



**MEC**  
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# ACOUSTIC AIR



**Western Avenue, Riverside Park, Andover**  
Air Quality Assessment  
March 2025

Report Ref: 28483-ENV-0402 Rev B

# Western Avenue, Riverside Park, Andover

## Air Quality Assessment

### March 2025

REPORT REF: 28483-ENV-0402 Rev B

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## 1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd (MEC) has been commissioned by Test Valley Borough Council (TVBC) to undertake an Air Quality Assessment for a proposed greenspace development at Western Avenue, Riverside Park, Andover.

### Existing Site and Development Proposals

1.2 The Site covers an approximate area of 2.69ha and comprises of open greenspace, the River Anton and two main roads; Western Avenue and West Street. The application is for the improvement of greenspaces located around the River Anton, removal of the underpass, creation of a natural river corridor, improved new cycle route and new pedestrian and cyclist infrastructure.

1.3 As part of the improvements to the greenspace, it is proposed to remove the existing one-way route that circulates the greenspace by altering Western Avenue, making it two-way. In addition, West Street would become a dead-end road with an area for vehicles to turn at the end of the road.

1.4 An approximate redline boundary is presented in Figure 1.1 and the General Arrangement Landscape Layout is presented in **Appendix A**.

**Figure 1.1: Approximate Redline Boundary**



## Assessment Scope

- 1.5 Due to the proposed alterations to the transport network, the TVBC EHO has raised concerns about the potential knock-on air quality impacts on the existing residential receptors in close proximity to the proposed changes.
- 1.6 Concerns have been raised in relation to an increase in road traffic related pollutants due changes in traffic flows on West Street and Western Avenue.
- 1.7 This Air Quality Assessment seeks to examine the impact of road traffic emissions upon existing receptors adjacent to local roads. The key traffic related pollutants considered are nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).
- 1.8 The assessment has been undertaken with reference to the advice provided within the Land-Use Planning and Development Control: Planning for Air Quality, and 'Guidance from Environmental Protection UK', May 2017, and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes.

## Disclaimer

- 1.9 MEC has completed this report for the benefit of the individuals referred to in Paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.
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## 2.0 AIR QUALITY STANDARDS

- 2.1 The principal air quality standards applied within the UK are the standards and objectives that were initially formulated within the Air Quality (England) Regulations 2000 (AQR) as amended in 2002. These were enacted as part of the UK National Air Quality Strategy (AQS) under Section 80 of the Environment Act 2021, and implement relevant directives of the European Union (EU). The latest version of the UK AQS was published in 2007.
- 2.2 It is important to note the distinction between air quality standards and objectives. Although the AQ Standards (AQS) define concentration levels that will avoid or minimise risks to health, they do not necessarily reflect levels that are presently technically feasible or economically efficient. In contrast, the AQ Objectives (AQO) have been set with regard to what is realistically achievable within a specified timetable. The approach adopted by the Strategy is to apply the objectives, where members of the public, in a non-occupational capacity and at locations close to ground level, are likely to be exposed over the averaging time of the objective, for example, over 1-hour, 24-hour or annual periods as appropriate.
- 2.3 Under the Environment Act 2021, Local Authorities must review and document local air quality within their areas by way of a staged appraisal and respond accordingly, with the aim of meeting the air quality objectives by the years defined in the Regulations. Where the objectives of the Regulations are not likely to be achieved by the objective year, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it will try to meet air quality standards in future.
- 2.4 The Strategy's current air quality objectives for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>, for the protection of human health are summarised in Table 2.1 below. Definitions of units and terms used to quantify air pollutant concentrations are provided in **Appendix B**.

**Table 2.1: UK Air Quality Objectives for Protection of Human Health**

Pollutant	Concentration	Measured as
Nitrogen dioxide	200 µg/m <sup>3</sup>	1 hour mean not to be exceeded more than 18 times per year
	40 µg/m <sup>3</sup>	Annual mean
Particles (PM <sub>10</sub> gravimetric)		
All authorities	50 µg/m <sup>3</sup>	Daily mean not to be exceeded more than 35 times a year
	40 µg/m <sup>3</sup>	Annual mean
Particles (PM <sub>2.5</sub> gravimetric)	20 µg/m <sup>3</sup> (target)	Annual mean
	12 µg/m <sup>3</sup>	2028 Interim target <sup>(a)</sup>
	10 µg/m <sup>3</sup>	Legally binding target 2040 <sup>(a)</sup>
<sup>(a)</sup> The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023		

- 2.5 The UK Government has also set NO<sub>2</sub> objectives for 2010 that must be met by all member states, although these 2010 EU NO<sub>2</sub> objectives are equal to the UK Air Quality Strategy NO<sub>2</sub> 2005 objectives.

- 2.6 The pollutants of most concern to planning authorities in urban areas, due to the high concentrations presently encountered (of which local road traffic makes a large contribution) are NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

### **National Planning Policy Framework**

- 2.7 The latest National Planning Policy Framework (NPPF), issued by the Ministry of Housing, Communities and Local Government in 2024, sets out the Government's planning policies for England and how these are to be expected to be applied. The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is to be a material consideration in planning decisions.
- 2.8 Paragraph 187 of the NPPF advises that, with respect to air quality, planning policies and decisions should contribute to and enhance the natural and local environment by *"...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"*.
- 2.9 Further, paragraph 199 advises that *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

### **Planning Practice Guidance**

- 2.10 In 2019, the Department for Communities & Local Government updated its on-line planning guidance to assist with interpretation of the NPPF. The guidance covers general matters such as relevance of air quality issues, role of the Local Plan, information sources, assessment approaches and mitigation. How considerations about air quality fit into the development management process is summarised by the guidance in a flowchart, which is included here in **Appendix C**.

### **Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) – Land-Use Planning & Development Control: Planning for Air Quality 2017**

- 2.11 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced this guidance to ensure that air quality is adequately considered in the land-use planning and development control processes.
- 2.12 The guidance clarifies when an air quality assessment is required and what it should contain. It sets out how impacts should be described and assessed. Importantly it sets out a recommended approach that can be used to assess the significance of the air quality impacts, taking account of the advice issued by IAQM. An

important focus of this guidance is on minimising the air quality impacts of all developments for which air quality assessments have been requested by the planning authority; this will be through good design and application of appropriate mitigation measures.

2.13 Stage 1 of the assessment in the local area seeks to screen out smaller development and/or developments where impacts can be considered to have insignificant effects. The Stage 1 criteria are set out in Table 2.2 and require any of the criteria in row A, coupled with any of the criteria in row B, to apply before an assessment proceeds to Stage 2. If none of the criteria are met then the impacts can be considered to be insignificant and there is no requirement to carry out an air quality assessment.

**Table 2.2: Stage 1 Criteria**

Criteria to Proceed to Stage 2
If any of the following apply: <ul style="list-style-type: none"> <li>• 10 or more residential units or a site of more than 0.5 ha</li> <li>• more than 1,000 m<sup>2</sup> of floor space for all other uses or a site area greater than 1 ha</li> </ul>
Coupled with any of the following: <ul style="list-style-type: none"> <li>• the development has more than 10 parking spaces</li> <li>• the development will have a centralised energy facility or other centralised combustion process</li> </ul>
Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

2.14 The criteria in Table 2.3 provide more specific guidance as to when an air quality assessment is likely to be required to assess the impacts of the proposed development on the local area.

**Table 2.3: Indicative Criteria for Requiring an Air Quality Assessment**

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans < 3.5t gross vehicle weight)	A change of LDV flows of: more than 100 AADT within or adjacent to an AQMA more than 500 AADT elsewhere
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses > 3.5t gross vehicle weight)	A change of HDV flows of: more than 25 AADT within or adjacent to an AQMA more than 100 AADT elsewhere
Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
Introduce or change a bus station.	Where bus flows will change by: more than 25 AADT within or adjacent to an AQMA more than 100 AADT elsewhere.
Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor Coupled with the car park having more than 100 movements per day (total in and out)
Have one or more substantial combustion processes.	Where the combustion unit is: any centralised plant using bio fuel any combustion plant with single or combined thermal input > 300kW

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment
	a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year)
Have a combustion process of any size.	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.

- 2.15 Where an air quality assessment is identified as being required, this may be either a Simple or a Detailed Assessment. A Simple Assessment is one relying on already published information and without quantification of impacts, in contrast to a Detailed Assessment that is completed with the aid of a predictive technique, such as a dispersion model. Passing a criterion in Table 2.3 does not automatically lead to the requirement for a Detailed Assessment. Once again, where none of the criteria are met the impacts can be considered to be insignificant and there is no requirement to carry out an air quality assessment.
- 2.16 The purpose of the air quality assessment is to define the likely quantitative or qualitative changes in air quality or exposure to air pollution as a result of the proposed development.
- 2.17 The suggested framework for describing the impacts on the basis set out above is set out in Table 2.4. The term Air Quality Assessment Level (AQAL) is used to include air quality objectives or limit values, where these exist. The Table is only intended to be used with annual mean concentrations, and all % changes are rounded up or down to whole numbers. At exposures less than 75% of the AQAL, the degree of harm is described as likely to be small. As the exposure encroaches and exceeds the AQAL the degree of harm increases, and the change becomes more important when the result is an exposure that is approximately equal to or greater than the AQAL.

