Baseline Air Quality Assessment:

Land at Parr Fold, Greater Manchester Spatial Framework

March 2019

Experts in air quality management & assessment

Document Control

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1 Introduction

1.1 This report provides a desktop baseline air quality study for the proposed residential-led urban extension of land at Parr Fold (the "Allocation Site"), in Wigan, as part of the Greater Manchester Spatial Framework (GMSF). The assessment has been carried out by Air Quality Consultants Ltd. on behalf of Peel Holdings (Land & Property) Ltd.

1.2 The Allocation Site is currently designated as green belt land and is being promoted for release and allocation for a residential-led sustainable urban extension comprising approximately 2,400 dwellings. This baseline study has been carried out to identify any potential air quality constraints to the development of the site for residential use. It considers the following:

- existing baseline air quality conditions, including:
  - a site description;
  - identification of nearby major sources of air pollution;
  - a review of Greater Manchester's Air Quality Review and Assessment Reports for identification of nearby Air Quality Management Areas (AQMAs);
  - identification of nearby relevant air quality monitoring; and
  - identification of background concentrations.
- identification of the potential air quality constraints associated with the proposed development of the land for residential and employment use;
- outline of the scope of works likely to be required for a detailed air quality assessment to be carried out for a future planning application for the development of the land; and
- a summary overview.

2 Baseline Air Quality

Site Description

2.1 The Allocation Site (shown in Figure 1) is located to the north of Bridgewater Road, east of Mort Lane and the A577 Mosley Common Road and west of Burgess Farm. It is situated between Mosley Common to the south, Walkden to the north and immediately south of the Manchester to Wigan railway line. The majority of the Allocation Site lies within the boundary of Wigan Council; a small portion of land to the east lies within Salford City Council.

