

7.1 AIR QUALITY STANDARDS AND GUIDELINES

Air quality criteria, currently relevant to vehicle emissions, are presented in Table D1.1. The UK has in place air quality standards for nitrogen dioxide and particulate matter. In accordance with Part IV of the Environment Act 1995, both the guidance for the assessment of air quality and the standards have been reviewed by the Government. In March 1997, the National Air Quality Strategy was published. The standards recommended in the Strategy were introduced into UK legislation under the Air Quality Regulations 1997 and had the specific objective that they are to be achieved by the year 2005 to a given level of compliance e.g. percentile or given number of exceedences.

More recently the European Commission (EC) formally adopted the Air Quality Framework Directive (96/62/EC) and published a daughter directive (99/30/EC) setting specific limits for four air pollutants: nitrogen dioxide; sulphur dioxide; PM₁₀; and lead. Limit values for other pollutants are still under consideration and further daughter directives will be published shortly.

The directives set a legal obligation on the UK and other EU Member States to achieve the limit values by the specified due dates. The limit values were adopted as national objectives in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland, published in 2000. The objectives set in the AQS in some cases are stricter than the EC limit values. The review proposals have changed the limit values for nitrogen dioxide (maximum hour only) and fine particulate matter (PM₁₀) and have been introduced into UK legislation under the Air Quality Regulations 2000. The other objectives were unaffected by this revision although compliance dates in some cases have been brought forward to 2003.

This year the limit values in the EC directives (for sulphur dioxide, nitrogen dioxide, oxides of nitrogen, PM₁₀ and lead) have been adopted in the UK under the Air Quality Limit Values Regulations 2001.

The concentration of particulate matter depends on the method used to take the measurement. Therefore where a particulate matter (or PM₁₀) standard is described the prescribed measurement technique is also noted.

TABLE 7.1.1 AIR QUALITY CRITERIA				
Pollutant	Averaging Period	Limit Value/Objective	Year for Compliance	Reference
Nitrogen Dioxide	1 hour mean	200 µg/m ³ , not to be exceeded more than 18 times a year (99.8 th percentile)	2005	AQS objective
			2010	UK limit value
	Annual mean	40 µg/m ³	2005	AQS objective
			2010	UK limit value
Carbon Monoxide	Running 8 hour mean	11.6 mg/m ³	2003	AQS objective
Benzene	Running annual mean	16.25 µg/m ³	2003	AQS objective
1,3 Butadiene	Running annual mean	2.25 µg/m ³	2003	AQS objective
Fine Particulates (PM₁₀) Measurement technique: Gravimetric	Daily mean	50 µg/m ³ , not to be exceeded more than 35 times a year (90 th percentile)	2004	AQS objective
			2005 (Stage I)	UK limit value
			2010 (Stage II)	UK limit value
	Annual mean	40 µg/m ³	2004	AQS objective
			2005 (Stage I)	UK limit value
			2010 (Stage II)	UK limit value
		20 µg/m ³	2010 (Stage II)	UK limit value

7.2 EXISTING AIR QUALITY

7.2.1 DEFRA Air Quality Monitoring Data

The recorded concentrations of carbon monoxide, nitrogen dioxide and PM₁₀ at the DEFRA Urban Centre monitoring station in Newcastle are presented in Table D2.1.

Pollutant	Statistic	Reading				Air Quality Strategy Objectives
		1997	1998	1999	2000	
Carbon monoxide	Maximum 8 hour mean (mg/m ³)	3.5	2.6	2.2	1.9	11.6 mg/m ³
Nitrogen dioxide	Annual Mean (µg/m ³)	40	36	31	29	40 µg/m ³
	Hourly mean - no of exceedences of 200 µg/m ³	0	0	0	0	18 exceedences
PM ₁₀ #	Annual Mean (µg/m ³)	27	24	21	17	40 µg/m ³
	24 hour mean – number of exceedences of 50 µg/m ³	20	6	6	0	35 exceedences of 50 µg/m ³

Data have been converted from TEOM units to gravimetric units by multiplying monitoring data by a factor of 1.3

The concentrations of nitrogen dioxide recorded at the DEFRA diffusion tube monitoring sites in the area of the New Tyne Crossing are presented in Table D2.2.

