



**RETFORD CIRCULAR ECONOMY PROJECT  
TECHNICAL APPENDIXES 13.1-13.4**

**FEBRUARY 2023**

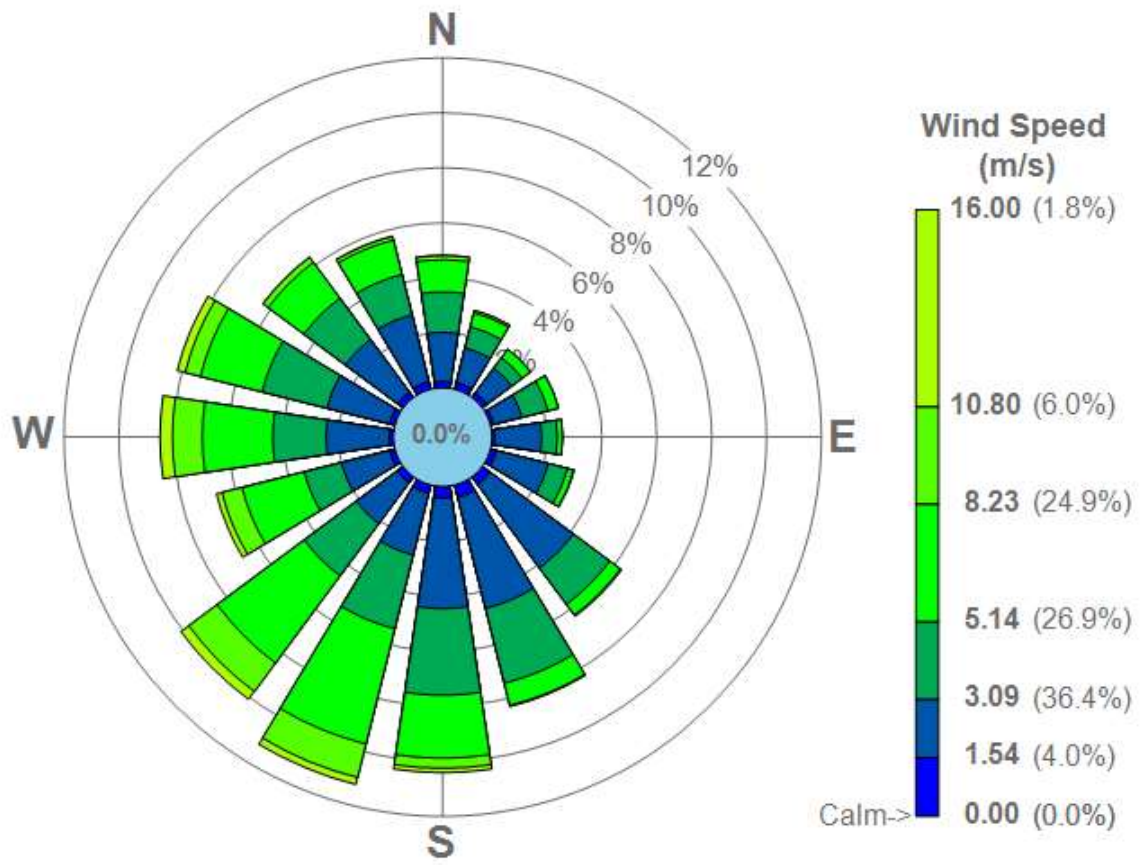
## Appendix 13.1: Glossary of Terms

<b>AADT</b>	Annual Average Daily Traffic
<b>AAHT</b>	Annual Average Hourly Traffic
<b>AQMA</b>	Air Quality Management Area -An area that a local authority has designated for action, based upon predicted exceedances of Air Quality Objectives.
<b>AQS/ NAQOs</b>	Air Quality Standard/ National Air Quality Objectives - The concentrations of pollutants in the atmosphere, which can broadly be taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive sub groups.
<b>AURN</b>	Automatic Urban and Rural Network Air Quality Monitoring Site.
<b>Calendar Year</b>	The average of the concentrations measured for each pollutant for one year. In the case of the AQS this is for a calendar year.
<b>Concentration</b>	The amount of a (polluting) substance in a volume (of air), typically expressed as a mass of pollutant per unit volume of air (for example, micrograms per cubic metre, $\mu\text{g}/\text{m}^3$ ) or a volume of gaseous pollutant per unit volume of air (parts per million, ppm).
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs
<b>DfT</b>	Department for Transport
<b>EFT</b>	Emissions Factor Toolkit
<b>Exceedance</b>	A period of time where the concentration of a pollutant is greater than the appropriate Air Quality Objective.
<b>HDV</b>	Heavy Duty Vehicle
<b>HGV</b>	Heavy Goods Vehicle
<b>LAQM</b>	Local Air Quality Management
<b>Nitrogen Oxides</b>	Nitric oxide (NO) is mainly derived from road transport emissions and other combustion processes such as the electricity supply industry. NO is not considered to be harmful to health. However, once released to the atmosphere, NO is usually very rapidly oxidised to nitrogen dioxide (NO <sub>2</sub> ), which is harmful to health. NO <sub>2</sub> and NO are both oxides of nitrogen and together are referred to as nitrogen oxides (NO <sub>x</sub> ).
<b>PM<sub>10</sub>/PM<sub>2.5</sub></b>	Fine Particles are composed of a wide range of materials arising from a variety of sources including combustion sources (mainly road traffic), and coarse particles, suspended soils and dust from construction work. Particles are measured in a number of different size fractions according to their mean aerodynamic diameter. Most monitoring is currently focused on PM <sub>10</sub> (less than 10 microns in aero-dynamic diameter), but the finer fractions such as PM <sub>2.5</sub> (less than 2.5 microns in aero-dynamic diameter) is becoming of increasing interest in terms of health effects.
