

Air Quality Assessment of Transport Model Options 2020

1. Introduction

A quantitative screening exercise to investigate the potential for air quality impacts of the estimated vehicle traffic associated with additional housing developments (outside of those detailed in the Adopted Local Plan) has been undertaken as part of the Local Plan Review (LPR).

This assessment provides the air quality screening exercise, together with an assessment of the current available baseline air quality conditions in the District.

2. Methodology

2.1 Baseline Conditions

A review of existing air quality conditions in the District has been undertaken through a review of CCC's 2020 Annual Status Report.

2.2 Air Quality Screening Exercise

The air quality screening exercise has been undertaken in accordance with DMRB LA 105 air quality guidance. The guidance sets out screening assessment criteria, whereby the change in traffic data (a comparison between traffic data where a proposed scheme is in place (Do Something) and a scenario without the proposed scheme in place (Do Minimum). Any roads that meet these criteria are considered 'Affected' and form part of the 'Affected Road Network' (ARN).

DMRB LA 105 was recently published (2019) and supersedes the previous air quality guidance HA 207/07. The screening criteria remain the same between the two sets of guidance, with the exception of speeds, with speed banding criteria now forming part of DMRB LA 105, which is largely used for Highways England assessments. The HA207/07 speed criteria are listed here for completeness.

The DMRB air quality screening criteria is as follows:

- Daily traffic flows would change by 1,000 Annual Average Daily Traffic (AADT) or more; or
- Heavy Duty Vehicle (HDV) flows would increase by 200 AADT or more; or
- The AM peak hour speed would increase by 20 km/hr or more; or
- The PM peak hour speed would increase by 20km/hr or more; or
- The daily average speed would increase by 10 km/hr or more; or
- A change in alignment of more than 5 m.

For the purposes of this assessment, the traffic data provided for the five LPR scenarios has been compared against the change in daily traffic flow (AADT) criterion above. Discussions with the traffic modellers confirmed that as the development scenarios relate to additional housing developments there is unlikely to be any real increase in HGV's, so in line with the traffic modellers advice, the increase in HGVs was assumed to be zero. The main DMRB criteria that affect screening are the changes in AADT flow, so while the other criteria were not available for this screening exercise, the extent of the affected roads are expected to be broadly as the results indicate. The results of the screening exercise are discussed in Section 4.1.

The resulting road links that meet the screening criteria were then analysed spatially using GIS to determine their proximity to AQMAs. It should be noted that the air quality screening exercise undertaken provides a high-level indication of the potential for air quality impacts, and does not provide a detailed assessment of specific locations of the air quality impact or significance, nor concentrations.

2.3 Traffic Data Scenarios

The traffic data used in the screening exercise was provided by Jacobs, and was the result of transport modelling and testing of the potential additional housing development locations above what is discussed in the current Adopted Local Plan.

This testing was divided into five separate scenarios. In order to determine whether each scenario could have potential air quality impacts, the following traffic data was utilised:

- Baseline (without each of the five separate development scenarios in place) – this dataset included the traffic associated with:
 - The current Adopted Local Plan housing growth;
 - Committed developments; and
 - Background factoring (for future year projection).

Five separate scenario datasets were provided. Table 1 shows the combinations of potential planned development areas and traffic schemes included in each scenario. Background growth of around 3,000 dwellings, reflecting windfall and regeneration sites, is distributed evenly across the district.

