

Air Quality Assessment
Faith in Nature, Radcliffe

Client: Treco Ltd

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Executive Summary

Redmore Environmental Ltd was commissioned by Treco Ltd to undertake an Air Quality Assessment in support of the installation of nine biomass boilers at the Faith in Nature facility in Radcliffe.

Combustion emissions from the biomass boilers have the potential to cause air quality impacts during normal operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and quantify potential effects.

Dispersion modelling was undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the biomass boilers. The results indicated that impacts were not predicted to be significant at any receptor location.

Based on the assessment results, air quality issues are not considered a constraint to planning consent for the project.

Table of Contents

1.0	INTRODUCTION	1
1.1	Background	1
1.2	Site Location and Context	1
1.3	Odour	1
2.0	LEGISLATION AND POLICY	2
2.1	Legislation	2
2.2	Local Air Quality Management	4
2.3	National Planning Policy	4
2.4	National Planning Practice Guidance	6
2.5	Local Planning Policy	6
3.0	BASELINE	8
3.1	Introduction	8
3.2	Local Air Quality Management	8
3.3	Air Quality Monitoring	8
3.4	Background Pollutant Concentrations	9
4.0	METHODOLOGY	10
4.1	Introduction	10
4.2	Dispersion Model	10
4.3	Modelling Scenarios	11
4.4	Assessment Area	11
4.5	Sensitive Receptors	12
4.6	Process Conditions and Emissions	13
4.7	NO _x to NO ₂ Conversion	15
4.8	Terrain Data	15
4.9	Building Effects	16
4.10	Meteorological Data	17
4.11	Roughness Length	17
4.12	Monin-Obukhov Length	17
4.13	Background Concentrations	17
4.14	Impact Significance	18
4.15	Modelling Uncertainty	20
5.0	ASSESSMENT	22
5.1	Introduction	22
5.2	Predicted Concentrations	22

	Nitrogen Dioxide	22
	Particulate Matter	24
5.3	Impact Significance	27
	Nitrogen Dioxide	27
	Particulate Matter	29
6.0	CONCLUSION	33
7.0	ABBREVIATIONS	34

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Treco Ltd to undertake an Air Quality Assessment in support of the installation of nine biomass boilers at the Faith in Nature facility in Radcliffe.

1.1.2 Combustion emissions from the biomass boilers have the potential to cause air quality impacts during normal operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and quantify potential effects.

1.2 Site Location and Context

1.2.1 The Faith in Nature facility is located off Miller Street, Radcliffe, at approximate National Grid Reference (NGR): 377673, 408935. Reference should be made to Figure 1 for a map of the site location and surrounding area.

1.2.2 It is proposed to install six Froling P4 100 (100kW) boilers, one Froling PT4e 140 (140kW) boiler and two Propel 100 (100kW) boiler distributed across 5 units at the site. Emissions will be released from each boiler via dedicated flues.

1.2.3 The operation of the biomass boilers may result in atmospheric emissions from the combustion of solid fuel. These have the potential to cause air quality impacts at sensitive locations within the vicinity of the site and have therefore been assessed using dispersion modelling. The results are presented in the following report.

1.3 Odour

1.3.1 Information provided by Treco Ltd indicated that any smoke/odour emissions are anticipated to be short in duration and limited to a ten minute interval during start up and shut down periods. In addition, emissions will be released at high levels. This is anticipated to promote effective dispersion of smoke/odours. As such, potential odour impacts are not considered to be significant. Further assessment was therefore not required.

2.0 LEGISLATION AND POLICY

2.1 Legislation

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

- Nitrogen dioxide (NO₂);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5});
- Benzene; and,
- Carbon monoxide

2.1.2 Air quality target values were also provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007¹. 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 and AQLVs for pollutants considered within this assessment.

¹ The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

Table 1 Air Quality Objectives/Air Quality Limit Values

Pollutant	Air Quality Objective/Air Quality Limit Value	
	Concentration (µg/m ³)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean; not to be exceeded on more than 7 occasions per annum
PM _{2.5}	20	Annual mean

2.1.5 The Environment Act (2021) was published on 9th November 2021 and makes provision for the setting of a lower PM_{2.5} target. However, the AQLV outlined in Table 1 remains the adopted air quality standard within the UK until further legislation is implemented.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance² on where the AQOs for pollutants considered within this report apply.

Table 2 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

² 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 **Local Air Quality Management**

2.2.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 **National Planning Policy**

2.3.1 The revised National Planning Policy Framework³ (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

2.3.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving

³ NPPF, Ministry of Housing, Communities and Local Government, 2021.

biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.3.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality [...]."

2.3.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

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

2.3.5 The implications of the NPPF have been considered throughout this assessment.

2.4 National Planning Practice Guidance

2.4.1 The National Planning Practice Guidance⁴ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

2.4.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.5 Local Planning Policy

2.5.1 The Bury Unitary Development Plan⁵ (UDP) acts as a guide for development or protection of land in the borough and its policies and proposals currently form the basis for Bury Council's (BC's) decisions on planning applications.

2.5.2 The Bury UDP was adopted on 29th August 1997. BC is now working to replace the adopted UDP with the Bury Local Plan. Until the new Local Plan is produced the UDP will continue to be used to make planning decisions.

2.5.3 A review of the Bury UDP was undertaken in order to identify any planning policies relevant to the assessment. This indicated the following:

⁴ <https://www.gov.uk/guidance/air-quality--3>.

⁵ UDP, BC, 1997.

"Policy EN7 - Pollution Control

The Council will seek to control environmental nuisance and minimise pollution levels associated with development by limiting the environmental impact of pollution wherever possible, in conformity with current legislation and prescribed standards."

"Policy EN7/1: Atmospheric Pollution

In seeking to limit atmospheric pollution the Council will not permit development which:

- Would result in unacceptable levels of atmospheric pollution; and/or
- Is not compatible with the achievement of the Council's long term air quality standards."

2.5.4 The above policies have been considered throughout this assessment by considering potential air quality effects as a result of the proposals.

3.0 BASELINE

3.1 Introduction

- 3.1.1 Existing air quality conditions in the vicinity of the site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

3.2 Local Air Quality Management

- 3.2.1 As required by the Environment Act (1995), BC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the council's administrative extents. As such, a number of roads within Bury have been included within the Greater Manchester Combined Authority AQMA. This is described as follows:

"This is the part of the Greater Manchester Combined Authority AQMA located within the Bury Council area."

