



Department
for Environment
Food & Rural Affairs



Department
for Transport

Air Quality Plan for tackling roadside nitrogen dioxide concentrations in Cardiff Urban Area (UK0026)

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1 Introduction

1.1 This document

This document is the Cardiff Urban Area agglomeration zone (UK0026) updated air quality plan for tackling roadside nitrogen dioxide (NO₂) concentrations. This is an update to the air quality plan published in December 2015 (<https://www.gov.uk/government/collections/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2015>).

This plan presents the following information:

- General information regarding the Cardiff Urban Area agglomeration zone
- Details of NO₂ exceedance situation within the Cardiff Urban Area agglomeration zone
- Details of local air quality measures that have been implemented, will be implemented or are being considered for implementation in this agglomeration zone

This air quality plan for the Cardiff Urban Area agglomeration zone should be read in conjunction with the separate UK Air Quality Plan for tackling roadside nitrogen dioxide concentrations (hereafter referred to as the overview document) which sets out, amongst other things, the authorities responsible for delivering air quality improvements and the list of UK and national measures that are applied in some or all UK zones. The measures presented in this zone plan, and the accompanying UK overview document show how the UK will ensure that compliance with the NO₂ limit values is achieved in the shortest possible time.

This plan should also be read in conjunction with the supporting UK Technical Report which presents information on assessment methods, input data and emissions inventories used in the analysis presented in this plan.

1.2 Context

Two NO₂ limit values for the protection of human health have been set in the Air Quality Directive (2008/50/EC). These are:

- The annual mean limit value: an annual mean concentration of no more than 40 $\mu\text{g}\text{m}^{-3}$
- The hourly limit value: no more than 18 exceedances of 200 $\mu\text{g}\text{m}^{-3}$ in a calendar year

The Air Quality Directive stipulates that compliance with the NO₂ limit values will be achieved by 01/01/2010.

1.3 Zone status

The assessment undertaken for the Cardiff Urban Area agglomeration zone indicates that the annual limit value was exceeded in 2015 but is likely to be achieved by 2022 through the introduction of measures included in the baseline. When combined with the measures outlined in the overview document for the UK we expect this zone to be compliant by 2021.

1.4 Plan structure

General administrative information regarding this agglomeration zone is presented in Section 2.

Section 3 then presents the overall picture with respect to NO₂ levels in this agglomeration zone for the 2015 reference year of this air quality plan. This includes a declaration of exceedance situations within the agglomeration zone and presentation of a detailed source apportionment for each exceedance situation.

An overview of the measures already taken and to be taken within the agglomeration zone both before and after 2015 is given in Section 4.

Baseline modelled projections for each year from 2017 to 2030 for each exceedance situation are presented in Section 5. The baseline projections presented here include, where possible, the impact of measures that have already been taken and measures for which the relevant authority has made a firm commitment to implement. However, it has not been possible to quantify the impact of all the measures. This section therefore also explains which measures have been quantified, and hence included in the model projections, and which measures have not been quantified.

2 General Information About the Zone

2.1 Administrative information

Zone name: Cardiff Urban Area

Zone code: UK0026

Type of zone: agglomeration zone

Reference year: 2015

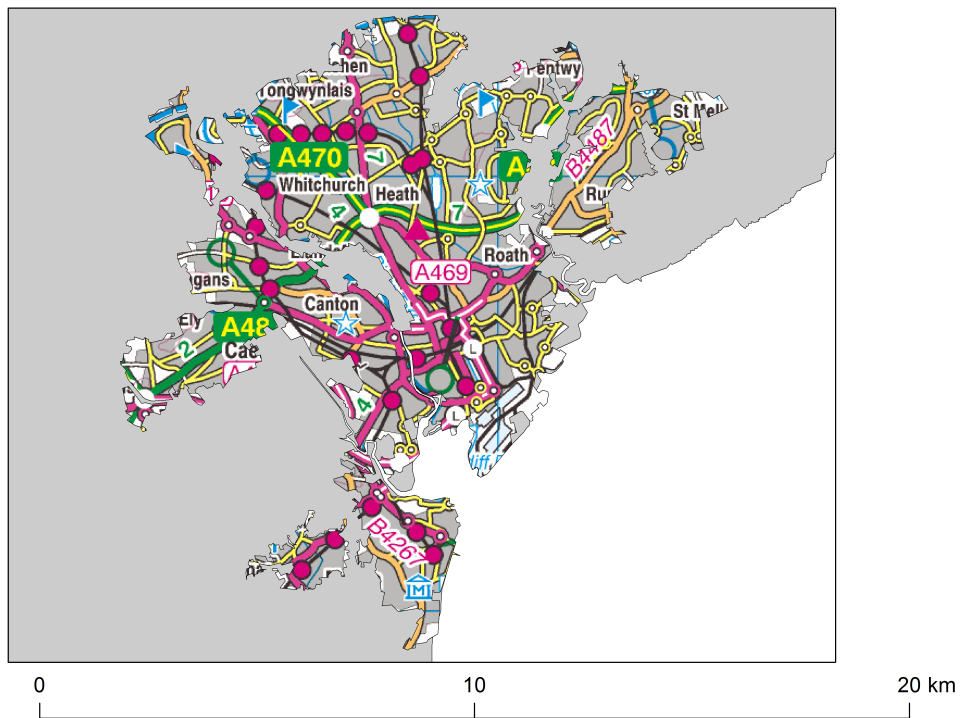
Extent of zone: Figure 1 shows the area covered by the Cardiff Urban Area agglomeration zone.

Local Authorities within the zone: Figure 2 shows the location of Local Authorities within the agglomeration zone. A list of these Local Authorities is also given below. The numbers in the list correspond to the numbers in Figure 2.

