Bradbury Oak Grove Farm, Chepstow- Air Quality Technical Note

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Prepared by

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1 INTRODUCTION

1.1 GL Hearn previously undertook an air quality assessment[1] in November 2020 to determine the local air quality impact due to an increase in traffic on the A48 highway due to a proposed development at Bradbury Oak Grove Farm for the provision of 800 dwellings (hereafter referred to as the 'Proposed Development' or 'the Site'). The Site is located within the administrative boundary of Monmouthshire County Council (MCC).

1.2 The Chepstow Air Quality Management Area (AQMA) declared in 2007 due to exceedances of the annual mean nitrogen dioxide (NO_2) National Air Quality Objectives (NAQOs encompasses a section of the A48.

1.3 Although the Proposed Development is approximately 5km away from the AQMA, some of the traffic generated by the Proposed Development is expected to use the A48 within the Chepstow AQMA and other nearby surrounding roads. The assessment was undertaken to confirm whether the operation of the Proposed Development is likely to have longer term air quality impacts within the Chesptow AQMA and surrounding area as a result of changes to road traffic emissions.

1.4 This Technical Note presents the details of the existing air quality conditions and includes a review of the current MCC air quality monitoring data in order to summarise existing conditions surrounding the Site and along the A48 to accompany the air quality assessment undertaken in November 2020 and considers the proposed changes to the number of dwellings from 800 to 960 units and the local air quality impact due to any increase in traffic on the A48 highway in relation to the proposed residential development of Bradbury Oak Grove Farm, Chepstow.

[1] GL Hearn, Bradbury Oak Grove Farm, Air Quality Assessment Report (November, 2020)

2 AIR QUALITY BASELINE CONDITIONS

Local Air Quality Management

2.1 MCC has declared two Air Quality Management Areas (AQMAs) within its administrative boundaries, one of which is known as the Chepstow AQMA which covers an area encompassing properties either side of the A48, between the roundabout with the A466 to the west and extending east just beyond the junction with the B4293 at Hardwick Terrace. The AQMA was declared on 11th April 2007 due to exceedances of the NAQOs for NO_2, a traffic related pollutant.

Defra Background Mapping

2.2 Defra provides modelled background concentrations for each 1x1km grid across all local authority areas from a base year of 2018. This data is projected up to 2030. Table 1 presents the estimated background concentrations for 1 km around the Site in 2021.

Table 1: 2021 Defra Background Modelled Concentrations

Grid Square (X,Y)	Defra Background Concentration (µg/m3)	
	NO_2	PM_{10}
352500,194500	6.2	11.5
352500,193500	7.2	11.7
353500,193500	8.0	11.9
352500, 192500	6.9	11.5

2.3 The 2021 background concentrations for the grid squares around the Chepstow AQMA are all well below the annual mean NAQOs.

MCC Monitoring

Automatic Monitoring

2.4 MCC currently undertakes automatic monitoring at one location, less than 1km to the Site, on the A48 at Hardwick Hill (AQMS). Details of the data collected during 2013 to 2019 at this monitoring location are presented below.

Table 2: AQMS Monitoring Data

Pollutant	2014	2015	2016	2017	2018	2019
Annual Mean NO_2 Concentration (µg/m^3)	38.6	37	35	35	36	39
No. of hourly mean NO_2 Concentration >200 µg/m^3	0	2	0	0	0	1
Annual Mean PM_{10} Concentration (µg/m^3)	18	17	18	16	18	20
No. of 24-hourly mean PM_{10} Concentration >50 µg/m^3	2	5	1	2	0	7
Annual Mean $PM_{2.5}$ Concentration (µg/m^3)	14	10	11	10	10	13

2.5 Monitoring at the AQMS indicates that the annual and daily mean objectives for NO_2 and PM_{10} are well below the relevant NAQOs. The annual mean objective for $PM_{2.5}$ are also within the encouraged NAQO of 25µg/m^3.