- 3.2.2 The development is located approximately 1.4km north of the AQMA. It is considered unlikely that emissions from the plant would significantly affect air quality over a distance of this magnitude. As such, the designation was not considered further in the context of this assessment.
- 3.2.3 BC has concluded that concentrations of all other pollutants considered within the AQMA are currently below the relevant AQOs. As such, no further AQMAs have been designated.

3.3 Air Quality Monitoring

- 3.3.1 Monitoring of pollutant concentrations is undertaken by BC throughout their area of jurisdiction. Recent results recorded in the vicinity of the site are shown in Table 3.

Table 3 Monitoring Results

Monitoring Site	Pollutant	Monitored Pollutant Concentrations (µg/m ³)		
		2019	2020	2021
Bury Radcliffe	NO ₂	26.0	20.0	21.7
	PM ₁₀	17.0	18.0	17.0

3.3.2 As shown in Table 3, annual mean NO₂ and PM₁₀ concentrations were below the relevant AQOs at the Bury Radcliffe monitor during recent years. Reference should be made to Figure 2 for a map of the survey position.

3.3.3 BC do not undertake monitoring of PM_{2.5} concentrations in the vicinity of the site.

3.4 Background Pollutant Concentrations

3.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist Local Authorities in their Review and Assessment of air quality. The site is located in grid square NGR: 377500, 408500. Data for this location was downloaded from DEFRA website⁶ for the purpose of the assessment and is summarised in Table 4.

Table 4 Background Pollutant Concentration Predictions

Pollutant	Predicted 2022 Background Pollutant Concentration (µg/m ³)
NO ₂	12.58
PM ₁₀	11.48
PM _{2.5}	7.89

3.4.2 As shown in Table 4, the predicted background pollutant concentrations are below the relevant AQOs and AQLV at the site.

⁶ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

4.0 METHODOLOGY

4.1 Introduction

- 4.1.1 There is the potential for air quality impacts as a result of combustion emissions from the biomass boilers. In order to assess pollutant concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology. This was agreed with Rebecca Jones, Environmental Protection Officer at BC, on 17th November 2022.

4.2 Dispersion Model

- 4.2.1 Dispersion modelling was undertaken using ADMS-5 (v5.2.4.0), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-5 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.
- 4.2.2 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.
- 4.2.3 The model requires input data that details the following parameters:
- Assessment area;
 - Process conditions;
 - Pollutant emission rates;
 - Terrain information;
 - Building dimensions;
 - Meteorological data;
 - Roughness length (z_0); and,
 - Monin-Obukhov length.

4.2.4 These are detailed in the following Sections.

4.3 **Modelling Scenarios**

4.3.1 The scenarios considered in the modelling assessment are summarised in Table 5.

Table 5 Assessment Scenarios

Parameter	Modelled As	
	Short Term	Long Term
NO ₂	99.8 th percentile (%ile) 1-hour mean	Annual mean
PM ₁₀	90.4 th %ile 24-hour mean	Annual mean
PM _{2.5}	-	Annual mean

4.3.2 Predicted pollutant concentrations were summarised in the following formats:

- Process contribution (PC) - Predicted pollutant level as a result of emissions from the biomass boilers only; and,
- Predicted environmental concentration (PEC) - Total predicted pollutant level as a result of emissions from the biomass boilers and existing baseline conditions.

4.3.3 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 5 were selected to represent the relationship between the permitted number of exceedences of short-term concentrations and the number of periods within a calendar year.

4.4 **Assessment Area**

4.4.1 The assessment area was defined based on the biomass boiler locations, anticipated pollutant dispersion patterns and the positioning of sensitive receptors. Ambient concentrations were predicted over NGR: 377000, 408200 to 378500, 409700. 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.

4.4.2 Reference should be made to Figure 3 for a graphical representation of the assessment grid extents.

4.5 **Sensitive Receptors**

4.5.1 A desk-top study was undertaken in order to identify any sensitive receptor locations in the vicinity of the site that required specific consideration during the assessment. These are summarised in Table 6.

Table 6 Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Miller Street	377651.2	408998.5
R2	Residential - Miller Street	377676.7	409013.3
R3	Residential - Miller Street	377634.4	408977.6
R4	Residential - Hardman Street	377783.0	408929.1
R5	Residential - Hardman Street	377786.4	408883.0
R6	Residential - Hardman Street	377769.1	408869.9
R7	Residential - Hardman Street	377741.6	408802.2
R8	Residential - Hardman Street	377710.4	408768.5
R9	Residential - Higher Ainsworth Road	377633.5	408754.7
R10	Residential - Higher Ainsworth Road	377614.6	408797.6
R11	Residential - Higher Ainsworth Road	377600.6	408853.4
R12	Residential - Higher Ainsworth Road	377573.6	408911.0
R13	Residential - Higher Ainsworth Road	377561.5	408945.6
R14	Residential - Higher Ainsworth Road	377587.8	408957.2

4.5.2 Reference should be made to Figure 4 for a graphical representation of the sensitive receptor locations.

4.6 Process Conditions and Emissions

- 4.6.1 Emissions from the plant were represented by nine point sources within the model. The relevant inputs for biomass boilers are summarised in Table 7. These were provided by Treco Ltd.

Table 7 Model Inputs - Biomass Boilers 1 to 9

Parameter	Unit	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Boiler 6	Boiler 7	Boiler 8	Boiler 9
Boiler type	-	Froling P4 100	Froling P4 100	Propel 100	Froling P4 100	Froling P4 100	Froling P4 100	Froling P4 100	Propel 100	Froling PT4e 140
Stack position	NGR	377660.6, 408866.3	377659.5, 408869.3	377685.2, 408948.2	377706.8, 408931.0	377709.7, 408933.6	377737.0, 408957.8	377739.6, 408960.1	377724.7, 409011.7	377722.4, 409014.3
Stack location	-	Unit 5	Unit 5	Unit 4	Unit 3A	Unit 3A	Unit 3	Unit 3	Unit 2	Unit 2
Stack height	m	10.5	10.5	11.7	12.2	13.7	12.4	12.4	8.3	8.4
Stack diameter	m	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Exhaust gas temperature	°C	165	165	118	165	165	165	165	123	117
Exhaust gas efflux velocity	m/s	2.99	2.99	2.02	2.94	2.94	2.96	2.96	2.25	2.04
NO _x emission concentration	g/GJ	150	150	150	150	150	150	150	150	150
PM emission concentration	g/GJ	30	30	30	30	30	30	30	30	30
NO _x emission rate	g/s	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Particulate matter (PM) emission rate	g/s	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030

4.6.2 The emission rate for PM is stated as total dust. However, for the purposes of dispersion modelling it was considered that the entire PM emission consisted of only PM₁₀ or PM_{2.5}. This allowed the maximum ground level impacts, with respect to the relevant criteria, to be assessed. Actual plant emissions of PM are unlikely to only consist of only one PM fraction, resulting in a worst-case assessment.

