Wardlow Hay Cop. Data from these sites for 2012-2013 have been obtained for use in this assessment.

8.23.8 The background concentrations of benzene, HCl and ammonia used in this assessment are summarised in Table 8.12.

Table 8.12: Annual Mean Background Pollutant Concentrations for Benzene, HCl and NH^3

Pollutant	Background Concentration (μg/m^3)	EAL
Benzene	0.69	**5**
HCl	0.25	**20**
HF	-[a]	**16**
NH^3	1.74	**3**

[a] No UK monitoring for HF from which to obtain a background concentration.

Background Deposition and Acidity

8.23.9 Background nitrogen deposition fluxes to the local wildlife sites have been taken from the APIS website (APIS, 2014), where they are reported as a three-year average (2009-2011). Background nutrient and acid nitrogen deposition rates both exceeded the critical load in this period.

Table 8.13: Estimated Annual Mean Background Nitrogen and Acid Deposition

Site	Nutrient Nitrogen Deposition (keq/ha/yr)		Total Acid Deposition (keq/ha/yr)	
	Background Deposition	Critical Load	Background Deposition	Critical Load
Woodland	40.9	10	2.99	1.77

8.24 Construction Phase Impacts

8.24.1 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway.

8.24.2 There are no residential properties or relevant receptors for the consideration relating to elevated PM_{10} levels within 350 m of the site boundary. There are no ecological receptors within 50m of the site boundary. There are no ecological receptors or residential receptors sensitive to elevated PM_{10} levels within 50m of the roads construction traffic may drive along up to 500 m from the site access. The buffer zones are shown in Figure 8.6.

8.24.3 There are some industrial receptors that maybe affected by dust soiling within the distance buffers. The assessment of construction dust impacts will only consider these.

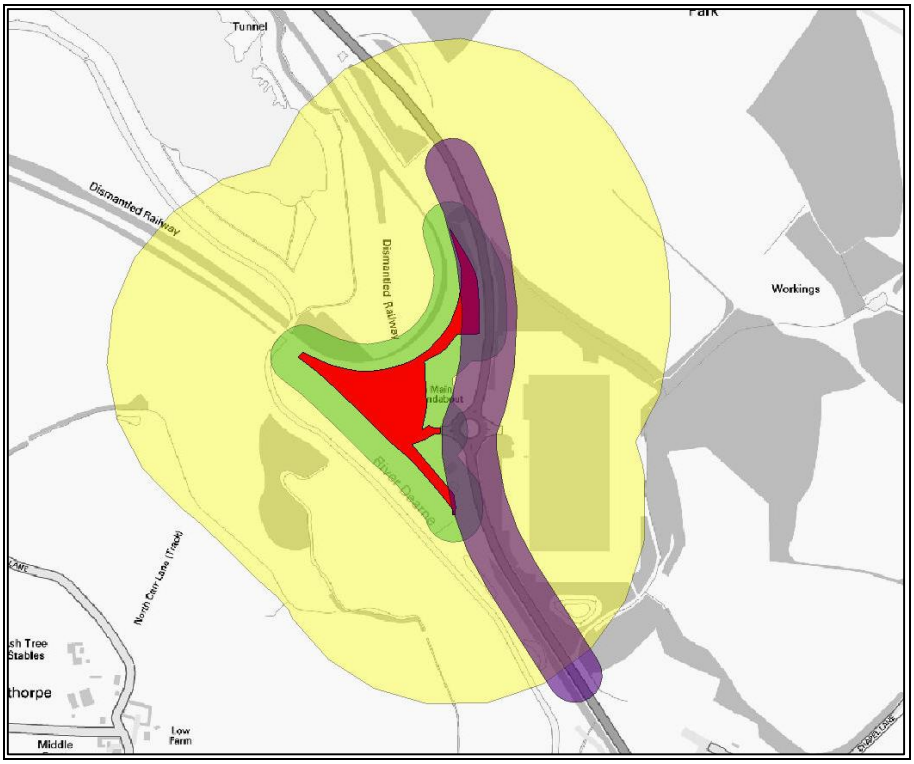


Figure 8.6: Construction buffer distances. Site – Red Area, 350m buffer – Yellow Area. 50 m buffer – Green Area. Road buffer – Purple Area.

8.25 Potential Dust Emission Magnitude

8.25.1 There is no requirement for demolition on site.

8.25.2 The site covers approximately 3 ha and most of this will be subject to earthworks. The earthworks will last around 6-12 months and dust will arise mainly from the vehicles travelling over unpaved ground and from the handling of dusty materials. Most of the earthworks will, though, involve the removal of subsoil, which will largely be damp and not prone to creating dust. Based on the example definitions set out in Appendix Table A1.1 the dust emission class for earthworks is considered to be *medium*.

8.25.3 Construction will involve the erection of a main TRRC building and small number of auxiliary buildings and structures. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete. The construction will take place over a 2-year period. Based on the example definitions set out in Appendix Table A1.1, the dust emission class for construction is considered to be *medium*.

8.25.4 The number of vehicles accessing the site, which may track out dust and dirt is currently unknown, but given the size of the site it is likely that there will be fewer than 10 outward bound heavy vehicle movements per day. Based on the example definitions set out in Table A1.1, the dust emission class for trackout is considered to be *small.*

8.25.5 Table 8.14 summarises the dust emission magnitude for the proposed development.

Table 8.14: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	None
Earthworks	Medium
Construction	Medium
Trackout	Small

8.26 Sensitivity of the Area

8.26.1 This assessment step combines the sensitivity of individual receptors to dust effects, with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

Sensitivity of the Area to Effects from Dust Soiling

8.26.2 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling, while the nearby industrial units and their car parks are a 'low' sensitivity receptor (Appendix Table A1.2). There are no residential properties within 350m of the site boundary or 50m of the roads, 500 m from the site entrance. Using the matrix set out in Appendix Table A1.3, the area surrounding the onsite works is of 'medium' sensitivity to dust soiling. Table 14 shows that dust emission magnitude for trackout is 'small' and Appendix Table A1.3 thus explains that there is a risk of material being tracked 200 m from the site exit. Since it is not known which roads construction vehicles will use, it has been assumed that all possible routes could be affected. There are no residential properties within 50 m of the roads along which material could be tracked. The industrial units, however, may be affected by dust soiling. Appendix Table A1.3 thus indicates that the area is of 'low' sensitivity to dust soiling due to trackout. Overall, it is judged that the area surrounding the onsite works is of 'medium' sensitivity to dust soiling, while the area surrounding roads along which material may be tracked from the site is of 'low' sensitivity (Table 15).

Table 8.15: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Medium	Low

8.27 Risk and Significance

8.27.1 The dust emission magnitudes in Table 14 have been combined with the sensitivities of the area in Table 15 using the matrix in Table A1.6 in Appendix A1,, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in 16. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 8.33.

Table 8.16: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling
Demolition	None
Earthworks	Low Risk
Construction	Low Risk
Trackout	Negligible

8.27.2 The IAQM does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance

8.28 Operational Phase Impact Assessment

8.28.1 Concentrations have been predicted at thirteen locations representing the nearest existing human health exposure, at ground level (1.5 m above ground) and first floor level (4.5 m above ground) for each receptor location. Six additional receptor locations have been modelled to represent the nearby sensitive ecosystems.

8.28.2 For consideration of concentrations in relations to the short-term objective, it has been assumed that the plant will run at continuous operation and at full (100%) load.

8.29 Initial Screening assessment

Health

8.29.1 The predicted maximum PCs have been compared with the Environment Agency screening criteria. The conclusions based on the screening criteria for the PCs are set out in Table 17.

Table 17: Maximum Predicted PCs in the Study Area (µg/m³)

Pollutant	Time Period	Maximum PC	EAL	% of EAL	Detailed Assessment Required
Nitrogen dioxide	Annual	2.3	40	5.72	Yes
	1 hour	63.9	200	31.94	Yes
PM_{10}	Annual	0.25	40	0.61	No
	24 hours	8.1	50	4.05	No
$PM_{2.5}$ [a]	Annual	0.25	25	0.98	No
SO_2	24 hours	6.1	125	4.92	No
	1 hour	12.9	350	3.68	No
	15 minutes	14.3	266	5.37	No
CO	8 hour rolling mean	60.4	10000	0.60	No
HF	Annual	0.0327	16	0.20	No
	1 hour	1.8	160	1.14	No
HCl [c]	Annual mean	0.4903	20	2.45	Yes
	1 hour	27.4	750	3.65	No
TOC as Benzene [b]	Annual mean	0.16	5	3.27	Yes
Cadmium	Annual	0.0004	0.005	8.17	Yes
Thallium [c]	Annual	0.0004	1	<0.1	No
	1hour	0.02	30	<0.1	No
Mercury	Annual	0.0004	0.25	0.16	No
	1hour	0.02	7.5	0.3	No
Antimony	Annual	0.004	5	<0.1	No
	1hour	0.2	150	0.2	No
Arsenic	Annual	0.004	0.003	136.2	Yes
Chromium (III)	Annual	0.004	5	<0.1	No
	1hour	0.2	150	0.2	No

Table 17: Maximum Predicted PCs in the Study Area (µg/m³)

Pollutant	Time Period	Maximum PC	EAL	% of EAL	Detailed Assessment Required
Chromium (VI) [c]	Annual	0.004	0.0002	2042.8	Yes
	1hour	0.2	150	0.2	No
Cobalt [c]	Annual	0.004	1	0.4	No
	1hour	0.2	30	0.8	No
Copper	Annual	0.004	10	<0.1	No
	1hour	0.2	200	0.1	No
Lead	Annual	0.004	0.25	1.6	Yes
Manganese	Annual	0.004	0.15	2.7	Yes
	1hour	0.2	1500	<0.1	No
Nickel	Annual	0.004	0.02	20.4	Yes
Vanadium	Annual	0.004	5	<0.1	No
Dioxins and Furans	Annual	8.2×10^{-13}	0.0000003	<0.1	No

[a] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. The EU limit value is the same, but is to be met by 2015.

[b] TOC assessed against the AQO for benzene.

[c] Long- and short-term EALs for thallium and cobalt, the long-term EAL for HCl and the short-term EAL for chromium (VI) has been calculated from the exposure limits in EH4024, and converted to the respective EAL using guidance in H1 (Environment Agency, 2010).

8.29.2 The predicted impacts exceed the screening criteria for several of the pollutants and therefore require further detailed assessment. Detailed assessment is required for nitrogen dioxide, HCl, TOC, cadmium, arsenic, chromium (VI), lead, manganese and nickel.

8.29.3 No further assessment is required for those pollutants which do not exceed the screening criteria as these are considered to be *insignificant*.

Ecosystem

8.29.4 The predicted nitrogen oxide, sulphur dioxide, hydrogen fluoride and ammonia concentrations and rates of nutrient and acid nitrogen deposition associated with emissions from the plant have been compared with the Environment Agency screening criteria. The screening criteria for locally

designated sites allows for an addition of 100% of the EAL. The conclusions from the screening criteria are set out in Table 8.18

Table 8.18: Maximum Predicted PCs to Sensitive Habitats in the Study Area

Pollutant	Time Period	Maximum PC (µg/m³)	EAL	% of EAL	Detailed Assessment Required
Nitrogen Oxides	Annual	4.2	30	13.9	No
	24-hour mean	32.16	75	42.9	No
Sulphur Dioxide	Annual	0.3117	20	1.56	No
Hydrogen Fluoride	24-hour mean	0.3	5	6.4	No
	Weekly mean	-	0.5	-	No
Ammonia	Annual	0.1	3	3.46	No
Nutrient Nitrogen Deposition Rate	Annual	1.64	5	32.94	No
Total Acid Deposition Rate	Annual	0.9	1.17	73.25	No

8.29.5 The predicted impacts do not exceed the screening criteria for any of the pollutants assessed and therefore further detailed assessment is not required for sensitive ecosystems and the potential impacts are considered to be *insignificant*.

8.30 Detailed Assessment

Nitrogen Dioxide

8.30.1 The impacts on nitrogen dioxide cannot be immediately discounted as insignificant, since the annual mean PC is more than 1% of the objective and the 99.8th percentile of 1-hour mean PC is more than 10% of the objective.

The maximum predicted PC to annual mean and short-term (as the 99.79th percentile of 1-hour means) nitrogen dioxide concentrations are set out in Table 8.17. For the annual mean objective, the table shows the worst-case prediction at any of the receptors relevant for the annual mean (Receptor 1-10), while for the 1-hour objective, the table shows the worst-case prediction across all the receptors.

8.30.2 Table 8.19 sets out the maximum PEC for annual mean and 99.8th percentile of 1-hour mean nitrogen dioxide concentrations at any of the receptors. The maximum PECs are both well below the relevant objectives.

Table 8.19: Maximum PCs and PECs for Nitrogen Dioxide (µg/m^3)

Objective	PC	Background	PEC	EAL
Annual Mean	2.3	13.8	16.1	40
1-hour mean (99.79th percentile)	63.9	26.3	90.2	200

8.30.3 Table 8.20 sets out the impact descriptors for the long-term objective, this takes account of both the magnitude of change and the absolute concentration and uses the impact descriptor table in guidance provided by EPUK (see Appendix A2). No descriptor is available for the short-term objectives.

8.30.4 The impacts on nitrogen dioxide concentrations are thus considered *insignificant*.

Table 8.20: Annual Mean Nitrogen Dioxide Impact Descriptor

Location	Without Scheme (µg/m^3)	With Scheme (µg/m^3)	Change	Impact Descriptor
Receptor 10	13.8	16.1	Medium	Negligible

Hydrogen Chloride and TOC

8.30.5 The impacts on the annual mean HCl and TOC concentrations cannot be immediately discounted as insignificant, since the maximum annual mean PCs are more than 1% of the relevant EALs. The impacts on short-term HCl EALs can be discounted as *insignificant*.

8.30.6 The maximum predicted PCs to annual mean HCl and TOC concentrations are set out in Table 8.17 for the annual mean objective, the table shows the worst-case prediction at any of the receptors relevant for the annual mean (Receptor 1-10). Table 23 sets out the maximum PEC for annual mean HCl and TOC concentrations. The maximum PECs are all well below the relevant EALs.

Table 8.23: Maximum PCs and PECs for HCl and TOC (µg/m^3)

Objective	PC	Background	PEC	EAL
HCl Annual Mean	0.5	0.2	0.7	20
TOC Annual Mean	0.2	0.7	0.9	5

8.30.7 Table 8.24 sets out the impact descriptors for the long-term objective. Using the descriptors provided by EPUK in Appendix A2, the magnitude of change combined with the overall concentration is therefore considered as a *negligible* impact for HCl and *slight adverse* impact for TOCs.

8.30.8 In terms of TOCs, the predicted *slight adverse* impact is based on the assumption that 100% of TOC emissions from the TRRC are benzene. In reality, benzene will only contribute a small fraction of TOC emissions and the impact is likely to be *negligible* and therefore the impacts on both HCl and TOC concentrations are considered to be *insignificant.*

Table 8.24: Annual Mean Impact Descriptors for HCl and TOC

Location	Without Scheme (µg/m^3)	With Scheme (µg/m^3)	Change	Impact Descriptor
HCl	0.2	0.7	Small	Negligible
TOC	0.7	0.9	Large	Slight Adverse [a]

[a] In practice considered to be negligible – see discussion

Trace Metals

Group I Metals

8.30.9 The impacts on the annual mean concentration of cadmium cannot be immediately discounted as insignificant, since the annual mean PC is more than 1% of the objective. The impacts on annual mean and the maximum 1-hour mean concentrations of thallium can be discounted as *insignificant.*

The maximum predicted PC to annual mean cadmium concentrations is set out in Table 8.17. The table shows the worst-case prediction at any of the receptors relevant for the annual mean (Receptor 1-10). Table 8.25 sets out the maximum PEC for annual mean concentration. The maximum PEC is well below the relevant EAL.

8.30.10 The Cadmium PEC is less than 100% of the EAL, therefore the impacts are considered to be *insignificant.*

Table 8.25: Maximum PEC for Cadmium

Metal	EAL	PC (µg/m^3)	Background (µg/m^3)	PEC (µg/m^3)	PEC as a % of EAL
Cadmium	0.005	0.0004	0.0001	0.000499	10.0

Group II Metals

8.30.11 The impacts on annual mean and the maximum 1-hour mean concentrations of Mercury can be discounted as *insignificant*.

Group III Metals

8.30.12 The assessment of trace metals follows the recommended methodology described by the Environment Agency in its Guidance to Applicants on Impacts for Group 3 Metals, V.3, September 2012. The methodology set out in the EA guidance, describes a three-step approach to the assessment of trace metals in stack emissions, as detailed in the Assessment Criteria section.

Step 1: Screening Scenario

8.30.13 On the basis of screening based on the PCs, further assessment is required for long-term concentrations of arsenic, chromium (VI), lead, manganese and nickel. The impacts from all other trace metals, for long-term and short-term concentrations, are considered to be insignificant.

The PECs for these trace metals that could not be initially screened out are shown in Table 8.26. Using the screening criteria for the PEC lead, manganese and nickel can also be considered *insignificant,* since the PECs are less than 100% of the EAL.

Table 8. 26: Group III Metals Assessment Step 1: Emissions at 100% IED Emission Limit

Metal	EAL	PC (µg/m^3)	PC as a % of EAL	Background (µg/m^3)	PEC (µg/m^3)	PEC as a % of EAL
Arsenic	0.003	0.0041	136.2	0.0006	0.0047	**155.7**
Chromium (VI)	0.0002	0.0041	2042.8	<0.0001	0.0041	**2066.8**
Lead	0.25	0.0041	1.6	0.0049	0.0090	3.6
Manganese	0.15	0.0041	2.7	0.0022	0.0062	4.2
Nickel	0.02	0.0041	20.4	0.0005	0.0046	23.1

8.30.14 On the basis of the Step 1 screening based on the PCs and the PECs, further assessment is required for long-term concentrations of arsenic and chromium (VI).

Step 2 – Worst Case Scenario Based on Currently Operating Plant

8.30.15 Step 2 of the EA's Guidance Note for Metals advises that modelling be undertaken assuming that each component group III metal is emitted as an equal portion of the total metals emission level. The model has thus been run assuming that arsenic and chromium (VI) emissions are 1/9th (11.1%) of the total IED group III metals emission limit respectively (as there are a total of 9 group III metals). The results of Step 2 of the assessment of chromium (VI) emissions is presented in Table 8.27.

8.30.16 The PC and PEC for chromium (VI) both exceed the EAL. It is therefore necessary to proceed to Step 3 for chromium (VI). In terms of arsenic, the PC is greater than 1% of the EAL, however, the PEC is less than 100% of the EAL therefore the impacts of arsenic can be considered *insignificant*.

Table 8.27: Group III Metals Assessment Step 2: Emissions at 1/9th IED Emission Limit

Metal	EAL	PC (µg/m^3)	PC as a % of EAL	Background (µg/m^3)	PEC (µg/m^3)	PEC as a % of EAL
Arsenic	0.003	0.0005	15.1	0.0006	0.0010	34.6%
Chromium (VI) [c]	0.0002	0.0005	227.0%	<0.0001	0.0005	**251.0%**

Step 3: Typical Operational Emissions

8.30.17 The Environment Agency's group 3 metals guidance includes a summary of emissions monitoring data from 20 municipal waste incinerators, which shows the maximum, minimum and mean emissions concentrations of the group 3 metals. For chromium, the guidance includes emissions for total chromium, as well as the fraction of total chromium that is chromium (VI), which is based on speciation analysis of Air Pollution Control (APC) residues from the same municipal waste incinerators. The minimum and maximum emissions concentrations of total chromium and fractions for chromium (VI) obtained from the EA guidance note, are presented in Table 8.28.

Table 8.28: Measured Concentrations in Emissions and Group 3 Fractions of Chromium at 20 Municipal Waste Incinerators between 2007 and 2009

Pollutant	Concentration (mg/Nm^3)		Fraction of Group III (%)	
	Minimum	Maximum	Minimum	Maximum
Total Chromium	0.0004	0.0521	0.08	10.4
Chromium (VI)	2.3×10^{-6}	1.3×10^{-4}	n/a	n/a

Step 3 of the group 3 metals assessment is to use the emission rates presented in Table 8.28 to determine PCs for chromium (VI). Table 8.29 sets out the maximum PC and PEC for chromium (VI) using the maximum emission concentration presented in Table 8.28. The final predicted maximum chromium (VI) PC is less than 1% of the long-term EAL. The final predicted maximum chromium (VI) PEC is less than 100% of the long-term EAL. The effects from long-term emissions of chromium (VI) are therefore considered to be *insignificant*.

Table 3.29: Predicted Long-term PC and PEC of Chromium (VI) Using the Maximum Emissions (Step 3)

Metal	EAL	PC (µg/m^3)	PC as a % of EAL	Background (µg/m^3)	PEC (µg/m^3)	PEC (µg/m^3)
Chromium (VI)	0.0002	0.000001	0.5	0.000048	0.000049	24.5

[a] 1 pg/m^3 equals 0.000001 µg/m^3.

[b] The average of annual mean measurements from the two nearest rural monitoring stations in 2012 have been used as the background concentrations. These values are presented in Table . The Chromium background concentration has been apportioned 80% Cr (III), 20% CR (VI) in accordance with the EA's Interim Guidance Note for Metals (Environment Agency, 2012).

Dioxins and Furans

8.30.18 The maximum predicted dioxin and furan PC at specific receptor locations is 0.82 fg/m^3. This is well below the WHO indicator concentration (300 fg/m^3) above which it would be considered necessary to identify and control emissions. The average background PCDD/Fs concentration at the nearest monitoring station, located in Manchester, is 27.3 fg/m^3. The PC is less than 1.0% of the background concentration.

8.30.19 There are no assessment criteria for dioxins and furans. When compared with the average background concentration measured in Manchester, the effect of the proposed development is considered to be *insignificant.*

8.31 Uncertainty in Modelling Predictions

8.31.1 There are many components that contribute to the uncertainty of modelling predictions. The ADMS-5 model used in this assessment is dependent upon the data that have been input, which will have inherent uncertainties associated with them. In order to account for this uncertainty, conservative and worst-case assumptions have been made where required. In particular, by assessing the TRRC using the WID/IED emissions limits, this tests the development at the capacity of its allowable emissions. In reality though, emissions from most modern plant will be well below the WID/IED emission limits, and it should be borne in mind that the limits are set to be applied to all waste processing facilities, including solid municipal waste and mixed commercial and

industrial waste streams, which are far less consistent (homogeneous) fuel sources than the waste biomass (timber products) that will be processed at Houghton Main.

8.31.2 Additional steps have also been taken to account for model uncertainty, including the use of five years of meteorological data, and testing the model with and without the influence of building wake effects. In both cases, the worst-case (highest) modelled concentrations have been presented in this assessment for robustness.

8.32 Significance of Operational Air Quality Impacts

8.32.1 The operational air quality impacts are judged to be *insignificant*.

Table 30: Factors Taken into Account in Determining the Overall Significance of the Scheme on Local Air Quality

Factors	Outcome of Assessment
Number of people affected by increases and/or decreases in concentrations and a judgement on the overall balance.	The area is largely rural and with limited numbers of receptors near to the development site. Overall there are unlikely to be many people affected by changes in concentrations.
The magnitude of the changes and the descriptions of the impacts at the receptors.	Some receptors may be exposed to large changes in concentrations in terms of the long-term objectives/EALs. However, all the concentrations are so far below the objectives/EALs that the impacts are considered negligible.
Whether or not an exceedance of an objective is predicted to arise in the study area where none existed before or an exceedance area is substantially increased.	There are no exceedances of the objectives/EALs.
Uncertainty, including the extent to which worst-case assumptions have been made.	Worst-case approaches have been adopted and a range of scenarios have been modelled to account for uncertainty. Scenarios include five years of meteorological data and with and without buildings.
The extent to which an objective is exceeded.	No objectives/EALs are predicted to exceed.
Whether or not the study area exceeds an objective and this exceedance is removed or the exceedance area is reduced.	No objectives/EALs are predicted to exceed.

8.33 Mitigation

Construction Impacts

8.33.1 Measures to mitigate dust emissions will be required during the construction phase of the development in order to reduce impacts upon nearby sensitive receptors.

8.33.2 The site has been identified as a *Low* Risk site as set out in Table 16. Comprehensive guidance has been published by IAQM (Institute of Air Quality Management, 2014), and on monitoring during demolition and construction (Institute of Air Quality Management, 2012b). This reflects best practice experience and has been used, together with the professional experience of the consultant and the findings of the dust impact assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix Table A6.

8.33.3 The mitigation measures should be written into a dust management plan (DMP).

8.33.4 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Operational Impacts

8.33.5 The TRRC will include all necessary emissions abatement and continuous emissions monitoring (CEMS) to ensure that emissions meet the requirements of the WID/IED reflected in the environmental permit emission limits that will be set by the Environment Agency. No additional mitigation measures are proposed for the development.

8.34 Residual Impacts and Effects

Construction

8.34.1 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'. The mitigation measures set out in Section 8.33 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be *insignificant*.

Operation

8.34.2 The residual impacts will be the same as those identified in the Section 6 (paragraph 8.32.1). In other words, the overall operational air quality impacts of the development are judged to be *insignificant.*

8.35 Conclusions

8.35.1 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be insignificant.

8.35.2 The operational impacts of increased traffic have been discounted as insignificant based on the flows in relation to screening criteria.

8.35.3 The operational impacts of the emissions to air from the TRRC stack have been shown to be insignificant in relation to human health. Where pollutants could not be screened out based on their PC being less than 1% (for long-term impacts) or 10% (for short-term impacts) of the objective/EAL, the total PEC has been shown to be well below the objective/EAL. Where annual mean objectives have been assessed the EPUK impact descriptors have been used to describe the impacts. All annual mean impacts are considered to be negligible7. Overall, the impacts on human health receptors are considered to be insignificant.

8.35.4 The operational impacts of the emissions to air from the new point sources have been shown to be insignificant at the sensitive ecological sites. All pollutants were screened out based on their PC being less than 100% of the objective/EAL/critical level. This is the screening criterion for locally designated ecological sites.

7 With the exception of annual mean TOCs, which are predicted to have a 'Slight Adverse' impact at the worst-case receptor. This prediction is based on the very conservative assumption that 100% of the TOC emissions are benzene, and as such, this predicted impact is judged to be negligible in the professional experience of the authors.

9 Chapter 9: Landscape and Visual Amenity

9.1 Introduction

9.1.1 The aim of this chapter is to provide an assessment of the impacts on the landscape, townscape and visual amenity of the proposals by Peel Environmental Management (UK) Limited and Houghton Main Waste Limited (Peel) for a proposed Timber Resource Recovery Centre (TRRC) development land off Houghton Main Colliery Roundabout, Park Spring Road, Barnsley, S71 5EX.

9.2 The Site

9.2.1 The proposed site is approximately 3 hectares in area and is shown edged red on PL002. The proposed TRRC is located approximately 1km west of Little Houghton and 6.5km east of Barnsley town centre on National Grid Reference (NGR) SE 4168 0641 (Full Grid Reference: 441681,4064171), access to the site is from a spur off the Houghton Main Colliery Roundabout on the A6195 Park Spring Road.

9.2.2 The proposal comprises a 150,000 tonne per annum (tpa) Timber Resource Recovery Centre (TRRC). The development of the site will create an energy generation facility with the potential to export 20MW from the TRRC and the potential to provide a direct heat and/or electrical supply to appropriate off-takers in the local area.

9.2.3 The site is brownfield land primarily vegetated with rough restored grassland. Some scattered shrubs and small trees are also present on the site. The site is relatively flat except for bunding at its northern and western boundaries.

9.2.4 The site was historically part of the Houghton Main Colliery site and was reclaimed some time ago. The colliery was subsequently open cast mined by UK Coal in the late 1990s. Open casting mining was completed and the land was reclaimed and compacted to provide a platform suitable for industrial development.

9.2.5 There is a large distribution centre developed by Prologis and operated by ASOS, which has recently been granted planning permission for an extension. Other land uses on adjoining sites include the following:

- ASOS, a large distribution centre;
- Mine Gas Utilisation Development
- Dismantled Railway Line;
- A6195 Park Spring Road;
- RSPB Nature Reserve;
- Agricultural land; and

- Dispersed settlements and scattered farmsteads.

9.2.6 The surrounding land uses are predominantly agricultural in nature, with the village of Little Houghton is approximately 1.0km south east, Darfield approximately 1.1km south, and Great Houghton 1.5km east.