1. Cardiff County Council
2. Vale of Glamorgan Council

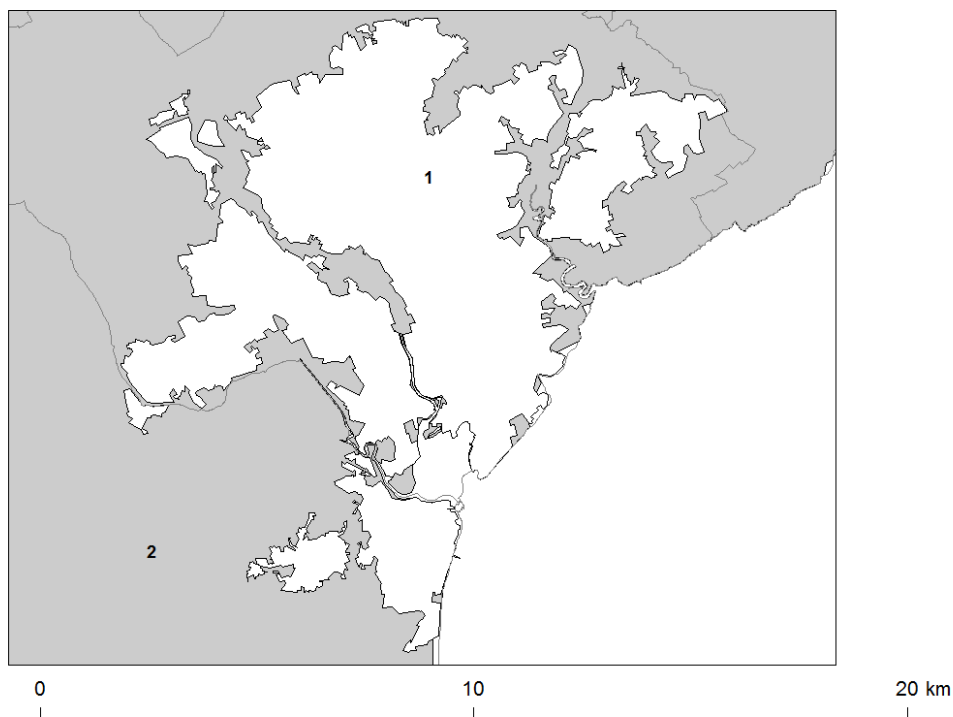
(Note: Local Authority boundaries do not necessarily coincide with zone boundaries. Hence Local Authorities may be listed within more than one zone plan.)

Figure 1: Map showing the extent of the Cardiff Urban Area agglomeration zone (UK0026).



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Figure 2: Map showing Local Authorities within the Cardiff Urban Area agglomeration zone (UK0026).



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2.2 Assessment details

Measurements

NO₂ measurements in this zone were available in 2015 from the following national network monitoring stations (NO₂ data capture¹ for each station in 2015 shown in brackets):

1. Cardiff Centre GB0580A (80%)

Full details of monitoring stations within the Cardiff Urban Area agglomeration zone are available from <http://uk-air.defra.gov.uk/networks/network-info?view=aurn>.

Modelling

Modelling for the 2015 reference year has been carried out for the whole of the UK. This modelling covers the following extent within this zone:

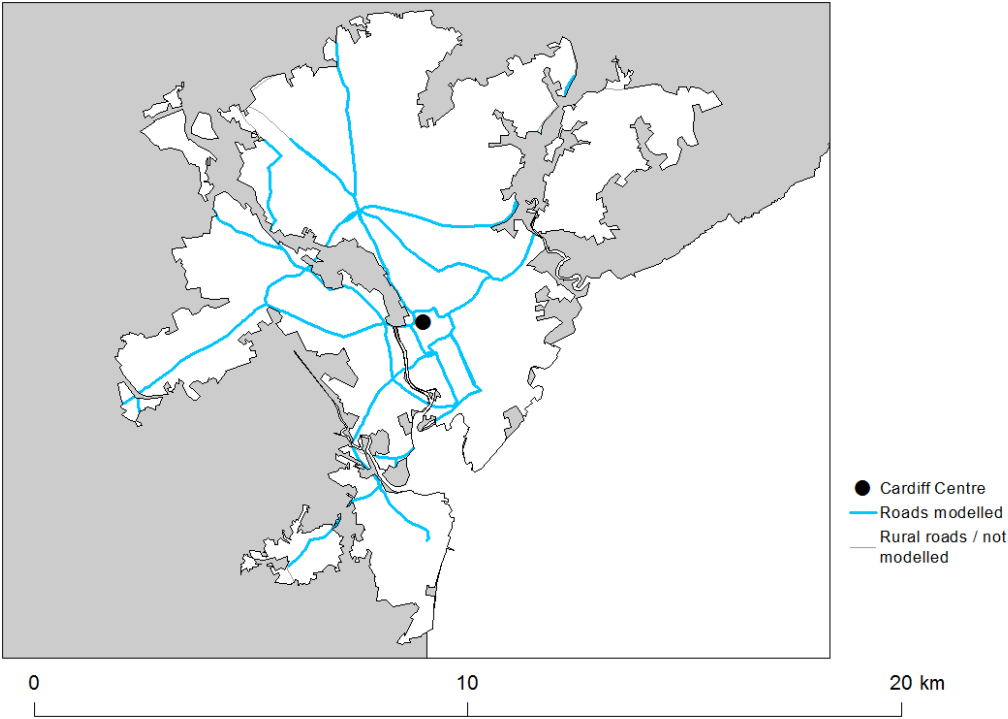
- Total background area within zone (approx): 86 km²
- Total population within zone (approx): 327,129 people

Zone maps

Figure 3 presents the location of the NO₂ monitoring stations within this zone for 2015 and the roads for which NO₂ concentrations have been modelled. NO₂ concentrations at background locations have been modelled across the entire zone at a 1 km x 1 km resolution.

¹Annual data capture is the proportion of hours in a year for which there are valid measurements at a monitoring station, expressed in this document as a percentage. The Implementing Provisions on Reporting (IPR) guidance requires that a minimum data capture of 85% is required for compliance reporting (that is 90% valid data, plus a 5% allowance for data loss due to planned maintenance and calibration). Monitoring stations with at least 75% data capture have been included in the modelling analysis to ensure that a greater number of operational monitoring sites have been used for model calibration and verification purposes. For more information on compliance reporting under European Directives see Section 2.3.

Figure 3: Map showing the location of the NO₂ monitoring stations with valid data in 2015 and roads where concentrations have been modelled within the Cardiff Urban Area (UK0026) agglomeration zone.



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2.3 Air quality reporting

From 2001 to 2012 the UK has reported annually on air quality concentrations using a standard Excel questionnaire (Decision 2004/461/EC). These questionnaires are available online from <http://cdr.eionet.europa.eu/gb/eu/annualair>. Since 2013 reporting has been via an e-reporting system (Decision 2011/850/EU) <http://cdr.eionet.europa.eu/gb/eu/>.

In addition, the UK has reported on air quality plans and programmes (Decision 2004/224/EC) since 2003. The most recent previous UK air quality plan for nitrogen dioxide was published in 2015. The plan and supporting documents are available at <https://www.gov.uk/government/collections/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2015> and the submission of this plan via e-reporting is published at <http://cdr.eionet.europa.eu/gb/eu/aqd/h/envvryhbq/>. Historic plans and programmes are available on <http://cdr.eionet.europa.eu/gb/eu/aqpp>.

3 Overall Picture for 2015 Reference Year

3.1 Introduction

There are two limit values for the protection of health for NO₂. These are:

- The annual limit value (annual mean concentration of no more than 40 µgm⁻³)
- The hourly limit value (no more than 18 hourly exceedances of 200 µgm⁻³ in a calendar year)

Within the Cardiff Urban Area agglomeration zone the annual limit value was exceeded in 2015. Hence, one exceedance situation for this zone has been defined, NO₂_UK0026_Annual_1, which covers exceedances of the annual limit value. This exceedance situation is described below.

