Dispersion Modelling Assessment

Enterprise Drive, Chesterfield

Client: EHS Projects Ltd

Reference: 10665-1r1

Date: 10th June 2026

Report Issue

Report Title: Dispersion Modelling Assessment - Enterprise Drive, Chesterfield

Report Reference: 10665-1

Field	Report Version			
	1	2	3	4
Authored by	Pearl Hutchinson			
Position	Director			
Reviewed by	Jethro Redmore			
Position	Director			
Authorised by	10th June 2026			
Position	-			

Serendipity Labs, Building 7, Exchange Quay, Salford, M5 3EP

info@red-env.co.uk | 0161 706 0075 | www.red-env.co.uk

Executive Summary

Redmore Environmental Ltd was commissioned by EHS Projects Ltd to undertake a Dispersion Modelling Assessment in support of an Environmental Permit Application for the CBE+ facility, Enterprise Drive, Chesterfield.

Operations at the CBE+ facility comprise multiple chemical and electrochemical plating lines, including several treatment vats with a combined volume greater than thirty cubic metres. As this exceeds the regulatory threshold under the Environmental Permitting (England and Wales) Regulations (2016) for surface treatment of metals and plastics, the site requires an Environmental Permit from the Environment Agency to regulate emissions to air and other environmental impacts associated with these activities.

An H1 Assessment has been undertaken in order to assess the impact of emissions from the facility on air quality. This predicted exceedences of the relevant screening criteria for several substances. As such, a Dispersion Modelling Assessment was undertaken in order to further evaluate potential effects.

Dispersion modelling was undertaken in order to predict pollutant concentrations and deposition at human and ecological locations as a result of emissions from the facility. The results indicated that impacts were not predicted to be significant at any receptor location in the vicinity of the site, subject to implementation of a derived maximum permissible concentration for oxides of nitrogen emissions.

Table of Contents

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by EHS Projects Ltd to undertake a Dispersion Modelling Assessment in support of an Environmental Permit Application for the CBE+ facility, Enterprise Drive, Chesterfield.

1.2 Site Location

1.2.1 The site is located at the CBE+ facility, off Enterprise Drive, Chesterfield, at National Grid Reference (NGR): 442632, 366552. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.3 Context

1.3.1 The CBE+ facility undertakes a range of activities including pre-production design and material sourcing, machining, specialist metal finishing through multiple plating processes, as well as heat treatment, testing, painting and final inspection and packaging. A key part of operations is the use of multiple chemical and electrochemical plating lines, comprising 37 treatment vats with a combined volume greater than 30m³. As this exceeds the regulatory threshold under the Environmental Permitting (England and Wales) Regulations 2016 (Schedule 1, Chapter 2, Section 2.3, Part A(1)(a)) for surface treatment of metals and plastics, the site requires an Environmental Permit to regulate emissions to air and other environmental impacts associated with these activities.

1.3.2 The emission points serving the facility are:

- A2 (Metal Plating Line 1);
- A3 (Metal Plating Line 2);
- A4 (Metal Plating Line 2a);
- S2 (Metal Plating Line 4);
- A5 (Stripping Line); and,
- S1 (Paint Spray Booth Exhausts).

1.3.3 An H1 Assessment has been undertaken in order to assess the impact of emissions from the facility on air quality. This predicted exceedences of the Environment Agency (EA) screening criteria for the following pollutants:

- Nickel (Ni);
- Nitrogen dioxide (NO_2)
- Hydrogen fluoride (HF);
- Ammonia (NH_3); and,
- Volatile Organic Compounds (VOCs).

1.3.4 The VOCs that have the potential to be emitted from the facility are:

- Tetrachloroethylene (PCE);
- Toluene (C_7H_8);
- Xylene;
- Ethylbenzene;
- n-Butyl acetate;
- Benzyl alcohol;
- 2-Methoxy-1-methylethyl acetate;
- Diethylenetriamine (DETA); and,
- Ethylenediamine.

1.3.5 DETA and ethylenediamine may be released from the stack serving the stripping line (A5), while the remaining VOCs may be emitted from the paint spray booth exhausts (S1). These compounds were identified through a review of the relevant Material Safety Data Sheet (MSDS) for the products used within the relevant processes.

1.3.6 Due to the predicted exceedences of the EA screening criteria within the H1 assessment, dispersion modelling has been undertaken to further consider potential impact associated with the installation. The associated methodology and results are provided in the following report.

1.3.7 It should be noted that the previous Dispersion Modelling Assessment[1] undertaken by Redmore Environmental Ltd is superseded by this report.

[1] 10665r1 - Dispersion Modelling Assessment - Enterprise Drive, Chesterfield, Redmore Environmental Ltd, 2026.

1.4 Emissions Data

1.4.1 The H1 Assessment was undertaken using Indicative Emission Benchmarks (IEB) provided in Sector Guidance Note (SGN) 'The Surface Treatment of Metals and Plastics by Electrolytic and Chemical Processes'[2] for the various pollutants, where available, in order to provide a precautionary screening assessment. The Dispersion Modelling Assessment was undertaken using estimated or monitored emissions data for the substances requiring further assessment in order to provide a more accurate analysis of potential impacts.

1.4.2 Data was not available to describe oxides of nitrogen (NO_x) emissions associated with the metal plating lines. A maximum permissible concentration within stack exhausts A2 to A4 and S2 was therefore derived to ensure compliance with relevant Environmental Quality Standards (EQSs) at receptors within the vicinity of the site.

[2] The Surface Treatment of Metals and Plastics by Electrolytic and Chemical Processes, EA, 2009.

2.0 ENVIRONMENTAL QUALITY STANDARDS

2.1 Air Quality Limit Values, Objectives and Target Values

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- NO_2;
- Sulphur dioxide (SO_2);
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm;
- Particulate matter with an aerodynamic diameter of less than 2.5µm;
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values (AQTVs) were also provided for an additional five pollutants. These include:

- Ozone;
- Arsenic;
- Cadmium;
- Ni; and,
- Benzo(a)pyrene.

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in April 2023[3]. The document contains standards, objectives, and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 Table 1 presents the AQOs for pollutants considered within this assessment.

[3] AQS: Framework for Local Authority Delivery, DEFRA, 2023.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum

2.1.5 Table 2 presents the AQTV for pollutants considered within this assessment.

Table 2 Air Quality Target Values

Pollutant	Air Quality Target Values	
	Concentration (µg/m³)	Averaging Period
Ni	0.02	Annual mean

2.1.6 Table 3 summarises the advice provided in DEFRA guidance[4] on where the AQOs for pollutants considered within this report apply.

Table 3 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.

[4] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 Environmental Assessment Levels

2.2.1 An Environmental Assessment Level (EAL) is the concentration of a substance, which, in a particular environmental medium, the regulators regard as an appropriate comparator value. This enables comparison between the environmental effects of different substances in that medium and between environmental effects in different media, enabling the summation of those effects.

2.2.2 Ideally EALs to fulfil this objective would be defined for each pollutant:

- Based on the sensitivity of particular habitats or receptors (in particular three main types of receptor should be considered, protection of human health, protection of natural ecosystems and protection of specific sensitive receptors, e.g. materials, commercial activities requiring a particular environmental quality);
- Be produced according to a standardised protocol to ensure that they are consistent, reproducible, and readily understood;
- Provide similar measure of protection for different receptors both within and between media; and,
- Take account of habitat specific environmental factors such as pH, nutrient status, bioaccumulation, transfer, and transformation processes where necessary.

2.2.3 EALs used in this assessment were obtained from Environment Agency (EA) guidance 'Air emissions risk assessment for your environmental permit'[5] and are summarised in Table 4.

[5] Air emissions risk assessment for your environmental permit, EA, 2025.

Table 4 Environmental Assessment Levels

Pollutant	Environmental Assessment Level (µg/m³)			
	Long Term			Short Term (1-hour)
	Annual	Weekly	24-hour	
HF	-	-	-	160
Ni	-	-	-	0.7
PCE	-	-	40	-
C_7H_8	-	260	-	8,000
Xylene	4,410	-	-	66,200
Ethylbenzene	4,410	-	-	55,200

2.2.4 The EA guidance[6] does not provide EALs for all VOCs emitted from the facility. As such, the information source hierarchy provided in 'Derivation of new Environmental Assessment Levels (EALs) to air consultation'[7] was reviewed in accordance with the process outlined in 'Air emissions risk assessment for your environmental permit'[8] in order to identify potential sources of data from which to derive appropriate EALs. This indicated that UK Expert Air Quality Standards (EPAQS) standards and guidelines, WHO Air Quality Guidelines for Europe, Tolerable Concentrations in Air derived according to the proposed EA hazard characterisation method and EA Health Criteria Values for inhalation were not available for any of the species. However, Derived No Effect Levels (DNELs) for the general population have been developed as part of the REACH process. These are summarised in Table 5 and were adopted as EALs for use in the assessment.

Table 5 Derived No Effect Levels

Pollutant	DNEL (µg/m³)	
	Long Term (Annual Mean)	Short Term (1-hour Mean)
n-Butyl acetate[(a)]	35,700	300,000
Benzyl alcohol[(a)]	5,400	27,000

6 Air emissions risk assessment for your environmental permit, EA, 2025.

7 Methodology for the scientific derivation of Environmental Assessment Levels (EALs), EA, 2025.

8 Air emissions risk assessment for your environmental permit, EA, 2025.

Pollutant	DNEL (µg/m³)	
	Long Term (Annual Mean)	Short Term (1-hour Mean)
2-Methoxy-1-methylethyl acetate[b]	33,000	-
DETA[a]	4,600	27,500
Ethylenediamine[c]	6.25	-

NOTE: (a) DNELs calculated for exposure of the general population. As such, the DNELs are suitable for use as EAL.
(b) DNEL calculated for long term exposure of the general population. As such, the DNEL is suitable for use as a long term EAL. No hazard identified for short term exposure pathway.
(c) DNEL calculated for long term exposure of the general population. As such, the DNEL is suitable for use as a long term EAL.

2.2.5 The VOCs emitted from stacks S1 and A5 with the lowest EAL for each averaging period were considered in the assessment. These are summarised in Table 6.

Table 6 Assessed Volatile Organic Compounds

Emission Point	Assessed VOC	Environmental Assessment Level (µg/m³)	Averaging Period
S1 (Paint Spray Booth Exhausts)	C_7H_8	8,000	1-hour mean
		260	Weekly mean
	PCE	40	24-hour mean
	Xylene	4,410	Annual mean
A5 (Stripping Line)	DETA	4,600	Annual mean
		27,500	1-hour mean

2.3 Critical Loads and Levels

2.3.1 A critical load is defined by the UK Air Pollution Information System (APIS)[9] as:

> "A quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge."

[9] UK Air Pollution Information System, www.apis.ac.uk.

2.3.2 A critical level is defined as:

> "Concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge."

2.3.3 A critical load refers to deposition of a pollutant, while a critical level refers to pollutant concentrations in the atmosphere (which usually have direct effects on vegetation or human health).

2.3.4 When pollutant loads (or concentrations) exceed the critical load or level it is considered that there is a risk of harmful effects. The excess over the critical load or level is termed the exceedence. A larger exceedence is often considered to represent a greater risk of damage.

2.3.5 Maps of critical loads and levels and their exceedences have been used to show the potential extent of pollution damage and aid in developing strategies for reducing pollution. Decreasing deposition below the critical load is seen as means for preventing the risk of damage. However, even a decrease in the exceedence may infer that less damage will occur.

2.3.6 Table 7 presents the critical levels for the protection of vegetation for pollutants considered within this assessment.

Table 7 Critical Levels for the Protection of Vegetation

Pollutant	Critical Level	
	Concentration (µg/m^3)	Comment
NO_x	30	Annual mean
	75	24-hour mean
	200	24-hour mean (where ozone is below the AOT40 critical level and sulphur dioxide (SO_2) is below the lower critical level of 10µg/m^3)
NH_3	1	Where lichens and bryophytes are present (where they form a key part of the ecosystem integrity)
	3	Other vegetation

Pollutant	Critical Level	
	Concentration (µg/m³)	Comment
HF	0.5	Weekly mean
	5.0	Daily mean

2.3.7 It should be noted that the ozone concentrations within the vicinity of the site are below the AOT40 critical level of 6,000µg/m³ and SO_2 concentrations are below the lower critical level of 10µg/m³. As such, a critical level of 200µg/m³ for NO_x has been utilised in the assessment in accordance with EA guidance[10]. Additionally, the lower critical level of 1µg/m³ for NH_3 has been utilised to provide precautionary assessment of potential effects.

2.3.8 Critical loads have been designated within the UK based on the sensitivity of the receiving habitat and have been reviewed for the purpose of this assessment. These are summarised in Section 3.3.

2.4 Substance Deposition

2.4.1 For certain substances, the potential environmental impact associated with deposition to soil and vegetation is assessed by comparison of the predicted deposition rate with established screening criteria. The relevant ground limit for substance deposition considered in the assessment is summarised in Table 8.

Table 8 Ground Limit for Substance Deposition

Substance	Ground Limit (mg/m²/day)
Ni	0.11

10 Air emissions risk assessment for your environmental permit, EA, 2025.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 Atmospheric emissions from the facility have the potential to affect pollutant concentrations in the vicinity of the site. These have been quantified through dispersion modelling in accordance with the methodology outlined in the following Sections.

3.2 Dispersion Model

3.2.1 Dispersion modelling was undertaken using ADMS-6 (v6.0.2.5), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-6 is a short-range dispersion modelling software package that simulates a wide range of buoyant and passive releases to atmosphere. It is a new generation model utilising boundary layer height and Monin-Obukhov length to describe the atmospheric boundary layer and a skewed Gaussian concentration distribution to calculate dispersion under convective conditions.

3.2.2 The model utilises hourly meteorological data to define conditions for plume rise, transport and diffusion. It estimates the concentration for each source and receptor combination for each hour of input meteorology and calculates user-selected long-term and short-term averages.

3.3 Assessment Area

3.3.1 The assessment area was defined based on the site location, anticipated pollutant dispersion patterns and the positioning of sensitive receptors. Ambient concentrations were predicted over NGR: 441925, 365785 to 443425, 367285. One Cartesian grid with a resolution of 10m was used within the model to produce data suitable for contour plotting using the Surfer software package.

3.3.2 Reference should be made to Figure 2 for a graphical representation of the assessment grid extents.

Human Receptors

3.3.3 A desk-top study was undertaken in order to identify any human receptor locations in the vicinity of the site that required specific consideration during the assessment. These are summarised in Table 9.

Table 9 Human Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Mansfield Road	442237.0	367208.8
R2	Residential - Birkin Lane	442082.4	367160.0
R3	Residential - Caister Drive	442259.8	366708.7
R4	Residential - Caister Drive	442316.7	366596.0
R5	Residential - Caister Drive	442285.0	366527.9
R6	Residential - Caister Drive	442363.9	366506.3
R7	Residential - Caister Drive	442349.9	366328.3
R8	Residential - Caister Drive	442389.6	366250.6
R9	Residential - Park Road	442456.2	366210.0
R10	Residential - Park Road	442521.9	366238.0
R11	Residential - Shakespeare Street	442584.8	366141.1
R12	Residential - Shakespeare Street	442669.0	366193.2
R13	Residential - Shakespeare Street	442764.9	366181.7
R14	Residential - Shakespeare Street	442865.5	366175.5
R15	Residential - Rosebud Way	442991.9	366170.0
R16	Residential - Colliers Way	443106.6	366122.4

3.3.4 Reference should be made to Figure 3 for a map of the human receptor locations.

Ecological Receptors

3.3.5 Atmospheric emissions from the facility also have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. A Nature and Heritage Conservation Screening Report[11] provided by the EA indicated the following designations should be considered in the assessment:

- Williamthorpe Local Nature Reserve (LNR);
- Williamthorpe Ponds Local Wildlife Site (LWS)
- Wolfie Pond Grasslands LWS;
- Holmewood Meadow LWS;
- Grassmoor Country Park LWS;
- Birkin Lane Carr LWS;
- Owlcotes Wood LWS;
- Heath Wood Ancient Woodland (AW); and,
- Unnamed AW.

3.3.6 For the purpose of the modelling assessment discrete receptors were placed at the closest points of each designation to the site to ensure the maximum potential impact was predicted. These are summarised in Table 10.

Table 10 Ecological Receptor Locations

Receptor		NGR (m)	
		X	Y
E1	Williamthorpe LNR	442515.0	366505.3
E2	Williamthorpe LNR	442580.1	366549.9
E3	Williamthorpe LNR	442603.9	366572.8
E4	Williamthorpe LNR	442622.3	366588.9
E5	Williamthorpe LNR	442645.8	366612.1
E6	Williamthorpe LNR	442681.8	366651.0
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	442785.7	366722.4

[11] Nature and Heritage Conservation Screening Report, EA, 2026.