Site Identifier	Grid Ref (NZ)	Site Type	Annual Average NO ₂ (µg/m ³)						
			1995	1996	1997	1998	1999	2000	Mean
Newcastle Upon Tyne 8N	4285,5650	Background	-	17	19	21	13	13	17
Wallsend 2N	4298,5664	Intermediate	-	29	27	31	36	33	31
Hebburn 4N	4315,5648	Background	23	21	21	27	21	21	22
North Shields 1N	4351,5686	Background	9	25	21	23	27	25	22
South Shields 2N	4368,5667	Intermediate	28	21	23	-	-	-	24
South Shields 7N	4371,5671	Background	24	17	21	33	21	25	23
South Shields 9N	4366,5669	Intermediate	-	-	-	38	23	23	28

Kerbside - between 1 and 5m from busy roadside (Results from any kerbside sites are not included as none are located close to the development site and therefore not representative of local conditions)

Intermediate - 20 to 30m from busy road

Background - at least 50m from busy road

7.2.2 Newcastle City Council Monitoring

The recorded concentrations of benzene and nitrogen dioxide from Newcastle City Council's diffusion tube monitoring programme (November 1999 to April 2001) are presented in Tables D2.3 to D2.6.

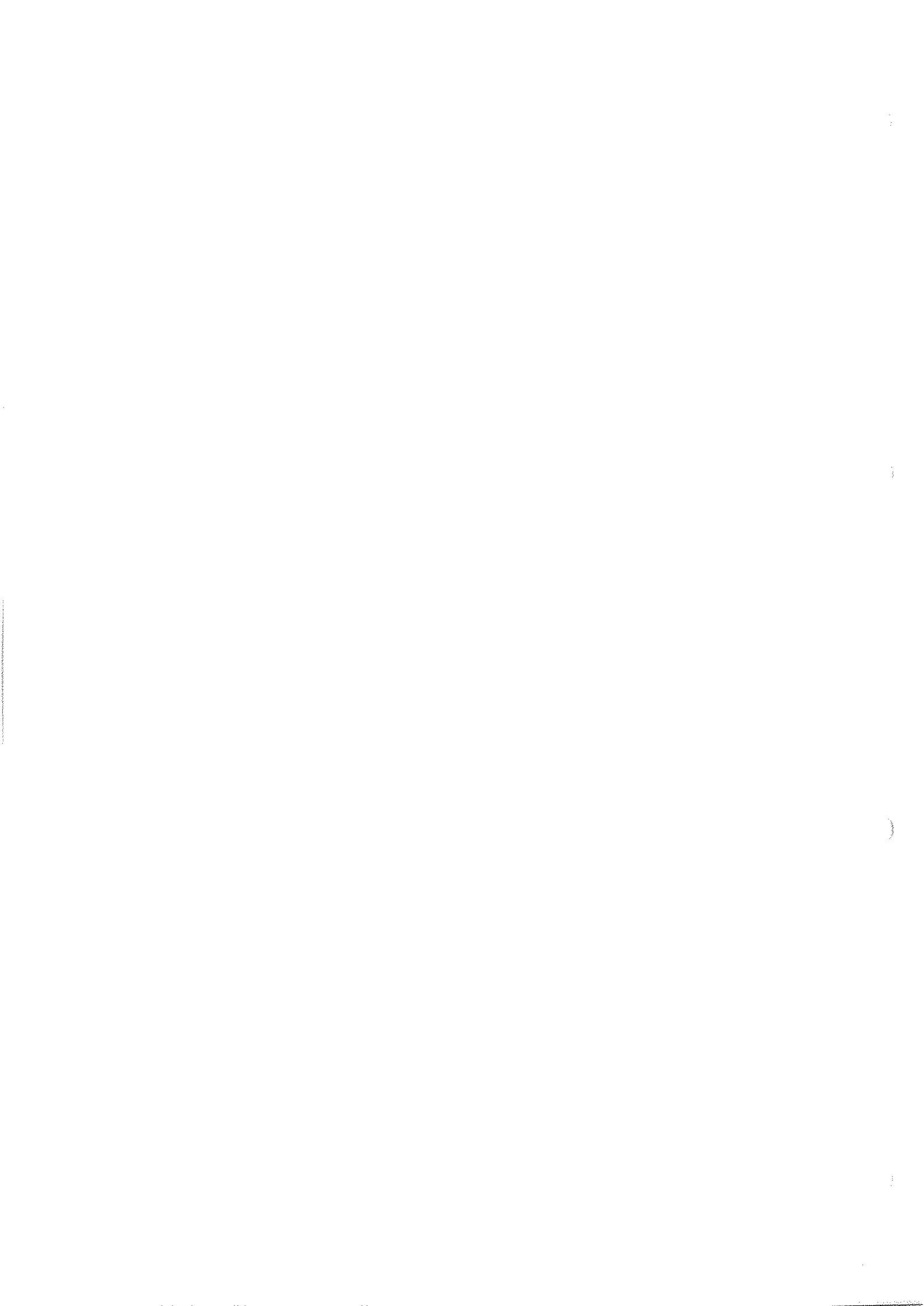
TABLE 7.2.3: NEWCASTLE CITY COUNCIL BTX DIFFUSION TUBE SURVEY RESULTS – BENZENE CONCENTRATIONS ($\mu\text{g}/\text{m}^3$). NORTH TYNESIDE		
Site Number	Location	Average 6 April 2000 to 6 April 2001
4	Lesbury Street	0.6
6	Flatworth Council Depot	0.6
12	54 Firtrees Avenue	0.5
14	Howdon Lane Council Nursery	0.5
16	Tyne View Terrace	0.7