3.2 Reference year: NO₂_UK0026_Annual_1

The NO₂_UK0026_Annual_1 exceedance situation covers all exceedances of the annual mean limit value in the Cardiff Urban Area agglomeration zone in 2015.

Compliance with the annual limit value in this exceedance situation has been assessed using a combination of air quality measurements and modelling. Table 1 presents measured annual concentrations at national network stations in this exceedance situation since the 1st Daughter Directive (1999/30/EC) came into force in 2001. This shows that there were no measured exceedances of the annual limit value in this zone in 2015. Table 2 summarises modelled annual mean NO₂ concentrations in this exceedance situation for the same time period. This table shows that, in 2015, 16.3 km of road length was modelled to exceed the annual limit value. There were no modelled background exceedances of the annual limit value. The maximum measured concentration in the zone varies due to changes in emissions and varying meteorology in different years. However, the models are also updated each year to take into account the most up-to-date science, so the modelled results for different years may not be directly comparable. Maps showing the modelled annual mean NO₂ concentrations for 2015 at background and at roadside locations are presented in Figures 4 and 5 respectively. All modelled exceedances of the annual limit value are coloured orange or red in the maps.

The modelling carried out for this exceedance situation has also been used to determine the annual mean NO_x source apportionment for all modelled locations. Emissions to air are regulated in terms of oxides of nitrogen

(NO_x), which is the term used to describe the sum of nitrogen dioxide (NO₂) and nitric oxide (NO). Ambient NO₂ concentrations include contributions from both directly emitted primary NO₂ and secondary NO₂ formed in the atmosphere by the oxidation of NO. As such, it is not possible to calculate an unambiguous source apportionment specifically for NO₂ concentrations; therefore the source apportionment in this plan is presented for NO_x, rather than for NO₂ (for further details please see the UK Technical Report). Table 3 summarises the modelled NO_x source apportionment for the section of road with the highest NO₂ concentration in this exceedance situation in 2015. This is important information because it shows which sources need to be tackled at the location with the largest compliance gap in the exceedance situation.

Figure B.1 in Annex B presents the annual mean NO_x source apportionment for each section of road within the NO₂_UK0026_Annual_1 exceedance situation (i.e. the source apportionment for all exceeding roads only) in 2015.

Table 1: Measured annual mean NO₂ concentrations at national network stations in NO₂_UK0026_Annual_1 for 2001 onwards, μgm^{-3} (a). Data capture shown in brackets.

Site name (EOI code)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cardiff Centre (GB0580A)	33 (93)	33 (94)	35 (87)	30 (97)	35 (56)	31 (97)	31 (98)	29 (99)	31 (98)	33 (95)	27 (95)	27 (91)	26 (96)	25 (98)	27 (80)

(a) Annual Mean Limit Value = $40 \mu\text{gm}^{-3}$

Table 2: Annual mean NO₂ model results in NO₂_UK0026_Annual_1 for 2001 onwards.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Road length exceeding (km)	19.5	3.1	37.6	17.1	16.1	16.0	15.6	18.4	18.8	25.9	24.3	23.2	19.8	19.8	16.3
Background exceeding (km ²)	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Maximum modelled concentration (μgm^{-3}) (a)	48.9	46.1	62.3	61.0	58.6	58.5	62.6	58.7	57.5	60.9	55	69	54	60	53

(a) Annual Mean Limit Value = $40 \mu\text{gm}^{-3}$

Table 3: Modelled annual mean NO_x source apportionment at the location with the highest NO₂ concentration in 2015 in NO2_UK0026_Annual_1 (μgm⁻³) traffic count point 74101 on the A4232; OS grid (m): 317500, 173435) .

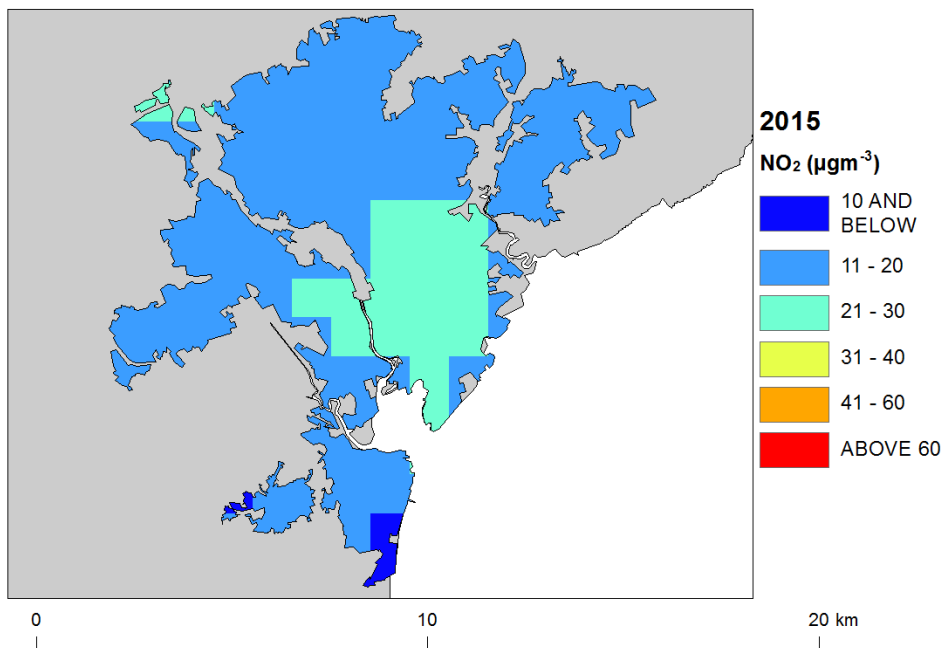
Spatial scale	Component	Concentration at highest road link (a)
Regional background sources NO _x (i.e. contributions from distant sources of > 30 km from the receptor).	Total	3.6
	From within the UK	1.8
	From transboundary sources (includes shipping and other EU member states)	1.8
Urban background sources NO _x (i.e. sources located within 0.3 - 30 km from the receptor).	Total	22.7
	From road traffic sources	11.5
	From industry (including heat and power generation)	4.7
	From agriculture	NA
	From commercial/residential sources	2.3
	From shipping	1.6
	From off road mobile machinery	1.0
	From natural sources	NA
	From transboundary sources	NA
From other urban background sources	1.7	
Local sources NO _x (i.e. contributions from sources < 0.3 km from the receptor).	Total	103.6
	From petrol cars	9.3
	From diesel cars	44.9
	From HGV rigid (b)	13.8
	From HGV articulated (b)	8.2
	From buses	4.8
	From petrol LGVs (c)	0.1
	From diesel LGVs (c)	22.3
From motorcycles	0.1	
From London taxis	0.0	
Total NO _x (i.e. regional background + urban background + local components)		130.0
Total NO ₂ (i.e. regional background + urban background + local components)		53

(a) Components are listed with NO_x concentration of NA when there is no source from this sector.