**Table 2.4: Impact Descriptors for Individual Receptors**

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

- 2.18 A judgement of the significance of the impacts is to be made by a competent professional who is suitably qualified, and the reasons for reaching the conclusions should be transparent and set out logically. Whilst the starting point for the assessment of significance is the degree of impact, as defined by Table 2.4, this should be seen as only one of the factors for consideration, not least because the outcome of this assessment procedure applies to a receptor and not the overall impact of the scheme on the locality.

2.19 The guidance also makes it clear that the presence of an AQMA should not halt all development, but where development is permitted, the planning system should ensure that any impacts are minimised as far as is practicable. Even where developments are proposed outside of AQMAs, and where pollutant concentrations are predicted to be below the objectives/limit values, it remains important that the proposed development incorporates good design principles and best practice measures and that emissions are fully minimised.

## 3.0 LOCAL AUTHORITY AIR QUALITY REVIEW AND ASSESSMENT

### Test Valley Borough Council

3.1 Air quality within the TVBC area is generally good and there are currently no declared Air Quality Management Areas (AQMAs) within the borough.

3.2 The council’s most recently published 2024 Annual Status Report (ASR) states:

*“Monitoring of NO<sub>2</sub> within the TVBC area continues to indicate that the current Air Quality Objectives have been met, with no current requirement to implement AQMAs.*

*The overall trends in the data indicate an improvement in air quality within the region compared to 2019, with a continued decrease in concentrations of NO<sub>2</sub> between 2022 and 2023.”*

3.3 TVBC operated a comprehensive network of twenty-one non automatic monitoring locations in 2023, and the most relevant monitoring locations to the Site, i.e., the closest, along with those used within the verification process, are shown in Table 3.1.

**Table 3.1: Annual Mean NO<sub>2</sub> Concentrations**

Site-ID	Location	OS Co-ordinates	Annual Mean Concentrations (µg/m <sup>3</sup> )				
			2019	2020	2021	2022	2023
S17	New Street, Andover	436682, 146683	35.4	30.2	30.2	32.1	28.1
S18E	Winchester Road, Andover	436545, 145179	-	-	-	-	22.5
S19	New Street – B, Andover	436684, 146688	-	-	-	-	23.5

3.4 The results in Table 3.1 show in 2023, monitored concentrations ranged between 22.5 µg/m<sup>3</sup> and 28.1 µg/m<sup>3</sup>, i.e., well below the objective level of 40 µg/m<sup>3</sup>, with site S17 showing a gradual decline in concentrations over the last 5-years.

3.5 TVBC recently installed a new diffusion tube site along West Street in 2024 (S19a), and the current results shown in Table 3.2.

**Table 3.2: S19a Monitored NO<sub>2</sub> Concentrations**

Site-ID	OS Co-ordinates	Monitored Annual Mean Concentrations (µg/m <sup>3</sup> )											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S19a	436351, 145660	22.1	16.3	18.3	13.2	12.5	11.4	8.5	10.6	12.5	19.3	24.8	16.1

3.6 It should be noted that the results shown in Table 3.2 have not been ratified (are subject to bias corrections, etc), and therefore represent raw monthly data sets. Nevertheless, the monthly monitored concentrations show a consistent trend in concentrations below the annual mean objective level for NO<sub>2</sub>.

3.7 However, it will be important that the air quality assessment looks at the potential effects of the re-routing of traffic around the local road network upon existing dwellings adjacent to local roads to establish that there will be no adverse effects upon their existing standards of air quality. This matter is covered in the following sections.

## 4.0 METHODOLOGY

### General

- 4.1 The assessment has been undertaken using the atmospheric dispersion modelling package ADMS-Roads Air Quality Management System Version 5.1, developed by Cambridge Environmental Research Consultants Ltd (CERC), to establish air pollutant concentrations at the proposed development.
- 4.2 The assessment has been undertaken with reference to guidance set out within Defra's LAQM.TG(22), the IAQM and EPUK's 'Guidance on Land-Use Planning and Development Control: Planning for Air Quality 2017 (v1.2)'.
- 4.3 Specifically, ADMS-Roads has been used to disperse emissions of NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> from local road sources and derive resultant road contributions to the concentrations of these pollutants at specific existing receptor locations. When added to the background concentration, this provides an indication of the resulting air quality at each receptor location.
- 4.4 The ADMS-Roads model requires the input of background pollutant concentration data, hourly traffic flows, annual average vehicle speed, vehicle classification broken down into light and heavy duty vehicles (LDV/HDV), information on the type of road and meteorological data (model inputs are discussed in turn later).
- 4.5 Current guidance has led to some changes in the way in which NO<sub>2</sub> concentrations should be modelled. In accordance with LAQM.TG(22) the ADMS-Roads model has been used to derive road-based concentrations of NO<sub>x</sub> at specific receptor locations. To convert the modelled road-based NO<sub>x</sub> to annual NO<sub>2</sub> the 'NO<sub>x</sub> to NO<sub>2</sub>' calculator (Version 9.1) (available from <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/>) has been applied to all modelled results.

### Assessment Scenarios

- 4.6 For the purpose of an Air Quality Assessment, sensitive receptors can be thought of as areas within 200m of the roadside where people may be subject to change in air quality. Beyond 200m from the roadside, atmospheric dispersion (and chemistry) effect render emissions from road traffic negligible.
- 4.7 The assessment considers the potential impact of emissions from proposed traffic changes due to the road realignment, upon NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at individual receptor locations as shown in **Appendix D**.
- 4.8 Of the assessed receptor locations, 18 represent relevant exposure, i.e., existing residential receptor locations adjacent to the respective road sources, with a further 11 receptors representing transient exposure within the proposed green space.
- 4.9 The following scenarios, informed by available TVBC's NO<sub>2</sub> monitoring data and the Transport Assessment work, have been included in the assessment:

- 2023 Model Verification; and
- 2040 Do Nothing (DN) i.e., 2040 Existing Road Configuration.
- 2040 Do Something (DS) i.e., 2040 Proposed Road Configuration

4.10 The 2040 scenarios has been modelled using future year traffic flow data, together with 2025 background and emissions data, to account for current uncertainty in future year projections. Background concentrations and vehicle emission factors are projected to decrease year on year due to fleet composition and technological changes. Using 2025 data therefore provides a conservative case for the future scenarios.

### **Local Road Network**

4.11 Local road sources have been input into the model using the interface between ADMS-Roads and the ADMS-Roads mapper, which enables roads to be input according to their geographic location using OS base mapping of the local area. Road/carriageway widths have been informed from OS base and aerial mapping.

### **Traffic Data & Emissions**

4.12 To inform emissions from the road source included within the model, traffic flows for the surrounding road network have been provided by the project's Transport Consultant (Stantec). The available traffic flow data, % HGV and average speed assumptions for each assessment scenario are provided in **Appendix E** for information.

4.13 Emission rates for each road source have been derived from traffic flow data using the Emission Factor Toolkit (EFT), Version 12.0, published by Defra and the devolved administrations in December 2023. The EFT is incorporated within ADMS-Roads Extra. The EFT allows users to calculate road vehicle pollutant emission rates for pollutants for a specified year, road type, and vehicle speed and vehicle fleet composition.

### **Background Concentrations**

4.14 Background concentrations of NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> have been obtained from the 2021-based maps available on the Defra website (<https://uk-air.defra.gov.uk/data/laqm-background-home/>) which provide estimated background pollutant concentrations for each 1kmx1km grid square in the UK.

