



## Bayfield Chepstow

Transport for Wales

### Trip Analysis and Air Quality Assessment

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## Contents

<b>Executive Summary</b> .....	<b>1</b>
<b>1. Introduction</b> .....	<b>2</b>
<b>2. Trip Generation and Distribution</b> .....	<b>3</b>
<b>3. Air Quality Assessment</b> .....	<b>4</b>
3.1 Overview.....	4
3.2 Review of the Assessment Methodology .....	4
3.3 Review of the Modelling Study .....	4
3.4 Review Outcome .....	5

**No table of contents entries found.**

## Executive Summary

This report reviews the assessment of the impact on air quality of a proposed housing development, at Bayfield, Chepstow. The proposed development consists of building new 200 new dwellings, of which 160 will be for private ownership and 40 will be classed as affordable housing.

The applicants forecast traffic volumes have been checked and found to be correct.

The air quality assessment followed the relevant guidance and the majority of the assumptions are appropriate.

The review highlighted a potential overestimate in speeds associated with modelled link roads and the lack of consideration for the effect of road gradient within the AQMA. These two factors combined are likely to have caused an underestimate of NO<sub>2</sub> concentrations at some receptors.

However, the impact of scheme (i.e. the difference in concentration with and without the proposed development) appear to be small and even assuming that concentration at receptors within the AQMA would be higher, is unlikely that the assessment would show a significant impact.

## 1. Introduction

A Traffic Assessment has been conducted to estimate the increase in traffic associated with the proposed development and to provide the input for the Air Quality study. The development consists of 200 dwellings of which 160 will be private ownership and 40 will be affordable housing. The area local to the site is mostly rural and suburban. Welsh Government expressed the concern for potential air quality impacts within or near the Chepstow AQMA.

Although the Traffic Assessment suggested that the increase in traffic would be minimal and that no congestion issues are anticipated at the High Beech roundabout, a review of the air quality assessment is requested as latest available (2016) monitoring data showed that NO<sub>2</sub> annual average concentrations are exceeding the limit at some locations along New Port Rd and Hardwick Hill, within the Chepstow Air Quality Management Area (AQMA).

The aim of this report is to assess the trip generation and distribution of the proposed residential development at Bayfield Chepstow and to review the Air Quality Assessment to ensure that the study was able to provide sufficient evidences that Barratt David Wilson Homes development does not, in air quality terms, conflict with national or local policies, or with measures set out in Monmouthshire County Council (MCC) Air Quality Action Plan.

## 2. Trip Generation and Distribution

The Traffic Assessment (TA) included trip generation and distribution, estimating the vehicular traffic likely to be generated by the development. As the dwellings are split proportionally between private and affordable housing, the TA contained two TRICs analyses, one for each housing type. To determine the validity of these results Jacobs conducted comparable trip calculations using a similar method as per the TA and compared the two results. Jacobs figures suggested that the trips generated during morning and afternoon peak times for the privately-owned housing may be slightly lower than that stated on the TA although potentially slightly higher for the affordable homes. However, due to the small size of the proposed development, the differences between trip rates in the TA and Jacobs are negligible and unlikely to impact on the conclusions of the TA. Therefore, the trip rates, as presented in the TA can be considered acceptable.

The TA predicts trip distribution and assignment based upon census data. It uses table WU03EW - Location of usual residence and place of work by method of travel to work (Middle Layer Super Output Area (MSOA) level), MSOA Monmouthshire 008, to assess the working patterns of existing local residents, and applies this model to the development trips. It is noted that the site is actually located within MSOA Monmouthshire 007 – which covers a wider area of rural Monmouthshire but the writers of the TA considered this to be unrepresentative of the proposed development which, is located on the outskirts of Chepstow We agree that MSOA Monmouthshire 008 provides a suitable base for development trip distribution.

The TA includes a visual illustration of MSOA Monmouthshire 008 taken from Datashine Commute website – which visually present the data of traffic flow for each MSOA. The diagram demonstrates majority of the traffic from Chepstow travels to Bristol, follow by Newport and Cardiff. This is consistent with the turning movements along the appropriate routes within the study area which were determined based on time and distance between the site and destination. eg. Chepstow to Bristol/Newport/Cardiff.

The rationale and theory stated in the TA and described above are in line with good practice. Therefore, the TA's trip generation and distribution methodology and results are acceptable and suitable to be used for the assessment of the potential impact the proposed development have on air quality.