9.2.7 There are two access points from the A6195, a track cuts along the northern site boundary, linking the bridge that crosses the A6195 to the dismantled railway, and an access track that is accessible from the Houghton Colliery roundabout that links the roundabout to the dismantled railway.

9.2.8 The access from the roundabout is shared with the mine gas utilisation development, adjacent to the site's southern boundary. This track roughly forms the southern site boundary. Neither of the access routes are Public Rights of Way (PRoW), although one is a 'de facto' access route for local people to access the dismantled railway.

9.3 The Proposed Development

9.3.1 The proposed development consists of a TRRC, consisting of a single unit that would house a reception hall and process building with associate access roads, and a separate condenser unit. The highest elevation of the roof of the TRRC would be 30 metres, with a stack of approximately 45 metres in height.

9.3.2 There would be areas of landscaping on the periphery of the development, next to the Houghton Main Colliery Roundabout. Existing areas of planting on the western and northern boundaries of the site would be supplemented also.

9.3.3 This planning application and its supporting Environmental Impact Assessment (EIA) present revised proposals for the development of a TRCC, which will treat up to 150,000 tonnes per annum of waste wood and virgin timber through a gasification process which will export over 20MW renewable electrical power.

9.3.4 The proposals are the same as those set out in a previous planning application 2014/0559, however the previously proposed anaerobic digestion facility which was included in the earlier application has been removed. This has reduced the amount of built development associated with the development of the site and also has reduced the amount of traffic generated through the proposed development. The eastern boundary of the application site has been amended to reflect the revised proposals.

9.3.5 In other respects, apart from some additional internal circulation space which has been added to the east of the Timber Resource Recovery Centre, a relocation of the sub-station, and some landscaping to its new eastern boundary, the application details remain the same to that determined by Barnsley Council on 18th November 2014.

9.3.6 The application updates existing technical assessments so that they are consistent with the proposals now being submitted. It updates information and assessments to take account of

the revised proposals, and changed impacts, in accordance with Town and Country planning and EIA regulations.

9.3.7 The applicants have worked closely with Barnsley Metropolitan Borough Council to ensure that the application meets council information requirements in terms of timescales for validation and determination.

9.4 Structure of the Chapter

- Section 2 of the chapter describes the methodology and approach taken to the assessment, the detailed assessment criteria is contained in Appendix 9.1 to the full LVIA set out in Volume 3 of the ES.
- Section 3 considers landscape and visual planning policy and designations that are relevant to the site.
- Section 4 describes the existing landscape features, landscape/townscape character, visual amenity and views of the study area which comprise the baseline situation.
- Section 5 describes the potential effects of the proposals. This is supported by detailed landscape and visual impact assessment tables contained in Appendix 9.2 of Volume 3 of the ES.
- Section 6 describes mitigation proposals for the site and Section 7 considers the residual effects following establishment of mitigation proposals.
- The landscape and visual impacts of the proposals are summarised in Section 8.

9.5 Section 2 - Methodology

9.5.1 A detailed methodology for the Landscape and Visual Impact Assessment (LVIA) is set out in Appendix 9.1, included in Volume 3 of the ES. The LVIA considers the potential effects of the development upon:

- Individual landscape/townscape features and elements;
- Landscape/Townscape character and quality (condition); and
- Visual amenity and the people who view the landscape.

9.5.2 Landscape and visual effects are two distinct but related areas, which has been assessed separately in accordance with the approach outlined below. Landscape and visual impacts do not necessarily coincide and can be beneficial or adverse. A clear distinction has been drawn between landscape and visual impacts as follows:

- Landscape impacts relate to the effects of the proposals on the physical and other characteristics of the landscape and its resulting character and quality.

- Visual impacts relate to the effects on views experienced by visual receptors (e.g. residents, footpath users, tourist's etc.) and on the visual amenity experienced by those people.

9.5.3 The LVIA of the proposed scheme has been undertaken by a Landscape Architect with experience of similar types of development. The assessment will be undertaken in accordance with best practice outlined in published guidance:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (2013) Landscape Institute and the Institute for Environmental Management and Assessment;
- Landscape Character Assessment Guidance for England and Scotland (2002); The Countryside Agency and Scottish Natural Heritage; and
- Guidelines for Environmental Impact Assessment (2004); Institute for Environmental Management and Assessment.

9.5.4 The LVIA has been broadly undertaken in the following stages:

- Baseline data collection via desk-top, consultation and fieldwork;
- Description of the baseline landscape character and visual amenity of the site and surrounding area which identify the relevant landscape and visual receptors (including key viewpoints) and determine their sensitivity to change;
- Description of the magnitude of change in the landscape and visual amenity as a consequence of the proposals;
- Description of the potential landscape and visual effects arising from the proposals; and
- Development of strategic mitigation proposals to assist in reducing adverse landscape and visual effects or provide compensation where unavoidable, and where possible enhance and safeguard beneficial effects.

9.5.5 Baseline information regarding landscape features and sensitive visual receptors, and the likely change in the landscape character and visual amenity of the site and its surroundings, will be used to identify potential effects and inform the final scheme as appropriate.

9.5.6 Strategic mitigation measures will be developed in tandem with the proposals to minimise adverse effects as part of an iterative design process. Options for screening various components of the scheme will be investigated and adopted as mitigation measures where appropriate.

9.5.7 Criteria thresholds for assessing the degree of change as a result of the scheme will be established and the final layout of the scheme will be reviewed to ascertain the magnitude of change in the landscape and in views. Visual effects on historic features of interest may also need to be assessed.

9.6 Sensitivity of Receptors, Magnitude of Change and Significance of Effects

9.6.1 The significance of effects of the proposals on both the landscape and visual receptors within the study area are ascertained by cross-referencing the sensitivity of the baseline landscape or visual receptor and the magnitude of change as a result of the development.

9.6.2 The sensitivity of landscape and visual receptors is judged as high, medium or low. The magnitude of change is also judged to be high, medium, low or negligible. Significance of effects is expressed as either slight, moderate or substantial, which may be either beneficial or adverse, or neutral.

9.7 Study Area

9.7.1 For the purposes of this LVIA, a 2.5km study area from the centre of the site has been used as a boundary to assess the effects of the proposals. 2.5km has been considered in acknowledgement of the scale of the proposals, the undulating nature of the local topography and the extent of built form and vegetation cover within the immediate environs. This is not to say that there will not be views of the site from outside this study area; however, it is considered that more distant views are likely to be limited and in any event the development would only be seen as a small element of a wider panorama.

9.8 Visual Envelope

9.8.1 The visual envelope of a scheme defines the broad area from within which it may be possible to see the whole or part of the proposed development, and helps to establish the potential for sensitive visual receptors. The development is not considered to be visible outside this area or would be very difficult to perceive, except from occasional higher elevations. However, there will still be pockets within the visual envelope from which there are no views of the study area, due to the local screening effects of vegetation and topography or other features such as buildings. Landscape features, which form visual barriers and restrict views towards parts of the study area, such as landform, settlements and woodland, can then be evaluated and significant barriers identified to refine the baseline visibility of the proposals.

9.9 Representative Viewpoints

9.9.1 Within the extent of the visual envelope, it would not be practical to illustrate the visual impact on every individual visual receptor affected by a scheme. Therefore, representative viewpoints will be used to assess the impacts on the different range of views towards the site. Viewpoints will be illustrated photographically using a 56mm lens digital SLR camera and the site location and significant features will be identified together with landmarks and features in the surrounding area. All photography carried out as part of this assessment is in accordance with LI Advice Note 01/11 (March 2011).

9.9.2 A provisional list of representative viewpoints and a plan demonstrating their locations were provided to Andrew Burton, the Senior Planning Officer at Barnsley Metropolitan Borough Council (BMBC) (e-mail dated 17.02.2014) for the previous assessment. The correspondence with Mr Burton included a request for an opinion on the suitability of the viewpoints. Mr Burton replied stating that the viewpoints were appropriate, however he asked that we included a viewpoint in the northern extents of Darfield as this is anticipated to be a sensitive receptor.

9.9.3 Given the nature of that this application is similar in nature to the previous application no further viewpoints were considered necessary as part of this application, although an updated set of 'Winter' photographs have been taken to accompany the original viewpoints.

9.10 Temporal Scope

9.10.1 2014 has been taken as the baseline year for defining the existing landscape. The relevant impacts of the development will be assessed at the following times:

- During construction;
- Year 1:- one year after opening (Opening Year) to assess the impacts once the major construction is complete; and
- Year 15:- fifteen years after opening (Design Year) to allow for any mitigation planting and other landscape schemes to mature to give the intended effect.

9.11 Approach to the Assessment

Study Areas

9.11.1 The Study Area for the landscape assessment comprises the regional context of the area surrounding the site (but ultimately limited by a 2.5km radius from the centre of the site as appropriate reference to consider the context in sufficient detail). The Study Area for the visual assessment is defined by the visual envelope of the proposals – the broad area over which any part of the scheme components would be seen – and is arrived at following an analysis of landscape features such as topography, significant vegetation and built form. The Study Area was verified by a site visit undertaken on 19th December 2013, and in 16th January 2015.

9.11.2 As stated above, a draft set of viewpoints was provided to BMBC as part of the preparation of the earlier assessment and no further viewpoints have been included for this assessment.

Desk Studies

9.11.3 The baseline landscape and visual assessment comprised a desktop study of the following data sources:

- Ordnance Survey Explorer Map; 1:2500, Sheffield and Barnsley 278

- The Google Earth website at www.earth.google.com;
- The Multi-Agency Geographical Information for the Countryside website at www.magic.gov.uk;
- National Planning Policy Framework (NPPF); Department for Communities and Local Government (2012);
- Barnsley Unitary Development Plan [2000], Barnsley City Council
- The Regional Spatial Strategy for Yorkshire and The Humber [2008]
- National Character Area Profile 38: Nottinghamshire, Derbyshire and Yorkshire Coalfield [2013], Natural England.

Field Studies

9.11.4 The site was visited on December 19th 2013, March 3rd 2014 and 16th January 2015 to obtain the following data:

- Photographs from approved Representative Viewpoints;
- A corroboration of the findings of the desktop review; and
- To obtain additional information on landscape features, views and localised screening barriers.
- Site surveys were all undertaken during periods of clement weather from public highways, PRoW and publically accessible areas, including areas of public open space.

9.12 Section 3 - Landscape Policy Review

9.12.1 The planning policy for the study area is covered in greater detail in the Policies and Plans Chapter. However, in this section we identify policy and designations of direct relevance to the landscape. The landscape planning constraints are illustrated on Figure 1 (Appendix 9.3 CRM.066.004.D.001.A).

European Landscape Convention, Council of Europe, 2000

9.12.2 The context of landscape policy in the UK can be placed within the broad framework provided by the European Landscape Convention (ELC). The ELC was signed by the Government in February 2006 and signals a commitment to support the aims of the Convention which include promoting landscape protection, management and planning. It suggests that *"Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factor"* and covers rural and urban situations.

National Planning Policy

9.12.3 The most relevant source of national landscape policy guidance is the National Planning Policy Framework (NPPF); Department of Communities and Local Government [DCLG] 2012.

9.12.4 The NPPF provides support for sustainable development principally through its 12 core planning principles, two of which are set out below:

"*support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy)*".

"*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*"

9.12.5 The NPPF also addresses meeting the challenge of climate change, flooding and coastal change, it states that Local Planning Authorities should; *"consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such source's."* [Bullet 3, Para 97, Page 22].

Good Design

9.12.6 Paragraph 65 relates to requiring good design stating: "Local planning authorities should not refuse planning permission for buildings or infrastructure which promote high levels of sustainability because of concerns about incompatibility with an existing townscape, if those concerns are mitigated by good design."

9.12.7 Paragraph 66 continues: "Applicants will be expected to work closely with those directly affected by their proposals to evolve designs that take account of the views of the community."

9.12.8 The site is within a landscape with comparable large scale units and design considerations therefore need to take account of this context. As such, the design approach is operationally-led and results in an industrial form that reflects the character of the area and the requirements of the technological process and site shape and constraints.

9.13 Local Landscape Policy

9.13.1 The site falls within the boundary of Barnsley Metropolitan Borough Council (BMBC) where the most relevant source of local landscape policy guidance is as follows:

- Barnsley Local Development Framework Core Strategy, Barnsley Council, [Adopted Sept 2011];
- Yorkshire and Humber Regional Spatial Strategy [2008]; and
- Barnsley, Doncaster and Rotherham Joint Waste DPD [2012].

Barnsley Local Development Framework (LDF)

9.13.2 The LDF is will gradually replace the existing Unitary Development Plan and be adopted alongside the Regional Spatial Strategy. The Core Strategy was adopted in September 2011 and forms part of the statutory development plan. It sets out the council's vision for the next 15 to 20 years.

9.13.3 The Core Strategy sets out a number of Policy Statements for Barnsley. Policy Statements of particular relevance to this proposal include:

CSP 6 Development that produces renewable energy

9.13.4 We will allow development that produces renewable energy as long as there is no significantly harmful effect on:

- the character of the landscape and appearance of the area
- living conditions
- biodiversity, geodiversity and water quality
- historical and cultural features and areas
- highway safety, and
- infrastructure including radar

9.13.5 Proposals must be accompanied by information that shows how the local environment will be protected, and that the site will be restored when production ends.

CSP 1 Climate Change

9.13.6 Development will be expected to:

- Reduce and mitigate the impact of growth on the environment and carbon emissions
- Ensure existing and new communities are resilient to climate change
- Harness the opportunities that growth, and its associated energy demands, brings to increase the efficient use of resources through sustainable construction techniques and the use of renewable energy
- We will take action to adapt to climate change by:
- Giving preference to development of previously developed land in sustainable locations
- Locating and designing development to reduce the risk of flooding
- Promoting the use of sustainable drainage systems
- Encouraging environments that promote biodiversity and improve the Borough's green infrastructure

Yorkshire and Humber Regional Spatial Strategy (RSS), 2008

9.13.7 Although the RSS was revoked in 2010 by central government, preceding a legal challenge the revocation of the RSS results in it forming part of the development plan. It aims to guide development within Yorkshire and Humber till 2026.

9.13.8 The Core Strategy sets out a number of Policy Statements for South Yorkshire and Yorkshire and Humber as a whole. Policy Statements of particular relevance to this proposal include:

ENV5 Energy

9.13.9 The Region will maximize improvements to energy efficiency and increases in renewable energy capacity. Plans, Strategies, investment decisions and programmes should reduce greenhouse gas emissions, improve energy efficiency and maximise the efficient use of power sources by:

- Maximising the use of combined heat and power, particularly for developments with energy demands over 2MW, and incorporating renewable sources of energy where possible; and
- Providing for new efficient energy generation and transmission infrastructure in keeping with local amenity and areas of demand.

9.14 Landscape Designations

9.14.1 There are a small number of historic designations within the study area to the site (refer to Figure 1, Appendix 9.3, Dwg. Ref. CRM.066.004.D.001.A) and these are as set out below.

9.14.2 There is one conservation areas within the study area, namely Darfield Conservation Area, which is located approximately 2.0km south-west of the site.

9.14.3 There is a single scheduled ancient monument within the study area, namely the cross in the churchyard of All Saints Church, Darfield, which is located approximately 2.0km south of the proposal site.

9.14.4 The following listed buildings are also located within the study area:

- Church of St Michaels and All Saint a Grade II* Listed , which is located approximately 1.26 km from the eastern boundary of the site;
- Middlewood Park a Grade II Listed buildings, which is located approximately 1.3km south of the proposal site;
- Middlewood Lodge a Grade II Listed, which is located approximately 1.5km south of the proposal site;
- Milepost opposite junction in Darfield, Grade II listed, which is located approximately 1.6km south of the proposal site;
- All Saint Church, Darfield, Grade I Listed, which is located approximately 2km south of the proposal site; and
- Parish Church of Emmanuel is a Grade II Listed church, which is located approximately 1.1 km east of the site (List Entry No. 217732).

9.14.5 There is one 'Regional Trail' within the study, namely 'The Dearne Way', which is located approximately 0.8km to the west of the site. This is a route of regional importance that follows the River Dearne from the watercourse's source to its confluence.

9.14.6 It is clear from the review that the landscape within the study area is afforded protection through both specified designations and policies. Although the site itself does not lie within a landscape designation, there are some designated areas which have the potential to be affected within the wider study area. To comply with policy the effects on their setting due to the proposals will be considered and clearly stated in this report.

9.15 Section 4 - Landscape and Visual Baseline

9.15.1 The following published landscape character assessment documents are considered to be relevant to this assessment (see Figure 3, Appendix 9.3, Dwg. Ref. CRM.066.004.D.003.A).

National Character Area

9.15.2 National Character Areas divide England into 159 separate areas. Each character area is defined by its unique combination of landscape features, amongst other factors. The boundaries of the areas are based upon naturally occurring features rather than administrative boundaries. Therefore they provide a good framework to begin to assess the character of a particular site. However the Character Area profiles are mostly concentrated on the rural character of a landscape.

9.15.3 National Character Area Profile 37: Yorkshire South Pennine Fringe – The site is located within Character Area 937: Yorkshire South Pennine Fringe, the key characteristic which is illustrative of the study area is identified as:

- 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.
- Predominantly pastoral farming, especially in western areas, with a shift to more arable land in the drier eastern areas.
- 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.
- Extensive and dramatic views from higher land out over lower-lying land to the east, even from within urban areas.
- 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 Character

9.15.4 Barnsley Borough Landscape Character Assessment, 2002 - The Barnsley Landscape character assessment was produced in 2002 by Landuse Consultants and the Environmental Consultancy of Sheffield Metropolitan Borough Council. It was undertaken to inform the borough's reviews of the Unitary Development Plan. The site is located within Landscape Character area C2 Lower Dearne Lowland River Floor the key characteristics of which are:

- Flat valley floor of varying width and degrees of enclosure, framed by sloping valley sides outside the character area.
- Diverse range of land use including agriculture, recreation, residential, industry, commercial, communication, landscape renewal and nature conservation.
- Substantial areas of agricultural land both in arable and pastoral use, intermixed and surrounded by other land uses and linear features.
- Large areas without built development or without a dense covering of trees, giving a sense of openness in much of the character area.
- Small areas of scrub and trees scattered throughout the character area, often associated with reclaimed or abandoned land, dismantled railway lines, watercourses and newly landscaped areas.

- Disused and active linear transport/communication routes running along and across the valley floor including dismantled railways, pylons, the River Dearne and the newly constructed A6195 road.
- Immature, newly created landscapes in the form of open grass areas and young tree planting, associated with reclaimed industrial areas and the A6195.
- Localised clusters of new warehouse style buildings bringing large scale buildings into the relatively open landscape.
- Open water in the form of the River Dearne, streams, dikes, flashes and manmade lakes.

9.16 Settlement Pattern, Townscape and Cultural Associations

9.16.1 The study area is characterised by the combination of agricultural and industrial land uses. The industry in the area comprises of former open cast workings and many modern industrial developments are located on the valley floor.

9.16.2 The valley floor of the River Dearne that characterises the study area is located approximately 100 metres to the west of the site.

9.16.3 The site is defined by its location between the A6195 Park Spring Road and the dismantled railway. There is an embankment adjoining the railway siding, which forms the western boundary of the site.

9.16.4 There are a number of settlements within the study area, there are some villages in close proximity to the site, these are; Little Houghton located approximately 1km to the south east, Middlecliffe located approximately 1.5km south east, Billingley, located approximately 1km further east. The hamlet of Edderthorpe is located approximately 0.7km to the south west.

9.16.5 The settlement pattern in the study area however, is dominated by larger towns such as Great Houghton located approximately 1.1km to the east, Grimethorpe located 1.5km to the north, Cudworth located 2km to the north and Darfield located 1km to the south.

9.16.6 There are a few sparsely scattered farms and properties within the study area, namely:

- Crook House Farm located approximately 0.8km to the west;
- Store Mill Farm located approximately 1.5km to the north west;
- Tyers Hall Farm located approximately 1.8km to the south west; and
- A housing development located on Doncaster Road, located approximately 1.8km south west of the site.

9.16.7 The landscape within the study areas is defined by agriculture, industry or naturalised areas for nature conservation. The site itself if located on part of the former Houghton Main

Colliery, there is an open cast working and other industrial development within the study area.

9.17 Landform and Drainage

9.17.1 The site itself is relatively flay ranging between 25 metres and 35 metres AOD approximately. The site contains a number of localised, manmade undulations (spoil heaps) and has a bank flanking the dismantled railway and forming the western site boundary (see Figure 2, Appendix 9.3, Dwg. Ref. CRM.066.004.D.003.A).

9.17.2 The wider study area is a predominantly flat river valley with minor undulations, ranging from between 142m and 104m AOD. The study area is defined topographically by the river valley with the ground rising both west and east. The highest ground is located approximately 2.7km from the site to the east of Great Houghton at 80 metres AOD, and approximately 2.2km west of the site at an intervening hill located to the east of Ardsley at 93 metres AOD.

9.18 Land cover, Vegetation and Land Use

9.18.1 The existing site is has been left to naturalise, typical roadside and railway side scrub vegetation has become established.

9.18.2 There are two tracks that cross the site, one along the northern and one along the southern boundary. Both connect the A6195 to the dismantled railway, neither of which are definitive rights of way. There is also a track located on the elevated railway siding.

9.18.3 The rest of the site is soft landscape, mostly naturalised grassed areas with areas of young to semi mature woodland and scrub. There is more formalised hedgerow planting that flanks the A6195 on the eastern boundary.

9.19 Landscape Receptors

9.19.1 To assess the potential impacts on the townscape resulting from the proposed development the main townscape features within and adjacent to the site have been identified and the most relevant landscape receptors are considered to be:

- Landform;
- Landcover; and
- Landscape Character of the site and study area.

9.20 Visual Baseline

Visual Envelope

9.20.1 Features that restrict the visual envelope include:

- The large scale ASOS building adjacent to the eastern boundary of the site;
- Rising landform to the east of Great Houghton and intervening vegetation;
- Rising land to the west blocks some views from Ardsley towards the site, the roof of the industrial shed would be visible from some locations.
- Areas of built form, including Houghton Main, Grimethorpe, Darfield and Middlecliff.
- Areas of woodland:
- To the west of the site intervening in views from Edderthorpe
- Linear woodland flanking the River Dearne and the Dismantled Railway
- To the north west of the site there is some significant areas of woodland following field boundaries that connects to the River Dearne vegetation.
- To the south of Grimethorpe, although the topography rises up towards the southern extents of the residential areas of Grimethorpe views are generally blocked by the woodland.

9.20.2 The ASOS Fulfilment Centre is a significant detracting element within the study area. The building has a total height of 18 metres to the building's apex. Therefore the proposed TRRC building elevation of 30 metres would potentially be visible above the roofline of the ASOS Fulfilment Centre for receptors to the east, particularly those located in Great Houghton and Little Houghton.

Visual Receptors

9.20.3 The principal groups of visual receptors identified within the study area are summarised as follows:

- Residential receptors, including towns, villages and isolated properties and listed buildings;
- Public rights of way, including: Footpaths; local roads; and major roads; and
- Recreational areas and visitor attractions (the Local Nature Reserve).

9.20.4 Due to the predominant industrial and commercial land uses immediately surrounding the site, there is a relatively low density of sensitive receptors.

Representative Viewpoints

9.20.5 A set of representative viewpoints have been selected to illustrate the views experienced by surrounding receptors, the location for which are shown on Figure 3 (Appendix 9.3. Figure 4 Dwg. Ref. CRM.066.004.D.004.A) These viewpoints are also set out in Table 9-1 below.

Table 9-1–Representative Viewpoints

No.	Name	Receptor Type	Distance and Direction from Site
1	Ings Lane Bridge	Public Rights of Way users, Residents	0.7km SE
2	Edderthorpe, Dearne Way PRoW Platform 1	Public Rights of Way users, Residents, Users of B Road	0.7km SW
3	Tyers Hall Farm/ Dearne Way	Residential properties with restricted views, place of work, Public Rights of Way users.	1.5km W
4	Ardsley	Public Rights of Way users, Residential properties with restricted views.	2.3km W
5	Park Spring Nature Reserve	Users of outdoor recreational facilities	0.6km NW
6	Chapel Lane, Great Houghton	Residential properties with open views, Listed building- Church of St Michael, Public Rights of Way Users	1.2km W
7	Darfield	Residential properties with open views, Public Rights of Way users	1.5km S

9.21 Section 5 - Assessment of Effects

9.21.1 Appendix 9.2 of this assessment set out in Volume 3 of the ES includes detailed landscape and visual assessment tables, the results of which are discussed and summarised below.

9.22 Construction Effects

Landscape Effects during Construction

9.22.1 During construction, the significance of effects upon the townscape would be similar to those in Year 1 (opening year). Any changes to the landscape of the site made during the construction phase would be permanent, and would therefore be in evident in Year 1, following opening of the development.

9.22.2 Wider awareness of construction activity is likely to be limited to the visibility of the construction equipment, such as cranes; and the movement of construction vehicles. The construction works are only temporary and the landscape of the site and immediate surrounding area does include existing industrial land uses which effectively reduce the sensitivity of the landscape and its capacity to accept development. As such landscape impacts during construction are considered to be neutral.

Visual Effects during Construction

9.22.3 The significance of visual effects during construction would also be limited by the factors outlined above within the 'Landscape Effects' section. The predominant visual effects during construction are likely to be associated with the visibility of construction equipment and the appearance of the partially constructed buildings. The immediate surrounding area includes a number of large-scale industrial structures, which would be visible from the identified receptors within the visual envelope, reducing the potential visual sensitivity of the site during construction. The relatively low sensitivity of receptors during construction coupled with the limited construction period means that the overall visual effects are considered to be no more than slight adverse.

9.23 Landscape Impacts

9.23.1 The identification of key effects will be considered at Year 1 (Opening Year)

Landscape Features and Land Cover

9.23.2 The features and land-cover on the site would change from a disused area of scrub to a predominantly hard surfaced area, including; large scale built form, access roads, car parking, fencing and perimeter landscaping.

9.23.3 The proposed built form on site would be similar in style and form to the adjacent ASOS building, located approximately 85 metres to the east of the proposal site. Although some of the elevations would be higher, the footprint of the proposed development would be substantially smaller than the existing ASOS building.

9.23.4 Although much of the existing immature trees and scrub on the boundaries would be retained the introduction of new buildings within the site would have a moderate to slight adverse impact at Year 1. The proposed mitigation incorporated as part of the proposals would reintroduce new naturalised features, reducing the significance of effects upon land use and landscape features from moderate/slight adverse to slight adverse as the planting matures.

Landform

9.23.5 The existing landform is relatively flat and any undulations on the site are manmade features, including a number of small spoil heaps which appear to be the product of the site's former use as a colliery. The bund that forms the site's western boundary was formed as a railway siding.

9.23.6 The site would be levelled to allow for the development; however, any levels changes would be minimal and the bund flanking the dismantled railway would be retained.

9.23.7 There would therefore be a neutral impact on landform due to the predominantly man-made nature of the site's current landform.

Landscape Character

9.23.8 The surrounding landscape is influenced, in part, by its former and more recent industrial uses. The scale of the development and the grain of built form are therefore in keeping with the character of the surrounding landscape.

9.23.9 The proposals include areas of landscape mitigation along the boundaries, which would greatly improve the tree cover in the area and assist in improving the character of the site itself.

9.23.10 The change in land use from disused brownfield semi-naturalised land to the proposed facility will change the character of the site itself. However, within the context of the study area, the proposal would have no more than a slight adverse impact on the landscape character of the site and immediate surrounding area due to the influence that 'industrial' developmental ready has had on the immediate study area.

9.24 Visual Impact

9.24.1 The proposed development would be more prominent within views than the existing site. The tallest element of the development would be the chimney stack, which would be approximately 45 metres in height. The other buildings associated with the development would be no more than 30 metres in height.

9.24.2 Views from the majority of sensitive receptors within the visual envelope would include other existing visual detractors within their view. Such as the ASOS Fulfilment Centre, the former open cast mining site, and the large scale commercial units that are located along the A6195 are all detracting features within close proximity to the site which would be viewed in combination or sequence with the proposed development from a large number of local receptors within the study area. Whilst the proposed development has a much smaller footprint than the adjacent ASOS Fulfilment Centre it would be taller and has the potential to break the horizon within views from some sensitive receptors. These include residential receptors located in Edderthorpe and on Doncaster Road in Darfield, who currently experience views towards the site as well as properties located adjacent to Crook House Farm.