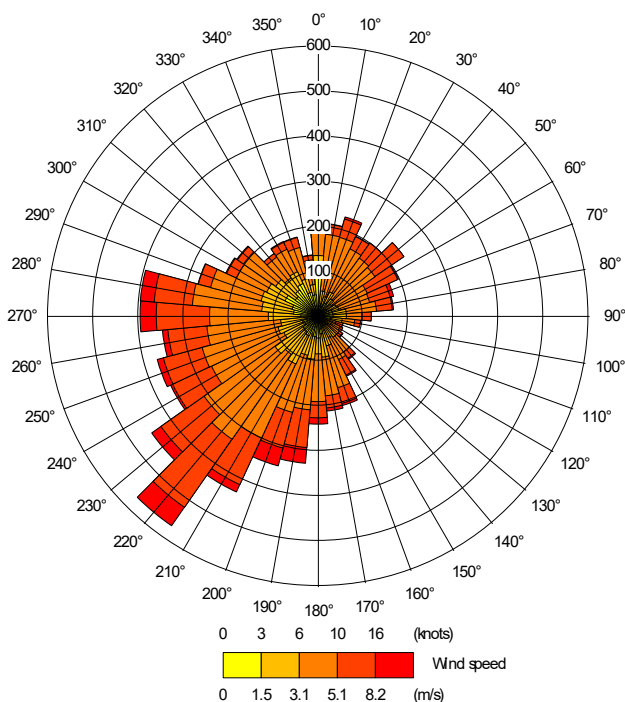
4.15 As the background maps provide data for individual pollutant sectors, those sectors relating to road traffic have been removed to avoid double counting of road emissions. As only total background concentrations are provided for NO<sub>2</sub>, the NO<sub>2</sub> map has been adjusted using the online NO<sub>2</sub> Adjustment for NO<sub>x</sub> Sector Removal Tool (Version 9.0), <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/no2-adjustment-for-nox-sector-removal-tool/>.

### **Meteorology**

4.16 The closest meteorological station is Middle Wallop Weather Station, located at a distance of approximately 9km from the Site.

4.17 The windrose for Middle Wallop Weather Station is presented in Figure 4.1. The predominant wind direction, associated with the highest wind speeds, is from the southwest.

**Figure 4.1: Middle Wallop Weather Station 2023**



**Verification**

- 4.18 To determine how well the model is performing and to correct any over or under estimation of pollutant concentrations, LAQM.TG(22) recommends a verification process that should be applied. Verification involves a comparison between predicted and measured ‘road traffic contributions’ at one or more local sites and adjustment of the modelled concentrations where necessary.
- 4.19 TVBC’s monitored results used within the verification process are shown in Table 4.1 below.

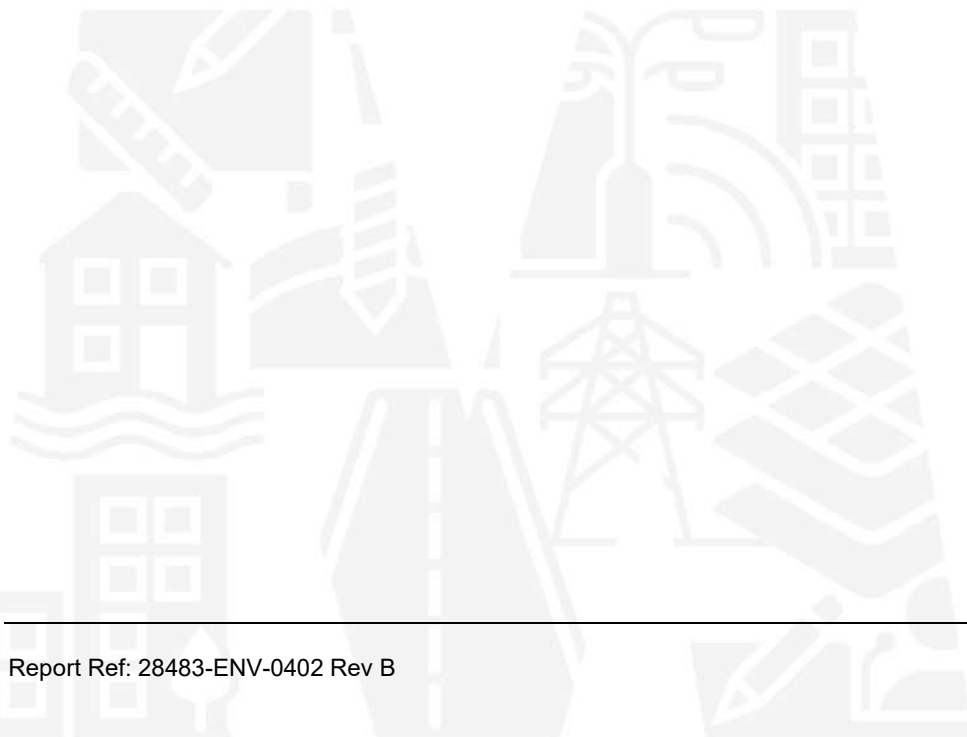
**Table 4.1: TVBC Monitoring Data Used in Verification**

Site-ID	OS Co-ordinates	Annual Mean Concentrations ( $\mu\text{g}/\text{m}^3$ )
		2023
S17	436682, 146683	28.1
S18E	436545, 145179	22.5
S19	436684, 146688	23.5

- 4.20 The derived adjustment factor is 3.7, and has been applied to all modelled road contribution  $\text{NO}_x$ ,  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$ . Details of this verification process are included in **Appendix F**. In order to get to the verification factor shown above, a reduction of assumed road speeds along the existing roads has been applied.
- 4.21 In addition to this, a Root Mean Square Error (RMSE) has been calculated to determine the error within the calculations. The calculations for the RMSE are also provided in **Appendix F**. The calculated RMSE is

1.9  $\mu\text{g}/\text{m}^3$ , which correlates to an error ratio of less than 5%. The RMSE means that modelled results could be under or over predicting pollution concentrations by between +/- 1.9  $\mu\text{g}/\text{m}^3$ .

4.22 It is considered that any attempts to reduce the verification factor further, would not be representative of the real world conditions at the links in question. Nevertheless, the calculated RMSE is less than 5% and is acceptable for assessment purposes.



## 5.0 AIR QUALITY ASSESSMENT

### General

5.1 This section of the report outlines the findings of the assessment discussed in Section 4.0. Having established the likely change in pollutant concentrations arising from the 'do something' assessment scenarios, the potential local air quality impact of the proposed development has been described using the approach set out in the IAQM and EPUK 'Guidance on Land-Use Planning and Development Control: Planning for Air Quality 2017'.

5.2 EPUK Guidance suggests a two stage process to be followed in the assessment:

- A qualitative or quantitative description of the impacts on local air quality arising from the development; and
- A judgement on the overall significance of the effects of any impacts.

5.3 For air quality impacts on the surrounding area, i.e., existing receptors, a practical way of assigning a meaningful description to the degree of an impact is to express the magnitude of incremental change as a proportion of the relevant assessment level and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion. The suggested IAQM/EPUK framework for describing the impacts on the basis set out above is shown in Table 2.4.

### Results

5.4 The findings of the assessment of pollutant concentrations at each of the receptor locations for the modelled scenarios are discussed below.

5.5 These results should be compared with the objectives listed in Table 2.1, and summarised as follows:

- NO<sub>2</sub> average annual mean not to exceed 40 µg/m<sup>3</sup>;
- PM<sub>10</sub> average annual concentrations not to exceed 40 µg/m<sup>3</sup>; and
- PM<sub>2.5</sub> average annual concentrations not to exceed 2040 target of 10 µg/m<sup>3</sup>.

### Nitrogen Dioxide (NO<sub>2</sub>)

5.6 The results in **Appendix G** indicate that for the do-nothing scenario, i.e., based on the existing road configuration, all receptors have values below the current annual mean air quality objectives (40 µg/m<sup>3</sup>) for NO<sub>2</sub>, which is consistent TVBC review and assessment data.

5.7 With the proposed road configuration, i.e., the 'do something' scenario in 2040, the absolute concentrations remain below the current air quality objectives and the incremental change is small (1 µg/m<sup>3</sup> or less to annual mean concentrations NO<sub>2</sub>), which would not have a significant impact upon local air quality.

5.8 The impact significance in accordance with the EPUK/IAQM guidance indicates that for all assessed receptors representing relevant exposure, the impact due to development is classed as 'Negligible', and none of the changes exceed 3% and the overall concentrations remain below 75% of the AQAL.

- 5.9 With regard to the 1-hour mean objective LAQM.TG(22) advises that “A study carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO<sub>2</sub> 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m<sup>3</sup>”. As the results in **Appendix G** indicate annual mean concentrations of NO<sub>2</sub> will remain below 60 µg/m<sup>3</sup>, it is considered that the NO<sub>2</sub> 1-hour objective will not be exceeded at any receptor.

#### **Particulate Matter (PM<sub>10</sub>)**

- 5.10 The results in **Appendix G** indicate that for the do-nothing scenario, i.e., based on the existing road configuration, receptors adjacent to all roads have values below the current annual mean air quality objectives (40 µg/m<sup>3</sup>) for PM<sub>10</sub>.
- 5.11 With the proposed road configuration, i.e., the ‘do something’ scenario in 2040, the absolute concentrations remain below the current air quality objectives and the incremental change is small (0.42 µg/m<sup>3</sup> or less to annual mean concentrations of PM<sub>10</sub>), which would not have a significant impact upon local air quality.
- 5.12 The impact significance in accordance with the EPUK/IAQM guidance indicates that for all assessed receptors representing relevant exposure, impact due to development is classed as ‘Negligible’, and none of the changes exceed 1% of the AQAL.

