APPENDIX 10.4
INTERIM JUNCTION DESIGN ASSESSMENT

Stag Brewery – Interim Junction Design Assessment
Technical Note

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

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1. Introduction

1.1. Stag Brewery (the 'Site') is in the London Borough of Richmond upon Thames (LBRuT) borough-wide Air Quality Management Area (AQMA). The AQMA has been designated due to exceedances of the Air Quality Strategy (AQS) objectives for annual mean nitrogen dioxide (NO_2) and annual mean and 24-hour mean particulate matter (PM_{10}). These exceedances are attributed to existing vehicle emissions. In addition, the Site is situated adjacent to the Greater London Authority Air Quality Focus Area (AQFA). An AQFA is an area identified by a London Borough that is exceeding the annual mean Limit Value for NO_2 coupled with high human exposure. The Chalkers Corner component of the Development is located in the AQFA.

1.2. As part of the Stag Brewery Development, highways works are proposed at the Chalkers Corner Junction to alleviate the transport and traffic implications associated with the operation of the Development. The reconfiguration of the Chalkers Corner Junction includes:

- the provision of a short additional left turn lane (flare) from Lower Richmond Road into the junction (26m long or about 5 car lengths);

- provision of an extended queuing reservoir between the main junction of Lower Richmond Road (this would accommodate about 9 extra cars southwest bound) and would also provide extra storage for northeast bound vehicles including those waiting to turn right into Lower Richmond Road); and

- provision of a wider pedestrian island within the Lower Richmond Road arm to 4m wide to sufficiently cater for cyclists crossing as well as pedestrians.

1.3. In addition, an extended, dedicated lane for traffic turning left from Clifford Avenue into Lower Richmond Road would also be provided.

1.4. As discussed in **Chapter 5: The Proposed Development** of the Environmental Statement (ES), the Chalkers Corner Junction forms part of the Development and as such the highway works have

been considered within the 'with Development' scenario of **Chapter 10: Air Quality** of the ES. During consultation LBRuT requested additional information is presented on the potential air quality impacts associated with the junction highway works in isolation.

1.5. This Technical Note presents additional modelling information on the Chalkers Corner Junction highways works. The Technical Note presents a comparison of scenarios not presented in the ES to determine the impact of the junction highway works on air quality in isolation and therefore determine the significance of effect of the highways works in isolation. It is noted that the scenarios assessed here are hypothetical only as the Chalkers Corner Junction highways works forms part of the wider Stag Brewery Development and would not be implemented in isolation. Given that the Chalkers Corner Junction is located in the AQFA this assessment has only focussed on NO_2.

2. Methodology

2.1. The same general methodology has been undertaken with regards to this air quality assessment as the air quality modelling completed for the air quality assessment presented in **Chapter 10: Air Quality** of the ES and the technical details set out in **Appendix 10.1** of the ES as part of the planning application. A general overview of the detailed modelling is provided below.

Model

2.2. The effect of the junction on local air quality was assessed using the advanced atmospheric dispersion model ADMS-Roads, considering the contribution of emissions from forecast road-traffic on the local road for the model scenarios discussed below.

Model Scenarios

2.3. To assess the effect of the junction on local air quality the following traffic data scenarios have been provided:

- 2016 Baseline (no Development and no highways works) – traffic data for the existing baseline year and the current existing situation;'

- 2027 Baseline (no Development and no highways works) - traffic data for the assessment year 2027, the data excludes any traffic flows relating to the Development and no highways works to the Chalkers Corner Junction;

- 2027 'with Development but without highway works to Chalkers Corner Junction' (with Development and no highways works) - traffic data for the assessment year 2027, the data includes any traffic flows relating to the Development at the time of opening in 2027 but does not include the highways works to the Chalkers Corner Junction; and

- 2027 'with Development and with highways work to Chalker's Corner Junction' (with Development and with highways works) - traffic data for the assessment year 2027, the data includes any traffic flows relating to the Development at the time of opening in 2027 and the highways works to the Chalkers Corner Junction.

2.4. The above traffic scenarios have been modelled assuming that there is no future NO_x to NO_2 reductions by 2027 (i.e. considering the potential impacts of the junction highway works against the baseline 2016 conditions, assuming no reduction in background concentrations or road-traffic emissions between 2016 and 2027)[1].

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[1] Defra (2012) Local Air Quality Management: Note on Projecting NO2 Concentrations.

2.5.   Given that the highways works and the Development are to be completed in 2027, it is very likely that concentrations will be lower than those considered in the air quality assessment, as Euro 6 emissions standards will have fully been implemented by then and there is an expected increase in electric vehicles. However, the sensitivity approach provides a clear method to account for the uncertainty in future NO_x and NO_2 concentrations and ensures the results presented in this Technical Note are conservative.

2.6.   The highway works to the Chalkers Corner Junction forms part of the Development and have therefore been considered within the 'with Development' scenario within **Chapter 10: Air Quality** of the ES.

2.7.   This Technical Note presents a comparison of the following scenarios:

- **Scenario 1:** 2016 Baseline compared against 2027 Baseline;

    This scenario shows the likely change in air quality conditions from 2016 to 2027 assuming the existing junction layout remains and there is no Development and no highways improvements .

- **Scenario 2:** 2027 Baseline compared against 2027 'with Development but without highway works to Chalkers Corner Junction'.

    This scenario shows the impact of the Development on the existing Chalkers Corner Junction layout. It is noted this scenario would not happen, as the highway works to Chalkers Corner Junction form part of the Development, and as set out in **Chapter 6: Development Programme, Demolition, Alteration, Refurbishment and Construction** the highway works are to be brought forward at the start of the Development construction programme.

- **Scenario 3**: 2027 'with Development but without highway works to Chalkers Corner Junction' compared against 2027 'with Development and with highway works to Chalkers Corner Junction'.

    This scenario shows the change in pollutant concentrations resulting from the highway works to Chalkers Corner Junction alone assuming the Development is already in place.

- **Scenario 4:** 2027 Baseline compared against 2027 'with Development and with highway works to Chalkers Corner Junction'.

    This scenario is presented to show the change in concentrations resulting from the Development and the highway works together and is the scenario considered in **Chapter 10: Air Quality** of the ES.

Traffic Data and Speeds

2.8.   Traffic data was provided by Peter Brett Associates (PBA) and is presented in Table A6 of **Appendix 10.1** of the ES. To consider the presence of slow moving traffic near junction, the high level of congestion at the Chalkers Corner Junction traffic speeds have been reduced as per the criteria set out in **Appendix 10.1**. The queue lengths at Chalkers Corner have been provided by PBA to replicate the existing levels of congestion on the road network and to determine when to apply the speeds and the approach was agreed with LBRuT during the meeting on the 14th November 2017.

Diurnal Profile

2.9. Traffic flows follow a diurnal variation throughout the day and week. Therefore, a diurnal profile was used in the model to replicate how the average hourly traffic flow would vary throughout the day and the week. This was based on traffic counts undertaken in 2017 by PBA and the diurnal profile is presented in **Figure A1** in **Appendix 10.1** of the ES.

Road Traffic Emission Factors

2.10. The latest version of the ADMS-Roads model (version 4.1.1.0) was used for the assessment. The model does not include the latest vehicle emission factors published by Defra in the Emission Factors Toolkit (version 8.0 published in November 2017, and based on the latest COPERT database published by the European Environment Agency). Therefore, these have been input manually into the model from the EFT spreadsheet, for use in the assessment.