4.6.3 The boilers located in Unit 2 are anticipated to be operational for 2,500-hours per annum. All other boilers are anticipated to be operational for 2,000-hours per annum. However, in order to provide a worst-case assessment, emissions from all plant were assumed to occur for 3,000 hours per annum. This is considered to provide a conservative prediction of potential impacts.

4.6.4 Reference should be made to Figure 3 for a graphical representation of the stack locations.

4.7 NO_x to NO₂ Conversion

4.7.1 Emissions of NO_x from combustion processes are predominantly in the form of nitrogen oxide (NO). Excess oxygen in the combustion gases and further atmospheric reactions cause the oxidation of NO to NO₂. Comparisons of ambient NO and NO₂ concentrations in the vicinity of point sources in recent years has indicated that it is unlikely that more than 30% of the NO_x is present at ground level as NO₂.

4.7.2 Ground level NO_x concentrations were predicted through dispersion modelling. NO₂ concentrations reported in the results section assume 70% conversion from NO_x to NO₂ for annual means and 35% conversion for 1-hour concentrations, based upon Environment Agency (EA) guidance⁷.

4.8 Terrain Data

4.8.1 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

⁷ <https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports>.

variations in ground height throughout the assessment extents. This was pre-processed using the method suggested by CERC⁸.

4.9 **Building Effects**

4.9.1 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.

4.9.2 Analysis of the site layout indicated a number of structures that should be included within the model in order to take account of effects on pollutant dispersion. Building input geometries are shown in Table 8.

Table 8 Building Geometries

Building	NGR (m)		Height (m)	Length (m)	Width (m)	Angle (°)
	X	Y				
Unit 5	377631.5	408889.6	10.3	72.8	37.9	159.3
Unit 4	377664.1	408944.4	10.0	33.9	33.0	130.8
Unit 3A	377691.3	408954.9	13.4	55.7	13.4	138.4
Unit 3	377718.2	408962.2	12.4	30.2	36.1	138.4
Unit 2	377728.2	408992.9	7.4	48.4	19.0	138.4
Unit 1	377699.5	408983.1	7.7	25.2	36.6	138.4
External Building	377672.6	408805.2	26.3	39.2	57.8	145.8

4.9.3 Reference should be made to Figure 3 for a graphical representation of the building locations.

⁸ Note 105: Setting up Terrain Data for Input to CERC Models, CERC, 2016.

4.10 Meteorological Data

4.10.1 Meteorological data used in the assessment was taken from Manchester Airport observation station over the period 1st January 2017 to 31st December 2021 (inclusive). The Manchester Airport meteorological station is located at NGR: 381792, 384116, which is approximately 25km south of the development. 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.

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

4.11 Roughness Length

4.11.1 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This value is considered appropriate for the morphology of the area and is suggested within ADMS-5 as being suitable for 'parkland, open suburbia'.

4.11.2 A z_0 of 0.2m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-5 as being suitable for 'agricultural areas (min)'.

4.12 Monin-Obukhov Length

4.12.1 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 and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-5 as being suitable for 'mixed urban/industrial'.

4.13 Background Concentrations

4.13.1 Review of existing data in the vicinity of the site was undertaken in Section 3.0 in order to identify suitable background values for use in the assessment. This indicated the annual

mean NO₂ and PM₁₀ concentrations recorded at the Bury Radcliffe monitor during 2019 are higher than the values predicted by DEFRA, as shown in Table 4. As such, these results were used to represent baseline pollutant levels within the modelled extents in order to provide a robust analysis.

- 4.13.2 Human activity, and hence emissions, during 2020 were interrupted by lockdown and restrictions due to the Coronavirus pandemic. The Institute of Air Quality Management (IAQM) position statement 'Use of 2020 and 2021 Monitoring Datasets'⁹ states that monitored levels throughout the year are atypical and do not represent "business as usual" conditions. As such, the 2019 NO₂ and PM₁₀ monitoring results were utilised in the assessment.
- 4.13.3 BC do not undertake monitoring of PM_{2.5} concentrations within the vicinity of the site. As such, the DEFRA background concentration was used to represent baseline levels of this species within the modelled extents.
- 4.13.4 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 EA guidance 'Air emissions risk assessment for your environmental permit'¹⁰, 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.

4.14 Impact Significance

- 4.14.1 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹¹. Using this methodology impacts on annual mean concentrations are defined based on the interaction between the predicted pollutant

⁹ Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.

¹⁰ <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>.

¹¹ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

concentration with the development in place (PEC) and the magnitude of change (PC), as outlined in Table 9.

Table 9 Significance of Impact - Long Term Concentrations

Concentration at Receptor in Assessment Year (PEC)	Predicted Concentration Change as Proportion of AQO (PC) (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

4.14.2 The matrix shown in Table 9 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

4.14.3 The significance of impacts on short-term pollutant concentrations at sensitive receptors was determined in accordance with the criteria outlined in the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'¹², as summarised in Table 10.

Table 10 Significance of Impact - Short Term Concentrations

Predicted Concentration Change as Proportion of AQO (PC) (%)	Significance of Impact
Less than 10	Negligible
11 - 20	Slight
21 - 50	Moderate
Greater than 51	Substantial

¹² Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

4.14.4 Following the prediction of impacts at discrete receptor locations, the IAQM¹³ provides guidance on determining the overall air quality impact significance of the operation of a development and states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

4.14.5 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

4.15 Modelling Uncertainty

4.15.1 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.

