



14 June 2013

Air Quality Assessment (WYG Planning & Environment Report Dated March 2013 Ref: A080809)

The following statement has been compiled in response to comments made by Jonathan Driver at Havant Borough Council (HBC) (28/04/2013).

The overview and scope of the Air Quality assessment was agreed with Environmental Health prior to being undertaken.

(3.2 - Table 2) Errors noted, Results from Monitoring Tubes at New Road, Compton Court and Stakes Hill mislabelled in the table. Ramblers Way was selected for validation / verification of the model, and this is correctly assigned within Table 2, along with correct values.

WYG Response : Comments noted, corrected table is presented below, however it should be noted that these errors have no effect on the findings of the air quality assessment.

Table 1 Monitored Annual Mean Nitrogen Dioxide Concentrations (Non-Automatic)

Site		Location		Annual Mean Nitrogen Dioxide Concentrations ($\mu\text{g}/\text{m}^3$)				
		Easting	Northing	2008	2009	2010	2011	2012
7	Brockhampton Lane	471191	106063	28.09	26.54	30.47	29.91	26.82
10	Ramblers Way	470025	110031	24.10	24.17	27.37	24.27	23.02
W10	Compton Court	471368	106805	-	-	-	36.11	32.44
24	New Road	471382	106818	48.44	42.96	47.13	44.15	48.23
25	Stakes Hill Road	468479	107721	29.98	35.07	33.47	30.89	29.47

WYG Response : The values are accurate as per email from Jonathan Driver Environmental Control Officer (Dated 18/02/2013). It should be noted that these values vary from those presented within the 2011 Air Progress Report for Havant Borough Council.

Ramblers Way sample location has inconsistencies with the subject site, and its use as a validation point for a model that uses meteorological data is not ideal, however it was agreed to be the most appropriate validation data. Validation results need to be treated carefully, owing to the variation in context between the validation & subject sites; and owing to the inherent uncertainties introduced when validating to a single monitoring location.

(3.3 – Meteorology) Shoreham was selected as the nearest meteorological station considered broadly representative of the application site, for which data were available. This was agreed with Environmental Health in advance.

It however worth noting that the site is approximately 34 miles East of Havant, compared with Southampton Airport (24 miles West). Whilst detailed data may well not have been available for Southampton Airport, it is worth highlighting that annual summary wind-rose's show a starkly different balance of Northerly, South-westerly & South-easterly winds in particular. As the model relied heavily upon the wind data, it is simply worth highlighting the modelling uncertainty introduced with non-local wind data.

WYG Response : We have undertaken a sensitivity analysis utilising alternative meteorological datasets in the area, results and adjustment factors for each meteorological site is presented in the table below.

