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## Appendix 13.3 Sensitivity Analysis

August 2021

## APPENDIX 13.3 SENSITIVITY ANALYSIS

### 2031 Opening Year (2030 Emissions)

#### Predicted Concentrations across the Proposed Development

Annual mean NO<sub>2</sub> and particulate matter (PM) concentrations were predicted across the Proposed Development for the 2031 DS scenario with the use of 2031 traffic data and 2030 emission factors at a height of 1.5m to represent exposure across the ground floor level.

Background NO<sub>2</sub> and PM levels are likely to be lower at elevated heights due to increased distance from emission sources, such as roads. Therefore, predicted concentrations at heights above ground floor level are considered acceptable in regards to future exposure and have not been assessed further.

#### Annual Mean Nitrogen Dioxide (NO<sub>2</sub>)

Predicted annual mean NO<sub>2</sub> concentrations across the Proposed Development site during the DS scenario are summarised in Table 13.3.1.

**Table 13.3.1: Modelling Results - Annual Mean NO<sub>2</sub> at Proposed Sensitive Use**

Floor Level	Predicted 2031 Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emission Factors)
Ground (1.5m)	7.80 – 19.36

The predicted concentrations shown in Table 13.3.1 indicate that there were no exceedances of the AQO at sensitive locations across ground floor areas of the proposed development.

Predictions of 1-hour NO<sub>2</sub> concentrations were not produced as part of the dispersion modelling assessment. LAQM.(TG16) states if annual mean NO<sub>2</sub> concentrations are below 60µg/m<sup>3</sup> then it is unlikely that the 1-hour AQO will be exceeded. As such, based on the results in Table 13.3.1, it is not predicted that on-site concentrations will exceed the 1-hour mean AQO for NO<sub>2</sub>.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated NO<sub>2</sub> concentrations.

#### Annual Mean Particulate Matter (PM<sub>10</sub> & PM<sub>2.5</sub>)

Predicted annual mean PM concentrations across the Proposed Development site during the DS scenario are summarised in Table 13.3.2.

**Table 13.3.2: Modelling Results - Annual Mean PM at Proposed Sensitive Use**

Floor Level	Predicted 2031 Annual Mean Concentration (µg/m <sup>3</sup> ) (2030 Emission Factors)	
	PM <sub>10</sub>	PM <sub>2.5</sub>
Ground (1.5m)	10.41 - 14.47	6.72 - 9.35

The predicted concentrations shown in Table 13.3.2 indicate that there were no exceedances of the annual mean AQOs for PM<sub>10</sub> or PM<sub>2.5</sub> throughout the modelling area.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for proposed end use without the implementation of mitigation techniques to protect future site users from elevated PM concentrations.

### Predicted Concentrations at Sensitive Receptors

#### Nitrogen Dioxide (NO<sub>2</sub>)

Annual mean NO<sub>2</sub> concentrations were predicted for 2031 DM and DS scenarios and are summarised in Table 13.3.3. Reference should be made to Figure 13.6 for a graphical representation of these locations.

**Table 13.3.3: Predicted Annual Mean NO<sub>2</sub> Concentrations**

Potential Impact		Predicted Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R1	Residential - 7 Pinewood Road	13.97	14.07	0.10
R2	Residential - 1 Loxwood Close	10.40	10.49	0.09
R3	Residential - Carwood Road	11.16	11.27	0.11
R4	Residential - 3 Dovetree Close	9.28	9.33	0.05
R5	Residential - 239A Leyland Rd	16.05	16.17	0.12
R6	Residential - Leyland Road	15.14	15.25	0.11
R7	Residential - Carrington Court	17.88	18.03	0.15
R8	Residential - 297 Leyland Road	15.58	15.67	0.09
R9	Residential - 209 Leyland Road	15.34	15.45	0.11
R10	Residential - 45 Pembury Avenue	15.68	15.80	0.12
R11	Residential - 163 Leyland Road	13.83	13.88	0.05
R12	Residential - 316 Leyland Road	10.91	10.93	0.02
R13	School - Moor Hey School	12.29	12.30	0.01
R14	Residential - 388 Leyland Road (AQMA)	14.78	14.80	0.02
R15	School - St Gerard's RC Primary	11.61	11.65	0.04
R16	Residential - 471 Leyland Road (AQMA)	19.05	19.11	0.06
R17	Residential - 501 Leyland Road (AQMA)	21.89	22.13	0.24
R18	Residential - 19 Watkin Lane (AQMA)	23.78	24.00	0.22
R19	Residential - 55 Watkin Lane (AQMA)	16.80	16.94	0.14
R20	Residential - 80 Watkin Lane	14.40	14.49	0.09
R21	Residential - 57 Browndedge Road	13.68	13.79	0.11
R22	Residential - 185 Browndedge Road	17.79	17.85	0.06
R23	Residential - 55 Victoria Road (AQMA)	19.25	19.38	0.13
R24	Residential - Golden Way	10.89	11.05	0.16
R25	Residential - Golden Way	13.11	13.28	0.17
R26	Residential - Cloughfield	9.06	9.14	0.08

Potential Impact		Predicted Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R27	Residential - Golden Way	9.77	9.86	0.09
R28	Residential - Chain House Lane	11.42	11.54	0.12
R29	Residential - Chain House Lane	8.92	8.95	0.03
R30	Residential - Chain House Lane	9.22	9.45	0.23
R31	Residential - Coot Lane	8.93	9.07	0.14
R32	Residential - 2 Marshall Brow	14.43	14.60	0.17
R33	Residential - Marshall Brow	11.42	11.50	0.08
R34	School - Cop Lane C of E Primary	10.84	10.96	0.12
R35	Residential - 236 Cop Lane	10.66	10.78	0.12
R36	Residential - 225 Cop Lane	11.76	11.93	0.17
R37	Residential - 12 Pope lane	10.97	11.07	0.10
R38	School - Penwortham Girls High (AQMA)	10.37	10.44	0.07
R39	Residential - 10 Cop Lane (AQMA)	10.42	10.52	0.10
R40	Residential - 36 Cop Lane	10.20	10.32	0.12
R41	Residential - Pope Lane	10.30	10.44	0.14
R42	Residential - 149 Broad Oak Lane	17.75	18.03	0.28
R43	Residential - Wingates	9.27	9.33	0.06
R44	Residential - 24 Victoria Road (AQMA)	15.04	15.12	0.08
R45	Residential - 15 Victoria Road (AQMA)	19.14	19.26	0.12
R46	Residential – 15 Browndge Road (AQMA)	24.71	24.87	0.16
R47	Residential – 7 Watkin Road (AQMA)	23.51	23.76	0.25
R48	Residential – 4 Browndge Road (AQMA)	16.92	17.03	0.11
R49	Residential -5 Browndge Road (AQMA)	26.70	26.90	0.20

As indicated in Table 13.3.3, annual mean NO<sub>2</sub> concentrations were below the relevant AQO (40µg/m<sup>3</sup>) at all receptor locations considered. Predicted impacts on annual mean NO<sub>2</sub> concentrations are summarised in Table 13.3.4.