#### **Particulate Matter (PM<sub>2.5</sub>)**

- 5.13 The results in **Appendix G** indicate that for the do-nothing scenario, i.e., based on the existing road configuration, receptors adjacent to all roads have values below the 2040 target (10 µg/m<sup>3</sup>) for PM<sub>2.5</sub>.
- 5.14 With the proposed road configuration, i.e., the ‘do something’ scenario in 2040, the absolute concentrations remain below the target objective and the incremental change is small (0.22 µg/m<sup>3</sup> or less to annual mean concentrations of PM<sub>2.5</sub>), which would not have a significant impact upon local air quality.
- 5.15 The impact significance in accordance with the EPUK/IAQM guidance indicates that for the majority of assessed receptors representing relevant exposure (Receptors 1 to 3, 5, 6, 8 to 14, 17 and 18), impact due to the proposed road configuration is classed as ‘Negligible’, and none of the changes exceed 1% of the AQAL.
- 5.16 However, for the ground floor of receptors 4, 7, 15 and 16, the impact significance in accordance with the EPUK/IAQM guidance is classed as ‘Slight’ due to the proposed road configuration. Nevertheless, the absolute concentrations predicted at these ground floor locations of between 7.72 µg/m<sup>3</sup> and 8.07 µg/m<sup>3</sup> would lie below the target objective, and the % change relative to the AQAL would not exceed 2%.

#### **Open Green Space**

- 5.17 For transient receptors located within the open green space area, the results in **Appendix G** show that for all pollutants, concentrations lie well below the respective air quality objective levels in all scenarios.
- 5.18 It should be noted that the above effects reflect a worst-case scenario, with the model using 2040 traffic flow data, together with 2025 background and emissions data, to account for current uncertainty in future year

projections. Background concentrations and vehicle emission factors are projected to decrease year on year, as new Euro standards and UK fleet turnover are assumed. Using 2025 data therefore provides a conservative case for the 2040 scenario. In reality, pollutant concentrations are likely to be lower.

- 5.19 Using the significance flowchart in **Appendix C**, air quality is not considered to be a significant consideration and the proposed development can proceed to a planning decision.
- 5.20 Since the air quality assessment indicates that the annual mean air quality objective will be met at the most exposed receptor locations, and since the actual changes due to the proposed road configuration are small, and not significant, it can be concluded that re-configuration of the road will not lead to significant adverse impact upon existing air quality.

## 6.0 CONCLUSIONS

- 6.1 MEC has been commissioned by Test Valley Borough Council (TVBC) to undertake an Air Quality Assessment for a proposed greenspace development at Western Avenue, Riverside Park, Andover.
- 6.2 This Air Quality Assessment seeks to examine the impact of road traffic emissions upon existing receptors adjacent to local roads. The key traffic related pollutants considered are nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).
- 6.3 The assessment has been undertaken with reference to the advice provided within the Land-Use Planning and Development Control: Planning for Air Quality, 'Guidance from Environmental Protection UK', the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes', May 2017.
- 6.4 The following scenarios have been included in the assessment:
- 2023 Model Verification;
  - 2040 Do Nothing (DN) i.e., 2040 Existing Road Configuration; and
  - 2040 Do Something (DS) i.e., 2040 Proposed Road Configuration.
- 6.5 The future year scenarios will be modelled using 2040 traffic flow data, together with 2025 background and emissions data, to account for current uncertainty in future year predictions.
- 6.6 The model has been verified using 2023 NO<sub>2</sub> monitoring data provided by TVBC. The verification has derived an adjustment factor of 3.7, which has been applied to all modelled outputs.

### Nitrogen Dioxide (NO<sub>2</sub>)

- 6.7 The results that for the do-nothing scenario, i.e., based on the existing road configuration, all receptors have values below the current annual mean air quality objectives (40 µg/m<sup>3</sup>) for NO<sub>2</sub>, which is consistent TVBC review and assessment data.
- 6.8 With the proposed road configuration, i.e., the 'do something' scenario in 2040, the absolute concentrations remain below the current air quality objectives and the incremental change is small (1 µg/m<sup>3</sup> or less to annual mean concentrations NO<sub>2</sub>), which would not have a significant impact upon local air quality. The impact due to development is classed as 'Negligible', and none of the changes exceed 3% of the AQAL.
- 6.9 With regard to the 1-hour mean objective LAQM.TG(22) advises that "A study carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO<sub>2</sub> 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m<sup>3</sup>". As the results indicate annual mean concentrations of NO<sub>2</sub> will remain below 60 µg/m<sup>3</sup>, it is considered that the NO<sub>2</sub> 1-hour objective will not be exceeded at any receptor.

### Particulate Matter (PM<sub>10</sub>)

- 6.10 Annual mean PM<sub>10</sub> concentrations are also expected to remain below the annual mean objective at all assessed receptor locations for all scenarios.
- 6.11 With the proposed road configuration, i.e., the 'do something' scenario in 2040, the absolute concentrations remain below the current air quality objectives and the incremental change is small (0.42 µg/m<sup>3</sup> or less to annual mean concentrations of PM<sub>10</sub>), which would not have a significant impact upon local air quality. The impact due to development is classed as 'Negligible', and none of the changes exceed 1% of the AQAL.

### Particulate Matter (PM<sub>2.5</sub>)

- 6.12 Annual mean PM<sub>2.5</sub> concentrations are also expected to remain below the 2040 target at all assessed receptor locations for all scenarios.
- 6.13 With the proposed road configuration, i.e., the 'do something' scenario in 2040, the absolute concentrations remain below the target objective and the incremental change is small (0.26 µg/m<sup>3</sup> or less to annual mean concentrations of PM<sub>2.5</sub>), which would not have a significant impact upon local air quality.
- 6.14 The impact significance in accordance with the EPUK/IAQM guidance indicates that for the majority of assessed receptors representing relevant exposure (1 to 3, 5, 6, 8 to 14, 17 and 18), impact due to proposed road configuration is classed as 'Negligible', and none of the changes exceed 1% of the AQAL.
- 6.15 However, for the ground floor of receptors 4 and 7, the impact significance in accordance with the EPUK/IAQM guidance is classed as 'Slight' due to the proposed road configuration. Nevertheless, the absolute concentrations predicted at these ground floor locations of between 7.72 µg/m<sup>3</sup> and 8.07 µg/m<sup>3</sup> would lie below the target objective, and the % change relative to the AQAL would not exceed 2%.

### Open Green Space

- 6.16 For transient receptors located within the open green space area, the results in **Appendix G** show that for all pollutants, concentrations lie below the respective air quality objective levels in all scenarios.

### Summary

- 6.17 The air quality assessment indicates that the annual mean air quality objective will be met at all receptor locations, and since the actual changes due to the proposed road configuration are small, and not significant, it can be concluded that re-configuration of the road will not lead to significant adverse impact upon existing air quality.



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# APPENDICES



## APPENDIX A



**LEGEND**

**Boundary**

- Site boundary (Red dashed line)
- Working operation (Red solid line)
- Southern Water extend of work (Red dashed line)

**Level**

- Existing level (Red square with 0.00)
- To be observed (Red square with 0.00)
- Proposed level (Blue square with 0.00)

**Paving**

- Pavement (Grey square)
- Concrete paving blocks (White square with black dots)
- Cycleway (White square with black lines)
- Park path (White square with black dots)
- Play safety surface (White square with black dots)
- Natural stone paving (White square with black dots)
- GRP grating deck (White square with black dots)
- Tactile paving (White square with black dots)

**Kerb**

- Road kerb (White square)
- Metal edge (White square)

**Furniture**

- Timber bench (White square)
- Wall top timber seating (White square)
- Concrete wall (White square)
- Water feature (White square)
- Metal wall (White square)
- Balustrade (White square)
- Fencing (White square)
- Play equipments (White square)
- Pavilion (White square)
- Sheffield cycle stands (White square)
- Bins (White square)
- Lighting column (White square)
- Lighting bollard (White square)

**Tree (potential location)**

- Existing tree (Green circle)
- Existing tree (Red circle)
- Existing tree (Blue circle)
- Boundary tree (Green circle)
- Feature tree (Green circle)
- River tree (Green circle)

**Planting**

- Existing mowed lawn retained (Green square)
- Existing woodland planting retained (Green square)
- Protective holt (Green square)
- Active glade (Green square)
- Chalk woodland (Green square)
- Passive grassland (Green square)
- Standard grass seed (Green square)
- Reinforced lawn (Green square)