Receptor		NGR (m)	
		X	Y
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	442903.0	366770.0
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	442945.1	366710.0
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	442945.1	366643.7
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	442923.7	366571.3
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	442869.9	366505.8
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	442884.4	366444.4
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	442910.0	366380.3
E15	Heath Wood AW	444401.8	367410.0
E16	Unnamed AW	442336.0	368138.3
E17	Birken Lane Carr LWS	441604.9	367028.5
E18	Grassmoor Country Park LWS	441277.5	367235.3
E19	Grassmoor Country Park LWS	441050.0	367039.8
E20	Wolfie Pond Grasslands LWS	441685.2	366163.0
E21	Holmewood Meadow LWS	443476.0	365979.5
E22	Owlcotes Wood LWS	444214.7	367718.2

3.3.7 Reference should be made to Figure 4 for a map of the ecological receptor locations.

3.3.8 Critical loads have been designated within the UK based on the sensitivity and relevant features of the receiving habitat. A review of the APIS[12] and MAGIC[13] websites, as well as the relevant site designations and publicly available information, was undertaken in order to identify the most suitable habitat description and associated critical load for the area of each designation considered within the assessment.

3.3.9 The relevant nitrogen deposition critical loads are summarised in Table 11.

[12] http://www.apis.ac.uk/.

[13] Multi-Agency Geographic Information for the Countryside, www.magic.gov.uk.

Table 11 Critical Loads for Nitrogen Deposition

Receptor		Habitat	Relevant Nitrogen Critical Load Class	Nitrogen Critical Load (kgN/ha/yr)	
				Low	High
E1 to E6	Williamthorpe LNR	Deciduous woodland	Broadleaved deciduous woodland	10	15
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	Deciduous woodland	Broadleaved deciduous woodland	10	15
E8 to E11	Williamthorpe LNR and Williamthorpe Ponds LWS	Neutral grassland	Low and medium altitude hay meadows	10	20
E12 to E14	Williamthorpe LNR and Williamthorpe Ponds LWS	Deciduous woodland	Broadleaved deciduous woodland	10	20
E15	Heath Wood AW	Deciduous woodland	Broadleaved deciduous woodland	10	15
E16	Unnamed AW	Deciduous woodland	Broadleaved deciduous woodland	10	15
E17	Birken Lane Carr LWS	Deciduous woodland	Broadleaved deciduous woodland	10	15
E18 and E19	Grassmoor Country Park LWS	Deciduous woodland	Broadleaved deciduous woodland	10	15
E20	Wolfie Pond Grasslands LWS	Deciduous woodland	Broadleaved deciduous woodland	10	15
E21	Holmewood Meadow LWS	Deciduous woodland	Broadleaved deciduous woodland	10	15
E22	Owlcotes Wood LWS	Deciduous woodland	Broadleaved deciduous woodland	10	15

3.3.10 The relevant acid deposition critical loads are summarised in Table 12.

Table 12 Critical Loads for Acid Deposition

Receptor		Habitat	Relevant Acid Critical Load Class	Acid Critical Load (keq/ha/yr)		
				CLMinN	CLMaxS	CLMaxN
E1 to E6	Williamthorpe LNR	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland[a]	0.36	3.15	3.51

Receptor		Habitat	Relevant Acid Critical Load Class	Acid Critical Load (keq/ha/yr)		
				CLMin N	CLMax S	CLMax N
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland[(a)]	0.36	3.15	3.51
E8 to E11	Williamthorpe LNR and Williamthorpe Ponds LWS	Neutral grassland	Calcareous grassland (using base cation)	0.86	4.05	4.90
E12 to E14	Williamthorpe LNR and Williamthorpe Ponds LWS	Deciduous woodland	Calcareous grassland (using base cation)	0.86	4.05	4.90
E15	Heath Wood AW	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland	0.36	3.15	3.51
E16	Unnamed AW	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland[(a)]	0.36	3.15	3.51
E17	Birken Lane Carr LWS	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland	0.36	3.16	3.52
E18 and E19	Grassmoor Country Park LWS	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland	0.36	3.16	3.52
E20	Wolfie Pond Grasslands LWS	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland	0.36	3.16	3.52
E21	Holmewood Meadow LWS	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland[(a)]	0.36	3.15	3.51
E22	Owlcotes Wood LWS	Deciduous woodland	Broadleafed/ Coniferous unmanaged woodland	0.36	3.15	3.51

Note: (a) Critical load not available for the woodland receptors using the search by location function on APIS. As such, the lowest critical load for other woodlands considered in the assessment was utilised in lieu of available data.

3.3.11 Baseline pollutant concentrations and deposition rates at each ecological receptor were obtained from the APIS[14] website and are summarised in Table 13.

Table 13 Baseline Pollution Levels at Ecological Receptors

Receptor		Annual Mean Concentration (µg/m³)		Deposition Rate	
		NO_x	NH_3	Nitrogen (kgN/ha/yr)	Acid (keq/ha/yr)
E1	Williamthorpe LNR	12.92	1.53	29.99	2.12
E2	Williamthorpe LNR	12.92	1.53	29.99	2.12
E3	Williamthorpe LNR	12.92	1.53	29.99	2.12
E4	Williamthorpe LNR	12.92	1.53	29.99	2.12
E5	Williamthorpe LNR	12.92	1.53	29.99	2.12
E6	Williamthorpe LNR	12.92	1.53	29.99	2.12
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	16.80	1.16
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	12.92	1.53	29.99	2.12
E15	Heath Wood AW	12.07	1.55	29.75	2.10
E16	Unnamed AW	10.40	1.53	29.42	2.08

[14] http://www.apis.ac.uk/.

Receptor		Annual Mean Concentration (µg/m³)		Deposition Rate	
		NO_x	NH_3	Nitrogen (kgN/ha/yr)	Acid (keq/ha/yr)
E17	Birken Lane Carr LWS	10.70	1.53	29.60	2.09
E18	Grassmoor Country Park LWS	10.70	1.53	29.60	2.09
E19	Grassmoor Country Park LWS	10.70	1.53	29.60	2.09
E20	Wolfie Pond Grasslands LWS	10.47	1.52	29.91	2.12
E21	Holmewood Meadow LWS	12.08	1.53	30.25	2.15
E22	Owlcotes Wood LWS	12.07	1.55	29.75	2.10

3.4 Modelling Scenarios

3.4.1 The scenarios considered in the modelling assessment for human receptors are summarised in Table 14.

Table 14 Human Receptor Assessment Scenarios

Parameter	Modelled As	
	Short Term	Long Term
NO_2	99.8th percentile (%ile) 1-hour mean	Annual mean
Ni	100th %ile 1-hour mean	Annual mean
HF	100th %ile 1-hour mean	-
C_7H_8	100th %ile 1-hour mean	100th %ile weekly mean
PCE	-	100th %ile 24-hour mean
Xylene	-	Annual mean
DETA	100th %ile 1-hour mean	Annual mean

3.4.2 Some short-term air quality criteria are framed in terms of the number of occasions in a calendar year on which the concentration should not be exceeded. As such, the %iles shown in Table 15 were selected to represent the relationship between the permitted

number of exceedences of short-period concentrations and the number of periods within a calendar year.

3.4.3 The scenarios considered in the modelling assessment for ecological receptors are summarised in Table 15.

Table 15 Ecological Receptor Assessment Scenarios

Parameter	Modelled As	
	Short Term	Long Term
NO_x	100th %ile 24-hour mean	Annual mean
NH_3	-	Annual mean
HF	100th %ile 24-hour mean	-
	100th %ile weekly mean	-
Nitrogen deposition	-	Annual deposition
Acid deposition	-	Annual deposition

3.4.4 Predicted pollutant concentrations were summarised in the following formats:

- Process Contribution (PC) - Predicted pollutant concentration as a result of emissions from the facility only; and,
- Predicted Environmental Concentration (PEC) - Total predicted pollutant concentration as a result of emissions from the facility and existing baseline levels.

3.4.5 Predicted ground level pollutant concentrations and deposition rates were compared with the relevant EQSs.

3.5 Process Conditions and Emissions

3.5.1 Process conditions and emission rates for the release points are summarised in the following Sections.

Metal Plating Lines

3.5.2 A summary of the model inputs for emission points A2 to A4 and S2 serving the metal plating processes is provided in Table 16. These were obtained from an LEV Testing report[15] and emissions monitoring reports[16] [17], as well as information provided by the Operator.

Table 16 Process Conditions and Emissions - Metal Plating Lines

Parameter	Unit	A2	A3	A4	S2
Stack height(a)	m	8.12	8.12	8.12	3.5
Stack diameter	m	0.7	0.8	0.8	0.35
Exhaust gas temperature(b)	°C	19.0	19.0	19.0	19.0
Exhaust gas flow rate	m^3/hr	28,128.9	14,978.9	29,080.6	5,091.5
Exhaust gas efflux velocity	m/s	20.3	8.3	16.1	14.7
Ni emission concentration(c) (d)	mg/Nm^3	0.0022	0.0022	0.0022	0.0022
Ni emission rate(d)	g/s	0.000017	0.000009	0.000018	0.0000031
NO_x emission concentration(c)	mg/Nm^3	40	40	40	40
NO_x emission rate(d)	g/s	0.31254	0.16643	0.32312	0.05657
NH_3 emission concentration(c)	mg/Nm^3	0.5	0.5	0.5	0.5
NH_3 emission rate(d)	g/s	0.003907	0.00208	0.004039	0.000707
HF emission rate	g/s	0.0000012	-	-	-

Note: (a) Above ground level.
(b) Average value of monitored temperature.
(c) Standard pressure, 0˚C, wet.
(d) Emission rate derived from the emission concentration and actual flow rate unadjusted for temperature to provide a robust assessment.

15 Report for the Thorough Examination and Testing of the LEV Systems at CBE Plus Limited on the 19 November 2025 - 20 November 2025, Synergy Environmental Solutions, 2025.

16 Monitoring of Hydrogen Chloride, Ammonia and Ni Emissions, Plating Line 1, CES Environmental Instruments Ltd, 2025.

17 Monitoring of Hydrogen Chloride, Ammonia and Ni Emissions, Plating Line 2A, CES Environmental Instruments Ltd, 2025.

3.5.3 As outlined previously, the NO_x concentration provided in Table 16 is the maximum permissible level within the stack exhausts gases from A2 to A4 and S2 that has been derived to ensure compliance with relevant EQSs at receptors within the vicinity of the site.

3.5.4 Monitoring of Ni emissions at the facility indicated concentrations of 0.0022mg/Nm^3 and 0.0001mg/Nm^3 for stacks A2 and A4, respectively. In order to provide a robust assessment, the highest value was applied to all emission points.

3.5.5 Monitoring of NH_3 emissions at the facility indicated concentrations of 0.5mg/Nm_3 for both stacks A2 and A4, respectively. This value was applied to points A3 and S2 in lieu of available monitoring data for these sources.

3.5.6 A mass HF emission of 106.371mg representing releases over a 24-hour period for stack A2 was derived by the site Chemist. This was converted to an emission rate and applied in the model.

3.5.7 The metal plating lines serving the stacks operate for 9-hours per day, 5-days per week. However, in order to provide a worst-case assessment scenario, emissions were assumed to be constant for 16-hours per day, 7-days a week.

Stripping Line

3.5.8 A summary of the model inputs for emission point A5 serving the stripping line is provided in Table 17. These were obtained from the emissions monitoring report[18], as well as information provided by the Operator.

Table 17 Process Conditions and Emissions - Stripping Line

Parameter	Unit	A5
Stack height[(a)]	m	8.12
Stack diameter	m	0.60
Exhaust gas temperature	°C	24
Exhaust gas flow rate[(b)]	Nm^3/hr	7,709

[18] Monitoring of Gaseous and Nickel Emissions, Stripping Line, CES Environmental Instruments Ltd, 2025.

Parameter	Unit	A5
Exhaust gas efflux velocity	m/s	8.41
Ni emission concentration(b)	mg/Nm^3	0.0002
Ni emission rate	g/s	0.0000005
NO_2 emission concentration(b)	mg/Nm^3	1.66
NO_2 emission rate	g/s	0.0036
DETA emission rate	g/s	0.38580

Note: (a) Above ground level.
(b) Standard pressure, 0˚C, wet.

3.5.9 Monitoring of DETA concentrations has not been undertaken at the facility. The following steps were therefore taken to predict pollutant levels at receptors in the absence of survey data:

- The stripper tank containing DETA has a capacity of 1,000 litres of solution;
- The 1,000 litre solution consists of 6% DETA, as confirmed by the site Chemist;
- The stripper tank is topped up with water intermittently. As such, the concentration of DETA within the solution depletes over time;
- The solution is fully replaced once a month on average;
- A release rate was derived and applied in the model based on the assumption that 100% of the 1,000 litre solution evaporates over a one-month period and the DETA content is continuously 6%. This approach provides a robust assessment as only a small proportion of the tank solution will evaporate over a one-month period and the concentration of DETA will reduce during this period; and,
- The DETA model output was factored by 0.06 to derive pollutant levels at receptors.

3.5.10 The stripping line serving the stack operates for 9-hours per day, 5-days per week. However, in order to provide a worst-case assessment scenario, emissions were assumed to be constant for 16-hours per day, 7-days a week.

Paint Spray Booth Exhausts

3.5.11 A summary of the model inputs for emission point S1 serving the paint spray booth exhausts is provided in Table 18. These were obtained from the emissions monitoring report[19], as well as information provided by the Operator.

Table 18 Process Conditions and Emissions - Paint Spray Booth Exhausts

Parameter	Unit	Stack 1	Stack 2
Stack height(a)	m	11.30	11.30
Stack diameter	m	0.70	0.70
Exhaust gas temperature	°C	22	24
Exhaust gas flow rate(b)	Nm^3/hr	7,119	9,937
Exhaust gas efflux velocity	m/s	5.53	7.80
Total Organic Carbon (TOC)	mg/Nm^3	114.69	64.33
TOC emission rate	g/s	0.22679	0.17757

Note: (a) Above ground level.
(b) Standard pressure, 0˚C, wet.

3.5.12 The TOC model output was converted to the relevant VOC concentrations using the molecular mass-to-carbon ratio for each compound. The resulting concentrations were then adjusted to account for the proportion of each VOC within the paint formulation obtained from the MSDS for the product, as follows:

- PCE - 80%;
- C_7H_8 - 5%; and,
- Xylene - 5%.

3.5.13 Releases from the paint spray booth stacks were assumed to be constant within the model. However, the daily output for PCE was adjusted to account for the maximum period of use for the paint product of 3-hours within a 24-hour day.

19 Monitoring of Particulate Matter and Gaseous Emissions, Spray Booth, CES Environmental Instruments Ltd, 2025.

3.6 NO_x to NO_2 Conversion

3.6.1 In the absence of information regarding the oxidation rate of NO_x emissions from the process, it was assumed 100% of NO_x is converted to NO_2 to provide a precautionary assessment.

3.7 Building Effects

3.7.1 The dispersion of substances released from elevated sources can be influenced by the presence of buildings close to the emission point. Structures can interrupt the wind flows and cause significantly higher ground-level concentrations close to the source than would arise in the absence of the buildings.

3.7.2 Analysis of the site layout indicated that a number of structures should be included within the model in order to take account of effects on pollutant dispersion. Input geometries are shown in Table 19.

Table 19 Building Geometries

Building	NGR (m)		Height (m)	Length (m)	Width (m)	Angle (°)
	X	Y				
CBE+ Building 1	442675.8	366513.3	10.33	113.0	39.9	119
CBE+ Building 2	442690.4	366539.9	7.92	113.0	20.6	119
Yearsley Logistics Building 1	442698.8	366570.9	19.0	119.4	27.1	119
Yearsley Logistics Building 2	442685.8	366607.1	19.0	47.0	23.5	119

3.7.3 Reference should be made to Figure 2 for a map of the building locations.

3.8 Meteorological Data

3.8.1 Meteorological data used in the assessment was taken from Nottingham Watnall meteorological station over the period 1st January 2020 to 31st December 2024 (inclusive). This observation station is located at NGR: 450431, 345004, which is approximately 22.7km south-east of the site. It is anticipated that conditions would be reasonably similar over a

distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

3.8.2 All meteorological files used in the assessment were provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 for wind roses of utilised meteorological records.

3.9 Roughness Length

3.9.1 Roughness length (z_0) is a modelling parameter applied to allow consideration of surface height roughness elements. A value of 0.5m was used to describe the modelling extents and meteorological site. This is considered appropriate for the morphology of both areas and is suggested within ADMS-6 as being suitable for 'parkland, open suburbia'.

3.10 Monin-Obukhov Length

3.10.1 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-6 as being suitable for 'mixed urban/industrial'.

3.10.2 A minimum Monin-Obukhov length of 10m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-6 as being suitable for 'small towns < 50,000'.

3.11 Terrain Data

3.11.1 Ordnance Survey OS Terrain 50 data was included in the model for the site and surrounding area in order to take account of the specific flow field produced by variations in ground height throughout the assessment extents. This was pre-processed using the method suggested by CERC[20].

[20] Note 105: Setting up Terrain Data for Input to CERC Models, CERC, 2016.

3.12 Nitrogen Deposition

3.12.1 Nitrogen deposition rates were calculated using the conversion factors provided within EA document 'Technical Guidance on Detailed Modelling approach for an Appropriate Assessment for Emissions to Air AQTAG 06'[21]. Predicted pollutant concentrations were multiplied by the relevant deposition velocity and conversion factor to calculate the speciated dry deposition flux. The conversion factors used for the determination of nitrogen deposition are presented within Table 20.

Table 20 Conversion Factors to Determine Dry Deposition Flux for Nitrogen Deposition

Pollutant	Deposition Velocity (m/s)		Conversion Factor (µg/m²/s to kg/ha/yr of pollutant species)
	Grassland	Forest	
NO_2	0.0015	0.003	95.9
NH_3	0.02	0.03	260

3.12.2 The relevant deposition velocity for each ecological receptor was selected from Table 20 based on the vegetation type present within each designation.