<b>TEMPro</b>	TEMPro is software produced by the DfT to calculate the expected growth of traffic by year on roads throughout the country. The factor varies depending on the region and type of road.
<b><math>\mu\text{g}/\text{m}^3</math></b>	Micrograms per cubic metre of air - A measure of concentration in terms of mass per unit volume. A concentration of $1\mu\text{g}/\text{m}^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollution.

Appendix 13.2: Air Quality Standards

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Limit Value</b>	<b>Margin of Tolerance</b>
<b>Benzene</b>	Calendar Year	5µg/m <sup>3</sup>	
<b>Carbon Monoxide</b>	Maximum daily running 8 Hour Mean	10mg/m <sup>3</sup>	
<b>Lead</b>	Calendar Year	0.5µg/m <sup>3</sup>	100%
<b>Nitrogen Dioxide</b>	One Hour	200µg/m <sup>3</sup> Not to be exceeded more than 18 times per year	
	Calendar Year	40µg/m <sup>3</sup>	
<b>Particulates (PM<sub>10</sub>)</b>	One day	50µg/m <sup>3</sup> Not to be exceeded more than 35 times per year	50%
	Calendar Year	40µg/m <sup>3</sup>	20%
<b>Particulates (PM<sub>2.5</sub>)</b>	Calendar Year	25µg/m <sup>3</sup>	20%
<b>Sulphur Dioxide</b>	One Hour	350µg/m <sup>3</sup> Not to be exceeded more than 24 times per calendar year	150µg/m <sup>3</sup>
	One Day	150µg/m <sup>3</sup> Not to be exceeded more than 3 times per calendar year	
<b>Nitrogen Oxides</b>	Calendar Year	30µg/m <sup>3</sup>	

Appendix 13.3: 2019 Doncaster Sheffield Airport Wind Rose



Appendix 13.4: Results of Modelling

Appendix 13.4.1: Modelled 2024 NO<sub>2</sub> Concentrations - Baseline and Operational traffic - Existing Receptors

Receptor	Air Quality Objective (µg/m <sup>3</sup> )	Baseline Without Development Total NO <sub>2</sub> (µg/m <sup>3</sup> )	Baseline with Operational traffic Total NO <sub>2</sub> (µg/m <sup>3</sup> )	Change in Concentration (µg/m <sup>3</sup> )	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)	Impact Descriptor
ER1	40	9.9	10.0	0.1	0.2%	Negligible
ER2		9.3	9.4	0.1	0.2%	Negligible
ER3		8.5	8.6	0.1	0.2%	Negligible
ER4		8.9	9.0	0.1	0.3%	Negligible
ER5		9.4	9.6	0.2	0.4%	Negligible
ER6		10.4	10.9	0.5	1.1%	Negligible
ER7		9.6	9.8	0.2	0.3%	Negligible
ER8		9.0	9.0	0.0	0.2%	Negligible
ER9		8.6	8.7	0.1	0.1%	Negligible
ER10		8.3	8.3	0.0	0.1%	Negligible
ER11		8.2	8.3	0.1	0.1%	Negligible
ER12		8.7	8.8	0.1	0.1%	Negligible
ER13		8.6	8.6	0.0	0.1%	Negligible
ER14		8.7	8.8	0.1	0.1%	Negligible
ER15		8.7	8.8	0.1	0.1%	Negligible
ER16		8.0	8.0	0.0	0.0%	Negligible
ER17		10.8	10.8	0.1	0.2%	Negligible
ER18		9.2	9.2	0.0	0.1%	Negligible
ER19		11.4	11.5	0.1	0.3%	Negligible
ER20		11.8	12.0	0.2	0.7%	Negligible
ER21		9.7	9.7	0.0	0.1%	Negligible
ER22		10.6	10.6	0.0	0.2%	Negligible