Diffusion Tube Monitoring

2.6 MCC also undertakes NO_2 diffusion tube monitoring at a range of locations across the Council area. The 10 closest diffusion tubes to the site which lie along the A48 are presented in Table 3 below.

Table 3: MCC NO2 Diffusion Tube Data

Site ID	Grid Location (X, Y)	Distance to Site (km)	Within AQMA	Type*	Annual Mean NO2 Concentration (µg/m^3)					
					2014	2015	2016	2017	2018	2019
PWLL4	351666,192300	3.3	No	Roadside	-	-	-	-	-	21.0
PWLL3	351724,192370	3.4	No	Roadside	-	-	-	-	-	29.9
PWLL2	351873,192489	3.6	No	Roadside	-	-	-	-	-	26.5
PWLL1	351983,192594	3.7	No	Roadside	-	-	-	-	-	25.5
CH1	352800,193274	4.8	Yes	Roadside	21.8	22.5	22.9	22.2	19.1	20.1
CH2a	352821,193307	4.8	Yes	Roadside	33.1	30.9	31.0	27.9	27.8	28.4
CH3	352970,193452	5.0	Yes	Roadside	32.5	29.8	31.1	29.9	26.5	28.8
CH4	353009,193444	5.0	Yes	Roadside	**57.7**	**51.4**	**53.2**	**51.1**	**42.5**	**42.3**
CH5	353141,193451	5.1	Yes	Roadside	26.1	25.9	26.7	26.8	23.5	26.0
AQ1	353125,193472	5.1	Yes	Roadside	-	-	-	37.6	34	36.6
CH6	353166,193586	5.2	Yes	Roadside	40	36.8	37.6	37.1	34.3	34.7
CH7	353164,193663	5.3	Yes	Roadside	28.4	26.9	27.9	25.9	25.1	25.5
CH8	353219,193730	5.4	No	Kerbside	31.8	28.1	27.7	27.1	26.4	26.3
CH9	353306,193681	5.4	No	Roadside	27.8	25.5	27.2	26.8	23.6	24.2

2.7 Table 3 indicates that between 2014 and 2019, the annual mean NO_2 NAQO was exceeded in all years at the CH4 monitor and met every year at all other monitoring locations. Figure 1 shows the location of each monitoring location.