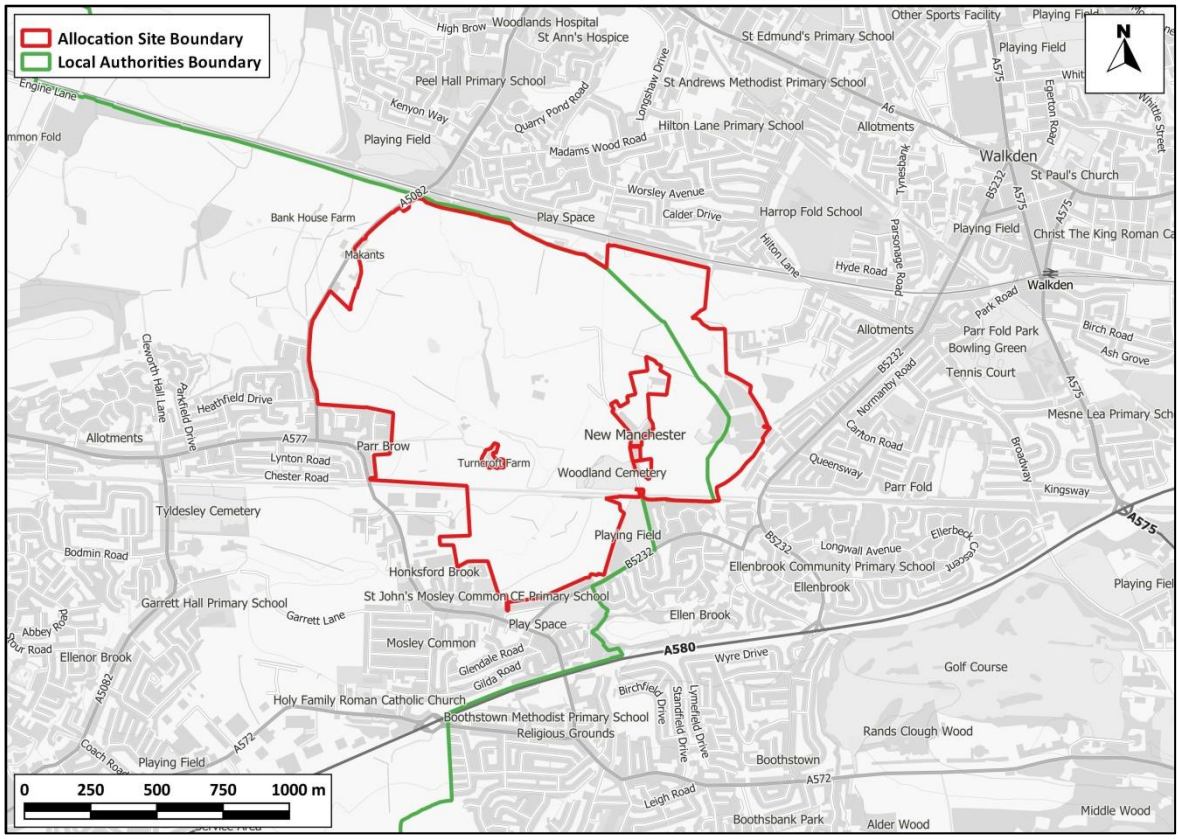

Figure 1: Allocation Site Location Plan

Industrial sources

2.2 A search of the UK Pollutant Release and Transfer Register (PRTR) (Defra, 2019a) website and reviewing satellite maps identified the following industrial sources near to the site (with the distance of these industrial sites from the Allocation Site provided in brackets):

- Toone Skip Company (immediately adjacent, to the west);
- Mort Lane Motor Salvage (immediately adjacent, to the west);
- Parr Bridge Works (immediately adjacent, to the west);
- Maxilead Ltd (immediately adjacent, to the west);
- Hart Street Garage (650 m to southwest); and
- Rubber Recycling Ltd (1.1 km to southwest).

2.3 Tonne Skip Company, Mort Lane Motor Salvage, Parr Bridge Works and Maxilead Ltd are either waste transfer or non-hazardous waste storage facilities, with the exception of Parr Bridge Works,

where hazardous waste is accepted. No emissions to air are reported for any of the sites; however, given the proximity to the Allocation site, it may be necessary to consider the potential dust and odours arising from operations at these sites in future air quality assessment work.

2.4 Rubber Recycling Ltd is used as a waste treatment and recycling facility, whilst Hart Street Garage is used as maintenance and motor vehicles repair facility. No emissions to air are reported for any of the sites. There are existing residential properties in the surroundings of these sites, therefore it is considered unlikely that emissions will have a significant adverse effect on the Allocation Site.

2.5 In addition to these facilities, a sewage treatment works (STW), 'Worsley Treatment Works', is located directly adjacent to the north of the Allocation Site. There is the potential for odour emissions from the STW to impact on the future residents of the Allocation Site, which will need to be considered in future air quality assessment work.

2.6 Leyland's Farm (located on Shuderhill Road) is located within the Allocation Site but does not form part of the land for development. It is a farming and livestock facility. Given its proximity to potential new properties on the Allocation Site, and the nature of the activities taking place, there is the potential for odour impacts at the Allocation Site, which will need to be considered in future air quality assessment work.

2.7 The Carrington Power Plant is an 880 MW gas-fired, combined cycle peaking power plant located on Manchester Road, approximately 7.8 km south of the Allocation Site. It commenced operations in 2016 and to date no emissions data for the plant has been published. It will be a significant source of nitrogen oxides (NO_x) emissions which will contribute to background nitrogen dioxide concentrations in the area. However, given the separation distance, it is unlikely to adversely impact the Allocation Site.

Air Quality Review and Assessment

2.8 The ten local authorities (which includes Wigan and Salford) that make up Greater Manchester have come together to form a combined authority, known as the Greater Manchester Combined Authority (GMCA). The GMCA investigates air quality within the Greater Manchester area as part of its responsibilities under the LAQM regime, and in April 2016 declared a single Greater Manchester AQMA (Greater Manchester Combined Authority, 2016), bringing together the AQMAs previously declared by the ten local authorities. The AQMA is for exceedances of the annual mean nitrogen dioxide objective. The Greater Manchester AQMA is shown in Figure 2; the closest parts of the AQMA to the Allocation Site are located on Sale Lane approximately 30 – 100 m west and along Mosley Common Road and the A580 East Lancashire Road, at approximately 75 m and 270 m distance, respectively.