Table 1: Development and Traffic Scenarios

Traffic Scenario ID	Traffic Schemes	Development in around Canterbury	Development in Whitstable	Development in Herne Bay
Option 1	Baseline	4000	500	1500
Option 2	Whitstable Bus Route Chestfield New Link & Junction Whitstable Park & Ride	2000	2000	2000
Option 3	Clean Air Zone Removed A2 Off Slip Bus Lane Approach Whitstable Bus Route NWMS Thanington 4th Slip Hospital Access Signalised Junctions 4th Park & Ride	4000	1000	1000
Option 4	Clean Air Zone Removed A2 Off Slip Bus Lane Approach Western & Eastern Bypass NWMS Thanington 4th Slip Hospital Access Signalised Junctions 4th Park & Ride	9000	1000	1000
Option 5	Shared Streets Removed A2 Off Slip Bus Lane Approach Western & Eastern Bypass NWMS Thanington 4th Slip	9000	1000	1000

	Hospital Access Blockers & Corridors 4th Park & Ride			
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3. Baseline Conditions

A range of readily available desk-study information regarding background/baseline air quality information has been obtained and reviewed as part of this assessment. This is discussed below.

3.1 Local Air Quality Management (LAQM)

Under the LAQM process, local authorities have an obligation to review and assess air quality in their areas to determine whether the Air Quality Objectives are likely to be achieved. Each local authority must publish an annual report of their data as an ASR. The CCC 2020 ASR notes that the main source of air pollution in the borough are traffic emissions from major roads notably the A2, A28 and A299.

3.2 Air Quality Management Areas (AQMAs)

Under the LAQM process, local authorities are required to designate an AQMA upon evidence of prolonged exceedance of Air Quality Objectives in their administrative area. Following declaring an AQMA, the local authority must put in place an AQAP to encourage reduction in air quality concentrations to improve air quality within the declared AQMA.

An AQMA was declared in April 2006 along parts of the A28 at Broad Street/Military Road, in Canterbury City Centre, where exceedances of the annual mean objective for nitrogen dioxide (NO₂) were predicted. This AQMA was then incorporated into an expanded area in 2011, which also included two small areas of Broad Street and Wincheap. The AQMA was expanded further in April 2018 to incorporate areas along Rheims Way, Old Dover Road, New Dover Road and Chaucer Road. The boundaries of the updated AQMA were conservatively selected to cover areas exceeding the annual mean air quality objective for NO₂, as well as those areas within 10% of the objective.

An additional AQMA in Herne was also declared in April 2018 to cover the Canterbury Road/School Lane junction for predicted exceedances of the annual mean NO₂ objective.

The AQMAs are illustrated in the figures below.