Table 2 Predicted Annual Mean NO₂ Concentrations Sensitivity Analysis

ID	UK NGR		Location	Shoreham 2010	Lee on Solent 2012	Thorney Island 2012
	X(m)	Y(m)				
PR1	469597.1	106444.4	Proposed Apartment Units 50-61	37.82	38.98	38.61
PR2	469597.8	106434.6	Proposed Apartment Units 50-61	37.82	39.05	38.64
PR3	469599.9	106446.5	Proposed Apartment Units 50-61	37.40	38.48	38.16
PR4	469601.8	106422.2	Proposed Apartment Units 62-71	37.68	38.97	38.54
PR5	469606.7	106402.4	Proposed Apartment Units 62-71	38.18	39.55	39.07
PR6	469614.2	106380.8	Proposed Apartment Units 72-78	38.46	39.91	39.40
PR7	469623.9	106366.5	Proposed Apartment Units 79-85	37.61	39.07	38.62
PR8	469664	106460.1	Proposed Residential Unit No. 10	31.79	32.40	32.35
PR9	469700.1	106467.1	Proposed Residential Unit No. 7	30.40	30.86	30.85
PR10	469730.6	106479.8	Proposed Residential Unit No. 2	30.04	30.41	30.44
PR11	469623.8	106425.4	Proposed Residential Unit No. 21	34.40	35.38	35.13
PR12	469636.1	106390.6	Proposed Residential Unit No. 25	34.32	35.39	35.13
PR13	469647.6	106369.9	Proposed Residential Unit No. 29	33.94	35.05	34.81
PR14	469667.5	106375.7	Proposed Residential Unit No. 30	32.10	32.97	32.84
PR15	469709.3	106379.8	Proposed Residential Unit No. 37	30.00	30.65	30.62
PR16	469692.2	106407.8	Proposed Residential Unit No. 44	30.24	30.88	30.83
PR17	469719.9	106413.5	Proposed Residential Unit No. 40	29.33	29.85	29.83
PR18	469694.6	106441.5	Proposed Residential Unit No. 15	30.01	30.53	30.50
R1	469585.4	106477.2	1 Pennant Hills	36.46	37.50	37.01
R2	469632.5	106488.9	34 Pennant Hills	32.03	32.70	32.44
R3	469738.4	106516.2	28 Pennant Hills	29.00	29.41	29.26
R4	469797.1	106528.8	23 Pennant Hills	28.68	29.04	28.90
R5	469802.1	106491.9	32 Portsdown Hill Road	28.70	28.97	29.02
R6	469768.8	106429.3	38d Portsdown Hill Road	28.37	28.75	28.77
R7	469759.6	106364.9	40 Bedhampton Hill	29.17	29.71	29.72
R8	469464.4	106451	14 Portsdown Hill Road	37.68	35.31	34.98
R9	469475.2	106412.6	10 Glebe Park Hill Avenue	38.11	35.86	35.69
R10	469435.9	106406.6	27 Portsdown Hill Road	34.09	32.36	32.30
R11	469294.1	106352.1	41 Portsdown Hill Road	28.96	28.14	28.19
R12	469947.8	106569.1	1 Portsdown Hill Road	29.01	29.34	29.05
R13	469976.3	106540.3	4 Bedhampton Hill	36.46	35.75	36.06
R14	469934.6	106503.7	14 Bedhampton Hill	30.57	30.55	30.73
R15	469975.4	106505.8	14 Bedhampton Hill	34.32	33.44	33.61
R16	469745.7	106236.7	63 Bedhampton Hill	32.49	33.00	33.10
R17	469807.4	106246.4	72b Lower Road	32.26	32.57	32.64
R18	469793.2	106158.1	76 Lower Road	34.55	35.70	35.52
R19	470010.2	106593	2a Maylands Road	28.34	28.18	28.10
R20	470034.6	106621.9	55 Belmont Drive	25.95	25.86	25.86
R21	470065.1	106572.9	5 Brookside Road	29.76	30.09	30.12
R22	470114.7	106654.4	39 Belmont Drive	25.28	25.30	25.27
R23	470148.1	106606.7	3 Nursery Road	27.98	27.96	28.05
Primary Adj.Factor=				1.8093	1.9724	1.7403
Secondary Adj.Factor=				0.9994	0.9993	0.9993

WYG Response : Results presented in Table 2 show no predicted exceedances of the Annual Mean NO₂ objective using these alternative met files.

creative minds safe hands

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(3.4 – Emission Sources) It is agreed that minor road sources within the study area can be reasonably regarded as being included in the background component, and that it is the main / strategic / trunk roads that are the primary emissions sources for which consideration is required. Traffic estimates for modelled road sources appear to be on the low side (compared with expectation – HBC or third-party estimates, based upon survey data & projected survey data, including TRADS), and road link definition described / shown in figure 1 is ambiguous / imprecise - e.g. slip roads are grouped, despite spatial separation (differential distance from receptors).

I have not sought to verify TRADS data, but it is noted that some A3(M) carriageway flow estimates are significantly lower than 2011 surveyed levels, possibly reflecting recessionary driver behaviour (i.e. an 'artificially' suppressed flow cf. more 'typical' demand). This is a potentially relevant consideration when estimating likely future year exposure.

WYG Response : Through consultation with Bellamy Roberts Traffic Consultants it was established that flows that were utilised within the modelling exercise were derived from the Department for Transport DfT website (<http://www.dft.gov.uk/traffic-counts/cp.php>). These flows show higher volume of traffic than those derived from the Highways Agency (HA) website (<http://www.hatris.co.uk/>). Reference should be made to Figure 1 below for the report generated from the HA dataset and provided by Bellamy Roberts Traffic Consultants.

Figure 1 HA Traffic counts for A3

Yearly flow during 2011 for site 3/3037

NB, A3(M), Junction 4 Main C way(E469288, N107441) [view site location on map](#)

Month	24hr		18hr		16hr		12hr		ATC
	ADT	AWT	ADT	AWT	ADT	AWT	ADT	AWT	DAY
Jan	27072	29373	26093	28365	25281	27523	21845	23651	19
Feb	29749	32471	28643	31312	27692	30318	23780	25900	28
Mar	28688	30905	27614	29796	26739	28899	22892	24596	29
Apr	29435	31070	28385	29966	27404	28973	23136	24450	30
May	29446	31445	28343	30295	27343	29294	23204	24746	31
Jun	30573	32385	29396	31162	28289	30077	23959	25347	16
Jul	30987	32390	29778	31152	28672	30106	24050	25291	9
Aug	-	-	-	-	-	-	-	-	0
Sep	-	-	-	-	-	-	-	-	0
Oct	31851	33730	30732	32585	29779	31645	25515	26931	18
Nov	29963	32808	28858	31621	27944	30669	23940	26036	23
Dec	31035	33167	29851	31969	28881	30981	24777	26332	8

Avg 29879.931974.428769.330822.327802.429848.523709.825328 211

Showing only complete days. No estimated data. Not including hidden data.