(b) HGV = heavy goods vehicle

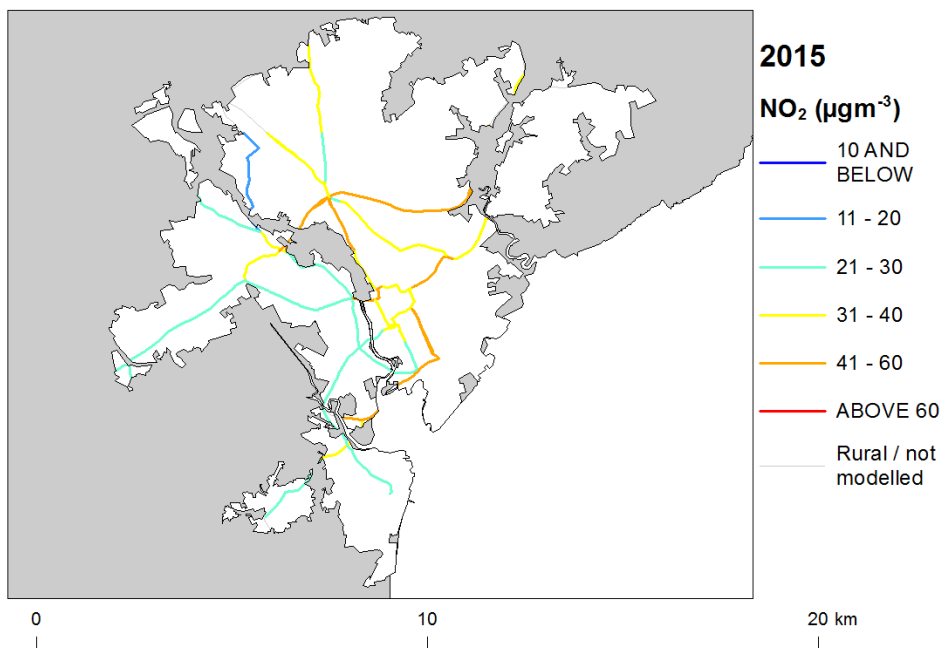
(c) LGV = light goods vehicle

Figure 4: Map of modelled background annual mean NO₂ concentrations 2015. Modelled exceedances of the annual limit value are shown in orange and red.



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Figure 5: Map of modelled roadside annual mean NO₂ concentrations 2015. Modelled exceedances of the annual limit value are shown in orange and red.



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4 Measures

4.1 Introduction

This section gives details of measures that address exceedances of the NO₂ limit values within Cardiff Urban Area agglomeration zone. This includes both measures that have already been taken and measures for which there is a firm commitment that they will be taken.

Section 5 then explains the extent to which it has been possible to incorporate the impacts of these measures into the baseline modelling carried out for this assessment.

4.2 Source apportionment

It is important to understand which sources are responsible for causing the exceedance in order to most effectively tailor measures to address the NO₂ exceedance situation described in Section 3 above. This can be achieved by considering the source apportionment for the exceedance situation, also presented in Section 3. A summary of what the source apportionment shows and the implications for which measures would therefore be appropriate is given here.

Local road traffic was the dominant source in this exceedance location in the reference year. The largest contribution was from diesel cars at the location of maximum exceedance with a contribution of 44.9 µgm⁻³ of NO_x out of a total of 130 µgm⁻³ of NO_x. Diesel cars, diesel LGVs and on some roads rigid and articulated HGVs and buses were important sources on the primary roads with the highest concentrations.

This indicates that appropriate measures should impact on local road traffic sources in this zone. Other measures to address the urban background sources may also be beneficial.

4.3 Measures

Measures potentially affecting NO₂ in this agglomeration zone have been taken and/or are planned at a range of administrative levels. These are:

- European Union
- National (i.e. England, Scotland, Wales, Northern Ireland or whole UK)
- Local (i.e. UK Local Authorities)

Details of European Union measures (e.g. Euro Standards, Fuel Quality Directives, Integrated Pollution Prevention and Control) can be found on the European Commission's website (http://ec.europa.eu/environment/air/index_en.htm). Details of national measures are given in the UK overview document.

Relevant Local Authority measures within this exceedance situation are listed in Table C.1 (see Annex C). Table C.1 lists measures which a local authority has carried out or is in the process of carrying out, plus additional measures which the local authority is committed to carrying out or is investigating with the expectation of carrying out in the future. Additional local measures which will deliver air quality improvements in Cardiff Urban Area agglomeration zone have been provided by the Welsh Government and these are listed in Table C.2.

The Local Transport Plan recognises the need to improve air quality. Its programme prioritises: development of active travel networks to increase walking and cycling for local journeys: the provision of cycling infrastructure;

the bus network; reduced speed limits; reducing congestion; improving transport efficiency and reliability; and bus based park and ride.

There have been a significant number of initiatives in the Area. There are widening choices for citizens that will help reduce traffic congestion e.g. pedestrian crossing schemes and strategic recreational routes for cycling.

Also, bus infrastructure improvements have been taking place in addition to park and ride, safer walking routes to schools and in the communities. School travel plans have also been implemented which encourages modal shift from cars to other forms of transport that help to improve air quality.

A cycling strategy is being implemented to increase the levels of uptake in place of using cars. An initiative on green fleet vehicles and alternative fuel vehicles is underway that will encourage the uptake of low emission vehicles.

The National Transport Finance Plan refers to investment in the Cardiff Capital Metro project which, alongside existing initiatives which have already been applied, is being designed to enhance sustainable travel choices for transport users and reduce private vehicle use.

4.4 Measures timescales

Timescales for national measures are given in the UK overview document.

Local Authorities report on progress with the implementation of their action plans annually and review action plan measures regularly. Information on local measures was collected in February/March 2015. Local authorities were asked to review and, where necessary, provide updates to measures in March/April 2017. Hence, any Local Authority action plans and measures adopted by Local Authorities after this time have not been included in this air quality plan, unless additional information was provided during the consultation process.

The reference year for this air quality plan is 2015. Where measures started and finished before 2015, then the improvement in air quality resulting from these measures will have already taken place before the reference year and the impact of these measures will have been included in the assessment where the measure has had an impact on the statistics used to compile the emission inventory. Many measures started before the reference year and will continue to have a beneficial impact on air quality well beyond the reference year. Measures with a start date before 2015 and an end date after 2015 may have an impact on concentrations in the reference year and a further impact in subsequent years. Where the Status column in Annex C is 'Implementation', this shows that this measure is already underway or that there is a commitment for this measure to go ahead. Where the Status is 'Planning', 'Preparation' or 'Other' the level of commitment is less clear and it is possible some of these measures may not go ahead.

5 Baseline Model Projections

5.1 Overview of model projections

Model projections for each year from 2017 to 2030, starting from the 2015 reference year described in Section 3, have been calculated in order to determine when compliance with the NO₂ limit values is likely to be achieved on the basis of EU, regional and local measures currently planned. Details of the methods used for the baseline emissions and projections modelling are provided in the UK technical report.