**Table 13.3.4: Predicted NO<sub>2</sub> Impacts**

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Residential - 7 Pinewood Road	0.25	75% or Less of AQO	Negligible
R2	Residential - 1 Loxwood Close	0.23	75% or Less of AQO	Negligible
R3	Residential - Carwood Road	0.27	75% or Less of AQO	Negligible
R4	Residential - 3 Dovetree Close	0.13	75% or Less of AQO	Negligible
R5	Residential - 239A Leyland Rd	0.30	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R6	Residential - Leyland Road	0.27	75% or Less of AQO	Negligible
R7	Residential - Carrington Court	0.38	75% or Less of AQO	Negligible
R8	Residential - 297 Leyland Road	0.23	75% or Less of AQO	Negligible
R9	Residential - 209 Leyland Road	0.27	75% or Less of AQO	Negligible
R10	Residential - 45 Pembury Avenue	0.30	75% or Less of AQO	Negligible
R11	Residential - 163 Leyland Road	0.13	75% or Less of AQO	Negligible
R12	Residential - 316 Leyland Road	0.05	75% or Less of AQO	Negligible
R13	School - Moor Hey School	0.03	75% or Less of AQO	Negligible
R14	Residential - 388 Leyland Road (AQMA)	0.05	75% or Less of AQO	Negligible
R15	School - St Gerad's RC Primary	0.10	75% or Less of AQO	Negligible
R16	Residential - 471 Leyland Road (AQMA)	0.15	75% or Less of AQO	Negligible
R17	Residential - 501 Leyland Road (AQMA)	0.60	75% or Less of AQO	Negligible
R18	Residential - 19 Watkin Lane (AQMA)	0.55	75% or Less of AQO	Negligible
R19	Residential - 55 Watkin Lane (AQMA)	0.35	75% or Less of AQO	Negligible
R20	Residential - 80 Watkin Lane	0.23	75% or Less of AQO	Negligible
R21	Residential - 57 Browndedge Road	0.27	75% or Less of AQO	Negligible
R22	Residential - 185 Browndedge Road	0.15	75% or Less of AQO	Negligible
R23	Residential - 55 Victoria Road (AQMA)	0.32	75% or Less of AQO	Negligible
R24	Residential - Golden Way	0.40	75% or Less of AQO	Negligible
R25	Residential - Golden Way	0.43	75% or Less of AQO	Negligible
R26	Residential - Cloughfield	0.20	75% or Less of AQO	Negligible
R27	Residential - Golden Way	0.23	75% or Less of AQO	Negligible
R28	Residential - Chain House Lane	0.30	75% or Less of AQO	Negligible
R29	Residential - Chain House Lane	0.07	75% or Less of AQO	Negligible
R30	Residential - Chain House Lane	0.57	75% or Less of AQO	Negligible
R31	Residential - Coote Lane	0.35	75% or Less of AQO	Negligible
R32	Residential - 2 Marshall Brow	0.43	75% or Less of AQO	Negligible
R33	Residential - Marshall Brow	0.20	75% or Less of AQO	Negligible
R34	School - Cop Lane C of E Primary	0.30	75% or Less of AQO	Negligible
R35	Residential - 236 Cop Lane	0.30	75% or Less of AQO	Negligible
R36	Residential - 225 Cop Lane	0.43	75% or Less of AQO	Negligible
R37	Residential - 12 Pope lane	0.25	75% or Less of AQO	Negligible
R38	School - Penwortham Girls High (AQMA)	0.18	75% or Less of AQO	Negligible
R39	Residential - 10 Cop Lane (AQMA)	0.25	75% or Less of AQO	Negligible
R40	Residential - 36 Cop Lane	0.30	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R41	Residential - Pope Lane	0.35	75% or Less of AQO	Negligible
R42	Residential - 149 Broad Oak Lane	0.70	75% or Less of AQO	Negligible
R43	Residential - Wingates	0.15	75% or Less of AQO	Negligible
R44	Residential - 24 Victoria Road (AQMA)	0.20	75% or Less of AQO	Negligible
R45	Residential - 15 Victoria Road (AQMA)	0.30	75% or Less of AQO	Negligible
R46	Residential – 15 Browndge Road (AQMA)	0.40	75% or Less of AQO	Negligible
R47	Residential – 7 Watkin Road (AQMA)	0.63	75% or Less of AQO	Negligible
R48	Residential – 4 Browndge Road (AQMA)	0.27	75% or Less of AQO	Negligible
R49	Residential -5 Browndge Road (AQMA)	0.50	75% or Less of AQO	Negligible

As indicated in Table 13.3.4 impacts on annual mean NO<sub>2</sub> concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at all receptor locations. It is therefore considered that the overall impacts as a result of the proposed development are **not significant**.

#### Particulate Matter (PM<sub>10</sub>)

Annual mean PM<sub>10</sub> concentrations were predicted for 2031 DM and DS scenarios and are summarised Table 13.3.5.

**Table 13.3.5: Predicted Annual Mean PM<sub>10</sub> Concentrations**

Potential Impact		Predicted Annual Mean PM <sub>10</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R1	Residential - 7 Pinewood Road	12.09	12.14	0.05
R2	Residential - 1 Loxwood Close	11.30	11.34	0.04
R3	Residential - Carwood Road	11.64	11.70	0.06
R4	Residential - 3 Dovetree Close	10.78	10.80	0.02
R5	Residential - 239A Leyland Rd	12.99	13.04	0.05
R6	Residential - Leyland Road	12.68	12.73	0.05
R7	Residential - Carrington Court	13.62	13.68	0.06
R8	Residential - 297 Leyland Road	13.03	13.07	0.04
R9	Residential - 209 Leyland Road	12.74	12.78	0.04
R10	Residential - 45 Pembury Avenue	12.85	12.90	0.05
R11	Residential - 163 Leyland Road	12.69	12.71	0.02
R12	Residential - 316 Leyland Road	11.55	11.56	0.01
R13	School - Moor Hey School	11.25	11.26	0.01
R14	Residential - 388 Leyland Road (AQMA)	12.05	12.06	0.01
R15	School - St Gerad's RC Primary	11.59	11.60	0.01

Potential Impact		Predicted Annual Mean PM <sub>10</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R16	Residential - 471 Leyland Road (AQMA)	14.07	14.10	0.03
R17	Residential - 501 Leyland Road (AQMA)	15.03	15.13	0.10
R18	Residential - 19 Watkin Lane (AQMA)	15.81	15.90	0.09
R19	Residential - 55 Watkin Lane (AQMA)	13.35	13.40	0.05
R20	Residential - 80 Watkin Lane	12.68	12.71	0.03
R21	Residential - 57 Browndedge Road	12.35	12.39	0.04
R22	Residential - 185 Browndedge Road	12.82	12.87	0.05
R23	Residential - 55 Victoria Road (AQMA)	15.96	16.02	0.06
R24	Residential - Golden Way	11.84	11.92	0.08
R25	Residential - Golden Way	12.08	12.16	0.08
R26	Residential - Cloughfield	10.88	10.92	0.04
R27	Residential - Golden Way	11.11	11.15	0.04
R28	Residential - Chain House Lane	12.09	12.15	0.06
R29	Residential - Chain House Lane	10.90	10.92	0.02
R30	Residential - Chain House Lane	11.10	11.19	0.09
R31	Residential - Coote Lane	10.48	10.54	0.06
R32	Residential - 2 Marshall Brow	13.34	13.42	0.08
R33	Residential - Marshall Brow	11.77	11.81	0.04
R34	School - Cop Lane C of E Primary	11.64	11.69	0.05
R35	Residential - 236 Cop Lane	11.54	11.59	0.05
R36	Residential - 225 Cop Lane	12.02	12.09	0.07
R37	Residential - 12 Pope lane	11.79	11.84	0.05
R38	School - Penwortham Girls High (AQMA)	11.56	11.59	0.03
R39	Residential - 10 Cop Lane (AQMA)	11.33	11.37	0.04
R40	Residential - 36 Cop Lane	11.59	11.64	0.05
R41	Residential - Pope Lane	11.58	11.64	0.06
R42	Residential - 149 Broad Oak Lane	15.21	15.36	0.15
R43	Residential - Wingates	10.99	11.01	0.02
R44	Residential - 24 Victoria Road (AQMA)	13.91	13.95	0.04
R45	Residential - 15 Victoria Road (AQMA)	15.89	15.95	0.06
R46	Residential - 15 Browndedge Road (AQMA)	14.13	14.22	0.09
R47	Residential - 7 Watkin Road (AQMA)	15.44	15.54	0.10
R48	Residential - 4 Browndedge Road (AQMA)	12.85	12.90	0.05
R49	Residential - 5 Browndedge Road (AQMA)	14.93	15.04	0.11

As indicated in Table 13.3.5 annual mean PM<sub>10</sub> concentrations were below the relevant AQO (40µg/m<sup>3</sup>) at all receptor locations considered. Predicted impacts on annual mean PM<sub>10</sub> concentrations are summarised in Table 13.3.6.