2.11. The EFT uses several parameters (traffic flow, percentage of HDV, speed and road type) to calculate road traffic emissions for the selected pollutants.

Background Pollutant Concentrations

2.12. Background pollutant concentration data (i.e. concentrations due to sources not directly considered in the dispersion model) have been added to the modelled concentrations, which only account for contributions from the local road traffic.

2.13. The EHO at LBRuT has requested background pollutant concentrations monitored at the Wetlands Centre, Barnes are used within the air quality assessment. Background concentrations used in the assessment and are presented in **Table A12** in **Appendix 10.1** of the ES.

Sensitive Receptors

2.14. The approach adopted by the UK Air Quality Strategy (AQS) is to focus on areas at locations at, and close to, ground level where members of the public (in a non-workplace area) are likely to be exposed over the averaging time of the objective in question (i.e. over 1-hour, 24-hour or annual periods). Exceedances of the AQS objectives principally relate to annual mean NO_2 and PM_{10}, and 24-hour mean PM_{10} concentrations, so that associated potentially sensitive locations relate mainly to residential properties and other sensitive locations (such as schools) where the public may be exposed for prolonged periods.

2.15. In total 140 receptors have been assessed, the sensitive receptors are representative of all existing properties at the Chalkers Corner Junction affected by the junction highway works, they include receptors at each floor within the buildings. The location of the selected existing receptors assessed are presented in Figure 1.

![Waterman logo]

Figure 1:   Receptor Locations
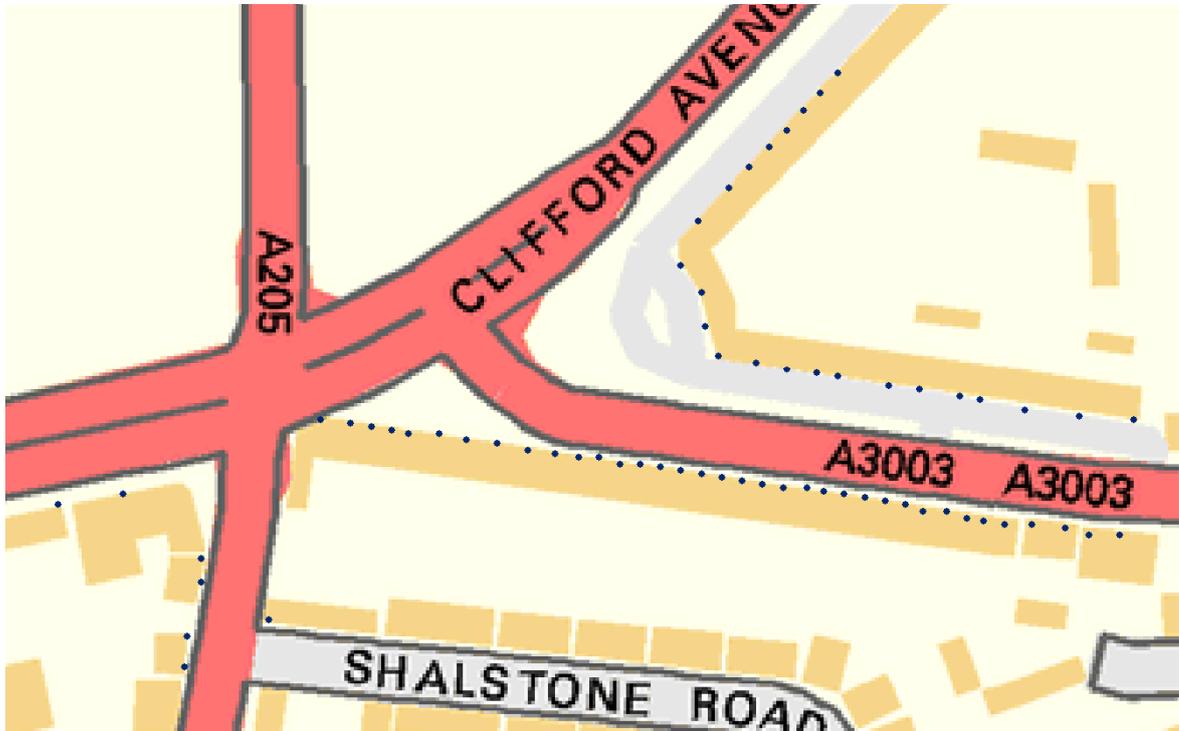
Note: Each dot represents the ground floor location of a receptor considered within the assessment.

Meteorological Data

2.16. Meteorological data to input into the model were obtained from the London Heathrow Airport Meteorological Station, which is the closest to the Site and considered to be the most representative. The 2016 data were used to be consistent with the base traffic year and model verification year.

Model Verification

2.17. Model verification is the process of comparing monitored and modelled pollutant concentrations and, if necessary, adjusting the modelled results to reflect actual measured concentrations, to improve the accuracy of the modelling results. The approach to the model verification is discussed in **Appendix 10.1** of the ES and compares the predicted annual mean NO_2 concentrations for the baseline 2016 (the latest year for which LBRuT air quality monitoring data is available), with the monitored annual mean NO_2 concentrations from LBRuT's diffusion tubes located at Site 21 (Lower Richmond Road), Site 51 (Sheen Lane) and Site 52 (Clifford Avenue). The results from the model verification showed that the model was over-performing at two diffusions and under-performing at one diffusion tube. Further review of the model was undertaken and no further refinement was considered necessary. An advanced statistical analysis was completed to determine the appropriateness of using the model verification and it was concluded that the unadjusted results were suitable for use in the air quality assessment. The verification and adjustment process is described in detail in **Appendix 10.1**.

Determining Significance

2.18. The EPUK / IAQM guidance provides an approach to assigning the magnitude of change because of a development as a proportion of a relevant assessment level, followed by examining this change in the context of the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations. The criteria are presented in **Table 10.9** of **Chapter 10: Air Quality** of the ES.

3. Results of the Modelling

3.1. As above, the modelled scenarios assume that there is no future NO_x to NO_2 reductions by 2027 (i.e. considering the potential impacts of the junction highway works against the baseline 2016 conditions, assuming no reduction in background concentrations or road-traffic emissions between 2016 and 2027). As such the modelled results are considered conservative as they do not take account of any vehicle improvements between 2016 and 2027.

Scenario 1: Future Air Quality Change Assuming No Development and No Highway Works (Current Situation)

3.2. **Table 1** presents the number of receptors at Chalkers Corner above and below the annual mean AQS Objective of $40\mu g/m^3$ for Scenario 1, which considers the change in annual mean NO_2 from the '2016 Baseline' to the '2027 Baseline' scenarios (i.e. the Chalkers Corner junction layout remains as it currently is and the Development does not come forward).

3.3. The results at each of the modelled receptors are presented in **Table A1 of Annex A** of this note.

Table 1: Scenario 1 - Summary of the Results of the ADMS-Roads Modelling at Residential Properties Located at Chalker's Corner Junction (NO_2)

	2016 Baseline		2027 Baseline	
	Above Annual Mean NO_2 Objective	**Below Annual Mean NO_2 Objective**	**Above Annual Mean NO_2 Objective**	**Below Annual Mean NO_2 Objective**
No. of Receptors	49	91	64 (+15)	76 (-15)

Note: Figures in brackets show the change in annual mean NO_2 concentrations between the period 2016 to 2027.

