



RETFORD CIRCULAR ECONOMY PROJECT

VOLUME 1

13. AIR QUALITY

FEBRUARY 2023

13 CHAPTER 13 AIR QUALITY

13.1 INTRODUCTION

This Chapter of the Environmental Statement (ES) evaluates the effects of the Proposed Development on Air Quality. This assessment was undertaken by ACCON UK Limited (ACCON).

This Chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Development Design Mitigation
- Assessment of Likely Effects;
- Mitigation Measures and Residual Effects;
- Cumulative Effect Assessment;
- Summary of Likely Effects; and
- Statement of Significance.

This Chapter of the EIA Report is supported by the following **figures in Volume 2 and appendices in Volume 3**.

Figures

- Figure 13.1: Representative Existing Sensitive Receptor Locations ER1 to ER8
- Figure 13.2: Representative Existing Sensitive Receptor Locations ER9 to ER11
- Figure 13.3: Representative Existing Sensitive Receptor Locations ER12 to ER16
- Figure 13.4: Representative Existing Sensitive Receptor Locations ER17 and ER18
- Figure 13.5: Representative Ecological Sensitive Receptor Locations Figure

Appendices

- Appendix 13.1: Glossary of Terms
- Appendix 13.2: Air Quality Standards
- Appendix 13.3: 2019 Doncaster Sheffield Airport Wind Rose
- Appendix 13.4: Results of Modelling
- Appendix 13.4.1: Modelled 2024 NO₂ Concentrations - Baseline and Operational traffic - Existing Receptors
- Appendix 13.4.2: Modelled 2024 NO₂ Concentrations - Baseline and Construction traffic - Existing Receptors
- Appendix 13.4.3: Modelled 2024 PM₁₀ Concentrations – Existing Receptors
- Appendix 13.4.4: Modelled 2024 PM_{2.5} Concentrations – Existing Receptors
- Appendix 13.4.5: Modelled 2024 NO_x, Concentrations – Ecological Receptors
- Appendix 13.5: ACCON Air Quality Assessment
- Appendix 13.6: Lound PFA Processing Facility - Environmental Permit Application - Dust Impact Assessment - Prepared For: Lound Hive Limited – SLR Ref: 416.V5954400001 Version No: v0.1, January 2023
- Appendix 13.7: Lound PFA Processing Facility - Environmental Permit Application - Dust Management Plan - Prepared for: Lound Hive Ltd - SLR Ref: 416.V59544.00001, Version No: 1.0, January 2023

LEGISLATION, POLICY AND GUIDANCE

The following guidance, legislation and information sources have been considered in carrying out this assessment:

- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1)
- Defra, 2022, Local Air Quality Management Technical Guidance (TG22)
- The Stationary Office (2000) Statutory Instrument 2000, The Air Quality (England) Regulations 2000, London
- The Stationary Office (2002) Statutory Instrument 2002, The Air Quality (England) (Amendment) Regulations 2002, London
- Moorcroft and Barrowcliffe. et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London
- United Kingdom National Air Quality Strategy (NAQS)
- DEFRA, 2019, The Clean Air Strategy 2019
- The Environment Act 2021
- Environmental Permitting (England and Wales) Regulations (2016) as amended (the EPR).
- Air emissions risk assessment for your environmental permit (<https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.)
- Section 79 - Part III of the Environmental Protection Act (EPA) 1990 (as amended)
- Ministry of Housing, Communities and Local Government, 2019, National Planning Policy Framework
- GOV.UK. (2014). Air quality Planning Practice Guidance (PPG). [online] Available at: <https://www.gov.uk/guidance/air-quality--3> [Accessed 10 December 2022].
- Local Planning Policy - Bassetlaw Local Plan 2020-2037
- Land-Use Planning & Development Control: Planning for Air Quality (IAQM, 2017)
- IAQM, Guidance on the Assessment of Mineral Dust Impacts for Planning, V1.1, May 2016.
- Nottinghamshire Spatial Planning and Health Framework 2019- 2022

13.2 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

13.2.1 Scoping Responses and Consultations

Consultation for this EIA Report topic was undertaken with the organisations shown in **Table 13.1**.