P06 17.03.25 For coordination JJP BS BS  
 P04.1 13.03.25 Updated Red Line Boundary JJP BS BS  
 P04 16.03.25 Updated Red Line Boundary JJP BS BS  
 P03 14.02.25 HCC & SV Coordination JJP BS BS  
 P02 25.11.24 Updated Planning Boundary JJP BS BS  
 P01.2 15.11.24 For Coordination JJP BS BS  
 P01.8 01.11.24 For Coordination JJP BS BS  
 P01.8 03.10.24 For Coordination JJP BS BS  
 P01.4 26.09.24 Updated Layout JJP BS BS  
 P01.2 29.08.24 For coordination JJP BS BS  
 P01.2 03.07.24 For coordination JJP BS BS  
 P01.1 17.04.24 First Issue JJP BS BS

Scale 1:500  
 0 5 10 15 20 25m  
 Do not scale from this drawing  
 All dimensions are to be verified on site  
 © Drawing & design copyright LUC

**LUC**  
www.landuse.co.uk

Project  
**Andover Western Avenue  
Riverside Park**

Client  
**Test Valley Borough Council**

LUC Job Nr Scale @A1 Status  
**12766 1:500 S1-Suitable for co-ordination**

Drawing Title  
**General Arrangement  
Landscape Layout**

Drawing Nr Issue  
**12766-LUC-XX-XX-DR-L-0001 P05**



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## APPENDIX B

## DEFINITION OF AIR QUALITY TERMS AND UNITS

ppm	parts per million - defines the units of pollution in every million ( $10^6$ ) units of air.
ppb	parts per billion - defines the units of pollution in every billion ( $10^9$ ) units of air.
$\mu\text{g}/\text{m}^3$	microgrammes per cubic metre - one microgramme is one millionth of a gram.
$\text{ng}/\text{m}^3$	nanogrammes per cubic metre – one nanogramme is one milliardth (i.e. one thousand millionth of a gram ( $10^{-9}$ ))
Annual mean	the average of the concentrations measured for one year.
1-hour mean	the average of the concentrations measured for one hour.
24-hour mean	the average of the concentrations measured for twenty four hours.
Running mean	the mean or series of means calculated for overlapping time periods. For example, an 8-hour running mean is calculated every hour and averages the values for eight hours. The period of averaging is stepped forward by one hour for each subsequent value so that a degree of overlap exists between successive values. Non-running means are calculated for consecutive time periods so that there is no overlap.
Percentile	a value that establishes a particular threshold in a collection of data. For example, the 90 <sup>th</sup> percentile of yearly values is the value that 90% of all the data in the year fall below or equal.
Exceedance	a period of time when the concentration of a pollutant is greater than, or equal to, the relevant air quality standard.

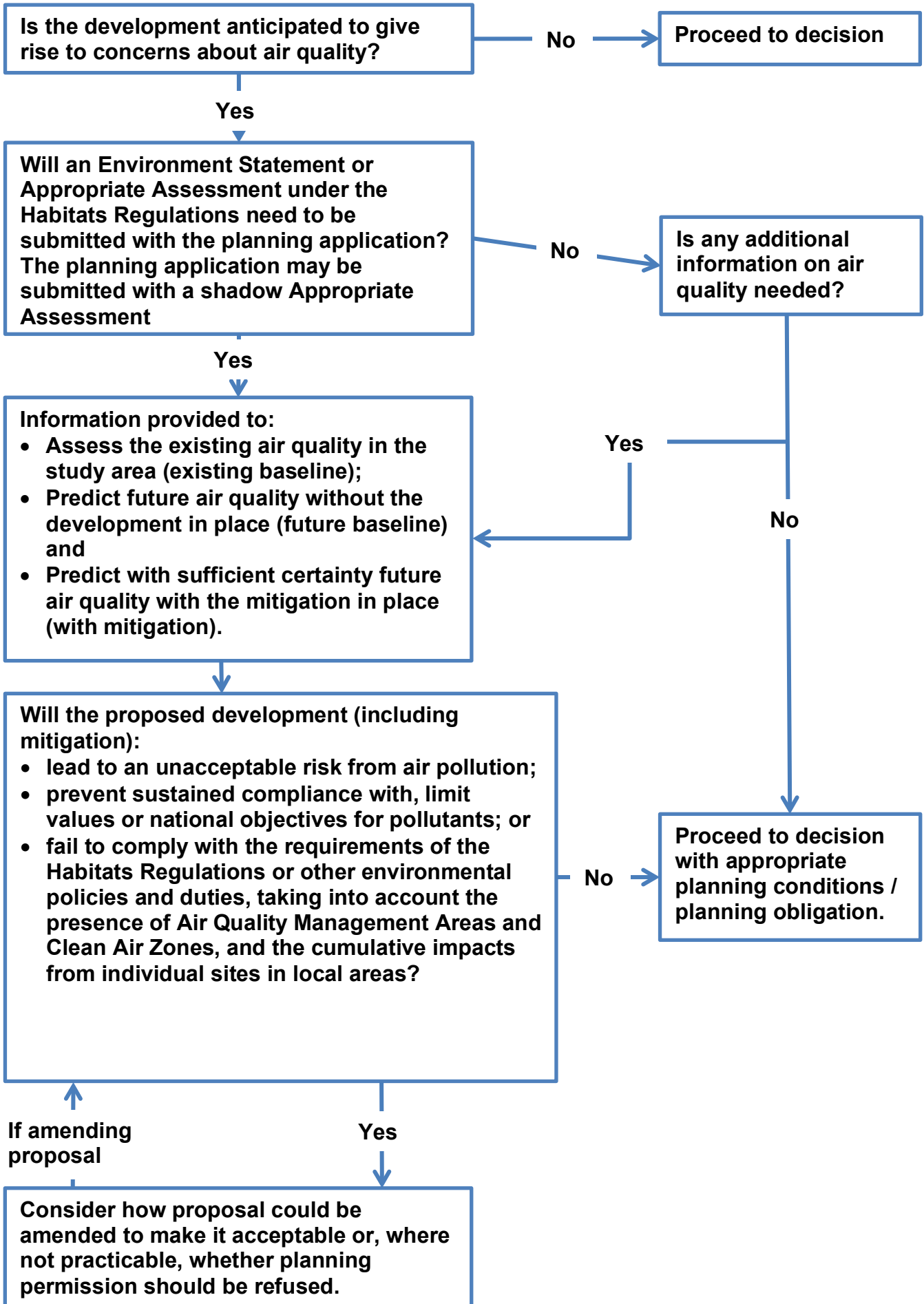


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# APPENDICES



## APPENDIX C





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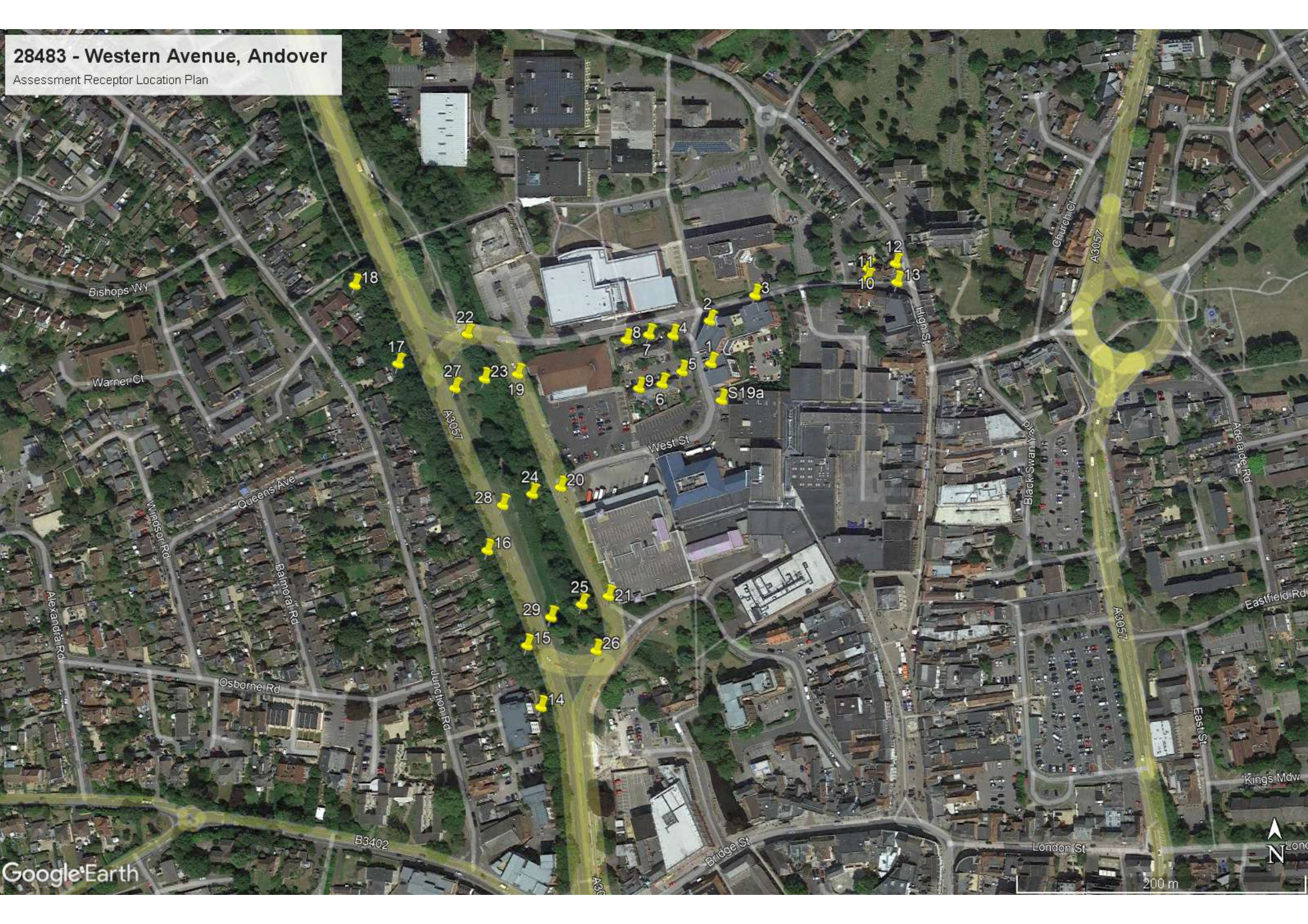
# APPENDICES



