

**APPENDIX 19-2**  
**DMRB ASSESSMENT**

## Appendix 19-2 DMRB Assessment

The assessment of potential impacts associated with development traffic has been conducted using the UK Design Manual for Roads and Bridges (DMRB) screening method v1.03c' methodology<sup>1</sup>. The DMRB methodology facilitates the prediction of pollutant concentrations near to roads, as a result of vehicle emissions.

According to the DMRB guidance, further assessment is only required when daily traffic flows are increased by 1000 AADT or more or Heavy Duty Vehicles (HDV) movements are increased by 200 or more. The total development trips are presented below (calculations are shown in the Traffic Assessment).

### Development Traffic

Year	Traffic Flows (24 Hour AADT)	HDV Flows (24 Hour AADT)
2012	314	264

The total development traffic AADT flow is below the DMRB assessment criteria (of 1000 AADT). Furthermore, it is anticipated that due to the distribution of HDV traffic on the local roads that less than 200 HDV AADT flow would affect any single road and would therefore be below the DMRB assessment criteria.

As a worst case from a highway impact perspective, the Traffic Assessment has assumed that 70% (i.e. 198 HDV's AADT) of the development traffic would use the Rover Way / Lamby Way route to and from the application site. For the purposes of the Air Quality Assessment of traffic emissions however, it has been assumed that 100% of development traffic will use Rover Way route.

Predicted concentrations at receptors are made using an empirical relationship using different emission factors for different vehicle types. These emission factors change from year to year as the technology in the vehicle fleet improves. The DMRB output for NO<sub>x</sub> has been input into the NO<sub>x</sub>:NO<sub>2</sub> calculator<sup>2</sup> to derive NO<sub>2</sub> concentrations (released by [www.airquality.co.uk](http://www.airquality.co.uk)) based on the latest monitoring data study between 2003 and 2006.

The DMRB local air quality assessment has concentrated on the impact relating to nitrogen dioxide (NO<sub>2</sub>) and fine particles (PM<sub>10</sub>) as the key pollutants relating to traffic emissions. The impact of the proposed development has been assessed for the anticipated earliest possible year of opening; 2012.

Any predictive modelling only determines the relative contribution to air pollution levels in an area as a consequence the traffic flows and vehicle mix. In order to determine the total concentration at the identified receptors, appropriate 'background' concentrations are required to be taken into consideration.

Background air quality data have been corrected for the assessment year using methodology set out in DEFRA Technical LAQM TG(09). The background PM<sub>10</sub> and NO<sub>2</sub> has been taken from the real time monitor at Cardiff Centre AURN site, the 2008

<sup>1</sup> Design Manual for Roads and Bridges Vol. 11 Environmental Assessment (Consolidated Edition), Section 3, Part 1 Air Quality (2007)

<sup>2</sup> <http://www.airquality.co.uk/archive/laqm/tools.php>

data (last year of ratified data) has been used. Backgrounds used for the DMRB assessment are presented below:

#### Background Concentrations used for the DMRB Assessment

Parameter	Baseline data 2008	Assessment Year 2012
PM <sub>10</sub>	20.0	19.1
NO <sub>2</sub>	29.0	26.5
NO <sub>x</sub>	47.1	40.6

#### Receptors

The receptor used to predict annual mean pollutant concentration has been selected to represent worst case locations. The closest residential location on Rover Way is the Caravan Site, located 14.5m from centre of road.

#### Vehicle Flows

The predicted baseline flows and flows with development traffic in 2012 for Rover Way (east of ocean way) are presented in the tables below.

#### Vehicle Flow Rates for Rover Way (East of Ocean Way)

Year	Traffic Flows (24 Hour AADT)	HDV Flows (24 Hour AADT)	HDV Combined % (24 hour)	Average Speed (km/h)
2012 – Without Development	27,131	3,527	13.0%	62.8
2012 – With Development	27,445	3,791	13.8%	62.8

The width of the road is approximately 9m and it has been classified as a type 'B' road for the DMRB assessment.

#### Results

Predicted NO<sub>2</sub> and PM<sub>10</sub> concentrations been calculated for the 'without development' and 'with development' assessment year of 2012.

#### Predicted Annual NO<sub>2</sub> and PM<sub>10</sub> Concentrations from Traffic Emissions (µg/m<sup>3</sup>)

Receptor	NO <sub>2</sub> ug/m <sup>3</sup>	PM <sub>10</sub> ug/m <sup>3</sup>	
	Annual mean	Annual mean	Days >50ug/m <sup>3</sup>
2012 Without Development	33.5	20.65	7
2012 With Development	33.8	20.70	7
Difference	+0.3	+0.05	0
UK AQS Objective	40	40	<35

On the basis of this worst case assessment, it is predicted that the development would lead to a 0.3 ug/m<sup>3</sup> and 0.05 ug/m<sup>3</sup> increase in NO<sub>2</sub> and PM<sub>10</sub> annual average concentrations respectively. This receptor location, and therefore all other receptor locations, are significantly below the Objective level.

A study of the relationship between 1-hour and annual mean concentrations in the UK concluded that the 1-hour nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below  $60\mu\text{g}/\text{m}^3$ . The DMRB assessment predicts no concentrations above the  $60\mu\text{g}/\text{m}^3$  criterion at the assessed receptor locations it can therefore be concluded that there are no exceedences of the hourly average  $\text{NO}_2$  objective of  $200\mu\text{g}/\text{m}^3$ .

### **Verification**

The verification of this prediction is based on the Nitrogen dioxide diffusion tube monitoring undertaken at this receptor location (Location 7 in Drawing 4-4) between September 2007 and September 2008. The diffusion tube result for this location indicates the average annual concentration is  $43.35\mu\text{g}/\text{m}^3$ ; full results and bias adjustment factors are presented in Table 4-15 of Technical Appendix 4-1.

The following input data was used for the DMRB calculation, the diffusion tube was located 4.5m from road centre:

Year	Traffic Flows (24 Hour AADT)	HDV Flows (24 Hour AADT)	HDV Combined % (24 hour)	Average Speed (km/h)
2008	26020	3339	13%	62.8

The DMRB calculation predicts a concentration at the diffusion tube monitoring location of  $40.1\mu\text{g}/\text{m}^3$ ; this is very close to the monitored level of  $43.35\mu\text{g}/\text{m}^3$  and therefore no adjustment to the model results is considered necessary.