3.4. As shown in **Table 1,** between 2016 and 2027 assuming there is no Development and no highways works at Chalkers Corner Junction, annual mean NO_2 concentrations are predicted to increase and worsen at Chalkers Corner.

3.5. Between 2016 and 2027, without any changes to Chalkers Corner Junction an additional 15 residential receptors will exceed the annual mean NO_2 AQS objective of $40\mu g/m^3$. This increase is related to the growth in transport trips for the local area, as set out in the traffic data.

3.6. As shown in **Table A1 of Annex A** all modelled receptors experience an increase in annual mean NO_2 concentrations between 2016 and 2027. The increase in annual mean NO_2 concentration ranges between $0.5\mu g/m^3$ and $2.7\mu g/m^3$. The greatest increase of $2.7\mu g/m^3$ is at Receptor J1 (located at the ground floor on Lower Richmond Road). The maximum increase in Chertsey Court

is 1.7µg/m³ located at Receptors J83 to J87. There are no predicted reductions in annual mean NO₂ between these years for this Scenario.

3.7. **Table 2** summarises those receptor locations which experience a change in concentration greater than 0.2µg/m³ (i.e. a change that would not be considered negligible by the IAQM criteria) where concentrations exceed the NO₂ AQS objective.

Table 2: Scenario 1 - Summary of Change in Concentrations at those Receptors which Exceed the Annual Mean NO₂ AQS Objective

	2016 Baseline Compared Against 2027 Baseline (no Development and no highways works)	
	Worsening of air quality objective already above objective or creation of a new exceedance	**Improvement of an air quality objective already above objective or the removal of an existing exceedance**
>4µg/m³	-	-
>2-4µg/m³	-	-
>0.2-2µg/m³	64 (15)	-

Note: Figures in brackets indicate number of receptors where an exceedance is either created or an existing exceedance is removed.

3.8. As above, when considering the change in annual mean NO₂ concentrations between 2016 to 2027 without the Development and no highways works to Chalkers Corner Junction, there is a worsening in annual mean NO₂ concentrations at all locations. It is predicted 64 locations will exceed the annual mean NO₂ AQS objective in 2027, with potential new exceedances at 15 of those locations. In Scenario 1, between 2016 to 2027 no locations are predicted to experience an improvement in concentrations at locations which already exceed the annual mean NO₂ AQS objective.

3.9. The results in **Table A1 of Annex A** shows that in Scenario 1 there is a 100% increase in relative exposure and no reduction in relative exposure to annual mean NO₂ concentrations at properties located at Chalkers Corner.

3.10. **Table 3** presents the significance of change in annual mean NO₂ concentrations at Chalker Corner for Scenario 1.

Table 3: Scenario 1 - Summary of Impact Significance for NO₂ Annual Mean at Sensitive Receptors

Significance of Impact (NO₂ Annual Mean)	**2016 Base - 2027 Base** **(without Development and without highway works)**
Substantial Adverse	34
Moderate Adverse	46
Slight Adverse	60
Negligible	-
Total	**140**

3.11. As shown in **Table 3** assuming there is no Development and no highways works at Chalkers Corner Junction, substantial adverse to slight adverse impacts on annual mean NO_2 concentrations are predicted as a result of natural traffic growth in the area between 2016 and 2027. The majority of residential properties at Chalkers Corner will have a worsening in annual mean NO_2 concentration of a slight adverse impact.

3.12. To date, we are unaware of any junction improvement plans proposed by TfL or LBRuT for the Chalker Corner Junction that would improve the predicted impacts as presented in **Tables 1 to 3,** and as such a 2016 to 2027 mitigation scenario has not been modelled.

Scenario 2: With Stag Brewery Element but Without Highway Works to Chalkers Corner Junction

3.13. **Table 4** presents the number of receptors at Chalkers Corner above and below the annual mean AQS Objective of $40\mu g/m^3$ for Scenario 2, which considers the change in annual mean NO_2 from the '2027 Baseline' to the 2027 'with Development but without highway works to Chalkers Corner Junction' scenarios (i.e. the impact of the Stag Brewery element of the Development only with the existing Chalkers Corner junction layout).

3.14. The results at each of the modelled receptors are presented in **Table A1 of Annex A** of this note.

Table 4: Scenario 2 - Summary of the Results of the ADMS-Roads Modelling at Residential Properties Located at Chalker's Corner Junction (NO_2)

	2027 Baseline		2027 With Development (without highways works)	
	Above Annual Mean NO_2 Objective	**Below Annual Mean NO_2 Objective**	**Above Annual Mean NO_2 Objective**	**Below Annual Mean NO_2 Objective**
No. of Receptors	64	76	76 (+12)	64 (-12)

Note: Figures in brackets show the change in annual mean NO_2 concentrations between the 2027 Baseline and the 2027 'With Development but without highways works' scenarios.

3.15. In 2027, without any changes to the Chalkers Corner Junction but taking account of transport trips associated with the Development, an additional 12 residential receptors will exceed the annual mean NO_2 AQS objective of $40\mu g/m^3$.

3.16. As shown in **Table A1 of Annex A** in Scenario 2 all modelled receptors experience an increase in annual mean NO_2 concentrations. The increase in annual mean NO_2 concentration ranges between $0.2\mu g/m^3$ and $4.4\mu g/m^3$. The greatest increase of $4.4\mu g/m^3$ is at Receptor J36 (located at the ground floor on Lower Richmond Road). The maximum increase in Chertsey Court is $1.9\mu g/m^3$ located at Receptors J52. There are no predicted reductions in annual mean NO_2 in this Scenario.

3.17. **Table 5** summarises those receptor locations which experience a change in concentration greater than $0.2\mu g/m^3$ (i.e. a change that would not be considered negligible by the IAQM criteria) where concentrations exceed the NO_2 AQS objective.

Table 5: Scenario 2 - Summary of Change in Concentrations at those Receptors which Exceed the Annual Mean NO_2 AQS Objective

	2027 Base - 2027 With Development (without highway works)	
	Worsening of air quality objective already above objective or creation of a new exceedance	Improvement of an air quality objective already above objective or the removal of an existing exceedance
>4µg/m^3	9 (6)	-
>2-4µg/m^3	6 (0)	-
>0.2-2µg/m^3	61 (6)	-

Note: Figures in brackets indicate number of receptors where an exceedance is either created or an existing exceedance is removed.

3.18. As above, when considering the change in annual mean NO_2 concentrations with the Development in 2027 (without the junction highway works) against the 2027 baseline, the Development results in a worsening in concentrations at 76 locations which already exceed the annual mean NO_2 AQS objective, with potential new exceedances at 12 of those locations. In this scenario, no locations are predicted to experience an improvement in concentrations at locations which already exceed the annual mean NO_2 AQS objective.

3.19. The results in **Table A1 of Annex A** shows that in Scenario 2 there is a 100% increase in relative exposure and no reduction in relative exposure to annual mean NO_2 concentrations at properties located at Chalkers Corner

3.20. **Table 6** presents the significance of change in annual mean NO_2 concentrations at Chalker Corner for Scenario 2.