TABLE 7.2.4: NEWCASTLE CITY COUNCIL BTX DIFFUSION TUBE SURVEY RESULTS – BENZENE CONCENTRATIONS ($\mu\text{g}/\text{m}^3$). SOUTH TYNESIDE		
Site Number	Location	Average 14 April 2000 to 3 April 2001
1	19 Bilton Hall Road	0.7
2	27 Prince Consort Road	0.7
3	Grange Nursing Home	0.7
4	105 High Street	0.7
5	1 Salem Street	0.7

TABLE 7.2.5: NEWCASTLE CITY COUNCIL AVERAGE ANNUAL NITROGEN DIOXIDE DIFFUSION TUBE SURVEY RESULTS – NORTH TYNESIDE ($\mu\text{g}/\text{m}^3$)

Site Number	Location	1999 4 November 1999 to 6 January 2000	2000 6 January 2000 to 10 January 2001	2001 10 January 2001 to 6 April 2001
01	Howdon Road – opposite. Frater Terrace	19	20	28
02	3 Brinkton Street	18	18	26
03	Meldon Street	27	22	23
04	Lesbury Way	21	18	25
05	95 St. Stephens Way	20	18	25
06	Flatworth Council Depot	19	18	20
07	Malmo Close	16	18	26
08	Narvik Way	18	19	23
09	14 Henley Gardens	21	19	31
10	105 Melrose Gardens	20	22	30
11	98 Rutherford Street	13	17	25
12	54 Firtrees Avenue	22	17	-
13	36 Brunton Avenue	18	12	-
14	Howdon Lane Council Nursery	18	15	30
15	56 Bewicke Road	25	20	28
16	Tyne View Terrace	20	21	23