4.15.2 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-5 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 meteorological data sets from the closest observation site to the facility to take account of local conditions. The assessment was based on the worst-case year for each averaging period to ensure maximum concentrations were considered;

¹³ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

- Surface characteristics - The z_0 and Monin-Obukhov length were determined for both the dispersion and meteorological sites based on the surrounding land uses and guidance provided by CERC. Terrain data was included and processed using the method outlined by CERC;
- Plant operating conditions - Operational parameters were provided by Treco Ltd based on the plant specifications. These are considered to be representative of likely operating conditions;
- Emission rates - Emission rates were provided by Treco Ltd based on the relevant Renewable Heat Incentive certificate for the plant. As such, these are considered to be representative of anticipated emissions;
- Background concentrations - Background pollutant concentrations were obtained from the DEFRA website and local monitoring results. These are considered representative of baseline air quality conditions at sensitive locations within the vicinity of the site;
- Receptor locations - A Cartesian Grid was included in the model in order to provide suitable data for contour plotting. Receptor points were also included at sensitive locations to provide additional consideration of these areas; and,
- Variability - All model inputs are as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

4.15.3 Results were considered in the context of the relevant AQOs, AQLV and IAQM 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.

5.0 **ASSESSMENT**

5.1 **Introduction**

5.1.1 Dispersion modelling was undertaken with the inputs described in Section 4.0. The results are provided in the following Sections.

5.1.2 Reference should be made to Figures 6 to 10 for graphical representations of predicted pollutant concentrations across the assessment extents. It should be noted that the data shown in the Figures are predictions from the meteorological data set which resulted in the maximum pollutant concentration for that species. For example, the maximum annual mean NO₂ concentration was predicted using the 2017 meteorological data set. As such, the contours shown in Figure 6 were produced from the 2017 model outputs.

5.2 **Predicted Concentrations**

Nitrogen Dioxide

5.2.1 Annual mean NO₂ concentrations, inclusive of background levels, were predicted at the sensitive receptor locations. These are summarised in Table 11.

Table 11 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R1	Residential - Miller Street	26.95	27.04	27.14	26.96	27.00
R2	Residential - Miller Street	27.37	27.42	27.62	27.37	27.40
R3	Residential - Miller Street	26.78	26.90	27.01	26.83	26.87
R4	Residential - Hardman Street	27.10	26.97	26.92	26.85	27.11
R5	Residential - Hardman Street	26.51	26.47	26.42	26.39	26.54
R6	Residential - Hardman Street	26.44	26.41	26.37	26.35	26.47
R7	Residential - Hardman Street	26.17	26.18	26.15	26.15	26.21
R8	Residential - Hardman Street	26.08	26.10	26.08	26.08	26.11

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R9	Residential - Higher Ainsworth Road	26.06	26.12	26.08	26.10	26.11
R10	Residential - Higher Ainsworth Road	26.11	26.25	26.17	26.23	26.25
R11	Residential - Higher Ainsworth Road	26.31	26.58	26.52	26.60	26.64
R12	Residential - Higher Ainsworth Road	26.36	26.53	26.58	26.50	26.54
R13	Residential - Higher Ainsworth Road	26.35	26.45	26.54	26.42	26.44
R14	Residential - Higher Ainsworth Road	26.46	26.57	26.69	26.53	26.56

5.2.2 As indicated in Table 11, predicted annual mean NO₂ concentrations were below the AQO of 40µg/m³ at all sensitive receptors for all modelled meteorological data sets.

5.2.3 Reference should be made to Figure 6 for a graphical representation of predicted annual mean NO₂ concentrations throughout the modelling extents. This indicates compliance with the relevant AQO at all locations.

5.2.4 Predicted 99.8th %ile 1-hour mean NO₂ concentrations, inclusive of background levels, are summarised in Table 12.

Table 12 Predicted 99.8th Percentile 1-hour Mean NO₂ Concentrations

Receptor		Predicted 99.8 th %ile 1-hour Mean NO ₂ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R1	Residential - Miller Street	60.87	60.52	60.79	60.68	60.76
R2	Residential - Miller Street	65.33	65.28	66.12	65.71	65.58
R3	Residential - Miller Street	62.26	62.43	62.67	62.45	62.52
R4	Residential - Hardman Street	62.94	63.29	63.16	62.92	63.62
R5	Residential - Hardman Street	60.06	60.03	60.15	60.02	60.19
R6	Residential - Hardman Street	60.60	60.73	60.78	60.76	60.71
R7	Residential - Hardman Street	57.65	57.29	57.30	57.48	57.74
R8	Residential - Hardman Street	56.14	56.28	55.98	56.05	56.53

Receptor		Predicted 99.8 th %ile 1-hour Mean NO ₂ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R9	Residential - Higher Ainsworth Road	58.63	59.13	57.96	58.52	58.72
R10	Residential - Higher Ainsworth Road	60.67	62.37	61.75	62.50	62.59
R11	Residential - Higher Ainsworth Road	62.11	64.53	63.28	64.26	64.52
R12	Residential - Higher Ainsworth Road	61.30	61.13	61.01	61.25	61.32
R13	Residential - Higher Ainsworth Road	59.70	59.92	60.33	60.06	60.07
R14	Residential - Higher Ainsworth Road	61.49	61.47	61.64	61.59	61.38

5.2.5 As indicated in Table 12, predicted 99.8th %ile 1-hour mean NO₂ concentrations were below the AQO of 200µg/m³ at all sensitive receptors for all modelled meteorological data sets.

5.2.6 Reference should be made to Figure 7 for a graphical representation of predicted 99.8th %ile 1-hour mean NO₂ concentrations throughout the modelling extents. This indicates compliance with the relevant AQO at all locations.

Particulate Matter

5.2.7 Annual mean PM₁₀ concentrations, inclusive of background levels, were predicted at the sensitive receptor locations. These are summarised in Table 13.

Table 13 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R1	Residential - Miller Street	17.28	17.30	17.33	17.28	17.29
R2	Residential - Miller Street	17.40	17.41	17.47	17.40	17.41
R3	Residential - Miller Street	17.22	17.26	17.29	17.24	17.25
R4	Residential - Hardman Street	17.32	17.28	17.27	17.25	17.32
R5	Residential - Hardman Street	17.15	17.13	17.12	17.11	17.16

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R6	Residential - Hardman Street	17.13	17.12	17.11	17.10	17.14
R7	Residential - Hardman Street	17.05	17.05	17.04	17.04	17.06
R8	Residential - Hardman Street	17.02	17.03	17.02	17.02	17.03
R9	Residential - Higher Ainsworth Road	17.02	17.04	17.02	17.03	17.03
R10	Residential - Higher Ainsworth Road	17.03	17.07	17.05	17.07	17.07
R11	Residential - Higher Ainsworth Road	17.09	17.17	17.15	17.17	17.18
R12	Residential - Higher Ainsworth Road	17.10	17.15	17.17	17.15	17.16
R13	Residential - Higher Ainsworth Road	17.10	17.13	17.16	17.12	17.13
R14	Residential - Higher Ainsworth Road	17.13	17.17	17.20	17.15	17.16

5.2.8 As indicated in Table 13, predicted annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at all sensitive receptors for all modelled meteorological data sets.