3.13 Acid Deposition

3.13.1 Acid deposition occurs as a result of NO_2 and NH_3. Predicted ground level pollutant concentrations of these species were converted to kilo-equivalent ion depositions (keq/ha/yr) for comparison with the critical load for acid deposition at each of the identified ecological receptors. The conversion to units of equivalents, a measure of the potential acidifying effect of a species, was undertaken using the standard conversion factors shown in Table 21.

[21] Technical Guidance on Detailed Modelling approach for an Appropriate Assessment for Emissions to Air AQTAG 06, EA, 2014.

Table 21 Conversion Factors to Determine Dry Deposition Flux for Acid Deposition

Pollutant	Deposition Velocity (m/s)		Conversion Factor (µg/m²/s to keq/ha/yr of pollutant species)
	Grassland	Forest	
NO_2	0.0015	0.003	6.84
NH_3	0.02	0.03	18.5

3.13.2 The following formula was used to calculate predicted PCs as a proportion of the critical load function where PECs were identified to be greater than the CLminN value:

PC as %CL function = ((PC of N deposition)/CLmaxN) x 100

3.13.3 The above formula was obtained from the APIS website[22].

3.14 Substance Deposition

3.14.1 The maximum annual mean Ni PC at any point within the modelling extents for any meteorological data set was converted to substance deposition in accordance with the methodology provided in EA guidance[23]. The result was compared with the relevant ground limit EQS for Ni.

3.15 Background Concentrations

3.15.1 Review of existing data in the vicinity of the site was undertaken in order to identify suitable background values for use in the assessment. These were subsequently utilised to represent existing concentrations at human receptors in the vicinity of the site. A summary of the relevant values is provided in Table 22.

22 http://www.apis.ac.uk/.

23 Air emissions risk assessment for your environmental permit, EA, 2025.

Table 22 Background Pollutant Concentrations - Human Receptors

Pollutant	Background Pollutant Concentration Used in Assessment	Unit	Source
NO_2	8.24	µg/m³	DEFRA mapping
Ni	0.0014	µg/m³	DEFRA (Chesterfield Loundsley)
HF	2.35[a]	µg/m³	Expert Panel on Air Quality Standards (EPAQS) report

Note: (a): Maximum monitored HF result provided in EPAQS report[24].

3.15.2 DEFRA do not undertake monitoring of the VOCs considered in the assessment. As such, the background level for the relevant compounds was treated as 0µg/m³.

3.15.3 Baseline pollutant levels at the ecological receptors were obtained from the APIS website, as summarised in Table 13.

3.15.4 It is not possible to add short-term peak baseline and process concentrations. This is because the conditions which give rise to peak ground-level concentrations of substances emitted from an elevated source at a particular location and time are likely to be different to the conditions which give rise to peak concentrations due to emissions from other sources. This point is addressed in in EA guidance 'Air emissions risk assessment for your environmental permit'[25], which advises that an estimate of the maximum combined pollutant concentration can be obtained by adding the maximum predicted short-term concentration due to emissions from the source to twice the annual mean baseline concentration. This approach was adopted throughout the assessment.

24 EPAQS Guidelines for halogens and hydrogen halides in ambient air for protecting human health against acute irritancy effects, DEFRA, Scottish Executive, National Assembly of Wales, Department of the Environment in Northern Ireland, 2006.

25 Air emissions risk assessment for your environmental permit, EA, 2025.

3.16 Assessment Criteria

Human Receptors

3.16.1 EA guidance 'Air emissions risk assessment for your environmental permit'[26] states that PCs can be screened as insignificant if they meet the following criteria:

- The short-term PC is less than 10% of the short-term environmental standard; and,
- The long-term PC is less than 1% of the long-term environmental standard.

3.16.2 If these criteria are exceeded the following guidance is provided on when whether PECs can be screened as insignificant:

- The short-term PC is less than 20% of the short-term environmental standards minus twice the long-term background concentration; and,
- The long-term PEC is less than 70% of the long-term environmental standards.

3.16.3 Should these criteria be exceeded then additional consideration to potential impacts should be provided.

Ecological Receptors

3.16.4 EA guidance 'Air emissions risk assessment for your environmental permit'[27] states that PCs at local designations, including LNRs, LWSs and AWs, can be screened as insignificant if they meet the following criteria:

- The short-term PC is less than 100% of the short-term environmental standard for protected conservation areas; and,
- The long-term PC is less than 100% of the long-term environmental standard for protected conservation areas.

3.16.5 Should these criteria be exceeded then additional consideration to potential impacts should be provided.

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26 Air emissions risk assessment for your environmental permit, EA, 2025.

27 Air emissions risk assessment for your environmental permit, EA, 2025.

Substance Deposition

3.16.6 EA guidance 'Air emissions risk assessment for your environmental permit'[28] states that substance deposition can be screened as insignificant if they meet the following criteria:

- The long-term PC to ground is less than 1% of the relevant ground limit.

3.16.7 Should the criteria be exceeded then additional consideration to potential impacts should be provided.

3.17 Modelling Uncertainty

3.17.1 Uncertainty in dispersion modelling predictions can be associated with a variety of factors, including:

- Model uncertainty - due to model limitations;
- Data uncertainty - due to errors in input data, including emission estimates, operational procedures, land use characteristics and meteorology; and,
- Variability - randomness of measurements used.

3.17.2 Potential uncertainties in the model results were minimised as far as practicable and worst-case inputs used in order to provide a robust assessment. This included the following:

- Choice of model - ADMS-6 is a commonly used atmospheric dispersion model and results have been verified through a number of studies to ensure predictions are as accurate as possible;
- Meteorological data - Modelling was undertaken using five annual meteorological data sets from an observation station local to the site. The analysis was based on the worst-case year for each averaging period to ensure maximum concentrations were considered;
- Surface characteristics - The z_0 and Monin-Obukhov length were determined for both the dispersion and meteorological sites based on the surrounding land uses

28 Air emissions risk assessment for your environmental permit, EA, 2025.

and guidance provided by CERC. Terrain data was included and processed using the method outlined by CERC;

- Plant operating conditions - Operational parameters were obtained from monitoring undertaken at the facility and information provided by the Applicant. As such, these are considered to be representative of operating conditions;
- Emission rates - Emission rates were derived from monitoring results, mass emission estimates and information provided by the Operator. As such, these are considered to be representative of anticipated releases during operation;
- Background concentrations - Background pollutant levels were obtained from the DEFRA mapping study, APIS and relevant national monitoring networks. As such, these are considered representative of baseline air quality conditions at sensitive locations within the vicinity of the site;
- Receptor locations - Sensitive human and ecological locations were identified through review of mapping resources to ensure impacts were predicted at worst-case positions within the vicinity of the site; and,
- Variability - All model inputs were as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

3.17.3 Results were considered in the context of the relevant EQSs and EA significance criteria. It is considered that the use of the stated measures to reduce uncertainty and the use of worst-case assumptions when necessary has resulted in model accuracy of an acceptable level.

4.0 RESULTS

4.1 Introduction

4.1.1 Dispersion modelling was undertaken with the inputs described in Section 3.0. The results are outlined in the following Sections.

4.2 Maximum Predicted Pollutant Concentrations

4.2.1 The maximum predicted pollutant concentrations at any point within the modelling extents for any meteorological data set are summarised in Table 23.

Table 23 Maximum Predicted Pollutant Concentrations

Pollutant	Averaging Period	EQS (µg/m³)	PC (µg/m³)	PC Proportion of EQS (%)	PEC (µg/m³)	PEC Proportion of EQS (%)
NO_2	Annual	40	71.39	178.49	79.64	111.55
	99.8th %ile 1-hour	200	453.70	226.85	470.19	235.10
Ni	Annual	0.02	0.0039	19.66	0.005	26.66
	100th %ile 1-hour	0.7	0.0334	4.78	0.036	5.18
HF	100th %ile 1-hour	160	0.0000005	0.00	4.70	2.94
C_7H_8	100th %ile Weekly	260	13.92	5.35	13.92	5.35
	100th %ile 1-hour	8,000	65.93	0.82	65.93	0.82
PCE	100th %ile 24-hour	40	237.86	594.65	237.86	594.65
Xylene	Annual mean	4,410	7.80	0.18	7.80	0.18
DETA	Annual mean	4,600	7.74	0.17	7.74	0.17
	100th %ile 1-hour	27,500	68.91	0.25	68.91	0.25

4.2.2 As shown in Table 23, annual mean and 1-hour mean NO_2 concentrations are predicted to exceed the EQS of 40µg/m³ and EQS of 200µg/m³, respectively, and 24-hour mean PCE concentrations are predicted to exceed the EQS of 40µg/m³. However, the exceedences are confined to a small area in the immediate vicinity of the site boundary, as shown in Figures 6 to 8. This convers vegetation, Enterprise Drive and industrial units. These are not considered locations of relevant exposure for the EQSs, as shown in Table 2. As such, the exceedences are not considered to be significant.

4.2.3 There were no predicted off-site exceedences of the EQS for any remaining pollutants over any remaining average period.

4.2.4 Reference should be made to Figure 6 to Figure 8 for graphical representations of predicted PECs, inclusive of background levels, throughout the assessment extents for annual mean NO_2, 1-hour mean NO_2 and 24-hour mean PCE concentrations. It should be noted that the values shown in the Figures are predictions from the meteorological data set which resulted in the maximum pollutant concentration for that averaging period. For example, the maximum annual mean NO_2 concentration was predicted using the 2024 meteorological data set. As such, the contours shown in Figure 6 were produced from the 2024 model outputs.

4.3 Human Receptors

4.3.1 Predicted concentrations of each pollutant at the sensitive human receptor locations identified in Table 9 are summarised in the following Sections.

Nitrogen Dioxide

4.3.2 Predicted annual mean NO_2 PECs at the human receptors, inclusive of background levels, are summarised in Table 24.

Table 24 Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	8.36	8.36	8.43	8.38	8.41
R2	Residential - Birkin Lane	8.32	8.32	8.40	8.35	8.37

Receptor		Predicted Annual Mean NO_2 PEC (µg/m³)				
		2020	2021	2022	2023	2024
R3	Residential - Caister Drive	8.57	8.66	8.84	8.63	8.75
R4	Residential - Caister Drive	8.83	9.06	9.16	8.98	9.04
R5	Residential - Caister Drive	8.92	9.17	9.13	9.10	9.05
R6	Residential - Caister Drive	9.43	9.79	9.65	9.70	9.53
R7	Residential - Caister Drive	9.44	9.54	9.20	9.40	9.27
R8	Residential - Caister Drive	9.23	9.34	9.00	9.11	9.23
R9	Residential - Park Road	9.07	9.25	8.84	9.02	9.18
R10	Residential - Park Road	9.11	9.42	8.85	9.18	9.30
R11	Residential - Shakespeare Street	8.68	8.93	8.58	8.91	8.86
R12	Residential - Shakespeare Street	8.76	9.05	8.72	9.03	8.98
R13	Residential - Shakespeare Street	8.77	8.95	8.78	8.83	8.88
R14	Residential - Shakespeare Street	8.73	8.84	8.81	8.71	8.77
R15	Residential - Rosebud Way	8.67	8.77	8.85	8.66	8.71
R16	Residential - Colliers Way	8.56	8.65	8.73	8.58	8.61

4.3.3 As indicated in Table 24, NO_2 PECs were below the annual mean EQS of 40µg/m³ at all human receptor locations for all meteorological data sets.

4.3.4 Maximum predicted annual mean NO_2 concentrations at the human receptor locations are summarised in Table 25. Reference should be made to Figure 6 for a graphical representation of predicted concentrations throughout the assessment extents.

Table 25 Maximum Predicted Annual Mean NO_2 Concentrations

Receptor		Maximum Predicted Annual Mean NO_2 Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - Mansfield Road	0.19	8.43	0.47	21.08
R2	Residential - Birkin Lane	0.16	8.40	0.39	21.00

Receptor		Maximum Predicted Annual Mean NO_2 Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R3	Residential - Caister Drive	0.60	8.84	1.50	22.10
R4	Residential - Caister Drive	0.92	9.16	2.29	22.90
R5	Residential - Caister Drive	0.93	9.17	2.31	22.92
R6	Residential - Caister Drive	1.54	9.79	3.86	24.47
R7	Residential - Caister Drive	1.29	9.54	3.23	23.84
R8	Residential - Caister Drive	1.09	9.34	2.74	23.35
R9	Residential - Park Road	1.01	9.25	2.53	23.14
R10	Residential - Park Road	1.18	9.42	2.95	23.56
R11	Residential - Shakespeare Street	0.68	8.93	1.71	22.32
R12	Residential - Shakespeare Street	0.81	9.05	2.02	22.63
R13	Residential - Shakespeare Street	0.71	8.95	1.78	22.39
R14	Residential - Shakespeare Street	0.60	8.84	1.49	22.10
R15	Residential - Rosebud Way	0.61	8.85	1.52	22.13
R16	Residential - Colliers Way	0.49	8.73	1.21	21.82

4.3.5 As indicated in Table 25, PECs were below 70% of the EQS at all human receptor locations. As such, predicted effects on annual mean NO_2 concentrations are not considered to be significant, in accordance with the EA criteria.

4.3.6 Predicted 99.8th %ile 1-hour mean NO_2 PECs at the human receptors, inclusive of background levels, are summarised in Table 26.

Table 26 Predicted 99.8th %ile 1-hour Mean NO_2 Concentrations

Receptor		Predicted 99.8th %ile 1-hour Mean NO_2 PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	25.06	26.83	28.71	28.48	26.58
R2	Residential - Birkin Lane	23.00	22.89	28.15	25.52	25.10

Receptor		Predicted 99.8th %ile 1-hour Mean NO_2 PEC (µg/m³)				
		2020	2021	2022	2023	2024
R3	Residential - Caister Drive	38.04	40.23	50.61	45.48	44.26
R4	Residential - Caister Drive	46.69	47.44	53.30	50.85	51.68
R5	Residential - Caister Drive	43.83	46.22	47.42	48.15	47.43
R6	Residential - Caister Drive	53.37	59.44	61.01	59.54	60.62
R7	Residential - Caister Drive	50.67	49.24	47.86	55.55	48.64
R8	Residential - Caister Drive	48.77	48.76	50.39	47.41	50.98
R9	Residential - Park Road	46.42	48.93	48.14	42.78	46.99
R10	Residential - Park Road	49.24	52.35	44.81	45.98	52.40
R11	Residential - Shakespeare Street	38.95	40.95	36.91	46.00	43.19
R12	Residential - Shakespeare Street	47.42	47.53	46.23	51.96	51.87
R13	Residential - Shakespeare Street	47.51	48.43	45.35	48.87	49.67
R14	Residential - Shakespeare Street	41.46	43.35	47.54	45.65	45.09
R15	Residential - Rosebud Way	39.94	43.64	45.89	40.83	43.67
R16	Residential - Colliers Way	33.33	37.34	39.24	35.81	36.33

4.3.7 As indicated in Table 26, 1-hour mean NO_2 PECs were below the EQS of 200µg/m³ at all human receptor locations for all meteorological data sets.

4.3.8 Maximum predicted 99.8th %ile 1-hour mean NO_2 concentrations at the human receptor locations are summarised in Table 27. Reference should be made to Figure 7 for a graphical representation of predicted concentrations throughout the assessment extents.

Table 27 Maximum Predicted 99.8th %ile 1-hour Mean NO_2 Concentrations

Receptor		Maximum Predicted 99.8th %ile 1-hour Mean NO_2 Concentration (µg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%)[a]
		PC	PEC		
R1	Residential - Mansfield Road	12.22	28.71	6.11	6.66

Receptor		Maximum Predicted 99.8th %ile 1-hour Mean NO_2 Concentration (µg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%)(a)
		PC	PEC		
R2	Residential - Birkin Lane	11.67	28.15	5.83	6.36
R3	Residential - Caister Drive	34.13	50.61	17.06	18.60
R4	Residential - Caister Drive	36.82	53.30	18.41	20.06
R5	Residential - Caister Drive	31.67	48.15	15.83	17.26
R6	Residential - Caister Drive	44.53	61.01	22.26	24.26
R7	Residential - Caister Drive	39.06	55.55	19.53	21.29
R8	Residential - Caister Drive	34.50	50.98	17.25	18.80
R9	Residential - Park Road	32.44	48.93	16.22	17.68
R10	Residential - Park Road	35.91	52.40	17.95	19.57
R11	Residential - Shakespeare Street	29.51	46.00	14.76	16.08
R12	Residential - Shakespeare Street	35.47	51.96	17.74	19.33
R13	Residential - Shakespeare Street	33.18	49.67	16.59	18.08
R14	Residential - Shakespeare Street	31.05	47.54	15.53	16.92
R15	Residential - Rosebud Way	29.40	45.89	14.70	16.02
R16	Residential - Colliers Way	22.75	39.24	11.37	12.40

Note: (a) PC proportion of the EQS minus twice the long-term background concentration.

4.3.9 As indicated in Table 27, PCs were below 20% of the EQS at all human receptor locations, with the exception of R6 and R7. However, the EQS is not predicted to be exceeded at these positions. As such, predicted effects on 1-hour mean NO_2 concentrations are not considered to be significant.