2.9 In terms of PM_{10}, the GMCA concluded that there are no exceedances of the objectives. It is, therefore, reasonable to assume that existing PM_{10} levels will not exceed the objectives near to the Allocation Site (Greater Manchester Combined Authority, 2017).

2.10 Further information is provided on the national air quality objectives in Appendix A1.

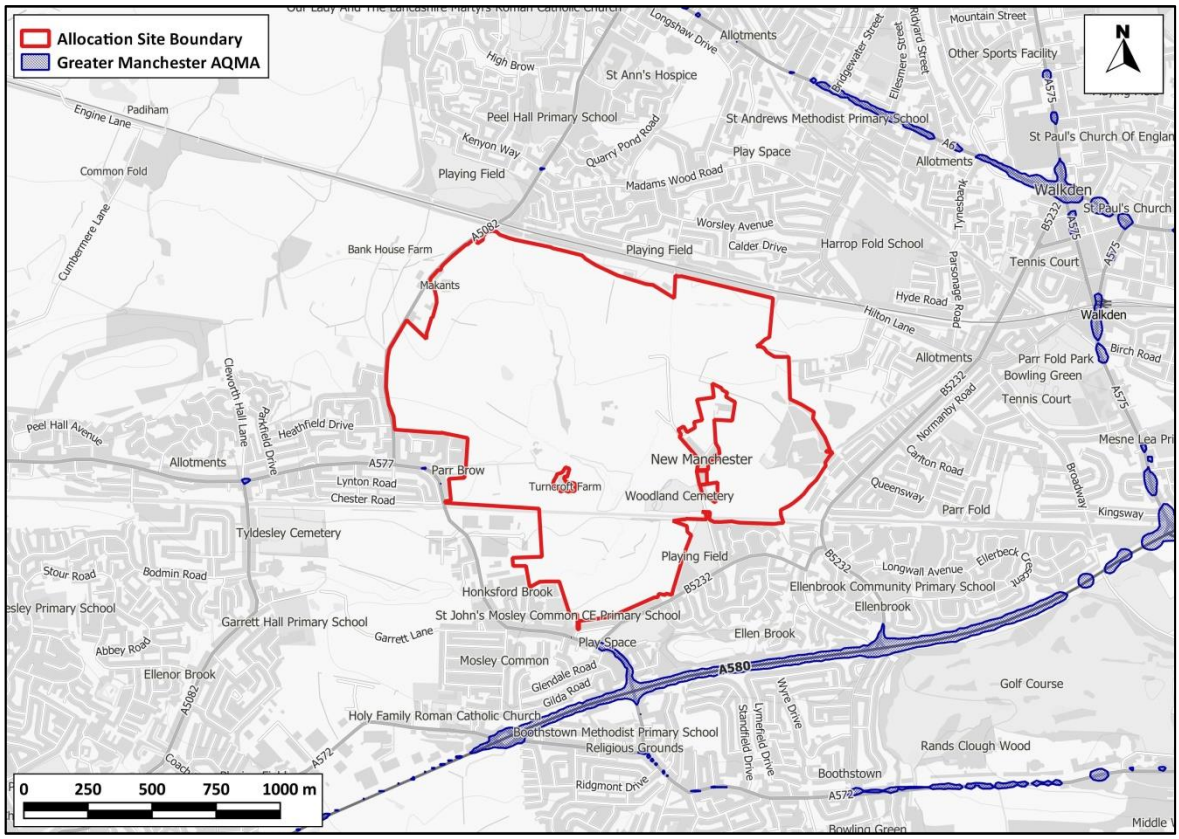

Figure 2: Greater Manchester AQMA

Local Air Quality Monitoring

2.11 The GMCA operates seventeen automatic monitoring stations within its area, one of which (Wigan Centre an urban background site) is located in Wigan and three located in Salford. However, the (Wigan Centre) site is located approximately 13 km west of the Allocation Site and is unlikely to be representative of the local air quality in the study area. The closest automatic monitor to the Allocation Site is a roadside station located approximately 2.4 km to southeast, which monitors concentrations adjacent to the M60.