5.2.9 Reference should be made to Figure 8 for a graphical representation of predicted annual mean PM₁₀ concentrations throughout the modelling extents. This indicates compliance with the relevant AQO at all locations.

5.2.10 Predicted 90.4th 24-hour mean PM₁₀ concentrations, inclusive of background levels, are summarised in Table 14.

Table 14 Predicted 90.4th %ile 24-hour Mean PM₁₀ Concentrations

Receptor		Predicted 90.4 th %ile 24-hour Mean PM ₁₀ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R1	Residential - Miller Street	35.97	36.13	36.30	35.96	36.06
R2	Residential - Miller Street	36.58	36.63	36.98	36.59	36.82
R3	Residential - Miller Street	35.73	35.87	36.31	35.79	35.99
R4	Residential - Hardman Street	36.41	36.42	36.42	36.08	36.62

Receptor		Predicted 90.4 th %ile 24-hour Mean PM ₁₀ Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R5	Residential - Hardman Street	35.17	35.17	35.15	35.05	35.35
R6	Residential - Hardman Street	34.99	35.12	35.06	34.86	35.14
R7	Residential - Hardman Street	34.47	34.50	34.49	34.41	34.57
R8	Residential - Hardman Street	34.23	34.31	34.23	34.27	34.32
R9	Residential - Higher Ainsworth Road	34.17	34.41	34.30	34.31	34.37
R10	Residential - Higher Ainsworth Road	34.41	35.00	34.60	34.79	34.81
R11	Residential - Higher Ainsworth Road	35.15	35.93	35.73	36.17	36.05
R12	Residential - Higher Ainsworth Road	35.15	35.60	35.70	35.50	35.77
R13	Residential - Higher Ainsworth Road	35.03	35.28	35.60	35.10	35.47
R14	Residential - Higher Ainsworth Road	35.23	35.48	35.85	35.35	35.59

5.2.11 As indicated in Table 14, predicted 90.4th %ile 24-hour mean PM₁₀ concentrations were below the AQO of 50µg/m³ at all sensitive receptors for all modelled meteorological data sets.

5.2.12 Reference should be made to Figure 9 for a graphical representation of predicted 90.4th %ile 24-hour mean PM₁₀ concentrations throughout the modelling extents. This indicates compliance with the relevant AQO at all locations.

5.2.13 Annual mean PM_{2.5} concentrations, inclusive of background levels, were predicted at the sensitive receptor locations. These are summarised in Table 15.

Table 15 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R1	Residential - Miller Street	8.17	8.19	8.22	8.17	8.18
R2	Residential - Miller Street	8.29	8.30	8.36	8.29	8.30
R3	Residential - Miller Street	8.12	8.15	8.18	8.13	8.14

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)				
		2017	2018	2019	2020	2021
R4	Residential - Hardman Street	8.21	8.17	8.16	8.14	8.21
R5	Residential - Hardman Street	8.04	8.03	8.01	8.01	8.05
R6	Residential - Hardman Street	8.02	8.01	8.00	7.99	8.03
R7	Residential - Hardman Street	7.94	7.94	7.93	7.93	7.95
R8	Residential - Hardman Street	7.91	7.92	7.92	7.91	7.92
R9	Residential - Higher Ainsworth Road	7.91	7.93	7.92	7.92	7.92
R10	Residential - Higher Ainsworth Road	7.92	7.96	7.94	7.96	7.96
R11	Residential - Higher Ainsworth Road	7.98	8.06	8.04	8.07	8.08
R12	Residential - Higher Ainsworth Road	7.99	8.04	8.06	8.04	8.05
R13	Residential - Higher Ainsworth Road	7.99	8.02	8.05	8.01	8.02
R14	Residential - Higher Ainsworth Road	8.03	8.06	8.09	8.04	8.05

5.2.14 As indicated in Table 15, predicted annual mean PM_{2.5} concentrations were below the AQLV of 20µg/m³ at all sensitive receptors for all modelled meteorological data sets.

5.2.15 Reference should be made to Figure 10 for a graphical representation of predicted annual mean PM_{2.5} concentrations throughout the modelling extents. This indicates compliance with the relevant AQLV at all locations.

5.3 Impact Significance

Nitrogen Dioxide

5.3.1 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 16. These utilise the meteorological data set which resulted in the maximum PEC in order to ensure a worst-case assessment.

Table 16 Predicted Impacts - Annual Mean NO₂ Concentrations

Receptor		Predicted PEC	Predicted Conc. Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Miller Street	Below 75% of AQO	2 - 5	Negligible
R2	Residential - Miller Street	Below 75% of AQO	2 - 5	Negligible
R3	Residential - Miller Street	Below 75% of AQO	2 - 5	Negligible
R4	Residential - Hardman Street	Below 75% of AQO	2 - 5	Negligible
R5	Residential - Hardman Street	Below 75% of AQO	1	Negligible
R6	Residential - Hardman Street	Below 75% of AQO	1	Negligible
R7	Residential - Hardman Street	Below 75% of AQO	1	Negligible
R8	Residential - Hardman Street	Below 75% of AQO	0	Negligible
R9	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible
R10	Residential - Higher Ainsworth Road	Below 75% of AQO	1	Negligible
R11	Residential - Higher Ainsworth Road	Below 75% of AQO	2 - 5	Negligible
R12	Residential - Higher Ainsworth Road	Below 75% of AQO	1	Negligible
R13	Residential - Higher Ainsworth Road	Below 75% of AQO	1	Negligible
R14	Residential - Higher Ainsworth Road	Below 75% of AQO	2 - 5	Negligible

5.3.2 As indicated in Table 16, impacts on annual mean NO₂ concentrations as a result of emissions from the biomass boilers were predicted to be **negligible** at all receptors. As such, predicted effects are considered to be **not significant**, in accordance with the stated criteria.

5.3.3 Predicted impacts on 1-hour mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 17. These utilise the meteorological data set which resulted in the maximum PEC in order to ensure a worst-case assessment.