For national measures, it has not been possible to quantify the impact of all measures on emissions and ambient concentrations. The impact for all quantifiable measures has been included in the baseline projections.

The impacts of the individual Local Authority measures have not been explicitly included in the baseline model projections. However, measures may have been included implicitly if they have influenced the traffic counts for 2015 (used as a basis for the compilation of the emission inventory) or in the traffic activity projections to 2020 and beyond (used to calculate the emissions projections). It should be recognised that these measures will have a beneficial impact on air quality, even if it has not been possible to quantify this impact here.

5.2 Baseline projections: NO₂_UK0026_Annual_1

Table 4 presents summary results for the baseline model projections for each year from 2017 to 2030 for the NO₂_UK0026_Annual_1 exceedance situation. This shows that the maximum modelled annual mean NO₂ concentration predicted for 2020 in this exceedance situation is 43 μgm^{-3} . By 2022, the maximum modelled annual mean NO₂ concentration is predicted to drop to 38 μgm^{-3} . Hence, the model results suggest that compliance with the NO₂ annual limit value is likely to be achieved by 2022 under baseline conditions.

Figure 6 and 7 presents maps of projected annual mean NO₂ concentrations at background and roadside locations respectively in 2022, the year at which compliance is achieved. For reference Figures 8 and 9 show maps of projected annual mean NO₂ concentrations in 2020, 2025 and 2030 for background and roadside locations respectively.

It should be noted that the baseline projections presented here include the impacts of some measures, where they can be quantified, that have already been or will be implemented.

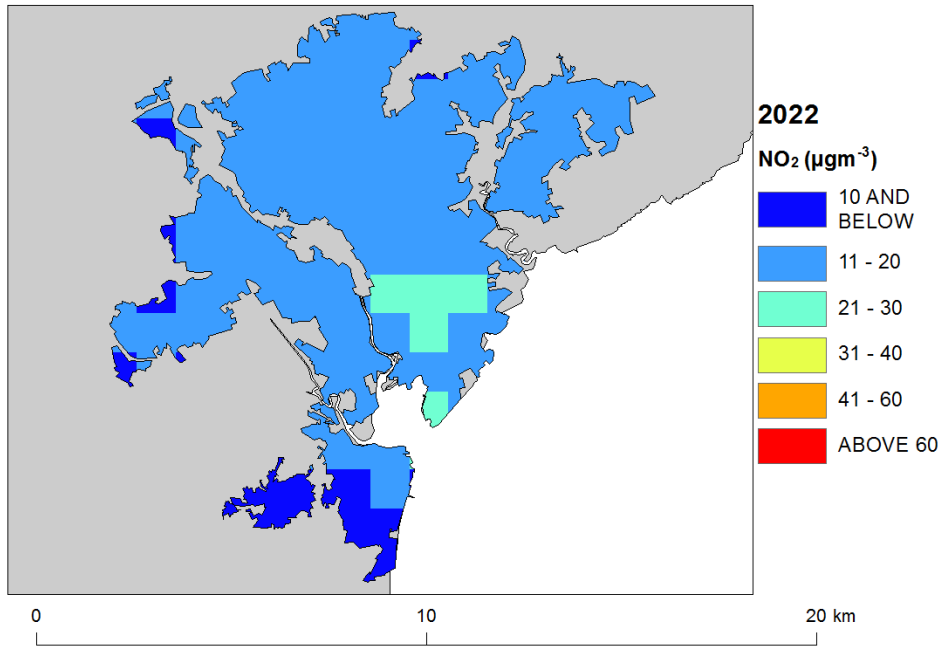
Table 4: Annual mean NO₂ model results in NO₂_UK0026_Annual_1.

	2015	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Road length exceeding (km)	16.3	12.7	11.1	8.4	4.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Background exceeding (km ²)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum modelled concentration NO ₂ (μgm ⁻³) (a)	53	50	48	46	43	41	38	36	34	32	31	29	28	27	26
Corresponding modelled concentration NO _x (μgm ⁻³) (b)	130	120	113	107	100	92	85	79	74	69	64	61	57	54	52

(a) Annual Mean Limit Value = 40 μgm⁻³

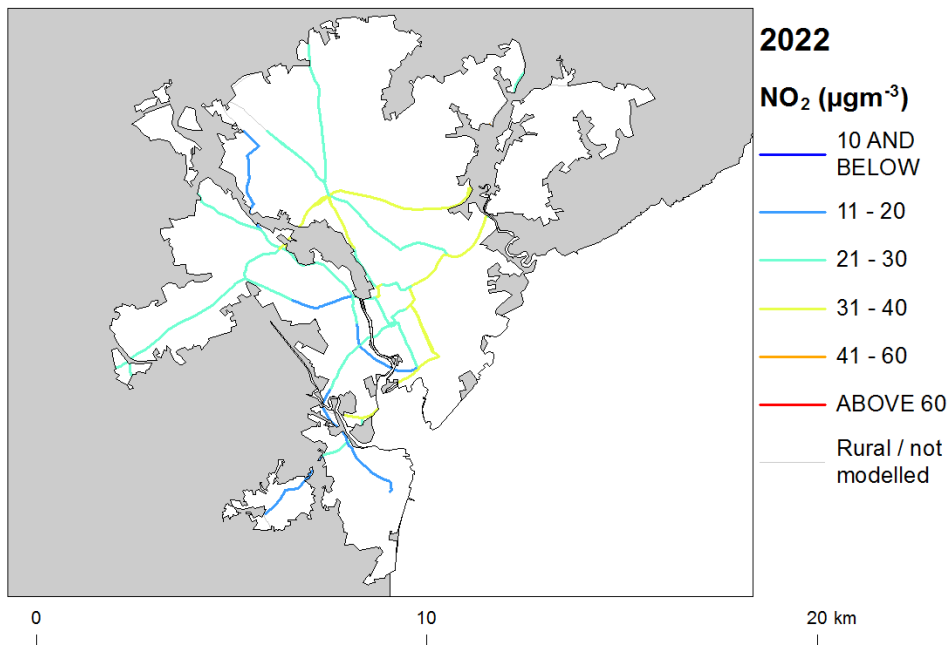
(b) NO_x is recorded here for comparison with the NO_x source apportionment graphs for 2015 presented in Annex B of this plan. Limit values for EU directive purposes are based on NO₂.

Figure 6: Background baseline projections of annual mean NO₂ concentrations in 2022, the year at which compliance is achieved under baseline conditions. Modelled exceedances of the annual limit value are shown in orange and red.



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Figure 7: Roadside baseline projections of annual mean NO₂ concentrations in 2022, the year at which compliance is achieved under baseline conditions. Modelled exceedances of the annual limit value are shown in orange and red.



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Figure 8: Background baseline projections of annual mean NO₂ concentrations in 2020, 2025 and 2030. 2015 is also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.