9.24.3 The residential receptors which would experience the greatest visual effects as a result of the proposed development would be:

- Crook House Farm, which has views towards the site although some views would be blocked by intervening features including both built form and vegetation. The woodland that borders the River Dearne would block views of the lower levels of the development but the chimney stack and upper elevations would be intermittently visible.
- Residential properties in the south west extent of Great Houghton (as demonstrated by Representative Viewpoint 6), that currently experience views of the ASOS Fulfilment

Centre, would have views of the development albeit partially screened by the rise in landform approximately 0.7km to the east of the proposal site and intervening vegetation.

- Residential properties in the northern extent of Darfield along the A635 (as demonstrated by Representative Viewpoint 7). Although views would be filtered by the roadside vegetation on the northern side of the A635 there would be some views towards the site from ground floor windows. The ASOS Fulfilment Centre is prominent detractor within views from Darfield.
- Residential properties within Edderthorpe, which would experience filtered views of the proposed facility (as demonstrated by Representative Viewpoint 2). Whilst views may be filtered by the area of woodland to the west of the proposal site most would experience views of the proposed development and the stack.
- Storrs Mill Farm would experience views of the top of the chimney stack; views are otherwise well screened by the significant areas of woodland bordering the River.
- Middlewood Park may experience partial or screened views of the top of the chimney stack. Views from the hall itself towards the site would be almost entirely screened by the mature boundary vegetation, and what view there are would be limited to small glimpses.

9.24.4 The closest and potentially most prominent views of the site would be for the users of Park Sprig Road (A6195) where road borders the eastern side of the site. The transient nature of these receptors means that any view of the proposed development would be seen at speed as well as being viewed in the context of the ASOS Fulfilment Centre, which occupies land on the opposite side of the road and other large scale commercial buildings along the A6195. The transient nature of the receptor, as well as the direction of view and sequential nature of the various detractors along the route mean that the significance of effect of the development from this receptor is greatly reduced.

9.24.5 There would be close range views of the development for workers within the ASOS centre, adjacent to the site. The view is currently of the proposal site, the roundabout, the mine gas utilisation scheme and the surrounding agricultural land. Mitigation measures would be incorporated in the form of landscaped screen planting along the site boundaries to assist in mitigating for any visual impacts of the proposed development for these receptors. The nature of the receptors occupation means that the sensitivity of the receptors is low.

9.25 Section 6 - Mitigation

Incorporated Enhancement and Mitigation

9.25.1 Mitigation measures include:

- The retention of boundary vegetation, worthy of retention, wherever possible;
- The retention of hedgerow trees, worthy of retention, wherever possible;
- Maintain, wherever possible, the existing topography of the site;
- Woodland, tree, shrub and grassland planting to the 'rural' northern and western boundaries, mirroring the existing linear planting along the former railway lines associated with the former colliery workings;
- Proposed indigenous tree, shrub and hedgerow planting along the eastern site boundary;
- Provision of a pond/wetland area providing landscape and ecological betterment for the site and the adjacent Dearne Valley Country Park; and
- The careful selection of building materials and colour palette to ensure that the facility would be sympathetic to its surroundings.

9.25.2 The Landscape Masterplan (Appendix 9.3, Figure 6, Dwg. Ref CRM.066.004.D.006) outlines the landscape proposals of the site. Significant areas of woodland screen planting are proposed to the north of the facility and adjacent to the former railway siding on the north west boundary. The purpose of this mitigation is to reduce the effects upon views of the facility from receptors in the north and the north-wet.

9.25.3 Additional tree, hedge and shrub planting to the east of the facility along the site boundary would be designed to screen potential impacts of the proposed development upon receptors, particularly road users, and workers in the fulfilment centre adjacent to the proposal site.

9.25.4 The nature of these close up views from the road mean that the development would form a substantial element in any view and could not be entirely screened from view. To this end the mitigation proposed have been designed to celebrate the development through the selection of building materials and colour palette, ensuring that the facility is sympathetic to its surroundings.

9.25.5 The existing areas of trees and vegetation on the boundaries of the site would, where practical, be retained as it provides some screening and provides significant mitigation opportunities for the proposed development. These areas would be managed and supplemented with additional tree and shrub planting, particularly along the western boundary.

9.25.6 Whilst views from sensitive residential receptors along and in the vicinity of Doncaster Road have been fully considered, it is accepted that the facility would be visible above the surrounding landscape.

9.25.7 Tall facilities of this nature cannot reasonably be screened by conventional landscape mitigation. However, the location of the facility adjacent to an existing, and much larger

structure [ASOS], as well as the careful selection of building materials and colour palette ensure that the facility would, as far as is possible, be sympathetic to its surroundings. Furthermore, the retention, improvement and replacement of landscape boundary treatment would provide enhanced screening of the low level activities [such as vehicle movements and lights etc.] as well as softening the effects of the development within the landscape.

9.25.8 Other mitigation measures including the use of non-reflective materials and low level lighting would also be incorporated within the design to reduce the visual impact of the built form.

9.26 Section 7 - Residual and Cumulative Impact

9.26.1 Residual landscape and visual impact are considered fifteen years after opening (Design Year) when the proposed landscape mitigation is expected to have matured sufficiently to serve its intended purpose. Mitigation planting would be expected to continue to mature beyond this date.

Residual Landscape Effects

9.26.2 The landscape effects are unlikely to change greatly between years one and fifteen. The proposed mitigation planting would have matured and will assist in screening lower level activities as well as integrating the buildings into its surroundings. The primary purpose of the mitigation proposals was to screen these lower level site activities, including; traffic movements, lighting etc.

9.26.3 In respect to landform the significance of effect in the design year would remain neutral as per the opening year.

9.26.4 The few landscape features, such as trees and shrubs, lost as a part of the development of the site would have been more than adequately replaced by proposed mitigation, which would now have reached the level of maturity envisaged by the proposals.

9.26.5 The landscape/townscape character of the site and its surroundings is considered to be fairly robust given the previous site uses and the surrounding large-scale industrial and commercial developments and as such is well capable of accepting this form of development.

9.26.6 Overall the landscape/townscape effect at Year 15 is considered to be no more than slight adverse.

Residual Visual Impact

9.26.7 By year 15 the proposed mitigation planting would have matured so that visual effects would be greatly reduced. The purpose of the mitigation was to screen the lower level activities

and features within the facility including lighting; however, potential views of the higher building elevations and the chimney stack would remain.

9.26.8 Whilst the proposed development would be visible to a number of sensitive receptors within the study area there are numerous other visual detractors within the landscape that would be viewed in combination with the proposed development, most notably the ASOS Fulfilment Centre.

9.26.9 Whilst the receptors in close proximity to the site would continue to experience some adverse residual visual effects, this must be offset by the current views which contain significant landscape detractors, such that a new development of this nature would not be incongruous.

9.26.10 Once mitigation planting has matured the visual effects on even most sensitive receptors in close proximity to the site would be reduced such that the significance of effects are considered to be moderate/slight adverse.

9.27 Section 8 - Summary and Conclusion

9.27.1 The development would not result in any significant landscape or visual adverse effects.

9.27.2 The application site is situated within a landscape characterised by former and continued industrial land uses meaning that the landscape is reasonably robust and has a low sensitivity to developments of this nature. Although the proposed buildings would be visible it is not out of character with the local setting.

9.27.3 The site itself is a brownfield site, which has been utilised for industrial operations in the past and is located within an area with a high level of commercial activity. Therefore the change of use is entirely congruous with both adjacent land uses and historically.

9.27.4 The inclusion of new landscape features and elements would be beneficial to both the site itself and the wider study area. The landscape proposals will provide mitigation for the lower level activity and features within the facility, particularly during the summer months.

9.27.5 It is unlikely that any residential receptors would be significantly affected by the proposed development, and where there are oblique or partial views of the development these would be seen as in combination with other detracting features within the view, notably the ASOS Fulfilment Centre buildings.

9.27.6 Overall, the development is expected to have a slight adverse effect on the landscape and slight to moderate adverse effect on visual amenity.

10 Chapter 10: Noise and Vibration

10.1 Introduction

10.1.1 Enzygo has been commissioned by Peel to undertake an assessment of the potential noise and vibration impacts associated with a proposed Timber Resource Recovery Centre (TRRC) on a parcel of land off Houghton Main Colliery Roundabout, Park Spring Rd, Houghton Main, Barnsley.

10.1.2 The information provided indicates that the operational TRRC would include the following aspects;

- 150,000tpa Timber Resource Recovery Centre (TRRC) operated by Northern Bio Ltd; and,
- Associated infrastructure, access roads and service yards.

10.1.3 Full details of throughputs and processes associated with the TRRC are presented within chapter 3 of this ES for reference. The full information contained within chapter 3 sets the basis against which this noise assessment has been conducted.

10.1.4 As a result of the nature of the development and the separation distances involved between the operational plant and the nearest sensitive receptors, it is not considered that operational vibration would be a significant issue associated with the TRRC. The processes associated with the TRRC are unlikely to generate significant levels of vibration that would be discernible beyond the site boundary and certainly not at the closest sensitive receptors which are some distance away. As such operational vibration is not considered to be a required facet of this assessment.

10.2 Cumulative Effects

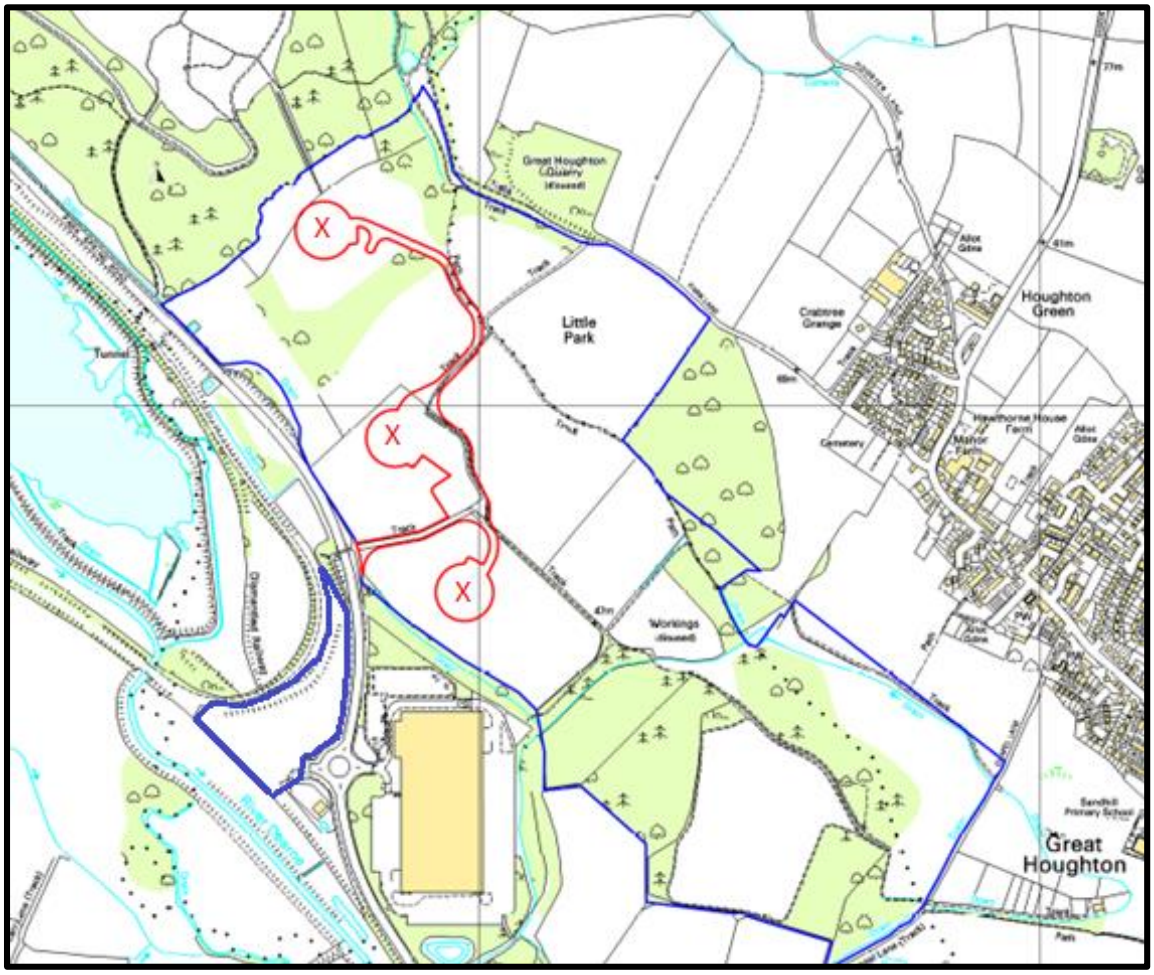
10.2.1 Within the scope of any noise assessment there should be appropriate consideration of cumulative impacts with other significant developments within influencing distance of the proposed facility. Consideration should be given to cumulative impacts of developments either proposed or permitted.

10.2.2 With respect to the noise assessment, the following development has been identified within the area;

Application Number	Site Address	Development Description	Decision
BMBC ref: 2013/0860	Park Spring Rd, Little Houghton, Barnsley	Erection of a 3no. turbine wind farm with hub heights of 80m	Approved

10.2.3 The information available relating to the proposed wind farm indicates that the turbines would be situated in the locations detailed below:

Figure 10-1: Wind Turbine Location Plan



Parsons Brinckerhoff Figure Reference PSR152

10.2.4 Consideration has been given to potential cumulative impacts of these developments (Wind farm and TRRC) within the subsequent sections of this Chapter.

10.3 Consultation

10.3.1 Within the scope of this application a formal consultation exercise was undertaken with the local planning authority (LPA), Barnsley Metropolitan Borough Council (BMBC) orchestrated by the Planning Consultant.

10.3.2 Within the scope of the preceding application for the Renewable Energy Centre (REC), additional consultation was undertaken with the Environmental Health Department at BMBC, specifically relating to noise and vibration issues associated with the development of the REC. These discussions were conducted as follows:

Contact	Caroline Petty (Group Leader, Pollution and Licensing.
Method	Telephone and Email Transmission
Date	6th February 2014

10.3.3 The main focus of the noise consultation exercise related to the following issues, all of which have been addressed and considered within the scope of this study:

- Noise Monitoring locations and representative monitoring periods; and,
- Appropriate assessment Methodology and Criteria for the proposed development.

10.3.4 It is considered that the points raised during the above consultation would remain pertinent to the revised application for the TRRC and as such, no further consultation has been undertaken as part of this assessment.

10.4 Methodology

10.4.1 The assessment of the potential noise and vibration impacts associated with the TRRC has involved the following:

- Identification of appropriate Standards and Guidance;
- Review of the baseline and ambient noise climate data established in the vicinity of the proposed development;
- Qualitative assessment of construction noise associated with the development;
- Quantitative prediction and assessment of noise generated by the proposed facility;
- Quantitative and qualitative prediction and assessment of traffic noise on the wider road network;
- Provision of proposals for mitigation measures where appropriate; and,

- Assessment of residual effects.

10.5 Standards and Guidance

10.5.1 Assessment and consideration of the development of the proposed TRRC will be undertaken in accordance with the following Standards and Guidance documents specific to noise. The Guidance referenced has been separated into the three distinct elements of the assessment namely the Construction Phase, the Operational Phase and Off-site Traffic Noise impacts.

10.5.2 Each of these documents is discussed in more detail within Appendix 10A.

Construction Phase Assessment

- BS 5228:2009 Code of practice for noise and vibration control on construction and open sites (Part 1) +A1:2014;
- BS 5228:2009 Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration;
- BS 6472: Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting, 2008;
- BS 7385: Evaluation and measurement for vibration in buildings – Part 2. Guide to damage levels from ground borne vibration, 1993;

Operational Phase

- ISO9613 – Pt 2: 1996 Attenuation of sound during propagation outdoors – Part 2: General method of calculation;
- BS 5228: 2009 Noise Control on Construction and Open Sites (Part 1 and Part 2);
- BS 4142: 2014 – Methods for rating and assessing industrial and commercial sound.

10.5.3 All noise predictions informing this study have been undertaken utilising the commercially available Braunstein + Berndt GmbH computer noise mapping software SoundPLAN 7.3. The SoundPLAN software implements the relevant UK Standards and prediction methodologies as and where appropriate. Details relating to the construction of the noise model are presented within Appendix 10B.

Offsite Traffic Assessment

- Calculation of Road Traffic Noise Memorandum
- The Design Manual for Roads and Bridges HD213/11

10.6 Significance Criteria

10.6.1 This section of the Chapter defines significance criteria associated with the assessment and consideration of noise drawing upon appropriate guidelines and Standards.

10.6.2 Significant impacts will be deemed to occur if the following conditions are met/breached for each of the given phases of the development:

Construction Noise - Significant effects

- Significant impacts will be deemed to occur if noise generated by construction operations exceeds the calculated noise limits for the locality based upon the example criteria of BS5228.

Construction Vibration - Significant effects

- Significant impacts will be deemed to occur if:
    - Vibration Dose Value (VDV) levels exceed the upper limit of the "Adverse Comment Probable" criteria of BS 6472.
    - Peak Particle Velocity (PPV) levels exceed 10mms^{-1} as stated within BS 5228 as the level at which "*Vibration is likely to be intolerable for any more than a very brief exposure to this level*".

Operational Noise – Significant effects

- Major/Significant impacts will be deemed to occur if the operational BS4142 'Rating' noise level exceeds the measured background noise level (LA90) by more than 5dB;
- Moderate impacts could be expected if the predicted facility noise levels are between 3dB and 5dB above the baseline climate;
- Minor impacts could be expected if the predicted facility noise levels are between 0dB and 3dB above the baseline climate; and,
- Impacts would reduce in severity as the level of facility noise drops further below the existing baseline noise climate, resulting in Negligible/Neutral impacts.

Off Site Road Traffic Noise

- Offsite traffic noise impacts would be deemed to be significant if a long term increase in excess of 3dB(A) in the predicted LA10 traffic noise parameter is calculated.

10.7 Planning Policy

10.7.1 Within the wider Environmental Statement document detailed review of the appropriate Local and County Council development plan documents, and the general planning context of the development has been undertaken, the specifics of this have been provided in Chapter 4.

10.7.2 Within this Chapter those policies and documents that are specifically relevant to noise are considered and summarised. The summary commences with National Policy and legislation then looks at Regional and finally Local Policy documents;

10.7.3 More detail and resolution on the documents referenced below is contained within Appendix 10A.

10.8 National Planning Policy

The Control of Pollution Act (CoPA)

10.8.1 The CoPA provides legislation that Local Authorities can implement in order to control the noise from construction sites and prevent the occurrence of disturbance to surrounding residents.

Environmental Protection Act (EPA)

10.8.2 The Environmental Protection Act (EPA) (Section 79, Part III of Chapter 43, Statutory Nuisances and Inspections) contains a definition of what constitutes a "statutory nuisance" with regard to noise and places a duty on Local Authorities to detect any such nuisances within their area.

The Land Compensation Act

10.8.3 Part 1 of the Land Compensation Act 1973 includes provision for compensation for loss in property value resulting from physical agents including noise. Part II includes provision for noise mitigation measures at dwellings adjacent to new highways if certain conditions are satisfied.

National Planning Policy Framework (NPPF), March 2012

10.8.4 The National Planning Policy Framework determines the government's overarching planning policy for England.

10.9 Regional/Local Policy

10.9.1 A review of the Barnsley Unitary Development Plan (UDP) indicates a number of policies which relate to noise and minimising any potential impacts arising from development. Most notable of these is Environmental Standards Policy ES1, which states the following:

Policy ES1

The council will refuse proposals for development which are likely to result in harm to the environment through excessive levels of pollution arising either within the site to be developed or occasioned elsewhere by the proposed development.

The council will in particular resist development which is likely to result in housing, schools, hospitals or other sensitive land uses being subjected to excessive levels of air, noise or other pollution.

Where development is permitted the council will seek to ensure that resulting pollution is avoided or minimised.

10.10 Baseline Conditions

10.10.1 The scope for the baseline surveys was agreed with BMBC during the initial consultation phase for the preceding application which is summarised within Paragraphs 10.3.2-10.3.3.

10.11 Baseline Noise Survey

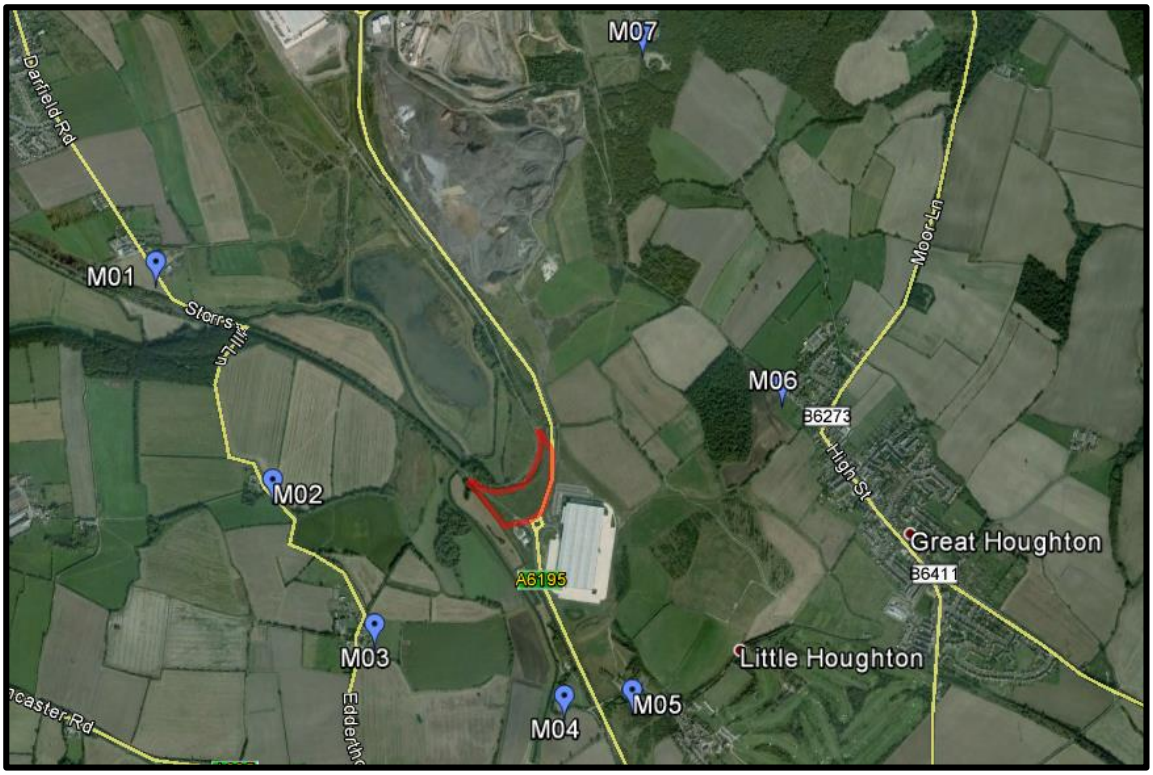
10.11.1 The existing baseline and ambient noise climate of the area was established as part of a preceding application for the land parcel. It is considered that no significant changes to infrastructure etc have taken place in the intervening time frame and as such, the data set, established in Feb 2014, is considered valid and representative of the area.

10.11.2 Noise monitoring was undertaken at seven locations around the periphery of the site in order to quantify the prevailing noise climate of the locality. The monitoring locations are defined in Table 10C-1 of Appendix 10C and are presented graphically on

10.11.3

10.11.4 Table 10-2 below. The equipment and setup parameters used to undertake the noise monitoring survey is also detailed in Appendix 10C.

Figure 10-2: Noise Monitoring Location Plan



10.11.5 The noise monitoring survey conducted within the vicinity of the Houghton Main site was undertaken through a combination of short term attended monitoring and longer term unattended monitoring surveys as defined below:

- Short Term Monitoring Locations: Locations ML01, ML03, ML04, ML05, and ML07; and,
- Long Term Monitoring Locations: Locations ML02 and ML06.

10.11.6 All monitoring was undertaken between the 13th February 2014 and the 26th February 2014.

10.11.7 During all noise monitoring surveys, the sound level meter was positioned approximately 1.5m above local ground level, with no reflecting façades within 3.5m of the microphone. As such, the measured data is considered to be representative of Free Field conditions.

10.12 Noise Monitoring Results

10.12.1 The noise monitoring survey was undertaken to cover both the daytime and overnight periods for the weekday and weekend.

10.12.2 For the purposes of the data summary presented below (Table 10-1 and 10-2), the monitoring dataset has been divided into the following periods:

- 07:00 to 23:00 – Daytime Period; and,
- 23:00 to 07:00 – Overnight Period.

10.12.3 The monitoring dataset presented within Table 10-1 below, presents the data in the following periods;

- Daytime periods – average 15 minute periods during the survey durations;
- Overnight periods – average 5 minute periods during the survey durations.

10.13 Weekday Monitoring Period

10.13.1 The weekday dataset covers the period between Monday and Friday.

Table 10-1: Weekday Noise Monitoring Data

Location Reference	Period	Duration hh:mm:ss	$L_{Aeq, T}$	L_{Amax}	$L_{A90, T}$	$L_{A10, T}$
M01	Daytime	01:30:00	48.5	69.0	39.2	50.5
	Overnight	00:35:00	32.6	53.6	28.0	33.5
M02	Daytime	78:15:00	53.2	91.1	44.5	51.1
	Overnight	24:00:00	45.5	72.8	39.2	44.3
M03	Daytime	01:15:00	64.1	80.9	47.3	66.3
	Overnight	00:30:00	46.0	74.8	30.5	40.9
M04	Daytime	02:00:00	52.6	69.3	48.0	54.6
	Overnight	*No Access available during the overnight period*				
M05	Daytime	02:00:00	58.5	88.7	51.1	59.6
	Overnight	00:30:00	44.9	60.2	36.0	48.1
M06	Daytime	29:45:00	49.9	79.5	43.3	50.2
	Overnight	08:00:00	41.8	68.4	31.7	40.2
M07	Daytime	01:30:00	49.5	75.8	41.4	48.6
	Overnight	00:35:00	30.6	41.4	28.9	31.9

10.13.2 It is noted that no access was available at location M04 during the overnight period. As such, no data could be established at this location during the monitoring survey.

10.14 Weekend Monitoring Period

10.14.1 The weekend monitoring dataset covers the period between Friday overnight and Sunday overnight (including the early hours of the Monday morning). It is noted that the weekend noise monitoring was only undertaken at location M02 and M06 as agreed with the LPA.

Table 10-2: Weekend Noise Monitoring Data

Location Reference	Period	Duration hh:mm:ss	$L_{Aeq, T}$	L_{Amax}	$L_{A90, T}$	$L_{A10, T}$
M02	Daytime	32:00:00	51.4	89.1	44.0	51.7
	Overnight	32:00:00	49.8	71.6	43.1	49.3
M06	Daytime	32:00:00	44.9	70.7	39.0	45.8
	Overnight	24:00:00	47.5	73.4	37.7	44.5

10.15 Conclusions

10.16 Construction Impacts

10.16.1 At the current time the exact programming and methodology of the construction works required to develop the site are not known. However, it is envisaged that the construction operations may require the following activities to be undertaken which have the potential to cause short term disturbance to the amenity of nearby sensitive receptors.

- Site establishment activities (inc. ground works) – this is typically the activity which employs the greatest amount of large earth moving equipment;
- Building construction – typically undertaken with less large scale equipment than the ground works phases;
- Construction traffic – the road traffic movements associated with the construction operations have the potential to generate short term increases in traffic movements on the surrounding highways depending upon flow numbers.

Construction Noise

10.16.2 As a result of the ambiguities associated with the prediction of noise from construction activities and the lack of specific information available at this stage of the development process, a qualitative assessment of construction noise in line with the requirements of BS5228 has been undertaken, discussing potential noise limits and control measures that could be implemented at the closest residential properties should it be necessary.

10.16.3 With regard to the potential increases in traffic flows on surrounding routes due to construction activities, unfortunately appropriate data is not available upon which to base an assessment. However, subjectively it is considered that these movements would not significantly increase the current flows on roads in the immediate area, specifically the A6195 and the A635 which already have high flow volumes. Increases in flow of up to 25% would be necessary in order to result in a noticeable change in traffic noise and this would account for a significant amount of flow on these roads. However, construction traffic and routing would require to be considered within either a Construction Environmental Management Plan (CEMP) or as part of a CoPA S61 agreement with BMBC for the site.