Table 13.1: Scoping and Consultation Response

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Nottinghamshire County Council	04/11/2022	An air quality (and dust) assessment should be included as proposed. In this instance the MWPA has no specific technical advice to offer on the proposed approach and methodology to assessing air quality impacts, however the Institute of Air Quality Management (IAQM) 'Guidance on the Assessment of Mineral Dust Impacts for Planning, along with the guidance contained within the Planning Practice Guidance in respect of dust emissions at minerals development would appear relevant. It may be worth the applicant approaching the	This chapter includes both traffic and dust impacts of the construction, operational, restoration and decommissioning phases of the

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		<p>Environmental Health Office at Bassetlaw District Council. Please also see the annual air quality reports at: https://data.bassetlaw.gov.uk/airquality-management.aspx</p> <p>The assessment should establish the existing background conditions and identify potentially sensitive receptors- including residential properties, users of the public rights of way and sensitive habitats.</p> <p>Potential emissions arising from the proposed development could include the use of fixed and mobile processing plant, as dust (PM₁₀ and PM_{2.5}), and from HGV movements to/from the site. Emissions could be localised, but adjacent habitats within the SSSI could be sensitive to changes and from dust deposition. Additional HGV movements along the Great North Road (or through Lound) could raise off-site concerns in relation to increased air pollution through road-side communities.</p> <p>Clear means of controlling and mitigating emissions, particularly dust, need to be worked up and presented. Proposals for ongoing monitoring and reporting should also be developed, but final details could be conditioned.</p>	Proposed Development.
Natural England – Advice for Scoping	04/11/2022	<p>Air quality in the UK has improved over recent decades but air pollution remains a significant issue. For example, approximately 85% of protected nature conservation sites are currently in exceedance of nitrogen levels where harm is expected (critical load) and approximately 87% of sites exceed the level of ammonia where harm is expected for lower plants (critical level of 1µg)¹. A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The Government’s Clean Air Strategy also has a number of targets to reduce emissions including to reduce damaging deposition of reactive forms of nitrogen by 17% over England’s protected priority sensitive habitats by 2030, to reduce emissions of ammonia against the 2005 baseline by 16% by 2030 and to reduce emissions of NO_x and SO₂ against a 2005 baseline of 73% and 88% respectively by 2030. Shared Nitrogen Action Plans (SNAPs) have also been identified as a tool to reduce environmental damage from air pollution.</p> <p>The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk).</p>	Both human and ecological receptors have been considered in the assessment.

¹ Report: Trends Report 2020: Trends in critical load and critical level exceedances in the UK - Defra, UK

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		<p>Information on air pollution modelling, screening and assessment can be found on the following websites:</p> <ul style="list-style-type: none"> • SCAIL Combustion and SCAIL Agriculture - http://www.scail.ceh.ac.uk/ • Ammonia assessment for agricultural development https://www.gov.uk/guidance/intensivefarming-risk-assessment-for-your-environmental-permit • Environment Agency Screening Tool for industrial emissions https://www.gov.uk/guidance/airemissions-risk-assessment-for-your-environmental-permit • Defra Local Air Quality Management Area Tool (Industrial Emission Screening Tool) – England http://www.airqualityengland.co.uk/laqm 	

13.2.2 Study Area / Survey Area

The Site is located approximately 500m south of the village of Lound and 400m south east of the village of Sutton-cum-Lound. Retford is located approximately 1.5km south of the Site. The Site is centred at approximately National Grid Reference (NGR): SK 69404 84864. The Site is located within the administrative area of Bassetlaw District Council (BDC) on land that is split between the 'Low-Rise' to the east (7.5 – 11 m AOD) and the 'High-Rise' to the centre and west (17 – 19 m AOD). The Site is also well screened owing to a combination of topography and existing vegetation, including tree planting and hedgerows along its perimeter, and woodland blocks and hedgerows in the surrounding area.

The study area around the Site has been defined to include the nearest residential and ecological sensitive receptors. Properties that are located within the vicinity of haulage roads during both construction, operational and restoration phases have also been considered. Road traffic data was provided by Arcus.

There are no National Site Network sites within 5km of the Site boundary, however there are two national statutory designated sites within 2km of the Site boundary; Sutton and Lound Gravel Pits SSSI, directly south and 0.3km north east, and Retford Cemetery, 1.4km southeast.

There are eight non-statutory sites within 2 km of the Site boundary, all Local Wildlife Site (LWS). In addition, the Idle Valley Nature Reserve is adjacent to the Site, which, although not a designated site, is managed for its value to biodiversity.

The Site is bounded by:

- Lound Low Road on which Wetlands Fisheries is located. Also Idle Valley Nature Reserve envelopes the site on its southern and eastern boundaries The southern boundary of the Site coincides with the Sutton & Lound Gravel Pits SSSI and the Idle Valley Nature Reserve through which the River Idle flows with a number of large surface water features associated with former minerals workings alongside.;
- Further south still, lies Hallcroft; and
- a collection of residential dwellings among agricultural land lies to the west as well as Sutton-cum-Lound.

The cumulative effects related to air quality are assessed in the context of other developments within 5km of the Site. Cumulative effects in this context are generally related to the traffic generation of multiple schemes, or effects such as multiple developments being constructed within proximity to one another. 5km is therefore considered to be the likely maximum distance over which these effects may occur.

This chapter addresses the comments made by NCC and focuses on the impact of Traffic emissions stemming from construction traffic and dust arising primarily from the extraction and restoration phases of the Proposed Development for both human and ecological receptors.