Nickel

4.3.10 Predicted annual mean Ni PECs at the human receptors, inclusive of background levels, are summarised in Table 28.

Table 28 Predicted Annual Mean Cd Concentrations

Receptor		Predicted Annual Mean Ni PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.00141	0.00141	0.00141	0.00141	0.00141
R2	Residential - Birkin Lane	0.00140	0.00140	0.00141	0.00141	0.00141
R3	Residential - Caister Drive	0.00142	0.00142	0.00143	0.00142	0.00143
R4	Residential - Caister Drive	0.00143	0.00144	0.00145	0.00144	0.00144
R5	Residential - Caister Drive	0.00144	0.00145	0.00145	0.00145	0.00144
R6	Residential - Caister Drive	0.00147	0.00149	0.00148	0.00148	0.00147
R7	Residential - Caister Drive	0.00147	0.00147	0.00145	0.00146	0.00146
R8	Residential - Caister Drive	0.00145	0.00146	0.00144	0.00145	0.00145
R9	Residential - Park Road	0.00145	0.00146	0.00143	0.00144	0.00145
R10	Residential - Park Road	0.00145	0.00147	0.00143	0.00145	0.00146
R11	Residential - Shakespeare Street	0.00142	0.00144	0.00142	0.00144	0.00143
R12	Residential - Shakespeare Street	0.00143	0.00144	0.00143	0.00144	0.00144
R13	Residential - Shakespeare Street	0.00143	0.00144	0.00143	0.00143	0.00143
R14	Residential - Shakespeare Street	0.00143	0.00143	0.00143	0.00143	0.00143
R15	Residential - Rosebud Way	0.00142	0.00143	0.00143	0.00142	0.00143
R16	Residential - Colliers Way	0.00142	0.00142	0.00143	0.00142	0.00142

4.3.11 As indicated in Table 28, PECs were below the annual mean EQS of 0.02µg/m³ at all human receptor locations for all meteorological data sets.

4.3.12 Maximum predicted annual mean Ni concentrations at the human receptor locations are summarised in Table 29.

Table 29 Maximum Predicted Annual Mean Ni Concentrations

Receptor		Maximum Predicted Annual Mean Ni Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - Mansfield Road	0.00001	0.00141	0.05	7.05
R2	Residential - Birkin Lane	0.00001	0.00141	0.04	7.04
R3	Residential - Caister Drive	0.00003	0.00143	0.17	7.17
R4	Residential - Caister Drive	0.00005	0.00145	0.25	7.25
R5	Residential - Caister Drive	0.00005	0.00145	0.26	7.26
R6	Residential - Caister Drive	0.00009	0.00149	0.43	7.43
R7	Residential - Caister Drive	0.00007	0.00147	0.36	7.36
R8	Residential - Caister Drive	0.00006	0.00146	0.30	7.30
R9	Residential - Park Road	0.00006	0.00146	0.28	7.28
R10	Residential - Park Road	0.00007	0.00147	0.33	7.33
R11	Residential - Shakespeare Street	0.00004	0.00144	0.19	7.19
R12	Residential - Shakespeare Street	0.00004	0.00144	0.22	7.22
R13	Residential - Shakespeare Street	0.00004	0.00144	0.20	7.20
R14	Residential - Shakespeare Street	0.00003	0.00143	0.16	7.16
R15	Residential - Rosebud Way	0.00003	0.00143	0.17	7.17
R16	Residential - Colliers Way	0.00003	0.00143	0.13	7.13

4.3.13 As indicated in Table 29, PECs were below 1% of the EQS at all human receptor locations. As such, predicted effects on annual mean Ni concentrations are not considered to be significant, in accordance with the EA criteria.

4.3.14 Predicted 100th %ile 1-hour mean Ni PECs at the human receptors, inclusive of background levels, are summarised in Table 30.

Table 30 Predicted 100th %ile 1-hour Mean Ni Concentrations

Receptor		Predicted 100th %ile 24-hour Mean Cd PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.0037	0.0040	0.0039	0.0038	0.0038
R2	Residential - Birkin Lane	0.0037	0.0037	0.0037	0.0038	0.0039
R3	Residential - Caister Drive	0.0054	0.0055	0.0057	0.0054	0.0054
R4	Residential - Caister Drive	0.0059	0.0057	0.0058	0.0058	0.0058
R5	Residential - Caister Drive	0.0056	0.0052	0.0057	0.0059	0.0058
R6	Residential - Caister Drive	0.0063	0.0059	0.0065	0.0062	0.0065
R7	Residential - Caister Drive	0.0056	0.0055	0.0055	0.0057	0.0053
R8	Residential - Caister Drive	0.0055	0.0053	0.0052	0.0052	0.0056
R9	Residential - Park Road	0.0054	0.0055	0.0053	0.0054	0.0053
R10	Residential - Park Road	0.0058	0.0062	0.0059	0.0058	0.0054
R11	Residential - Shakespeare Street	0.0051	0.0050	0.0054	0.0052	0.0050
R12	Residential - Shakespeare Street	0.0055	0.0055	0.0053	0.0060	0.0056
R13	Residential - Shakespeare Street	0.0058	0.0056	0.0055	0.0052	0.0057
R14	Residential - Shakespeare Street	0.0053	0.0053	0.0054	0.0052	0.0053
R15	Residential - Rosebud Way	0.0047	0.0048	0.0050	0.0047	0.0050
R16	Residential - Colliers Way	0.0044	0.0044	0.0045	0.0044	0.0044

4.3.15 As indicated in Table 30, 100th %tile 1-hour mean Ni PECs were below the EQS of 0.7µg/m³ at all human receptor locations for all meteorological data sets.

4.3.16 Maximum predicted 100th %ile 1-hour mean Ni concentrations at the human receptor locations are summarised in Table 31.

Table 31 Maximum Predicted 100th %ile 1-hour Mean Ni Concentrations

Receptor		Maximum Predicted 100th %ile 1-hour Mean Ni Concentration (µg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%)(a)
		PC	PEC		
R1	Residential - Mansfield Road	0.0012	0.0040	0.17	0.17
R2	Residential - Birkin Lane	0.0011	0.0039	0.16	0.16
R3	Residential - Caister Drive	0.0029	0.0057	0.42	0.42
R4	Residential - Caister Drive	0.0031	0.0059	0.44	0.44
R5	Residential - Caister Drive	0.0031	0.0059	0.44	0.44
R6	Residential - Caister Drive	0.0037	0.0065	0.53	0.53
R7	Residential - Caister Drive	0.0029	0.0057	0.41	0.41
R8	Residential - Caister Drive	0.0028	0.0056	0.40	0.40
R9	Residential - Park Road	0.0027	0.0055	0.39	0.39
R10	Residential - Park Road	0.0034	0.0062	0.48	0.48
R11	Residential - Shakespeare Street	0.0026	0.0054	0.37	0.37
R12	Residential - Shakespeare Street	0.0032	0.0060	0.46	0.46
R13	Residential - Shakespeare Street	0.0030	0.0058	0.43	0.44
R14	Residential - Shakespeare Street	0.0026	0.0054	0.37	0.38
R15	Residential - Rosebud Way	0.0022	0.0050	0.32	0.32
R16	Residential - Colliers Way	0.0017	0.0045	0.24	0.24

Note: (a) PC proportion of the EQS minus twice the long-term background concentration.

4.3.17 As indicated in Table 31, PCs were below 10% of the EQS at all human receptor locations. As such, predicted effects on 100th %tile 1-hour mean Ni concentrations are not considered to be significant, in accordance with the EA criteria.

Hydrogen Fluoride

4.3.18 Predicted 100th %tile 1-hour mean HF PECs at the human receptors, inclusive of background levels, are summarised in Table 32.

Table 32 Predicted 100th %tile 1-hour Mean HF Concentrations

Receptor		Predicted 100th %ile 1-hour Mean HF PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	4.700	4.700	4.700	4.700	4.700
R2	Residential - Birkin Lane	4.700	4.700	4.700	4.700	4.700
R3	Residential - Caister Drive	4.700	4.700	4.700	4.700	4.700
R4	Residential - Caister Drive	4.700	4.700	4.700	4.700	4.700
R5	Residential - Caister Drive	4.700	4.700	4.700	4.700	4.700
R6	Residential - Caister Drive	4.700	4.700	4.700	4.700	4.700
R7	Residential - Caister Drive	4.700	4.700	4.700	4.700	4.700
R8	Residential - Caister Drive	4.700	4.700	4.700	4.700	4.700
R9	Residential - Park Road	4.700	4.700	4.700	4.700	4.700
R10	Residential - Park Road	4.700	4.700	4.700	4.700	4.700
R11	Residential - Shakespeare Street	4.700	4.700	4.700	4.700	4.700
R12	Residential - Shakespeare Street	4.700	4.700	4.700	4.700	4.700
R13	Residential - Shakespeare Street	4.700	4.700	4.700	4.700	4.700
R14	Residential - Shakespeare Street	4.700	4.700	4.700	4.700	4.700
R15	Residential - Rosebud Way	4.700	4.700	4.700	4.700	4.700
R16	Residential - Colliers Way	4.700	4.700	4.700	4.700	4.700

4.3.19 As indicated in Table 32, 100th %ile 1-hour mean HF PECs were below the EQS of 160µg/m³ at all human receptor locations for all meteorological data sets.

4.3.20 Maximum predicted 100th %ile 1-hour mean HF concentrations at the human receptor locations are summarised in Table 33.

Table 33 Maximum Predicted 100th %ile 1-hour Mean HF Concentrations

Receptor		Maximum Predicted 100th %ile 1-hour Mean HF Concentration (µg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%)[a]
		PC	PEC		
R1	Residential - Mansfield Road	0.000	4.700	0.00	0.00
R2	Residential - Birkin Lane	0.000	4.700	0.00	0.00
R3	Residential - Caister Drive	0.000	4.700	0.00	0.00
R4	Residential - Caister Drive	0.000	4.700	0.00	0.00
R5	Residential - Caister Drive	0.000	4.700	0.00	0.00
R6	Residential - Caister Drive	0.000	4.700	0.00	0.00
R7	Residential - Caister Drive	0.000	4.700	0.00	0.00
R8	Residential - Caister Drive	0.000	4.700	0.00	0.00
R9	Residential - Park Road	0.000	4.700	0.00	0.00
R10	Residential - Park Road	0.000	4.700	0.00	0.00
R11	Residential - Shakespeare Street	0.000	4.700	0.00	0.00
R12	Residential - Shakespeare Street	0.000	4.700	0.00	0.00
R13	Residential - Shakespeare Street	0.000	4.700	0.00	0.00
R14	Residential - Shakespeare Street	0.000	4.700	0.00	0.00
R15	Residential - Rosebud Way	0.000	4.700	0.00	0.00
R16	Residential - Colliers Way	0.000	4.700	0.00	0.00

Note: (a) PC proportion of the EQS minus twice the long-term background concentration.

4.3.21 As indicated in Table 33, PCs were below 10% of the EQS at all human receptor locations. As such, predicted effects on 100th %ile 1-hour mean HF concentrations are not considered to be significant, in accordance with the EA criteria.

Toluene

4.3.22 Predicted 100th %ile weekly mean C_7H_8 PECs at the human receptors, inclusive of background levels, are summarised in Table 34.

Table 34 Predicted 100th %ile Weekly Mean C_7H_8 Concentrations

Receptor		Predicted 100th %ile Weekly Mean C_7H_8 PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.024	0.020	0.033	0.022	0.023
R2	Residential - Birkin Lane	0.013	0.014	0.028	0.021	0.029
R3	Residential - Caister Drive	0.050	0.077	0.085	0.084	0.098
R4	Residential - Caister Drive	0.081	0.135	0.152	0.150	0.122
R5	Residential - Caister Drive	0.091	0.130	0.176	0.157	0.169
R6	Residential - Caister Drive	0.176	0.214	0.303	0.237	0.261
R7	Residential - Caister Drive	0.180	0.179	0.222	0.220	0.203
R8	Residential - Caister Drive	0.152	0.139	0.174	0.195	0.205
R9	Residential - Park Road	0.155	0.180	0.138	0.199	0.165
R10	Residential - Park Road	0.167	0.249	0.139	0.214	0.176
R11	Residential - Shakespeare Street	0.091	0.172	0.064	0.085	0.082
R12	Residential - Shakespeare Street	0.103	0.175	0.093	0.126	0.129
R13	Residential - Shakespeare Street	0.108	0.100	0.110	0.119	0.127
R14	Residential - Shakespeare Street	0.088	0.073	0.101	0.085	0.081
R15	Residential - Rosebud Way	0.062	0.076	0.105	0.056	0.061
R16	Residential - Colliers Way	0.048	0.055	0.087	0.044	0.045

4.3.23 As indicated in Table 34, C_7H_8 PECs were below the weekly mean EQS of 260µg/m³ at all human receptor locations for all meteorological data sets.

4.3.24 Maximum predicted 100th %ile weekly mean C_7H_8 concentrations at the human receptor locations are summarised in Table 35.

Table 35 Maximum Predicted 100th %ile Weekly Mean C_7H_8 Concentrations

Receptor		Maximum Predicted 100th %ile Weekly Mean C_7H_8 Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - Mansfield Road	0.033	0.033	0.01	0.01
R2	Residential - Birkin Lane	0.029	0.029	0.01	0.01
R3	Residential - Caister Drive	0.098	0.098	0.04	0.04
R4	Residential - Caister Drive	0.152	0.152	0.06	0.06
R5	Residential - Caister Drive	0.176	0.176	0.07	0.07
R6	Residential - Caister Drive	0.303	0.303	0.12	0.12
R7	Residential - Caister Drive	0.222	0.222	0.09	0.09
R8	Residential - Caister Drive	0.205	0.205	0.08	0.08
R9	Residential - Park Road	0.199	0.199	0.08	0.08
R10	Residential - Park Road	0.249	0.249	0.10	0.10
R11	Residential - Shakespeare Street	0.172	0.172	0.07	0.07
R12	Residential - Shakespeare Street	0.175	0.175	0.07	0.07
R13	Residential - Shakespeare Street	0.127	0.127	0.05	0.05
R14	Residential - Shakespeare Street	0.101	0.101	0.04	0.04
R15	Residential - Rosebud Way	0.105	0.105	0.04	0.04
R16	Residential - Colliers Way	0.087	0.087	0.03	0.03

4.3.25 As indicated in Table 35, PECs were below 1% of the EQS at all human receptor locations. As such, predicted effects on weekly mean C_7H_8 concentrations are not considered to be significant, in accordance with the EA criteria.

4.3.26 Predicted 100th %ile 1-hour mean C_7H_8 PECs at the human receptors, inclusive of background levels, are summarised in Table 36.

Table 36 Predicted 100th %ile 1-hour Mean C_7H_8 Concentrations

Receptor		Predicted 100th %ile 1-hour Mean C_7H_8 PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.32	0.38	0.36	0.35	0.38
R2	Residential - Birkin Lane	0.34	0.33	0.35	0.35	0.35
R3	Residential - Caister Drive	1.29	1.15	1.55	1.27	1.32
R4	Residential - Caister Drive	1.60	1.09	1.13	1.59	1.11
R5	Residential - Caister Drive	1.27	1.09	1.25	1.04	1.04
R6	Residential - Caister Drive	1.33	1.34	1.33	1.34	1.32
R7	Residential - Caister Drive	0.87	0.87	0.87	0.87	0.87
R8	Residential - Caister Drive	0.84	0.83	0.85	0.83	0.83
R9	Residential - Park Road	0.87	0.89	0.89	0.89	0.87
R10	Residential - Park Road	1.12	1.11	1.11	1.07	1.10
R11	Residential - Shakespeare Street	0.89	0.91	0.89	0.77	0.82
R12	Residential - Shakespeare Street	1.14	1.11	1.06	1.12	1.07
R13	Residential - Shakespeare Street	1.06	1.06	1.06	1.08	1.06
R14	Residential - Shakespeare Street	0.97	0.97	0.95	0.98	0.93
R15	Residential - Rosebud Way	0.79	0.81	0.79	0.80	0.80
R16	Residential - Colliers Way	0.73	0.79	0.78	0.80	0.75

4.3.27 As indicated in Table 36, 1-hour mean C_7H_8 PECs were below the EQS of 8,000µg/m³ at all human receptor locations for all meteorological data sets.

4.3.28 Maximum predicted 100th %ile 1-hour mean C_7H_8 concentrations at the human receptor locations are summarised in Table 37.

Table 37 Maximum Predicted 100th %ile 1-hour Mean C_7H_8 Concentrations

Receptor		Maximum Predicted 100th %ile 1-hour Mean C_7H_8 Concentration (µg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%)(a)
		PC	PEC		
R1	Residential - Mansfield Road	0.38	0.38	0.00	0.00
R2	Residential - Birkin Lane	0.35	0.35	0.00	0.00
R3	Residential - Caister Drive	1.55	1.55	0.02	0.02
R4	Residential - Caister Drive	1.60	1.60	0.02	0.02
R5	Residential - Caister Drive	1.27	1.27	0.02	0.02
R6	Residential - Caister Drive	1.34	1.34	0.02	0.02
R7	Residential - Caister Drive	0.87	0.87	0.01	0.01
R8	Residential - Caister Drive	0.85	0.85	0.01	0.01
R9	Residential - Park Road	0.89	0.89	0.01	0.01
R10	Residential - Park Road	1.12	1.12	0.01	0.01
R11	Residential - Shakespeare Street	0.91	0.91	0.01	0.01
R12	Residential - Shakespeare Street	1.14	1.14	0.01	0.01
R13	Residential - Shakespeare Street	1.08	1.08	0.01	0.01
R14	Residential - Shakespeare Street	0.98	0.98	0.01	0.01
R15	Residential - Rosebud Way	0.81	0.81	0.01	0.01
R16	Residential - Colliers Way	0.80	0.80	0.01	0.01

Note: (a) PC proportion of the EQS minus twice the long-term background concentration.