10.16.4 As previously stated details of construction techniques and types of plant likely to be used within the construction of the site are not currently available. However, it is considered useful to present potential worst-case noise levels from a selection of typical construction plant sources which may be used within a development of this type, and to calculate noise levels from these back to different distances which may reflect noise levels at sensitive receptors.

10.16.5 It is noted that the noise levels presented within

10.16.6 Table 10-3 below do not take into account any attenuation due to screening and have been based upon hard reflective ground between the source and receiver (water, concrete, bituminous surfaces). Given the nature of the existing ground cover around the site being predominantly soft ground (grass, fields etc.) these predicted noise levels should be similar, and in most cases slightly higher, than those that would be experienced in practice. The figures presented are based upon a 100% on-time which is unlikely to occur in practice.

10.16.7 All predicted noise levels have been based on typical plant source noise levels taken from the appendices of BS 5228.

Table 10-3: General Plant Noise Levels

Plant	Sound Pressure Level in dB(A) at 10m	Sound pressure level (dB L_{Aeq})						
		20m	50m	100m	200m	300m	600m	1km
Tubular Steel Piling Hydraulic Hammer Rig	88	82	74	68	62	58	52	48
Vibratory Sheet Piling rig	88	82	74	68	62	58	52	48
44tn Tracked 360° Excavator	85	79	71	65	59	55	49	45
Grab hopper dredging ship dredging harbour	82	76	68	62	56	52	46	42
Articulated Dump Truck	80	74	66	60	54	50	44	40
14tn Tracked 360° Excavator	83	77	69	63	57	53	47	43
Wheeled 360° Excavator	68	62	54	48	42	38	32	28
Telescopic Handlers	71	65	57	51	45	41	35	31
Water Pump	62	56	48	42	36	32	26	22
Concrete Pump	78	72	64	58	52	48	42	38
Generators	57	51	43	37	31	27	21	17
Cement Mixers	75	69	61	55	49	45	39	35
Crane	78	72	64	58	52	48	42	38
Road lorry (Drive by)	80*	74*	66*	60*	54*	50*	44*	40*

*Drive by maximum sound pressure level, LpA (max), at speed in km/h as shown in BS5228

10.16.9 It is considered that the potentially worst affected properties due to construction noise would be those in the vicinity of Crooke House Lane, Middlecliff and Ings Lane with lesser impacts expected at properties located further away or screened by surrounding land uses.

10.16.10 Impacts to specific identified receptors during the construction phase are expected to be relatively short-term in duration, although the exact duration over which the construction phase will occur is not yet known. As such construction noise should be covered within the scope of a Construction Environmental Management Plan (CEMP) or as part of a CoPA S61 agreement with BMBC once the specifics of the program are known and understood.

10.16.11 Referencing the measured ambient noise levels quantified as part of this study the information contained within Table 10-4 below details the threshold levels at which significant effects would be expected to occur due to construction noise. The noise limits have been calculated based on the two methodologies described in BS5228 and a breach of these limits would dictate a need to put in place mitigation to reduce noise back to within acceptable levels.

10.16.12 General practice dictates that construction operations normally only occur during the daytime hours. For the purposes of the assessments presented within the scope of this chapter, these are taken as being 07:00 to 19:00hrs Monday to Friday and 07:00 to 13:00hrs on Saturday. As such only measured noise levels during these periods are considered within Table 10-4 below.

10.16.13 No construction works have been assumed to occur during Sundays or on public holidays as is normal practice with construction works.

Table 10-4: Construction Noise Limits

Location Reference	Period	Average Measured $L_{Aeq, 1hr}$ of the locality	Col 3 Rounded to the nearest 5dB "ABC Method"	BS5228 Methodology	
				"ABC Method"	"+5dB Change Method"
M01	Weekday	49.6	50	65	65
M02	Weekday	53.2	55	65	65
	Saturday	52.9	55	65	65
M03	Weekday	63.6	65	70	69
M04	Weekday	53.1	55	65	65
M05	Weekday	57.2	55	65	65
M06	Weekday	50.4	50	65	65
	Saturday	47.4	50	65	65
M07	Weekday	49.2	50	65	65

Note to table 10-4 above: The monitoring data has been presented for the specific periods detailed above.

Construction Vibration (Ground Borne) Limits

10.16.14 Certain activities that have the potential to be required during the construction phase of a development such as this present the potential to generate ground borne vibration. However, whether this vibration becomes perceptible or even detrimental to amenity in the surrounding area depends not only upon the magnitude and duration of the source but also the ground type and the separation distances between the source and receptor.

10.16.15 The main construction based operations which have the potential to generate discernible vibration outside of a site boundary, and could be required on a development such as this is piling or dynamic ground stabilisation.

10.16.16 Aside from those specified above, typical construction techniques employed within the scope of a development such as this would not generally give rise to significant vibratory issues discernible outside of the immediate vicinity of the operation.

10.16.17 However, as with noise, ground borne vibration effects should be considered and evaluated within the scope of the CEMP or CoPA S61 agreement.

10.17 Operational Impacts

10.17.1 The key elements of the operational phase of the development which could potentially generate long term disturbance to the amenity of adjacent receptors are as detailed below:

- Operation of the onsite equipment both within and external to the proposed building structures during the daytime and night-time periods;

- Vehicular movements on the site roads - typically restricted to the daytime period;
- Increases in daytime road traffic volumes on the surrounding highways as a result of development generated traffic movements.

10.17.2 Assessment of onsite operational noise has been undertaken based upon the methodology of BS4142, the measured background noise level data and predicted operational noise levels from the entire TRRC (plant and on site vehicles).

10.17.3 The assessment has been undertaken for both the weekday and weekend periods based upon the proposed operational parameters of the facility and the average measured LA90, 15min levels and the average LA90, 5min levels during the daytime and overnight respectively during these periods. The assessment has further been undertaken to whole decibels as required by the BS4142.

10.17.4 In line with the requirements from BS4142:2014, the following feature corrections have been applied to the predicted 'Specific' noise level, in order to give the calculated 'Rating' level.

Characteristic	Subjective Perception	Justification	BS4142 Correction
Tonality	Just	No information relating to tonality is available at this time and as such, it is conceded that some degree of tonality could be audible at receptor locations from fans and other items of plant associated with the TRRC. That said, given the separation distance between the facility and the nearest noise sensitive receptors it is considered that any element of tonality would only be 'Just' perceptible.	+2
Impulsivity	None	All tipping, loading/ unloading activities would be undertaken within the building structures and as such, it is considered that no correction for impulsivity has been applied.	+0
Other Characteristics	None	No 'other' characteristics, outside of the existing nature of the site are proposed.	+0
Intermittency	None	The facility, once operational will be active in some capacity 24/7 and as such would not be considered intermittent. As such no feature correction for intermittency is applicable.	+0
		Total Character Correction	**+2**

10.17.5 Figures 10-4 and 10-5 (Appendix 10C) present the calculated grid noise map outputs of the noise model upon which the data within subsequent sections are based. Figure 10-4 depicts the daytime operational period and Figure 10-5 the overnight.

10.17.6 It is understood that the TRRC would be operational in some capacity for 24 hours per day, 365 day per year. It is noted however, that HGV deliveries would only take place during typical daytime hours, identified as 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays and the assessment produced reflects this as below:

Typical Operational Daytime	07:00 to 19:00 Monday to Friday 07:00 to 13:00 Saturday	Facility operating at 100% including HGV and vehicle movements.
Typical Operational Overnight	23:00 to 07:00 Monday to Saturday	Facility operating at 100%. No vehicle movements
Sunday Operational Period	07:00 to 23:00 Daytime 23:00 to 07:00 Overnight	Facility operating at 100%. No vehicle movements

Typical Operational Period

10.17.7 As detailed above, the "Typical Operational Period" of the TRRC includes the following items of noise generating plant/ machinery:

- Timber Resource Recovery Centre (TRRC) – 100% Operational
- HGV deliveries and movements associated with the TRRC (Daytime Only).

10.17.8 All of the noise sources associated with this operational scenario are detailed within Appendix 10B.

Table 10-5: Typical Operational Assessment

Location Reference	Period	Measured Background Noise Level $L_{A90,\ 15mins}$, dB (1)	Predicted Specific Noise Level, dB (1)	Rating Level, dB	Difference, dB	Impact significance
Typical Operational Daytime (07:00 – 19:00 Monday to Friday, 07:00 – 13:00 Saturday)						
M01	Weekday	40	17 (17.0)	19	-21	*Negligible/ Neutral Impacts*
M02	Weekday	45	27 (26.7)	29	-16	
	Saturday	43	27 (26.7)	29	-14	
M03	Weekday	48	29 (29.2)	31	-17	
M04	Weekday	49	30 (29.6)	32	-17	
M05	Weekday	50	27 (26.8)	29	-21	
M06	Weekday	44	23 (22.7)	25	-19	
	Saturday	43	23 (22.7)	25	-18	
M07	Weekday	41	19 (18.6)	21	-20	
Typical Operational Overnight (23:00 – 07:00 Monday to Friday)						
M01	Weekday	28	12 (11.8)	14	-14	*Negligible/ Neutral Impacts*
M02	Weekday	43	24 (24.0)	26	-17	
M03	Weekday	31	25 (25.0)	27	-4	
M05	Weekday	36	24 (23.8)	26	-10	
M06	Weekday	32	19 (19.2)	21	-11	
M07	Weekday	29	16 (16.2)	18	-11	

(1) Note: Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

10.17.9 The BS4142 assessment for the proposed development shows that, based upon the measured background noise level data and the output of the noise modelling undertaken relating to facility generated noise, the predicted BS4142 Rating levels are as detailed below within the given time periods:

Typical Operational Daytime	Between -14 and -21dB below the measured background (L_{A90}). Considered by the Standard to be of *'Negligible/ Neutral significance'.*
Typical Operational Overnight	Between -4 and -17dB relative to the measured background noise level (L_{A90}). Considered by the Standard to be of *'Negligible/ Neutral significance'*

10.17.10 The assessment presented within Table 10-5 is also in accordance with the limit proposed by the LPA during the preceding consultation of LA90 +3dB.

10.17.11 Impacts of neutral/ negligible significance not be considered to be detrimental to the amenity of the area and as such would not be considered prejudicial to development.

Sunday Operational Period

10.17.12 The Sunday period is typically considered to be the quietest portion of a week and as such it is considered appropriate to assess the potential impact of the proposed TRRC against those levels specifically measured during this period.

10.17.13 It is noted that background noise levels were established during a Sunday period at two of the monitoring locations (M02 and M06 cf. Figure 10-2) as agreed with the LPA. The impact of the proposed TRRC has been considered for both the daytime and overnight Sunday periods at these locations within Table 10-6.

Table 10-6: Sunday Operational Period

Location Reference	Period	Measured Background Noise Level $L_{A90, T}$, dB (1)	Predicted Specific Noise Level, dB (1)	Rating Level, dB	Difference, dB	Impact significance
M02	Daytime	45	24	26	-19	*Negligible/ Neutral Impacts*
	Overnight	44	24	26	-18	
M06	Daytime	36	19	21	-15	*Negligible/ Neutral Impacts*
	Overnight	32	19	21	-11	

(1) Note: Noise levels rounded to nearest whole dB in accordance with the guidance of BS4142

10.17.14 The assessments presented within Table 10-6 above would classify the potential impacts of the scheme during the sensitive Sunday operational period as follows:

Sunday Operational Daytime	Between -15 and -19dB below the measured background (L_{A90}). Considered by the Standard to be of *'Neutral/ Negligible impact'*
Sunday Operational Overnight	Between -11 and -18dB below the measured background (L_{A90}). Considered by the Standard to be of *'Neutral/ Negligible impact'*

10.17.15 The assessment presented within Table 10-6 is also in accordance with the limit proposed by the LPA during the preceding consultation of LA90 +3dB. Impacts of this magnitude would not be considered detrimental to the amenity of the area and as such would not be considered prejudicial to development.

10.18 Offsite Traffic Assessment

10.18.1 Traffic data for the surrounding road network has been supplied by SK Transport Ltd and is presented as part of the Transport Assessment within Chapter 6.

10.18.2 The traffic data is based on surveyed data established in 2012 and 2014 (base year) and factored to 2017 and 2019, representative of opening and future assessment years, using appropriate factors. The data is presented in AADT (Annual Average Daily Traffic) format.

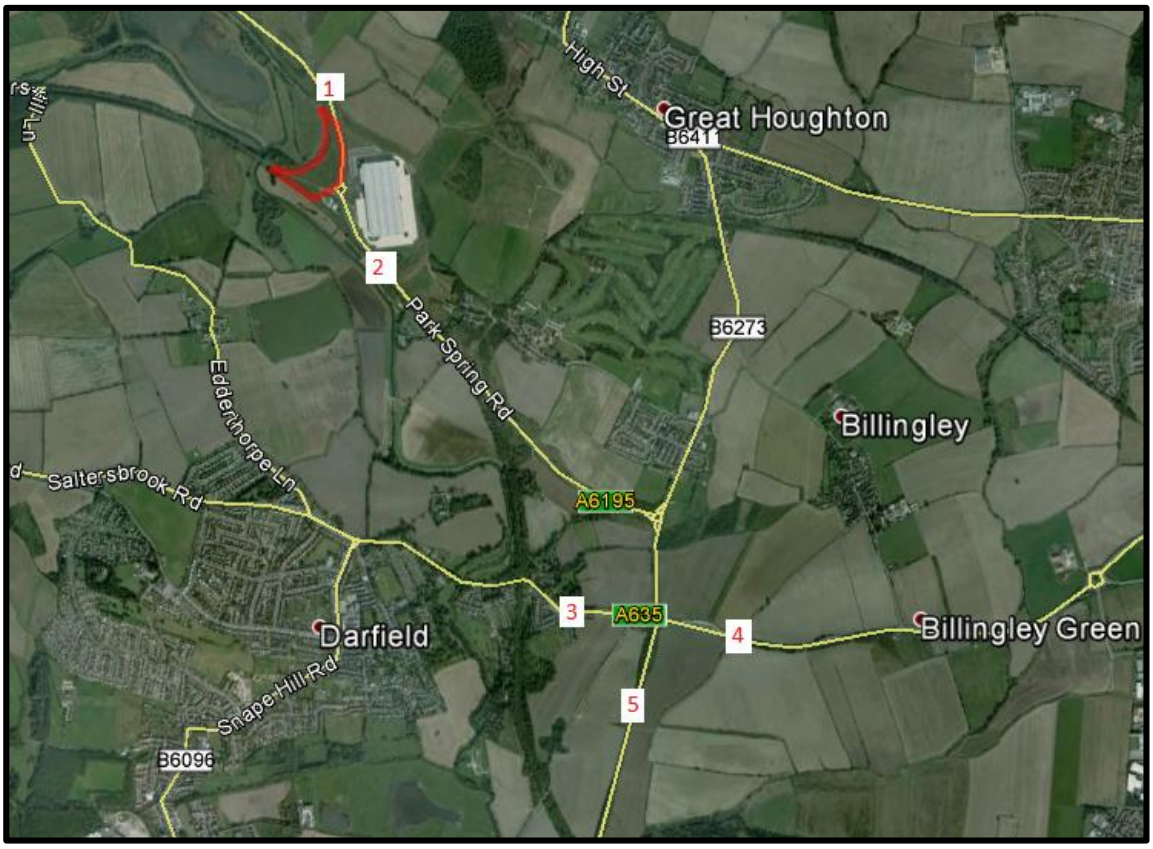
10.18.3 The assessments presented within this Chapter have considered the following impact periods;

- Short Term Impact – 2017 Without Development vs 2017 With Development; and,
- Long Term Impact – 2017 Without Development vs 2019 With Development.

10.18.4 Figure 10-3 below presents the locations of the traffic links considered in the traffic noise assessment in relation to the Houghton Main development site for context. The link descriptions are presented below:

- Link 1: A6195 Park Spring Road north of the site entrance;
- Link 2: A6195 Park Spring Road south of the site entrance;
- Link 3: A635 Doncaster Rd west of the roundabout with A6195;
- Link 4: A635 Doncaster Rd east of the roundabout with A6195; and,
- Link 5: A6195 south of the roundabout with the A635.

Figure 10-3: Traffic Data Link Locations



(Image Source: Imagery ©2014 Bluesky, DigitalGlobe GeoEye Getmapping plc. Infoterra Ltd & Bluesky, The Geoinformation Group, Map data ©2014 Google)

10.18.5 The traffic data provided has been summarised into a single, two way flow figure for each road link as no significant central reservation was noted.

10.18.6 The traffic data provided by SK transport indicates that while there is an increase in the number of HGVs on the surrounding road network the level of change is such that it will not fundamentally alter the composition of the traffic flows when expressed as a "percentage HGV" figure. As such, the assessment presented below is undertaken based on the calculated Basic Noise Level values calculated in accordance with CRTN and does not account for changes in the percentage of HGV content of flow or the average link flow speed.

Table 10-7: Short Term 2017 Traffic Noise Assessment

Link Id	Link Location	2017 Do Min		2017 Do Some		Percentage Change in Flow	Change in BNL, dB
		Flow	BNL, dB	Flow	BNL, dB		
1	A6195 (Park Spring Road	9349	68.8	9437	68.8	+0.95%	+/-0.0
2	A6195 (Park Spring Road	9583	68.9	9674	68.9	+0.95%	+/-0.0
3	A635 W Doncaster Rd	17077	71.4	17106	71.4	+0.17%	+/-0.0
4	A635 E Doncaster Rd	13204	70.3	13226	70.3	+0.17%	+/-0.0
5	A6195 (S)	23515	72.8	23555	72.8	+0.17%	+/-0.0

10.18.7 The information presented within Table 10-7 above indicates that offsite traffic noise increases on the considered links as a result of the facility during 2017 would be less than 0.1dB. Consideration of this increase in accordance with the short term impact rating scheme of DMRB would classify the offsite traffic noise increases as being of 'Negligible' significance and as such not detrimental to the area.

10.18.8 Table 10-10 below considers the impacts of offsite traffic noise changes during the longer term between 2017 and 2019 on the qualified links.

Table 10-8: Long Term Traffic Noise Assessment

Link Id	Link Location	2017 Do Min		2019 Do Some		Percentage Change	Change in BNL, dB
		AADT	BNL, dB	AADT	BNL, dB		
1	A6195 (Park Spring Road	9349	68.8	9786	69.0	+4.68%	+0.2
2	A6195 (Park Spring Road	9583	68.9	10032	69.1	+4.68%	+0.2
3	A635 W Doncaster Rd	17077	71.4	17733	71.6	+3.84%	+0.2
4	A635 E Doncaster Rd	13204	70.3	13712	70.5	+3.84%	+0.2
5	A6195 (S)	23515	72.8	24419	73.0	+3.84%	+0.2

10.18.9 The information presented within Table 10-8 above indicates that the long term noise impact arising from the proposed development would be +0.2dB across all links assessed which would be considered by the criteria detailed within the DMRB as 'Negligible'. It is further noted that the majority of this increase would be made up by year on year traffic growth on the road network and not solely as a function of the proposed development. This is

demonstrated by consideration of the traffic data presented within Chapter 6 for the without development scenarios in both 2017 and the factored 2019 period.

10.18.10 Given the assessments presented within the tables above it is considered unlikely that the proposed Houghton Main development would result in any significant noise impacts on the surrounding road network in either the short term or the longer term.

10.18.11 Furthermore the increase in noise on the surrounding road network as a result of the development during both the short and long terms are demonstrated to be below the "threshold Criteria" of the DMRB for road traffic noise which corroborates the conclusion that impacts of this magnitude are in no way detrimental to amenity of an area.

10.19 Cumulative Impact Assessment

10.19.1 This section of the Chapter considers potential cumulative effects arising from the Houghton Main REC Development and the other significant development noted within the area. Review of available information concludes that only the Park Spring Wind Farm development at Little Houghton has the potential to result in cumulative effects on noise with the TRRC.

10.19.2 An Environmental Impact Assessment (EIA) of the proposed wind farm development was prepared in July 2013 by Parsons Brinckerhoff (PB) and is publically available via the BMBC planning website.

10.19.3 A review of the information presented within the Parsons Brinckerhoff EIA for the wind farm indicates that noise generated by the facility has been predicted to the receptors detailed within Table 10-11 below. It is noted that only those receptors likely to result in a cumulative effect of both developments have been considered within the scope of this aspect of the study.

Table 10-9: Cumulative Assessment Locations

Parsons Brinckerhoff Wind Farm Assessment Locations		Relative Assessment Location TRRC
L1	Middlecliff Lane	M05
L3	Crabtree Drive	M06
NL3	Woodland Terrace	M07

10.19.4 Using these assessment locations and the noise levels predicted for each facility, a cumulative assessment has been undertaken as a means of considering the combined impacts should both the wind farm and the proposed Houghton Main REC be permitted. This information is presented within Table 10-12 below:

10.19.5 **Table 10-10: Cumulative Noise Levels**

Location	Period	Wind Farm Predicted Noise (PB), dB(1)	Houghton Main TRRC Predicted Noise (Enzygo), dB	Cumulative Noise Level, dB(2)	Difference, dB
M05	Daytime	32.6	26.8	33.6	+1.0
	Overnight	32.6	23.8	33.1	+0.5
M06	Daytime	36.6	22.7	36.8	+0.2
	Overnight	36.6	19.2	36.7	+0.1
M07	Daytime	32.4	18.6	32.6	+0.2
	Overnight	32.4	16.2	32.5	+0.1

(1) It is noted, that the level of noise generated by a wind turbine is dependent on the speed of the wind. Given this, the noise levels presented within Table 10-11 above assume a worst case wind speed of 12m/s which accounts for the highest predicted noise levels.

(2) The cumulative total has been ascertained by logarithmically adding the noise level generated by the wind farm and the Specific level generated by the Houghton Main TRRC.

10.19.6 The assessment presented within Table 10-10 above indicates that the cumulative noise level generated by the TRRC and the wind farm would be between +0.1 and +1.0dB above the predicted levels for the wind farm alone. Changes in noise level of this magnitude would be considered imperceptible under normal listening conditions.

10.20 Proposed Mitigation

Construction Phase Mitigation

10.20.1 It is recommended that advanced consent to undertake construction works be sought from the Local Planning Authority in the form of a CoPA Section 61 Agreement or construction operations be controlled within the scope of a Construction Environmental Management Plan (CEMP) for the development.

10.20.2 These documents would require considering the following measures relating to the construction phase of the TRRC:

- Details of how the construction works are to be carried out. This is likely to include information regarding the proposed plant and equipment to be used, location of works, proposed hours of operation, duration of works, delivery schedules etc;
- Consideration of the likely levels of noise and vibration associated with the construction works (this is likely to involve a more detailed assessment in accordance with BS5228 once specific construction programmes and plant types have been identified); and,
- Consideration of measures to be taken in order to minimise noise and vibration impacts resulting from the construction works. This is likely to include information regarding any noise control measures, community liaison and monitoring schemes.

10.20.3 In addition it is also recommended that 'Best Practicable Means' be employed where possible within the construction works to minimise noise and vibration impacts. The following points contain advice with regard to reducing the impact of noise and vibration.

Plant and Equipment

- modern, silenced and well-maintained plant should be used at all times, conforming to standards set out in EU Directives;
- machinery, including vehicles, should be shut down or throttled back when not in use;
- engine compartments should be closed when equipment is in use and the resonance of body panels and cover plates should be reduced by the addition of suitable dampening materials. Any rattling noise should be addressed by the tightening of loose parts or the addition of resilient materials;
- semi-static equipment is to be sited and orientated as far as is reasonably practicable away from noise-sensitive receptors and to have localised screening if deemed necessary;
- Static plant known to generate significant vibration levels to be fitted with acoustic dampening;
- generators and water pumps required for 24-hour operation should be super-silenced or screened as appropriate;
- crane spindles, pulley wheels, telescopic sections and moving parts of working platforms should be adequately lubricated in order to prevent undue screeching and squealing; and,
- where possible mains electricity should be used rather than generators.

Methods of Working

- where practicable, pile caps should be cut and then broken with hydraulic rams to minimise the use of heavy air-powered breakers;
- burning equipment should be used in preference to cold cutting where possible; and,
- large concrete pours (for which an extension of working hours may be necessary) should commence as early as possible within normal working hours so that the activities can be completed within normal working hours as far as possible.

Management of Works Programme

- When considering operations with a significant risk of disturbance, i.e. piling, bund construction etc. a letter drop of local residents should be undertaken detailing the duration and type of works to be undertaken. The main contractor should provide a dedicated site contact (public liaison officer) regarding noise and vibration concerns, with their contact details being made available to all surrounding residents in the vicinity of the works;

- Wherever practicable, noisy works, which are audible at the site boundary, should be undertaken during normal daytime hours, e.g. between 07.00 and 19.00 Monday to Friday and between 07.00 and 13.00 on Saturdays;
- routes and programming for the transportation of construction materials, fill, personnel etc. are to be carefully considered in order to minimise the overall noise impact generated by these movements on the wider road network;
- personnel should be instructed on Best Practical Means measures to reduce noise and vibration as part of their site induction training;
- shouting and raised voices should be kept to a minimum e.g. in cases where warnings of danger must be given; and,
- The use of radios should be prohibited except where two-way radios are required for reasons of safety and communication.

10.21 Operational Phase Mitigation

10.21.1 Based upon the site layout, plant complement and noise levels, as well as the inherent mitigation measures (detailed within Appendix 10B), it is apparent that the proposed TRRC would conform to the criteria detailed by the LPA (L90 +3dB) and as such additional mitigation would not be necessary.

10.21.2 To summarise, the inherent mitigation assumed within the assessment of the proposed facility would include;

- The façade construction of the building envelopes have been assumed in all cases to provide an Rw sound reduction index of at minimum -38dB(A) based upon the usage of a standard cladding product (Kingspan KS 1000RW/40 including I (insulation) and L (perforated steel liner sheeting).
- The roof construction has been assumed to provide an Rw sound reduction index of at minimum -38 dB(A). This could be supplied by the use of a Kingspan KS 1000RW/30 or 50 both including I (insulation) and L (perforated steel liner sheeting).
- Noise associated with the 4No. ACC fans requires to be reduced by 6dB by appropriate acoustic or design measures from the level quoted by O-Gen UK Ltd:
- ACC Fans: 100dB (quoted level) – 6dB (required mitigation) = 94dB source level

10.22 Offsite Traffic Movements

10.22.1 With regard to noise associated with offsite vehicle movements, it is noted that impacts of negligible significance have been calculated. As such no mitigation measures are necessary within the design of the facility to control off site traffic nose.

10.23 Residual Affects

Construction Phase

10.23.1 The short term effects of the construction activities could result in significant impacts depending upon the works being undertaken at the time and the area in which they occur. With the implementation of the proposed temporary mitigation measures, careful consideration of the construction programme, and adherence to a CEMP or S61 agreement, the resulting impact significance will be reduced to within acceptable levels.

Operational Phase

10.23.2 The impacts of operational noise from the proposed facility, with the implementation of the incorporated mitigation measures as detailed within this Chapter and accompanying technical appendix, are predicted to be acceptable and are not, therefore, deemed to have an adverse effect on the amenity in the vicinity of the application site.

Offsite Traffic

10.23.3 The development of the site would result in changes in road traffic flow volumes in the vicinity of the site. Overall, these traffic flow changes are predicted to result in neutral impacts on the existing traffic noise levels of the area.

11 Chapter 11: Ecology and Nature Conservation

11.1 Introduction

11.1.1 This Ecology chapter considers the existing habitats, flora and fauna on, and within the potential zone-of-influence of the Houghton Main site. It will provide an assessment of the ecological and nature conservation impacts of the proposal to develop a 150,000 tonnes per annum Timber Resource Recovery Centre and associated infrastructure on part of the Houghton Main employment site and detail any necessary mitigation measures to be employed.

11.1.2 Enzygo Limited undertook a Preliminary Ecological Appraisal (PEA) of the whole of the allocated employment site at Houghton Main, which includes the current application site, in the winter of early 2014. This included an enhanced Phase 1 Habitat Survey and a problematic species audit. Whilst the PEA was undertaken outside the timing window that would be considered optimal (April to September in this case/location) for this type of survey it was considered crucial to obtain a baseline understanding of the ecological condition that would be supplemented by Phase II ecology surveys as the 2014 ecological survey season opened.