2.12 Wigan Council and Salford City Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Staffordshire Scientifics Services (using the

20% TEA in water method), eleven of which are located near to the Allocation Site. Results for the years 2012 to 2017 are summarised in Table 1 and the monitoring locations are shown in Figure 3.

Table 1: Summary of Nitrogen Dioxide (NO_2) Monitoring (2012-2017) [a]

Site No.	Site Type	Location	2012	2013	2014	2015	2016	2017
Automatic Monitor – Annual Mean (µg/m^3)								
M60	Roadside	Salford M60	**62.2**	**61.5**	**59.6**	**52.1**	**46.1**	**43.3**
Objective			**40**					
Automatic Monitor - No. of Hours > 200 µg/m^3								
M60	Roadside	Salford M60	8 (191)	4 (187)	0	3	0	0
Objective			**18 (200 – 99.79th Percentile if low data capture)** [c]					
Diffusion Tubes - Annual Mean (µg/m^3) [b]								
WI54	Roadside	A580	37.2	33.1	32	33.4	33.9	31.9
WI71	Roadside	A577	38	25.7	35.6	34.9	36.9	35.4
SA9	Urban Background	St Marks School	30.2	27.2	28.8	25.1	27.1	25.3
SA16	Urban Background	Wharton School	27.1	24.4	26.7	22.4	24.4	23.0
SA20	Roadside	M60 Colocation	**52.1**	**48.7**	**46.8**	**43.0**	**44.0**	39.4
SA21	Roadside	M60 Colocation	**51.2**	**50.3**	**49.5**	**43.4**	**46.0**	**40.2**
SA22	Roadside	M60 Colocation	**49.5**	**51.3**	**47.1**	**43.7**	**46.0**	**41.8**
SA31	Roadside	Walkden Road	32.3	30.6	31.5	29.2	32.5	30.4
SA33	Roadside	Arnfield Drive	32.3	31.3	30.7	29.1	31.5	30.4
SA42	Roadside	Edenfield Lane	**42.4**	**44.2**	**40.4**	38.7	39.1	37
SA53	Urban Background	Ryecroft Lane	n/a	**49.0**	36.1	36.3	36.5	34.2
SA54	Urban Background	Ryecroft Lane	n/a	31.4	30.6	28.3	30.9	29.5
SA55	Roadside	Leigh Rd/Ellenbrook Rd	n/a	n/a	35.9	33.6	37.9	34.8
Objective			**40**					

[a] Exceedances of the objectives are shown in bold.

[b] 2012 to 2017 automatic data have been downloaded from the Air Quality England website (Air Quality England, 2019). 2012 to 2017 Wigan diffusion tube data have been taken from the Clean Air Greater Manchester website (Greater Manchester Combined Authority and Transport for Greater Manchester, 2019) and 2012 - 2017 diffusion tube data were provided by Salford City Council.

[c] Values in brackets are 99.79th percentiles, which are presented where data capture is less than 90%.