Table 17 Predicted Impacts - 1-hour Mean NO₂ Concentrations

Receptor		Predicted Concentration Change as Proportion of AQO (PC) (%)	Significance of Impact
R1	Residential - Miller Street	Less than 10	Negligible
R2	Residential - Miller Street	Less than 10	Negligible
R3	Residential - Miller Street	Less than 10	Negligible
R4	Residential - Hardman Street	Less than 10	Negligible
R5	Residential - Hardman Street	Less than 10	Negligible
R6	Residential - Hardman Street	Less than 10	Negligible
R7	Residential - Hardman Street	Less than 10	Negligible
R8	Residential - Hardman Street	Less than 10	Negligible
R9	Residential - Higher Ainsworth Road	Less than 10	Negligible
R10	Residential - Higher Ainsworth Road	Less than 10	Negligible
R11	Residential - Higher Ainsworth Road	Less than 10	Negligible
R12	Residential - Higher Ainsworth Road	Less than 10	Negligible
R13	Residential - Higher Ainsworth Road	Less than 10	Negligible
R14	Residential - Higher Ainsworth Road	Less than 10	Negligible

5.3.4 As indicated in Table 17, impacts on 1-hour mean NO₂ concentrations as a result of emissions from the biomass boilers were predicted to be **negligible** at all receptors. As such, predicted effects are considered to be **not significant**, in accordance with the stated criteria.

Particulate Matter

5.3.5 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 18. These utilise the meteorological data set which resulted in the maximum PEC in order to ensure a worst-case assessment.

Table 18 Predicted Impacts - Annual Mean PM₁₀ Concentrations

Receptor		Predicted PEC	Predicted Conc. Change as Proportion of AQO (PC) (%)	Impact Significance
R1	Residential - Miller Street	Below 75% of AQO	1	Negligible
R2	Residential - Miller Street	Below 75% of AQO	1	Negligible
R3	Residential - Miller Street	Below 75% of AQO	1	Negligible
R4	Residential - Hardman Street	Below 75% of AQO	1	Negligible
R5	Residential - Hardman Street	Below 75% of AQO	0	Negligible
R6	Residential - Hardman Street	Below 75% of AQO	0	Negligible
R7	Residential - Hardman Street	Below 75% of AQO	0	Negligible
R8	Residential - Hardman Street	Below 75% of AQO	0	Negligible
R9	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible
R10	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible
R11	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible
R12	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible
R13	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible
R14	Residential - Higher Ainsworth Road	Below 75% of AQO	0	Negligible

5.3.6 As indicated in Table 18, impacts on annual mean PM₁₀ concentrations as a result of emissions from the biomass boilers were predicted to be **negligible** at all receptors. As such, predicted effects are considered to be **not significant**, in accordance with the stated criteria.

5.3.7 Predicted impacts on 24-hour mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 19. These utilise the meteorological data set which resulted in the maximum PEC in order to ensure a worst-case assessment.

Table 19 Predicted Impacts - 24-hour Mean PM₁₀ Concentrations

Receptor		Predicted Concentration Change as Proportion of AQO (PC) (%)	Significance of Impact
R1	Residential - Miller Street	Less than 10	Negligible
R2	Residential - Miller Street	Less than 10	Negligible
R3	Residential - Miller Street	Less than 10	Negligible
R4	Residential - Hardman Street	Less than 10	Negligible
R5	Residential - Hardman Street	Less than 10	Negligible
R6	Residential - Hardman Street	Less than 10	Negligible
R7	Residential - Hardman Street	Less than 10	Negligible
R8	Residential - Hardman Street	Less than 10	Negligible
R9	Residential - Higher Ainsworth Road	Less than 10	Negligible
R10	Residential - Higher Ainsworth Road	Less than 10	Negligible
R11	Residential - Higher Ainsworth Road	Less than 10	Negligible
R12	Residential - Higher Ainsworth Road	Less than 10	Negligible
R13	Residential - Higher Ainsworth Road	Less than 10	Negligible
R14	Residential - Higher Ainsworth Road	Less than 10	Negligible

5.3.8 As indicated in Table 19, impacts on 24-hour mean PM₁₀ concentrations as a result of emissions from the biomass boilers were predicted to be **negligible** at all receptors. As such, predicted effects are considered to be **not significant**, in accordance with the stated criteria.

5.3.9 Predicted impacts on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 20. These utilise the meteorological data set which resulted in the maximum PEC in order to ensure a worst-case assessment.

Table 20 Predicted Impacts - Annual Mean PM_{2.5} Concentrations

Receptor		Predicted PEC	Predicted Conc. Change as Proportion of AQLV (PC) (%)	Impact Significance
R1	Residential - Miller Street	Below 75% of AQLV	2 - 5	Negligible
R2	Residential - Miller Street	Below 75% of AQLV	2 - 5	Negligible
R3	Residential - Miller Street	Below 75% of AQLV	1	Negligible
R4	Residential - Hardman Street	Below 75% of AQLV	2 - 5	Negligible
R5	Residential - Hardman Street	Below 75% of AQLV	1	Negligible
R6	Residential - Hardman Street	Below 75% of AQLV	1	Negligible
R7	Residential - Hardman Street	Below 75% of AQLV	0	Negligible
R8	Residential - Hardman Street	Below 75% of AQLV	0	Negligible
R9	Residential - Higher Ainsworth Road	Below 75% of AQLV	0	Negligible
R10	Residential - Higher Ainsworth Road	Below 75% of AQLV	0	Negligible
R11	Residential - Higher Ainsworth Road	Below 75% of AQLV	1	Negligible
R12	Residential - Higher Ainsworth Road	Below 75% of AQLV	1	Negligible
R13	Residential - Higher Ainsworth Road	Below 75% of AQLV	1	Negligible
R14	Residential - Higher Ainsworth Road	Below 75% of AQLV	1	Negligible

5.3.10 As indicated in Table 20, impacts on annual mean PM_{2.5} concentrations as a result of emissions from the biomass boilers were predicted to be **negligible** at all receptors. As such, predicted effects are considered to be **not significant**, in accordance with the stated criteria.