11.1.3 Phase II surveys were initiated in May 2014, to assess ecological impacts in more detail and at a suitable timing period. A full reptile presence/likely absence survey was conducted in acceptable survey conditions. During the repeat visits to the site, undertaken for the reptile survey, observations relating to nesting birds were also recorded. Further site visits were also made to conduct badger surveys within the proposed construction footprint and the immediate peripheries, and to assess the presence or absence of problematic species on site, in particular, Japanese Knotweed and Himalayan Balsam.

11.1.4 On the basis of the Phase II survey results and an additional habitat evaluation, recommendations have been made for appropriate mitigation in advance of proposed construction to comply with statutory legislation.

11.1.5 On the 27th March, 2012 the UK Government published its National Planning Policy Framework (NPPF)[8] – at the core of which is a presumption in favour of sustainable development. The NPPF, with immediate reflect replaces previously published Planning Policy Statements.

11.1.6 The NPPF deals with Conserving and Enhancing the Natural Environment in Section 11. NPPF states that the planning system should contribute to and enhance the natural and local environment by:

- protecting and enhancing valued landscapes, geological conservation interests and soils;

[8] National Planning Policy Framework. Department for Communities and Local Government . March 2012. ISBN 978-1-4098-3413-7

- 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.

11.1.7 The NPPF stipulates that the core presumption in favour of sustainable development is not applied in cases where the development requires Appropriate Assessment under the Birds or Habitats Directives. As this is not the case the presumption for sustainable development applies to this proposal.

11.2 Application Site Characteristics

11.2.1 The subject site is located approximately 1km west of Little Houghton and 6.5km east of Barnsley town centre. The site is relatively remote from any residential properties.

11.2.2 The site is well connected to the strategic highway network, with the both the A1 (M) and M1 approximately 9km away to the east and west respectively. Access to the motorway network can be gained using the A6195 and other A class roads linking to it. Similarly, a good class of road (A635) provides connection to Barnsley town centre.

11.2.3 Access to the site is from a spur off a roundabout (known as Houghton Main Colliery Roundabout) on the A6195 Park Spring Road. The existing access will be improved as part of the proposed development and tailored to suit the development proposals.

11.2.4 The site is bounded by the A6195 Park Spring Road to east and curved flood defence bunds to the north and west which follow the alignment of a disused rail line. The River Dearne runs in a north-south direction to the west of the site.

11.2.5 The site is brownfield land primarily vegetated with rough restored grassland. Some scattered shrubs and small trees are also present on the site. The site is flat except for the bunding at its northern and western boundaries.

11.2.6 The site was historically part of the Houghton Main Colliery Site and was reclaimed some time ago. The site was open cast mined by UK Coal in the late 1990s. Open casting was completed and the land was reclaimed and compacted to provide a platform suitable for industrial development.

11.2.7 The site is part of a larger allocated 'Employment Policy Area' (Policy DA3) and an 'Area of Investigation for Potential Employment Development' (Policy DA4) in the Barnsley Unitary Development Plan (UDP) (December 2000) (Saved Policies). The site is proposed as an

Employment Site (Policy proposal N2) in the current Draft Local Plan published in November 2014.

11.2.8 There is a large Distribution Centre, currently occupied by a clothing retailer, on adjacent land to the east and south east of the site. The warehouse was developed by Prologis and was constructed under Reserved Matters Approval 2005/1441 (which followed Outline Planning Permission B/03/0762/HR granted in 2003 for Class B1, B2 and B8 development of the site). The existing warehouse has recently been granted planning permission for an extension (ref: 2012/1018).

11.2.9 The proposed development site is approximately 3.0 hectares in area and is shown edged red on drawing PL002 Site Location Plan. The development of the site for the TRRC will create an energy generation facility with the potential to export 20MW of renewable electrical power, through the gasification of waste wood and virgin timber and to provide a direct heat and/or electrical supply to appropriate offtakers in the local area.

11.2.10 The TRRC will receive approximately 150,000tpa of biomass which may include construction and demolition waste timber and will subject it to a process that recovers clean ferrous and non-ferrous material for recycling and exports approximately 20MW of renewable electrical power.

11.2.11 The TRRC will be located on the western portion of the site. A parcel of land to the east of the application will be for promoted alternative, non-waste related uses with an adjoining land owner.

11.3 Methodology

11.3.1 The site had been subjected to an Enhanced Phase I Habitat Survey undertaken by SLR in 2012. The full report of this is attached in Appendix 11.1. Enzygo's Preliminary Ecological Appraisal (PEA) of the site in February 2014 refreshed the SLR assessment and checked baseline ecological conditions. A further visit was conducted by Enzygo Ltd in May 2014, when much of the vegetation on site would be visible, in order to avoid an underestimation of the conservation values of the site. Any revisions are outlined below. Enzygo's PEA and Phase II surveys are included in Appendix 11.2.

11.4 Preliminary Ecological Appraisal

11.4.1 In 2012, The Chartered Institute of Ecology and Environmental Management (CIEEM) published standard guidelines for the production of a baseline ecological survey of sites to be known as the Preliminary Ecological Appraisal (PEA). The PEA incorporates the Enhanced Phase I Habiat survey that has usually been offered as the preliminary ecological assessment as well as cementing the need for data searches of existing biological records, the analysis of habitat quality and the assessment of further evaluation that might be necessary.

11.4.2 The Phase 1 Habitat Survey element broadly follows the guidelines of the Joint Nature Conservation Guidelines (Handbook for Phase 1 habitat survey - a technique for environmental audit. JNCC 1990 – updated 2010). This provides a relatively rapid method of recording vegetation, as generic alphanumeric codes and colours represent habitat types. Areas of land are visited and mapped, with classification based principally on types and species of plants. Target notes are produced (to accompany the maps) and these are generally used to identify any further work, points of interest or special considerations.

11.5 Desk Study

11.5.1 Relevant ecological data including records of protected or rare species and designated sites for nature conservation (SSSIs and Nature Reserves etc) were requested for a designated study area defined as a 2 km radius around the site and the data search was presented to BMBC for officer verification purposes. It is a confidential document and so cannot be placed on the public register but de-sensitised summaries are included in the 2012 SLR report and Enzygo 2014 PEA.

11.5.2 The DEFRA MAGIC database http://magic.defra.gov.uk/ and Natural England's Nature on the Map database http://www.natureonthemap.naturalengland.org.uk/ were interrogated to confirm the presence and location of statutory designated areas within 2km around the proposed development site.

11.5.3 Barnsley Biological Records Centre was commissioned in 2014 for ecological information on protected species records of the site and also any non-statutory designations, which were present within 2km of the proposed development.

11.5.4 The desk study forms an important part of the ecology surveys, as it identifies local areas of protection or designation and also local ecological records, and identifies ecological receptors that might be directly or indirectly affected by a proposal.

11.5.5 The protected or designated areas are important to identify, as any development must be assessed specifically. The integrity of protected sites must not be affected by proposed development. Therefore, any European designations such as a Special Area of Conservation (SAC) or a Special Protection Area (SPA) that occur within 10km of the proposed site must be evaluated in line with the development plan. National designations within 2km of the development, such as legally protected Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR) should not normally be adversely affected. There are also non-statutory designations such as Sites of Importance for Nature Conservation (SINCs), County Wildlife Sites (CWS) and Ancient Woodland, which also need to be evaluated within the context of the development proposal.

11.6 Legislation and Designations

11.6.1 The following legislation and designations have been fully considered in the preparation of this assessment. While some of this information is now proceeded and other sets are not

necessarily directly geographically relevant the mass are considered for the good practice that might still be drawn from them.

- European Law For The Protection Of Species
  - *EC Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (EC "Habitats Directive").*
  - *Council Directive 79/409/EEC on the conservation of wild birds (the 'Birds Directive')*
- UK Law For The Protection Of Species
  - *Conservation of Habitats and Species Regulations SI 2010/490. Part of the legal framework set up to conserve natural habitats and wild flora and fauna. Also implements parts of the Marine and Coastal Access Act 2009.*
  - *Conservation of Habitats and Species (Amendment) Regulations SI 2011/625. Makes technical changes to the way that government authorities carry out their duties.*
  - *Wildlife and Countryside Act 1981(as amended). Bans certain methods of killing or taking wild animals, including birds, and restricts the introduction and sale of certain non-native animals and plants. Provides fundamental species protection for a selection of flora and fauna.*
  - *Countryside and Rights of Way Act 2000. Sets out rules on countryside public access, rights of way, driving vehicles off road, nature conservation and protecting wildlife and areas of outstanding natural beauty. It also enables traffic regulation orders to be made to conserve areas of natural beauty.*
  - *Environmental Damage (Prevention and Remediation) Regulations SI 2009/153. Requires polluters to prevent and repair damage to water systems, land quality, protected sites, species and their habitats.*
  - *Marine and Coastal Access Act 2009. Introduced a new system for managing and protecting the marine environment, including the Marine Maritime Organisation (MMO) and new marine planning and marine licensing systems. Allows the designation of marine conservation zones.*
  - *Natural Environment and Rural Communities Act 2006. Establishes Natural England as the main body responsible for conserving, enhancing and managing the natural environment. It also covers biodiversity, pesticides harmful to wildlife and the protection of birds.*
- Non-Statutory Designations Of Species
  - *Biodiversity Action Plan*

- *Birds of Conservation Concern 2002-2007*

- *UK Guidance*
  - *National Planning Policy Framework NPPF (Mar 2012)*
  - *Former PPS9 - Biodiversity & Geological Conservation (August 2005 now superseded by NPPF)*
  - *Circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within The Planning System (August 2005)*
  - *Planning for Biodiversity and Geological Conservation: A Guide to Good Practice (March 2006*
  - *Planning Policy Wales – Chapter 5 (Edition 3, July 2010)*
  - *Technical Advice Note 5: Nature Conservation and Planning (September 2009)*
  - *Valuation of Ecosystem services - DEFRA*
  - *Ecosystems Approach Action Plan – DEFRA*
  - *Joint Nature Conservation Committee website - information about protected species*
  - *Defra Website - Biodiversity Information*
  - *Guidance for Public Authorities on Implementing the Biodiversity Duty*
  - *Guidance for Local Authorities on Implementing the Biodiversity Duty*
  - *Wales Biodiversity Partnership Checklists and Guidance*
  - *Local Sites - Guidance on their Identification, Selection and Management (Defra, February 2006)*
  - *Conserving Biodiversity – The UK Approach (Defra, October 2007)*
  - *The Birds and Habitats Directives: Outline Government Position (May 1998)*
  - *The Planning Response to Climate Change: Advice on Better Practice (ODPM) (September 2004) - Biodiversity pages 52-56*
  - *Conserving biodiversity in a changing climate: guidance on building capacity to adapt (Defra, May 2007)*
  - *Ecological Impact Assessment Guidelines (IEEM, July 2006 – currently under review)*
  - *PINS Notes*

- *LDF Note 3/2006 - PPS9 Biodiversity and Geological Conservation*

- International Designations For Habitats
  - *Ramsar Sites*
- *E*uropean Designations For Habitats and Species
  - *Special Areas of Conservation*
  - *Special Protection Area*
- UK Designations For Habitats
  - *Statutory*
  - *Non statutory*

11.7 Terminology

11.7.1 Potential impacts affecting ecology and nature conservation on and around the site are identified and discussed. The impacts of development on the surrounding area, especially designated sites are considered along with any impacts on species recorded in the desk study.

11.7.2 The ecological impact assessment methodology is taken from the standard guidelines of the Institute of Ecology and Environmental Management (IEEM). The following terms describe the magnitude and significance of an impact on ecology.

Table 11.1: Ecological Impact Magnitude – Magnitude Examples

High	Loss of 50% or more of a habitat or species from the site; Other effects (e.g. disturbance or damage arising from pollution) including indirect impacts having an adverse impact equivalent in nature conservation terms to a loss of 50% or more of the habitat or species.
Medium	Loss of 20-49% of a habitat or species from the site; Other effects (e.g. disturbance or damage arising from pollution) including indirect impacts having an adverse impact equivalent in nature conservation terms to a loss of 20-49% or more of the habitat or species.
Low	Loss of 5-19% of a habitat or species from the site; Other effects (e.g. disturbance or damage arising from pollution) including indirect impacts having an adverse impact equivalent in nature conservation terms to a loss of 5-19% or more of the habitat or species.

Very Low	Loss of less than 5% of a habitat or species from the site; Other effects (e.g. disturbance or damage arising from pollution) including indirect impacts having an adverse impact equivalent in nature conservation terms to a loss of less than 5% of the habitat or species.

Table 11.2: Ecological Impact Significance - Significance Examples

Major	Adverse effects upon the integrity of an internationally designated site; Permanent loss affecting the ability of the site to support an internationally important habitat and its associated species; Permanent loss of any protected or nationally important rare species (as defined in Schedules 5 and 8 of the Wildlife and Countryside Act 1981 and the IUCN Red Data Book) through loss of habitat, severance or disturbance; Permanent loss of some or all of a priority habitat or species, as defined in the EU Habitat Directive, such as that the presence of the species or the integrity of the habitat is threatened; Permanent loss to those resources within a site of national importance where the presence of those resources was the reason for the site's designation.
Moderate	Damage to an international or national site that comprises the ability of that site to support the habitats or species for which it was notified, but partial or total recovery is likely soon after cessation of the impact; Permanent loss of nationally scarce species (as defined in the Red Data Book) through loss of habitat, severance or disturbance; Damage to a priority habitat or species but recovery is likely soon after cessation of the impact
Minor	Affects a small part of a site of international or national importance and to such a limited extent that the key elements of the ecosystem are sustained fully; Negligible or insignificant impacts on protected or rare species or their habitats, such that their populations on site or the habitat available is not measurably affected; Permanent loss of or damage to a habitat or species that has local conservation value.
Very Minor	No measurable adverse impact on a site of international or national significance or protected or rare species or their habitats; Loss of or damage to a habitat or species that has minimal local conservation value.

11.8 Mitigation

11.8.1 Mitigation measures are detailed where deemed necessary to ensure that adverse effects resulting from the development are minimised.

11.9 Baseline Conditions

Site and surrounding area

11.9.1 The approximate site centre is located on National Grid Reference SE 41693 06444, and is:

- The site is located approximately 1Km from the village of Little Houghton South Yorkshire. The nearest postcode available for the site is S70 5EX
- The site was previously used for open cast mining in 2001, however upon ceasing works; efforts were made to encourage site restoration.

Photograph 11.1: View of the site, towards the north-east.

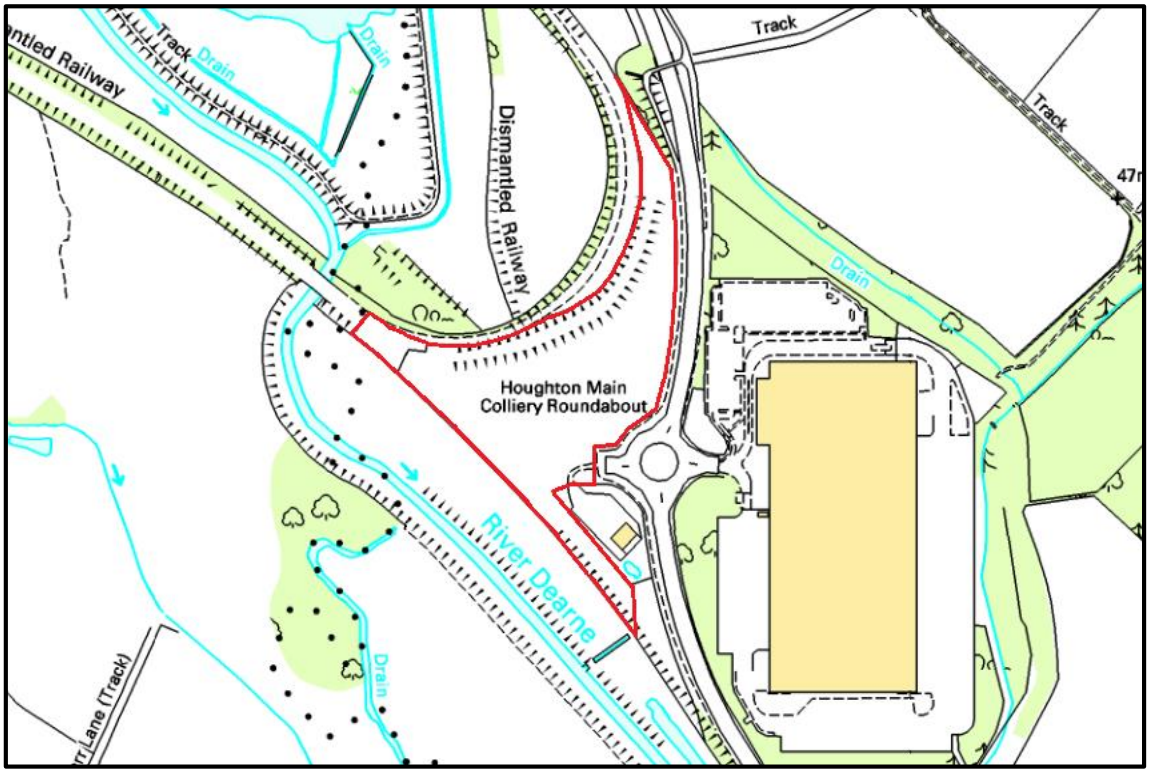
11.9.2 The northern boundary of the site is comprised of a dismantled railway curve bund and a secondary bund associated with the infill of the open cast workings, boarded by a sparse immature hedgerow. The eastern edge of the site is comprised of wire fence and immature blackthorn hedge which separates the site from the A4195 (Park Spring Road). The south of the site is boarded partly by a new electricity generating compound, which utilises the same access point as the proposed site. Finally the western boarder of the site is made up of fencing and an intact hedgerow.

11.9.3 Beyond the site runs the River Dearne parallel to the south–west boundary of the site from the north western corner of the site.

11.9.4 Beyond the immediate peripheries, the site is boarded by arable grassland (to the west) and a Dearne Valley RSPB reserve to the north, separated from the site by a small semi improved grassland field, with sparse scrub and plantation woodland. Towards the east is a large, and well used warehouse/distribution centre.

11.9.5 The red-line boundary of the site is shown on PL002 Site Location Plan. Figure 11.1 below shows the redline boundary of a previous planning application submitted to BMBC in May 2014 for the same and additional development (planning application reference 2014/0559). As referred to above, the PEA and Phase II surveys were undertaken for the whole of this site.

Figure 11.1 Boundary of the site on which ecological surveys have been undertaken, incporating the application site and adjoining land.



11.10 Designated Sites

Statutory

11.10.1 There are no internationally designated sites within 2km of the site.

11.10.2 There is one nationally designated site within 2km – the Carlton Main Brickworks Site of Special Scientific Interest (SSSI). This is a geological SSSI located at NGR SE 412 081 and is not considered further in this chapter.

11.10.3 There is one designated Local Nature Reserve (LNR) within 2km of the site – West Haigh Wood. The LNR is part of a larger Natural Heritage Site (NHS)

Non-Statutory

11.10.4 The consultation with Barnsley Biological Records Centre highlighted the following NHS sites within 2km of the site:

- Edderthorpe Ings
- West Haigh Wood (also see above)
- Sunny Bank, Horse Carr and Storrs Wood
- Houghton Marsh (Candidate Site)

11.10.5 The NHS sites are locally designated sites (by the Local Authority) and represent sites that whilst not meeting nationally important criteria are ecologically important at the local/county scale and may be afforded further protection through planning. The published site descriptions are attached in Appendix 11.1. Both Edderthorpe Ings and Houghton Marsh are currently managed by the Royal Society for Protection of Birds (RSPB) and are within close proximity (<200m) of the site.

11.10.6 The site lies within the Dearne Valley Green Heart 'Nature Improvement Area', for which BMBC have given a commitment to require biodiversity enhancements on new developments. Whilst this policy is being developed the LPA is encouraging developers to incorporate enhancements (as well as the current requirement to mitigate for losses) into any proposals.

11.10.7 The Planning Authority Biodiversity Officer has indicated that the site may be important for lower plant species.

11.10.8 The MAGIC database search confirmed the site status in the area.

11.11 Protected species

11.11.1 The 2km BBRC data search has revealed the following protected species within the search area:

- Water vole Arvicola amphibious
- Otter Lutra lutra
- Daubenton's bat Myotis daubentoni
- Common pipistrelle bat Pipistrellus pipistrellus
- Noctule bat Nyctalus noctula
- Viviparous lizard Lacerta vivipara

- Smooth newt Triturus vulgaris

11.11.2 In addition the Barnsley Biodiversity Officer has informed Enzygo that they consider grass snake *Natrix natrix* to likely be present on site (a potential that Enzygo also reached from its PEA survey).

Great Crested Newt

11.11.3 The site itself contains no water-bodies, or habitats which are suitable to support breeding amphibians. However, there are 5 water-bodies in 500m of the site boundary. Upon assessment only one of the water bodies was identified to hold potential for supporting amphibian species.

11.11.4 There are 12 records of amphibians within the 2km buffer area of the site, 5 records of common toad (Bufo bufo), 2 records of common frog (Rana temporaria) and 5 records of smooth newt (Triturus vulgaris).

11.11.5 It is recommended that if third party access can be obtained, a survey to determine the presence/likely absence of great crested newts, this can be facilitated by eDNA testing of the pond be conducted to further confirm the presence/absence of the species.

Badgers

11.11.6 The site provides very limited foraging habitat for badger along its peripheries.

11.11.7 Searches were made for any evidence of use of the site and peripheries by badgers, including any signs of setts, "push-throughs", foraging signs, latrines and well-worn paths. The site itself offers few resources to support a badger (Meles meles) population and no setts were located on site. Further there was limited secondary evidence to suggest a badger population is utilising the site, such as no obvious scratching posts, signs of foraging, dung and latrines or badger hairs in caught in any of the boundary fences. There was evidence of animal tracks and paths cutting from the south to east of the site however this cannot be confidently identified to species level.

11.11.8 There are no records of badgers within the 2km buffer zone of the site area.

11.11.9 The European badger is protected by the Protection of Badgers Act, 1993, which makes it a criminal offence to:

- Wilfully kill, injure, take or possess, or cruelly ill-treat a badger, or attempt to do so;
- Interfere with a sett by damaging or destroying it;
- Obstruct access to, or any entrance of, a badger sett;
- Disturb a badger when it is occupying a sett.

11.11.10 The legislation to protect badgers arises from a desire to control persecution of the species rather than for nature conservation purposes- the native badger population is not any threat as such

11.11.11 A walkover survey for badgers was conducted across the site in the summer of 2014. This includes a search for a number of characteristic fields signs, listed in paragraph 1.11.6, and most importantly a search for any badgers setts on the site and in all accessible areas beyond the site. In this case, the site is taken to mean anything within the surveyed site shown in Figure 11.1 and the sites immediate peripheries out to 30m.

11.11.12 The survey was not constrained, and unrestricted access was granted to the entire site. The survey was undertaken over two days in June 2014 during the optimal survey window by the Director of Ecology and a field assistant.

11.11.13 The survey revealed no evidence of badger setts or activities on site and it is assessed that it is not necessary to seek a disturbance licence for badgers from Natural England to continue with the development works. However, due to the restrictions encountered during the survey as a result of vegetation obstructions, it is recommended that a suitably qualified ecologist is present on the site during vegetation clearance to supervise works and supply alternative advice if any badgers setts or field signs are revealed or encountered.

Bats

11.11.14 There is limited roosting potential within the site itself due to the immaturity of the trees located throughout; however there is some potential within the wider environment and immediate habitats. The mature woodland at the northern boundary of the site and beyond the site boundary has potential for bat roosts in the form of old woodpecker holes, cracks and crevices. There is also roost potential for bats within the bridge over the River Dearne and limited potential for bats within the electricity compound to the south of the site.

11.11.15 There are 15 records of bat species within the 2km search buffer from the sites peripheries, 7 of the records are made up of pipistrelle species (Pipistrellus spp.) sightings, the most recent in 2005. There is also one record of a noctule bat (Nyctalus noctula) and a record of a Daubenton's bat (Myotis daubentoni) within the buffer area; both were noted over a decade ago. The remaining records are comprised of bat records which could not be identified to species level.

11.11.16 In order to gauge the baseline bat activity over the site a standard bat activity survey was undertaken in accordance with 2nd edition Bat Conservation Trust (BCT) Guidelines. The survey was conducted in May and June 2014, commencing half an hour before sunset and concluding two hours after sunset. The surveys were conducted in favourable weather conditions and were unconstrained.

11.11.17 On both survey occasions bat activity was low. Of all the bat detections, recorded by broadband bat detectors, the majority were recorded on the transect which extended beyond the site, along the old railway line, to the river Dearne railway bridge.

11.11.18 Only three bats were recorded over the site boundaries. Two of these recordings were in May and one in June. All the bats detected on site have been identified as common pipistrelles (Pipistrellus pipistrellus), commuting across the site.

11.11.19 Beyond the red-line boundary, along the old rail track, three species of bat were detected. These were the common pipistrelle, the soprano pipistrelle (Pipistrellus pygmaeus) and the Daubenton's bat (Myotis daubentonii). It is estimated that ~5 beats of each species were foraging around the bridge and along the Dearne riparian corridor. The site is assessed as being a minor commuting area for relatively common bat species. No evidence of bat roosting was located and the activity across the site is judge as very low.

11.11.20 The river Dearne is not surprisingly a bat corridor, but the proposals are not expected to impact this area, and light pollution should be minimised by topographical shielding and appropriate external lighting design.

Reptiles

11.11.21 The site offers areas of good quality reptile habitat (rough grassland, hedgerows and scrub habitat), with good connections to further suitable habitat, through the dismantled rail corridor and the river Dearne riparian corridor.

11.11.22 The data search provide a single record of a reptile, viviparous lizard (Lacerta vivipara) within 2km of the site, this was approximately 1km away from the site boundary directly along the rail corridor.

11.11.23 There are six native reptile species within the UK. Four of these are relatively common- the common lizard (Zootoca vivipara), slow-worm (Anguis fragilis), adder (Vipera berus) and grass snake (Natrix natrix). These species enjoy limited protection under the Wildlife and Countryside Act 1981, by virtue of subsections 9(1) and 9(5) and as such are protected against killing, injury and trading.

11.11.24 The two rarer native reptiles in the UK are the sand lizard (Lacerta agililis) and the smooth snake (Coronella austriaca). These species are European Protected species that enjoy further protection under the Conservation Regulations. These two species are no known to be present in the South Yorkshire area and are generally found on sandy heathland and dunes in the south of England. However, for the purposes of this survey their potential presence was not discounted.

11.11.25 An extended reptile presence/likely absence survey was conducted in May/June 2014 under optimal survey conditions, and was not considered to be limited or restricted in any way.

11.11.26 The grassland available to the surveying effort was restricted to 60% of the site; however, this area was deemed the most suitable for any reptiles utilising the site and was not considered to restrict or limit the survey results.

11.11.27 There were 3 reptiles seen on site during the surveying effort, where 2 of the individuals were confidently identified as a common lizard and a grass snake, the final animal could not be identified confidently, however it was believed likely to have been a juvenile grass snake.

11.11.28 In order to develop the site it will be necessary to ensure that the reptiles within the construction footprint are not harmed or injured. The normal methodology to ensure this, would be to seal the construction footprint with herptile fencing, and remove the reptile

population by systematic trapping to a receptor site, either on site, or to land adjacent to the site boundary.

11.11.29 This process would be undertaken prior to, but as close to the commencement of construction as appropriate. However, it will be necessary to undertake substantial ground contamination investigations on the site which will be intrusive, the reptile removal will be synchronised to be in advance of that operation (which in itself will have the potential to pose a risk to the reptile population).

11.11.30 The erection of herptile fencing and installation of pitfall traps and roofing felt refugia will be constructed on site as appropriate. A trapping effort of between 2 months and 2 years, depending on the assessed levels of reptile population on site will be applied. The previous population assessment, conducted in support of this assessment has suggested a low-level population of reptiles are present on site, and their distribution is somewhat patchy.

11.11.31 The current intention is to utilise an open-ended approach to trapping effort. It is considered that this approach is reasonable and that it favours the variable conditions that will be encountered on the site. The open-ended approach has the benefit of allowing areas to be opened for work as quickly as possible where areas are clear of animals and yet provides for increased trapping effort where the animal numbers so demand it.