TABLE 7.2.6: NEWCASTLE CITY COUNCIL AVERAGE ANNUAL NITROGEN DIOXIDE DIFFUSION TUBE SURVEY RESULTS – SOUTH TYNESIDE ($\mu\text{g}/\text{m}^3$)				
Site Number	Location	1999 4 November 1999 to 6 January 2000	2000 6 January 2000 to 10 January 2001	2001 10 January 2001 to 6 April 2001
01	20 Brixham Crescent	20	18	20
02	35 Salcombe Avenue	19	18	18
03	77 Salcombe Avenue	20	20	15
04	35 Newlyn Drive	21	18	21
05	38 Newlyn Drive	22	17	19
06	Bilton lodge, Newlyn Drive	20	17	22
07	46 Epinay Walk	22	21	25
08	23 Regent Road	18	16	22
09	105 High Street	20	19	26
10	27 Prince Consort Road	19	16	28
11	2 Abbey Drive	18	15	21
12	14 Canon Grove	19	17	25
13	3 Chaytor Street	16	18	25
14	15 Pearson Place	19	18	23
15	21 Ferry Street	25	18	32
16	45 Shakespeare Street	19	17	36
17	57 Priory Road	22	16	-
18	53 Minister Parade	19	13	18
19	8 Hope Street	21	16	22
21	41 Wilberforce Street	21	15	-
22	1 Percy Street	24	18	-
23	1A Wilberforce Street	24	16	-
24	13 Salem Street	24	20	22
25	1 Salem Street	23	21	24
26	5 Stothard Street	17	15	-
27	67 Stothard Street	22	14	-
28	1 Prince Consort Road	20	18	27
29	101 St Paul's Road	10	16	20



7.3 SENSITIVITY OF DUST TO DIFFERENT LAND USES

The sensitivity of different land uses to impacts from dust generated during construction activities is presented in Table D3.1.

TABLE 7.3.1 SENSITIVITY TO DUST OF DIFFERENT LAND USES			
Insensitive	Low	Medium	High
Undeveloped land	Isolated residential properties	Multiple residential properties	High density residential properties
Parkland	Commercial and industrial sites – including heavy industry, warehousing, factories, scrapyards and farms	Commercial and industrial premises – premises including: nurseries and garden centres, car/other showrooms, food retail premises and agriculture Community facilities – doctors' surgeries	Commercial and industrial properties – specialist technical or industrial facilities, such as: double glazing manufacture, electronics factories, paint and finishing workshops. Sensitive Community facilities – Schools, colleges, playgrounds, hospitals and nursing homes



7.4 GRAPHICAL SCREENING RESULTS

TABLE 7.4.1 GRAPHICAL SCREENING RESULTS, NORTH SIDE						
Pollutant	Carbon Monoxide	Benzene	Nitrogen Dioxide		Fine Particulate Matter (PM ₁₀)	
Averaging Period	Maximum 8-hour mean (mg/m ³)	Annual mean (µg/m ³)	Annual mean (µg/m ³)	99.8 th percentile of hourly means (µg/m ³)	Annual mean (µg/m ³)	90 th percentile of daily means (µg/m ³)
GN1 – 48 Firtrees Avenue						
2000 existing	3.1	1.9	20	89	20	35
2006 w/o scheme	2.2	1.3	17	76	17	30
2006 with scheme	2.4	1.4	19	84	17	31
2021 w/o scheme	1.8	1.1	16	71	16	28
2021 with scheme	1.9	1.1	18	80	16	29
GN2 – 2 Henley Gardens						
2000 existing	3.3	2.0	22	94	20	35
2006 w/o scheme	2.3	1.4	19	83	17	31
2006 with scheme	2.3	1.4	19	86	17	31
2021 w/o scheme	1.9	1.1	17	76	16	28
2021 with scheme	1.9	1.1	18	79	16	29
GN3 – 19 Melrose Gardens						
2000 existing	3.4	2.2	29	116	20	37
2006 w/o scheme	2.4	1.4	23	97	18	31
2006 with scheme	2.5	1.5	24	102	18	31
2021 w/o scheme	1.9	1.1	20	86	16	29
2021 with scheme	2.0	1.2	22	93	16	29
<i>AQS Objective</i>	11.6 mg/m ³	16.25 µg/m ³	40 µg/m ³	200 µg/m ³ not to be exceeded more than 18 times a year	40 µg/m ³	50 µg/m ³ not to be exceeded more than 35 times a year