13.2.3 Methodology

Traffic Emissions

For the traffic emissions, the UK, DEFRA provides guidance on the most appropriate methods to estimate pollutant concentrations for use in Local Air Quality Management (LAQM). DEFRA regularly updates its Technical Guidance, with the latest LAQM Technical Guidance (TG22) published in August 2022. The methodology in LAQM.TG22, directs air quality professionals to a number of tools published by DEFRA to predict and manage air quality. For example, it is necessary to use the updated NO_x to NO₂ calculator to derive NO₂ concentrations from the NO_x outputs from Breeze Roads modelling. This is because NO₂ concentrations within the model are predicted using the CALINE4 NO_x to NO₂ conversion methodology, which should not be used within the model as current evidence shows that the proportion of primary NO₂ in vehicle exhausts has increased since the model was developed, which would affect the relationship between NO_x and NO₂ at roadside locations.

In order to determine the extent to which air quality issues would affect the Proposed Development of the site, the study has considered the following:

- Any air quality measurements carried out in the area near the proposed development; and
- The most recent Air Quality Review and Assessment Reports from BDC.

Dust Emissions

The assessment of fugitive dust emissions from the Proposed Development (Dust Impact Assessment in Appendix 13.6) has been undertaken on the basis of a Source-Pathway-Receptor (S-P-R) conceptual model as outlined in the document 'IAQM Assessment of Mineral Dust Impacts for Planning'. The conceptual model takes into consideration the potential dust sources, surrounding sensitive receptors and the pathway effectiveness between source(s) and receptor(s) in order to assess the magnitude of dust impact risk.

Specifically, the following aspects are considered:

- the type of activities proposed on site, including designed-in mitigation measures, in order to determine:
- the potential magnitude of releases in general terms and the nature of that release; the location of receptors in the surrounding area with specific consideration of the type of receptor and therefore their potential sensitivity to dust;
- the pathway between source and receptors incorporating the buffer distance between receptors and any mitigating features and the frequency of meteorological conditions likely to result in the dispersion of emissions towards receptors (i.e., dry periods where wind speeds are low); and
- following determination of dust impact risk, the guidance provides a framework from which to determine impact significance.

Traffic

13.2.4 Breeze Roads Modelling of Pollutant Concentrations

Dispersion modelling has been undertaken using Breeze Roads to determine air quality concentrations across the Site. Breeze Roads is an air dispersion modelling software suite that predicts air quality impacts of carbon monoxide (CO), nitrogen dioxide, particulate matter (PM), and other inert pollutant concentrations from moving and idling motor vehicles at or alongside roadways and roadway intersections.

Breeze Roads can be used in conjunction with the MOBILE5, EMFAC emission models or other emissions data, to demonstrate compliance with the UK's National Air Quality Strategy. Breeze Roads predicts air pollutant concentrations near highways and arterial streets due to emissions from motor vehicles operating under free-flow conditions and idling vehicles. In addition, 1-hour and running 8-hour averages of CO or 24-hour and annual block averages of PM₁₀ can be calculated.

13.2.5 Model Set-up Parameters

The most recent Emissions Factor Toolkit (EFT, version 11.0, November 2021) issued by DEFRA was used to derive emissions rates (in grams per kilometre) for vehicle movements along roads incorporated into the model.

Briefly, the changes between v10.1 and 11.0 are as follows:

- EFT 11.0 allows users to define Input Years up to 2050.
 - 2031 - 2050 outputs are limited to England (not London) only.
 - Emissions outputs for the years 2031-2050 are provided in support of climate assessments and appraisals only. Where emissions are to be used after 2030 to inform air quality assessments, the appropriate caveats around the limitations of the analysis must be included to accompany the assessment.
- It is noted that the default fleet projections in EFT v11.0 are based on fleet growth assumptions which were current before the Covid-19 outbreak in the UK. In consequence, default fleet outputs from the tool do not reflect short- or longer-term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.
- Meteorological data from Doncaster Sheffield Airport (2019) has been utilised for the dispersion modelling, which is considered representative of the development area, and the wind rose is shown in **Volume 13, Appendix 13.3**.

13.2.6 Assessment Criteria

Traffic

For the purposes of the traffic assessment, the limit values assigned to individual pollutants as set out in the Air Quality Standards Regulations 2010 form the basis of the air quality assessment. The limit values are based on an assessment of the effects of each pollutant on public health. Therefore, they are a good indicator in assessing whether, under normal circumstances, the air quality in the vicinity of a development is likely to be detrimental to human health.

Dust

For the purposes of dust, the assessment the limit values in the IAQM, Guidance on the Assessment of Mineral Dust Impacts for Planning, V1.1, both for human and ecological receptors.