Figure 1: Canterbury Air Quality Management Area

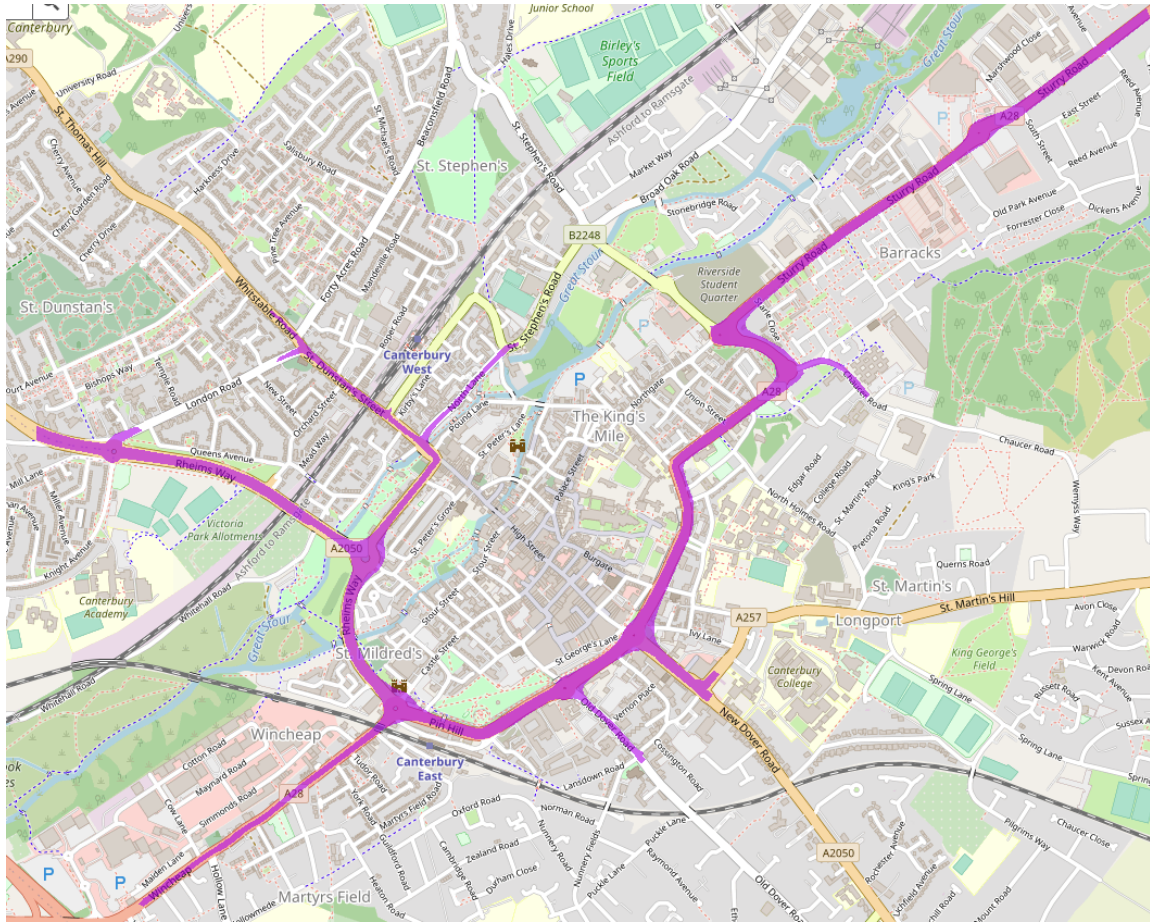
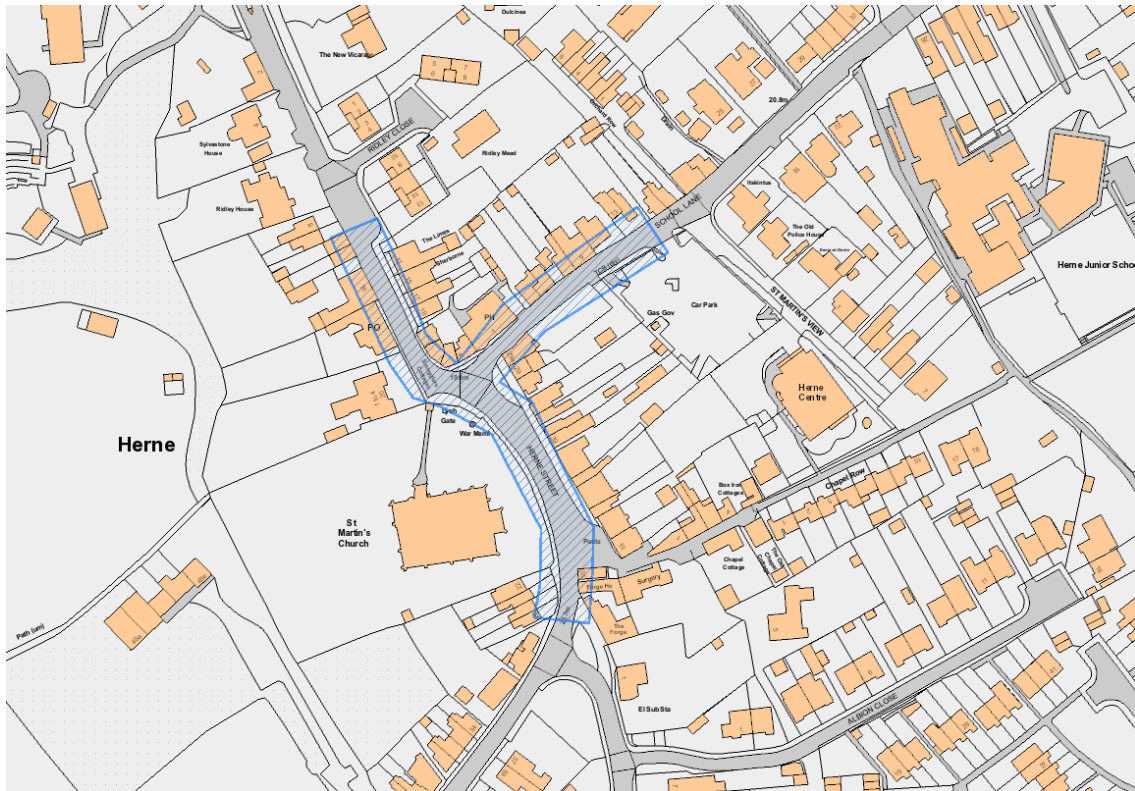