Yearly flow during 2011 for site 3/30012760

SB, A3(M), TMU site 5504/2 on A3(M) southbound between J3 and J4(E469307, N107508) [view site location on map](#)

Month	24hr		18hr		16hr		12hr		ATC
	ADT	AWT	ADT	AWT	ADT	AWT	ADT	AWT	DAY
Jan	27230	29647	26486	28916	25824	28249	22514	24538	27
Feb	27389	30152	26621	29412	25913	28707	22508	24933	28
Mar	25678	29353	24915	28614	24227	27925	20888	24193	29
Apr	28936	30715	28164	29960	27408	29203	23748	25242	30
May	28768	30698	27961	29926	27197	29171	23475	25077	31
Jun	29607	31599	28738	30761	27931	29968	24072	25748	30
Jul	30567	32352	29652	31497	28810	30677	24734	26277	31
Aug	31122	32967	30266	32166	29486	31400	25534	27146	31
Sep	30262	32334	29406	31496	28653	30762	24845	26611	30
Oct	30612	32624	29743	31782	28981	31032	25230	26919	31
Nov	30050	32109	29213	31293	28462	30562	24891	26645	30
Dec	27860	30162	27049	29392	26255	28579	22973	24975	31

Avg 29006.8 31226 28184.5 30434.6 27428.9 29686.3 23784.3 25692 359

Showing only complete days. No estimated data. Not including hidden data.

WYG Response : Monitored two way traffic flows show that the AADT along A3 at Junction 4 is less than 60,000 vehicles per day. The WYG Air Quality Assessment utilises 65794 vehicles North of Junction 4 and 79605 vehicles North of Junction 5. As such it is considered a robust assessment.

(5.0 – Assessment of Air Quality) This section confirms the assessment to be based upon 2012 traffic flows, and the effects of existing traffic emissions sources on proposed new residential units.

(5.1 Existing Traffic Flows) EFT 5.1.2 has been used for 2012 (existing) emissions rates, and while this section makes reference to future year predictions, it is noted that none are presented.

WYG Response : Given that recent traffic trends show no significant increase in traffic volumes and that the assessment does not assume improvement in emission factors and background concentrations, the assessment considered that the current traffic flows are also representative for future year predictions as a worst case.

(5.2 Background Concentrations) It is acknowledged that 2010 background concentrations are less conservative, but more realistic as a basis for assessment – especially as the study area assessment is reliant upon the background concentration component to account for the emissions from local roads not specifically modelled.

(5.3 – Model Verification) The procedure for generating the model verification factor is in line with DEFRA recommended methodology for use in local air quality assessments. The model is shown to be under-predicting concentrations (as is common).



The report suggests that this under-prediction is likely due to the effects of "congestion and stop-start driving behaviour in the study area... [and] increased tailpipe emissions as traffic accelerates away from roundabouts and junctions".

While these statements are likely true in relation to the study area, the validation point selected for validation is one that targets a road source characterised by relatively high-speed, free-flowing traffic; notably measuring from a position "up-prevailing-wind-direction" from the source road, with reference to the Shoreham data.

If anything, the use of Ramblers Way as a validation point (whilst accepted to be the closest available / most appropriate) would be expected to lead to an under-estimation of emissions from the Portsdown Hill Road site, where the receptors are down-wind of the prevailing* south-westerly winds, and where local congestion / slow road junction traffic etc. might be expected to be more prevalent (as is suggested in the above presented explanation for the model under prediction). (*- notwithstanding the significant portion of Northerly winds shown in the Shoreham data)

WYG Response : Results for different Meteorological Stations are presented in Table 2.

The final (adjusted model produced data at all modelling locations falling within 25% of monitoring results as recommended in DEFRA guidance – however this is very likely to happen with a single point validation, as the measured data is the 'anchor' for adjustment of the (single) predicted concentration data-point against which it is being compared.

For the reasons outlined above, this section is considered to demonstrate the model validation should be regarded with relatively wide margins of error, and likely to under-estimate the 'true' emissions at the modelled locations. Please see appended plan for graphical representation of concentrations as presented in the report, for reference, and support of the conclusions & recommendations presented at the foot of this response.

WYG Response : WYG undertook a series of dispersion models to verify the model uncertainty. Reference should be made to Table 2 for the adjustment factors associated with various Meteorological datasets. Results show no predicted exceedance of the annual mean NO₂ concentrations.

(5.4 – Summary of Model Inputs) It is noted that "Urban Road (Not London)" classification was used for the Road type – this may not appropriately represent both the urban B-roads (Such as Portsdown Hill Rd.), and strategic trunk roads. The likely impact of this on the model output is unclear.