Table 6: Scenario 2 - Summary of Impact Significance for NO_2 Annual Mean at Sensitive Receptors

Significance of Impact (NO_2 Annual Mean)	2027 Base - 2027 With Development (without highway works)
Substantial Adverse	29
Moderate Adverse	41
Slight Adverse	45
Negligible	25
Total	**140**

3.21. As shown in **Table 6** assuming the Development is operational in 2027 without the junction highway works, substantial adverse to slight adverse impacts on annual mean NO_2 concentrations are predicted. The majority of residential properties at Chalkers Corner will have a worsening in annual mean NO_2 concentration of a slight adverse impact.

Scenario 3: With Stag Brewery Element With and Without Highway Works to Chalkers Corner Junction

3.22. **Table 7** presents the number of receptors at Chalkers Corner above and below the annual mean AQS Objective of 40µg/m^3 for Scenario 3 which considers the change in annual mean NO_2 from the 'with Development but without highway works to Chalkers Corner Junction' scenario compared to the 'with Development but with highway works to Chalkers Corner Junction' scenario (i.e. the impact of the highways works to Chalkers Corner Junction, assuming the Stag Brewery element of the Development is in place).

3.23. The results at each of the modelled receptors are presented in **Table A1 of Annex A** of this note.

Table 7: Scenario 3 - Summary of the Results of the ADMS-Roads Modelling at Residential Properties Located at Chalker's Corner Junction (NO_2)

	2027 With Development (without highways works)		2027 With Development (with highways works)	
	Above Annual Mean NO_2 Objective	Below Annual Mean NO_2 Objective	Above Annual Mean NO_2 Objective	Below Annual Mean NO_2 Objective
No. of Receptors	76	64	72 (-4)	68 (+4)

Note: Figures in brackets show the change in annual mean NO_2 concentrations between 2027 'with Development but without highway works' and 2027 'with Development but with highways works' scenarios.

3.24. In 2027 assuming the transport trips associated with the Development are operating at Chalkers Corner and then including the highways works to Chalker Corner Junction, four residential receptors are expected to have a decrease such that they would then be below the annual mean NO_2 AQS objective of 40µg/m^3.

3.25. As shown in **Table A1 of Annex A** in Scenario 3 modelled receptors experience both an increase and reduction in annual mean NO_2 concentrations. The increase in annual mean NO_2 concentration ranges between 0.1µg/m^3 and 0.5µg/m^3 and the reduction ranges between 0.1µg/m^3 to 3.9µg/m^3. The greatest increase of 0.5µg/m^3 is at Receptor J60 (located at the ground floor in Chersey Court) and the greatest reduction of 3.9µg/m^3 is at Receptors J21 and J22 (located at ground floor on Lower Richmond Road). The decreases are related to the realignment of the realignment of Lower Richmond Road 12m to the north east Chalkers Corner Junction.

3.26. **Table 8** summarises those receptor locations which experience a change in concentration greater than 0.2µg/m^3 (i.e. a change that would not be considered negligible by the IAQM criteria) where concentrations exceed the NO_2 AQS objective.

Table 8: Scenario 3 - Summary of Change in Concentrations at those Receptors which Exceed the Annual Mean NO_2 AQS Objective

	2027 With Development (without highway works) – 2027 With Development (with highway works)	
	Worsening of air quality objective already above objective or creation of a new exceedance	Improvement of an air quality objective already above objective or the removal of an existing exceedance
>4µg/m^3	-	-
>2-4µg/m^3	-	23 (2)
>0.2-2µg/m^3	10 (0)	19 (2)

Note: Figures in brackets indicate number of receptors where an exceedance is either created or an existing exceedance is removed.

3.27. As above, when considering the change in annual mean NO_2 concentrations assuming the transport trips associated with the Development are operating at Chalkers Corner and then including the highways works to Chalker Corner Junction, the Development results in a worsening in concentrations at 10 locations which already exceed the annual mean NO_2 AQS objective. No new exceedances are predicted in this scenario. In addition, the Development results in a reduction in concentrations at 42 locations which already exceed the annual mean NO_2 AQS objective, with a potential reduction at 4 of those locations so that they are no longer exceeding the NO_2 AQS objective.

3.28. The results in **Table A1 of Annex A** shows that in Scenario 3 there is a 12% increase in relative exposure and a 88% reduction in relative exposure to annual mean NO_2 concentrations at properties located at Chalkers Corner.

3.29. **Table 9** presents the significance of change in annual mean NO_2 concentrations at Chalker Corner for Scenario 3.

Table 9: Scenario 3 - Summary of Impact Significance for NO_2 Annual Mean at Sensitive Receptors

Significance of Impact (NO_2 Annual Mean)	2027 With Development (without highway works) – 2027 With Development (with highway works)
Substantial Adverse	0
Moderate Adverse	7
Slight Adverse	2
Negligible	65
Slight Beneficial	21
Moderate Beneficial	17
Substantial Beneficial	28
Total	**140**

3.30. As shown in **Table 9** assuming the transport trips associated with the Development are operating at Chalkers Corner and then including the highways works to Chalker Corner Junction moderate

adverse to substantial beneficial impacts on annual mean NO_2 concentrations are predicted. The majority of residential properties at Chalkers Corner will have an improvement in annual mean NO_2 concentration of a substantial beneficial impact.

Scenario 4: Future Change Assuming Development and Highway Works Against the Future Baseline

3.31.   **Table 10** presents the number of receptors at Chalkers Corner above and below the annual mean AQS Objective of $40\mu g/m^3$ for Scenario 4 which considers the change in annual mean NO_2 from the 2027 'Baseline' to the 2027 'with Development and with highways work to Chalker's Corner Junction' scenarios.

3.32.   The results at each of the modelled receptors are presented in **Table A1 of Annex A** of this note.

Table 10:   Scenario 4 - Summary of the Results of the ADMS-Roads Modelling at Residential Properties Located at Chalker's Corner Junction (NO_2)

	2027 Baseline		2027 With Development (with highways works)	
	Above Annual Mean NO_2 Objective	**Below Annual Mean NO_2 Objective**	**Above Annual Mean NO_2 Objective**	**Below Annual Mean NO_2 Objective**
No. of Receptors	64	76	72 (+8)	68 (-8)

Note: Figures in brackets show the change in annual mean NO_2 concentrations between 2027 'Baseline' and 'with Development but with highways works' scenarios.

3.33.   In 2027, with the Development and including the highways works, an additional eight residential receptors will exceed the annual mean NO_2 AQS objective of $40\mu g/m^3$.

3.34.   As shown in **Table A1 of Annex A** in Scenario 4 modelled receptors experience both an increase and reduction in annual mean NO_2 concentrations. The increase in annual mean NO_2 concentration ranges between $0.1\mu g/m^3$ and $1.0\mu g/m^3$ and the reduction ranges between $0.1\mu g/m^3$ to $3.2\mu g/m^3$. The greatest increase of $1.0\mu g/m^3$ is at Receptors J58 and J57 (located at the ground floor in Chersey Court) and the greatest reduction of $3.2\mu g/m^3$ is at Receptors J21 (located at ground floor on Lower Richmond Road). The decreases are related to a reduction in congestion predicted at Chalkers Corner Junction.

3.35.   **Table 11** summarises those receptor locations which experience a change in concentration greater than $0.2\mu g/m^3$ (i.e. a change that would not be considered negligible by the IAQM criteria) where concentrations exceed the NO_2 AQS objective.