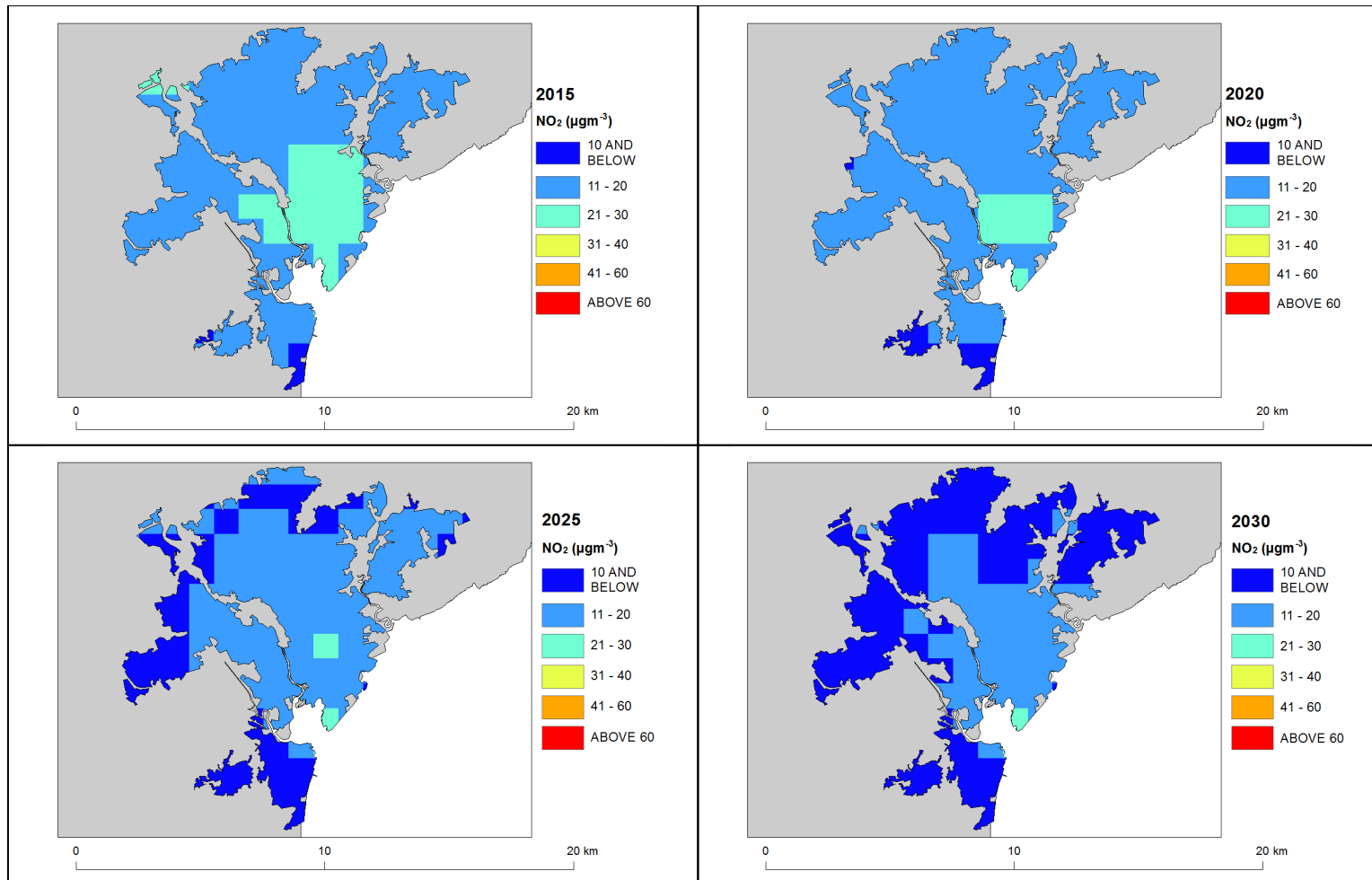
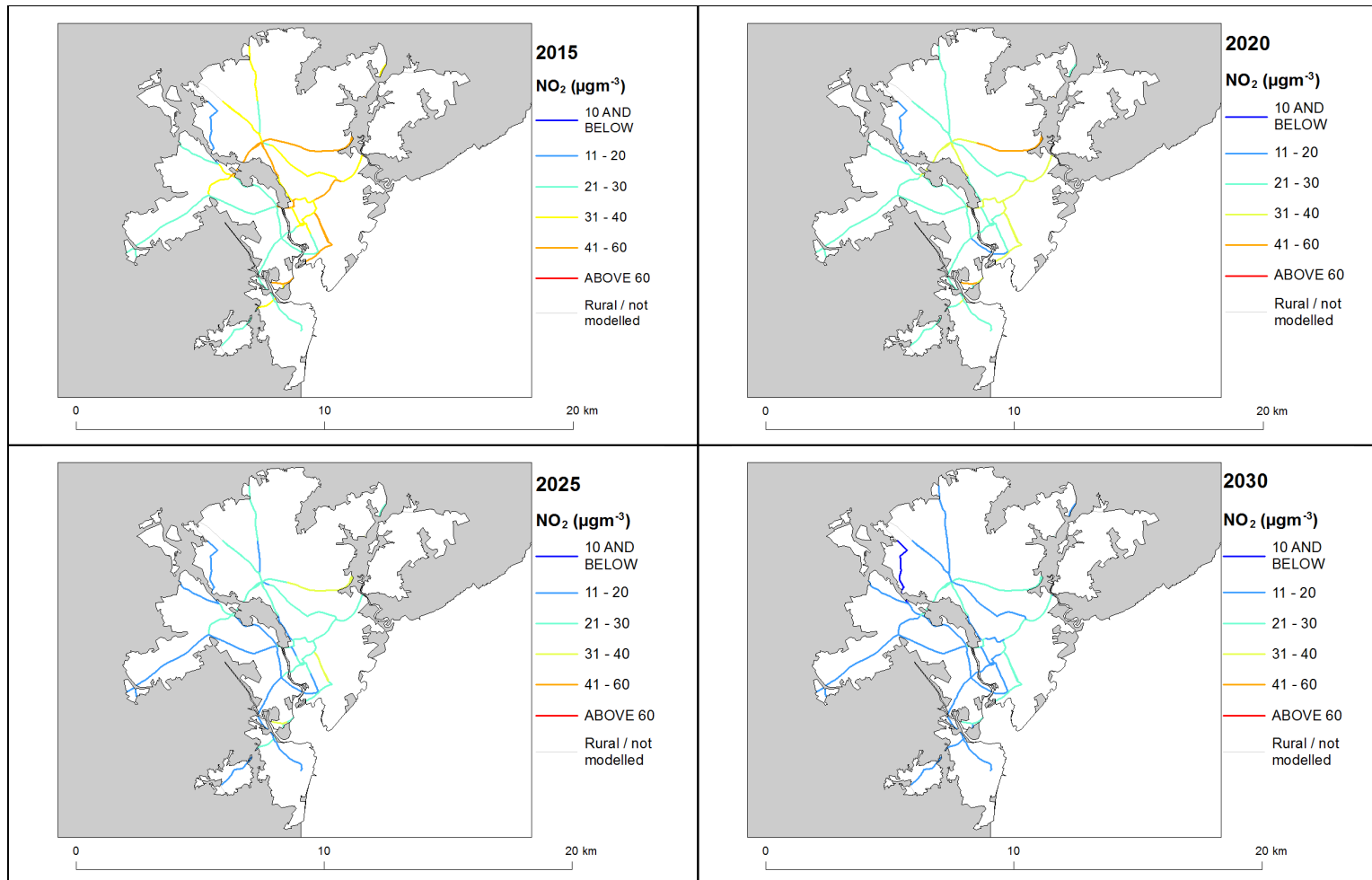


Figure 9: Roadside baseline projections of annual mean NO₂ concentrations in 2020, 2025 and 2030. 2015 is also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.