TABLE 7.4.2: GRAPHICAL SCREENING RESULTS, SOUTH SIDE

Pollutant	Carbon Monoxide	Benzene	Nitrogen Dioxide		Fine Particulate Matter (PM ₁₀)	
	Maximum 8-hour mean (mg/m ³)	Annual mean (µg/m ³)	Annual mean (µg/m ³)	99.8 th percentile of hourly means (µg/m ³)	Annual mean (µg/m ³)	90 th percentile of daily means (µg/m ³)
GS1 – 28 Newlyn Drive						
2000 existing	3.0	2.4	18	78	19	35
2006 w/o scheme	2.2	1.6	15	69	17	30
2006 with scheme	2.2	1.6	15	69	17	30
2021 w/o scheme	1.8	1.2	14	66	16	28
2021 with scheme	1.8	1.2	14	66	16	28
GS2 – 21 Bilton Hall Road						
2000 existing	3.2	2.5	24	102	20	35
2006 w/o scheme	2.3	1.6	19	85	17	31
2006 with scheme	2.3	1.6	19	86	17	31
2021 w/o scheme	1.8	1.3	17	77	16	28
2021 with scheme	1.9	1.3	18	80	16	29
GS3 – 74 Salcombe Avenue						
2000 existing	3.4	2.6	28	113	20	37
2006 w/o scheme	2.3	1.6	22	93	17	31
2006 with scheme	2.4	1.7	22	94	18	31
2021 w/o scheme	1.9	1.3	19	84	16	29
2021 with scheme	1.9	1.3	20	87	16	29
GS4 – 155 Lulworth Avenue						
2000 existing	3.3	2.5	25	105	20	35
2006 w/o scheme	2.3	1.6	20	87	17	31
2006 with scheme	2.3	1.6	20	88	17	31
2021 w/o scheme	1.9	1.3	18	79	16	29
2021 with scheme	1.9	1.3	18	82	16	29
GS5 – 5 Regent Road						
2000 existing	3.4	2.6	30	120	21	37
2006 w/o scheme	2.4	1.7	23	98	18	31
2006 with scheme	2.4	1.7	23	98	17	31
2021 w/o scheme	1.9	1.3	20	88	16	29
2021 with scheme	1.9	1.3	21	90	16	29
AQS Objective	11.6 mg/m ³	16.25 µg/m ³	40 µg/m ³	200 µg/m ³ not to be exceeded more than 18 times a year	40 µg/m ³	50 µg/m ³ not to be exceeded more than 35 times a year