13.3 BASELINE CONDITIONS

Traffic

13.3.1 Proposed Development

The Proposed Development includes the extraction of PFA from the former ash disposal lagoons. The PFA, which is a waste, would be treated by dewatering as necessary, screening/shredding and drying at the Main Processing Site (Area C) to make it suitable as an end-of-waste material for recovery as a cement replacement and potentially other sustainable building products. The Proposed Development would process approximately 300,000 tonnes per annum (tpa) of PFA.

13.3.2 Local Air Quality Monitoring

BDC monitors local air quality through an automatic monitor and diffusion tube monitoring network. The monitoring sites chosen for verification of the air quality modelling were located where there was publicly available traffic data for these sites.

The 2019 annual mean NO₂ concentrations for the monitoring sites are identified in **Table 13.2**. The annual mean NO₂ NAQO was not exceeded at any of the monitoring sites.

In the UK, DEFRA provides guidance on the most appropriate methods to estimate pollutant concentrations for use in Local Air Quality Management (LAQM). DEFRA regularly updates its Technical Guidance, with the latest LAQM Technical Guidance (TG22) published in August 2022. The methodology in LAQM.TG22, directs air quality professionals to a number of tools published by DEFRA to predict and manage air quality. For example, it is necessary to use the updated NO_x to NO₂ calculator to derive NO₂ concentrations from the NO_x outputs from Breeze Roads modelling. This is because NO₂ concentrations within the model are predicted using the CALINE4 NO_x to NO₂ conversion methodology, which should not be used within the model as current evidence shows that the proportion of primary NO₂ in vehicle exhausts has increased since the model was developed, which would affect the relationship between NO_x and NO₂ at roadside locations.

In order to determine the extent to which air quality issues will affect the development of the Site, the study has considered the following:

- Any air quality measurements carried out in the area near the proposed development; and

- The most recent Air Quality Review and Assessment Reports from Bassetlaw District Council.

Table 13.2: Local Monitoring Data Suitable for Model Verification

Monitor Site	Grid Reference		2019 Annual Mean NO ₂ (µg/m ³)	2019 Data Capture (%)
	X	Y		
25 London Road Junction, Retford	470759	380698	24.7	92
26 Hospital Road, Retford	470095	381292	30.1	100
27 Arlington Way / Grove Street, Retford	470793	381106	28.7	100

13.3.3 Background Concentration of Air Pollutants

Background concentrations of air pollutants for the modelling were obtained from the DEFRA pollutant concentration maps². **Table 13.3** identifies the background pollutant concentrations at the proposed site at the associated 1km x 1km grid. All of the estimated background concentrations for the annual mean NO₂ and PM₁₀ used in the assessment are significantly below the annual mean objective limit of 40µg/m³ in 2019 and 2024.

Table 13.3: Background Concentrations of Pollutants

Location and Year	NO _x µg/m ³	NO ₂ µg/m ³	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³
Verification 2019 470500, 380500	15.99	11.92	14.36	8.84
Verification 2019 470500, 381500	15.16	11.39	13.91	8.63
Site and ecological receptors - 2024 468500, 383500	9.75	7.57	14.91	8.01
Site 2024 468500, 384500	10.12	7.83	14.82	8.51
Site 2024 469500, 385500	9.79	7.59	14.19	8.30
Site 2024 470500, 384500	8.63	6.75	15.18	8.07
Site 2024 470500, 385500	8.56	6.70	14.29	7.88
Existing receptors ER1 & ER2 - 2024 465500, 388500	10.79	8.31	15.26	8.30
Existing receptors – ER3 to ER8 - 2024 465500, 387500	9.51	7.41	14.70	7.98
Existing receptors – ER9 to ER11 - 2024 465500, 386500	9.31	7.26	15.07	8.03
Existing receptors – ER12 to ER16 - 2024	9.53	7.42	14.18	7.83

² DEFRA, *Background Mapping Data for Local Authorities- 2019* [online] Available at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2019>
07.02.2023

Location and Year	NO _x µg/m ³	NO ₂ µg/m ³	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³
466500, 384500				
Existing receptors – ER17 and ER18 - 2024 469500, 382500	10.70	8.26	13.55	7.82
Existing receptors – ER19 and ER22 - 2024 469500, 381500	11.38	8.75	13.03	7.75

Note: In 2024 the ratio between PM₁₀ and PM_{2.5} at the Existing sensitive Receptors is 0.53 - 0.59.

13.3.4 Traffic Data

Table 13.4 identifies the estimated AADT traffic flows for roads near to the Proposed Development, with the Proposed Development fully operational. This data was provided by the Transport Consultants, Arcus.

The Proposed Development would generate approximately 136 vehicle movements per day (71% HDV) during the operational phase, and in the initial construction phase would result in an additional 50 vehicle movements per day (40% HDV). The proposed development flows have been applied to all the roads as a worst-case scenario.

Three scenarios are identified below:

- 2024 Baseline
- 2024 Baseline plus Operational Traffic
- 2024 Baseline plus Construction Traffic.