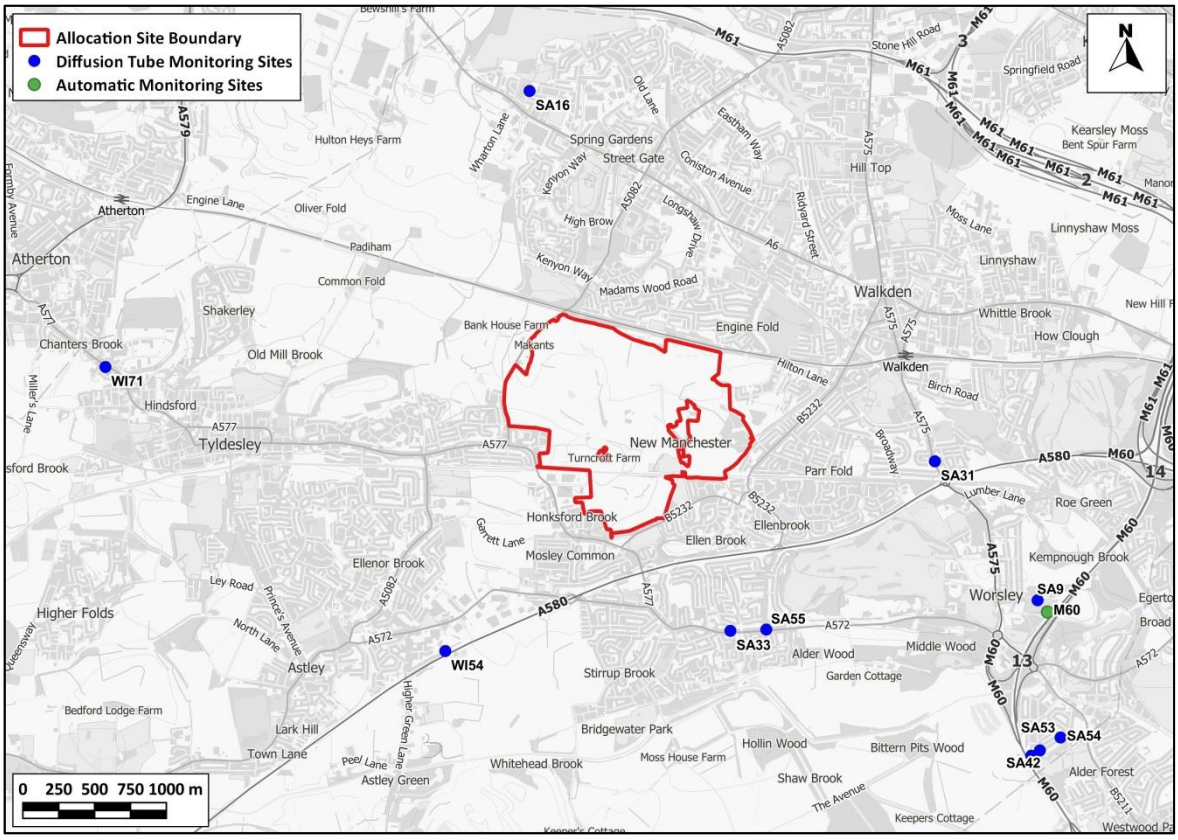

Figure 3: Air Quality Monitoring Locations

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2.13 Measured concentrations at the M60 automatic and diffusion tube sites (SA20, SA21 and SA22) exceeded the annual mean nitrogen dioxide objective (40 µg/m^3 – see Appendix A1) for the last six years (2012 to 2017). Concentrations exceeded the objective at the SA42 diffusion tube monitoring sites further down the M60 during the period 2011 to 2014. Concentrations at both urban background sites SA9 and SA16 have been below the objective since 2011. At all other sites, in recent years, concentrations have been below the annual mean objective. There appears to have been an overall downward trend in annual mean concentrations at the Salford monitoring sites for the years 2012 to 2017 but no clear trend at the Wigan diffusion tube sites.

2.14 The 1-hour mean objective was achieved at the M60 automatic monitor between 2011 and 2015. As measured concentrations are below 60 µg/m^3 at the diffusion tube monitoring sites, the 1-hour mean objective is also likely to have been achieved.

2.15 The M60 automatic monitoring station also measures PM_{10} concentrations, with results for the years 2012 to 2017 summarised in Table 2. There were no measured exceedances of the

objectives. The council began measuring $PM_{2.5}$ concentrations at the M60 automatic monitoring station in 2017; the results for this year are also presented in Table 2.