**Table 13.3.6: Predicted PM<sub>10</sub> Impacts**

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Residential - 7 Pinewood Road	0.13	75% or Less of AQO	Negligible
R2	Residential - 1 Loxwood Close	0.10	75% or Less of AQO	Negligible
R3	Residential - Carwood Road	0.15	75% or Less of AQO	Negligible
R4	Residential - 3 Dovetree Close	0.05	75% or Less of AQO	Negligible
R5	Residential - 239A Leyland Rd	0.12	75% or Less of AQO	Negligible
R6	Residential - Leyland Road	0.13	75% or Less of AQO	Negligible
R7	Residential - Carrington Court	0.15	75% or Less of AQO	Negligible
R8	Residential - 297 Leyland Road	0.10	75% or Less of AQO	Negligible
R9	Residential - 209 Leyland Road	0.10	75% or Less of AQO	Negligible
R10	Residential - 45 Pembury Avenue	0.13	75% or Less of AQO	Negligible
R11	Residential - 163 Leyland Road	0.05	75% or Less of AQO	Negligible
R12	Residential - 316 Leyland Road	0.02	75% or Less of AQO	Negligible
R13	School - Moor Hey School	0.02	75% or Less of AQO	Negligible
R14	Residential - 388 Leyland Road (AQMA)	0.02	75% or Less of AQO	Negligible
R15	School - St Gerad's RC Primary	0.02	75% or Less of AQO	Negligible
R16	Residential - 471 Leyland Road (AQMA)	0.07	75% or Less of AQO	Negligible
R17	Residential - 501 Leyland Road (AQMA)	0.25	75% or Less of AQO	Negligible
R18	Residential - 19 Watkin Lane (AQMA)	0.23	75% or Less of AQO	Negligible
R19	Residential - 55 Watkin Lane (AQMA)	0.13	75% or Less of AQO	Negligible
R20	Residential - 80 Watkin Lane	0.08	75% or Less of AQO	Negligible
R21	Residential - 57 Browndge Road	0.10	75% or Less of AQO	Negligible
R22	Residential - 185 Browndge Road	0.12	75% or Less of AQO	Negligible
R23	Residential - 55 Victoria Road (AQMA)	0.15	75% or Less of AQO	Negligible
R24	Residential - Golden Way	0.20	75% or Less of AQO	Negligible
R25	Residential - Golden Way	0.20	75% or Less of AQO	Negligible
R26	Residential - Cloughfield	0.10	75% or Less of AQO	Negligible
R27	Residential - Golden Way	0.10	75% or Less of AQO	Negligible
R28	Residential - Chain House Lane	0.15	75% or Less of AQO	Negligible
R29	Residential - Chain House Lane	0.05	75% or Less of AQO	Negligible
R30	Residential - Chain House Lane	0.23	75% or Less of AQO	Negligible
R31	Residential - Coote Lane	0.15	75% or Less of AQO	Negligible



Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R32	Residential - 2 Marshall Brow	0.20	75% or Less of AQO	Negligible
R33	Residential - Marshall Brow	0.10	75% or Less of AQO	Negligible
R34	School - Cop Lane C of E Primary	0.12	75% or Less of AQO	Negligible
R35	Residential - 236 Cop Lane	0.13	75% or Less of AQO	Negligible
R36	Residential - 225 Cop Lane	0.18	75% or Less of AQO	Negligible
R37	Residential - 12 Pope lane	0.13	75% or Less of AQO	Negligible
R38	School - Penwortham Girls High (AQMA)	0.07	75% or Less of AQO	Negligible
R39	Residential - 10 Cop Lane (AQMA)	0.10	75% or Less of AQO	Negligible
R40	Residential - 36 Cop Lane	0.13	75% or Less of AQO	Negligible
R41	Residential - Pope Lane	0.15	75% or Less of AQO	Negligible
R42	Residential - 149 Broad Oak Lane	0.37	75% or Less of AQO	Negligible
R43	Residential - Wingates	0.05	75% or Less of AQO	Negligible
R44	Residential - 24 Victoria Road (AQMA)	0.10	75% or Less of AQO	Negligible
R45	Residential - 15 Victoria Road (AQMA)	0.15	75% or Less of AQO	Negligible
R46	Residential – 15 Browndedge Road (AQMA)	0.23	75% or Less of AQO	Negligible
R47	Residential – 7 Watkin Road (AQMA)	0.25	75% or Less of AQO	Negligible
R48	Residential – 4 Browndedge Road (AQMA)	0.13	75% or Less of AQO	Negligible
R49	Residential -5 Browndedge Road (AQMA)	0.27	75% or Less of AQO	Negligible

As indicated in Table 13.3.6 impacts on annual mean PM<sub>10</sub> concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. It is therefore considered that the overall impacts as a result of the Proposed Development are **not significant**.

#### Particulate Matter (PM<sub>2.5</sub>)

Annual mean PM<sub>2.5</sub> concentrations were predicted for 2031 DM and DS scenarios and are summarised Table 13.3.7.

**Table 13.3.7: Predicted Annual Mean PM<sub>2.5</sub> Concentrations**

Potential Impact		Predicted Annual Mean PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R1	Residential - 7 Pinewood Road	7.81	7.84	0.03
R2	Residential - 1 Loxwood Close	7.27	7.30	0.03
R3	Residential - Carwood Road	7.46	7.50	0.04
R4	Residential - 3 Dovetree Close	6.98	7.00	0.02
R5	Residential - 239A Leyland Rd	8.35	8.38	0.03
R6	Residential - Leyland Road	8.18	8.20	0.02