Table 13.4: 2024 Traffic Flow Data

Road	AADT Baseline No Development	HDV %	AADT Baseline plus Operational Traffic	HDV %	AADT Baseline plus Construction traffic	HDV %
A638, between Scooby and Ranskill	5,526	4.8	5,662	6.4	5,576	5.1
A638, near Torworth	5,388	6.2	5,524	7.7	5,438	6.5
A638, South of Barnby Moor	9,052	4.7	9,188	5.7	9,102	4.9
A638, Retford	16,081	2.0	16,217	2.6	-	-

13.3.5 Methodology for the Assessment of Traffic Effects

Effects on air quality can be described as direct or cumulative. The assessment aims to predict the likely effects (both beneficial and adverse) arising from the Proposed Development;

- Direct effects: changes in pollutant concentrations that can be directly linked to the Proposed Development; and
- Cumulative Effects: where the combined effect of two or more developments are of greater significance than those of the Proposed Development itself.

The significance of the potential effects of the Proposed Development has been classified by professional consideration of the sensitivity of the receptor and the magnitude of the potential effects of site traffic using the local road network.

Dust

The Dust Assessment presented in Volume 3, Appendix 13.6 represents three scenarios which have been assessed. These are based upon the progressive extraction / restoration phases and the three pre-processing site locations. The main processing site would remain operational throughout all scenarios:

- Scenario A: Extraction of PFA with pre-processing at Processing Area 1 (PA1) and transfer by ADTs to main processing site;
- Scenario B: Extraction of PFA with pre-processing at PA2 and transfer by conveyor to main processing site; and
- Scenario C: Extraction of PFA with pre-processing at PA3 and transfer by conveyor to main processing site.

13.3.5.1 Sensitivity of Receptors

The sensitivity of the baseline conditions, including the importance of environmental features on or near to the Site or the sensitivity of potentially affected receptors, has been assessed in line with best practice guidance, legislation, statutory designations and professional judgement.

The initial consideration of sensitivity of a receptor to an effect reflects the level of importance assigned to it, which allows the identification of key sensitive receptors with respect to Air Quality.

Table 13.5 details the framework for determining the sensitivity of receptors.

Table 13.5: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Human	Ecological
Very High	Low Farm/Sutton Grange Farm Bellmoor Farm and adjacent properties Cross Hand Farm, Sutton Lane Botney & Brooklyn House - North Road Wetland Fisheries	N/A
High	N/A	Sutton and Lound Gravel Pits - SSSI
Medium	N/A	Retford Cemetery
Low	N/A	Sutton and Lound - Local Wildlife Site (LWS) Idle Valley – Nottingham Wildlife

Sensitivity of Receptor	Human	Ecological
		Trust (NWT) Reserve Idle Valley Nature Centre Pond - LWS Tiln Wood Track - LWS Tiln North and the Conservation Lake - LWS River Idle Chainbridge Lane Bridge – LWS Bolham Wood – LWS Folly Dyke, Chain Bridge Lane, NW of Hayton – LWS Chesterfield Canal (Shireoaks to Welham) - LWS

13.3.5.2 Magnitude of Change

Traffic

The magnitude of potential effects has been identified through consideration of the Proposed Development, the degree of change to baseline conditions predicted as a result of the Proposed Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

In determining the magnitude of effect, the values of the asset affected are first defined. This provides the baseline against which the magnitude of change can be assessed; the magnitude of effect being proportional to the degree of change in the asset’s baseline value.

The criteria for assessing the magnitude of an effect is presented in **Table 13.6**.

Table 13.6: Framework for Determining Magnitude of Effects

Long-Term Average Concentration in Assessment Year	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Low	Medium
76-94% of AQAL	Negligible	Low	Medium	Medium
95-102% of AQAL	Low	Medium	Medium	High
103-109% of AQAL	Medium	Medium	High	High
110% or more of AQAL	Medium	High	High	High

The AQAL is the Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency ‘Environmental Assessment Level’
Table derived from the Environmental Protection UK and IAQM (2017, v1.2) – Land-Use Planning and Development Control: Planning for Air Quality Table 6.3 Table 6.3: Impact descriptors for individual receptors.

Dust

13.3.5.3 Likely Magnitude of Dust Risk

With reference to the methodology outlined in the IAQM mineral dust guidance, the likely magnitude of dust effects has been determined by consideration of the residual source emission and the pathway effectiveness for each scenario.

13.3.5.4 Significance of Effects

The sensitivity of the asset and the magnitude of the predicted change has been used as a guide, in addition to professional judgement, to predict the significance of the likely effects. **Table 13.7** summarises guideline criteria for assessing the significance of effects.

Table 13.7: Framework for Assessment of the Significance of Effects

Magnitude of Effect	Sensitivity of Resource or Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations and are shaded in light grey in **Table 13.7**.