Table 2: Summary of PM_{10} Automatic Monitoring (2011-2016) [a]

Site No.	Site Type	Location	2012	2013	2014	2015	2016	2017
PM_{10} Annual Mean ($\mu g/m^3$)								
-	Roadside	Salford M60	23.3	24.7	20.7	19.5	21.4	20.2
Objective			**40**					
PM_{10} No. Days >50 $\mu g/m^3$								
-	Roadside	Salford M60	16	19	3 (34)	5	5 (34)	8 (31)
Objective			**35 (50) [b]**					
$PM_{2.5}$ Annual Mean ($\mu g/m^3$)								
	Roadside	Salford M60	-	-	-	-	-	9.1
Objective			**25 [c]**					

[a] Reference equivalent. 2012-2017 automatic data have been downloaded from the Air Quality England website (Air Quality England, 2019).

[b] Data capture was less than 90% in 2014, 2016 and 2017 and thus the 90.4th percentile of daily means is provided in parentheses.

[c] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Exceedances of EU Limit Value

2.16 There are no AURN monitoring sites within 1 km of the development site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2017a), which are used to report exceedances of the limit value to the EU, and which have been updated to support the 2017 Air Quality Plan identify exceedances of the limit value in 2015 along the A580 to the south of the Allocation Site. Defra's predicted concentrations for future years, presented for three scenarios ('baseline', 'with CAZs' and 'with CAZs and additional actions' – the latter two taking account of the measures contained in its 2017 Air Quality Plan (Defra, 2017b)), do not identify any exceedances within the study area. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

2.17 As discussed in Paragraph 2.16, Defra has produced an Air Quality Plan (Defra, 2017b) to tackle roadside nitrogen dioxide concentrations in the UK. Within this Plan, the Greater Manchester Combined Authority is listed as an authority upon which the Government has placed legal duties to *"develop and implement a plan designed to deliver compliance in the shortest time possible"*. Although Wigan Council is not on the list, Salford City Council is due to exceedances of the EU limit value being identified beyond 2020 alongside several roads, though none of these roads are located within 1 km of the proposed site, thus future limit value exceedances are unlikely to be affected by any proposed development. The Greater Manchester Combined Authority is required to produce a local action plan by the end of 2018 which may include a CAZ, or other measures if

they can deliver compliance as quickly as a CAZ, and might reasonably be expected to improve air quality within the study area.

Background Concentrations

2.18 Estimated 2017 background concentrations at the Allocation Site, derived from Defra's background maps (Defra, 2019b) are set out in Table 3; the background concentrations are all well below the objectives.

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

Year	NO_2	PM_{10}	$PM_{2.5}$
2017	14.0-15.1	12.4-12.5	8.2-8.3
Objectives	**40**	**40**	**25** [a]

[a] The range of values is for the different 1x1 km grid squares covering the Allocation Site.

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

3 Air Quality Constraints

3.1 Baseline conditions show air quality to be acceptable in the immediate vicinity of the Allocation Site. Background concentrations are well below the relevant objectives.

3.2 Dust from the construction works has the potential to impact on future residents of the Allocation Site.

3.3 The main air quality constraints associated with the development of the Allocation Site for residential use relate to the potential impacts of traffic emissions from the adjacent road network. The northern part of the Allocation Site lies immediately adjacent to the south of the Manchester to Wigan railway line, which has been identified by Defra in its 'Local Air Quality Management Technical Guidance (TG16)' (Defra, 2016) as a line with "Heavy Traffic of Diesel Passenger Trains"; emissions from locomotives on this railway line therefore have the potential to impact future residents of the Allocation Site. The main air pollutants of concern related to traffic emissions are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$) and from the railway line is nitrogen dioxide.

3.4 In the design of the Masterplan, it will be necessary for consideration to be given to the proximity of new properties to the nearby main roads and the railway line, to ensure that the proposed development does not lead to new exceedances of the national air quality objectives.