Table 11: Scenario 4 - Summary of Change in Concentrations at those Receptors which Exceed the Annual Mean NO_2 AQS Objective

	2027 Base -2027 With Development (with highway works)	
	Worsening of air quality objective already above objective or creation of a new exceedance	Improvement of an air quality objective already above objective or the removal of an existing exceedance
>4µg/m^3	-	-
>2-4µg/m^3	-	6 (0)
>0.2-2µg/m^3	40 (8)	12 (0)

Note: Figures in brackets indicate number of receptors where an exceedance is either created or an existing exceedance is removed.

3.36. As above, when considering the change in annual mean NO_2 concentrations with the Development and including the highways works, the Development results in a worsening in concentrations at 40 locations which already exceed the annual mean NO_2 AQS objective. There are predicted to be eight new exceedances are predicted in this scenario. In addition, the Development results in a reduction in concentrations at 18 locations which already exceed the annual mean NO_2 AQS objective.

3.37. The results in **Table A1 of Annex A** shows that in Scenario 4 there is a 86% increase in relative exposure and a 14% reduction in relative exposure to annual mean NO_2 concentrations at properties located at Chalkers Corner.

3.38. **Table 12** presents the significance of change in annual mean NO_2 concentrations at Chalker Corner for Scenario 4.

Table 12: Scenario 4 - Summary of Impact Significance for NO_2 Annual Mean at Sensitive Receptors

Significance of Impact (NO_2 Annual Mean)	2027 Base -2027 With Development (with highway works)
Substantial Adverse	4
Moderate Adverse	31
Slight Adverse	22
Negligible	66
Slight Beneficial	0
Moderate Beneficial	4
Substantial Beneficial	13
Total	**140**

3.39. As shown in **Table 12** when considering the change in annual mean NO_2 concentrations with the Development and including the highways work, substantial adverse to substantial beneficial

impacts on annual mean NO_2 concentrations are predicted. The majority of residential properties at Chalkers Corner will have a negligible impact.

Summary of Predicted Scenario Impacts

3.40. Table 13 presents a summary of the predicted impacts for each of the Scenarios above and shows that:

- Between 2016 and 2027 assuming no Development and no highways works to Chalkers Corner Junction (Scenario1) annual mean NO_2 concentrations are predicted to increase at all modelled receptors in Chalkers Corner, associated with an increase in local traffic between these years. There would be a 100% increase in relative exposure to annual mean NO_2 at all receptors;

- If the Stag Brewery element of the Development was operational without highways works to Chalkers Corner Junction (Scenario 2), annual mean NO_2 concentrations are predicted to increase at all modelled receptors in Chalkers Corner. This is associated with an increase in local traffic generated by the Development and increased congestion. There would be a 100% increase in relative exposure to annual mean NO_2 at all receptors;

- Considering the change in annual mean NO_2 as a result of the highways works to Chalkers Corner Junction (Scenario 3) with the Stag Brewery element of the Development operational, annual mean NO_2 concentrations are predicted to decrease on Lower Richmond Road but increase at Chertsey Court. This is associated with the realignment of Lower Richmond Road 12m to the north east. This realignment would improve annual mean NO_2 concentrations at properties at Lower Richmond Road as these properties are further distanced from vehicle tail pipe emissions, but the realignment would worsen concentrations at Chertsey Court as the road (and vehicle tail pipe emissions) moves closer to these properties. There would be an 80.8% increase in relative exposure to annual mean NO_2 at properties in Chertsey Court and an 100% decrease in relative exposure to annual mean NO_2 at properties at properties on Lower Richmond Road; and

- Comparing the Development (including the Stag Brewery element and highways works) to the future baseline (Scenario 4), as above annual mean NO_2 concentrations are predicted to decrease on Lower Richmond Road but increase at Chertsey Court, associated with the realignment of Lower Richmond Road. In addition, in this scenario there is an increase in traffic at Chalkers Corner related to the Development, resulting in an increase in annual mean NO_2 concentrations on Lower Richmond Road. Overall there would be a 100% increase in relative exposure to annual mean NO_2 at properties in Chertsey Court and a 41.3% increase in relative exposure to annual mean NO_2 at properties at properties on Lower Richmond Road; and

- Overall, based on the results in Table 13 it is considered that when compared to the without junction works scenario, the junction highway works have a beneficial effect on air quality.

Table 13: Summary of Change in Annual Mean NO_2 for the Scenarios Considered

| Scenario | Scenario Description | Max Increase (NO_2) µg/m³ | | Max Decrease (NO_2) µg/m³ | | % Relative Exposure to annual mean NO_2 AQS objective | | | | | |
| | | | | | | All Receptors | | Lower Richmond Road | | Chertsey Court | |
		Lower Richmond Road	Chertsey Court	Lower Richmond Road	Chertsey Court	Increase	Decrease	Increase	Decrease	Increase	Decrease
1	Future Change Assuming No Development and No Highway Works (Current Situation)	2.7µg/m³	1.7µg/m³	-	-	100%	0	100%	0	100%	0
2	With Stag Brewery Element but Without Highway Works to Chalkers Corner Junction	4.4µg/m³	1.9µg/m³	-	-	100%	0	100%	0	100%	0
3	With Stag Brewery Element but With and Without Highway Works to Chalkers Corner Junction	-	0.5µg/m³	3.9µg/m³	2.7µg/m³	12%	88%	0	100%	80.8%	19.2%
4	Future Change Assuming Development and Highway Works Against the Future Baseline (The Development)	0.7µg/m³	1.0µg/m³	3.2µg/m³	-	86%	14%	41.3%	58.7%	100%	0%

4. Changes in Effective Travel Distance of Air (Chalkers Corner Mitigation)

4.1. As part of the Development and realignment of Chalkers Corner Junction some of the existing trees are proposed to be removed outside Chertsey Court and as shown in **Figure 2**, will be replaced with a 2 metres high wall and two landscaping areas of new mature planting. Both landscaping areas include 6 metres high mature trees outside Chertsey Court.

Figure 2:   Chalkers Corner Proposed Landscaping

4.2. Compared to the existing landscaping outside Chertsey Court the proposed planting within the landscaping is denser; includes species which are evergreen so can capture pollutants throughout the year; and includes vegetation species selected to filter ambient pollutants.

4.3. Whilst green walls and green screens can have beneficial impacts to air quality by reducing the pathway of air flow and by capturing and filtering ambient pollutants, the benefits of green planting cannot be quantified (in $\mu g/m^3$) in air quality assessments due to the variability in the behaviour of plants related to local specific site conditions; local climatic conditions; and individual characteristics of plants.

4.4. The air quality modelling has identified the maximum increase in annual mean NO_2 with the Development at Chertsey Court is $1\mu g/m^3$ at Receptors J58 and J57 which are located on the

corner of Lower Richmond Road at ground level. For these receptor locations, the proposed landscape mitigation will reduce the effective pathway of air, as air flow would travel up and over the new 2 metre wall and up and over the 6 metre trees (in both landscape areas), prior to reaching Chertsey Court.

4.5.   Defra has produced a calculator that allows for the change in air quality concentrations due to effective/actual distance that the air travels to be calculated[2]. Whilst this calculator is generally used to understand the change in monitored air pollutant concentrations linearly away from a road, it is also considered appropriate to use to determine the likely change in annual mean NO_2 concentrations associated with a change in vertical distance as a result of the proposed landscaping.