Effects can be beneficial or adverse and these are specified where applicable in the assessment within this Chapter.

For assessing significance, consideration is given to the national, regional and local baseline situation. The magnitude of the impact is determined in proportion to the area of impact relevant to each receptor.

Potential air quality effects would be considered significant if the Proposed Development resulted in long-term increases in pollutant concentrations at sensitive receptors which are identified as "high" in **Table 13.6**.

13.3.6 Assessment Limitations

Data used to compile this report consists of data obtained from secondary information which has been derived from a variety of sources including Transport Consultants and DEFRA. The assumption is made that this secondary information is reasonably accurate.

13.4 ASSESSMENT OF LIKELY EFFECTS

13.4.1 Designed-In Mitigation Measures

Dust

The extraction, processing, transfer and storage of PFA has the potential to create dust emissions. A range of dust mitigation measures have been incorporated into the scheme process design, which are identified in **Table 13.8**.

Table 13.8: Designed-In Mitigation Measures

Site Operation / Area	Dust Control Measures
Pre-processing	Processing Areas 1-3 located >250m from any residential receptors. Finley Screen (or similar) supplied with canvas dust covers on mains and fines conveyor. Constructed hard standing area of ~6,000 m ² to allow surface to be swept and effectively watered. 3-sided bays for storage and turning of PFA No stockpiles of PFA to remain at the end of each working day
Main Processing Site	Hard paved to allow surface to be swept and effectively watered. Designated collection area Enclosed material storage building, kept under negative pressure with extraction system fitted with filters. All processing plant fully enclosed, with the exhaust from the dryers passing through cyclone and fabric filters prior to release to atmosphere/condensation. PFA transfer fully enclosed via covered conveyors / piping.
Material transfer	Transfer of PFA done by fully covered conveyor under normal operations (with exception of HR P1)
General	Water availability at all times on site with a dust suppression system utilising a tractor and bowser for all internal roads, stockpiles and surfaces, where practicable.
Soil and overburden storage	Designated areas on site. Graded and vegetated at the earliest opportunity.
On-Site transportation	Minimal use of internal unpaved haulage route following the completion of the optimisation phase (PFA haulage undertaken by covered conveyor under normal operations). Material transfer using articulated dump truck only to be utilised during optimisation phase and as contingency scenario.
Off-Site transportation	All vehicles exiting site to utilise wheel wash located adjacent to weighbridge. >400m of hard paved access road between wheel wash and local road network. No road-bound vehicles to access unpaved roads on site (i.e., areas north of the Main Processing Site). All material transferred off site contained either by powder tankers or sheeted wagons. Road sweeper on site for use on local road network, access road and main processing area, as required.

13.4.2 Construction Effects/Operational Scenario A

Traffic

The effects resulting from the construction phase would result in an additional 50 vehicles movements per day (40% HGV). This traffic would access and leave the Site utilising the A638 and not minor roads. This would reduce the temporary effects on sensitive receptors to being of **neutral significance**.

Dust

The likely significance of effects as a result of dust generation during Scenario A of the Proposed Facility is therefore considered '**not significant**' at all identified and considered receptor locations in accordance with the IAQM guidance.

13.4.3 Operational and Restoration Effects/Operational Scenarios B and C

Traffic

The operational and restoration effects of the Proposed Development is not predicted to result in any exceedances of relevant AQS objectives for sensitive human receptors (NO₂ & PM₁₀ 40µg/m³) or sensitive ecological receptors NO_x (30µg/m³)) with the Proposed Development fully operational (worst-case in 2024). This would reduce the effects of the whole life of the project at sensitive receptors to being of **neutral significance**.

Dust

The likely significance of effects as a result of dust generation during Scenario B of the Proposed Facility is therefore considered '**not significant**' at all identified and considered receptor locations in accordance with the IAQM guidance.

The likely significance of effects as a result of dust generation during Scenario C of the Proposed Development is therefore considered '**not significant**' at all identified and considered receptor locations in accordance with the IAQM guidance.

13.5 CUMULATIVE EFFECTS ASSESSMENT

Traffic

The appropriate scale for considering cumulative development depends on the nature of the potential effect.

There are a number of development sites, either consented or in the planning process, as set out in **Table 13.9**.

Dust

Residual dust effects are those impacts that cannot be reasonably mitigated. Appropriate dust mitigation and controls are proposed as part of the Proposed Development design. Such measures are generally accepted by regulatory bodies and the mineral industry and provide effective control against the impacts of airborne dust.

The implementation of the dust controls and recommendations in **Appendix 13.7** and measures provided in the OCEMP, would result in a negligible risk of adverse effects during the construction and operation of the Proposed Development for the development sites identified in **Table 13.9**.