WYG Response : Reference should be made to Table 3 for road types utilised within the emission factor toolkit. The Road types affect the additional factors for congestion effects. These are considered to be worst case.

Table 3 Road types within the Emission Factor toolkit

SourceID	Road Type
A27/A2030 Roundabout	Urban (not London)
A3 North	Motorway (not London)
A3 Slip Road East	Motorway (not London)
A3 Slip Road North	Urban (not London)
A3 SlipRoad North SD	Urban (not London)
A3 SlipRoad South SD	Urban (not London)
A3 South	Motorway (not London)
A3jctn-3-4	Motorway (not London)
A3jctn3N	Motorway (not London)
B2177	Urban (not London)
B2177 East	Urban (not London)

SourceID	Road Type
B2177 SD 5	Urban (not London)
B2177 SD3	Urban (not London)
B2177 SD4	Urban (not London)
B2177 Slip Road N SD	Urban (not London)
B2177 Slip Road S SD	Urban (not London)
B2177/ Maylands R	Urban (not London)
Portsdown Rd SD	Urban (not London)
Portsdown Road	Urban (not London)

(5.5.1 – Traffic Assessment) This section indicates that the maximum average exposure at a proposed residential unit is $38.46\mu\text{g}/\text{m}^3$ at units 72-78 (within the 'noise barrier-block' in the South-west portion of the site).

This section also emphasises that the assessment presents a worst case scenario, and makes a number of worst-case assumptions. Whilst this is true for some parameters, worst case assumptions are countered a variety of 'non-worst-case' assumptions (e.g. validation), alongside (anecdotally) reduced traffic flows, for which there may be a variety of reasons - as outlined in 3.4 above.

WYG Response : Reference should be made to Figure 1 for the traffic data derived from HA's website, which shows lower volumes of traffic along the A3 than those utilised within the WYG Air Quality Assessment Report

2010 factors were agreed prior to the assessment being undertaken as recent factors have repeatedly over-estimated emissions improvements and uptake of Euro 4, 5 & 6 standards within the on-road vehicle 'fleet'. I would suggest that these factors could reasonably be considered to be 'more realistic', as opposed to 'strongly conservative' estimates, which could be argued to be supported by the inherent under-prediction of the model despite the use of 2010 factors & background levels. Note the report text states that 2010 factors were used for future year estimates only, and 2012 factors used for 2012 year. This is either a typographical error in the report, or the conservative assumptions being referred to were not applied to the presented data.

WYG Response : The Assessment states:

"Emission factors for 2012 have been calculated using Defra's latest EFT version 5.1.2 (released in June 2012). However it should be noted that to represent a robust approach, this assessment does not assume improvement in emission rates associated with road traffic, as such 2010 emission rates were utilised for future year predictions."

As stated above the assessment considers 2011 monitored traffic flow with 2010 emission factors and 2010 background dataset, representative for future year predictions as it does not assume improvement in the emission factors and the background concentrations.

(7.0 – Summary & Conclusions) The significance of the effects of potential emissions from the construction phase has been assessed as 'negligible' following the adoption of appropriate mitigation measures, as recommend in the report. This assessment is considered to be reasonable, and the mitigation measures proposed are considered appropriate. Standard conditions relating to the control of dust & to prevent the tracking of mud out on to the highway are considered suitable for the purpose of controlling construction phase emissions, and I expect this to be picked up in the usual way.

I have dealt with the degree of conservatism built into the air quality modelling in the sections above – and largely for the reason of the introduction of non-conservative biases into the modelling process, I do not agree that it can be confidently stated that no modelled receptors [are likely to] experience NO_2 concentrations in exceedance of the annual mean objective.



It is considered that the assessment demonstrates that the NO₂ objective value is likely to fall within the range of modelling uncertainty (notably not defined within this assessment). If the true traffic flows are artificially suppressed due to temporary economic factors, or if the use of the single validation point or its own geographical / topographical context is likely to introduce an error greater than 4.004% (the margin between the maximum predicted concentration and the objective value); NO₂ concentrations could become a significant issue in the foreseeable future.

As a result, the Western block of residential dwellings (Apartment A, No.'s 50-83) could become actionable under Local Air Quality Management (LAQM) responsibilities. It would be very difficult to implement an action plan to improve the air quality at this location (should this become necessary) on local level (as the primary source would be a strategic national trunk road), and so the opportunity to ensure that unacceptable exposure does not occur is in the initial construction / specification of the scheme itself.

WYG Response : Following a review of modelling results associated with various Meteorological station datasets there were no predicted exceedance of the annual mean NO₂ concentrations at proposed residential receptor locations. It is also established that the assessment utilises a series of worst case assumptions, and as such it is reasonable to assume that the assessment is suitable to demonstrate future year predictions with existing monitored traffic flow.