4.6.   Receptors J58 and J57 were predicted to have the greatest impact at Chertsey Court with the Development (see Scenario 4 above). To quantify the change in the effective travel distance of air from the road to Chertsey Corner, the ADMS-Roads model has been re-run for the With Development Scenario (which includes the Development and highways works to Chalker's Corner Junction) for a location on the roadside closest to Receptors J58 and J57 (modelled at National Grid Reference 519897, 175859). For this modelled roadside location, the annual mean NO_2 concentration has been derived using the methodology detailed in **Appendix 10.2** (as 41.3µg/m^3)**.**

4.7.   Without landscaping the effective distance from the road to the façade of Chertsey Court has been measured as approximately 25 metres.

4.8.   With the landscaping the effective distance from the road to the façade of Chertsey Court is approximately 37 metres. This has been calculated as 25 metres from the road to the façade of Chertsey Court (as mentioned above) plus 12 meters to take account of the air flowing up and down the 6 metres trees contained within the first landscaping area. The 2 metres new wall has been ignored as the new mature trees are located immediately behind this. In addition given that the second set of landscaping is smaller and provides protection at the corner of Chertsey Court only, this landscaping has also been ignored. The results are therefore conservative.

4.9.   **Tables 14 and 15** present the calculations for Chertsey Corner without the landscaping and with the landscaping, taken directly from the Defra calculator. As above, it is noted the results in **Table 14 and Table 15** are not comparable to the modelled results for Receptors J58 and J57 as these concentrations have been derived from the Defra calculator which are based on the change in air quality concentrations due to effective/actual distance that the air travels rather than concentrations directly taken from the dispersion model.

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[2] NO_2 Fall-off with Distance Calculator (Version 4.1)

Table 14: Effective Travel Distance of Annual Mean NO$_2$ at Chalkers Corner Without Landscape Mitigation

		Enter data into the red cells	
Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	25	metres
Step 3	What is the local annual mean background NO$_2$ concentration (in µg/m^3)?	25	µg/m^3
Step 4	What is your measured annual mean NO$_2$ concentration (in µg/m^3)?	41.3	µg/m^3
Result	The predicted annual mean NO$_2$ concentration (in µg/m^3) at your receptor	31.7	µg/m^3

Table 15: Effective Travel Distance of Annual Mean NO$_2$ at Chalkers Corner With Landscape Mitigation

		Enter data into the red cells	
Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	37	metres
Step 3	What is the local annual mean background NO$_2$ concentration (in µg/m^3)?	25	µg/m^3
Step 4	What is your measured annual mean NO$_2$ concentration (in µg/m^3)?	41.3	µg/m^3
Result	The predicted annual mean NO$_2$ concentration (in µg/m^3) at your receptor	30.2	µg/m^3

4.10. As shown in **Table 14** and in **Table 15**, the difference in annual mean NO$_2$ without and with the landscaping at Chertsey Court is 1.5µg/m^3. It is therefore considered that the proposed landscaping has the potential to reduce annual mean NO$_2$ concentrations within Chertsey Court by approximately 1.5µg/m^3 by reducing the effective travel distance of air.

5. Summary

5.1. Computer modelling has been carried out to predict the effect on local air quality from traffic related exhaust emissions and the highway works to the Chalkers Corner Junction following the completion of the Development. The impact of the Development on local air quality has been predicted for sensitive locations surrounding the junction. Following completion of the Development, and considering the likely beneficial impact of the landscaping (due to an increase in

the effective travel distance to air) the highway works to Chalkers Corner Junction is predicted to have an **insignificant** impact on annual mean NO_2.

Annex A: Air Quality Modelled Results

Table A1: Results of the Modelling at Selected Receptors at the Chalkers Corner Junction

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development (with Junction Amendment)	Change: Base - With Development (with Junction Amendment)
J1	179 Lower Richmond Rd	46.0	48.1	48.4	48.2	2.1	0.3	-0.1	0.2
J2	179 Lower Richmond Rd	43.4	45.3	45.6	45.4	1.9	0.3	-0.1	0.1
J3	179 Lower Richmond Rd	38.3	39.7	39.9	39.8	1.4	0.2	-0.1	0.1
J4	179 Lower Richmond Rd	33.9	34.9	35.0	34.9	0.9	0.2	-0.1	0.1
J5	189 Lower Richmond Rd	42.9	44.7	45.0	44.9	1.8	0.3	-0.1	0.2
J6	2 South Circular	45.4	47.4	47.7	47.5	2.1	0.2	-0.1	0.1
J7	2a South Circular	42.4	44.2	44.4	44.3	1.8	0.2	-0.2	0.0
J8	4 South Circular	45.5	47.6	47.8	47.6	2.1	0.2	-0.1	0.1
J9	4a South Circular	42.1	43.9	44.1	44.0	1.8	0.2	-0.1	0.1
J10	6 South Circular	42.9	44.7	44.9	44.8	1.9	0.2	-0.1	0.1
J11	8 South Circular	42.8	44.6	44.8	44.7	1.9	0.2	-0.1	0.1
J12	67 Shalstone Road	45.9	48.0	48.3	48.1	2.1	0.2	-0.2	0.0
J13	1 Lower Richmond Road	54.2	56.9	57.3	56.9	2.7	0.4	-0.4	-0.1

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development	Change: Base - With Development (with Junction Amendment)
J14	2 Lower Richmond Road	**53.2**	**55.9**	**56.2**	**55.6**	2.7	0.4	-0.7	-0.3
J15	3 Lower Richmond Road	**49.9**	**52.4**	**52.7**	**51.9**	2.4	0.4	-0.9	-0.5
J16	4 Lower Richmond Road	**47.7**	**49.9**	**50.3**	**49.2**	2.2	0.4	-1.2	-0.8
J17	5 Lower Richmond Road	**46.3**	**48.4**	**48.8**	**47.4**	2.1	0.4	-1.4	-1.0
J18	6 Lower Richmond Road	**45.4**	**47.4**	**47.8**	**45.8**	2.0	0.5	-2.0	-1.6
J19	7 Lower Richmond Road	**44.5**	**46.5**	**47.0**	**44.4**	2.0	0.5	-2.5	-2.0
J20	8 Lower Richmond Road	**45.0**	**46.9**	**47.6**	**44.1**	2.0	0.6	-3.4	-2.8
J21	9 Lower Richmond Road	**45.5**	**47.5**	**48.2**	**44.3**	2.0	0.7	-3.9	-3.2
J22	10 Lower Richmond Road	**46.3**	**48.3**	**49.1**	**45.2**	2.0	0.8	-3.9	-3.1
J23	11 Lower Richmond Road	**46.6**	**48.7**	**49.5**	**46.1**	2.0	0.8	-3.4	-2.6
J24	12 Lower Richmond Road	**47.7**	**49.8**	**50.7**	**47.5**	2.1	0.9	-3.3	-2.4
J25	13 Lower Richmond Road	**46.4**	**48.4**	**49.3**	**46.8**	2.0	0.9	-2.5	-1.6
J26	14 Lower Richmond Road	**47.3**	**49.4**	**50.4**	**47.9**	2.1	1.0	-2.4	-1.5