## APPENDIX D

# 28483 - Western Avenue, Andover

Assessment Receptor Location Plan





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# APPENDICES



## APPENDIX E

## 2023 Verification

Link ID	DfT ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed (Kph)	Link Width (m)
V1	37676	Winchester Road	12348	12170	507	1%	178	7	5-35	4.8
V2	78088	A343	12638	12448	519	2%	190	8	5-35	6.5-14



## 2040 Do Nothing

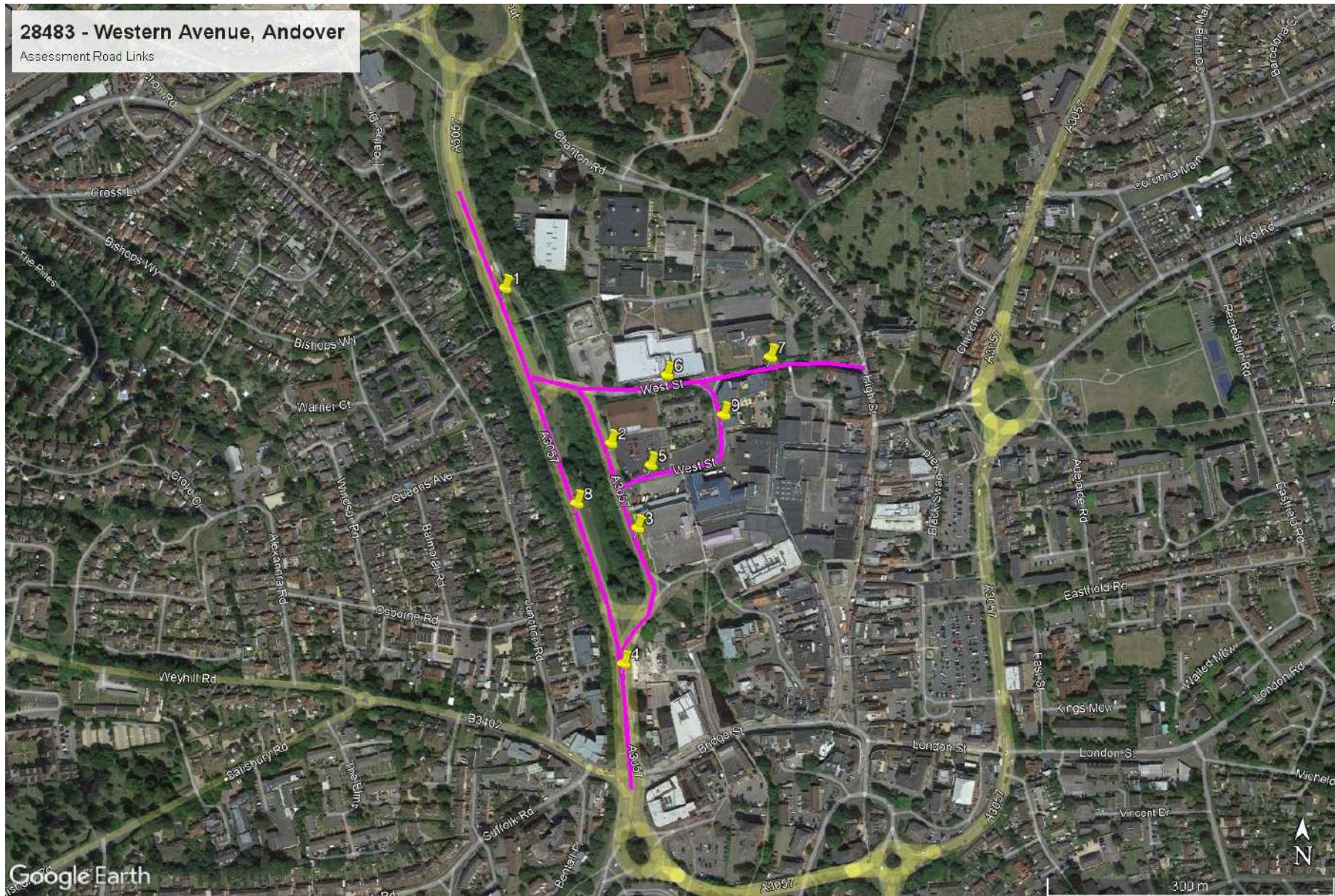
Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed (Kph)	Link Width (m)
1	A3507 Western Ave Gyratory - northern arm	17142	16772	699	2.16%	370	15	20-45	6.5-14
2	A3507 Western Ave Gyratory - eastern circulatory (N of Chantry St Car Park)	8470	8414	351	0.66%	56	2	30	6.5
3	A3507 Western Ave Gyratory - eastern circulatory (N of Waterloo Ct)	11610	11264	469	2.98%	346	14	30	6.5
4	A3507 Western Ave Gyratory - southern arm	15974	15547	648	2.67%	427	18	30-40	15
5	West Street (south of Lidl)	3921	3518	147	10.28%	403	17	5-15	6
6	West Street (north of Lidl)	2021	1683	70	16.72%	338	14	15-30	4-6
7	Chantry Street (west of High Street)	1498	1409	59	5.94%	89	4	10-30	5-9
8	A3507 Western Avenue Gyratory (northbound arm (between N and S easxt0)	10459	10153	423	2.93%	306	13	40	15
9	West Street (South of Portland Grove)	2609	2214	92	15.14%	395	16	25-30	6

## 2040 Do Something

Link ID	Link Name	AADT	LGV	Hourly	%HGV	HGV	Hourly	Speed (Kph)	Link Width (m)
1	A3507 Western Ave Gyratory - northern arm	17142	16772	699	2.16%	370	15	20-45	14-16
2	A3507 Western Ave Gyratory - eastern circulatory (N of Chantry St Car Park)	0	0	0	0%	0	0	0	0
3	A3507 Western Ave Gyratory - eastern circulatory (N of Waterloo Ct)	0	0	0	0%	0	0	0	0
4	A3507 Western Ave Gyratory - southern arm	15974	15547	648	2.67%	427	18	30-40	15
5	West Street (south of Lidl)	1257	653	27	48.05%	604	25	15	6
6	West Street (north of Lidl)	4568	3843	160	15.87%	725	30	10-30	4-8
7	Chantry Street (west of High Street)	1498	1409	59	5.94%	89	4	10-30	5-9
8	A3507 Western Avenue Gyratory (northbound arm (between N and S easxt0)	16313	15886	662	2.62%	427	18	20-40	15
9	West Street (South of Portland Grove)	3016	2380	99	21.09%	636	27	25-30	6

# 28483 - Western Avenue, Andover

Assessment Road Links





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# APPENDICES



## APPENDIX F

Verification (LAQM.TG 22)