4.3.29 As indicated in Table 37, PCs were below 10% of the EQS at all human receptor locations. As such, predicted effects on 1-hour mean C_7H_8 concentrations are not considered to be significant, in accordance with the EA criteria.

Tetrachloroethylene

4.3.30 Predicted 100th %ile 24-hour mean PCE PECs at the human receptors, inclusive of background levels, are summarised in Table 38.

Table 38 Predicted 100th %ile 24-hour Mean PCE Concentrations

Receptor		Predicted 100th %ile 24-hour Mean PCE PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.79	0.84	0.95	0.83	0.96
R2	Residential - Birkin Lane	0.47	0.63	0.87	0.86	0.89
R3	Residential - Caister Drive	2.35	3.07	3.56	2.93	3.54
R4	Residential - Caister Drive	2.17	4.07	5.20	3.41	3.94
R5	Residential - Caister Drive	2.74	3.47	3.15	4.83	4.01
R6	Residential - Caister Drive	4.70	5.17	5.30	7.28	5.65
R7	Residential - Caister Drive	5.81	4.51	4.18	5.05	3.72
R8	Residential - Caister Drive	3.49	3.46	4.51	3.83	4.77
R9	Residential - Park Road	3.53	4.04	4.80	3.29	4.35
R10	Residential - Park Road	3.83	5.29	5.10	4.30	4.52
R11	Residential - Shakespeare Street	3.14	3.09	2.47	3.42	3.31
R12	Residential - Shakespeare Street	2.96	4.46	4.10	4.20	3.85
R13	Residential - Shakespeare Street	4.09	3.86	4.98	4.33	5.23
R14	Residential - Shakespeare Street	4.12	3.15	3.46	2.45	3.55
R15	Residential - Rosebud Way	3.02	2.30	2.55	2.71	2.69
R16	Residential - Colliers Way	2.17	1.75	1.96	2.09	2.21

4.3.31 As indicated in Table 38, C_7H_8 PECs were below the 24-hour mean EQS at all human receptor locations for all meteorological data sets.

4.3.32 Maximum predicted 100th %ile 24-hour mean PCE concentrations at the human receptor locations are summarised in Table 39. Reference should be made to Figure 9 for a graphical representation of predicted concentrations throughout the assessment extents.

Table 39 Maximum Predicted 100th %ile 24-hour Mean PCE Concentrations

Receptor		Maximum Predicted 100th %ile 24-hour Mean PCE Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - Mansfield Road	0.96	0.96	2.40	2.40
R2	Residential - Birkin Lane	0.89	0.89	2.22	2.22
R3	Residential - Caister Drive	3.56	3.56	8.90	8.90
R4	Residential - Caister Drive	5.20	5.20	13.00	13.00
R5	Residential - Caister Drive	4.83	4.83	12.07	12.07
R6	Residential - Caister Drive	7.28	7.28	18.19	18.19
R7	Residential - Caister Drive	5.81	5.81	14.53	14.53
R8	Residential - Caister Drive	4.77	4.77	11.93	11.93
R9	Residential - Park Road	4.80	4.80	12.01	12.01
R10	Residential - Park Road	5.29	5.29	13.24	13.24
R11	Residential - Shakespeare Street	3.42	3.42	8.56	8.56
R12	Residential - Shakespeare Street	4.46	4.46	11.15	11.15
R13	Residential - Shakespeare Street	5.23	5.23	13.08	13.08
R14	Residential - Shakespeare Street	4.12	4.12	10.31	10.31
R15	Residential - Rosebud Way	3.02	3.02	7.56	7.56
R16	Residential - Colliers Way	2.21	2.21	5.52	5.52

4.3.33 As indicated in Table 39, PECs were below 70% of the EQS at all human receptor locations. As such, predicted effects on 24-hour mean PCE concentrations are not considered to be significant, in accordance with the EA criteria.

Xylene

4.3.34 Predicted annual mean xylene PECs at the human receptors, inclusive of background levels, are summarised in Table 40.

Table 40 Predicted Annual Mean Xylene Concentrations

Receptor		Predicted Annual Mean Xylene PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.081	0.076	0.119	0.089	0.102
R2	Residential - Birkin Lane	0.056	0.059	0.092	0.071	0.085
R3	Residential - Caister Drive	0.223	0.306	0.362	0.293	0.322
R4	Residential - Caister Drive	0.383	0.538	0.560	0.476	0.482
R5	Residential - Caister Drive	0.451	0.608	0.571	0.548	0.501
R6	Residential - Caister Drive	0.790	1.008	0.941	0.949	0.831
R7	Residential - Caister Drive	0.794	0.894	0.709	0.819	0.709
R8	Residential - Caister Drive	0.673	0.770	0.570	0.655	0.653
R9	Residential - Park Road	0.581	0.715	0.491	0.567	0.631
R10	Residential - Park Road	0.641	0.846	0.537	0.665	0.752
R11	Residential - Shakespeare Street	0.325	0.523	0.285	0.432	0.456
R12	Residential - Shakespeare Street	0.386	0.622	0.382	0.577	0.570
R13	Residential - Shakespeare Street	0.406	0.533	0.415	0.489	0.511
R14	Residential - Shakespeare Street	0.378	0.461	0.425	0.365	0.442
R15	Residential - Rosebud Way	0.317	0.406	0.418	0.311	0.370
R16	Residential - Colliers Way	0.245	0.320	0.343	0.251	0.282

4.3.35 As indicated in Table 40, xylene PECs were below the annual mean EQS of 4,410µg/m³ at all human receptor locations for all meteorological data sets.

4.3.36 Maximum predicted annual mean xylene concentrations at the human receptor locations are summarised in Table 41.

Table 41 Maximum Predicted Annual Mean Xylene Concentrations

Receptor		Maximum Predicted Annual Mean Xylene Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - Mansfield Road	0.119	0.119	0.00	0.00
R2	Residential - Birkin Lane	0.092	0.092	0.00	0.00
R3	Residential - Caister Drive	0.362	0.362	0.01	0.01
R4	Residential - Caister Drive	0.560	0.560	0.01	0.01
R5	Residential - Caister Drive	0.608	0.608	0.01	0.01
R6	Residential - Caister Drive	1.008	1.008	0.02	0.02
R7	Residential - Caister Drive	0.894	0.894	0.02	0.02
R8	Residential - Caister Drive	0.770	0.770	0.02	0.02
R9	Residential - Park Road	0.715	0.715	0.02	0.02
R10	Residential - Park Road	0.846	0.846	0.02	0.02
R11	Residential - Shakespeare Street	0.523	0.523	0.01	0.01
R12	Residential - Shakespeare Street	0.622	0.622	0.01	0.01
R13	Residential - Shakespeare Street	0.533	0.533	0.01	0.01
R14	Residential - Shakespeare Street	0.461	0.461	0.01	0.01
R15	Residential - Rosebud Way	0.418	0.418	0.01	0.01
R16	Residential - Colliers Way	0.343	0.343	0.01	0.01

4.3.37 As indicated in Table 41, PECs were below 1% of the EQS at all human receptor locations. As such, predicted effects on annual mean xylene concentrations are not considered to be significant, in accordance with the EA criteria.

Diethylenetriamine

4.3.38 Predicted annual mean DETA PECs at the human receptors, inclusive of background levels, are summarised in Table 42.

Table 42 Predicted Annual Mean DETA Concentrations

Receptor		Predicted Annual Mean DETA PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.007	0.003	0.005	0.004	0.005
R2	Residential - Birkin Lane	0.005	0.002	0.004	0.003	0.004
R3	Residential - Caister Drive	0.020	0.012	0.017	0.011	0.015
R4	Residential - Caister Drive	0.038	0.024	0.027	0.022	0.023
R5	Residential - Caister Drive	0.044	0.027	0.026	0.026	0.023
R6	Residential - Caister Drive	0.076	0.046	0.041	0.043	0.038
R7	Residential - Caister Drive	0.068	0.035	0.026	0.031	0.029
R8	Residential - Caister Drive	0.057	0.030	0.021	0.024	0.027
R9	Residential - Park Road	0.049	0.028	0.017	0.022	0.027
R10	Residential - Park Road	0.053	0.034	0.018	0.027	0.031
R11	Residential - Shakespeare Street	0.027	0.019	0.010	0.019	0.018
R12	Residential - Shakespeare Street	0.033	0.023	0.014	0.024	0.022
R13	Residential - Shakespeare Street	0.033	0.021	0.016	0.019	0.019
R14	Residential - Shakespeare Street	0.030	0.017	0.016	0.014	0.016
R15	Residential - Rosebud Way	0.026	0.015	0.017	0.012	0.013
R16	Residential - Colliers Way	0.019	0.011	0.013	0.009	0.010

4.3.39 As indicated in Table 42, DETA PECs were below the annual mean EQS of 4,600µg/m³ at all human receptor locations for all meteorological data sets.

4.3.40 Maximum predicted annual mean DETA concentrations at the human receptor locations are summarised in Table 43.

Table 43 Maximum Predicted Annual Mean DETA Concentrations

Receptor		Maximum Predicted Annual Mean DETA Concentration (µg/m³)		Proportion of EQS (%)	
		PC	PEC	PC	PEC
R1	Residential - Mansfield Road	0.007	0.007	0.00	0.00
R2	Residential - Birkin Lane	0.005	0.005	0.00	0.00
R3	Residential - Caister Drive	0.020	0.020	0.00	0.00
R4	Residential - Caister Drive	0.038	0.038	0.00	0.00
R5	Residential - Caister Drive	0.044	0.044	0.00	0.00
R6	Residential - Caister Drive	0.076	0.076	0.00	0.00
R7	Residential - Caister Drive	0.068	0.068	0.00	0.00
R8	Residential - Caister Drive	0.057	0.057	0.00	0.00
R9	Residential - Park Road	0.049	0.049	0.00	0.00
R10	Residential - Park Road	0.053	0.053	0.00	0.00
R11	Residential - Shakespeare Street	0.027	0.027	0.00	0.00
R12	Residential - Shakespeare Street	0.033	0.033	0.00	0.00
R13	Residential - Shakespeare Street	0.033	0.033	0.00	0.00
R14	Residential - Shakespeare Street	0.030	0.030	0.00	0.00
R15	Residential - Rosebud Way	0.026	0.026	0.00	0.00
R16	Residential - Colliers Way	0.019	0.019	0.00	0.00

4.3.41 As indicated in Table 44, PECS were below 1% of the EQS at all human receptor locations. As such, predicted effects on annual mean DETA concentrations are not considered to be significant, in accordance with the EA criteria.

4.3.42 Predicted 100th %ile 1-hour mean DETA PECs at the human receptors, inclusive of background levels, are summarised in Table 44.

Table 44 Predicted 100th %ile 1-hour Mean DETA Concentrations

Receptor		Predicted 100th %ile 1-hour Mean DETA PEC (µg/m³)				
		2020	2021	2022	2023	2024
R1	Residential - Mansfield Road	0.90	1.18	1.11	0.92	0.96
R2	Residential - Birkin Lane	0.96	0.83	0.91	0.97	1.09
R3	Residential - Caister Drive	2.72	2.61	4.01	3.27	3.20
R4	Residential - Caister Drive	3.52	3.21	3.40	3.52	3.30
R5	Residential - Caister Drive	3.07	2.94	3.07	3.22	3.07
R6	Residential - Caister Drive	3.96	3.80	4.01	4.05	3.93
R7	Residential - Caister Drive	2.69	2.69	2.67	2.70	2.70
R8	Residential - Caister Drive	2.72	2.63	2.70	2.52	2.70
R9	Residential - Park Road	3.08	3.26	3.10	3.07	3.05
R10	Residential - Park Road	3.71	3.78	3.86	3.53	3.48
R11	Residential - Shakespeare Street	2.76	2.75	2.72	2.73	2.72
R12	Residential - Shakespeare Street	3.09	3.09	3.23	3.47	3.24
R13	Residential - Shakespeare Street	3.22	2.90	3.09	3.20	3.22
R14	Residential - Shakespeare Street	2.65	2.73	2.65	2.75	2.82
R15	Residential - Rosebud Way	2.09	2.24	2.15	2.19	2.32
R16	Residential - Colliers Way	1.62	1.64	1.62	1.61	1.60

4.3.43 As indicated in Table 44, 1-hour mean DETA PECs were below the EQS of 27,500µg/m³ at all human receptor locations for all meteorological data sets.

4.3.44 Maximum predicted 100th %ile 1-hour mean DETA concentrations at the human receptor locations are summarised in Table 45.

Table 45 Maximum Predicted 100th %ile 1-hour Mean DETA Concentrations

Receptor		Maximum Predicted 100th %ile 1-hour Mean DETA Concentration (µg/m³)		PC Proportion of EQS (%)	PC Proportion of EQS Headroom (%)(a)
		PC	PEC		
R1	Residential - Mansfield Road	1.18	1.18	0.00	0.00
R2	Residential - Birkin Lane	1.09	1.09	0.00	0.00
R3	Residential - Caister Drive	4.01	4.01	0.01	0.01
R4	Residential - Caister Drive	3.52	3.52	0.01	0.01
R5	Residential - Caister Drive	3.22	3.22	0.01	0.01
R6	Residential - Caister Drive	4.05	4.05	0.01	0.01
R7	Residential - Caister Drive	2.70	2.70	0.01	0.01
R8	Residential - Caister Drive	2.72	2.72	0.01	0.01
R9	Residential - Park Road	3.26	3.26	0.01	0.01
R10	Residential - Park Road	3.86	3.86	0.01	0.01
R11	Residential - Shakespeare Street	2.76	2.76	0.01	0.01
R12	Residential - Shakespeare Street	3.47	3.47	0.01	0.01
R13	Residential - Shakespeare Street	3.22	3.22	0.01	0.01
R14	Residential - Shakespeare Street	2.82	2.82	0.01	0.01
R15	Residential - Rosebud Way	2.32	2.32	0.01	0.01
R16	Residential - Colliers Way	1.64	1.64	0.01	0.01

Note: (a) PC proportion of the EQS minus twice the long-term background concentration.

4.3.45 As indicated in Table 45, PCs were below 10% of the EQS at all human receptor locations. As such, predicted effects on 1-hour mean DETA concentrations are not considered to be significant, in accordance with the EA criteria.

4.4 Ecological Receptors

4.4.1 Predicted concentrations of each pollutant at the ecological receptor locations identified in Table 10 are summarised in the following Sections.

Nitrogen Oxides

4.4.2 Predicted annual mean NO_x PCs at the ecological receptors are summarised in Table 46.

Table 46 Predicted Annual Mean NO_x Concentrations

Receptor		Predicted Annual Mean NO_x PC (µg/m³)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	5.02	5.86	4.85	5.53	4.41
E2	Williamthorpe LNR	10.40	13.10	11.15	13.40	10.46
E3	Williamthorpe LNR	5.70	6.81	8.56	6.50	7.39
E4	Williamthorpe LNR	7.50	6.33	8.77	6.55	7.76
E5	Williamthorpe LNR	12.19	10.84	13.23	10.34	10.73
E6	Williamthorpe LNR	13.92	12.29	13.88	12.09	12.46
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	4.53	4.27	4.64	4.80	4.63
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	2.66	2.50	2.75	2.96	2.80
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	2.88	2.72	2.91	3.22	2.95
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	3.09	2.97	3.07	3.39	3.22
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	3.02	3.03	3.13	3.32	3.48
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	3.03	3.40	3.70	3.42	3.79
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	1.90	2.33	2.69	2.20	2.39
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	1.20	1.51	1.80	1.35	1.45
E15	Heath Wood AW	0.17	0.16	0.18	0.20	0.18
E16	Unnamed AW	0.07	0.06	0.07	0.06	0.07
E17	Birken Lane Carr LWS	0.06	0.08	0.12	0.07	0.10
E18	Grassmoor Country Park LWS	0.04	0.05	0.07	0.05	0.06

Receptor		Predicted Annual Mean NO_x PC (µg/m³)				
		2020	2021	2022	2023	2024
E19	Grassmoor Country Park LWS	0.03	0.04	0.07	0.04	0.06
E20	Wolfie Pond Grasslands LWS	0.18	0.22	0.19	0.21	0.18
E21	Holmewood Meadow LWS	0.16	0.21	0.25	0.19	0.20
E22	Owlcotes Wood LWS	0.16	0.15	0.17	0.19	0.17

4.4.3 Maximum predicted annual mean NO_x concentrations at the ecological receptor locations are summarised in Table 47.

Table 47 Maximum Predicted Annual Mean NO_x Concentrations

Receptor		Maximum Predicted Annual Mean NO_x PC (µg/m³)	PC Proportion of EQS (%)
E1	Williamthorpe LNR	5.86	19.55
E2	Williamthorpe LNR	13.40	44.67
E3	Williamthorpe LNR	8.56	28.53
E4	Williamthorpe LNR	8.77	29.23
E5	Williamthorpe LNR	13.23	44.10
E6	Williamthorpe LNR	13.92	46.41
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	4.80	15.99
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	2.96	9.87
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	3.22	10.73
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	3.39	11.29
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	3.48	11.62
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	3.79	12.62
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	2.69	8.97
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	1.80	6.00
E15	Heath Wood AW	0.20	0.66
E16	Unnamed AW	0.07	0.24

Receptor		Maximum Predicted Annual Mean NO_x PC (µg/m³)	PC Proportion of EQS (%)
E17	Birken Lane Carr LWS	0.12	0.38
E18	Grassmoor Country Park LWS	0.07	0.24
E19	Grassmoor Country Park LWS	0.07	0.22
E20	Wolfie Pond Grasslands LWS	0.22	0.72
E21	Holmewood Meadow LWS	0.25	0.84
E22	Owlcotes Wood LWS	0.19	0.62

4.4.4 As shown in Table 47, PCs were below 100% of the EQS at all local designations. As such, predicted effects on annual mean NO_x concentrations are considered to be not significant, in accordance with the EA criteria.