4 Future Detailed Air Quality Assessment

4.1 It will be necessary for a detailed air quality impact assessment to be carried out to support future planning applications for the proposed development of the Allocation Site.

4.2 The development will lead to an increase in traffic on the local roads, which may impact on air quality at existing residential properties in an area of poor air quality. Taking into account the baseline conditions set out in Section 2, and air quality constraints identified in Section 3, it is envisaged that it will be necessary for the air quality assessment to address:

- the impacts of the operation of the proposed development on concentrations of nitrogen dioxide, PM_{10} and $PM_{2.5}$ from road traffic in the proposed year of opening on existing properties and sensitive ecological receptors;
- the impacts of existing sources on future residents of the proposed development itself, including road traffic emissions, odour emissions from the Worsley Treatment Works, the adjacent industrial sites and Leyland's Farm; and
- the impacts of the construction of the proposed development on dust soiling and concentrations of PM_{10} during the construction period.

4.3 The Allocation Site is located near to two locally designated ecological sites (categorised as Local Nature Reserves (LNRs)), namely Blackleach Country Park (located 1.6 km to the northeast) and Worsley Woods (located 2.1 km to the southeast). It may be necessary for the air quality assessment to also consider the air quality impact of the Allocation Site on these sites.

4.4 If the scheme includes a centralised energy plant (which includes a Combined Heat and Power (CHP) unit and/or large gas boilers, it will be necessary for the air quality assessment to consider the impact on existing local air quality, as well as new residents of the scheme itself.

4.5 The assessments should adopt the approaches recommended in best practice guidance. Measures to mitigate any significant air quality effects from the proposed development during both construction and operation should be recommended, as required.

5 Summary Overview

5.1 The air quality constraints for the development of land at Parr Fold have been identified.

5.2 Existing conditions within the study area show acceptable air quality, with background concentrations of nitrogen dioxide below the annual mean objective. The Allocation Site lies close to part of the Greater Manchester AQMA.

5.3 The main air quality constraints associated with the Allocation Site relate to future residents of new properties at the site, which will be subject to the impact of traffic emissions from the adjacent road network and railway line. In the Masterplan design it will be necessary for consideration to be given to the location of new properties with respect to these roads and the railway line, to ensure the national air quality objectives are not exceeded. This may require the inclusion of a "stand-off" zone along the road/railway corridor[1].

5.4 Provided these air quality constraints are taken into account within the scheme design, the land at Parr Fold is considered suitable for housing development.

5.5 To support future planning applications, it will be necessary to carry out a detailed air quality assessment which considers both the impact of the proposed development on existing local air quality conditions (in terms of human and ecological health), as well as the impact of existing pollution sources on the proposed development itself. With appropriate mitigation measures implemented as required[2], there should be no air quality constraints to the development of the Allocation Site for residential use.

[1] Pollutant concentrations decrease rapidly with increased distance from the kerbside / railway

[2] Pending the outcome of the air quality assessment, measures to reduce traffic generation on the local road network may be required to minimise air quality impacts at both existing residential properties and/or sensitive ecological sites..

6 References

Air Quality England (2019), [Online], Available: http://www.airqualityengland.co.uk/local-authority/?la_id=300.

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7 Appendices

A1 National Air Quality Objectives

A1.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000 (2000) and the Air Quality (England) (Amendment) Regulations 2002 (2002).

A1.2 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2016). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 (Defra, 2016). The predicted annual mean PM_{10} concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM_{10} objective. Where predicted annual mean concentrations are below 32 µg/m^3 it is unlikely that the 24-hour mean objective will be exceeded.

A1.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2016). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

A1.4 The European Union has also set limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$. The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one (Directive 2008/50/EC of the European Parliament and of the Council, 2008). In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with

the limit values. Central Government does not recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded.

A1.5 The relevant air quality criteria for this assessment are provided in Table A1.1.

Table A1.1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3 [a]
Fine Particles ($PM_{2.5}$) [b]	Annual Mean	25 µg/m^3

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2016).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.