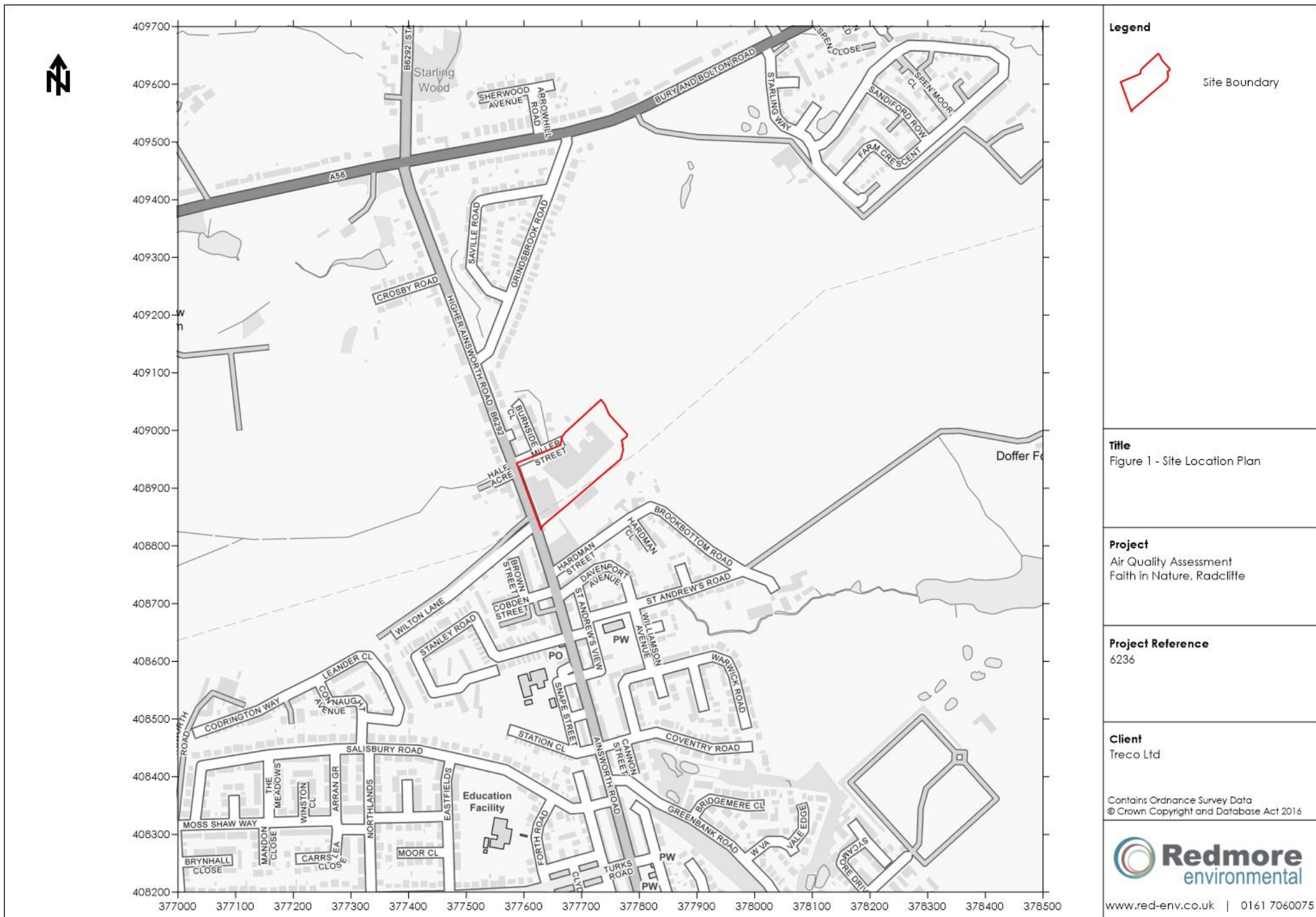
6.0 CONCLUSION

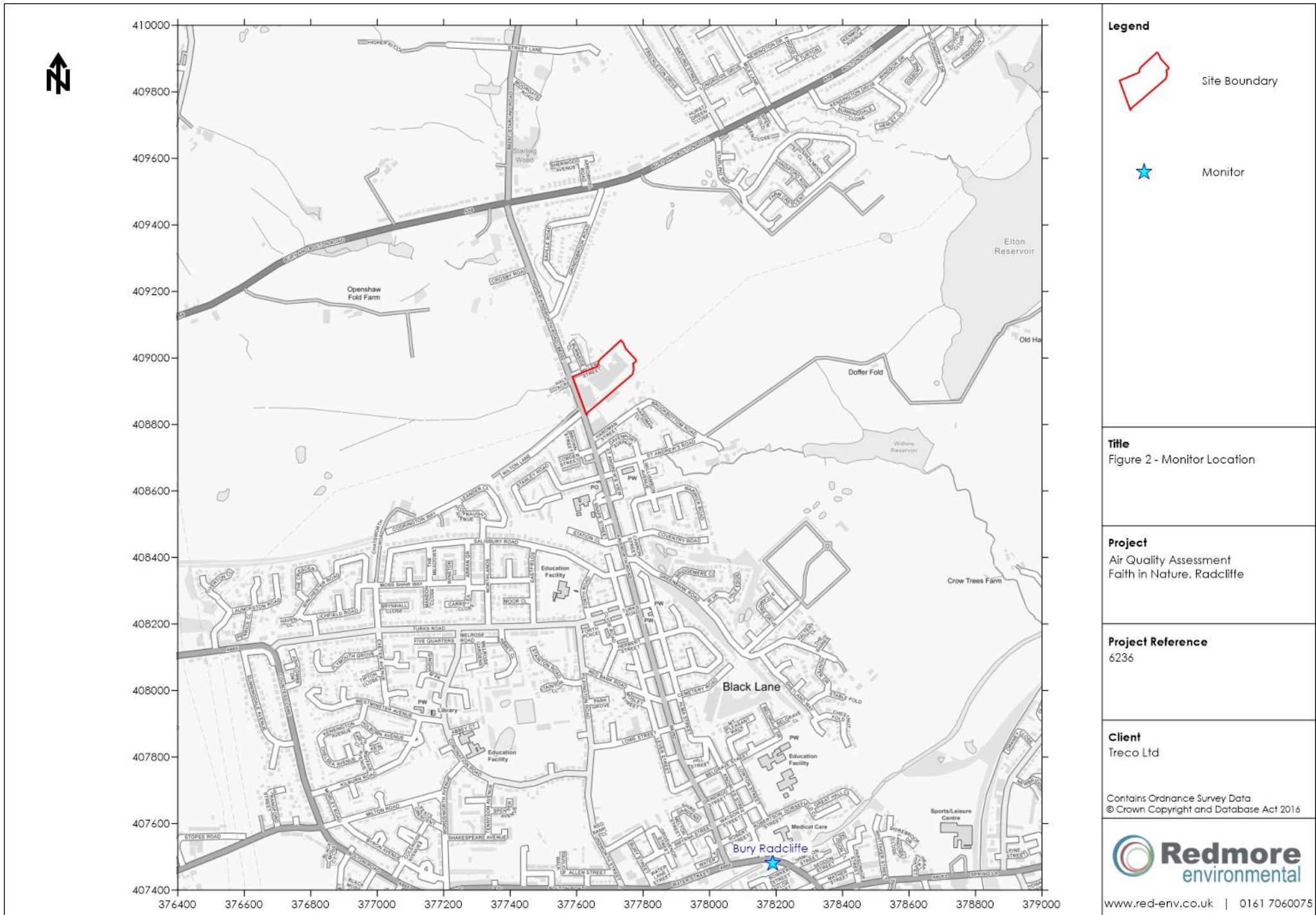
- 6.1.1 Redmore Environmental Ltd was commissioned by Treco Ltd to undertake an Air Quality Assessment in support of the installation of nine biomass boilers at the Faith in Nature facility in Radcliffe.
- 6.1.2 Combustion emissions from the biomass boilers have the potential to cause air quality impacts during normal operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and quantify potential effects.
- 6.1.3 Dispersion modelling was undertaken using ADMS-5 in order to predict pollutant levels as a result of emissions from the biomass boilers. The results indicated concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted to be below the relevant AQOs and AQLV at all sensitive receptor locations for all meteorological data sets assessed.
- 6.1.4 Impacts on NO₂, PM₁₀ and PM_{2.5} concentrations as a result of the operation of the plant were predicted to be **negligible** at all receptors. Following consideration of the relevant issues, air quality impacts as a result of the operation of the biomass boilers were considered to be **not significant**, in accordance with the IAQM guidance.
- 6.1.5 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the proposals.