Annexes

A References

1st Daughter Directive 1999/30/EC. Council Directive 1999/30/EC, of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air (The First Daughter Directive). From the Official Journal of the European Communities, 29.6.1999, En Series, L163/41.

Air Quality Directive 2008/50/EC. Council Directive 2008/50/EC, of 21 May 2008. On ambient air quality and cleaner air for Europe. From the Official Journal of the European Union, 11.6.2008, En Series, L152/1

Air Quality Expert Group (AQEG, 2004). Nitrogen Dioxide in the United Kingdom. <http://uk-air.defra.gov.uk/library/aqeg/publications>

CDR Central Data Repository. <http://cdr.eionet.europa.eu/>

Decision 2004/224/EC. Commission Decision of 20 February 2004 laying down arrangements for the submission of information on plans or programmes required under Council Directive 96/62/EC in relation to limit values for certain pollutants in ambient air. From the Official Journal of the European Union, 6.3.2004, En Series, L68/27

Decision 2004/461/EC. Commission Decision of 29 April 2004 laying down a questionnaire to be used for annual reporting on ambient air quality assessment under Council Directives 96/62/EC and 1999/30/EC and under Directives 2000/69/EC and 2002/3/EC of the European Parliament and of the Council. From the Official Journal of the European Union, 30.4.2004, En Series, L156/78

Decision 2011/850/EU. Commission Implementing Decision of 12 December 2011 laying down rules for Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council as regards the reciprocal exchange of information and reporting on ambient air quality. From the Official Journal of the European Union, 17.12.2011, En Series, L335/86

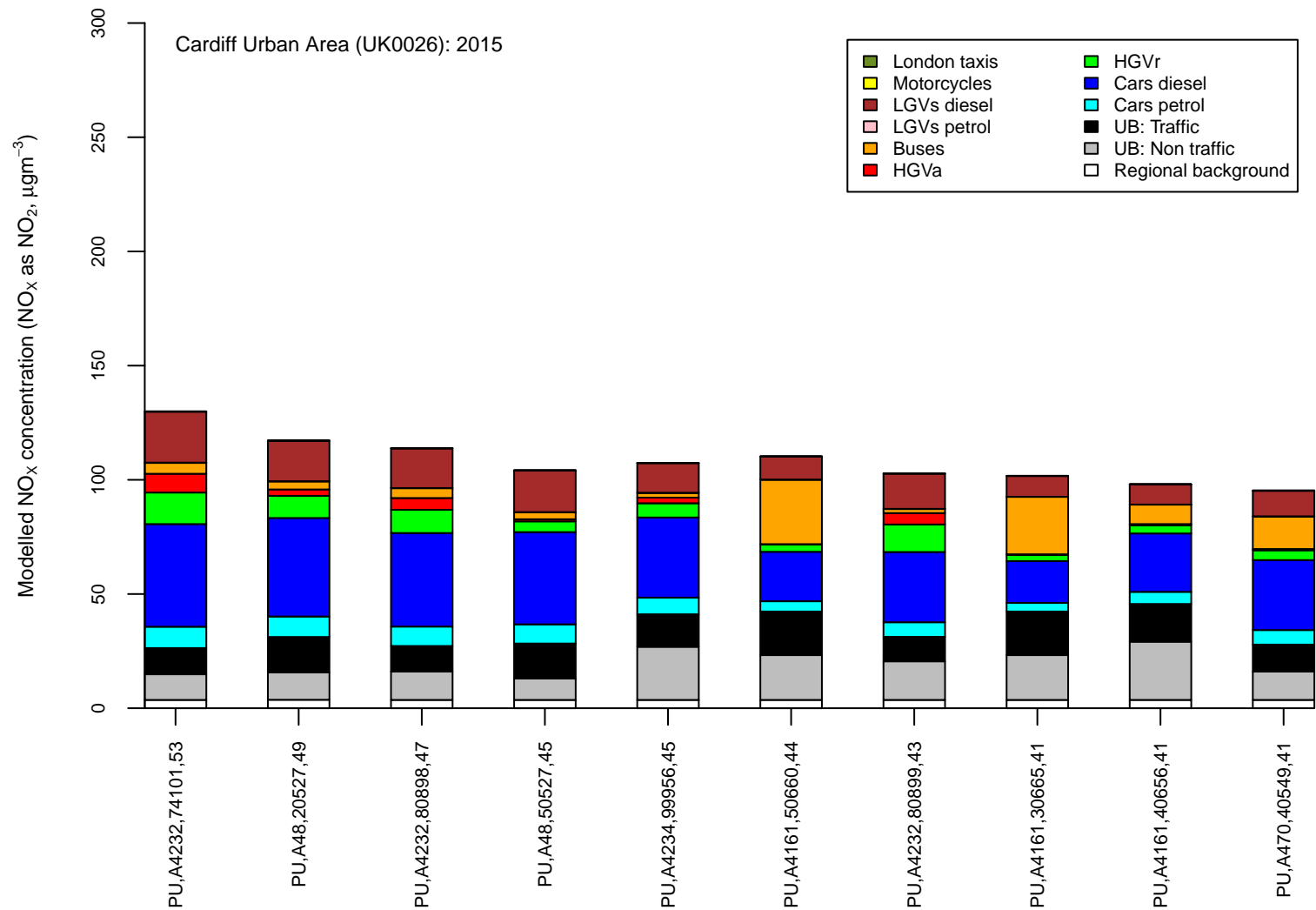
IPR 2013. Guidance on the Commission Implementing Decision laying down rules for Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council as regards the reciprocal exchange of information and reporting on ambient air (Decision 2011/850/EU). http://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

UK Air Quality Plan for tackling roadside nitrogen dioxide concentrations and the UK technical report are available at: <http://www.gov.uk/defra>.

B Source apportionment graphs

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Figure B.1: Annual mean roadside NO_x source apportionment plots for all roads exceeding the annual mean NO₂ limit value in 2015.