Figure 2: Herne Air Quality Management Area



3.3 Monitoring Sites

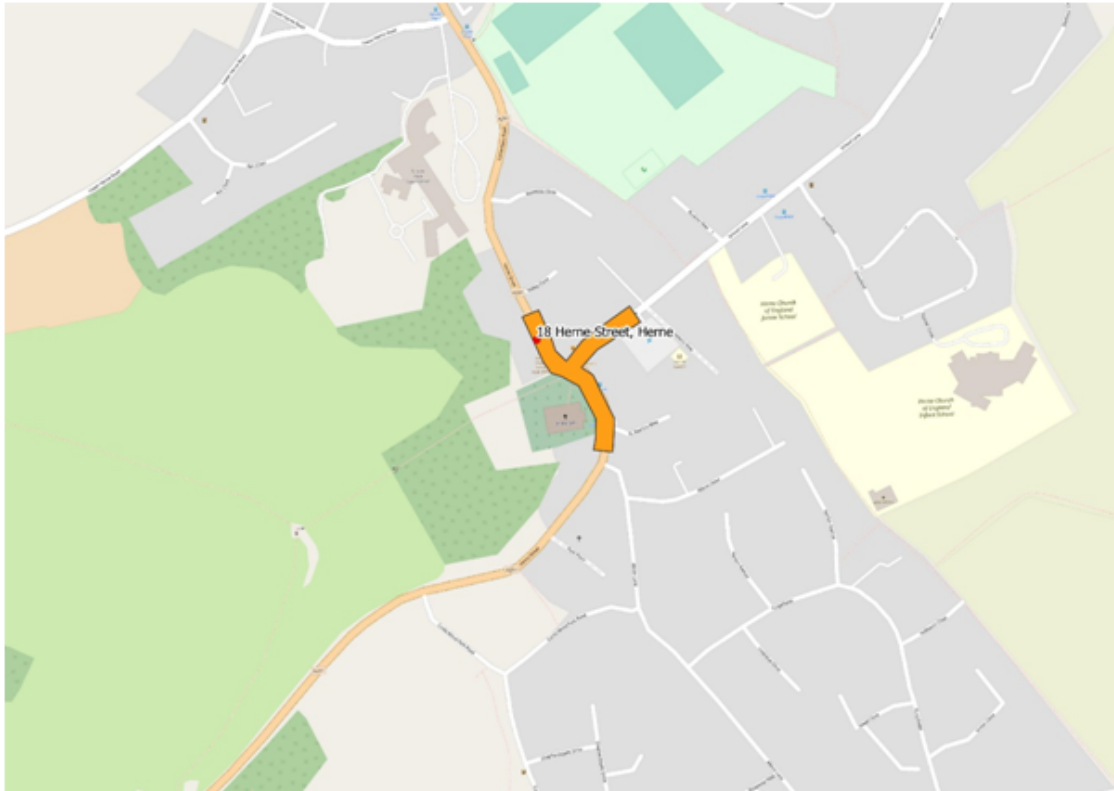
CCC undertook automatic (continuous) monitoring at two sites during 2019 and passive (diffusion tube) monitoring at 59 sites during 2019.