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development	Change: Base - With Development (with Junction Amendment)
J27	15 Lower Richmond Road	**47.1**	**49.1**	**50.1**	**48.0**	2.0	1.0	-2.1	-1.1
J28	16 Lower Richmond Road	**46.8**	**48.8**	**49.8**	**48.0**	2.0	1.0	-1.8	-0.8
J29	17 Lower Richmond Road	**46.4**	**48.4**	**49.5**	**47.8**	2.0	1.1	-1.7	-0.6
J30	18 Lower Richmond Road	**46.1**	**48.0**	**49.2**	**47.6**	2.0	1.2	-1.6	-0.4
J31	19 Lower Richmond Road	**45.6**	**47.6**	**48.8**	**47.4**	1.9	1.2	-1.4	-0.2
J32	20 Lower Richmond Road	**45.2**	**47.1**	**48.4**	**47.1**	1.9	1.4	-1.3	0.0
J33	21 Lower Richmond Road	**44.7**	**46.5**	**48.1**	**46.8**	1.8	1.5	-1.3	0.2
J34	22 Lower Richmond Road	**45.3**	**47.1**	**49.1**	**47.7**	1.9	2.0	-1.5	0.5
J35	23 Lower Richmond Road	**44.1**	**45.9**	**48.4**	**46.6**	1.8	2.5	-1.8	0.7
J36	24 Lower Richmond Road	**42.8**	**44.5**	**47.7**	**45.2**	1.7	3.2	-2.5	0.7
J37	25 Lower Richmond Road	**41.9**	**43.6**	**47.2**	**44.2**	1.6	3.6	-3.0	0.7
J38	26 Lower Richmond Road	**41.3**	**42.9**	**46.7**	**43.5**	1.6	3.9	-3.2	0.6
J39	27 Lower Richmond Road	**40.8**	**42.3**	**46.3**	**42.9**	1.5	4.0	-3.4	0.6

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development (with Junction Amendment)	Change: Base - With Development (with Junction Amendment)
J40	28 Lower Richmond Road	39.6	**41.0**	**44.8**	**41.6**	1.4	3.8	-3.2	0.6
J41	29 Lower Richmond Road	39.9	**41.4**	**45.5**	**42.0**	1.4	4.2	-3.6	0.6
J42	30 Lower Richmond Road	38.9	**40.3**	**44.2**	**40.8**	1.4	4.0	-3.4	0.6
J43	31 Lower Richmond Road	38.5	39.9	**43.8**	**40.4**	1.3	4.0	-3.4	0.6
J44	32 Lower Richmond Road	38.2	39.5	**43.5**	**40.1**	1.3	4.0	-3.4	0.6
J45	33 Lower Richmond Road	38.6	**40.0**	**44.2**	**40.6**	1.3	4.2	-3.6	0.6
J46	34 Lower Richmond Road	38.5	39.9	**44.2**	**40.4**	1.3	4.3	-3.7	0.6
J47	35 Lower Richmond Road	37.6	38.9	**43.0**	39.4	1.2	4.1	-3.6	0.6
J48	36 Lower Richmond Road	38.0	39.3	**43.6**	39.9	1.3	4.4	-3.8	0.6
J49	1 Chertsey Court	35.7	36.9	39.5	37.3	1.1	2.6	-2.2	0.4
J50	2 Chertsey Court	35.9	37.0	39.5	37.5	1.1	2.5	-2.1	0.5
J51	3 Chertsey Court	36.3	37.5	39.7	38.0	1.2	2.2	-1.7	0.5
J52	4 Chertsey Court	36.9	38.1	**40.1**	38.7	1.2	1.9	-1.4	0.5
J53	5 Chertsey Court	37.7	39.0	**40.3**	39.7	1.3	1.3	-0.7	0.6
J54	6 Chertsey Court	38.1	39.4	**40.6**	**40.1**	1.4	1.1	-0.4	0.7

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development (with Junction Amendment)	Change: Base - With Development (with Junction Amendment)
J55	7 Chertsey Court	38.8	**40.2**	**41.2**	**41.0**	1.4	1.0	-0.2	0.8
J56	8 Chertsey Court	39.2	**40.7**	**41.5**	**41.6**	1.5	0.8	0.0	0.8
J57	9 Chertsey Court	**40.1**	**41.6**	**42.3**	**42.6**	1.5	0.7	0.3	1.0
J58	10 Chertsey Court	39.3	**40.8**	**41.4**	**41.8**	1.5	0.6	0.4	1.0
J59	11 Chertsey Court	39.3	**40.8**	**41.3**	**41.6**	1.5	0.5	0.3	0.9
J60	12 Chertsey Court	**41.0**	**42.6**	**43.1**	**43.5**	1.7	0.5	0.5	0.9
J61	13 Chertsey Court	**41.8**	**43.5**	**44.0**	**44.2**	1.7	0.4	0.2	0.6
J62	14 Chertsey Court	**41.4**	**43.1**	**43.5**	**43.5**	1.7	0.4	0.1	0.5
J63	15 Chertsey Court	**41.0**	**42.7**	**43.1**	**43.1**	1.7	0.4	0.0	0.4
J64	16 Chertsey Court	**40.7**	**42.3**	**42.7**	**42.7**	1.7	0.4	0.0	0.4
J65	17 Chertsey Court	**40.4**	**42.0**	**42.4**	**42.4**	1.6	0.4	-0.1	0.3
J66	18 Chertsey Court	**40.4**	**42.0**	**42.4**	**42.3**	1.6	0.4	-0.1	0.3
J67	19 Chertsey Court	**40.1**	**41.7**	**42.1**	**42.0**	1.6	0.4	-0.1	0.3
J68	20 Chertsey Court	**40.1**	**41.7**	**42.1**	**42.0**	1.6	0.4	-0.1	0.3
J69	21 Chertsey Court	35.7	36.8	39.8	37.3	1.1	3.0	-2.5	0.4
J70	22 Chertsey Court	35.4	36.4	39.5	36.9	1.1	3.1	-2.7	0.4
J71	23 Chertsey Court	34.8	35.8	39.0	36.3	1.0	3.1	-2.7	0.4
J72	1 Chertsey Court	34.8	35.8	38.0	36.2	1.0	2.2	-1.8	0.4
J73	2 Chertsey Court	34.9	36.0	38.1	36.4	1.1	2.1	-1.7	0.4
J74	3 Chertsey Court	35.3	36.4	38.3	36.8	1.1	1.9	-1.5	0.4
J75	4 Chertsey Court	35.8	37.0	38.6	37.4	1.1	1.6	-1.2	0.5