Road class (MU = motorway, PU = primary road, TU = trunk road), road number, census id 15 and modelled NO₂ concentration (μgm⁻³)

C Tables of measures

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Table C.1 Relevant Local Authority measures within Cardiff Urban Area (UK0026)

Measure code	Description	Focus	Classification	Status	Other information
Cardiff County Council_1	Deliver pedestrian improvements as part of annual programme of infrastructure schemes	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Other	Start date: 2015 Expected end date: 2020 Spatial scale: Local Source affected: Transport Indicator: Traffic reduction Target emissions reduction: Not quantified
Cardiff County Council_2	The Rights of Way Improvement Plan (ROWIP) has been in operation since 2008. The document has a ten year life span and tasks detailed within the document remain relevant.	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Implementation	Start date: 2001 Expected end date: 2018 Spatial scale: Whole town or city Source affected: Transport Indicator: Traffic reduction Target emissions reduction: Not quantified
Cardiff County Council_3	Developing and implementing an ambitious Cycling Strategy to double the number of cycle trips by 2026, from a 9.2% modal share in 2015 to 18.4% in 2026	Cycling Improvements	Traffic planning and management: Encouragement of shift of transport modes	Planning	Start date: 2016 Expected end date: 2026 Spatial scale: Whole town or city Source affected: Transport Indicator: Increase in cycling Target emissions reduction: Not quantified
Cardiff County Council_4	City Centre Transport Interchange	Bus Improvements	Traffic planning and management: Improvement of public transport	Planning	Start date: 2001 Expected end date: 2018 Spatial scale: Local Source affected: Transport Indicator: Public Transport use Target emissions reduction: Not quantified
Cardiff County Council_5	Developing bus priority measures on strategic bus corridors to help reduce bus journey times, improve journey time reliability and make bus travel a more attractive alternative to the car for a greater range of journeys	Bus Improvements	Traffic planning and management: Improvement of public transport	Implementation	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Public Transport use Target emissions reduction: Not quantified
Cardiff County Council_6	Developing new Park and Ride sites to capture car-based traffic at key points on the periphery of the city	Widening Travel Choices	Traffic planning and management: Improvement of public transport	Planning	Start date: 2001 Expected end date: 2026 Spatial scale: Local Source affected: Transport Indicator: Usage statistics Target emissions reduction: Not quantified

Measure code	Description	Focus	Classification	Status	Other information
Cardiff County Council_7	Safe routes to Schools	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Planning	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Walking statistics Target emissions reduction: Not quantified
Cardiff County Council_8	Safer Routes in Communities	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Planning	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Walking statistics Target emissions reduction: Not quantified
Cardiff County Council_9	School Travel Plans	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Evaluation	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Adoption of plans Target emissions reduction: Not quantified
Cardiff County Council_10	Traffic management	Intelligent Transport Systems	Traffic planning and management: Other measure	Evaluation	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Road transport numbers Target emissions reduction: Not quantified
Cardiff County Council_11	Real-time Information and Bus Priority System	Intelligent Transport Systems	Traffic planning and management: Improvement of public transport	Implementation	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Bus usage statistics Target emissions reduction: Not quantified
Cardiff County Council_12	Green Fleet and Alternative Fuel Vehicles	Air Quality	Public procurement: New vehicles, including low emission vehicles	Implementation	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Fleet management statistics Target emissions reduction: Not quantified
Cardiff County Council_13	Air Quality Monitoring linked to UTC	Air Quality	Traffic planning and management: Other measure	Other	Start date: 2002 Expected end date: 2007 Spatial scale: Local Source affected: Transport Indicator: AQ improvements Target emissions reduction: Not quantified

Measure code	Description	Focus	Classification	Status	Other information
Cardiff County Council_14	City Centre Movement Strategy - Develop and seek funding for proposals to support sustainable transport movements to and through the city centre in conjunction with the implementation of the new bus interchange development	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Planning	Start date: 2016 Expected end date: 2021 Spatial scale: Local Source affected: Transport Indicator: Bus usage, walking and cycling statistics Target emissions reduction: Not quantified
Cardiff County Council_15	Working with key partners such as Welsh Government and Network Rail to bring forward proposals such as electrification and the redevelopment of Cardiff Central Station	Rail improvements	Traffic planning and management: Improvement of public transport	Planning	Start date: 2010 Expected end date: 2020 Spatial scale: National Source affected: Transport Indicator: Public Transport use Target emissions reduction: Not quantified
Cardiff County Council_16	Working with regional partners to co-ordinate the implementation of strategic bus corridor improvements on key routes to and across the city	Bus Improvements	Traffic planning and management: Improvement of public transport	Implementation	Start date: 2001 Expected end date: 2020 Spatial scale: Whole town or city Source affected: Transport Indicator: Bus usage and journey time statistics Target emissions reduction: Not quantified
Cardiff County Council_17	Extending 20mph limit areas to promote lower speeds in primarily residential areas	Widening Travel Choices	Traffic planning and management: Reduction of speed limits and control	Implementation	Start date: 2013 Expected end date: 2020 Spatial scale: Local Source affected: N/A Indicator: Traffic speeds, walking and cycling statistics Target emissions reduction: Not quantified
Cardiff County Council_18	Continue the implementation of annual programme of cycling infrastructure improvements	Widening Travel Choices	Traffic planning and management: Encouragement of shift of transport modes	Planning	Start date: 2001 Expected end date: 2026 Spatial scale: Local Source affected: Transport Indicator: Cycling statistics Target emissions reduction: Not quantified
Cardiff County Council_19	Targeted enforcement of Moving Traffic Offences to ensure the efficient management of the transport network	Intelligent Transport Systems	Traffic planning and management: Other measure	Evaluation	Start date: 2015 Expected end date: 2015 Spatial scale: Local Source affected: N/A Indicator: Road transport numbers Target emissions reduction: Not quantified

Measure code	Description	Focus	Classification	Status	Other information
Cardiff County Council_20	Implement Smart Parking project and progress actions in the Parking Strategy	Intelligent Transport Systems	Traffic planning and management: Other measure	Implementation	Start date: 2016 Expected end date: 2020 Spatial scale: Local Source affected: Transport Indicator: Road user and parking statistics Target emissions reduction: Not quantified

Table C.2 Additional measures provided by the Welsh Government which will deliver air quality improvements within Cardiff Urban Area (UK0026)

Measure code	Description	Focus	Classification	Status	Other information
WG_Cardiff_1	Cardiff City Region Metro Project, including Valley Line Modernisation (South Wales)	Reduced journey times; increased public transport use; improved quality of service; reduced operating and maintenance costs; improved reliability; capacity to meet demand; accessibility improvements; park and ride improvements; reduced emissions; and direct service to economic centres.	Traffic planning and management: Other measure	Planning	Start date: 2014 Expected end date: N/A Spatial scale: Local Source affected: Transport Indicator: N/A Target emissions reduction: Not yet quantified