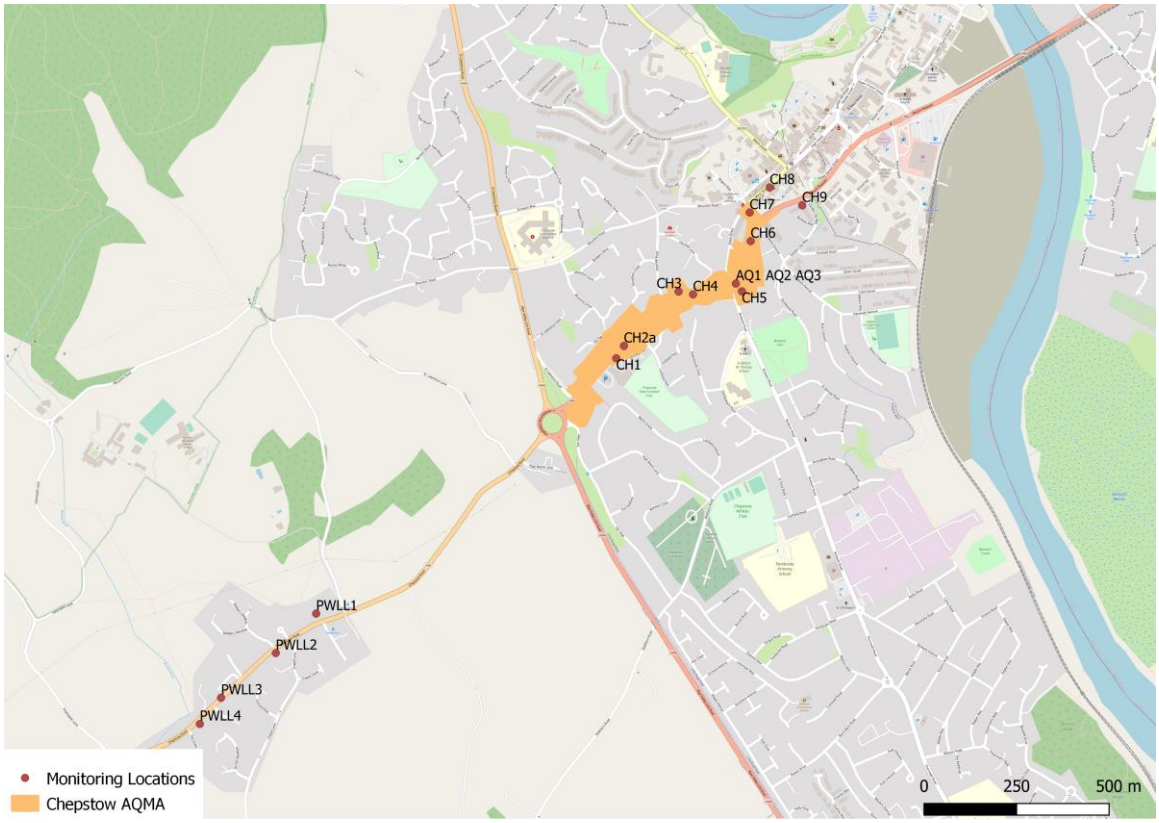

Figure 1 Monitoring Locations

2.8 Concentrations of NO_2 from the Defra background maps are significantly less than the monitored concentrations closest to the Site therefore baseline NO_2 concentrations will be only be considered from the local monitoring within the AQMA.

3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

3.1 As described in the baseline section, the annual mean NO_2 concentrations are associated with local vehicle emissions. The Proposed Development would generate additional traffic in the vicinity of the Site and potentially change local air quality in terms of PM_{10} and NO_2 concentrations resulting in potential impacts at the nearest local sensitive receptors. These Impacts would need to be quantified as part of an air quality assessment and applicable mitigation measures adopted.

3.2 In the air quality assessment previously undertaken, annual mean concentrations of NO_2 and PM_{10} were modelled at relevant existing sensitive receptors located within and outside the AQMA for the 2018 Baseline, 2036 Do Nothing and 2036 Do Something opening year scenarios based upon the provision of 800 dwellings.

3.3 The annual mean NO_2 concentrations predicted at all receptors were below the NAQO both in the 2036 Do Nothing and 2036 Do Something opening year scenarios, the highest modelled concentration was 27.6 µg/m^3 at Receptor 2 which lies within the Chepstow AQMA. The change in annual mean NO_2 concentrations at all receptors was than less than 1% and the significance of the impact of this change were deemed negligible in accordance with the EPUK/IAQM guidance.

3.4 In accordance with the LAQM.TG(16)[2], since the annual mean NO_2 concentrations predicted at all receptors is less than 60 µg/m^3, then the hourly mean NO_2 NAQO is unlikely to be exceeded.

3.5 Given the change in annual mean concentrations based on the provision of 800 dwellings was less than 1% It is likely that the effect of an additional 160 dwellings, would be not significant.

[2] Defra (April 2016) Local Air Quality Management Technical Guidance (TG16)

4 SUMMARY AND CONCUSIONS

4.1 Overall, based on the 2019 air quality monitoring data and surrounding uses; air pollutant concentrations are not a constraint to development at the Site.

4.2 Given that the previous air quality modelling resulted in a negligible impact based on 800 dwellings, the likely impacts from 960 dwellings will be negligible. However, the impacts of the provision of 960 dwellings would need to be quantified as part of an additional air quality modelling exercise to qualitatively determine the changes in pollutant concentrations.