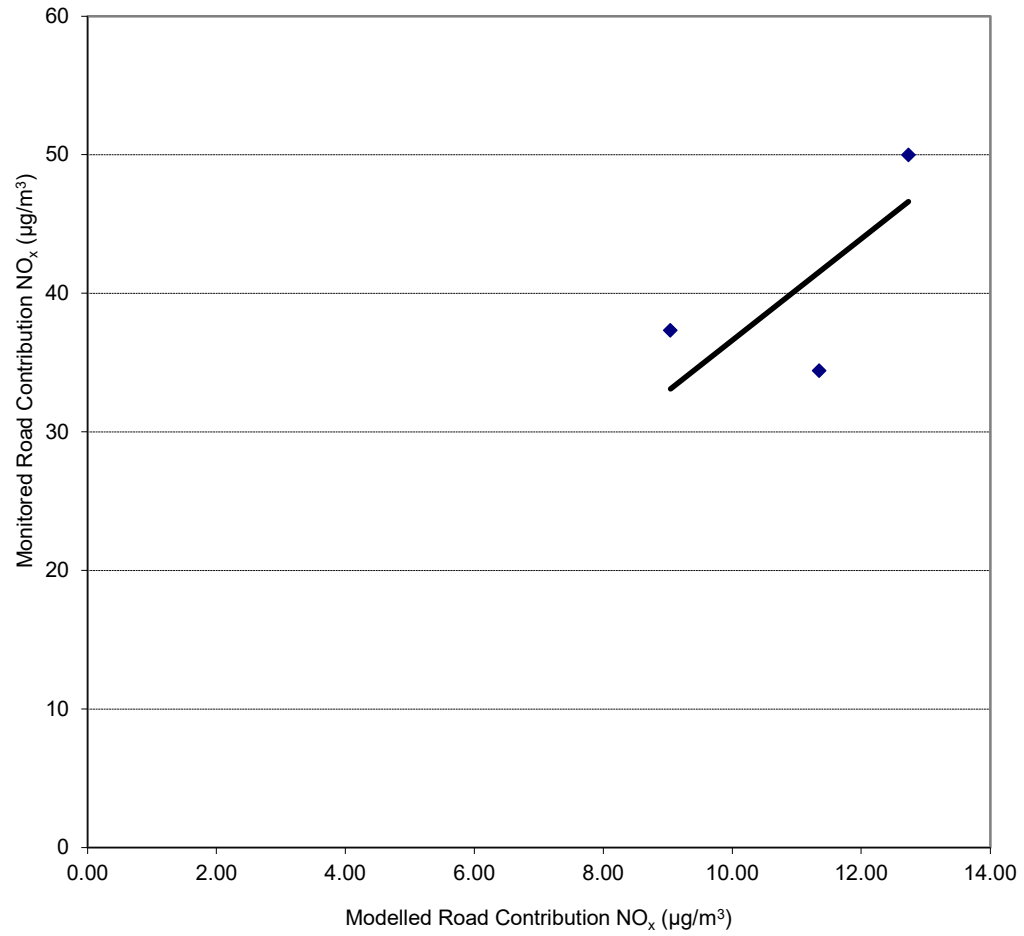
	<b>436500, 146500</b>	<b>436500, 145500</b>
<b>Background NO<sub>2</sub></b>	7.19	7.33
<b>Background NO<sub>x</sub></b>	9.16	9.34

Site ID	Location		Modelled Road Contribution NO <sub>x</sub> (ex-background)	Monitored Total NO <sub>2</sub>	Monitored Road Contribution Nox*	Monitored Total NO <sub>x</sub>	Ratio of Monitored Road Contribution NO <sub>x</sub> / Modelled Road Contribution NO <sub>x</sub>
	X (m)	Y (m)					
S17	436682	146683	12.73	28.1	49.97	59.1	3.9
S18E	436545	145179	11.35	22.5	34.41	43.8	3.0
S19	436684	146688	9.04	23.5	37.33	46.5	4.1

<b>Verification Factor</b>	3.7
----------------------------	-----

### Adjustment Factor

$$y = 3.6611x$$

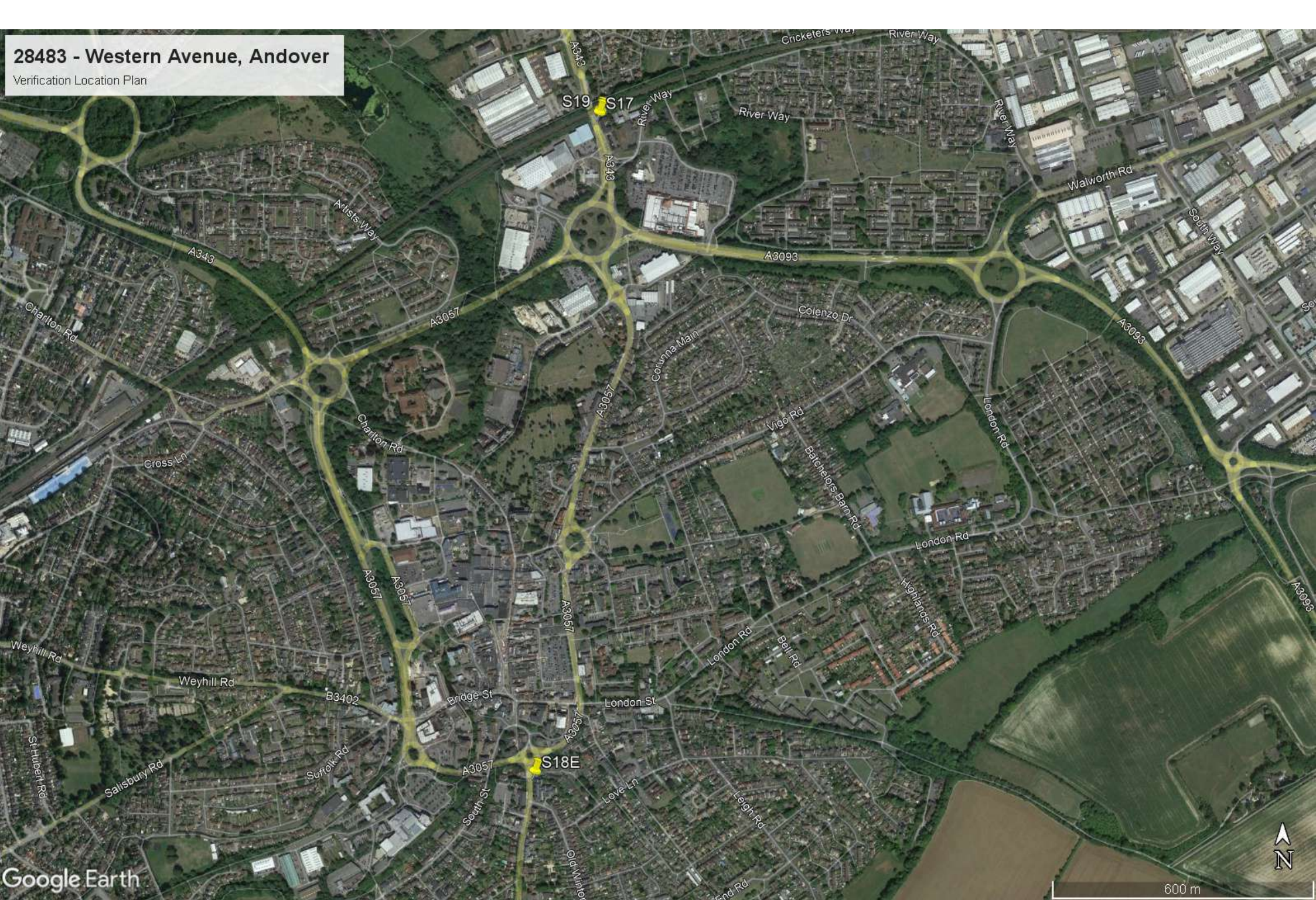


### Root Mean Square Error (RMSE)

$$RMSE = \sqrt{\frac{1}{N} \sum_{i=1}^N (Obs_i - Pred_i)^2}$$

Name	Observations	Predictions	Observations – Predictions	Squared	Total	Average	RMSE	%
S17	28.1	26.92	1.18	1.39	11.37	3.8	1.9	5%
S18E	22.5	25.2	-2.7	7.29				
S19	23.5	21.86	1.64	2.69				