Potential Impact		Predicted Annual Mean PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R7	Residential - Carrington Court	8.71	8.74	0.03
R8	Residential - 297 Leyland Road	8.37	8.39	0.02
R9	Residential - 209 Leyland Road	8.31	8.34	0.03
R10	Residential - 45 Pembury Avenue	8.38	8.41	0.03
R11	Residential - 163 Leyland Road	8.27	8.28	0.01
R12	Residential - 316 Leyland Road	7.53	7.53	0.00
R13	School - Moor Hey School	7.35	7.35	0.00
R14	Residential - 388 Leyland Road (AQMA)	7.80	7.81	0.01
R15	School - St Gerard's RC Primary	7.80	7.81	0.01
R16	Residential - 471 Leyland Road (AQMA)	9.21	9.22	0.01
R17	Residential - 501 Leyland Road (AQMA)	9.75	9.81	0.06
R18	Residential - 19 Watkin Lane (AQMA)	10.19	10.24	0.05
R19	Residential - 55 Watkin Lane (AQMA)	8.80	8.83	0.03
R20	Residential - 80 Watkin Lane	8.41	8.43	0.02
R21	Residential - 57 Browndedge Road	8.23	8.25	0.02
R22	Residential - 185 Browndedge Road	8.35	8.37	0.02
R23	Residential - 55 Victoria Road (AQMA)	9.85	9.89	0.04
R24	Residential - Golden Way	7.26	7.30	0.04
R25	Residential - Golden Way	7.70	7.74	0.04
R26	Residential - Cloughfield	7.03	7.05	0.02
R27	Residential - Golden Way	7.16	7.19	0.03
R28	Residential - Chain House Lane	7.45	7.49	0.04
R29	Residential - Chain House Lane	6.79	6.80	0.01
R30	Residential - Chain House Lane	6.90	6.96	0.06
R31	Residential - Coote Lane	6.77	6.81	0.04
R32	Residential - 2 Marshall Brow	8.62	8.67	0.05
R33	Residential - Marshall Brow	7.75	7.77	0.02
R34	School - Cop Lane C of E Primary	7.50	7.53	0.03
R35	Residential - 236 Cop Lane	7.44	7.48	0.04
R36	Residential - 225 Cop Lane	7.71	7.76	0.05
R37	Residential - 12 Pope lane	7.58	7.61	0.03
R38	School - Penwortham Girls High (AQMA)	7.45	7.47	0.02
R39	Residential - 10 Cop Lane (AQMA)	7.36	7.38	0.02
R40	Residential - 36 Cop Lane	7.40	7.42	0.02

Potential Impact		Predicted Annual Mean PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> ) (2030 Emissions)		
		DM	DS	Change
R41	Residential - Pope Lane	7.41	7.45	0.04
R42	Residential - 149 Broad Oak Lane	9.13	9.21	0.08
R43	Residential - Wingates	7.14	7.15	0.01
R44	Residential - 24 Victoria Road (AQMA)	8.71	8.73	0.02
R45	Residential - 15 Victoria Road (AQMA)	9.81	9.85	0.04
R46	Residential - 15 Browndedge Road (AQMA)	9.25	9.31	0.06
R47	Residential - 7 Watkin Road (AQMA)	9.98	10.04	0.06
R48	Residential - 4 Browndedge Road (AQMA)	8.52	8.55	0.03
R49	Residential - 5 Browndedge Road (AQMA)	9.70	9.77	0.07

As indicated in Table 13.3.7 annual mean PM<sub>2.5</sub> concentrations were below the relevant AQO (25µg/m<sup>3</sup>) at all receptor locations considered. Predicted impacts on annual mean PM<sub>2.5</sub> concentrations are summarised in Table 13.3.8:

**Table 13.3.8: Predicted PM<sub>2.5</sub> Impacts**

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Residential - 7 Pinewood Road	0.12	75% or Less of AQO	Negligible
R2	Residential - 1 Loxwood Close	0.12	75% or Less of AQO	Negligible
R3	Residential - Carwood Road	0.16	75% or Less of AQO	Negligible
R4	Residential - 3 Dovetree Close	0.08	75% or Less of AQO	Negligible
R5	Residential - 239A Leyland Rd	0.12	75% or Less of AQO	Negligible
R6	Residential - Leyland Road	0.08	75% or Less of AQO	Negligible
R7	Residential - Carrington Court	0.12	75% or Less of AQO	Negligible
R8	Residential - 297 Leyland Road	0.08	75% or Less of AQO	Negligible
R9	Residential - 209 Leyland Road	0.12	75% or Less of AQO	Negligible
R10	Residential - 45 Pembury Avenue	0.12	75% or Less of AQO	Negligible
R11	Residential - 163 Leyland Road	0.04	75% or Less of AQO	Negligible
R12	Residential - 316 Leyland Road	<0.01	75% or Less of AQO	Negligible
R13	School - Moor Hey School	<0.01	75% or Less of AQO	Negligible
R14	Residential - 388 Leyland Road (AQMA)	0.04	75% or Less of AQO	Negligible
R15	School - St Gerad's RC Primary	0.04	75% or Less of AQO	Negligible
R16	Residential - 471 Leyland Road (AQMA)	0.04	75% or Less of AQO	Negligible
R17	Residential - 501 Leyland Road (AQMA)	0.24	75% or Less of AQO	Negligible
R18	Residential - 19 Watkin Lane (AQMA)	0.20	75% or Less of AQO	Negligible
R19	Residential - 55 Watkin Lane (AQMA)	0.12	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R20	Residential - 80 Watkin Lane	0.08	75% or Less of AQO	Negligible
R21	Residential - 57 Browndge Road	0.08	75% or Less of AQO	Negligible
R22	Residential - 185 Browndge Road	0.08	75% or Less of AQO	Negligible
R23	Residential - 55 Victoria Road (AQMA)	0.16	75% or Less of AQO	Negligible
R24	Residential - Golden Way	0.16	75% or Less of AQO	Negligible
R25	Residential - Golden Way	0.16	75% or Less of AQO	Negligible
R26	Residential - Cloughfield	0.08	75% or Less of AQO	Negligible
R27	Residential - Golden Way	0.12	75% or Less of AQO	Negligible
R28	Residential - Chain House Lane	0.16	75% or Less of AQO	Negligible
R29	Residential - Chain House Lane	0.04	75% or Less of AQO	Negligible
R30	Residential - Chain House Lane	0.24	75% or Less of AQO	Negligible
R31	Residential - Coote Lane	0.16	75% or Less of AQO	Negligible
R32	Residential - 2 Marshall Brow	0.20	75% or Less of AQO	Negligible
R33	Residential - Marshall Brow	0.08	75% or Less of AQO	Negligible
R34	School - Cop Lane C of E Primary	0.12	75% or Less of AQO	Negligible
R35	Residential - 236 Cop Lane	0.16	75% or Less of AQO	Negligible
R36	Residential - 225 Cop Lane	0.20	75% or Less of AQO	Negligible
R37	Residential - 12 Pope lane	0.12	75% or Less of AQO	Negligible
R38	School - Penwortham Girls High (AQMA)	0.08	75% or Less of AQO	Negligible
R39	Residential - 10 Cop Lane (AQMA)	0.08	75% or Less of AQO	Negligible
R40	Residential - 36 Cop Lane	0.08	75% or Less of AQO	Negligible
R41	Residential - Pope Lane	0.16	75% or Less of AQO	Negligible
R42	Residential - 149 Broad Oak Lane	0.32	75% or Less of AQO	Negligible
R43	Residential - Wingates	0.04	75% or Less of AQO	Negligible
R44	Residential - 24 Victoria Road (AQMA)	0.08	75% or Less of AQO	Negligible
R45	Residential - 15 Victoria Road (AQMA)	0.16	75% or Less of AQO	Negligible
R46	Residential – 15 Browndge Road (AQMA)	0.24	75% or Less of AQO	Negligible
R47	Residential – 7 Watkin Road (AQMA)	0.24	75% or Less of AQO	Negligible
R48	Residential – 4 Browndge Road (AQMA)	0.12	75% or Less of AQO	Negligible
R49	Residential -5 Browndge Road (AQMA)	0.28	75% or Less of AQO	Negligible

As indicated in Table 13.3.8: impacts on annual mean PM<sub>2.5</sub> concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. It is therefore considered that the overall impacts as a result of the Proposed Development are **not significant**.

## PENWORTHAM WAY DUALLING SCENARIO

### 2025 Emission Factors

#### Predicted Concentrations across the Proposed Development

Annual mean NO<sub>2</sub> and PM concentrations were predicted across the Proposed Development for the 2031 DS scenario with the use of 2031 traffic data and 2025 emission factors at a height of 1.5m to represent exposure across the ground floor level.