Table 13.9: Cumulative Developments to be taken into Account

Reference Number	Authority	Address	Description	Distance/ direction from Boundary	Status
SC/3827	Nottinghamshire County Council	Land at Botany Bay, Retford	Scoping request for sand and gravel quarry, establishment of new plant site (with establishment of use of ancillary facilities including a new site access off the A638) and restoration to a combination of agricultural and water-based nature conservation after-uses	1.81km southwest of the Site	Scoping Opinion given - 20/04/2018
17/01509/FUL	Bassetlaw District Council	Land North of Chainbridge Road Lound Nottinghamshire	Retain Engineering Operations to Sub-Divide Lake into Four Smaller Lakes, Including Dredging of Lake to Achieve Original Depth of 1.5 metres	1.09 km north of the Site	Approved - Mon 27 Apr 2020
18/01442/OUT	Bassetlaw District Council	Land South Of Broad Gores Clarborough Nottinghamshire	Outline Planning Application with Some Matters Reserved (Approval Being Sought for Access) Proposed Residential Development	3.62 km east of the Site	Awaiting decision
20/01405/FUL	Bassetlaw District Council	Tiln Farm Land Tiln Lane Retford Nottinghamshire	Installation and Operation of a Solar Farm with all Associated Works, Equipment and Necessary Infrastructure	1.2km East of the Site	Approved - Fri 19 Feb 2021
21/00508/VOC			Variation of Conditions 2, 3, 4, 12, 13 and 14 of P.A. 20/01405/FUL to Amend the Location, Design and Elevations and Retention of the 132kV Substation and Associated Access Beyond the Temporary 40 Years to a Permanent Basis		Approved - Mon 05 Jul 2021
19/00157/SCR	Bassetlaw District Council	Land North of Bigsby Road Retford Nottinghamshire	Screening Opinion - Erect 171 Dwellings	3.04 km southeast of the Site	Not EIA - Mon 25 Feb 2019
22/01698/FUL	Bassetlaw District Council	Land Adjacent to Bellmoor Farm Lound Low Road Sutton Cum	Erection of 4 Holiday Lodges, Fish Welfare/Reception/Equipment Store, Driveway and Car Parking Area	0.1 km west of the Site	Planning application submitted 20th December 2022

		Lound Retford Nottinghamshire DN22 8SD			(resubmission of a 2018 planning permission)
--	--	--	--	--	---

13.6 MITIGATION AND RESIDUAL EFFECTS

13.7 SUMMARY OF EFFECTS

The air pollutant concentration modelling has identified that there would be negligible increases in nitrogen dioxide and particulate matter concentrations at ecological and existing sensitive receptors as a result of the traffic from the extraction site. There are no sensitive ecological or human receptor locations which would exceed the AQO, both during the construction phase and as a result of the extraction processes within the Proposed Development.

Traffic

Air quality impacts from the Proposed Development are considered to be acceptable, and mitigation is not required.

Dust

The dust assessment has considered the potential impacts of dust on air quality and local amenity associated with the proposed PFA extraction and processing facility. The potential impact associated with the dust emissions on human and ecological receptor locations within the Site locale have been assessed used methodologies as outlined within the IAQM minerals dust guidance.

The conclusions of the assessment are that the proposed operations would result in a '**not significant**' effect with regard to dust at sensitive receptors within the Site locale, in consideration of the designed-in and recommended mitigation measures as described in the Dust Management Plan in **Volume 3, 13.5**.

Table 13.10 provides a summary of effects detailed within this chapter.

Table 13.10: Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Construction Phase				
Low Farm/Sutton Grange Farm	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Bellmoor Farm and adjacent properties	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Cross Hand Farm, Sutton Lane	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Botney & Brooklyn House - North Road	Effects on ambient	Negligible, negative	Traffic will access and leave the site	Negligible, negative

