

Air Quality Technical Note

CLIENT:	Rex Proctor and Partners on behalf of Strata Sterling Barnsley West Limited
PROJECT:	Barnsley West Roundabout Applications
SUBJECT:	Provision of Additional 2021 Scenario relating to Air Quality (Proposed Highways Works at Barugh Green Road, Higham Common Road and Higham Lane, Barnsley associated with the new Link Road between M1, Junction 37 and the A635, Barugh Green Road).
JOB NO.:	ST17019
DATE:	24th April 2020
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Introduction

Wardell Armstrong (WA) LLP has been commissioned by Rex Proctor and Partners on behalf of Strata Sterling Barnsley West Limited to address potential air quality impacts associated with the Barnsley West Roundabout applications. The commission is for the consideration of one scenario, in addition to previous scenarios already assessed, at the request of Pollution Officer, Chris Shields of Barnsley Council, following a project meeting held on 15th April 2020.

This technical note should accompany, and be read in conjunction with technical reports referenced:

- ST17019 AQ Detailed Report Final dated December 2019; and
- ST17019 AQ Addendum Final dated March 2020.

The technical reports address all other relevant scenarios relating to the Barnsley West Roundabout applications and present the methodology utilised to undertake all assessment work.

Additional Scenario Considered

The following scenario has been considered and takes into account overall cumulative effects of the overall proposal (i.e. the completed link road between the Barugh Green Road and the Higham Common Road roundabouts and the SCRIF funded highway improvements):

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- 2021 Future Year (including both roundabouts and link road, no MU1 development).

The assessment has been determined through undertaking a detailed air quality modelling assessment (dispersion modelling), informed through the provision of detailed road traffic data from Fore Consulting, on 16th April 2020. Previously available monitoring data has been used to check the performance of the model. It should be noted that it is unrealistic that the link road will be completed by 2021 without the associated wider MU1 development and is therefore considered to be theoretical. It is understood that this has been acknowledged by Chris Shields and that the request for an air quality assessment for this additional scenario is for consistency with the recent request to include within the noise assessment.

Operational Phase Results

The construction dust phase has been included in the previous two technical reports and would not change for this additional scenario.

Therefore, a summary of operational results of the findings for this scenario only are presented in the following Tables 1 to 4. Table 4 provides a sensitivity analysis for NO₂ only, methodology details of which are provided in ST17019 AQ Addendum Final dated March 2020.

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Table 1 Predicted Adjusted NO₂ Concentrations for 2021 at Existing Sensitive Receptors (Using EFT Version 9)

Receptor	Calculated Annual Mean NO ₂ Concentrations (µg/m ³) ^a				
	Without Development Concentration	With Development		Concentration Change as Percentage of AQAL	Impact ^b
		Concentration	Percentage in Relation to AQAL		
ESR 1	18.89	24.91	<75%	>10%	Moderate Adverse
ESR 2	18.44	18.75	<75%	1%	Negligible
ESR 3	26.12	23.59	<75%	6-9%	Slight Beneficial
ESR 4	24.40	21.70	<75%	6-9%	Slight Beneficial
ESR 5	26.42	26.91	<75%	1%	Negligible
ESR 6	32.37	32.37	76-94%	<0.5%	Negligible
ESR 7	21.70	20.42	<75%	2-5%	Negligible
ESR 8	27.04	27.33	<75%	1%	Negligible
ESR 9	23.39	24.75	<75%	2-5%	Negligible
ESR 10	30.31	30.73	76-94%	1%	Negligible
ESR 11	<u>47.39</u>	<u>46.89</u>	>110%	1%	Moderate Beneficial
ESR 12	<u>42.64</u>	<u>42.22</u>	103-109%	1%	Moderate Beneficial
ESR 13	21.28	21.79	<75%	1%	Negligible
ESR 14	19.35	20.19	<75%	2-5%	Negligible

^aNO₂ concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO₂ calculator, in accordance with LAQM.TG(16)

^bAssessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible.

Underlined values represent an exceedance of the relevant AQO.

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Table 2: Predicted Adjusted PM₁₀ Concentrations for 2021 at Existing Sensitive Receptors (Using EFT Version 9)

Receptor	Calculated Annual Mean PM ₁₀ Concentrations (µg/m ³)				
	Without Development Concentration	With Development		Concentration Change as Percentage of AQAL	Impact ^a
		Concentration	Percentage in Relation to AQAL		
ESR 1	10.93	11.40	<75%	1%	Negligible
ESR 2	10.86	10.85	<75%	<0.5%	Negligible
ESR 3	11.14	10.91	<75%	<0.5%	Negligible
ESR 4	10.99	10.74	<75%	<0.5%	Negligible
ESR 5	12.73	12.74	<75%	<0.5%	Negligible
ESR 6	13.08	13.04	<75%	<0.5%	Negligible
ESR 7	12.60	12.47	<75%	<0.5%	Negligible
ESR 8	13.08	13.11	<75%	<0.5%	Negligible
ESR 9	10.48	10.61	<75%	<0.5%	Negligible
ESR 10	13.45	13.49	<75%	<0.5%	Negligible
ESR 11	14.43	14.38	<75%	<0.5%	Negligible
ESR 12	14.05	14.01	<75%	<0.5%	Negligible
ESR 13	10.44	10.50	<75%	<0.5%	Negligible
ESR 14	12.27	12.36	<75%	<0.5%	Negligible

^aAssessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible

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Table 3: Predicted Unadjusted PM _{2.5} Concentrations for 2021 at Existing Sensitive Receptors (Using EFT Version 9)					
Receptor	Calculated Annual Mean PM _{2.5} Concentrations (µg/m ³)				
	Without Development Concentration	With Development		Concentration Change as Percentage of AQAL	Impact ^a
		Concentration	Percentage in Relation to AQAL		
ESR 1	6.74	7.02	<75%	1%	Negligible
ESR 2	6.71	6.70	<75%	<0.5%	Negligible
ESR 3	6.98	6.84	<75%	<0.5%	Negligible
ESR 4	6.89	6.75	<75%	<0.5%	Negligible
ESR 5	7.72	7.72	<75%	<0.5%	Negligible
ESR 6	7.94	7.92	<75%	<0.5%	Negligible
ESR 7	7.61	7.54	<75%	<0.5%	Negligible
ESR 8	7.96	7.97	<75%	<0.5%	Negligible
ESR 9	6.72	6.80	<75%	<0.5%	Negligible
ESR 10	8.16	8.19	<75%	<0.5%	Negligible
ESR 11	8.75	8.72	<75%	<0.5%	Negligible
ESR 12	8.52	8.50	<75%	<0.5%	Negligible
ESR 13	6.78	6.81	<75%	<0.5%	Negligible
ESR 14	7.43	7.48	<75%	<0.5%	Negligible

^aAssessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible

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Table 4: Predicted Adjusted NO ₂ Concentrations for 2021 at Existing Sensitive Receptors (Sensitivity Analysis)					
Receptor	Calculated Annual Mean NO ₂ Concentrations (µg/m ³) ^a				
	Without Development Concentration	With Development		Concentration Change as Percentage of AQAL	Impact ^b
		Concentration	Percentage in Relation to AQAL		
ESR 1	21.12	27.40	<75%	>10%	Moderate Adverse
ESR 2	20.65	20.96	<75%	1%	Negligible
ESR 3	28.65	25.99	<75%	6-9%	Slight Beneficial
ESR 4	26.85	24.02	<75%	6-9%	Slight Beneficial
ESR 5	29.02	29.52	<75%	1	Negligible
ESR 6	35.22	35.22	76-94%	<0.5%	Negligible
ESR 7	24.07	22.73	<75%	2-5%	Negligible
ESR 8	29.63	29.94	<75%	1%	Negligible
ESR 9	25.83	27.26	<75%	2-5%	Negligible
ESR 10	33.01	33.46	76-94%	1%	Negligible
ESR 11	<u>50.66</u>	<u>50.13</u>	>110%	1%	Moderate Beneficial
ESR 12	<u>45.76</u>	<u>45.33</u>	>110%	1%	Moderate Beneficial
ESR 13	23.62	24.16	<75%	1%	Negligible
ESR 14	21.61	22.49	<75%	2-5%	Negligible

^aNO₂ concentrations obtained by inputting predicted NO_x concentrations into the NO_x to NO₂ calculator, in accordance with LAQM.TG(16)

^bAssessed using the Impact Descriptors from the EPUK/IAQM guidance, included in Appendix C. Changes of less than 0.5% should be described as negligible.

Underlined values represent an exceedance of the relevant AQO.

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Conclusions

For this scenario, there are no new breaches of air quality objectives predicted at any of the receptors assessed, as a result of the proposed roundabouts, or cumulatively when taking into account the completed link road and other highways improvements. This includes air quality areas of concern along the M1 corridor Air Quality Management Area (AQMA) and the A628 AQMA. Although the roundabouts alter the alignment of the road, they do not generate any additional traffic, rather they redistribute traffic from the existing road network to the link road on completion. In relation to this, NO₂ concentrations at ESR 11 and ESR 12 (Tables 1 and 4), inside the A628 AQMA, are predicted to improve and there is potential for a moderate beneficial impact, although remaining above the air quality objective. Slight beneficial impacts of NO₂ concentrations are also predicted at ESR 3 and ESR 4 (around the crossroads where Barugh Green Road meets Higham Common Lane), owing to the redistribution of traffic.

Impacts of all pollutants assessed at all receptors, with the exception of NO₂ at the aforementioned ESR locations, are predicted to be negligible. Although there is a potential moderate adverse air quality impact of NO₂ (Tables 1 and 4) at receptor ESR1, predicted concentrations remain well below air quality objectives and would be expected to drop steadily thereafter due to improvements in vehicle emission technologies, and are therefore considered to be 'not significant'. In addition, it should be emphasised that the modelling incorporates a robust approach to queue zones around the proposed roundabouts which may overstate the potential air quality impact.

Summary

The modelling undertaken for the 2021 scenario concludes that there would be no significant impacts arising from the overall proposal. In addition, it should be noted that the Barugh Green Road roundabout and Higham Common Road roundabout developments and associated link road, will be addressed further during the EIA air quality assessment of the forthcoming MU1 Barnsley West application.