Background NO<sub>2</sub> and PM levels are likely to be lower at elevated heights due to increased distance from emission sources, such as roads. Therefore, predicted concentrations at heights above ground floor level are considered acceptable in regards to future exposure and have not been assessed further.

#### Annual Mean Nitrogen Dioxide (NO<sub>2</sub>)

Predicted annual mean NO<sub>2</sub> concentrations across the Proposed Development site during the DS scenario are summarised in Table 13.3.9.

**Table 13.3.9: Modelling Results - Annual Mean NO<sub>2</sub> at Proposed Sensitive Use**

Floor Level	Predicted 2031 Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emission Factors)
Ground (1.5m)	9.05 - 29.81

The predicted concentrations shown in Table 13.3.9 indicate that there were no exceedances of the AQO at sensitive locations across ground floor areas of the proposed development.

Predictions of 1-hour NO<sub>2</sub> concentrations were not produced as part of the dispersion modelling assessment. LAQM.(TG16) states if annual mean NO<sub>2</sub> concentrations are below 60µg/m<sup>3</sup> then it is unlikely that the 1-hour AQO will be exceeded. As such, based on the results in Table 13.3.9, it is not predicted that on-site concentrations will exceed the 1-hour mean AQO for NO<sub>2</sub>.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated NO<sub>2</sub> concentrations.

#### Annual Mean Particulate Matter (PM<sub>10</sub> & PM<sub>2.5</sub>)

Predicted annual mean PM concentrations across the Proposed Development site during the DS scenario are summarised in Table 13.3.10.

**Table 13.3.10: Modelling Results - Annual Mean PM at Proposed Sensitive Use**

Floor Level	Predicted 2031 Annual Mean Concentration (µg/m <sup>3</sup> ) (2025 Emission Factors)	
	PM <sub>10</sub>	PM <sub>2.5</sub>
Ground (1.5m)	10.48 - 16.97	6.77 - 10.40

The predicted concentrations shown in Table 13.3.10 indicate that there were no exceedances of the annual mean AQOs for PM<sub>10</sub> or PM<sub>2.5</sub> throughout the modelling area.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for proposed end use without the implementation of mitigation techniques to protect future site users from elevated PM concentrations.

### Predicted Concentrations at Sensitive Receptors

#### Nitrogen Dioxide (NO<sub>2</sub>)

Annual mean NO<sub>2</sub> concentrations were predicted for 2031 DM and DS scenarios and are summarised in Table 13.3.11. Reference should be made to Figure 13.6 for a graphical representation of these locations.

**Table 13.3.11: Predicted Annual Mean NO<sub>2</sub> Concentrations**

Potential Impact		Predicted Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R1	Residential - 7 Pinewood Road	17.00	17.13	0.13
R2	Residential - 1 Loxwood Close	13.06	13.20	0.14
R3	Residential - Carwood Road	14.31	14.50	0.19
R4	Residential - 3 Dovetree Close	11.21	11.29	0.08
R5	Residential - 239A Leyland Rd	22.00	21.74	-0.26
R6	Residential - Leyland Road	20.58	20.34	-0.24
R7	Residential - Carrington Court	24.87	24.55	-0.32
R8	Residential - 297 Leyland Road	21.32	21.14	-0.18
R9	Residential - 209 Leyland Road	20.85	20.61	-0.24
R10	Residential - 45 Pembury Avenue	21.39	21.13	-0.26
R11	Residential - 163 Leyland Road	18.56	18.44	-0.12
R12	Residential - 316 Leyland Road	13.88	13.70	-0.18
R13	School - Moor Hey School	14.18	14.13	-0.05
R14	Residential - 388 Leyland Road (AQMA)	18.25	17.99	-0.26
R15	School - St Gerard's RC Primary	13.89	13.84	-0.05
R16	Residential - 471 Leyland Road (AQMA)	25.80	25.13	-0.67
R17	Residential - 501 Leyland Road (AQMA)	30.13	29.38	-0.75
R18	Residential - 19 Watkin Lane (AQMA)	33.09	32.34	-0.75
R19	Residential - 55 Watkin Lane (AQMA)	22.31	21.86	-0.45
R20	Residential - 80 Watkin Lane	18.53	18.34	-0.19
R21	Residential - 57 Browndedge Road	17.32	17.44	0.12
R22	Residential - 185 Browndedge Road	22.09	22.16	0.07
R23	Residential - 55 Victoria Road (AQMA)	27.32	27.63	0.31
R24	Residential - Golden Way	14.51	13.70	-0.81
R25	Residential - Golden Way	17.18	15.04	-2.14
R26	Residential - Cloughfield	11.26	10.70	-0.56

Potential Impact		Predicted Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R27	Residential - Golden Way	12.41	11.67	-0.74
R28	Residential - Chain House Lane	15.33	15.69	0.36
R29	Residential - Chain House Lane	11.22	11.25	0.03
R30	Residential - Chain House Lane	11.75	11.83	0.08
R31	Residential - Coot Lane	10.71	10.73	0.02
R32	Residential - 2 Marshall Brow	19.59	19.54	-0.05
R33	Residential - Marshall Brow	14.68	14.65	-0.03
R34	School - Cop Lane C of E Primary	14.12	14.26	0.14
R35	Residential - 236 Cop Lane	13.82	13.95	0.13
R36	Residential - 225 Cop Lane	15.65	15.84	0.19
R37	Residential - 12 Pope lane	14.30	14.26	-0.04
R38	School - Penwortham Girls High (AQMA)	13.03	13.11	0.08
R39	Residential - 10 Cop Lane (AQMA)	13.26	13.34	0.08
R40	Residential - 36 Cop Lane	13.11	13.27	0.16
R41	Residential - Pope Lane	13.32	13.61	0.29
R42	Residential - 149 Broad Oak Lane	25.63	25.97	0.34
R43	Residential - Wingates	11.52	11.57	0.05
R44	Residential - 24 Victoria Road (AQMA)	20.55	20.74	0.19
R45	Residential - 15 Victoria Road (AQMA)	27.10	27.40	0.30
R46	Residential – 15 Browndge Road (AQMA)	31.75	31.70	-0.05
R47	Residential – 7 Watkin Road (AQMA)	32.37	31.61	-0.76
R48	Residential – 4 Browndge Road (AQMA)	21.66	21.51	-0.15
R49	Residential -5 Browndge Road (AQMA)	34.95	34.69	-0.26

As indicated in Table 13.3.11, annual mean NO<sub>2</sub> concentrations were below the relevant AQO at all receptor locations considered. Predicted impacts on annual mean NO<sub>2</sub> concentrations are summarised in Table 13.3.12.