7.5 DETAILED MODELLING RESULTS

TABLE 7.5.1: RESULTS OF DETAILED MODELLING AT SELECTED SITES, NORTH SIDE

Pollutant	Carbon Monoxide	Benzene	Nitrogen Dioxide		Fine Particulate Matter (PM ₁₀)	
			Annual mean (µg/m ³)	99.8 th percentile of hourly means (µg/m ³)	Annual mean (µg/m ³)	90 th percentile of daily means* (µg/m ³)
Averaging Period	Maximum 8-hour mean (mg/m ³)	Annual mean (µg/m ³)	Annual mean (µg/m ³)	99.8 th percentile of hourly means (µg/m ³)	Annual mean (µg/m ³)	90 th percentile of daily means* (µg/m ³)
DN1 – 2 Mitford Street						
2000 existing	1.2	0.7	29	102	20	30
2006 w/o scheme	0.9	0.4	25	88	17	27
2006 with scheme	0.9	0.4	23	80	17	26
2010 w/o scheme	-	-	22	78	16	25
2010 with scheme	-	-	21	72	16	25
2021 w/o scheme	0.7	0.3	24	84	16	25
2021 with scheme	0.7	0.3	21	74	16	25
DN2 – 1 Meldon Street						
2000 existing	1.2	0.8	34	119	20	30
2006 w/o scheme	0.9	0.4	30	106	18	27
2006 with scheme	0.8	0.4	25	86	17	27
2010 w/o scheme	-	-	26	92	17	25
2010 with scheme	-	-	22	76	16	25
2021 w/o scheme	0.7	0.3	29	101	16	25
2021 with scheme	0.7	0.3	24	82	16	25
DN3 – 47 Norman Terrace						
2000 existing	1.1	0.6	21	74	19	29
2006 w/o scheme	0.8	0.3	19	66	17	26
2006 with scheme	0.8	0.3	18	63	17	26
2010 w/o scheme	-	-	17	61	16	25
2010 with scheme	-	-	17	59	16	25
2021 w/o scheme	0.7	0.3	19	65	16	24
2021 with scheme	0.7	0.3	17	61	16	24
DN4 – 111 Cumberland Street						
2000 existing	1.1	0.6	24	85	19	30
2006 w/o scheme	0.8	0.4	21	73	17	26
2006 with scheme	0.8	0.3	20	71	17	26
2010 w/o scheme	-	-	19	68	16	25
2010 with scheme	-	-	19	66	16	25
2021 w/o scheme	0.7	0.3	20	72	16	24
2021 with scheme	0.7	0.3	19	68	16	24
DN5 – 48 Telford Street						
2000 existing	1.2	0.6	22	78	19	30
2006 w/o scheme	0.8	0.3	20	69	17	26
2006 with scheme	0.8	0.3	19	67	17	26
2010 w/o scheme	-	-	18	63	16	25
2010 with scheme	-	-	17	61	16	25
2021 w/o scheme	0.7	0.3	19	65	16	25
2021 with scheme	0.7	0.3	18	63	16	25
DN6 – 2/4 Chatton Street						

2000 existing	1.2	0.6	22	78	19	30
2006 w/o scheme	0.8	0.3	20	69	17	26
2006 with scheme	0.8	0.3	18	65	17	26
2010 w/o scheme	-	-	18	63	16	25
2010 with scheme	-	-	17	61	16	25
2021 w/o scheme	0.7	0.3	19	67	16	25
2021 with scheme	0.7	0.3	17	61	16	25
<i>AQS Objective</i>	11.6 mg/m ³	16.25 µg/m ³	40 µg/m ³	200 µg/m ³ not to be exceeded more than 18 times a year	40 µg/m ³	50 µg/m ³ not to be exceeded more than 35 times a year