The CCC air quality monitoring results identified exceedances of the NO₂ annual mean Air Quality Objective (40µg/m³) at four non-automatic monitoring sites located within the AQMAs. These were located in Broad Street and Wincheap in Canterbury and at Herne Street in Herne shown in figures 3 and 4 below.

Figure 3 – Diffusion Tube Sites Exceeding the NO₂ AQS Objective in the Canterbury AQMA



Figure 4 – Diffusion Tube Sites Exceeding the NO2 AQS Objective in the Herne AQMA



3.4 Air Quality Action Plan (AQAP)

The AQAP published in December 2018 outlines the actions CCC will take to improve air quality in Canterbury City and Herne over the period 2018-2023. A number of initiatives will be implemented to increase modal shift away from private car use for workplace travel to increased use of more sustainable transport including walking, cycling and enhanced bus and Park & Ride provisions and raising public awareness of air quality issues and promoting good practise. The construction of the Herne Relief Road due to be completed in 2023 will remove a significant amount of traffic from the centre of Herne which is expected to significantly improve air quality resulting in the removal of the AQMA. The effect on the Herne AQMA is therefore not included in the following screening exercise.

However, the monitoring data highlights the continued need for both AQMAs, with exceedances of the NO2 annual mean within the AQMAs. Concentrations along the Canterbury City Centre ring road and in the centre of Herne remain high. Additional development in the District would therefore have the potential to worsen pollutant concentrations within the AQMAs, rather than helping to reduce them. Additional development site locations therefore need to be taken into consideration in order to support the AQAP.

4. Air Quality Screening Exercise

4.1 Screening Exercise Results

The scenario traffic data provided was used to determine the change in AADT traffic flow on each road link between the baseline and development options. The change in flow was then compared with the DMRB LA105 screening criteria (i.e. a change of 1000 AADT). Those road links that 'met' the criteria were then classified as 'affected' and the total number of affected traffic links was calculated for each option. The effect on Broad Street and Wincheap, the most polluted locations within the Canterbury AQMA, was also recorded. The results of the screening exercise for all five options are shown in Table 2.

Table 2: Local Plan Options: Air Quality Screening Results

Local Plan Option	Total Number of Affected Traffic Links (DS-DM)		Affect on Broad Street in Canterbury AQMA (AADT)	Affect on Wincheap* in Canterbury AQMA (AADT)
	> 1000 AADT	< -1000 AADT		
Option 1	785	81	+375	-382 to +1252
Option 2	291	159	+343	+180 to +612
Option 3	364	337	-881	-7745 to -1965
Option 4	596	486	-2752	-7655 to -358
Option 5	676	664	-5710	-1992 to -960

*Wincheap is presented as a range due to there being more than one site of air quality exceedance.

4.2 Option 1

The results of the screening exercise indicate that there are 785 affected road links that meet the air quality criteria for option 1. The affected links encompass the Canterbury AQMA and negatively affect both Broad Street and Wincheap as traffic is predicted to increase along these roads.

4.3 Option 2

The results of the screening exercise indicate that there are 291 affected road links that meet the air quality criteria for option 2. The affected links encompass the Canterbury AQMA and negatively affect both Broad Street and Wincheap as traffic is predicted to increase along these roads.

4.4 Option 3

The results of the screening exercise indicate that there are 364 affected road links that meet the air quality criteria for option 3. The affected links encompass the Canterbury AQMA and positively affects Broad Street as traffic is predicted to decrease along this road. Wincheap experiences a substantial improvement as traffic is predicted to decrease significantly along this road.

4.5 Option 4

The results of the screening exercise indicate that there are 596 affected road links that meet the air quality criteria for option 4. The affected links encompass the Canterbury AQMA and both Broad Street and Wincheap experience a substantial improvement as traffic is predicted to decrease significantly along these roads.

4.3 Option 5

The results of the screening exercise indicate that there are 676 affected road links that meet the air quality criteria for option 5. The affected links encompass the Canterbury AQMA and positively affects Wincheap as traffic is predicted to decrease along this road. Broad Street experiences a substantial improvement as traffic is predicted to decrease significantly along this road.