**Table 13.3.12: Predicted NO<sub>2</sub> Impacts**

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Residential - 7 Pinewood Road	0.32	75% or Less of AQO	Negligible
R2	Residential - 1 Loxwood Close	0.35	75% or Less of AQO	Negligible
R3	Residential - Carwood Road	0.47	75% or Less of AQO	Negligible
R4	Residential - 3 Dovetree Close	0.20	75% or Less of AQO	Negligible
R5	Residential - 239A Leyland Rd	-0.65	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R6	Residential - Leyland Road	-0.60	75% or Less of AQO	Negligible
R7	Residential - Carrington Court	-0.80	75% or Less of AQO	Negligible
R8	Residential - 297 Leyland Road	-0.45	75% or Less of AQO	Negligible
R9	Residential - 209 Leyland Road	-0.60	75% or Less of AQO	Negligible
R10	Residential - 45 Pembury Avenue	-0.65	75% or Less of AQO	Negligible
R11	Residential - 163 Leyland Road	-0.30	75% or Less of AQO	Negligible
R12	Residential - 316 Leyland Road	-0.45	75% or Less of AQO	Negligible
R13	School - Moor Hey School	-0.12	75% or Less of AQO	Negligible
R14	Residential - 388 Leyland Road (AQMA)	-0.65	75% or Less of AQO	Negligible
R15	School - St Gerard's RC Primary	-0.13	75% or Less of AQO	Negligible
R16	Residential - 471 Leyland Road (AQMA)	-1.68	75% or Less of AQO	Negligible
R17	Residential - 501 Leyland Road (AQMA)	-1.88	75% or Less of AQO	Negligible
R18	Residential - 19 Watkin Lane (AQMA)	-1.88	76-94% of AQO	<b>Minor Beneficial</b>
R19	Residential - 55 Watkin Lane (AQMA)	-1.13	75% or Less of AQO	Negligible
R20	Residential - 80 Watkin Lane	-0.48	75% or Less of AQO	Negligible
R21	Residential - 57 Brownedge Road	0.30	75% or Less of AQO	Negligible
R22	Residential - 185 Brownedge Road	0.18	75% or Less of AQO	Negligible
R23	Residential - 55 Victoria Road (AQMA)	0.77	75% or Less of AQO	Negligible
R24	Residential - Golden Way	-2.03	75% or Less of AQO	Negligible
R25	Residential - Golden Way	-5.35	75% or Less of AQO	Negligible
R26	Residential - Cloughfield	-1.40	75% or Less of AQO	Negligible
R27	Residential - Golden Way	-1.85	75% or Less of AQO	Negligible
R28	Residential - Chain House Lane	0.90	75% or Less of AQO	Negligible
R29	Residential - Chain House Lane	0.07	75% or Less of AQO	Negligible
R30	Residential - Chain House Lane	0.20	75% or Less of AQO	Negligible
R31	Residential - Coote Lane	0.05	75% or Less of AQO	Negligible
R32	Residential - 2 Marshall Brow	-0.13	75% or Less of AQO	Negligible
R33	Residential - Marshall Brow	-0.07	75% or Less of AQO	Negligible
R34	School - Cop Lane C of E Primary	0.35	75% or Less of AQO	Negligible
R35	Residential - 236 Cop Lane	0.32	75% or Less of AQO	Negligible
R36	Residential - 225 Cop Lane	0.47	75% or Less of AQO	Negligible
R37	Residential - 12 Pope lane	-0.10	75% or Less of AQO	Negligible
R38	School - Penwortham Girls High (AQMA)	0.20	75% or Less of AQO	Negligible
R39	Residential - 10 Cop Lane (AQMA)	0.20	75% or Less of AQO	Negligible



Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R40	Residential - 36 Cop Lane	0.40	75% or Less of AQO	Negligible
R41	Residential - Pope Lane	0.72	75% or Less of AQO	Negligible
R42	Residential - 149 Broad Oak Lane	0.85	75% or Less of AQO	Negligible
R43	Residential - Wingates	0.13	75% or Less of AQO	Negligible
R44	Residential - 24 Victoria Road (AQMA)	0.47	75% or Less of AQO	Negligible
R45	Residential - 15 Victoria Road (AQMA)	0.75	75% or Less of AQO	Negligible
R46	Residential – 15 Browndedge Road (AQMA)	-0.13	76-94% of AQO	Negligible
R47	Residential – 7 Watkin Road (AQMA)	-1.90	76-94% of AQO	<b>Minor Beneficial</b>
R48	Residential – 4 Browndedge Road (AQMA)	-0.37	75% or Less of AQO	Negligible
R49	Residential -5 Browndedge Road (AQMA)	-0.65	76-94% of AQO	Negligible

As indicated in Table 13.3.12 impacts on annual mean NO<sub>2</sub> concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be negligible at 47 receptor locations.

Two **minor beneficial** impacts were predicted as a result of decreases along Watkin Road following the redistribution of traffic associated with the dualling of Penwortham Way Development.

It is therefore considered that the overall impacts as a result of the proposed development are not significant.

#### Particulate Matter (PM<sub>10</sub>)

Annual mean PM<sub>10</sub> concentrations were predicted for 2031 DM and DS scenarios and are summarised Table 13.3.13.

**Table 13.3.13: Predicted Annual Mean PM<sub>10</sub> Concentrations**

Potential Impact		Predicted Annual Mean PM <sub>10</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R1	Residential - 7 Pinewood Road	12.17	12.24	0.07
R2	Residential - 1 Loxwood Close	11.37	11.43	0.06
R3	Residential - Carwood Road	11.72	11.80	0.08
R4	Residential - 3 Dovetree Close	10.85	10.88	0.03
R5	Residential - 239A Leyland Rd	13.11	13.07	-0.04
R6	Residential - Leyland Road	12.79	12.76	-0.03
R7	Residential - Carrington Court	13.74	13.70	-0.04
R8	Residential - 297 Leyland Road	13.14	13.12	-0.02
R9	Residential - 209 Leyland Road	12.84	12.81	-0.03
R10	Residential - 45 Pembury Avenue	12.96	12.93	-0.03
R11	Residential - 163 Leyland Road	12.78	12.77	-0.01

Potential Impact		Predicted Annual Mean PM <sub>10</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R12	Residential - 316 Leyland Road	11.63	11.59	-0.04
R13	School - Moor Hey School	11.32	11.32	0.00
R14	Residential - 388 Leyland Road (AQMA)	12.14	12.10	-0.04
R15	School - St Gerad's RC Primary	11.66	11.66	0.00
R16	Residential - 471 Leyland Road (AQMA)	14.19	14.05	-0.14
R17	Residential - 501 Leyland Road (AQMA)	15.16	14.98	-0.18
R18	Residential - 19 Watkin Lane (AQMA)	15.96	15.76	-0.20
R19	Residential - 55 Watkin Lane (AQMA)	13.45	13.35	-0.10
R20	Residential - 80 Watkin Lane	12.77	12.73	-0.04
R21	Residential - 57 Browndedge Road	12.43	12.45	0.02
R22	Residential - 185 Browndedge Road	12.90	12.92	0.02
R23	Residential - 55 Victoria Road (AQMA)	16.07	16.16	0.09
R24	Residential - Golden Way	11.93	12.03	0.10
R25	Residential - Golden Way	12.17	12.27	0.10
R26	Residential - Cloughfield	10.96	11.03	0.07
R27	Residential - Golden Way	11.19	11.32	0.13
R28	Residential - Chain House Lane	12.18	12.28	0.10
R29	Residential - Chain House Lane	10.98	10.99	0.01
R30	Residential - Chain House Lane	11.18	11.22	0.04
R31	Residential - Coot Lane	10.55	10.57	0.02
R32	Residential - 2 Marshall Brow	13.43	13.43	0.00
R33	Residential - Marshall Brow	11.86	11.86	0.00
R34	School - Cop Lane C of E Primary	11.72	11.78	0.06
R35	Residential - 236 Cop Lane	11.62	11.68	0.06
R36	Residential - 225 Cop Lane	12.10	12.17	0.07
R37	Residential - 12 Pope lane	11.87	11.88	0.01
R38	School - Penwortham Girls High (AQMA)	11.63	11.66	0.03
R39	Residential - 10 Cop Lane (AQMA)	11.41	11.43	0.02
R40	Residential - 36 Cop Lane	11.67	11.71	0.04
R41	Residential - Pope Lane	11.66	11.82	0.16
R42	Residential - 149 Broad Oak Lane	15.34	15.54	0.20
R43	Residential - Wingates	11.06	11.09	0.03
R44	Residential - 24 Victoria Road (AQMA)	14.01	14.07	0.06
R45	Residential - 15 Victoria Road (AQMA)	15.99	16.09	0.10

Potential Impact		Predicted Annual Mean PM <sub>10</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R46	Residential – 15 Browndedge Road (AQMA)	14.24	14.25	0.01
R47	Residential – 7 Watkin Road (AQMA)	15.57	15.38	-0.19
R48	Residential – 4 Browndedge Road (AQMA)	12.95	12.93	-0.02
R49	Residential -5 Browndedge Road (AQMA)	15.06	15.01	-0.05

As indicated in Table 13.3.13 annual mean PM<sub>10</sub> concentrations were below the relevant AQO at all receptor locations considered.