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
	pollutant concentrations on existing residential receptors		utilising the A638 and not minor roads.	
Wetland Fisheries	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Sutton and Lound Gravel Pits - SSSI	Effects on ambient pollutant concentrations on existing ecological receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Retford Cemetery	Effects on ambient pollutant concentrations on existing ecological receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Sutton and Lound - Local Wildlife Site (LWS) Idle Valley – Nottingham Wildlife Trust (NWT) Reserve Idle Valley Nature Centre Pond - LWS Tiln Wood Track - LWS Tiln North and the Conservation Lake - LWS River Idle Chainbridge Lane Bridge – LWS Bolham Wood – LWS Folly Dyke, Chain Bridge Lane, NW of Hayton – LWS Chesterfield Canal (Shireoaks to Welham) - LWS	Effects on ambient pollutant concentrations on existing ecological receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Low Farm/Sutton Grange Farm	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Bellmoor Farm and adjacent properties	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Cross Hand farm, Sutton Lane	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Botney & Brooklyn House - North Road	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Wetland Fisheries	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Sutton and Lound Gravel Pits - SSSI	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Retford Cemetery	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Sutton and Lound - Local Wildlife Site (LWS) Idle Valley – Nottingham Wildlife Trust (NWT) Reserve Idle Valley Nature Centre Pond - LWS Tiln Wood Track - LWS Tiln North and the Conservation Lake - LWS River Idle Chainbridge Lane Bridge – LWS Bolham Wood – LWS Folly Dyke, Chain Bridge Lane, NW of Hayton – LWS Chesterfield Canal (Shireoaks to Welham) - LWS	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Wetland Fisheries	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Appendix 13.7).	Negligible, negative
Operational Phase				
Low Farm/Sutton Grange Farm	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Bellmoor Farm and adjacent properties	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Cross Hand farm, Sutton Lane	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Botney & Brooklyn House - North Road	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Wetland Fisheries	Effects on ambient pollutant concentrations on existing residential receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Sutton and Lound Gravel Pits - SSSI	Effects on ambient pollutant concentrations on existing ecological receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Retford Cemetery	Effects on ambient pollutant concentrations	Negligible, negative	Traffic will access and leave the site	Negligible, negative

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
	on existing ecological receptors		utilising the A638 and not minor roads.	
Sutton and Lound - Local Wildlife Site (LWS) Idle Valley – Nottingham Wildlife Trust (NWT) Reserve Idle Valley Nature Centre Pond - LWS Tiln Wood Track - LWS Tiln North and the Conservation Lake - LWS River Idle Chainbridge Lane Bridge – LWS Bolham Wood – LWS Folly Dyke, Chain Bridge Lane, NW of Hayton – LWS Chesterfield Canal (Shireoaks to Welham) - LWS	Effects on ambient pollutant concentrations on existing ecological receptors	Negligible, negative	Traffic will access and leave the site utilising the A638 and not minor roads.	Negligible, negative
Low Farm/Sutton Grange Farm	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative
Bellmoor Farm and adjacent properties	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative
Cross Hand farm, Sutton Lane	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative
Botney & Brooklyn House - North Road	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative
Wetland Fisheries	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Sutton and Lound Gravel Pits - SSSI	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative
Retford Cemetery	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative
Sutton and Lound - Local Wildlife Site (LWS) Idle Valley – Nottingham Wildlife Trust (NWT) Reserve Idle Valley Nature Centre Pond - LWS Tiln Wood Track - LWS Tiln North and the Conservation Lake - LWS River Idle Chainbridge Lane Bridge – LWS Bolham Wood – LWS Folly Dyke, Chain Bridge Lane, NW of Hayton – LWS Chesterfield Canal (Shireoaks to Welham) - LWS	Dust soiling from both dust soiling and trackout	Negligible, negative	Implementation of the dust management plan (Volume 3, Appendix 13.7).	Negligible, negative

13.7.1 Summary of Cumulative Effects

The human receptors at Low Farm/Sutton Grange Farm, Bellmoor Farm and adjacent properties, Cross Hand Farm, Sutton Lane, Wetland Fisheries and Botney and Brooklyn House - North Road would not be impacted by the traffic generation or dust from the construction, operation or restoration phases of the Proposed Development.

The ecological receptors at Sutton and Lound Gravel Pits – SSSI, Retford Cemetery, Sutton and Lound - Local Wildlife Site (LWS), Idle Valley – Nottingham Wildlife Trust (NWT) Reserve, Idle Valley Nature Centre Pond – LWS, Tiln Wood Track – LWS, Tiln North and the Conservation Lake – LWS, River Idle Chainbridge Lane Bridge – LWS, Bolham Wood – LWS, Folly Dyke, Chain Bridge Lane, NW of Hayton – LWS and Chesterfield Canal (Shireoaks to Welham) – LWS would also not be impacted by the traffic

generation or dust from the construction, operation or restoration phases of the Proposed Development.

There would also be negligible effects with the other cumulative developments in construction or occupied/operational.

13.8 STATEMENT OF SIGNIFICANCE

The Chapter has identified potential significant effects at the closest human and ecological sensitive receptors. These significant effects can be reduced through the implementation of those mitigation measures and through the consideration of the additional information (see **Appendix 13.7**) as set out in this Chapter.

The main air quality impacts predicted within this Chapter are due primarily to the increase of HGVs on the local road network and the extraction of the PFA .

Mitigation options have been identified and discussed in this chapter.

Additionally, the air quality and dust impact assessments contained within this chapter have considered the worst-case scenarios.

Therefore, in conclusion, the significance of effects due to the Proposed Development are as follows:

- The significance of effects on human and ecological receptors due to construction activities is considered to be of **negligible significance**.
- The significance of effects on human and ecological receptors due to operational phases is considered to be of **negligible significance**.
- The significance of effects on human and ecological receptors due to restoration phases is considered to be of **negligible significance**.