Appendix 13.4.2: Modelled 2024 NO<sub>2</sub> Concentrations - Baseline and Construction traffic - Existing Receptors

Receptor	Air Quality Objective (µg/m <sup>3</sup> )	Baseline Without Development Total NO <sub>2</sub> (µg/m <sup>3</sup> )	Baseline with Construction Traffic Total NO <sub>2</sub> (µg/m <sup>3</sup> )	Change in Concentration (µg/m <sup>3</sup> )	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)	Impact Descriptor
ER1	40	9.9	9.9	0.0	0.1%	Negligible
ER2		9.3	9.4	0.1	0.0%	Negligible
ER3		8.5	8.6	0.1	0.1%	Negligible
ER4		8.9	8.9	0.0	0.1%	Negligible
ER5		9.4	9.5	0.1	0.1%	Negligible
ER6		10.4	10.5	0.1	0.2%	Negligible
ER7		9.6	9.7	0.1	0.1%	Negligible
ER8		9.0	9.0	0.0	0.0%	Negligible
ER9		8.6	8.6	0.0	0.0%	Negligible
ER10		8.3	8.3	0.0	0.1%	Negligible
ER11		8.2	8.3	0.1	0.0%	Negligible
ER12		8.7	8.8	0.1	0.0%	Negligible
ER13		8.6	8.6	0.0	0.0%	Negligible
ER14		8.7	8.7	0.0	0.0%	Negligible
ER15		8.7	8.8	0.1	0.0%	Negligible
ER16		8.0	8.0	0.0	0.0%	Negligible
ER17		10.8	10.8	0.0	0.0%	Negligible
ER18		9.2	9.2	0.0	0.0%	Negligible
ER19		11.4	11.4	0.0	0.1%	Negligible
ER20		11.8	11.8	0.0	0.1%	Negligible
ER21		9.7	9.7	0.0	0.0%	Negligible
ER22		10.6	10.6	0.0	0.0%	Negligible

Appendix 13.4.3: Modelled 2024 PM<sub>10</sub> Concentrations – Existing Receptors

Receptor	Total PM <sub>10</sub> Without Development µg/m <sup>3</sup> (Days >50 µg/m <sup>3</sup> )	Total PM <sub>10</sub> With Development µg/m <sup>3</sup> (Days >50 µg/m <sup>3</sup> ) <sup>1</sup>	Change in PM <sub>10</sub> (µg/m <sup>3</sup> )	Total PM <sub>10</sub> Baseline plus Construction traffic µg/m <sup>3</sup> (Days >50 µg/m <sup>3</sup> ) <sup>2</sup>	Change in PM <sub>10</sub> (µg/m <sup>3</sup> )
ER1	15.6 (0)	15.6 (0)	0.0	15.6 (0)	0.0
ER2	15.5 (0)	15.5 (0)	0.0	15.5 (0)	0.0
ER3	14.9 (0)	14.9 (0)	0.0	14.9 (0)	0.0
ER4	15.1 (0)	15.2 (0)	0.1	15.2 (0)	0.1
ER5	15.2 (0)	15.2 (0)	0.0	15.2 (0)	0.0
ER6	15.2 (0)	15.2 (0)	0.0	15.2 (0)	0.0
ER7	15.3 (0)	15.4 (0)	0.1	15.4 (0)	0.1
ER8	15.2 (0)	15.2 (0)	0.0	15.2 (0)	0.0
ER9	15.2 (0)	15.3 (0)	0.1	15.3 (0)	0.1
ER10	15.2 (0)	15.2 (0)	0.0	15.2 (0)	0.0
ER11	15.2 (0)	15.2 (0)	0.0	15.2 (0)	0.0
ER12	14.5 (0)	14.5 (0)	0.0	14.5 (0)	0.0
ER13	14.5 (0)	14.5 (0)	0.0	14.5 (0)	0.0
ER14	14.5 (0)	14.5 (0)	0.0	14.5 (0)	0.0
ER15	14.5 (0)	14.5 (0)	0.0	14.5 (0)	0.0
ER16	14.3 (0)	14.3 (0)	0.0	14.3 (0)	0.0
ER17	14.1 (0)	14.1 (0)	0.0	14.1 (0)	0.0
ER18	13.8 (0)	13.8 (0)	0.0	13.8 (0)	0.0
ER19	13.6 (0)	13.6 (0)	0.0	13.6 (0)	0.0
ER20	13.4 (0)	13.4 (0)	0.0	13.4 (0)	0.0
ER21	13.2 (0)	13.2 (0)	0.0	13.2 (0)	0.0
ER22	13.4 (0)	13.4 (0)	0.0	13.4 (0)	0.0