4.4.5 Predicted 24-hour mean NO_x PCs at the ecological receptors are summarised in Table 48.

Table 48 Predicted 24-hour Mean NO_x Concentrations

Receptor		Predicted 24-hour Mean NO_x PC (µg/m³)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	43.79	51.98	43.26	45.25	47.01
E2	Williamthorpe LNR	157.41	186.78	185.45	182.27	199.50
E3	Williamthorpe LNR	99.36	99.58	170.09	108.25	137.57
E4	Williamthorpe LNR	95.51	93.52	90.50	88.51	79.42
E5	Williamthorpe LNR	99.66	86.48	96.87	94.82	80.32
E6	Williamthorpe LNR	91.56	84.02	107.92	100.19	86.82
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	20.92	20.63	21.85	24.79	23.19
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	11.09	14.04	15.16	15.40	13.13
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	13.77	15.59	16.74	12.78	13.82

Receptor		Predicted 24-hour Mean NO_x PC (µg/m³)				
		2020	2021	2022	2023	2024
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	13.31	15.60	14.33	14.86	13.90
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	15.29	15.36	15.78	18.60	15.87
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	17.58	23.54	25.82	22.41	21.92
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	17.10	17.60	20.71	19.58	16.64
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	12.37	13.24	16.41	14.77	16.59
E15	Heath Wood AW	1.30	1.50	1.48	1.39	1.16
E16	Unnamed AW	1.28	1.45	0.95	1.11	1.32
E17	Birken Lane Carr LWS	1.61	1.51	1.69	2.04	2.07
E18	Grassmoor Country Park LWS	0.95	1.05	1.01	1.50	1.34
E19	Grassmoor Country Park LWS	1.08	0.73	1.34	0.80	1.02
E20	Wolfie Pond Grasslands LWS	2.99	2.56	2.57	2.79	1.89
E21	Holmewood Meadow LWS	1.88	2.16	3.03	2.84	2.59
E22	Owlcotes Wood LWS	1.08	1.30	1.44	1.60	1.16

4.4.6 Maximum predicted 24-hour mean NO_x concentrations at the ecological receptor locations are summarised in Table 49.

Table 49 Maximum Predicted 24-hour Mean NO_x Concentrations

Receptor		Maximum Predicted 24-hour Mean NO_x PC (µg/m³)	PC Proportion of EQS (%)
E1	Williamthorpe LNR	51.98	25.99
E2	Williamthorpe LNR	199.50	99.75
E3	Williamthorpe LNR	170.09	85.04
E4	Williamthorpe LNR	95.51	47.75

Receptor		Maximum Predicted 24-hour Mean NO_x PC (µg/m³)	PC Proportion of EQS (%)
E5	Williamthorpe LNR	99.66	49.83
E6	Williamthorpe LNR	107.92	53.96
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	24.79	12.40
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	15.40	7.70
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	16.74	8.37
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	15.60	7.80
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	18.60	9.30
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	25.82	12.91
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	20.71	10.36
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	16.59	8.30
E15	Heath Wood AW	1.50	0.75
E16	Unnamed AW	1.45	0.73
E17	Birken Lane Carr LWS	2.07	1.03
E18	Grassmoor Country Park LWS	1.50	0.75
E19	Grassmoor Country Park LWS	1.34	0.67
E20	Wolfie Pond Grasslands LWS	2.99	1.49
E21	Holmewood Meadow LWS	3.03	1.52
E22	Owlcotes Wood LWS	1.60	0.80

4.4.7 As shown in Table 49, PCs were below 100% of the EQS at all local designations. As such, predicted effects on 24-hour mean NO_x concentrations are considered to be not significant, in accordance with the EA criteria.

Hydrogen Fluoride

4.4.8 Predicted weekly mean HF PCs at the ecological receptors are summarised in Table 50.

Table 50 Predicted Weekly Mean HF Concentrations

Receptor		Predicted Weekly Mean HF PC (µg/m³)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	0.00003	0.00003	0.00004	0.00004	0.00003
E2	Williamthorpe LNR	0.00004	0.00005	0.00005	0.00005	0.00004
E3	Williamthorpe LNR	0.00002	0.00002	0.00003	0.00002	0.00002
E4	Williamthorpe LNR	0.00003	0.00004	0.00004	0.00002	0.00003
E5	Williamthorpe LNR	0.00004	0.00005	0.00006	0.00003	0.00003
E6	Williamthorpe LNR	0.00003	0.00005	0.00006	0.00004	0.00004
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00001	0.00001	0.00001	0.00001
E15	Heath Wood AW	0.00000	0.00000	0.00000	0.00000	0.00000
E16	Unnamed AW	0.00000	0.00000	0.00000	0.00000	0.00000
E17	Birken Lane Carr LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E18	Grassmoor Country Park LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E19	Grassmoor Country Park LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E20	Wolfie Pond Grasslands LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E21	Holmewood Meadow LWS	0.00000	0.00000	0.00000	0.00000	0.00000

Receptor		Predicted Weekly Mean HF PC (µg/m³)				
		2020	2021	2022	2023	2024
E22	Owlcotes Wood LWS	0.00000	0.00000	0.00000	0.00000	0.00000

4.4.9 Maximum predicted weekly mean HF concentrations at the ecological receptor locations are summarised Table 51.

Table 51 Maximum Predicted Weekly Mean HF Concentrations

Receptor		Maximum Predicted Weekly Mean HF PC (µg/m³)	PC Proportion of EQS (%)
E1	Williamthorpe LNR	0.00004	0.01
E2	Williamthorpe LNR	0.00005	0.01
E3	Williamthorpe LNR	0.00003	0.01
E4	Williamthorpe LNR	0.00004	0.01
E5	Williamthorpe LNR	0.00006	0.01
E6	Williamthorpe LNR	0.00006	0.01
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00
E15	Heath Wood AW	0.00000	0.00
E16	Unnamed AW	0.00000	0.00
E17	Birken Lane Carr LWS	0.00000	0.00
E18	Grassmoor Country Park LWS	0.00000	0.00
E19	Grassmoor Country Park LWS	0.00000	0.00

Receptor		Maximum Predicted Weekly Mean HF PC (µg/m³)	PC Proportion of EQS (%)
E20	Wolfie Pond Grasslands LWS	0.00000	0.00
E21	Holmewood Meadow LWS	0.00000	0.00
E22	Owlcotes Wood LWS	0.00000	0.00

4.4.10 As shown in Table 51, PCs were below 100% of the EQS at all local designations. As such, predicted effects on weekly mean HF concentrations are considered to be not significant, in accordance with the EA criteria.

4.4.11 Predicted daily mean HF PCs at the ecological receptors are summarised in Table 52.

Table 52 Predicted Daily Mean HF Concentrations

Receptor		Predicted Daily Mean HF PC (µg/m³)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	0.00006	0.00007	0.00006	0.00006	0.00006
E2	Williamthorpe LNR	0.00010	0.00014	0.00010	0.00010	0.00009
E3	Williamthorpe LNR	0.00007	0.00006	0.00009	0.00010	0.00009
E4	Williamthorpe LNR	0.00011	0.00011	0.00011	0.00007	0.00007
E5	Williamthorpe LNR	0.00012	0.00010	0.00012	0.00011	0.00010
E6	Williamthorpe LNR	0.00009	0.00011	0.00012	0.00010	0.00010
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00003	0.00002	0.00003	0.00003	0.00003
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00001	0.00002	0.00002	0.00002	0.00002
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00002	0.00002	0.00002	0.00002
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00002	0.00002	0.00002	0.00002
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00002	0.00002	0.00002	0.00002

Receptor		Predicted Daily Mean HF PC (µg/m³)				
		2020	2021	2022	2023	2024
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00003	0.00003	0.00003	0.00003
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00002	0.00002	0.00002	0.00002
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00002	0.00002	0.00002	0.00002
E15	Heath Wood AW	0.00000	0.00000	0.00000	0.00000	0.00000
E16	Unnamed AW	0.00000	0.00000	0.00000	0.00000	0.00000
E17	Birken Lane Carr LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E18	Grassmoor Country Park LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E19	Grassmoor Country Park LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E20	Wolfie Pond Grasslands LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E21	Holmewood Meadow LWS	0.00000	0.00000	0.00000	0.00000	0.00000
E22	Owlcotes Wood LWS	0.00000	0.00000	0.00000	0.00000	0.00000

4.4.12 Maximum predicted daily mean HF concentrations at the ecological receptor locations are summarised in Table 53.

Table 53 Maximum Predicted Daily Mean HF Concentrations

Receptor		Maximum Predicted Daily Mean HF PC (µg/m³)	PC Proportion of EQS (%)
E1	Williamthorpe LNR	0.00007	0.00
E2	Williamthorpe LNR	0.00014	0.00
E3	Williamthorpe LNR	0.00010	0.00
E4	Williamthorpe LNR	0.00011	0.00
E5	Williamthorpe LNR	0.00012	0.00
E6	Williamthorpe LNR	0.00012	0.00
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00003	0.00

Receptor		Maximum Predicted Daily Mean HF PC (µg/m³)	PC Proportion of EQS (%)
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00003	0.00
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.00002	0.00
E15	Heath Wood AW	0.00000	0.00
E16	Unnamed AW	0.00000	0.00
E17	Birken Lane Carr LWS	0.00000	0.00
E18	Grassmoor Country Park LWS	0.00000	0.00
E19	Grassmoor Country Park LWS	0.00000	0.00
E20	Wolfie Pond Grasslands LWS	0.00000	0.00
E21	Holmewood Meadow LWS	0.00000	0.00
E22	Owlcotes Wood LWS	0.00000	0.00

4.4.13 As shown in Table 53, PCs were below 100% of the EQS at all local designations. As such, predicted effects on daily mean HF concentrations are not considered to be significant, in accordance with the EA criteria.

Ammonia

4.4.14 Predicted annual mean NH_3 PCs at the ecological receptors are summarised in Table 54.

Table 54 Predicted Annual Mean NH_3 Concentrations

Receptor		Predicted Annual Mean NH_3 PC (µg/m³)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	0.062	0.073	0.060	0.069	0.055

Receptor		Predicted Annual Mean NH_3 PC (µg/m³)				
		2020	2021	2022	2023	2024
E2	Williamthorpe LNR	0.129	0.162	0.138	0.166	0.130
E3	Williamthorpe LNR	0.070	0.083	0.105	0.080	0.091
E4	Williamthorpe LNR	0.092	0.078	0.108	0.080	0.095
E5	Williamthorpe LNR	0.151	0.134	0.164	0.128	0.133
E6	Williamthorpe LNR	0.173	0.153	0.172	0.150	0.155
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.056	0.053	0.058	0.060	0.058
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.033	0.031	0.034	0.037	0.035
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.036	0.034	0.036	0.040	0.037
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.038	0.037	0.038	0.042	0.040
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.038	0.038	0.039	0.041	0.043
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.038	0.042	0.046	0.043	0.047
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.024	0.029	0.034	0.027	0.030
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.015	0.019	0.022	0.017	0.018
E15	Heath Wood AW	0.002	0.002	0.002	0.002	0.002
E16	Unnamed AW	0.001	0.001	0.001	0.001	0.001
E17	Birken Lane Carr LWS	0.001	0.001	0.001	0.001	0.001
E18	Grassmoor Country Park LWS	0.000	0.001	0.001	0.001	0.001
E19	Grassmoor Country Park LWS	0.000	0.001	0.001	0.001	0.001
E20	Wolfie Pond Grasslands LWS	0.002	0.003	0.002	0.003	0.002
E21	Holmewood Meadow LWS	0.002	0.003	0.003	0.002	0.002
E22	Owlcotes Wood LWS	0.002	0.002	0.002	0.002	0.002

4.4.15 Maximum predicted annual mean NH_3 concentrations at the ecological receptor locations are summarised in Table 55.

Table 55 Maximum Predicted Annual Mean NH_3 Concentrations

Receptor		Maximum Predicted Annual Mean NH_3 PC ($\mu g/m^3$)	PC Proportion of EQS (%)
E1	Williamthorpe LNR	0.073	7.30
E2	Williamthorpe LNR	0.166	16.62
E3	Williamthorpe LNR	0.105	10.51
E4	Williamthorpe LNR	0.108	10.75
E5	Williamthorpe LNR	0.164	16.41
E6	Williamthorpe LNR	0.173	17.31
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.060	5.96
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.037	3.68
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.040	4.00
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.042	4.21
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.043	4.34
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.047	4.71
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.034	3.35
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.022	2.24
E15	Heath Wood AW	0.002	0.25
E16	Unnamed AW	0.001	0.09
E17	Birken Lane Carr LWS	0.001	0.14
E18	Grassmoor Country Park LWS	0.001	0.09
E19	Grassmoor Country Park LWS	0.001	0.08
E20	Wolfie Pond Grasslands LWS	0.003	0.27
E21	Holmewood Meadow LWS	0.003	0.31
E22	Owlcotes Wood LWS	0.002	0.23

4.4.16 as shown in Table 55, PCs were below 100% of the EQS at all local designations. As such, predicted effects on annual mean NH_3 concentrations are not considered to be significant, in accordance with the EA criteria.

Nitrogen Deposition

4.4.17 Predicted annual nitrogen PC deposition rates at the ecological receptors are summarised in Table 56.

Table 56 Predicted Annual Nitrogen Deposition Rates

Receptor		Predicted Annual PC Nitrogen Deposition Rate (kgN/ha/yr)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	1.93	2.26	1.87	2.13	1.69
E2	Williamthorpe LNR	4.00	5.04	4.28	5.15	4.02
E3	Williamthorpe LNR	2.18	2.61	3.28	2.49	2.84
E4	Williamthorpe LNR	2.87	2.43	3.36	2.51	2.98
E5	Williamthorpe LNR	4.69	4.17	5.09	3.98	4.13
E6	Williamthorpe LNR	5.36	4.73	5.34	4.65	4.79
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	1.74	1.64	1.79	1.85	1.78
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.64	0.60	0.66	0.71	0.67
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.69	0.66	0.70	0.78	0.71
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.74	0.72	0.74	0.82	0.78
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.73	0.73	0.75	0.80	0.84
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	1.16	1.31	1.42	1.32	1.46
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.73	0.90	1.04	0.85	0.92
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.46	0.58	0.69	0.52	0.56

Receptor		Predicted Annual PC Nitrogen Deposition Rate (kgN/ha/yr)				
		2020	2021	2022	2023	2024
E15	Heath Wood AW	0.07	0.06	0.07	0.08	0.07
E16	Unnamed AW	0.03	0.02	0.03	0.02	0.03
E17	Birken Lane Carr LWS	0.02	0.03	0.04	0.03	0.04
E18	Grassmoor Country Park LWS	0.01	0.02	0.03	0.02	0.02
E19	Grassmoor Country Park LWS	0.01	0.02	0.03	0.02	0.02
E20	Wolfie Pond Grasslands LWS	0.07	0.08	0.07	0.08	0.07
E21	Holmewood Meadow LWS	0.06	0.08	0.10	0.07	0.08
E22	Owlcotes Wood LWS	0.06	0.06	0.07	0.07	0.07

4.4.18 Maximum predicted annual nitrogen deposition rates at the ecological receptor locations are summarised in Table 57.

Table 57 Maximum Predicted Annual Nitrogen Deposition Rates

Receptor		Predicted Annual PC Nitrogen Deposition Rate (kgN/ha/yr)	PC Proportion of Low EQS (%)
E1	Williamthorpe LNR	2.26	22.56
E2	Williamthorpe LNR	5.15	51.52
E3	Williamthorpe LNR	3.28	32.83
E4	Williamthorpe LNR	3.36	33.62
E5	Williamthorpe LNR	5.09	50.86
E6	Williamthorpe LNR	5.36	53.56
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	1.85	18.45
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.71	7.13
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.78	7.75
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.82	8.16
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.84	8.40

Receptor		Predicted Annual PC Nitrogen Deposition Rate (kgN/ha/yr)	PC Proportion of Low EQS (%)
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	1.46	14.57
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	1.04	10.36
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.69	6.93
E15	Heath Wood AW	0.08	0.76
E16	Unnamed AW	0.03	0.28
E17	Birken Lane Carr LWS	0.04	0.44
E18	Grassmoor Country Park LWS	0.03	0.28
E19	Grassmoor Country Park LWS	0.03	0.25
E20	Wolfie Pond Grasslands LWS	0.08	0.83
E21	Holmewood Meadow LWS	0.10	0.97
E22	Owlcotes Wood LWS	0.07	0.72

4.4.19 As shown in Table 57, PCs were below 100% of the EQS at all local designations. As such, predicted effects on annual nitrogen deposition are not considered to be significant, in accordance with the EA criteria.