11.11.32 It is proposed that an off-site receptor area be utilised. The reasons for this are that the amount of suitable reptile habitat will be significantly restricted after construction and therefore the potential of holding reptiles on site and then releasing them after the build to disperse back of the site is discounted. It is considered that the best approach will be to identify a suitable translocation area with the RSPB, who are co-ordinating a sequence of local wildlife reserves and biodiversity improvements in the wider locale, including two sites in close proximity to the proposals.

11.11.33 It is currently envisaged that habitat enhancement measures will be carried out in receptor areas to increase their holding capacity for reptile and amphibian species. This will take into account both any animal that may already be present in the areas and the artificially elevated densities of animals that will be concentrated into these areas. Depending on the catch numbers, the need to extend the receptor areas, or open new ones shall be continually evaluated by the ecologists on site.

11.11.34 Site enhancement measures expected, will include:

- Part-buried rubble hibernacula will be created in the receptor area,
- The mosaic nature of the habitat will be strengthened through scrub and grassland planting,
- Vegetation mounds, arising from cleared vegetation, are to be placed to form nesting habitat for grass snakes.

11.11.35 Prior to construction a detailed scheme showing reptile fencing and confirmed receptor location, including manipulation and details surrounding the above mitigation processes will be submitted to the LPA for approval.

Nesting birds

11.11.36 With the site boundaries a number of nests seen within the hedgerows, introduced shrub and scrub on site expected to contain nesting common farmland birds. A number of species were seen on site Eurasian magpie (Pica pica), European robin (Erithacus rubecula), great tit (Parus major), blue tit (Cyanistes caeruleus), herring gull (Larus argentatus), wood pigeon (Columba palumbus) and jackdaw (Corvus monedula) on the site during the survey period. The site offers a good range of habitats for nesting bird species, particularly the peripheries.

11.11.37 The wider environment is considered of national and county importance for a large number of bird species. Within the 2km buffer zone, there are over 250 records of 28 bird species that are included on the "Birds of conservation concern 32 red list and 700 records of 67 bird species noted on the amber list (see Enzygo PEA Report for full summary)

11.11.38 During the visits undertaken to check for reptiles the ecology team performed checks for nesting bird activity across the site. The site contains minor nesting habitat. Bird activity was observed on all occasions, but it was clear this was limited, and generally comprised of common woodland and garden bird species.

11.11.39 The following is a potted summary of observed birds on site. A single grey heron (Ardea cinera), a buzzard (Buteo buteo), a black-headed gull (Larus ridibundus), lesser black-backed gull (Larus fuscus) and a herring gull (Larus argentatus) was seen flying over the site. A wren (Troglodytes troglodytes), a robin (Erithacus rubelcula), song thrush (Turdus philomelos), blackbird (Turdus merula), great tit (Parus major), blue tit (Cyanistes caeruleus), long tailed tit (Aegithalos caudatus), house sparrow (Passer domesticus) and chaffinch (Fringilla coelebs) were recorded along the peripheries. A magpie (Pica pica), carrion crow (Corvus corone), jackdaw (Corvus monedula) and a jay (Garrulus glandarius) were seen across the site.

11.11.40 It is not considered that the site is ornithologically valuable and in particular relative to the broader locale which has some significant ornithological sites.

11.11.41 Inevitably there is some nesting activity on site but it is considered that this can be dealt with through planning conditions, which will restrict vegetation removal to outside the nesting season of March to August, inclusive. Or failing that, ensure that it is conducted under the direct supervision of an ecologist to ensure that birds, eggs and nests are not harmed or disturbed by construction works.

11.12 Problematic Species Assessment

11.12.1 A problematic species assessment was conducted by SLR in March 2012, which identified and established stand of Himalyan balsam (Impatiens glanduliffera) along the banks of the river Dearne, beyond the site boundary.

11.12.2 "Biosecurity" is the protection afforded from the risks posed by organisms to their economy, environment and public health; through exclusion, eradication and control. The International Union for the Conservation of Nature (IUCN) has stated that one of the major threats to native biological diversity is now acknowledged by science and the government, to be a biological invasion caused by non-native species.

11.12.3 Under the Wildlife and Countryside Act (as amended) 1981, there is a provision that any person that releases or allows to escape into the wild any animal which:

- is of a kind which is not ordinarily a resident in and is not a regular visitor to the UK in a wild state; or
- is included in Part 1 of Schedule 9, shall be guilty of an offence.

11.12.4 No signs of any problematic species were found within the construction footprint and the site boundaries. The site was inspected at optimum growing time and when most species would reasonably expected to be at peak growth, or obviously visible.

11.12.5 The survey is an above surface examination only.

11.12.6 Particular attention to patches of fly-tipped material present on site was made as these are often precursors of wilder site contamination.

11.12.7 The Himalayan balsam within the Dearne riparian corridor appears to be restricted to the corridor itself, as described by SLR in 2012. There are no current signs of it spreading towards the site, although there is no physical barrier to prevent it doing so.

11.12.8 As the site is free from contamination at the time of the survey, no further considerations need to be given at this stage. The nearest route for the spread of contamination onto the site is the Himalayan balsam identified in the river corridor. It is recommended that the operator be vigilant to this risk, and that ground managers undertake period inspections of the site boundaries and be prepared to use herbicidal spot-spraying if the site does become threatened by encroachment.

11.13 Results and Assessment

11.14 Enhanced Phase I Habitat Survey

11.14.1 There is an approximate 45% covering of scattered scrub (A2) on site. The dominant species is immature sliver birch (Betula pendula), with occasional examples of goat willow (Salix caprea) and oak species (Quercus) scattered throughout.

11.14.2 The second prevalent habitat on site is restored poor semi-improved grassland (B6) across around 40% of the site. A second walkover assessment in May 2014 revealed several patches of orchid spikes along the track-way along the south eastern end of the site.

11.14.3 There is approximately 0.12 hectares of broadleaved wood land (A1) in the far north-western corner of the site comprised of crack willow (Salix fragilis), hawthorn (Crataegus monogyna), blackthorn (Prunus spinosa) and small quantities of elder (Sambucus nigra). The understory was comprised predominantly of bramble (Rubus fructicosus) and common nettle (Urtica dioica).

11.14.4 During the assessment conducted in February 2014, a small area (approximately 5%) of acid flush (E2.1), identified towards the centre of the site, comprised of species of sphagnum moss (Sphagnum sp.) and bulrush species (Typha sp.) The second walkover assessment in May 2014 revealed this area is better described as marshy grassland (B5), although it possess characteristics of both habitat blocks. These are best-fit descriptions, as these areas are likely to be reflections of previous site reclamation works. It is likely that the reclaimed soils used during the restoration of the site will have been compacted, and this has resulted in the presence of sphagnum mosses in the local patches of land with perched water-tables which have come to take on the habitat structure associated with marshy grassland. Nonetheless, this mosaic of wetter grassland does possess and intrinsic nature conservation value which is assessed to be notable at a local or county level.

11.14.5 The marshy grassland on site is unlikely to be sustainable, if the site were able to continue its ecological succession it will tend towards woodland very rapidly with a loss of the majority of the marshy grassland habitat block.

11.14.6 Immediately alongside the northern boundary is an area (~0.71 hectare) of mature semi natural broadleaved woodland, situated between the proposed site and the River Dearne. The woodland was comprised of similar species as the area of woodland on site, with occasional mature silver birch and ash (Fraxinus excelsior).

11.14.7 The western border of the site is comprised of hedgerow with trees (J3.2) emerging from woodland at its northern most point and becoming increasingly defunct towards the south of the site. The hedgerow is comprised both mature and immature specimens of silver birch, goat willow, oak, elder, hawthorn, blackthorn and hazel (Corylus avellena).

11.14.8 The eastern border of the site is made up of defunct immature hedge (J2.2) comprised of chiefly of blackthorn (Prunus spinosa).

11.14.9 A small section to the south of the site, surrounding the electricity generating compound, is made up of introduced shrub (J1.4).

11.14.10 The wider habitat includes areas of plantation woodland (A1) at the sites north eastern corner, standing water (G1), running water (G2) (River Dearne) and semi-improved grassland.

11.14.11 The habitat present is considered to possess a low ecological value but may be of local importance particularly as linking habitat. The site may be important for lower plant species and this needs to be verified by survey. Also the presence of problematic plant species needs to be checked by survey

11.14.12 The habitat on site is generally species-poor and impoverished. The ecological impact resulting from losses or changes to the habitat is currently assessed as Very Low, Very Minor. However, it is recommended that an effort could be made to save the best blocks of habitat on site through "cherry-picking" and within site translocation to the site margins. Turfs can be cut from the most diverse sections of the marshy grassland and taken to wetland habitats created on site. A pre-commencement protocol will be submitted to the LPA detailing the translocation protocol. Furthermore cores of orchid spikes will be rescued and translocate to this area, and introduced into the planting zone by plug planted. Whilst it may be possible to save a proportion of the better habitat present on site in this way, the potential for on-site ecological preservation and enhancement is very limited.

Fauna

11.14.13 The following table summarises the presence/likely absence of onsite based on the SLR 2012 and Enzygo 2014 PEA surveys and data searches:

Species	Presence-likely absence	Notes
Breeding birds	Expected to be present	Breeding Bird Survey underway in May 2014 as part of Phase II Ecology Surveys
Bats	Likely-absence of roosts	Commuting/foraging possible – bat activity to be surveyed to BCT standard May to July 2014
Badgers	Likely-absence of setts	Owing to dynamic nature of badger populations should be re-surveyed for within 6 months of construction.
Reptiles	Expected to be present	Reptile presence/likely absence survey underway in April/May 2014
Great crested newts	HIS scores indicate possible presence in off-site ponds	If third party access is granted ponds to be checked using eDNA tests in May/June 2014

11.15 Designated Sites

Statutory Sites

European/Nationally Important Sites

11.15.1 There are no sites of international importance or national importance such as SPAs, SACs or SSSIs within the proposal site boundary.

11.15.2 The likelihood of risk pathways leading to indirect impacts on European sites or national sites has been considered and is discounted.

European/national site	Existence of risk pathways	Notes
Carlton Main Brickworks SSSI	No	Site is geological SSSI

11.16 Air Emissions

11.16.1 The impacts of air emissions are evaluated and detailed in Chapter 8. The broad conclusion is that air emission impacts are negligible and that they pose no risk to statutory or non-statutory designated nature conservation sites beyond the site boundary.

11.17 Hydrological Impacts

11.17.1 The residual impacts of the proposals to water resources is considered in Chapter 7 and it is assessed that there no significant risks to surface or ground water resources in the catchment and no risk of the transfer of contamination to remote sites beyond the boundary.

11.18 Noise Impacts

11.18.1 The impacts of air emissions are evaluated and detailed in Chapter 10. The proposals will not generate noise impacts that will have any significant effect on sensitive ecological receptors beyond the site boundary.

11.19 Landscaping

11.19.1 Landscaping proposals are dealt with in Chapter 9.

11.20 Vermin

11.20.1 The TRRC will import prepared biomass from commercial and industrial waste wood and some virgin timber sources. There should be no risk from the operation generating vermin species (particularly avian species) and no risk to designated sites beyond the site boundary.

11.21 Conclusions

11.21.1 There are no sites of international importance such as SPAs or SACs within the Application Site boundary or within a zone of influence of the site.

11.21.2 There are no non-statutory designated sites of nature conservation importance within the Application Site. The nearest designated site is Edderthorpe Ings which is approximately 200m north of the zone of influence of the proposals. The development footprint is entirely secluded from Edderthorpe Ings by curved flood defence bunds running adjacent to the disused railway, resulting in no “line of sight” for any avian species at the sites waterbody. There is no waterbodies on site suitable of supporting wetland bird species in the winter

months. The physical barrier present between both sites will provide a buffer for disturbance from noise at the development of the site. It is considered unlikely the proposed development will impact the designated sites and/or species found within.

11.21.3 Protected faunal species have been identified through Phase II ecological evaluations, conducted within optimum timing windows. Appropriate mitigation measures have been recommended, and can be further developed through planning conditions to protect species found on site.

11.21.4 The habitat on site does not possess intrinsic ecological value, which has been further confirmed by an extended assessment in the spring/summer of 2014, which looked for valuable lower plant species, and the presence/likely-absence of problematic invasive species such as Japanese knotweed and Himalayan balsam.

11.21.5 In conclusion, all relevant ecological issues have been addressed within this Environmental Statement. The proposals are not considered to generate any significant lasting impacts, either direct or indirect, upon ecological receptors. Landscaping improvements are likely to generate a minor improvement to the site ecology by providing new niche habitat and foraging opportunity and it is considered that there are opportunities to strengthen the general ecological value of the broader locale. Proposed landscaping through planting, particularly around the site peripheries will seek to increase connectivity to the wider environment, providing wildlife corridors for many terrestrial mammal species, particularly for Edderthrope Ings Nature Reserve to the north.

11.21.6 Additional land, made available by adjacent land owners, is to be utilised as land for the creation of semi-naturalised grassland, with wet wildflower meadows. It is proposed to create ponds containing indigenous plants, as receptors for preserved plant species.

11.21.7 A potential receptor site for reptile translocation has been identified in land to the immediate west of the site. A Unilateral Undertaking Agreement which was prepared in support of the previous application 2014/0559 could be applied to the revised proposals and would facilitate a financial contribution to BMBC for ecological improvements within the Dearne Valley NIA. Discussions were held previously with officers of the Dearne Valley Green Hart Partnership over ways to improve the ecology of the site for receiving translocated animals.

11.21.8 The main biodiversity enhancement proposed within the landscaping works is the wildlife pond area (Please refer Chapter 9 of the ES and the LVIA Appendix 9 Volume 3 of the ES).

12 Chapter 12: Hydrology and Ground Conditions

12.1 Introduction

12.1.1 This chapter provides a description of ground and groundwater conditions, including mining assessment for a proposed Renewable Energy Centre.

12.1.2 The nature and significance of potential impacts are assessed against baseline conditions for the site.

12.2 Background

Proposed Development

12.2.1 Section 3.2 provides further details of the proposed development.

12.3 Methodology

12.3.1 "Contaminated Land" is defined under the Environmental Protection Act as "any land which appears to the local authority in whose area it is situated to be in such condition, by reason of substances in, on or under the land, that:

- Significant Harm is being or there is a significant possibility of such harm being caused, or
- Pollution of Controlled Waters is being, or likely to be caused".

12.3.2 Assessment of contamination uses a risk based approach to determine risk of harm or pollution of controlled waters and is based on a pollutant linkage being present. This requires the presence of:

- Source of Contamination;
- Pathway for the contaminant source to move to the receptor; and
- Receptor affected by the contaminant, such as human beings, controlled waters, ecology or the built environment.

12.3.3 Ground instability is assessed using professional judgement and reference to Codes of Practice and guidance documents including, but not limited to:

- Eurocode 7: Geotechnical Design (1995);
- British Standards BS8004 Code of Practice for Foundations (1986);
- British Standards BS6031 Code of Practice for Earthworks (1981); and
- CIRIA Special Publication 32 Construction Over Abandoned Mine Workings (1984).

12.4 Methodology

12.4.1 The site conditions have been assessed based on a Phase I Environmental and Mining Report together, Hydrogeological Desk Study and Contamination Assessment, which includes an intrusive ground investigation. Impacts of the development are based on the details of the proposed development.

12.5 Assessment of Significance

12.5.1 The site conditions have been assessed based on a Phase I Environmental and Mining Report, Hydrogeological Desk Study and Contamination Assessment. Impacts of the development are based on the details of the proposed development.

12.6 Assessment of Significance

12.6.1 The approach followed during the assessment considered the degree (of the "significance") of the potential impacts on the geological, hydrogeological and hydrological characteristics of the Site.

12.6.2 The significance has been defined taking into account the sensitivity of the receiving environment or structure and the potential magnitude of the impact.

12.6.3 The sensitivity of the receiving environment, i.e. its ability to absorb the impact without perceptible change is defined in Table 12.1.

Table 12.1 Definition of Sensitivity

Sensitivity	Definition
Very High	High quality and rarity, regional or national scale and limited potential for substitution/replacement. End users who are more vulnerable. Structures which are easily damaged and cannot be repaired.
High	Receptor with a high quality and rarity, local scale and limited potential for substitution/replacement or receptor with a medium quality and rarity, regional or national scale and limited potential for substitution/replacement. End users who are vulnerable. Structures which are easily damaged but can be repaired.
Medium	Receptor with a medium quality and rarity, local scale and limited potential for substitution/replacement or receptor with a medium quality and rarity, regional or national scale and limited potential for substitution/replacement. End users who are vulnerable. Structures which are easy to repair.
Low	Low quality and rarity, regional or national scale and limited potential for substitution/replacement. End users who are less vulnerable and. Structures which are difficult to damaged and easy to repair.

12.6.4 The magnitude of the effect includes the timing, scale, size and duration of the potential effect. For the purpose of this assessment the magnitude criteria defined in Table 12.2 are used.

Table 12.2 Definition of Magnitude

Magnitude	Definition
Major	Severe detrimental effect on human health. Permanent detrimental effects on animal or plant populations. Permanent detrimental effect to nationally or regional important geological feature. Catastrophic failure of structures.
Moderate	Moderate detrimental effect on human health. Severe temporary detrimental effects on animal or plant populations. Severe detrimental effect to nationally or regional important geological feature. Significant damage to structures requiring substantial repair.
Minor	Temporary and minor detrimental effect to human health. Reversible detrimental effect on animal or plant populations. Reversible detrimental effects to nationally or regionally important geological feature. Small damage to structures requiring minor repair.
Negligible	No appreciable impact on human, animal or plant health, or geological feature of importance. Any minor adverse effects are reversible. No damage to structures requiring repair.

12.6.5 The sensitivity of the receiving environment together with the magnitude of the effect defines the significance of the effect prior to application of mitigation measures as outlined in Table 12.3.

Table 12.3 Significance Criteria

Magnitude	Sensitivity			
	Very High	**High**	**Medium**	**Low**
Major	Major	Major	Moderate	Minor
Moderate	Major	Moderate	Moderate	Minor
Minor	Moderate	Minor	Minor	Not Significant
Negligible	Minor	Not Significant	Not Significant	Not Significant

12.6.6 Potential effects are therefore considered to be of major, moderate, minor or not significant. Effects are considered Beneficial where they provide positive enhancement or Adverse where the impact is negative.

12.6.7 This assessment considers whether the residual significance of the resultant impacts of the restoration of the Application Site will be major, moderate, minor, not significant or there will be no change, once appropriate mitigation measures have been implemented. This assessment relies on professional judgment to ensure that the impacts are appropriately assessed. Impacts of moderate significance or greater are considered significant in terms of the EIA regulations and should be taken into account during the decision making process.

Cumulative Impacts

12.6.8 Given the localised nature of ground and groundwater related impacts it is not considered that there will be any significant cumulative impact.

12.7 Planning Policy

12.8 Legislative And Planning Context

National Policy and Legislation

12.8.1 Contaminated land is addressed through the following key Acts of Parliament:

- Environmental Protection Act, 1990, requiring the identification and remediation of Contaminated Land.
- Water Resources Act, 1991, governing the control of pollution of groundwater and surface water including that from contaminated land.
- Town and Country Planning Act, 1991, which requires contamination to be assessed and addressed as part of development.
- The Environment Act, 1995, which clarifies the role of the above legislation in assessing and implementing remediation

12.8.2 The National Planning Policy Framework (NPPF) which withdraws and replaces Planning Policy Statement (PPS) 23 Planning and Pollution Control and Planning Policy Guidance (PPG) 14 Development on Unstable Land. The NPPF provides the following requirements in relation to Contamination, Pollution and land stability:

12.8.3 Paragraph 109 requires that:

> '*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; and*
> *Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

12.8.4 Paragraph 110 requires that:

> *'In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment. Plans should allocate land with the least environmental or amenity value, where consistent with other policies in this Framework'*

12.8.5 Paragraph 111 requires that

> '*Planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value. Local planning authorities may continue to consider the case for setting a locally appropriate target for the use of brownfield land.'*

12.8.6 Paragraph 120 requires:

> '*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'.*

12.8.7 Paragraph 121 requires:

> *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;*
> *Adequate site investigation information, prepared by a competent person, is presented.'*

12.8.8 Paragraph 122 requires that:

> *'In doing so, local planning authorities should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively.*

Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.'

12.8.9 The NPPF advises that due weight should be given to Local Plans particularly where there is no conflict with the NPPF.

The Yorkshire and Humber Plan

12.8.10 The Yorkshire and Humber Plan Regional Spatial Strategy to 2026 published in May 2008 includes the following policies in relation to ground and groundwater conditions:

ENV3 water quality requires:

12.8.11 The Region will maintain high standards of water quality. Plans, strategies, investment decisions and programmes should:

Prevent development that could pollute surface and underground water resources especially in Source Protection Zones and close to above groundwater resources of reservoirs and some rivers.

Provide for adequate sewerage infrastructure and treatment capacity and promote more sustainable waste water treatment methods.

Continue to improve bathing waters at Staithes and Flamborough Head North. Achieve and maintain a high standard of coastal water quality at Whitby, Scarborough, Filey, Bridlington, Hornsea and Cleethorpes.

Protect and improve water quality at internationally important biodiversity sites at Denby Grange Colliery Ponds, Hornsea Mere, Kirk Deighton and the Humber Estuary.'

Barnsley Local Development Framework Core Strategy

12.8.12 The Barnsley Local Development Framework Core Strategy Adopted September 2011 includes the following policies in relation to ground and groundwater conditions:

12.8.13 CSP 39 Contaminated and Unstable Land requires:

'Where the future users or occupiers of a development would be affected by contamination or stability issues, or where contamination may present a risk to the water environment, proposals must be accompanied by a report which:
Shows that investigations have been carried out to work out the nature and extent of contamination or stability issues and the possible effect it may have on the development and its future users, the natural and historic environment; and

- *Sets out detailed measures to allow the development to go ahead safely, including, as appropriate:*

- *Removing the contamination;*
- *Treating the contamination;*
- *Protecting or separating the development from the effects of the contamination; and*
- *Addressing land stability issues resulting from former coal mining activities.*

Where measures are needed to allow the development to go ahead safely, these will be required as a condition of any planning permission.'

12.8.14 CSP 40 Pollution Control and Protection requires:

'Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water and groundwater, noise, smell, dust, vibration, light or other, pollution which would unacceptably effect or cause nuisance to the natural and built environment or to people.

We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.

Developers will be expected to minimise the effects of any possible pollution and provide mitigation measures where appropriate.'

Barnsley Unitary District Plan

12.8.15 There are no saved policies pertaining to ground and groundwater within the Barnsley Unitary District Plan.

12.8.16 The Barnsley, Doncaster and Rotherham Joint Waste Plan was adopted in March 2012.

12.8.17 Policy WCS4 Waste Management Proposals on Non Allocated Sites requires that:

'A. Proposals for waste development on non-allocated sites will be permitted provided they demonstrate how they:

1) Do not significantly adversely affect the character or amenity of the site or surrounding area;

2) Contribute towards the aims of sustainable waste management in line with the waste hierarchy;

3) Do not undermine the provision of waste development on strategic sites set out under WCS3;

4) Prioritise the reuse of vacant or underused brownfield land, where possible; and

5) Facilitate quicker and better quality reclamation, and do not prevent timely reclamation of the site (where applicable).

B. Subject to meeting these criteria, the types of location where waste proposals may be acceptable in principal include:

1) existing waste transfer recycling, composting, treatment and recovery sites;

2) designated employment and industrial areas/sites;

3) agricultural buildings;

4) waste water treatment and sewage works;

5) active mineral workings (including collieries); and

6) landfill sites.'

12.8.18 Policy WCS6, General Considerations for All Waste Management Proposals, requires that:

'A. Proposals for waste development will only be permitted within Barnsley, Doncaster and Rotherham provided they can demonstrate how they:

1) Support the vision, aims and overall strategy of the Joint Waste Management Plan and, where relevant, the delivery of our municipal waste management strategies;

2) Provide access (which is appropriate to the scale and nature of the development) to and from the main transport network – including, where possible rail and canal/river links that offer the potential to transport waste;

3) Ensure there is adequate highways capacity to accommodate any additional vehicles generated;

4) Ensure there is adequate space on site for vehicles to enter, wait, unload and leave safely;

5) Propose technology which is suitable for the location and nature of the site;

6) Provide high quality design and architecture, sympathetic to its context and surroundings using sustainable construction, water and energy saving measures to maximise efficiency and recover energy, where practical;

7) Provide effective on-site waste management measures to ensure safety and security;

8) Mitigate any constraints that may reduce the potential to redevelop the site and adjoining areas in the future;

9) Provide adequate means of controlling noise, vibration, glare, dust, litter, odour, vermin and other emissions (e.g. greenhouse gases and leachate) so as to avoid adverse effects on the amenity of the immediate and surrounding environment and human health, both during and after operations;

10) Will not result in loss or damage to the diversity of wildlife and habitats at the site or adjoining land, including linear or other features that facilitate the dispersal of species;

11) Will not have an adverse impact upon the quality of ground and surface water or drainage, especially groundwater aquifers and flood risk areas;

12) Will not have an adverse impact upon the integrity of conservation sites of national and international importance, particularly Thorne and Hatfield moors;

13) Will not have an adverse impact upon the significance of heritage assets and features;

14) Maintain, safeguard and enhance green infrastructure corridors and assets, particularly within areas of sensitivity such as greenbelts, air quality management areas country parks, rivers and wildlife corridors;

15) Will not reduce the safety of air travel (I.e. will provide effective management of bird-strike risk);

16) Will not increase the risk of flooding elsewhere in the catchment area and will, where possible, improve the existing flood risk situation; and

17) Will maximise any training and educational opportunities arising from the development.

B. Proposals must include sufficient information with the planning application to demonstrate how they comply with the above criteria. This will include:

1) The type of process;

2) The amount and type of waste to be handled or treated at the site (together with any residues and how they will be addresses (including estimated annual throughput);

3) Details of proposed hours of working, expected number of existing and proposed employees and the anticipated number and types of vehicle movements per day both in and out of the site;

4) The estimated life of the operations;

5) The origins of the waste and where it is going;

6) The location of storage facilities within the site; and

Access and travel arrangements for both employees and customers, including alternative modes of travel to the private car; such as public transport, cycling and walking.'

12.9 Baseline Conditions

12.9.1 A Phase I Environmental and Mining Report, together with a Hydrogeological Desk Study Appraisal and Contamination Assessment have been undertaken at the site by Enzygo Ltd. These reports are included as Appendix 12.1 to 12.3. Pertinent details are provided below:

Site Description

12.9.2 The Application Site occupies an area of approximately 3.0 hectares comprising overgrown derelict land with shrubs, bushes and rough grassland. Numerous unauthorised dog walking paths are present on the site.

12.9.3 There are no buildings on site and there do not appear to be any drains on site.

History

12.9.4 Historical maps shows the following features to have been present:

- Fields with railway lines;
- Railway lines shown as dismantled on later maps;
- Sludge pit within the western part of the site;
- Houghton Main Colliery with spoil heaps 50m south east of the site; and
- Colliery building shown as being demolished and replaced with a commercial building on later maps.

12.9.5 The site was subject to open cast colliery workings between 1997 and 2001 which included the removal of any earthworks associated with the former railway lines. Historical maps do not cover the period of the open cast workings.

12.9.6 More comprehensive information on the historical development of the site and surrounding land is provided Appendix 12.1.

Geology and Hydrogeology

12.9.7 The site is underlain by Alluvium over Middle Coal Measures. Both the Alluvium and the Coal Measures are classified as Secondary A Aquifers. Made Ground is shown across the southern area of the site associated with former open cast workings. The ground investigation undertaken by Enzygo Ltd and included within the Contamination Assessment Report (Appendix 12.3) confirmed ground and groundwater conditions to comprise:

- Made Ground consisting of sandy gravelly clay with fragments of ash and brick extending to a depth of 28.7m below ground level (bgl); over
- Coal Measures comprising interbedded sandstone and mudstone.
- Groundwater was measured at a depth of 8.9m bgl.

12.9.8 The Alluvium was not encountered during the ground investigation.

12.9.9 There are no licensed or private groundwater abstractions within 500m of the site and the site is not within a Source Protection Zone.

Contamination

12.9.10 Chemical analysis has been undertaken on samples of soil and groundwater, the results and assessment of which are included in the Contamination Assessment prepared by Enzygo Ltd (Appendix 12.3). The assessment of the results is summarised below:

- No exceedance of General Acceptance Criteria (GAC) for Commercial Land Use was measured and no asbestos was detected.