<sup>1</sup> Not to be exceeded more than 35 times a year

<sup>2</sup> Not to be exceeded more than 35 times a year

Appendix 13.4.4: Modelled 2024 PM<sub>2.5</sub> Concentrations – Existing Receptors

Receptor	Total PM <sub>2.5</sub> Without Development µg/m <sup>3</sup>	Total PM <sub>2.5</sub> With Development µg/m <sup>3</sup>	Change in PM <sub>2.5</sub> (µg/m <sup>3</sup> )	Total PM <sub>2.5</sub> Baseline plus Construction traffic µg/m <sup>3</sup>	Change in PM <sub>2.5</sub> (µg/m <sup>3</sup> )
ER1	8.5	8.5	0.0	8.5	0.0
ER2	8.4	8.4	0.0	8.4	0.0
ER3	8.1	8.1	0.0	8.1	0.0
ER4	8.2	8.2	0.0	8.2	0.0
ER5	8.3	8.3	0.0	8.3	0.0
ER6	8.3	8.3	0.0	8.3	0.0
ER7	8.3	8.4	0.1	8.4	0.1
ER8	8.3	8.3	0.0	8.3	0.0
ER9	8.1	8.1	0.0	8.1	0.0
ER10	8.1	8.1	0.0	8.1	0.0
ER11	8.1	8.1	0.0	8.1	0.0
ER12	8.0	8.0	0.0	8.0	0.0
ER13	8.0	8.0	0.0	8.0	0.0
ER14	8.0	8.0	0.0	8.0	0.0
ER15	8.0	8.0	0.0	8.0	0.0
ER16	7.9	7.9	0.0	7.9	0.0
ER17	8.1	8.1	0.0	8.1	0.0
ER18	7.9	7.9	0.0	7.9	0.0
ER19	8.1	8.1	0.0	8.1	0.0
ER20	7.9	7.9	0.0	7.9	0.0
ER21	7.9	7.9	0.0	7.9	0.0
ER22	8.0	8.0	0.0	8.0	0.0



Appendix 13.4.5: Modelled 2024 NO<sub>x</sub> Concentrations – Ecological Receptors

Ecological Receptor	NO <sub>x</sub>						
	Baseline Without Development Total NO <sub>x</sub> (µg/m <sup>3</sup> )	Baseline plus Operational Traffic Total NO <sub>x</sub> (µg/m <sup>3</sup> )	Change in Concentration (µg/m <sup>3</sup> )	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)	Baseline plus Construction Traffic Total NO <sub>x</sub> (µg/m <sup>3</sup> )	Change in Concentration (µg/m <sup>3</sup> )	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)
ECO 1	10.3	10.4	0.1	0.4%	10.4	0.1	0.4%
ECO 2	10.2	10.3	0.1	0.2%	10.3	0.1	0.2%
ECO 3	10.2	10.3	0.1	0.2%	10.3	0.1	0.2%
ECO 4	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 5	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 6	10.1	10.2	0.1	0.1%	10.2	0.1	0.1%
ECO 7	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 8	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 9	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 10	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 11	10.0	10.1	0.1	0.1%	10.1	0.1	0.1%
ECO 12	10.0	10.1	0.1	0.1%	10.1	0.1	0.1%
ECO 13	10.0	10.0	0.0	0.0%	10.0	0.0	0.0%
ECO 14	10.0	10.0	0.0	0.0%	10.0	0.0	0.0%
ECO 15	10.4	10.6	0.1	0.5%	10.6	0.2	0.5%
ECO 16	10.3	10.4	0.1	0.3%	10.4	0.1	0.3%
ECO 17	10.3	10.3	0.0	0.2%	10.3	0.1	0.2%
ECO 18	10.2	10.3	0.1	0.1%	10.3	0.1	0.1%
ECO 19	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 20	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 21	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 22	10.1	10.2	0.1	0.1%	10.2	0.1	0.1%

ECO 23	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 24	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 25	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 26	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 27	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 28	10.0	10.1	0.1	0.1%	10.1	0.1	0.1%
ECO 29	10.5	10.6	0.1	0.4%	10.6	0.1	0.4%
ECO 30	10.4	10.5	0.1	0.2%	10.5	0.1	0.2%
ECO 31	10.3	10.4	0.1	0.2%	10.4	0.1	0.2%
ECO 32	10.3	10.3	0.0	0.1%	10.3	0.0	0.1%
ECO 33	10.2	10.3	0.1	0.1%	10.3	0.1	0.1%
ECO 34	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 35	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 36	10.2	10.2	0.0	0.1%	10.2	0.0	0.1%
ECO 37	10.1	10.2	0.1	0.1%	10.2	0.1	0.1%
ECO 38	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 39	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 40	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 41	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%
ECO 42	10.1	10.1	0.0	0.1%	10.1	0.0	0.1%