TABLE 7.5.2: RESULTS OF DETAILED MODELLING AT SELECTED SITES, SOUTH SIDE

Pollutant	Carbon Monoxide	Benzene	Nitrogen Dioxide		Fine Particulate Matter (PM ₁₀)	
	Maximum 8-hour mean (mg/m ³)	Annual mean (µg/m ³)	Annual mean (µg/m ³)	99.8 th percentile of hourly means (µg/m ³)	Annual mean (µg/m ³)	90 th percentile of daily means (µg/m ³)
DS1 – 40 Epinay Walk						
2000 existing	1.1	0.8	23	81	19	30
2006 w/o scheme	0.8	0.4	21	73	17	26
2006 with scheme	0.8	0.4	22	76	17	26
2010 w/o scheme	-	-	19	65	16	25
2010 with scheme	-	-	19	68	16	25
2021 w/o scheme	0.7	0.4	20	72	16	26
2021 with scheme	0.7	0.4	21	75	16	25
DS2 – 46 Debussey Court						
2000 existing	1.1	0.9	28	98	20	30
2006 w/o scheme	0.8	0.5	25	88	17	26
2006 with scheme	0.8	0.5	25	86	17	26
2010 w/o scheme	-	-	22	78	16	25
2010 with scheme	-	-	22	78	16	25
2021 w/o scheme	0.7	0.4	25	88	16	26
2021 with scheme	0.7	0.4	25	87	16	25
DS3 – 45 Harold Street						
2000 existing	1.2	0.8	25	89	20	30
2006 w/o scheme	0.8	0.5	22	77	17	26
2006 with scheme	0.8	0.4	21	74	17	26
2010 w/o scheme	-	-	20	70	16	25
2010 with scheme	-	-	19	68	16	25
2021 w/o scheme	0.7	0.4	22	78	16	26
2021 with scheme	0.7	0.4	21	72	16	25
DS4 – 3/5 Stothard Street						
2000 existing	1.2	0.9	27	93	20	30
2006 w/o scheme	0.8	0.5	24	84	17	26
2006 with scheme	0.8	0.5	23	81	17	26
2010 w/o scheme	-	-	21	74	16	25
2010 with scheme	-	-	21	73	16	25
2021 w/o scheme	0.7	0.4	24	85	16	26
2021 with scheme	0.7	0.4	23	80	16	25
DS5 – 35/37 Stothard Street						
2000 existing	1.2	0.9	31	110	20	30
2006 w/o scheme	0.8	0.5	27	96	17	26
2006 with scheme	0.8	0.5	27	95	17	26
2010 w/o scheme	-	-	24	85	16	25
2010 with scheme	-	-	24	85	16	25
2021 w/o scheme	0.7	0.4	29	100	16	26
2021 with scheme	0.7	0.4	27	94	16	25
DS6 - 67 Stothard Street						

2000 existing	1.2	1.1	39	138	21	31
2006 w/o scheme	0.8	0.6	34	120	18	26
2006 with scheme	0.8	0.6	35	123	18	26
2010 w/o scheme	-	-	30	104	17	25
2010 with scheme	-	-	30	106	17	25
2021 w/o scheme	0.7	0.4	36	126	17	26
2021 with scheme	0.7	0.5	35	122	17	25
DS7 – 12 Raglan Street						
2000 existing	1.2	0.8	21	74	19	30
2006 w/o scheme	0.8	0.4	20	69	17	26
2006 with scheme	0.8	0.4	18	65	17	26
2010 w/o scheme	-	-	18	63	16	25
2010 with scheme	-	-	17	61	16	25
2021 w/o scheme	0.7	0.3	19	65	16	26
2021 with scheme	0.7	0.3	18	63	16	25
DS8 – 55/57 Priory Road						
2000 existing	1.2	0.8	24	85	19	30
2006 w/o scheme	0.8	0.4	21	75	17	26
2006 with scheme	0.8	0.4	21	74	17	26
2010 w/o scheme	-	-	19	68	16	25
2010 with scheme	-	-	19	67	16	25
2021 w/o scheme	0.7	0.3	20	69	16	26
2021 with scheme	0.7	0.4	21	72	16	25
DS9 – Commercial Priory Road						
2000 existing	1.2	0.8	22	78	19	30
2006 w/o scheme	0.8	0.4	20	71	17	26
2006 with scheme	0.8	0.4	20	70	17	26
2010 w/o scheme	-	-	19	65	16	25
2010 with scheme	-	-	18	64	16	25
2021 w/o scheme	0.7	0.3	19	67	16	26
2021 with scheme	0.7	0.4	19	67	16	25
DS10 – 21 Ferry Street						
2000 existing	1.2	0.8	24	85	19	30
2006 w/o scheme	0.8	0.4	21	73	17	26
2006 with scheme	0.8	0.4	21	72	17	26
2010 w/o scheme	-	-	19	67	16	25
2010 with scheme	-	-	19	66	16	25
2021 w/o scheme	0.7	0.3	20	69	16	26
2021 with scheme	0.7	0.4	19	68	16	25
AQS Objective	11.6 mg/m ³	16.25 µg/m ³	40 µg/m ³	200 µg/m ³ not to be exceeded more than 18 times a year	40 µg/m ³	50 µg/m ³ not to be exceeded more than 35 times a year