7.0 **ABBREVIATIONS**

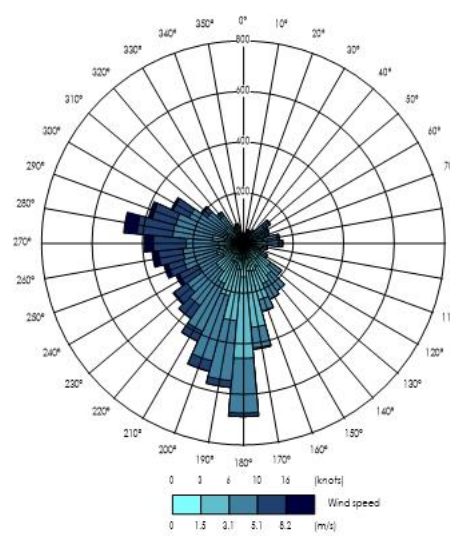
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
BC	Bury Council
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NO	Nitrogen oxide
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PC	Process contribution
PEC	Predicted environmental concentration
PM	Particulate matter
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
UDP	Unitary Development Plan
Z ₀	Roughness length
%ile	Percentile

Figures

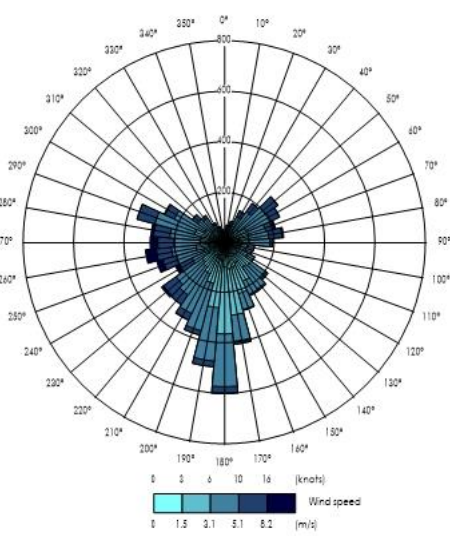




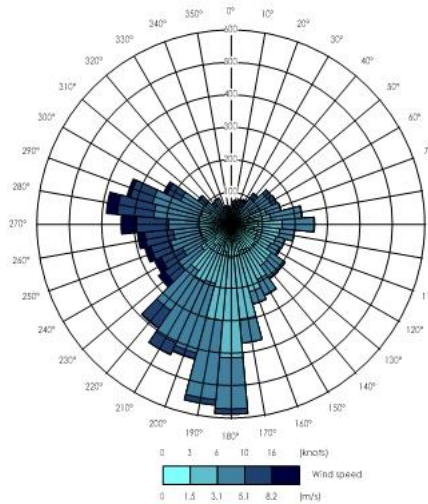




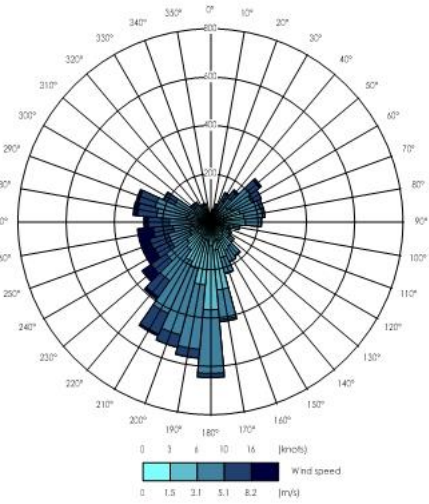
2017 Meteorological Data



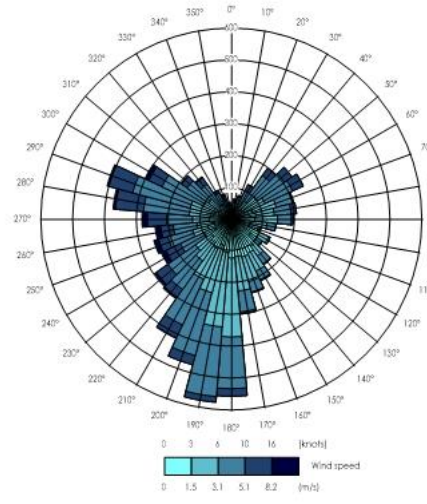
2018 Meteorological Data



2019 Meteorological Data



2020 Meteorological Data



2021 Meteorological Data

Legend

Title

Figure 5 - Wind Roses of 2017 to 2021
Manchester Airport Meteorological Data

Project

Air Quality Assessment
Faith in Nature, Radcliffe

Project Reference

6236

Client

Treco Ltd