- Leaching tests and groundwater analysis recorded exceedances of Flouranthene above fresh water Environmental Quality Standards (EQS). The potential risk to controlled waters was dismissed within the Contamination Assessment report.
- No significant values of ground gas were measured,
- No remedial measures are identified as being required.

Mining

12.9.11 The site is identified as being within an area of mining activity and details of the mining information is included within Appendix 12.1. Pertinent information is summarised below:

- Deep mining was undertaken on coal seams at depths of between 300m and 850m below ground level (bgl) from between 1800's and 1991. The Coal Authority concludes that any ground movements from these coal workings should have stopped.
- There are no mine entries or shafts within 20m of the site.
- Opencast mine workings were undertaken between 1997 and 2001 on site. The workings are referred to as the Houghton Main Open Cast Colliery and understood to extend to a depth of 40m bgl. The open cast workings are reported to have been restored to original levels using earthworks compaction method, although a subsequent investigation concluded that some areas of fill material will require further compaction.
- The edge of the open cast workings is formed by a batter slope which is present on site with an associated 'no build area'. The location of this batter slope and no build area are shown on a plan included in Appendix 12.1.
- Mine gas risk has been identified as being reduced due to mine water levels having recovered such that the residual risk is from isolated gas pockets which my potentially be present.

Geological Hazards

12.9.12 BGS information identifies the geotechnical hazards summarised in Table 12.4, below:

Table 12.4 Geotechnical Hazards

Item	Risk Designation
Collapsible Ground	Negligible to Very Low
Compressible Ground	Negligible to Very Low
Ground Dissolution	Null
Landslide	Very Low to Low
Running Sands	Negligible to Low
Swelling / Shrinkage Clay	Negligible to Low

Consultation

12.9.13 Consultation undertaken within the Groundsure report, incorporated into Appendix 12.1 identifies an electrical sub-station within 250m of the site. No other industrial features are identified.

Radon

12.9.14 The site is identified as being outside a Radon Affected Area.

Waste Facilities

12.9.15 There are no licensed landfills or waste management facilities within 500m of the site.

12.10 Incorporated Enhancement

Construction Phase

12.10.1 Remedial recommendations were provided in the Appendix 12.1, 12.2 and 12.3 which are to be incorporated in to the proposed development as enhancement measures. These are discussed below:

12.10.2 No specific remedial measures are proposed.

12.10.3 The backfill material to the open cast colliery was placed in accordance with an earthworks specification, however, some areas requiring further compaction have been identified. In order to address potential settlement issues from the fill material on pavement areas the following enhancement measures are proposed:

- Supplementary ground investigation to confirm the thickness, nature and competence of the fill material;
- Supplementary ground improvement works, where required using techniques such as dynamic or vibro compaction. The methods considered will be determined following the ground investigation;
- Use of geo-grid reinforcement below areas of hardstanding to manage potential differential settlement where necessary, together with the use of flexible pavement construction such as bituminous asphalt; and
- Use of steeper gradients to drainage runs and flexible couplings to manage residual settlement.

12.10.4 Foundations to proposed structures and tanks will be designed to address potential bearing capacity and settlement risks associated with the backfill material to the infilled open cast colliery. Foundation selection and design will be determined from the supplementary ground investigation but is likely to involve:

- Structures and tanks located on areas of deep fill material may be constructed on either raft foundations or piled foundations set in to the underlying rock head. Final design will

depend on the nature of the fill material, loading of the structures and the allowable settlement tolerances.

- The use of raft and piled foundations on fill material are well established.
- Depending on the nature of the fill and local environmental receptors ground improvement techniques such as dynamic compaction may be considered.
- Where structures straddle the open cast batter and are within the recommended No Build Area additional measures are to be incorporated in to the foundation design. Typically this may involve the use of piled foundations which are set in to the underlying rock head, including that on the batter slope.
- Where necessary the foundations will be additionally reinforced to allow them to span or cantilever over areas where piled foundations cannot easily be installed.
- Tanks will be constructed on concrete bases which can be reinforced and piled where necessary to resist differential settlement and potential cracking. This will also maintain the integrity of any bund walls to the tanks.

12.10.5 Specific remediation measures are not required within the design of the development. The following areas of environmental betterment will be provided:

- Any localised groundwater encountered during excavation works will be treated as necessary prior to disposal under a suitable trade effluent consent.

12.10.6 Re-development will provide hardstanding with dedicated drainage across the majority of the site which will reduce potential surface water infiltration and associated leaching thereby providing betterment to the groundwater and surface water environment by allowing residual determinants to attenuate naturally.

12.10.7 A 'Discovery Strategy' is proposed with any unforeseen contamination encountered during the construction works being assessed and where necessary remediated. Source removal or clean cover will be the preferred remedial option. Where concentrations exceed the appropriate GAC value in soft landscape areas clean cover soils, incorporating a geotextile separator will be used. Elsewhere the proposed hard landscaping will act as a barrier so breaking the existing pollutant linkage.

12.10.8 Construction materials and waste arising from the construction activities will be appropriately stored and managed to prevent accidental release. Any waste materials will be appropriately stockpiled and tested prior to disposal in accordance with current legislation and best practice.

12.10.9 Any chemicals, fuels or lubricants used during the construction works will be stored in bunded structures or double skinned tanks to prevent accidental release to the soil and water environment.

Operational Phase

12.10.10 The operational phase is likely to be limited to storage of waste and liquids and fuels. All liquid storage, other than clean surface water run-off, is to be stored in above ground tanks so reducing potential environmental risks.

12.10.11 Any chemicals, fuels, lubricants liquids and wastes used during the operational phase will be stored in bunded structures or double skinned tanks to prevent accidental release to the soil and water environment.

12.10.12 Drainage system will include suitable interceptors.

12.11 Key Impacts

Construction Phase

12.11.1 Remediation of contaminated land in accordance with the proposed Incorporated Enhancement Measures will remove existing potential risk to site users, ground water, surface water and other receptors giving environmental betterment. Current magnitude is Negligible and sensitivity is considered Medium. Therefore, remediation will give a Not Significant Beneficial Impact.

12.11.2 Unforeseen contamination maybe encountered during the construction works. The impact without mitigation is considered to be Minor Adverse. Impact following implementation of Incorporated Enhancement will be Not Significant to Minor Beneficial

12.11.3 Potential release from construction wastes and materials to groundwater and surface water receptors is considered to have Minor magnitude whilst the sensitivity of controlled water resources is considered Medium. Based on this impact without mitigation is considered to be Minor Adverse. Impact following implementation of Incorporated Enhancement will be Not Significant.

12.11.4 Potential release from fuel chemicals liquids and waste to groundwater and surface water receptors is considered to have Minor magnitude whilst the sensitivity of surface water resources is considered Medium. Based on this impact without mitigation is considered to be Minor Adverse. Impact following implementation of Incorporated Enhancement will be Not Significant.

12.11.5 Foundations will be appropriately designed to manage potential settlement and bearing capacity failure. There is no significant risk to the development following incorporation of the enhancement measures. Magnitude of impact is considered to be Minor and sensitivity is considered to be Low. Therefore the potential impact is considered to be Not Significant.

12.11.6 Residual settlement risks from the fill material will be addressed through additional compaction and design measures in to pavement areas to reduce the impact of potential settlement. There is no significant risk to the development following incorporation of the

enhancement measures. Magnitude of impact is considered to be Minor and sensitivity is considered to be Low. Therefore the potential impact is considered to be Not Significant.

12.11.7 Residual risks from ground gas and mine gas will be addressed through the use of gas protective measures. There is no significant risk to the development following incorporation of the enhancement measures. Magnitude of impact is considered to be Minor and sensitivity is considered to be Low. Therefore the potential impact is considered to be Not Significant.

12.11.8 The Coal Authority have identified that settlement from deep mining activities should have ceased and as such there is no significant risk to the development. Therefore the potential impact is considered to be Not Significant.

12.11.9 Groundwater maybe encountered within excavations during construction of substructures and deeper utilities. There is no significant risk to the development but water will require disposal under a Trade Effluent Discharge. Magnitude of impact from the disposal of groundwater is considered to be Minor and sensitivity of the sewer is considered to be Medium. Therefore the potential impact is considered to be Minor Adverse.

Operational Phase

12.11.10 Potential release of fuel, chemicals, liquids and waste to groundwater and surface water receptors is considered to have Minor magnitude whilst the sensitivity of controlled water receptors is considered Medium. Based on this impact without mitigation is considered to be Minor Adverse. Impact following implementation of Incorporated Enhancement will be Not Significant.

12.12 Mitigation

Construction and Operational Phases

12.12.1 The following mitigation measures are proposed over and above the Incorporated Enhancement Measures:

12.12.2 Water entering excavations will be undertaken using appropriate methodologies designed and managed by a specialist contractor and will include any necessary measures to remove sediment.

12.12.3 Suitable foundations will be designed based on the loading and settlement tolerances of structures.

12.13 Residual Impacts

12.13.1 Following implementation of mitigation measures it is considered that residual impacts will generally be Not Significant.

12.13.2 Where contaminated soils are encountered and removed from site there will be a Minor Adverse impact associated with transport and disposal operation. However, there will be a Moderate Beneficial impact to the site. Overall this will give a beneficial impact.

12.14 Conclusions

12.14.1 An assessment of the Application Site has been undertaken based on a Phase I Environmental and Mining Report, Hydrogeological Desk Study Appraisal and Contamination Assessment.

12.14.2 The proposed development is to comprise a Timber Resource Recovery Centre.

12.14.3 Incorporated enhancement measures will mitigate most adverse impacts.

12.14.4 Following implementation of mitigation measures no significant adverse impacts are expected in relation to geology and hydrogeology.

12.14.5 Development of the scheme will allow remediation to be undertaken giving environmental betterment in accordance with the requirements of the NPPF and Local Plans.

13 Chapter 13: Archaeology and Cultural Heritage

13.1 Introduction

13.1.1 This Cultural Heritage Assessment (CHA) forms a part of the Environmental Statement for land off Houghton Main Colliery Roundabout, Park Spring Road, Barnsley, S71 5EX, close to the site of the former colliery at Houghton Main, north of Little Houghton and 7 km to the east of Barnsley in South Yorkshire.

13.1.2 This assessment informs a Planning Application for revised proposals to develop a Timber Resource Recovery Centre on land located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley. The application site boundary has been amended in accordance with the revised proposals and the land now omitted from the application site will be promoted for an alternative, non-waste related use.

13.1.3 The CHA is a means of identifying the potential impact of the proposed development on sites of cultural heritage significance.

13.1.4 The principal aims and objectives of the CHA are as follows:

i) To identify and describe any potential cultural heritage sites within the study area;

ii) To assess the significance of the sites within a national, regional or local framework;

iii) To determine the likely impact of the proposed development on any such sites.

13.1.5 The application site is located at NGR SE 41799 06582 (Figure 1 of Appendix 13 of Volume 3 of the ES) north of Little Houghton village and west of Great Houghton. A dismantled railway forms the northern boundary and Houghton Main Colliery roundabout is located to the south. The A6195 runs to the east and the River Dearne flows close to the southern extent of the site.

13.2 Background

13.2.1 The South Yorkshire Historic Environment Characterisation survey records the area thus: The earliest recorded use of the area comprised open fields which were subsequently enclosed in the mid-18th century. More recently in the 20th century the dominant characteristic of the area is the nearby Houghton Main colliery. The first shafts at Houghton Main Colliery were sunk in 1873 but the extensive spoil heaps didn't develop until the mid-20th century. The colliery closed in late 1993 and some of the spoil heaps were later subject to opencast extraction as part of the clearance of the site. Undeveloped land is shown on 2003 aerial photographs but at this time the area was under redevelopment as new roads are in place. There remains partial legibility of the spoil heaps in surviving disturbed ground but there is no legibility of the former enclosed landscape. The date of the enclosures marked on historic maps is uncertain as there is no record of a parliamentary award for the area but the fields

were quite regular. Several of the fields are named Park Field on a 1776 map of the area. This may indicate a former deer park in the area, although there is no known record of one.

13.3 Methodology

13.3.1 Cultural Heritage assets, both designated and non-designated, within a 2 km radius have been identified (Appendix 1). Designated assets (Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields and Conservation Areas) between 2 and 5 km radius have been reviewed (Appendix 2).

13.3.2 A Heritage Gateway search was carried out to obtain data from the following resources:

- The National Heritage List for England
- South Yorkshire HER
- Pastscape

13.3.3 Further searches were made on:

- MAGIC interactive map: DEFRA
- National Monuments Record Aerial Photographic Archive
- Barnsley Local Development Framework Core Strategy Document
- Old Maps online
- Google Earth

13.4 Planning And Legislative Background

National Planning Policy Framework (NPPF)

13.4.1 Chapter 12 of the NPPF relates to conserving and enhancing the historic environment. Paragraph 128 provides that:

> *In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance.*

13.4.2 In paragraph 129 it states:

> *Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a*

heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.

13.4.3 With regards designated historic assets, The NPPF provides as follows:

132. When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting.

13.4.4 With regards undesignated historic assets, The NPPF provides as follows:

135. The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non-designated heritage assets, a balanced judgment will be required having regard to the scale of any harm or loss and the significance of the heritage asset.

Barnsley Local Development Framework

13.4.5 CSP30 in the Barnsley Local Development Framework states that:

Development which affects the historic environment and Barnsley's heritage assets will be expected to protect or improve:

- *the character and/or appearance of Conservation Areas;*
- *the character and/or appearance of Scheduled Ancient Monuments and their settings;*
- *the character and/or appearance of Listed Buildings and their settings (including any locally listed buildings);*
- *archaeological remains of national importance and their settings; and*
- *the character and/or appearance of historic parks and gardens*

13.5 Baseline Conditions

13.6 Historic Environment Record

13.6.1 Forty-nine sites are recorded on the South Yorkshire HER within the 2 km study area (see Appendix 1). Of these, nine are listed buildings: the Church of St Michael and All Angels, Great Houghton, being Listed Grade II* with the remainder Listed Grade II.

13.6.2 Sixteen of the sites are cropmarks of later prehistoric or Romano-British field systems, while there are three Roman coin hoards from Darfield. The remaining sites are mainly either medieval or post-medieval structures.

13.6.3 A geophysical survey and topsoil monitoring brief undertaken in the 1990s in advance of opencast mining some 400 m to the north-east of the application site (centred on NGR SE 41850 06950) recorded ridge and furrow and a possible Iron Age ditch. It is possible that the prehistoric feature is associated with nearby cropmark features.

13.6.4 The number of designated sites within a radius of between 2 and 5 km of the application site increases to 87, 81 of which are Listed Buildings and six Scheduled Monuments.

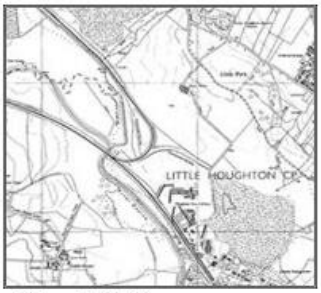
13.7 Conservation areas

13.7.1 Three Conservation Areas are present. Two of these, Darfield and Billingley, are approximately 2 km south of the application site. A third, Brierley, is 5 km to the north of the application site.

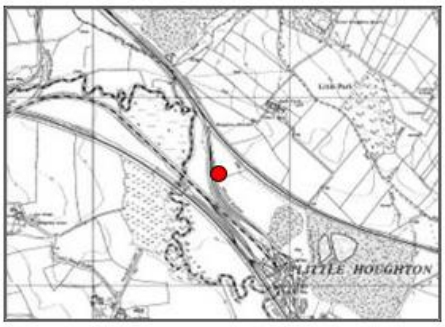
13.8 Map regression

13.8.1 Ordnance Survey maps of the area around the application site show the gradual encroachment of infrastructure and industrial development on a largely rural landscape. The principle developments are the growth of the railway system and the colliery (Fig.13.2). A former railway line runs through the application site in a north to south direction.

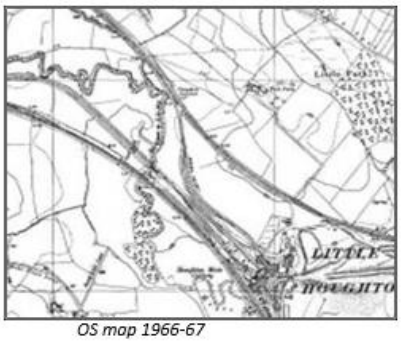
OS map 1989-93



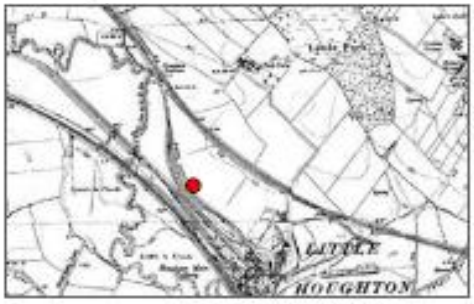
OS map 1974-83



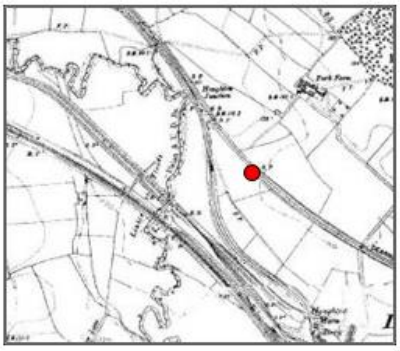
OS map 1955-56



OS map 1966-67



1938-48 OS map



1906-07 OS map

1854 OS map

Figure 13.2. Map regressions

13.9 Historic Environment Characterisation

13.9.1 The South Yorkshire Historic Environment Characterisation survey defines the area of the application site as 'Post Industrial' and identifies Houghton Main colliery as the most dominant characteristic of the area. The colliery was first opened in 1873 but the extensive spoil heaps did not develop until the 20th century. After its closure in 1993 the site appears to have been landscaped and new road constructed within the area of the former colliery.

13.10 Conclusions

13.10.1 There are no known designated or undesignated sites within the footprint of proposed development.

13.10.2 There are 11 designated sites within a 2 km radius of the application site (the 'study area'): nine Listed Buildings and two Conservation Areas. The Church of St Michael and All Angels, Great Houghton, is a Grade II* listing, considered to be a particularly important building of more than special interest. The remaining buildings are Grade II listings and are nationally important and of special interest. Two Conservation Areas, Darfield and Billingley, are present, 2 km to the south of the application site.

13.10.3 The 40 non-designated sites within a 2 km radius of the application site comprise crop marks of probable later prehistoric or Romano-British date, and medieval and post-medieval structures. It is recognised in the NPPF (para 139) that non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to Scheduled Monuments, should be considered subject to the policies for designated heritage assets. On the present evidence these sites are all considered to be of regional or local significance.

13.10.4 The number of designated sites 2 and 5 5 km radius (the 'outer study area') of the application site is 81, 74 of which are Listed buildings. Six Scheduled Monuments and an additional Conservation Area, Brierley, are also present.

13.11 Impact on setting

13.11.1 The Listed Buildings and Conservation Areas situated within a 2 km radius of the application site are sufficiently distant from the application site for there to be a minimal impact on their settings.

13.11.2 Designated sites within a radius of between 2 and 5 km of the application site are sufficiently distant for there to be a minimal impact on their settings.

13.12 Potential impact of the development on unrecorded sites

13.12.1 The map regression and the Historic Environment Characterisation both indicate that the immediate study area has been subject to intensive development as a result of infrastructure and mining developments in the mid-19th and 20th centuries.

13.12.2 It is considered likely that any features of archaeological significance that might have once been present on the site, principally potentially crop marks of later prehistoric/Romano-British features, will almost certainly have been truncated, severely damaged or destroyed by later intensive industrial development.

13.12.3 In view of the above, it is considered that the proposed development has minimal potential to adversely affect any sites of Cultural Heritage significance. This has been confirmed by the Archaeological Officer for South Yorkshire (Appendix 3).

14 Chapter 14: Socio-Economy Impact

14.1 Introduction

14.1.1 This Socio-Economic Statement accompanies a planning application made by Peel Environmental Management (UK) Limited on behalf of Houghton Main Waste Limited (Peel) for the works necessary to develop a Renewable Energy Centre (REC) on land off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley.

14.1.2 The proposed development represents an opportunity to implement a sustainable energy generation strategy which will contribute to reducing reliance on electricity from fossil fuels.

14.1.3 The site was historically part of the Houghton Main Colliery Site. The colliery was subsequently open cast mined by UK Coal in the late 1990s. Open casting was completed and the land was reclaimed and compacted to provide a platform suitable for industrial development.

14.1.4 The use of this brownfield site for a sustainable energy recovery centre would be a sustainable development. The proposed development will contribute to reductions in CO2 emissions on previously developed land suitable for redevelopment.

14.1.5 The REC will accommodate a facility which will generate energy from organic waste wood which otherwise may be sent to landfill for disposal. The facility will export 20MW of electricity, which is enough to power up to 47,000 homes.

14.1.6 This Socio-Economic Statement assesses the potential socio-economic impacts arising as a result of the development. Its purpose is to consider the positive and negative effects resulting from the proposed development on the day to day life of communities in the surrounding area. For example, new employment would provide positive economic benefits.

14.1.7 The area covered by the planning application is shown on Drawing PL 002 Site location Plan Appendix 1 of this statement.

14.2 Policy Context

14.2.1 This section of the Statement considers the relevant socio-economic policy framework. Firstly, it will examine the overall national energy policy, and then go on to discuss:

a) Economic policy and documents at national and local level; and

b) Social and community policy and documents at national and local level.

14.3 National Planning Policy Framework

14.3.1 The National Planning Policy Framework (NPPF) states:

"……sustainable development is about positive growth- making economic, environmental and social progress for this and future generations"

14.3.2 The NPPF goes on to state that there are three dimensions to sustainable development. Two of which are relevant to the development proposals:

"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 co-ordinating development requirements, including the provision of infrastructure"

14.3.3 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 is health, social and cultural well-being"

14.3.4 One of the main aims of the NPPF is to promote healthy communities. "The planning system can play an important role in facilitating social interaction and creating healthy, inclusive communities". Involving local communities is pivotal in achieving this.

14.3.5 The proposed REC will create a secure low carbon energy development to make a direct contribution towards the Government's Climate Change objectives. It is important to note that there is a need for renewable energy developments in relation to both demand and the achievement of the Governments Climate change objectives.

14.3.6 The Biomass Strategy acknowledges the importance of fuels sourced from biomass in tackling climate change. Biomass will have a central role to play in meeting the EU target of 20% renewable energy by 2020.

Planning Practice Guidance

14.3.7 On the 6th March 2014 the Department for Communities and Local Government (DCLG) launched planning practice guidance web-based resource. This is accompanied by a Written Ministerial Statement which includes a list of the previous planning practice guidance documents cancelled when the site was launched.

14.3.8 Paragraph 1 of the planning practice guidance states that;

"Increasing the amount of energy from renewable and low carbon technologies will help to make sure the UK has a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses"

14.3.9 Paragraph 3 states;

"Local and neighbourhood plans are the key to delivering development that has the backing of local communities. When drawing up a Local Plan local planning authorities should first consider what the local potential is for renewable and low carbon energy generation. In considering that potential, the matters local planning authorities should think about include:

- *the range of technologies that could be accommodated and the policies needed to encourage their development in the right places;*
- *the costs of many renewable energy technologies are falling, potentially increasing their attractiveness and the number of proposals;*
- *different technologies have different impacts and the impacts can vary by place;*
- *the UK has legal commitments to cut greenhouse gases and meet increased energy demand from renewable sources. Whilst local authorities should design their policies to maximise renewable and low carbon energy development, there is no quota which the Local Plan has to deliver"*

14.3.10 Paragraph 5 states;

"There are no hard and fast rules about how suitable areas for renewable energy should be identified, but in considering locations, local planning authorities will need to ensure they take into account the requirements of the technology and, critically, the potential impacts on the local environment, including from cumulative impacts. The views of local communities likely to be affected should be listened to"

Climate Change

14.3.11 Paragraph 1 states;

"In addition to supporting the delivery of appropriately sited green energy, effective spatial planning is an important part of a successful response to climate change as it can influence the emission of greenhouse gases. In doing so, local planning authorities should ensure that protecting the local environment is properly considered alongside the broader issues of protecting the global environment. Planning can also help increase resilience to climate change impact through the location, mix and design of development"

Local Economic Policy

14.3.12 The Core Strategy is a fundamental element of Barnsley's Local Development Framework. The Barnsley Core Strategy was adopted in September 2011. It sets out the key elements of the planning framework for Barnsley. The document reflects the Council's hopes and aims for the people who live, work, run businesses and enjoy leisure in Barnsley. It is the spatial expression of the Sustainable Community Strategy.

14.3.13 The Core Strategy states that the challenge for Barnsley is as follows;

- *"Developing the Barnsley economy to meet local needs and to provide local jobs opportunities;*
- *Reducing serious levels of worklessness and encouraging the transition from a low skill/low wage economy to a higher skill/higher wage economy;*
- *Maintaining sustainable rural communities and viable villages;*

The Current Position

- *85,000 jobs are currently based in the borough (not all of these jobs are filled by people from Barnsley)*
- *Barnsley's Growth Plan described the position where Barnsley was (and is still believed to be) under performing economically in comparison with South Yorkshire and the wider region.*

Policy solutions

- *Ensure provision of a wide range of employment locations, land and premises*
- *Accommodating a range of employment generating use, including work from/ at home, within the fabric of settlements, particularly in or adjacent to the centre of the settlements"*

14.3.14 Policy CSP39 of the Barnsley Core Strategy is related to contaminated and unstable land. The proposed REC constitutes re-use of contaminated land. The proposals are designed to ensure that the risk of future pollution is minimised. The regeneration of a colliery site is a difficult task as it can result in pollutants and instability of land. Providing a waste to energy facility will provide a sustainable use on this previously developed land.

14.4 Methodology

Relevant Guidance

14.4.1 There is currently no formal guidance or regulation setting out the preferred method or content for an assessment of potential community and social impacts. This preliminary study has been prepared using specialist knowledge and professional experience gained from carrying out studies in respect of other projects.

14.4.2 This study has been informed primarily by the Census 2011, and supplemented by a range of additional data sources. The baseline conditions for the present proposal have partly been investigated through data from the 2011 Census, and partly from other sources such as the Joint Strategic Needs Assessment (JANA).

14.4.3 The socio-economic statement is based broadly on the collection of available desk-based information, results of stakeholder feedback and a thorough qualitative assessment of a range of social and economic indicators.

14.4.4 The most relevant tables from the 2011 Census were identified in order to provide a comprehensive picture of current economic conditions within the study area. Relevant tables include those containing data outside the economic study area, for example on population, health and long-term illness, education, car ownership and mode of travel to work. These were considered either to provide appropriate background information or to detail further economic data.

14.4.5 A consideration of socio-economic impacts needs to clarify the type, duration, spatial extent and distribution of potential impacts. To this extent the methodology of the assessment is to establish:

- The assessment criteria;
- The area of study;
- The timescale over which the assessment will consider potential impacts;
- Establish the baseline and assess changes resulting from the construction phases of the development; and
- Establish and assess changes resulting from the operational phase of the development.

14.4.6 In defining the criteria or aspects that will be considered by the study, the socio-economic assessment covers the following aspects:

- Population;
- Land-use;
- Employment;
- Economic activity;
- Unemployment;
- Transport and infrastructure; and
- Leisure and tourism.

14.5 Study Area

14.5.1 The boundary of Barnsley Metropolitan Borough Council (BMBC) constitutes the study area. The Barnsley Metropolitan Area has a population of 231,221. The Houghton Main site lies on the former colliery land off Houghton Main Colliery Roundabout, Park Spring, Houghton Main, Barnsley at National Grid Reference SE 41696, 06515.

14.6 Baseline

14.6.1 In order to consider the economic impacts resulting from the proposed development, it is first necessary to assemble the baseline information for the area in order for a comparison to be made.

Population Structure

14.6.2 Census data gathered in 2011 shows that, the Barnsley area has an estimated population of 231,221. Its working age population, at 59.1%, is marginally lower than the UK average at 62.1%.

	Barnsley	Yorkshire and the Humber	England
Total Population	231,221	5,283,733	53, 012,456
Working Age Population (%)	59.1%	60.0%	62.1%

Source: Office for National Statistics, 2011 census data

Economic Activity

14.6.3 In 2011 Barnsley also had a lower than England average economic activity rate in employment (66.5% are economically active and 33.5% economically inactive). The unemployment rate for Barnsley was higher than the UK average in 2011.