5. Air Quality Screening Exercise Review

An air quality screening exercise has been undertaken to identify whether the traffic flows associated with additional housing developments within the CCC area have the potential to result in air quality impacts, and therefore affect the delivery of CCC planning and air quality policy and action plans.

The exercise used traffic data to determine whether the traffic would meet the DMRB LA 105 screening criteria for air quality assessment (and therefore lead to potential air quality impacts).

The exercise is to support the wider LPR and to determine whether further assessment of the potential air quality impacts (associated with Options 1 to 5) will be necessary.

The results indicate that all five options have the potential to have an adverse impact on air quality at sensitive receptors within CCC.

5.1 Potential Impacts on Receptors

The increases in traffic flow as result of the additional developments indicate the potential to adversely affect air quality concentrations in already exceeding areas, namely the Canterbury AQMA; albeit to differing degrees for each scenario.

5.2 Option Comparison

Comparison of the options indicates that Option 1, has the greatest number of affected links. This indicates that the inclusion of developments around the City and in Herne Bay with no additional traffic schemes leads to greater traffic flow changes across a wider area compared to the other options. The Canterbury AQMA is negatively affected.

Option 2 is likely to have an adverse impact on the fewest number of sensitive receptors. As evident in Table 2, Option 2 has the fewest number of affected links, encompassing a smaller area than the other scenarios. This even distribution of development combined with traffic schemes in Whitstable has a slight negative effect on the Canterbury AQMA.

Option 3 is likely to have an adverse impact on the second fewest number of sensitive receptors as it has the second fewest number of affected links. The Canterbury focussed distribution of development combined with the traffic schemes in Canterbury has a significant positive effect on the Canterbury AQMA.

Options 4 and 5 have the second and third greatest number of affected links. Both options have an added 5,000 homes to the development around the City, compared to Options 1, 2 and 3 and have included an Eastern and Western bypass to reduce traffic entering the city centre. Option 4 includes a Clean Air Zone and signalised junctions at Wincheap which results in a substantial positive effect on the Canterbury AQMA notably at the Wincheap junction. Option 5 also includes shared streets and blockers and corridors instead which results in a substantial positive effect on the Canterbury AQMA notably along Broad Street.

5.3. Uncertainties

It should be noted that the air quality screening exercise undertaken provides a high-level indication of the potential for air quality impacts, and does not provide a detailed assessment of specific locations of the air quality impact or significance, nor concentrations. The traffic data provided does not include detailed compositions relating to future improvements in low emissions vehicles, or the potential for increased public transport usage (and improvements to public transport fleets), or the potential for people walking and cycling instead of driving. For example the Stage 3 forecast report¹ assesses the potential for mode shift and ranks Option 5 as very high compared to Option 3 at high and Option 4 at medium. These factors could have a significant positive impact on the results presented within this report and therefore these results should be considered conservative.

Subsequent stages of the LPR will examine these variables more closely, and the air quality impacts will be re-assessed as part of this work.

¹Jacobs, Stage 3 Canterbury LP Forecast Report, March 2021

5.4 Conclusion

Of the three options (1, 2 & 3) that deliver 6000 additional homes Option 3 gives the most air quality improvements within the Canterbury AQMA, due to the introduction of traffic schemes in Canterbury that reduce capacity by discouraging inbound city centre traffic flows.

Out of the two options that deliver 11000 additional homes (4 & 5), Option 4, overall gives the most air quality improvements within the Canterbury AQMA as the reduction in traffic along Wincheap is the largest amount and the reduction in traffic on Broad Street is significant, even though it is lower than in option 5. This is due to the additional traffic being rerouted to the bypass and other traffic schemes discourage inbound city centre traffic flows.

The results of the air quality screening exercise should be considered conservative due to the high-level assessment used, which has not taken into account the potential for increased mode shift which is likely to reduce car use and improve air quality even further.