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development	Change: Base - With Development (with Junction Amendment)
J76	5 Chertsey Court	36.6	37.8	39.0	38.4	1.2	1.2	-0.6	0.6
J77	6 Chertsey Court	37.0	38.2	39.2	38.8	1.2	1.0	-0.4	0.6
J78	7 Chertsey Court	37.6	38.9	39.8	39.5	1.3	0.9	-0.2	0.6
J79	8 Chertsey Court	38.1	39.4	**40.2**	**40.1**	1.3	0.8	0.0	0.7
J80	9 Chertsey Court	38.9	**40.3**	**40.9**	**41.1**	1.4	0.7	0.2	0.9
J81	10 Chertsey Court	38.4	39.8	**40.4**	**40.7**	1.4	0.6	0.3	0.8
J82	11 Chertsey Court	38.5	39.9	**40.4**	**40.6**	1.4	0.5	0.3	0.8
J83	12 Chertsey Court	39.9	**41.5**	**41.9**	**42.3**	1.6	0.4	0.4	0.8
J84	13 Chertsey Court	**40.5**	**42.1**	**42.5**	**42.7**	1.6	0.4	0.2	0.6
J85	14 Chertsey Court	**40.1**	**41.6**	**42.0**	**42.1**	1.6	0.4	0.0	0.4
J86	15 Chertsey Court	39.7	**41.3**	**41.7**	**41.6**	1.6	0.4	0.0	0.4
J87	16 Chertsey Court	39.4	**40.9**	**41.3**	**41.3**	1.5	0.4	0.0	0.3
J88	17 Chertsey Court	39.2	**40.7**	**41.0**	**41.0**	1.5	0.4	-0.1	0.3
J89	18 Chertsey Court	39.1	**40.6**	**41.0**	**40.9**	1.5	0.4	-0.1	0.3
J90	19 Chertsey Court	38.9	**40.3**	**40.7**	**40.6**	1.5	0.4	-0.1	0.3
J91	20 Chertsey Court	38.8	**40.3**	**40.7**	**40.6**	1.5	0.3	-0.1	0.2
J92	21 Chertsey Court	34.6	35.6	38.1	36.0	1.0	2.5	-2.1	0.4
J93	22 Chertsey Court	34.3	35.2	37.9	35.6	1.0	2.6	-2.2	0.4
J94	23 Chertsey Court	33.8	34.7	37.4	35.1	0.9	2.7	-2.3	0.4
J95	1 Chertsey Court	32.7	33.5	34.9	33.8	0.8	1.4	-1.2	0.3
J96	2 Chertsey Court	32.8	33.7	35.0	34.0	0.8	1.4	-1.1	0.3

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development (with Junction Amendment)	Change: Base - With Development (with Junction Amendment)
J97	3 Chertsey Court	33.2	34.1	35.3	34.4	0.9	1.2	-0.9	0.3
J98	4 Chertsey Court	33.6	34.5	35.6	34.9	0.9	1.1	-0.7	0.3
J99	5 Chertsey Court	34.2	35.2	36.0	35.6	1.0	0.8	-0.4	0.4
J100	6 Chertsey Court	34.5	35.5	36.3	35.9	1.0	0.7	-0.4	0.4
J101	7 Chertsey Court	35.0	36.0	36.7	36.5	1.1	0.7	-0.2	0.4
J102	8 Chertsey Court	35.4	36.5	37.1	37.0	1.1	0.6	-0.1	0.5
J103	9 Chertsey Court	36.1	37.3	37.8	37.8	1.2	0.5	0.0	0.5
J104	10 Chertsey Court	36.2	37.4	37.9	38.0	1.2	0.5	0.1	0.6
J105	11 Chertsey Court	36.4	37.6	38.0	38.1	1.2	0.4	0.1	0.5
J106	12 Chertsey Court	37.3	38.6	39.0	39.2	1.3	0.4	0.2	0.6
J107	13 Chertsey Court	37.5	38.8	39.1	39.2	1.3	0.4	0.1	0.5
J108	14 Chertsey Court	37.0	38.3	38.7	38.7	1.3	0.4	0.0	0.4
J109	15 Chertsey Court	36.8	38.0	38.4	38.3	1.3	0.4	0.0	0.3
J110	16 Chertsey Court	36.5	37.7	38.1	38.0	1.2	0.3	-0.1	0.3
J111	17 Chertsey Court	36.3	37.5	37.8	37.7	1.2	0.3	-0.1	0.3
J112	18 Chertsey Court	36.2	37.4	37.7	37.6	1.2	0.3	-0.1	0.2
J113	19 Chertsey Court	36.0	37.2	37.5	37.4	1.2	0.3	-0.1	0.2
J114	20 Chertsey Court	35.9	37.1	37.4	37.3	1.2	0.3	-0.1	0.2
J115	21 Chertsey Court	32.4	33.2	34.8	33.5	0.8	1.6	-1.3	0.3
J116	22 Chertsey Court	32.0	32.8	34.5	33.1	0.8	1.7	-1.4	0.3
J117	23 Chertsey Court	31.7	32.4	34.2	32.7	0.7	1.8	-1.5	0.3

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development	Change: Base - With Development (with Junction Amendment)
J118	1 Chertsey Court	30.8	31.4	32.2	31.6	0.6	0.8	-0.6	0.2
J119	2 Chertsey Court	30.9	31.6	32.3	31.7	0.6	0.8	-0.6	0.2
J120	3 Chertsey Court	31.2	31.9	32.6	32.1	0.7	0.7	-0.5	0.2
J121	4 Chertsey Court	31.5	32.2	32.8	32.4	0.7	0.6	-0.4	0.2
J122	5 Chertsey Court	32.0	32.7	33.2	32.9	0.8	0.5	-0.3	0.2
J123	6 Chertsey Court	32.2	32.9	33.4	33.2	0.8	0.5	-0.3	0.2
J124	7 Chertsey Court	32.5	33.3	33.7	33.5	0.8	0.4	-0.2	0.2
J125	8 Chertsey Court	32.8	33.7	34.1	33.9	0.8	0.4	-0.2	0.2
J126	9 Chertsey Court	33.3	34.2	34.6	34.4	0.9	0.4	-0.1	0.3
J127	10 Chertsey Court	33.6	34.6	34.9	34.9	0.9	0.4	-0.1	0.3
J128	11 Chertsey Court	33.9	34.8	35.1	35.1	0.9	0.3	0.0	0.3
J129	12 Chertsey Court	34.3	35.3	35.6	35.6	1.0	0.3	0.0	0.3
J130	13 Chertsey Court	34.2	35.2	35.5	35.5	1.0	0.3	0.0	0.3
J131	14 Chertsey Court	33.9	34.8	35.1	35.1	1.0	0.3	0.0	0.3
J132	15 Chertsey Court	33.7	34.6	34.9	34.8	0.9	0.3	-0.1	0.2
J133	16 Chertsey Court	33.5	34.4	34.7	34.6	0.9	0.3	-0.1	0.2
J134	17 Chertsey Court	33.3	34.2	34.5	34.4	0.9	0.3	-0.1	0.2
J135	18 Chertsey Court	33.2	34.1	34.4	34.3	0.9	0.3	-0.1	0.2
J136	19 Chertsey Court	33.1	33.9	34.2	34.1	0.9	0.3	-0.1	0.2
J137	20 Chertsey Court	32.9	33.8	34.1	34.0	0.9	0.3	-0.1	0.2
J138	21 Chertsey Court	30.5	31.1	31.9	31.3	0.6	0.9	-0.7	0.2

ID	Receptor Name	2016 Baseline	2027 Baseline	2027 With Development (without Junction Amendment)	2027 With Development (with Junction Amendment)	Change: 2016 Baseline – 2027 Baseline	Change: Base- With Development (without Junction Amendment)	Change: With Development (without Junction Amendment) - With Development	Change: Base - With Development (with Junction Amendment)
J139	22 Chertsey Court	30.2	30.7	31.7	30.9	0.6	0.9	-0.8	0.2
J140	23 Chertsey Court	29.9	30.4	31.4	30.6	0.5	1.0	-0.8	0.2

Note: For accuracy, the changes have been calculated using the exact output from the ADMS-Roads model rather than the rounded numbers within Table A2. This explains where there may a slight difference in the calculated change in concentrations between the different scenarios.