Predicted impacts on annual mean PM<sub>10</sub> concentrations are summarised in Table 13.3.14.

**Table 13.3.14: Predicted PM<sub>10</sub> Impacts**

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Residential - 7 Pinewood Road	0.18	75% or Less of AQO	Negligible
R2	Residential - 1 Loxwood Close	0.15	75% or Less of AQO	Negligible
R3	Residential - Carwood Road	0.20	75% or Less of AQO	Negligible
R4	Residential - 3 Dovetree Close	0.08	75% or Less of AQO	Negligible
R5	Residential - 239A Leyland Rd	-0.10	75% or Less of AQO	Negligible
R6	Residential - Leyland Road	-0.07	75% or Less of AQO	Negligible
R7	Residential - Carrington Court	-0.10	75% or Less of AQO	Negligible
R8	Residential - 297 Leyland Road	-0.05	75% or Less of AQO	Negligible
R9	Residential - 209 Leyland Road	-0.07	75% or Less of AQO	Negligible
R10	Residential - 45 Pembury Avenue	-0.08	75% or Less of AQO	Negligible
R11	Residential - 163 Leyland Road	-0.02	75% or Less of AQO	Negligible
R12	Residential - 316 Leyland Road	-0.10	75% or Less of AQO	Negligible
R13	School - Moor Hey School	<0.01	75% or Less of AQO	Negligible
R14	Residential - 388 Leyland Road (AQMA)	-0.10	75% or Less of AQO	Negligible
R15	School - St Gerad's RC Primary	<0.01	75% or Less of AQO	Negligible
R16	Residential - 471 Leyland Road (AQMA)	-0.35	75% or Less of AQO	Negligible
R17	Residential - 501 Leyland Road (AQMA)	-0.45	75% or Less of AQO	Negligible
R18	Residential - 19 Watkin Lane (AQMA)	-0.50	75% or Less of AQO	Negligible
R19	Residential - 55 Watkin Lane (AQMA)	-0.25	75% or Less of AQO	Negligible
R20	Residential - 80 Watkin Lane	-0.10	75% or Less of AQO	Negligible
R21	Residential - 57 Browndedge Road	0.05	75% or Less of AQO	Negligible
R22	Residential - 185 Browndedge Road	0.05	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R23	Residential - 55 Victoria Road (AQMA)	0.23	75% or Less of AQO	Negligible
R24	Residential - Golden Way	0.25	75% or Less of AQO	Negligible
R25	Residential - Golden Way	0.25	75% or Less of AQO	Negligible
R26	Residential - Cloughfield	0.17	75% or Less of AQO	Negligible
R27	Residential - Golden Way	0.33	75% or Less of AQO	Negligible
R28	Residential - Chain House Lane	0.25	75% or Less of AQO	Negligible
R29	Residential - Chain House Lane	0.02	75% or Less of AQO	Negligible
R30	Residential - Chain House Lane	0.10	75% or Less of AQO	Negligible
R31	Residential - Coote Lane	0.05	75% or Less of AQO	Negligible
R32	Residential - 2 Marshall Brow	<0.01	75% or Less of AQO	Negligible
R33	Residential - Marshall Brow	<0.01	75% or Less of AQO	Negligible
R34	School - Cop Lane C of E Primary	0.15	75% or Less of AQO	Negligible
R35	Residential - 236 Cop Lane	0.15	75% or Less of AQO	Negligible
R36	Residential - 225 Cop Lane	0.18	75% or Less of AQO	Negligible
R37	Residential - 12 Pope lane	0.03	75% or Less of AQO	Negligible
R38	School - Penwortham Girls High (AQMA)	0.07	75% or Less of AQO	Negligible
R39	Residential - 10 Cop Lane (AQMA)	0.05	75% or Less of AQO	Negligible
R40	Residential - 36 Cop Lane	0.10	75% or Less of AQO	Negligible
R41	Residential - Pope Lane	0.40	75% or Less of AQO	Negligible
R42	Residential - 149 Broad Oak Lane	0.50	75% or Less of AQO	Negligible
R43	Residential - Wingates	0.07	75% or Less of AQO	Negligible
R44	Residential - 24 Victoria Road (AQMA)	0.15	75% or Less of AQO	Negligible
R45	Residential - 15 Victoria Road (AQMA)	0.25	75% or Less of AQO	Negligible
R46	Residential – 15 Browndedge Road (AQMA)	0.02	75% or Less of AQO	Negligible
R47	Residential – 7 Watkin Road (AQMA)	-0.47	75% or Less of AQO	Negligible
R48	Residential – 4 Browndedge Road (AQMA)	-0.05	75% or Less of AQO	Negligible
R49	Residential -5 Browndedge Road (AQMA)	-0.13	75% or Less of AQO	Negligible

As indicated in Table 13.3.14 impacts on annual mean PM<sub>10</sub> concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. It is therefore considered that the overall impacts as a result of the Proposed Development are not significant.

#### Particulate Matter (PM<sub>2.5</sub>)

Annual mean PM<sub>2.5</sub> concentrations were predicted for 2031 DM and DS scenarios and are summarised Table 13.3.15.

**Table 13.3.15: Predicted Annual Mean PM<sub>2.5</sub> Concentrations**

Potential Impact		Predicted Annual Mean PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R1	Residential - 7 Pinewood Road	7.88	7.91	0.03
R2	Residential - 1 Loxwood Close	7.33	7.37	0.04
R3	Residential - Carwood Road	7.53	7.57	0.04
R4	Residential - 3 Dovetree Close	7.04	7.06	0.02
R5	Residential - 239A Leyland Rd	8.45	8.43	-0.02
R6	Residential - Leyland Road	8.27	8.26	-0.01
R7	Residential - Carrington Court	8.82	8.79	-0.03
R8	Residential - 297 Leyland Road	8.46	8.45	-0.01
R9	Residential - 209 Leyland Road	8.41	8.39	-0.02
R10	Residential - 45 Pembury Avenue	8.47	8.45	-0.02
R11	Residential - 163 Leyland Road	8.35	8.34	-0.01
R12	Residential - 316 Leyland Road	7.59	7.57	-0.02
R13	School - Moor Hey School	7.40	7.40	0.00
R14	Residential - 388 Leyland Road (AQMA)	7.88	7.85	-0.03
R15	School - St Gerard's RC Primary	7.86	7.86	0.00
R16	Residential - 471 Leyland Road (AQMA)	9.31	9.23	-0.08
R17	Residential - 501 Leyland Road (AQMA)	9.87	9.77	-0.10
R18	Residential - 19 Watkin Lane (AQMA)	10.33	10.22	-0.11
R19	Residential - 55 Watkin Lane (AQMA)	8.89	8.83	-0.06
R20	Residential - 80 Watkin Lane	8.49	8.47	-0.02
R21	Residential - 57 Browndedge Road	8.30	8.31	0.01
R22	Residential - 185 Browndedge Road	8.41	8.43	0.02
R23	Residential - 55 Victoria Road (AQMA)	9.96	10.01	0.05
R24	Residential - Golden Way	7.33	7.38	0.05
R25	Residential - Golden Way	7.78	7.82	0.04
R26	Residential - Cloughfield	7.09	7.13	0.04
R27	Residential - Golden Way	7.23	7.29	0.06
R28	Residential - Chain House Lane	7.53	7.59	0.06
R29	Residential - Chain House Lane	6.86	6.87	0.01
R30	Residential - Chain House Lane	6.97	6.99	0.02
R31	Residential - Coote Lane	6.83	6.84	0.01
R32	Residential - 2 Marshall Brow	8.70	8.70	0.00
R33	Residential - Marshall Brow	7.82	7.82	0.00