## 3. Air Quality Assessment

### 3.1 Overview

The air quality assessment undertaken to accompany the planning application was prepared by RPS on behalf of Barratt David Wilson Homes and considers the air quality impacts from the construction and full operational phases of the proposed development.

The proposed development is located in Chepstow (Monmouthshire) which has designated two AQMAs. In particular, the development is only 750m north-west of the Chepstow AQMA that has been declared for NO<sub>2</sub>.

This review focuses on the operational impacts associated with the increase in road traffic.

### 3.2 Review of the Assessment Methodology

The air quality assessment methodology followed by RSP is consistent with EPUK and IAQM Land-Use Planning & Development Control: Planning for Air Quality document and is considered to be appropriate for the scope.

The considered road network presented in Figure 1, is appropriate and includes roads within the Chepstow AQMA.

Road emissions have been estimated using the Defra's 2017 Emission Factor Toolkit (EFT) version 8.0, which was the latest version available at the time of the study. There is no reference to where emission estimates give consideration to road gradients.

The assumed background is the Defra mapped background, which is appropriate for the scope and it has not been projected (i.e. no reduction in backgrounds has been applied for future years), which is a reasonable conservative assumption. Paragraph 4.11 (page 21) should be reviewed as some text is missing.

The selected sensitive receptors are representative of worst case locations and provide a sufficient coverage within the Chepstow AQMA.

The dispersion model applied is ADMS-Roads, which is widely used in the UK and internationally for regulatory purposes.

### 3.3 Review of the Modelling Study

Model input data are presented and, in general, they are appropriate to represent the local meteorological and baseline conditions. However, assumed speeds appear to be too high, in some cases equal or even higher than the likely speed limit. The typical speed limit in urban areas is 30mph which corresponds to 48kph. Table 3.1 reports speeds above 50 kph even for links within the AQMA (urban area). The actual average speed is likely to be well below the speed limit on trafficked roads such as the A48 east of High Beech.

This is likely to have resulted in an underestimate of NO<sub>x</sub> emissions, especially from heavy good vehicles (HGVs) for which emissions increases significantly at lower speeds.

The raw modelling results have been adjusted through a model verification process. The overall approach is consistent with the relevant guidance but the results after the verification still show differences between modelled and measured NO<sub>2</sub> concentrations greater than +/-25% at four locations out of six. This suggests that the verification process is not effective in improving the correlation between model and measures.

In this case it is usually recommended to review the emissions estimate and/or use multiple verification factors to improve the validation.

Reviewing the diffusion tube locations within the Chepstow AQMA, it is possible to see that the A48 westbound is uphill through the AQMA. “Uphill emissions” are known to be significantly higher than emissions associated with a road with no gradient (this is due to an increase in emissions from HGVs), while emissions from downhill traffic flows usually do not show any significant reduction when compared with road with no gradient.

There is no reference to the correction of HGVs emissions to account for the road gradient. This is likely to be the main reason why the model is not able to properly reproduce high NO<sub>2</sub> concentrations at location CH3, CH4 and CH5.

As result of that NO<sub>2</sub> concentration presented in Table 5.1 are likely to be underestimated for some of the receptors within the AQMA. In particular, concentration at receptor 27, which is located in correspondence of monitoring location CH4, is likely to be significantly underestimated and it cannot be concluded that the actual concentration in the opening year (i.e. 2023) will be very close to the limit of 40 µg/m<sup>3</sup>, if not even exceeding the limit.

### 3.4 Review Outcome

The air quality assessment followed the relevant guidance, clearly presents modelling inputs and the majority of the assumptions are considered to be appropriate.

The overestimate in speeds associated with modelled link roads and the lack of consideration for the effect of road gradient within the AQMA are likely to have led to an underestimate of NO<sub>2</sub> concentrations at some receptors. However, the impact of the scheme (i.e. the difference in concentration with and without the proposed development) appears to be small and, even assuming that concentrations at receptors within the AQMA would be higher, is unlikely that the assessment would show a significant impact. This appears to be consistent with the predicted changes in traffic within the AQMA. As reported in Table 3.1, the expected increase in traffic flows along the A48 east of High Beech is limited to 10 vehicles per day only.

**In conclusion the overall outcome of the air quality assessment is considered to be valid**