Acid Deposition

4.4.20 Predicted annual acid PC deposition rates at the ecological receptors are summarised in Table 58.

Table 58 Predicted Annual PC Acid Deposition Rates

Receptor		Predicted Annual PC Acid Deposition Rate (keq/ha/yr)				
		2020	2021	2022	2023	2024
E1	Williamthorpe LNR	0.14	0.16	0.13	0.15	0.12
E2	Williamthorpe LNR	0.29	0.36	0.31	0.37	0.29
E3	Williamthorpe LNR	0.16	0.19	0.23	0.18	0.20

Receptor		Predicted Annual PC Acid Deposition Rate (keq/ha/yr)				
		2020	2021	2022	2023	2024
E4	Williamthorpe LNR	0.20	0.17	0.24	0.18	0.21
E5	Williamthorpe LNR	0.33	0.30	0.36	0.28	0.29
E6	Williamthorpe LNR	0.38	0.34	0.38	0.33	0.34
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.12	0.12	0.13	0.13	0.13
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.07	0.07	0.08	0.08	0.08
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.08	0.07	0.08	0.09	0.08
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.08	0.08	0.08	0.09	0.09
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.08	0.08	0.09	0.09	0.10
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.08	0.09	0.10	0.09	0.10
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.05	0.06	0.07	0.06	0.07
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.03	0.04	0.05	0.04	0.04
E15	Heath Wood AW	0.00	0.00	0.00	0.01	0.00
E16	Unnamed AW	0.00	0.00	0.00	0.00	0.00
E17	Birken Lane Carr LWS	0.00	0.00	0.00	0.00	0.00
E18	Grassmoor Country Park LWS	0.00	0.00	0.00	0.00	0.00
E19	Grassmoor Country Park LWS	0.00	0.00	0.00	0.00	0.00
E20	Wolfie Pond Grasslands LWS	0.00	0.01	0.01	0.01	0.01
E21	Holmewood Meadow LWS	0.00	0.01	0.01	0.01	0.01
E22	Owlcotes Wood LWS	0.00	0.00	0.00	0.01	0.00

4.4.21 Maximum predicted annual acid deposition rates at the ecological receptor locations are summarised in Table 59.

Table 59 Predicted Annual Acid Deposition Rates

Receptor		Maximum Predicted Annual Acid PC Deposition Rate (keq/ha/yr)	PC Proportion of EQS (%)
E1	Williamthorpe LNR	0.16	4.58
E2	Williamthorpe LNR	0.37	10.46
E3	Williamthorpe LNR	0.23	6.66
E4	Williamthorpe LNR	0.24	6.83
E5	Williamthorpe LNR	0.36	10.33
E6	Williamthorpe LNR	0.38	10.87
E7	Williamthorpe LNR and Williamthorpe Ponds LWS	0.13	3.75
E8	Williamthorpe LNR and Williamthorpe Ponds LWS	0.08	1.66
E9	Williamthorpe LNR and Williamthorpe Ponds LWS	0.09	1.80
E10	Williamthorpe LNR and Williamthorpe Ponds LWS	0.09	1.89
E11	Williamthorpe LNR and Williamthorpe Ponds LWS	0.10	1.95
E12	Williamthorpe LNR and Williamthorpe Ponds LWS	0.10	2.12
E13	Williamthorpe LNR and Williamthorpe Ponds LWS	0.07	2.10
E14	Williamthorpe LNR and Williamthorpe Ponds LWS	0.05	1.41
E15	Heath Wood AW	0.01	0.15
E16	Unnamed AW	0.00	0.06
E17	Birken Lane Carr LWS	0.00	0.09
E18	Grassmoor Country Park LWS	0.00	0.06
E19	Grassmoor Country Park LWS	0.00	0.05
E20	Wolfie Pond Grasslands LWS	0.01	0.17
E21	Holmewood Meadow LWS	0.01	0.20
E22	Owlcotes Wood LWS	0.01	0.15

4.4.22 As shown in Table 59, PCs were below 100% of the EQS at all local designations. As such, predicted effects on annual acid deposition are considered to be not significant, in accordance with the EA criteria.

4.5 Substance Deposition

4.5.1 The maximum predicted Ni PC to ground at any point within the modelling extents for any meteorological data set is summarised in Table 60.

Table 60 Maximum Predicted Ni PC to Ground

Maximum Predicted Ni PC to Ground (mg/m²/day)	PC Proportion of EQS (%)
0.01	9.26

4.5.2 As shown in Table 60, the maximum Ni PC to ground was above 1%. However, the PC is not predicted to exceed the EQS of 0.11mg/m²/day. As such, predicted substance deposition effects are not considered to be significant.

5.0 CONCLUSION

5.1.1 Redmore Environmental Ltd was commissioned by EHS Projects Ltd to undertake a Dispersion Modelling Assessment in support of an Environmental Permit Application for the CBE+ facility, Enterprise Drive, Chesterfield.

5.1.2 Operations at the CBE+ facility comprise multiple chemical and electrochemical plating lines, including several treatment vats with a combined volume greater than thirty cubic metres. As this exceeds the regulatory threshold under the Environmental Permitting (England and Wales) Regulations (2016) for surface treatment of metals and plastics, the site requires an Environmental Permit from the EA to regulate emissions to air and other environmental impacts associated with these activities.

5.1.3 Dispersion modelling was undertaken in order to predict pollutant concentrations and deposition as a result of emissions from the facility. Impacts at sensitive receptors were quantified and the results compared with the relevant EQSs and significance criteria.

5.1.4 The results indicated that impacts on pollutant concentrations and deposition were not predicted to be significant at any human or ecological receptor location in the vicinity of the site, subject to implementation of a derived maximum permissible concentration for NO_x emissions.

6.0 ABBREVIATIONS

APIS	Air Pollution Information System
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
AW	Ancient Woodland
CERC	Cambridge Environmental Research Consultants
C_7H_8	Toluene
DEFRA	Department for Environment, Food and Rural Affairs
DETA	Diethylenetriamine
EA	Environment Agency
EQS	Environmental Quality Standard
EPAQS	Expert Panel on Air Quality Standards
HF	Hydrogen fluoride
LAQM	Local Air Quality Management
LNR	Local Nature Reserve
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
NGR	National Grid Reference
NH_3	Ammonia
Ni	Nickel
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
PC	Process Contribution
PCE	Tetrachloroethylene
PEC	Predicted Environmental Concentration
SGN	Sector Guidance Note
SO_2	Sulphur dioxide
VOC	Volatile Organic Compound
TOC	Total Organic Compound
z_0	Roughness length
%ile	Percentile

Figures

Legend

Site Boundary

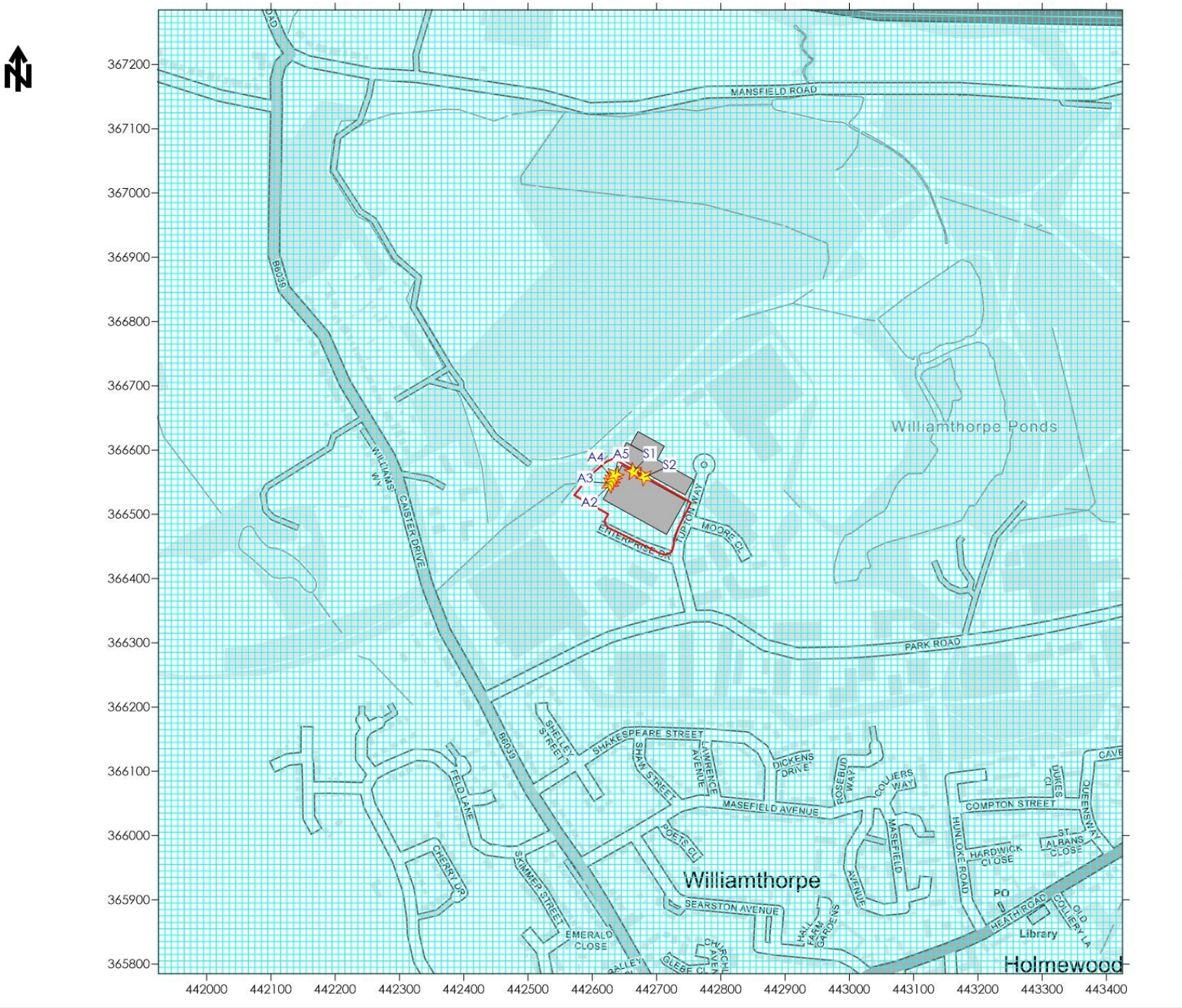
Title
Figure 1 - Site Location Plan

Project
Dispersion Modelling Assessment
Enterprise Drive, Chesterfield

Project Reference
10665-1

Client
EHS Projects Ltd

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

- Site Boundary
- Stack
- Building
- Output Grid

Title
Figure 2 - ADMS-6 Inputs

Project
Dispersion Modelling Assessment
Enterprise Drive, Chesterfield

Project Reference
10665-1

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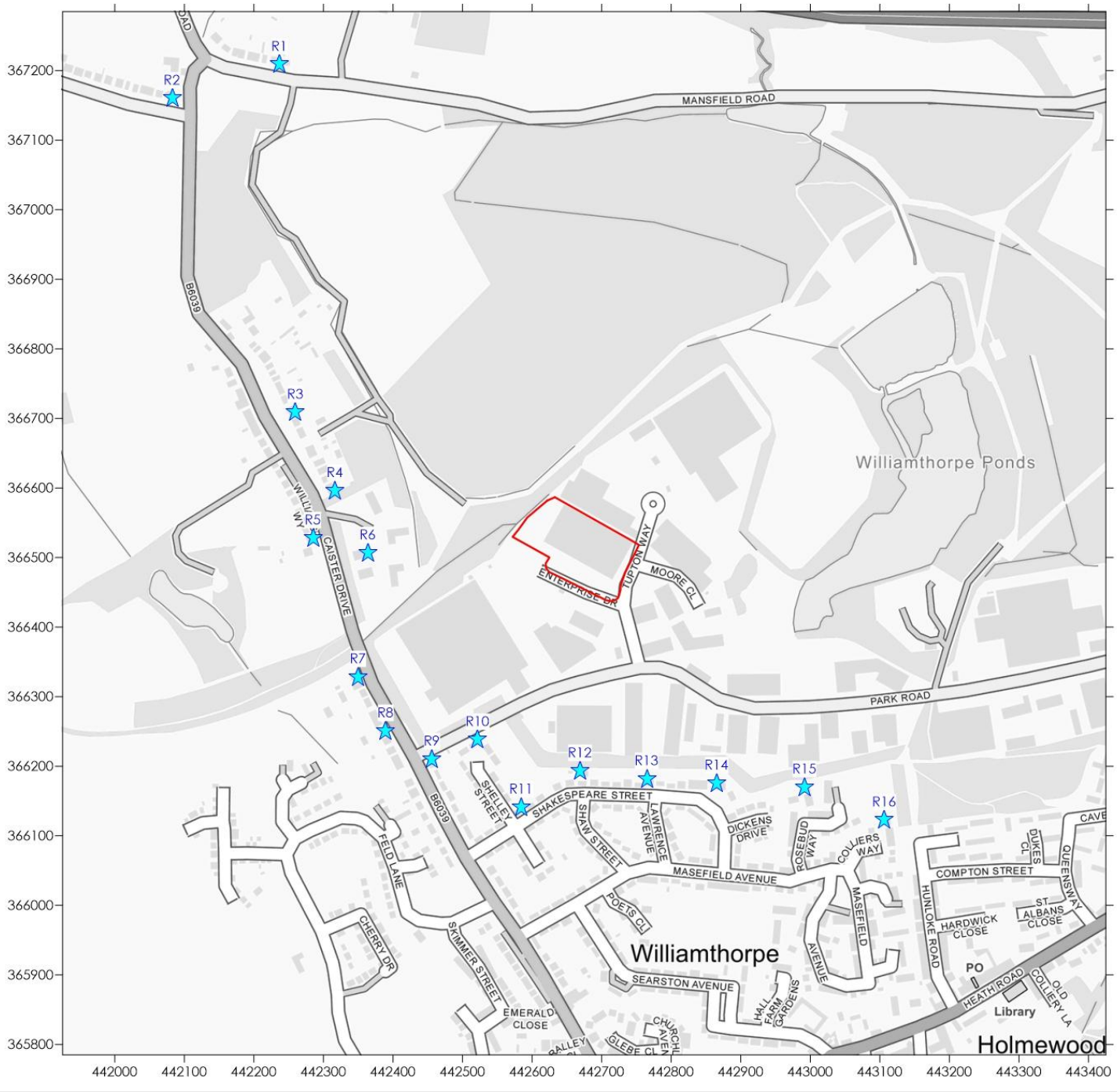

Legend

Site Boundary

Human Receptor

Title
Figure 3 - Human Receptor Locations

Project
Dispersion Modelling Assessment
Enterprise Drive, Chesterfield

Project Reference
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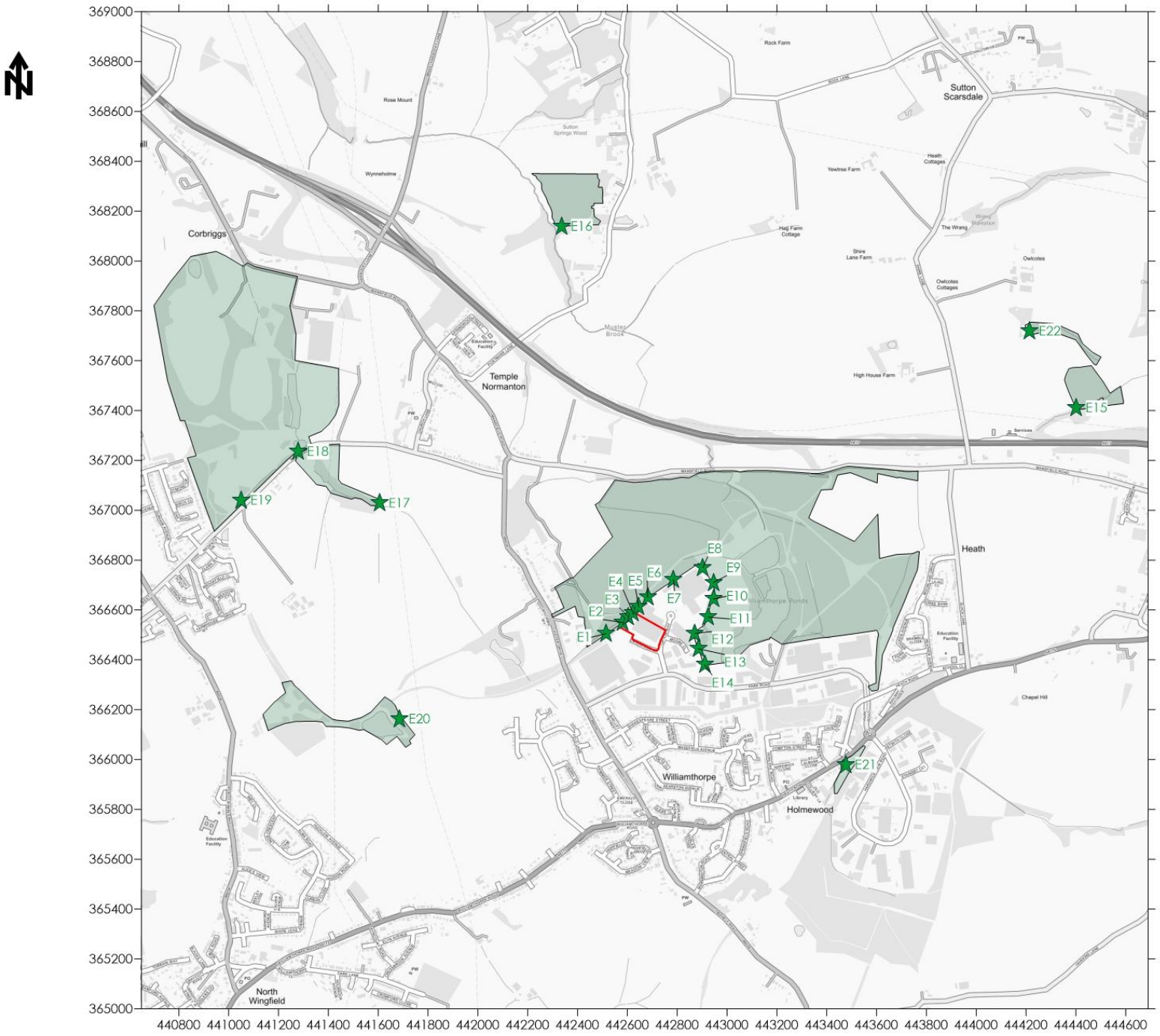