Potential Impact		Predicted Annual Mean PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> ) (2025 Emissions)		
		DM	DS	Change
R34	School - Cop Lane C of E Primary	7.57	7.60	0.03
R35	Residential - 236 Cop Lane	7.51	7.55	0.04
R36	Residential - 225 Cop Lane	7.79	7.83	0.04
R37	Residential - 12 Pope lane	7.65	7.65	0.00
R38	School - Penwortham Girls High (AQMA)	7.51	7.53	0.02
R39	Residential - 10 Cop Lane (AQMA)	7.42	7.44	0.02
R40	Residential - 36 Cop Lane	7.46	7.49	0.03
R41	Residential - Pope Lane	7.48	7.57	0.09
R42	Residential - 149 Broad Oak Lane	9.25	9.36	0.11
R43	Residential - Wingates	7.20	7.21	0.01
R44	Residential - 24 Victoria Road (AQMA)	8.80	8.83	0.03
R45	Residential - 15 Victoria Road (AQMA)	9.92	9.97	0.05
R46	Residential – 15 Browndge Road (AQMA)	9.36	9.36	0.00
R47	Residential – 7 Watkin Road (AQMA)	10.11	10.00	-0.11
R48	Residential – 4 Browndge Road (AQMA)	8.60	8.59	-0.01
R49	Residential -5 Browndge Road (AQMA)	9.83	9.79	-0.04

As indicated in Table 13.3.15 annual mean PM<sub>2.5</sub> concentrations were below the relevant AQO at all receptor locations considered.

Predicted impacts on annual mean PM<sub>2.5</sub> concentrations are summarised in Table 13.3.16.

**Table 13.3.16: Predicted PM<sub>2.5</sub> Impacts**

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R1	Residential - 7 Pinewood Road	0.12	75% or Less of AQO	Negligible
R2	Residential - 1 Loxwood Close	0.16	75% or Less of AQO	Negligible
R3	Residential - Carwood Road	0.16	75% or Less of AQO	Negligible
R4	Residential - 3 Dovetree Close	0.08	75% or Less of AQO	Negligible
R5	Residential - 239A Leyland Rd	-0.08	75% or Less of AQO	Negligible
R6	Residential - Leyland Road	-0.04	75% or Less of AQO	Negligible
R7	Residential - Carrington Court	-0.12	75% or Less of AQO	Negligible
R8	Residential - 297 Leyland Road	-0.04	75% or Less of AQO	Negligible
R9	Residential - 209 Leyland Road	-0.08	75% or Less of AQO	Negligible
R10	Residential - 45 Pembury Avenue	-0.08	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R11	Residential - 163 Leyland Road	-0.04	75% or Less of AQO	Negligible
R12	Residential - 316 Leyland Road	-0.08	75% or Less of AQO	Negligible
R13	School - Moor Hey School	<0.01	75% or Less of AQO	Negligible
R14	Residential - 388 Leyland Road (AQMA)	-0.12	75% or Less of AQO	Negligible
R15	School - St Gerard's RC Primary	<0.01	75% or Less of AQO	Negligible
R16	Residential - 471 Leyland Road (AQMA)	-0.32	75% or Less of AQO	Negligible
R17	Residential - 501 Leyland Road (AQMA)	-0.40	75% or Less of AQO	Negligible
R18	Residential - 19 Watkin Lane (AQMA)	-0.44	75% or Less of AQO	Negligible
R19	Residential - 55 Watkin Lane (AQMA)	-0.24	75% or Less of AQO	Negligible
R20	Residential - 80 Watkin Lane	-0.08	75% or Less of AQO	Negligible
R21	Residential - 57 Browndedge Road	0.04	75% or Less of AQO	Negligible
R22	Residential - 185 Browndedge Road	0.08	75% or Less of AQO	Negligible
R23	Residential - 55 Victoria Road (AQMA)	0.20	75% or Less of AQO	Negligible
R24	Residential - Golden Way	0.20	75% or Less of AQO	Negligible
R25	Residential - Golden Way	0.16	75% or Less of AQO	Negligible
R26	Residential - Cloughfield	0.16	75% or Less of AQO	Negligible
R27	Residential - Golden Way	0.24	75% or Less of AQO	Negligible
R28	Residential - Chain House Lane	0.24	75% or Less of AQO	Negligible
R29	Residential - Chain House Lane	0.04	75% or Less of AQO	Negligible
R30	Residential - Chain House Lane	0.08	75% or Less of AQO	Negligible
R31	Residential - Coote Lane	0.04	75% or Less of AQO	Negligible
R32	Residential - 2 Marshall Brow	<0.01	75% or Less of AQO	Negligible
R33	Residential - Marshall Brow	<0.01	75% or Less of AQO	Negligible
R34	School - Cop Lane C of E Primary	0.12	75% or Less of AQO	Negligible
R35	Residential - 236 Cop Lane	0.16	75% or Less of AQO	Negligible
R36	Residential - 225 Cop Lane	0.16	75% or Less of AQO	Negligible
R37	Residential - 12 Pope lane	<0.01	75% or Less of AQO	Negligible
R38	School - Penwortham Girls High (AQMA)	0.08	75% or Less of AQO	Negligible
R39	Residential - 10 Cop Lane (AQMA)	0.08	75% or Less of AQO	Negligible
R40	Residential - 36 Cop Lane	0.12	75% or Less of AQO	Negligible
R41	Residential - Pope Lane	0.36	75% or Less of AQO	Negligible
R42	Residential - 149 Broad Oak Lane	0.44	75% or Less of AQO	Negligible
R43	Residential - Wingates	0.04	75% or Less of AQO	Negligible
R44	Residential - 24 Victoria Road (AQMA)	0.12	75% or Less of AQO	Negligible
R45	Residential - 15 Victoria Road (AQMA)	0.20	75% or Less of AQO	Negligible

Potential Impact		% Change in Concentration Relative to AQO	Long Term Average Concentration	Impact
R46	Residential – 15 Browndge Road (AQMA)	<0.01	75% or Less of AQO	Negligible
R47	Residential – 7 Watkin Road (AQMA)	-0.44	75% or Less of AQO	Negligible
R48	Residential – 4 Browndge Road (AQMA)	-0.04	75% or Less of AQO	Negligible
R49	Residential -5 Browndge Road (AQMA)	-0.16	75% or Less of AQO	Negligible

As indicated within Table 13.3.16 impacts on annual mean PM<sub>2.5</sub> concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. It is therefore considered that the overall impacts as a result of the Proposed Development are not significant.