	Economically Active	In Employment	Employees	Self Employed	Unemployed
Barnsley	66.5%	59.1%	14.6%	7.7%	5.1%
Yorkshire and Humber	68.4%	60.0%	14.6%	8.4%	4.8%
England	69.9%	62.1%	13.7%	9.8%	4.4%

Source: Office for National Statistics, 2011 census data

14.6.4 The latest release from the office for National Statistics (ONS) shows that the number of people claiming jobseekers allowance has risen by 291 (9.6%). It now means that there are 3032 people in Barnsley claiming benefits whilst looking for work.

General Health and Limiting Long Term Illness

14.6.5 Data in the Census on health is based on Census respondents' self-assessment of health, or of other people in their care. The results are therefore subjective. Nevertheless, on aggregate these data should provide a reasonably accurate picture of the relative health of different parts of the borough. The data should be read in the context of figures for economic activity and unemployment, which are dealt with below.

14.6.6 At the time of the Census, 34.2% of England enjoyed good health. Percentages are slightly lower for Barnsley Council (33.6%), which again is lower than the trend for the Yorkshire & Humber region (34.4%). 1.2% of the population in England described themselves as being in "not good health", a figure which was higher for Barnsley (1.8%).

Industry

14.6.7 Data on employment by sector is taken from the 2011 Census. The table below shows the local authority areas industry profiles within the study area.

	Barnsley	Yorkshire and Humber	England
In Employment	59.1%	60.0%	62.1%
Employee: Part-time	14.6%	14.6%	13.7%
Employee: Full-time	36.9%	37.0%	38.6%
Self-employed	7.7%	8.4%	9.8%
	Barnsley	**Yorkshire and Humber**	**England**
Agriculture, forestry and fishing	0.5%	0.9%	0.8%
Mining and quarrying	0.4%	0.2%	0.2%
Manufacturing	12.6%	11.2%	8.8%
Electricity, gas, steam and air conditioning supply	0.5%	0.6%	0.6%
Water supply; sewerage, waste management and remediation activities	1.0%	0.7%	0.7%
Construction	10.7%	8.0%	7.7%
Wholesale and retail trade; repair of motor vehicles and motor cycles	17.5%	16.9%	15.9%
Transport and storage	5.0%	4.9%	5.0%
Accommodation and food service activities	4.5%	5.7%	5.6%

Information and communication	2.1%	2.5%	4.1%
Financial and insurance activities	2.3%	3.7%	4.4%
Real estate activities	1.1%	1.2%	1.5%
Professional, scientific and technical activities	3.7%	5.0%	6.7%
Administrative and support service activities	5.3%	4.6%	4.9%
Public administration and defence; compulsory social security	5.7%	5.9%	5.9%
Education	9.1%	10.1%	9.9%
Human health and social work activities	13.7%	13.4%	12.4%
Other	4.1%	4.4%	5.0%

Source: Office for National Statistics, 2011 census data

14.6.8 The table indicates that Barnsley has a high proportion of people working in manufacturing, construction, distribution hotel and restaurant, the public sector, and transport and communications industries.

Qualifications

14.6.9 Data for qualifications is taken from the 2011 Census. Levels 1 and 2 represent GCSEs or equivalent, Level 3 'A' levels and Levels 4/5 degree level and above. The relatively small figures for Level 3 reflect the fact that many young people who have taken 'A' levels then go on to higher education of some kind.

14.6.10 Compared with the national average (13.3%), Barnsley Council has a much higher proportion of residents with the highest level (level 4/5) of qualifications (17.4%). It also has a high level of residents without any qualifications (32.3%), compared to the English average (22.5%).

Travel to Work

14.6.11 Data on this topic is taken from the 2011 Census. In England, approximately 36.9% of people travelled to work by car or van drivers at the time of the 2011 Census. This figure is reflected in Barnsley, with 41.5% of people driving a car or van to work. Travel by train has a very low

rate of 1.2% compared to England (3.5%). 3,516 people in Barnsley work from home or use the home as a base from which to work.

14.7 Summary of Baseline Conditions

14.7.1 The data discussed above show that on a number of significant indicators, particularly the economic activity rates, unemployment, occupational structures, and qualification, Barnsley is generally 'average' in terms of its economic status.

14.7.2 The local economy is made up of employment in manufacturing, education, health care and the retail sector. There is also a large proportion of small enterprises including freelance and consultancy. This is highlighted by the high percentage of the population who work within occupational groups 1-4 (Managers and Senior Officials, Professional Occupations, Associate Prof and Tech Occupations and Admin and Secretarial Occupations).

14.7.3 In addition, it is clear that the majority of those who are resident in Barnsley work within the local area. This is reflected by the very low numbers that travel by train and the short distances of travel to work.

14.8 Assessments of Effects

14.8.1 As is nearly always the case for major developments, impacts are considered at both the construction and operational stages.

Construction Phase

14.8.2 Construction of the proposed development is likely to take up to 24-30 months and will generate approximately 200 jobs during this period. It is expected that the majority of jobs are likely to be secured locally and Peel will work with technology contractors to achieve this. Due to the short term nature of this phase, the number of jobs generated is considered to have a minor benefit to employment levels and the local economy.

14.8.3 In terms of economic impacts, the sourcing and transportation of labour, materials and plant, to and from the plant site, is likely to lead to opportunities for local companies to capture sub-contractor roles.

14.8.4 There will also be a number of jobs created as an 'indirect' effect from the construction phase. The multiplier effect (indirect and induced employment) would include additional expenditure on local goods and services. This in turn will have an impact in terms of additional revenue brought into local businesses and potential employment creation that is likely to result from this extra trade and spending on accommodation, food, drink, and transport by employees.

14.8.5 The number of lorry movements generated during construction is unknown at this stage, however the Transport Assessment identifies that projects of a similar nature generate 60 (30 in, 30 out) lorry movements per day during peak construction. Any social impacts

deriving from this activity will be considered and mitigated against. Mitigation measures may typically include limiting hours of operation, establishing the most appropriate vehicle route to and from the strategic road network and dust mitigation through wheel washing.

Operational Phase

14.8.6 The expected operational lifetime of the facility is 25 years. It is estimated that there will be a requirement for upto 25 full time staff to operate and maintain the facility. During the operational phase staff will be required at various levels, consisting of management, administration, technicians, labourers, and plant operators.

14.8.7 A variety of skills will be required to operate the plant effectively and to appropriate standards, however it is not the case that relevant skills will necessarily have to have been acquired in the waste industry. To a great extent, skills can be transferred from other industries where appropriate. It is therefore unlikely that the requirements of the proposed development, in terms of either numbers or skills required, will place the local labour market under any strain.

14.9 Energy Benefits

14.9.1 Manageable energy costs and improved energy resilience are key emerging requirements for the UK economy. Many businesses are becoming focused on meeting their energy demands on site or from local sources of sustainable energy supply. In this context, the Houghton Main Renewable Energy Centre has the clear potential to support important local businesses meet their energy needs and improve energy security.

14.9.2 As a key location near to other employment areas, the REC has the potential to act as an anchor energy development attractive in locational terms to energy intensive enterprises wishing to locate on attractive sites.

14.9.3 Another by-product is in providing local energy supply into the national grid capable of providing energy to up to 47,000 homes locally.

14.10 Mitigation

14.10.1 It is considered from the previous sections that the proposals are unlikely to have any adverse impacts on the community. Any mitigations are outlined below. Any amenity issues arising as a result of noise and traffic will be fully assessed within the Environmental Statement.

Mitigation measures

- The use of local contractors for engineering services and related activities, where possible to do so;
- Careful planning of vehicle movements through a traffic management plan to minimise disruption to the local traffic during the construction period;

- Regular updates to the public and other interested parties;

Mitigation measures during the operational phase of the proposed development

- Employment of local people to fulfil long term employment roles, where possible;
- Active consideration of additional, follow-on developments to encourage wider renewable energy schemes.

14.10.2 The REC will enable long-term employment for the Houghton Main development site and will secure that the development being an important employer within the BMBC area.

14.11 Social Impacts

14.11.1 Social impacts identified for the operation phase include:

- Improved social inclusion through investment in local suppliers of organic materials such as wood;
- Related follow on developments in renewable energy schemes that could enhance follow on developments in renewable energy schemes that could enhance the socio-economic status of the region;
- Use of local labour to fill approximately 25 long-term jobs created by the development. This will therefore provide new job opportunities benefiting individuals through income and the potential to utilise local mining skills.
- Increased number of training opportunities to local people.

14.11.2 Peel has involved the public as part of the decision-making process. The proposed REC may have an economic and environmental impact to the local community, it is important to note that Peel will continue to work with the local community though consultation and participation in the project.

14.12 Community Benefits

14.12.1 The proposed REC will create long-term local jobs and also generate temporary employment, using local labour, during the construction and operational phase of the project.

14.12.2 The REC will create an energy generation facility with the potential to export 20 megawatts (MW) of electricity and to provide a direct heat and/or electrical supply to appropriate offtakers in the local area.

14.12.3 It is considered that the supply of organic materials such as wood from local suppliers will provide benefits to local businesses within the local community, it will also provide an overall economic benefit to the community of Barnsley and the surrounding area.

14.13 Summary and conclusions

14.13.1 It is considered that the overall impact on the REC is expected to have a significant positive impact on the economy and employment structure at a local level.

14.13.2 This Socio-economic Statement has demonstrated that the proposed development would bring a number of positive benefits to the local economy. These positive benefits include direct and indirect jobs created from the proposed development.

14.13.3 Community and social effects impacts are unlike most other topics addressed in that they deal to a great extent with matters of human behaviour where individual choice is exercised. It is not possible for example to predict with any degree of accuracy who will benefit the likely employment created by the proposed development at either the construction or operational stage- whether the jobs will be taken entirely by people in the local or whether the impact will be diffused within the Yorkshire and Humber region.

14.13.4 The overall conclusion from the study is that the Houghton Main Renewable Energy Centre proposed development could have a positive economic and social impacts at both local and national levels. The Renewable Energy Centre will create an up to 25 full-time jobs. This is addition to the creation of up to 200 jobs during the 2-3 years construction phase.

14.13.5 It is therefore likely that employment impact will in this case be spread over a wider area than the immediate locality. Nevertheless, in providing new employment in this part of Barnsley Borough, any positive impact will be beneficial.

15 Chapter 15: Other Amenity Issues

15.1 Introduction

15.1.1 In addition to transport, Flood Risk, Landscape and Visual Amenity, Noise and Vibration, Ecology and Nature Conservation, Hydrogeology and Ground Conditions, Archaeology and Cultural Heritage and Socio-Economic Impacts, which are contained in this ES at Chapters 6, 7, 8, 9, 10, 11, 12, 13 and 14 respectively, this chapter of the ES considers and assesses the potential for the proposed REC to cause environmental nuisance due to the generation of any environmental issues.

15.1.2 In addition to the planning permission sought by the accompanying planning application the future operators of the REC will apply for an Environmental Permit from the Environmental Agency. Amenity issues such as dust are principally under the control of the Environmental Permit process. Notwithstanding this, in the interest of completeness, the potential impacts and mitigation measures proposed are outlined here.

15.1.3 This chapter details the assessment methodology used for the assessment. It sets out the baseline conditions on the site and surrounding environment; details the potential environmental impacts; process mitigation measures required to ensure the potential impacts are at an acceptable level.

15.2 Background

15.2.1 The development of the site will create an energy generation facility with the potential to export 20 megawatts (MW) of electricity and to provide a direct heat and/ or electrical supply to appropriate off-takers in the local area.

15.2.2 The development of the REC comprises a 150,000 tonnes per annum (tpa) Timber Resource Recovery Centre (TRRC) on land located off the Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley.

15.3 Methodology

15.3.1 This chapter focuses on the potential environmental impacts arising from the proposed development.

15.4 Planning Policy

Legislative and Policy Context

15.4.1 As already detailed, amenity issues such as those considered have are principally controlled under the Environmental Permit process. Nonetheless, impacts on the amenity of the surrounding environment and its residents are a material consideration in the determination

of planning applications for waste management facilities. A full assessment of the proposal against the provisions of the development plan is, including in relation to amenity issues, is provided in the Planning Supporting Statement which accompanies this application.

15.4.2 A summary of the national and local policy relating to dust and environmental issues is provided below.

National Policy

15.4.3 National Planning Policy Framework, (NPPF, March 2012)

In terms of renewable energy the NPPF, at paragraph 98 states that Local Planning Authorities should: *"Approve the application if its impacts are (or can be made) acceptable"……. The NPPF sets out the focus of planning as contributing to sustainable development. This requires planning to have an economic, social and environmental role"….*

Local Policy

15.4.4 Barnsley Adopted Core Strategy states at paragraph 4.12 states that;

"*Promoting sustainable development and reducing the boroughs impact on climate change are overarching principles of this Core Strategy…..the use of land will be assessed against the objective of securing sustainable development with Barnsley to meet its environmental, economic and social needs"*

15.4.5 It goes on to state:

"Protection or enhancement of the quality of natural assets including water, air, soil, minerals *and biodiversity"*

13.1 The above policy requirements have been taken into consideration in the assessment in this chapter.

Relevant Guidance

15.4.6 There is no statutory or non-statutory best practice guidance for undertaking assessments of potential environmental impacts on amenity issues for proposed waste to energy management facilities. Consequently, the methodology used for this assessment is based on advice received in pre-application discussions and informal scoping exercises carried out with the statutory consultees and the Application's experience with the preparation of similar planning applications and Environmental Statement.

Consultation

15.4.7 During informal scoping activity undertaken by the Applicant in the pre-application phase of consultation, no specific issues relating to the other amenity issues considered in this chapter were highlighted.

Development Stages

15.4.8 The proposed development has been separated into three distinct stages for the purposes of this assessment. The development stages are detailed below.

- **Site Preparation**: This stage includes any works required to clear and level the site prior to the commencement of construction works;
- **Construction**: This stage includes on site works required for the physical construction of the facility. It also includes traffic movements required during the construction stage.
- **Operation**: This stage covers the day-to-day operation of the facility following commissioning.

Significance of Impact

15.4.9 The significance of any potential impact will be qualified using the categories detailed below:

- **Insignificant**- The potential impact is negligible or insignificant;
- **Minor**- The potential Impact will occur infrequently and will have minimal effect;
- **Moderate**: The potential impact will occur at moderate frequency and will have moderate effects;
- **Major**- The potential impact will occur at frequently and will have significant effects

Cumulative Impacts

15.4.10 As detailed in Chapter 4 of this ES, the site has been the subject of a planning application, granted in 2008 and extended in 2012, for 19 light industrial units using the existing site access. Full details of the site's planning history are provided in Chapter 4 of this statement.

15.4.11 It is understood that there are no definite plans for the development of the land in accordance with the above planning permission. However, the potential for the development of this land is considered in this assessment.

15.5 Baseline Conditions

15.5.1 Full details of the Application Site are provided in the Planning Supporting Statement and in Chapter 2 of this ES. The site is part of the former Houghton Main Colliery which has been

subject to both deep shaft mining and, more recently, opencast working. Following opencast working the site was backfilled and restored to original levels. The site is therefore considered to be brownfield, previously developed land suitable for redevelopment. The site is currently vacant for future industrial use.

15.5.2 Surrounding land uses include an existing warehouse (ASOS Fulfilment Centre) on land to the east of the site on the opposite side of Park Spring Road. The site is surrounded by the Barnsley Green Belt on three sides. A public footpath runs alongside the north east tip of the application side.

15.5.3 The RSPB Dearne Valley Old Moor wetlands nature reserve lies approximately 5km to the south of the site. There are no European Designated Sites (Ramsar, Special Areas of Conservation or Special Protection Areas) within 15km of the site.

15.5.4 The site is relatively remote from any residential properties. There are a few scattered farms and properties nearby, the closest being location approximately 0.8km to the west of the proposed development.

15.6 Assessment of Effects

Site Preparation

15.6.1 Groundworks, storage and demolition required for site preparation all have the potential to create litter and dust. A Construction and Environmental Management Plan will be implemented to ensure best practice measures are utilised during site preparation activities. Impacts will be minor.

Construction

15.6.2 Construction activities, if not properly managed also have potential to cause dust and litter nuisance.

15.6.3 Delivery vehicles will all be securely sheeted to avoid litter and dust originating from vehicles. Suitable storage containers will be employed on site for waste material waiting to be transported off site.

15.6.4 Regular site checks will be undertaken during construction to ensure on site litter is kept to a minimum.

15.6.5 In potentially dusty (dry and windy) conditions, damping equipment will be used to minimise dust creation during construction activities. Impacts will be minor.

Operation

15.6.6 The proposed facility, if not managed correctly, has the potential to generate litter. Litter can have both visual and nuisance implications if it were to escape the operational area of the site.

15.6.7 All waste management operations on the site will be undertaken within the TRRC building. The delivery doors will only be opened when a fuel delivery vehicle enters the building.

15.6.8 Vehicles carrying material into the building will be enclosed and/or securely sheeted to ensure no litter problem will occur.

15.6.9 Regular site checks will be undertaken to ensure the proposed litter measures implemented are effective. Impacts will be insignificant.

Dust

15.6.10 As already detailed, all waste management operations will be undertaken within the building and all delivery vehicles will be secured. Impacts will therefore be minor.

15.6.11 No waste material will be stored outside and waste inside the building will be regularly disturbed to ensure potential infestation is minimised.

15.6.12 As all activities will be contained within the enclosed building and the Environmental Permit Regulations will impose control measure requirement, the potential for environmental nuisance will be low. Impacts will therefore be insignificant.

Cumulative

15.6.13 There are no surrounding operational activities that have the potential to create cumulative impacts.

15.6.14 Given the low potential for dust and litter impacts in the Application site, and with an expectation that construction activities on any other site would also follow best practice construction methods, the potential cumulative impact during construction will be low.

15.7 Mitigation

15.8 Site Preparation

15.8.1 The following mitigation measures will be implemented to reduce any potential amenity impacts from wind-blown litter during the site preparation:

- All delivery vehicles will be enclosed or sheeted to prevent items falling or being blown from the load;
- All skips and loads carried in open vehicles or containers will be secured with a net or tarpaulin;
- All vehicles leaving the site will follow an effective vehicle cleaning and wheel wash procedure prior to leaving the site;

- Suitable containers would be utilised for recyclable material or soil to be reused on site to avoid any escape of litter from the site; and
- Regular site inspections will be undertaken to ensure the proposed measures are effective. Any litter found will be collected at the end of each working day.

Dust

15.8.2 The following mitigation measures will be implemented to reduce any potential amenity impacts from dust during site preparation:

- The site will be dampened down using water bowsers during dusty (dry and/or windy) conditions

15.9 Construction

15.9.1 The following mitigation measures will be implemented to reduce any potential amenity impacts from wind-blown litter during construction:

- All delivery vehicles will be enclosed or sheeted to prevent items falling or being blown from the load;
- All skips and loads carried in open vehicles or containers will be secured with a net or tarpaulin;
- All vehicles leaving the site will follow an effective vehicle cleaning and wheel wash procedure prior to leaving the site; and
- Regular site inspections will be undertaken to ensure the proposed measures are effective. Any litter found will be collected at the end of each working day.

Dust

15.9.2 The following mitigation measures will be implemented to reduce any potential amenity impacts from dust during construction:

- The site will be dampened down using water bowsers during dusty dry and/or windy) conditions;
- Wheel wash facilities will be used for all vehicles leaving the site

15.10 Operation

15.10.1 The following mitigation measures will be implemented to reduce any potential amenity impacts from wind-blown litter during operation:

- All delivery vehicles will be enclosed to ensure no material will fall from the vehicle or be blown from the load;
- All unloading materials will take place inside the Waste Reception Hall;
- Suitable containers will be utilised for recyclables to avoid any escape of litter from the site; and
- Regular site inspections will be undertaken to ensure the proposed measures are effective. Any litter found will be collected at the end of each working day.

Dust

15.10.2 The following mitigation measures will be implemented to reduce any potential amenity impacts from dust during operation:

- The site will be dampened down using water bowsers during dusty (dry and/or windy) conditions; and
- Wheel wash facilities will be used for all vehicles leaving the site.

15.11 Cumulative Impacts

15.11.1 Provided the above mitigation measures (which essentially are the employment of best practice construction and site operation measures), the cumulative impacts of other amenity issues (dust, litter) will be of minor frequency and significance.

15.12 Residual Impact

15.12.1 The residual amenity impacts in relation to dust and litter from the proposed facility will be

15.13 Summary And Conclusions

15.13.1 The potential adverse impacts on local amenity from litter and dust will be adequately mitigated using best practice construction and waste management methods. The methods proposed are likely to be a requirement of the Environmental Permit which will need to be issued before works commence.

15.13.2 This chapter demonstrates that the impacts of the proposal in terms of litter and dust, will be minor particularly when the mitigation measures proposed are implemented.

16 Chapter 16: Cumulative Impacts

16.1 Introduction

16.1.1 This chapter provides an assessment of potential cumulative effects of the proposed development. The assessment covers potential impacts during both the construction and operational phases of the development.

16.2 Methodology

16.2.1 The cumulative impact assessment undertaken for the proposal has been informed by both national legislation and guidance and local policy.

16.3 Planning Policy

Legislation

16.3.1 The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (the EIA Regulations), at Schedule 4 Part 1.4, require that Environmental statements include:

> *"A description of the likely significant effects of the development on the environment, which should cover the…..cumulative…effects of the development…."*

Guidance

16.3.2 Paragraph 50 of the 'Amended Circular on Environmental Impact Assessment' consultation paper (DCLG, June 2006) states:

> *"There are occasions where the existence of other development may be particularly relevant in determining whether significant effects are likely, and local planning authorities should always have regard to the possible cumulative effects with any existing or approved development"*

16.3.3 The European Commission document 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions' (May 1999) defines cumulative impacts as:

> *"Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project"*

16.3.4 It is this generally accepted definition of cumulative impact that has been adopted in the assessment undertaken for this chapter.

16.3.5 The assessment methodology included a review of extant and unimplemented planning permissions (i.e. developments that do not form part of the existing baseline conditions) in the area to determine the potential cumulative impacts of the proposal.

16.3.6 Generally, this cumulative impact assessment impact assessment draws on the assessments undertaken for the preceding technical chapters of the ES.

16.4 Projects Considered in Assessment

16.4.1 Following a review of the existing developments in the area of the Application Site and scrutiny of the recently consented developments on the BMBC website, the following potential future developments are considered to potentially contribute to cumulative impacts:

- Erection of 3 no turbines wind farm with a height of 80m to hub and 126.5m to blade tip, including substation building and ancillary infrastructure;
- Erection of extensions to southern and western elevations of existing distribution warehouse and extension to existing surfaced car parking area;

16.5 Cumulative Effects Assessment

ASOS Fulfilment Centre

16.5.1 Immediately on adjacent land to the east and south of the site is the ASOS Fulfilment Centre. The warehouse was developed by Prologis and was constructed under Reserved Matters Approval 2005/1441 (which followed Outline Planning Permission B/03/0762/HR granted in 2003 for class B1, B2 and B8 development of the site). The existing warehouse has recently been granted planning permission for an extension (ref: 2012/1018). This development has a number of planning permissions associated with it, the latest of which is an extension to the southern and western elevations of existing distribution warehouse and extension to existing surfaced car parking area, which was granted by BMBC in September 2012.

16.5.2 The development proposed by this application will have potential cumulative visual impact in combination with the ASOS Fulfilment Centre consented development.

16.5.3 Due to the predominant industrial and commercial land uses surrounding the site, there is a low density of sensitive receptors.

16.5.4 The Landscape and Visual Impact Assessment (LVIA) undertaken for this proposal has taken the neighbouring ASOS Fulfilment Centre into account in determining the potential visual impact of the proposed REC. The LVIA concludes that the proposal will have a slight adverse landscape impact and slight moderate adverse visual impact.

16.5.5 The Transport Assessment undertaken for this proposal also includes the ASOS Fulfilment Centre in its baseline generation figures. The Transport Assessment concludes that, in

combination with the existing baseline traffic flows, the proposal will have an acceptable transport impact on the road network.

16.5.6 Consequently, there are not considered to be any significant cumulative effects related to the consented ASOS Fulfilment Centre.

16.6 Intensification of Use or Development

16.6.1 The proposed REC will be constructed to a maximum operating capacity which corresponds to the capacity for which planning permission is currently being sought. The associated Environmental Permit applications will also seek permission to operate to the proposed capacity. It will not be possible to operate the facility in exceedance of the limits specified on the planning permission and Environmental Permit for the facility.

16.6.2 The construction of the facility will also be in accordance with the plans and specifications detailed in the Planning and Environmental Permit applications. The development of the application site has been designed comprehensively to take account of the features and constraints of the site, the operational requirements of the facility and the outcomes of the environmental assessments undertaken for this ES.

16.6.3 Any further development of the site, either in terms of capacity of the facility or intensification of built form or activity on the site, would require revisions to the Environmental Permit and planning permission currently being sought. The impact of the change proposed would therefore need to be considered at that time. It is therefore not considered likely that development on the site could significantly intensify without the implications of such intensification being considered through the planning and permitting processes.

16.7 Conclusions

16.7.1 This assessment of potential cumulative impacts identified 1 development that, in combination with the development proposed by this application, have the potential to result in actual cumulative impacts. When considered in combination with the proposed development, it was determined that there were potential cumulative visual, traffic, noise and air quality impacts.

16.7.2 The respective assessments undertaken and detailed in this ES conclude that the level of cumulative impact, taking into consideration the proposed development and those existing/consented developments detailed above, will be at an acceptable level and that significant cumulative Impacts are unlikely to be generated.

16.7.3 The assessment of potential intensification of use or development on site concludes that the imposition of conditions on any planning permission and Environmental Permit issued for the development will mean that the proposed activity will be controlled to a level that the

activity cannot change the scale and/ or nature of its activities without undergoing a comprehensive re-consenting process.

16.7.4 The potential cumulative impacts of the proposed are therefore considered to be acceptable.

17 Chapter 17: Summary and Conclusion

17.1 Introduction

17.1.1 This ES provides details of the EIA carried out for the proposed development of the Houghton Main Renewable Energy Centre (REC) on land off Houghton Main Colliery Roundabout, Park Spring Road, Houghton Main, Barnsley. The ES provides a description of the proposed development, an assessment of the likely and potential environmental impacts arising from the development, both during construction and operation of the development, and outlines proposed measures incorporated into the design to avoid, reduce and/or mitigate the adverse impacts of the proposal.

17.1.2 It is proposed to construct and operate the REC on 3.0 hectares of land that was previously part of the Houghton Main Colliery. The development will comprise a Timber Resource Recovery Centre, receiving 150,000 tpa of biomass to export 20MW of electrical energy via a highly efficient advanced gasification process.

17.1.3 The scope and methodology for the assessments undertaken to inform this ES were developed in consultation with the LPA, BMBC, and other relevant statutory consultees. This was achieved through both informal scoping and the submission of a formal scoping request to the LPA undertaken to support preparation of planning application 2014/0559 and confirmed with BMBC to support preparation of revised proposals. A formal Scoping request has also been submitted in January 2015. Details of the consultation undertaken with various stakeholders are provided in the relevant chapters of this ES.

17.1.4 This ES is presented in the form of a main report – Volume 1, in accordance with the EIA Regulations, Volume 2 a Non-Technical Summary which sets out the main findings of the ES in accessible (i.e. non-technical) language and Volume 3 technical appendices. Volume 1 of the ES is comprised of individual chapters which report the findings of detailed assessments contained in Volume 3 of the ES undertaken in relation to transport, ecology, air quality etc.

17.1.5 This chapter provides an overall summary of the impacts of the proposal and draws on the preceding chapters to propose a coherent and balanced strategy to ensuring the development can take place whilst having acceptable environmental impacts. This summary considers the impacts both at construction and operational phases of the project.

17.1.6 The EIA undertaken for the development and reported in this ES provides a number of mitigation measures that will be employed to ensure the environmental impacts of the proposal are not significant. All mitigation measures can be put in place without conflicting with any other proposed measure. This will ensure the development is undertaken in a coherent and complimentary manner and that no cross-disciplinary issues arise.

17.2 Conclusion

17.2.1 The assessments contained within this ES, and the summary put forward in this chapter, conclude that the development as proposed can be undertaken without creating any significant adverse environmental impact.