Legend

Site Boundary

Ecological Receptor

Designation

Title
Figure 3 - Ecological Receptor Locations

Project
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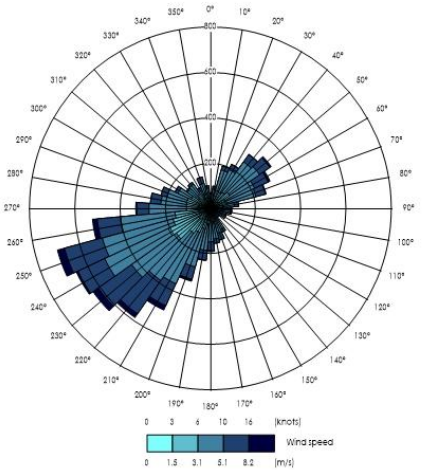
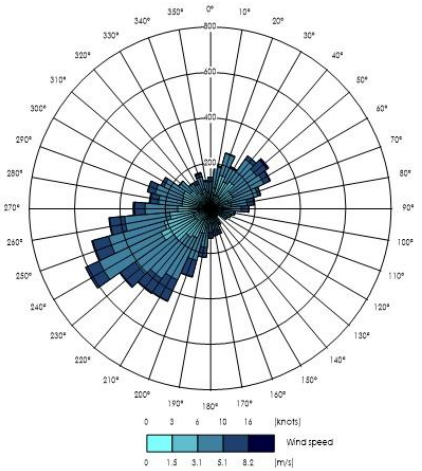


2020 Meteorological Data



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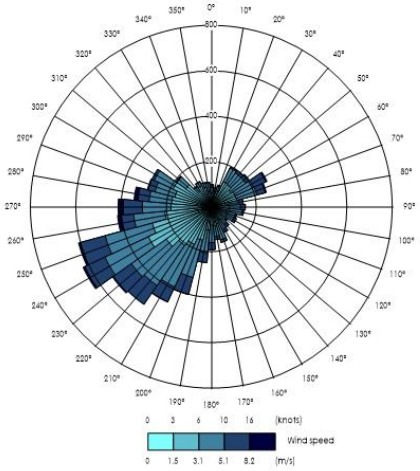

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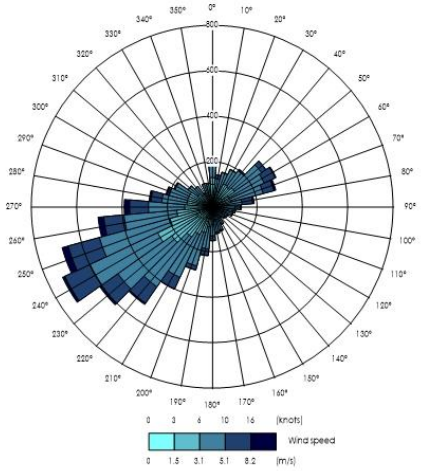
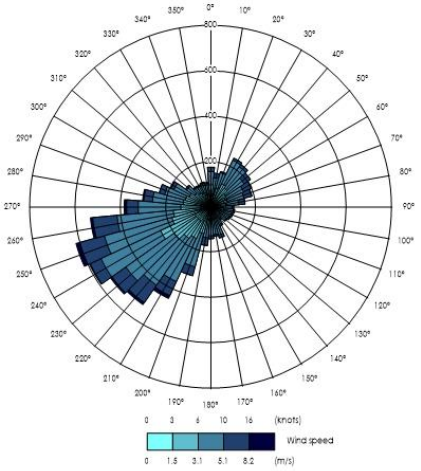


2023 Meteorological Data



2024 Meteorological Data

Legend

Title
Figure 5 - Wind Roses of 2020 to 2024 Nottingham Watnall Meteorological Data

Project
Dispersion Modelling Assessment
Enterprise Drive, Chesterfield

Project Reference
10665-1

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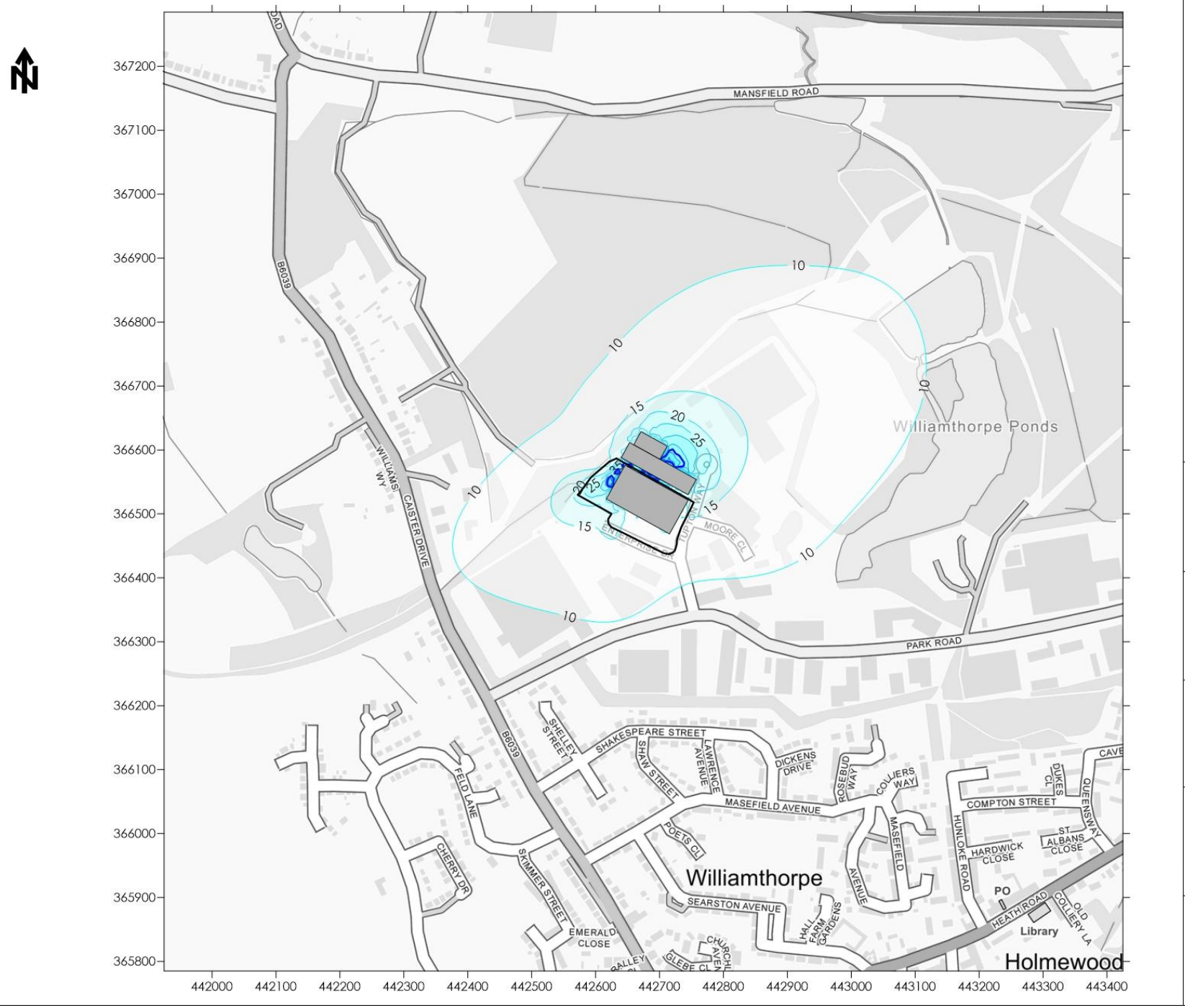

Legend

Site Boundary

Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)

75
70
65
60
55
50
45
40
35
30
25
20
15
10

Title

Figure 6 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$) 2023 Meteorological Data

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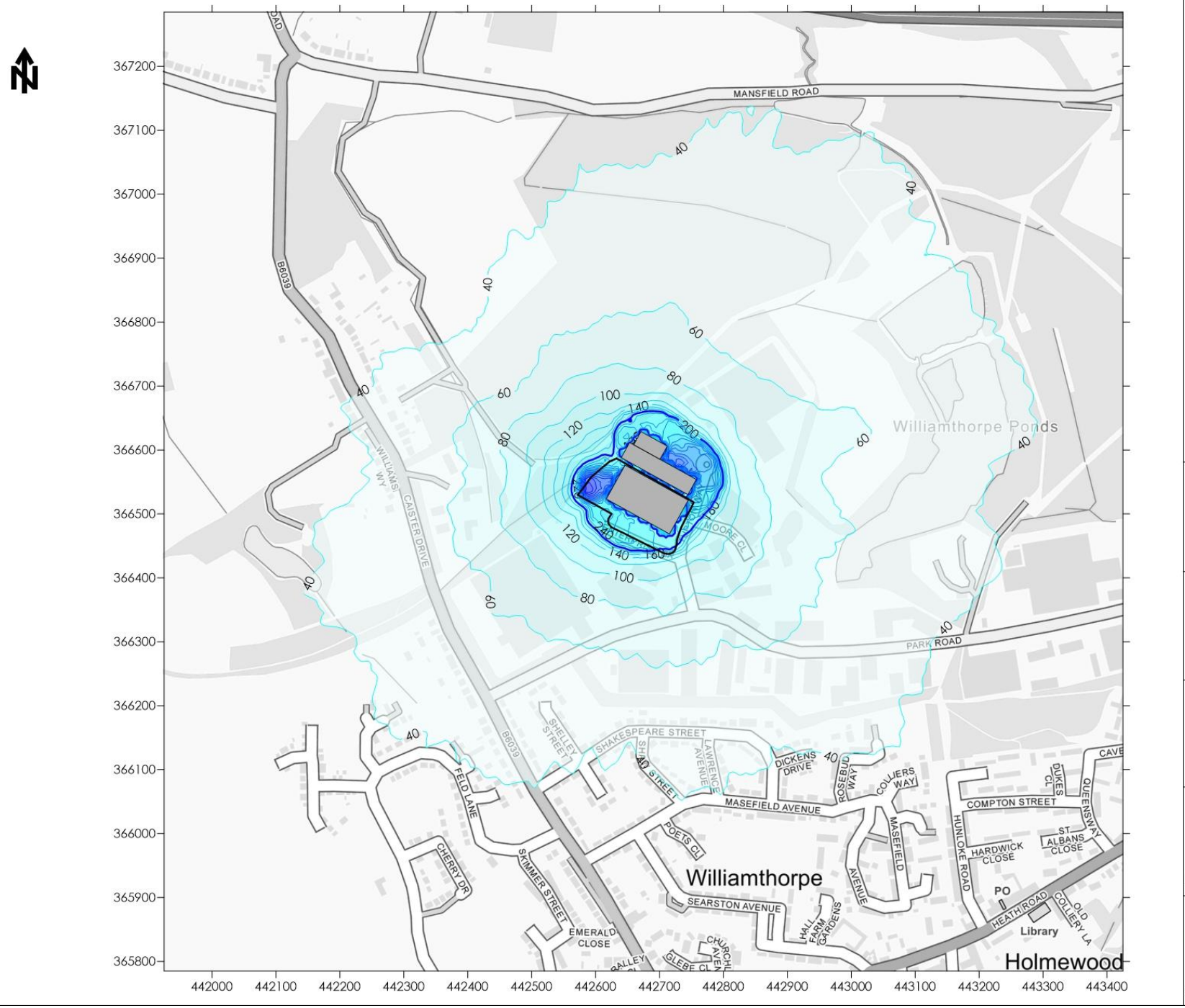

Legend

Site Boundary

460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40

Predicted 99.8th %ile 1-hour Mean NO_2 Concentration (µg/m³)

Title

Figure 7 - Predicted 99.8th %ile 1-hour Mean NO_2 Concentrations (µg/m³) 2021 Meteorological Data

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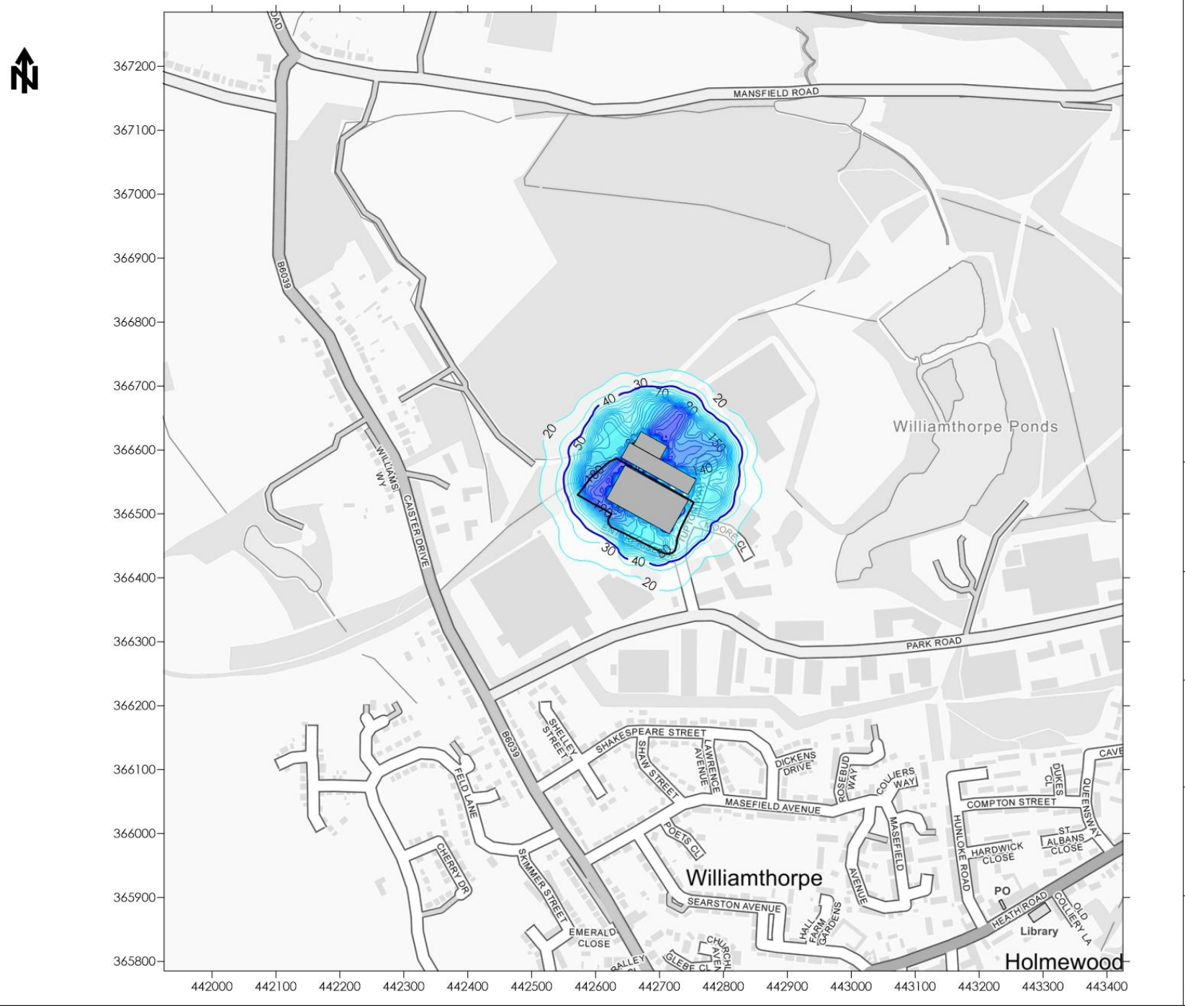

Legend

Site Boundary

240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20

Predicted 100th %ile 24-hour Mean PCE Concentration (µg/m³)

Title

Figure 8 - Predicted 100th %ile 24-hour Mean PCE Concentrations (µg/m³) 2024 Meteorological Data

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