**28483 - Western Avenue, Andover**  
Verification Location Plan





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# APPENDICES



## APPENDIX G

NO <sub>2</sub>										
Receptor Name	X(m)	Y(m)	Z(m)	2040 DN	2040 DS	DS-DN	% Change	AQAL	AQAL	Impact Descriptor
1 1st Floor	436344	145686	5	8.45	8.82	0.37	1%	21%	22%	Negligible
1 2nd Floor	436344	145686	8.5	7.64	7.71	0.07	0%	19%	19%	Negligible
1 3rd Floor	436344	145686	12	7.29	7.28	-0.01	0%	18%	18%	Negligible
2 1st Floor	436343	145716	5	8.25	8.77	0.52	1%	21%	22%	Negligible
2 2nd Floor	436343	145716	8.5	7.54	7.67	0.13	0%	19%	19%	Negligible
2 3rd Floor	436343	145716	12	7.21	7.22	0.01	0%	18%	18%	Negligible
3 1st Floor	436375	145734	5	7.69	7.83	0.14	0%	19%	20%	Negligible
3 2nd Floor	436375	145734	8.5	7.29	7.38	0.09	0%	18%	18%	Negligible
3 3rd Floor)	436375	145734	12	7.08	7.12	0.04	0%	18%	18%	Negligible
4 Ground Floor	436317	145706	1.5	8.87	9.87	1.00	3%	22%	25%	Negligible
4a 1st Floor	436317	145706	4	8.46	9.09	0.63	2%	21%	23%	Negligible
5 Ground Floor	436323	145680	1.5	8.73	9.09	0.36	1%	22%	23%	Negligible
5a 1st Floor	436323	145680	4	8.45	8.7	0.25	1%	21%	22%	Negligible
6 Ground Floor	436309	145672	1.5	8.71	8.82	0.11	0%	22%	22%	Negligible
6a 1st Floor	436309	145672	4	8.51	8.58	0.07	0%	21%	21%	Negligible
7 Ground Floor	436300	145707	1.5	8.85	9.76	0.91	2%	22%	24%	Negligible
7a 1st Floor	436300	145707	4	8.49	9.08	0.59	1%	21%	23%	Negligible
8 Ground Floor	436284	145703	1.5	8.96	9.71	0.75	2%	22%	24%	Negligible
8a 1st Floor	436284	145703	4	8.62	9.08	0.46	1%	22%	23%	Negligible
9 Ground Floor	436293	145669	1.5	8.9	8.78	-0.12	0%	22%	22%	Negligible
9a 1st Floor	436293	145669	4	8.7	8.58	-0.12	0%	22%	21%	Negligible
10 Ground Floor	436456	145753	1.5	9.96	9.97	0.01	0%	25%	25%	Negligible
10a 1st Floor	436456	145753	4	9.71	9.72	0.01	0%	24%	24%	Negligible
11 Ground Floor	436455	145746	1.5	10.22	10.23	0.01	0%	26%	26%	Negligible
11a 1st Floor	436455	145746	4	9.97	9.98	0.01	0%	25%	25%	Negligible
12 Ground Floor	436475	145756	1.5	8.27	8.28	0.01	0%	21%	21%	Negligible
12a 1st Floor	436475	145756	4	7.47	7.48	0.01	0%	19%	19%	Negligible
13 Ground Floor	436476	145743	1.5	8.32	8.32	0.00	0%	21%	21%	Negligible
13a 1st Floor	436476	145743	4	7.5	7.5	0.00	0%	19%	19%	Negligible
14 Ground Floor	436223	145447	1.5	9	9.55	0.55	1%	23%	24%	Negligible
14a 1st Floor	436223	145447	4	8.6	8.93	0.33	1%	22%	22%	Negligible
14b 2nd Floor	436223	145447	6.5	8.06	8.18	0.12	0%	20%	20%	Negligible
14c 3rd Floor	436223	145447	9	7.6	7.59	-0.01	0%	19%	19%	Negligible
14d 4th Floor	436223	145447	11.5	7.25	7.2	-0.05	0%	18%	18%	Negligible
15 Ground Floor	436214	145490	1.5	9.85	10.75	0.90	2%	25%	27%	Negligible
16 Ground Floor	436186	145556	1.5	9.89	10.88	0.99	2%	25%	27%	Negligible
17 Ground Floor	436123	145687	1.5	8.88	9.7	0.82	2%	22%	24%	Negligible
18 Ground Floor	436092	145743	1.5	8.26	8.4	0.14	0%	21%	21%	Negligible

PM10										
Receptor Name	X(m)	Y(m)	Z(m)	2040 DN	2040 DS	DS-DN	% Change	AQAL	AQAL	Impact Descriptor
1 1st Floor	436344	145686	5	12.35	12.44	0.09	0%	31%	31%	Negligible
1 2nd Floor	436344	145686	8.5	12.08	12.09	0.00	0%	30%	30%	Negligible
1 3rd Floor	436344	145686	12	11.97	11.96	-0.02	0%	30%	30%	Negligible
2 1st Floor	436343	145716	5	12.28	12.43	0.15	0%	31%	31%	Negligible
2 2nd Floor	436343	145716	8.5	12.06	12.08	0.03	0%	30%	30%	Negligible
2 3rd Floor	436343	145716	12	11.95	11.94	-0.01	0%	30%	30%	Negligible
3 1st Floor	436375	145734	5	12.11	12.14	0.03	0%	30%	30%	Negligible
3 2nd Floor	436375	145734	8.5	11.98	11.99	0.01	0%	30%	30%	Negligible
3 3rd Floor)	436375	145734	12	11.91	11.91	0.00	0%	30%	30%	Negligible
4 Ground Floor	436317	145706	1.5	12.49	12.80	0.31	1%	31%	32%	Negligible
4a 1st Floor	436317	145706	4	12.35	12.54	0.19	0%	31%	31%	Negligible
5 Ground Floor	436323	145680	1.5	12.43	12.50	0.08	0%	31%	31%	Negligible
5a 1st Floor	436323	145680	4	12.34	12.38	0.05	0%	31%	31%	Negligible
6 Ground Floor	436309	145672	1.5	12.41	12.40	-0.01	0%	31%	31%	Negligible
6a 1st Floor	436309	145672	4	12.35	12.33	-0.02	0%	31%	31%	Negligible
7 Ground Floor	436300	145707	1.5	12.48	12.76	0.28	1%	31%	32%	Negligible
7a 1st Floor	436300	145707	4	12.37	12.54	0.17	0%	31%	31%	Negligible
8 Ground Floor	436284	145703	1.5	12.52	12.74	0.22	1%	31%	32%	Negligible
8a 1st Floor	436284	145703	4	12.41	12.54	0.12	0%	31%	31%	Negligible
9 Ground Floor	436293	145669	1.5	12.46	12.38	-0.08	0%	31%	31%	Negligible
9a 1st Floor	436293	145669	4	12.40	12.32	-0.08	0%	31%	31%	Negligible
10 Ground Floor	436456	145753	1.5	12.87	12.87	0.00	0%	32%	32%	Negligible
10a 1st Floor	436456	145753	4	12.81	12.80	0.00	0%	32%	32%	Negligible
11 Ground Floor	436455	145746	1.5	12.96	12.96	0.00	0%	32%	32%	Negligible
11a 1st Floor	436455	145746	4	12.90	12.90	0.00	0%	32%	32%	Negligible
12 Ground Floor	436475	145756	1.5	12.15	12.14	0.00	0%	30%	30%	Negligible
12a 1st Floor	436475	145756	4	11.98	11.97	0.00	0%	30%	30%	Negligible
13 Ground Floor	436476	145743	1.5	12.16	12.15	0.00	0%	30%	30%	Negligible
13a 1st Floor	436476	145743	4	11.98	11.98	0.00	0%	30%	30%	Negligible
14 Ground Floor	436223	145447	1.5	12.66	12.87	0.21	1%	32%	32%	Negligible
14a 1st Floor	436223	145447	4	12.50	12.63	0.13	0%	31%	32%	Negligible
14b 2nd Floor	436223	145447	6.5	12.30	12.35	0.05	0%	31%	31%	Negligible
14c 3rd Floor	436223	145447	9	12.12	12.12	0.00	0%	30%	30%	Negligible
14d 4th Floor	436223	145447	11.5	11.99	11.97	-0.02	0%	30%	30%	Negligible
15 Ground Floor	436214	145490	1.5	13.01	13.39	0.38	1%	33%	33%	Negligible
16 Ground Floor	436186	145556	1.5	13.02	13.44	0.42	1%	33%	34%	Negligible
17 Ground Floor	436123	145687	1.5	12.61	12.75	0.13	0%	32%	32%	Negligible
18 Ground Floor	436092	145743	1.5	12.40	12.42	0.02	0%	31%	31%	Negligible

PM <sub>2.5</sub>										
Receptor Name	X(m)	Y(m)	Z(m)	2040 DN	2040 DS	DS-DN	% Change	AQAL	AQAL	Impact Descriptor
1 1st Floor	436344	145686	5	7.50	7.55	0.05	1%	75%	75%	Negligible
1 2nd Floor	436344	145686	8.5	7.36	7.36	0.00	0%	74%	74%	Negligible
1 3rd Floor	436344	145686	12	7.30	7.29	-0.01	0%	73%	73%	Negligible
2 1st Floor	436343	145716	5	7.46	7.55	0.08	1%	75%	75%	Negligible
2 2nd Floor	436343	145716	8.5	7.34	7.36	0.01	0%	73%	74%	Negligible
2 3rd Floor	436343	145716	12	7.29	7.28	0.00	0%	73%	73%	Negligible
3 1st Floor	436375	145734	5	7.37	7.39	0.02	0%	74%	74%	Negligible
3 2nd Floor	436375	145734	8.5	7.30	7.31	0.01	0%	73%	73%	Negligible
3 3rd Floor)	436375	145734	12	7.27	7.27	0.00	0%	73%	73%	Negligible
4 Ground Floor	436317	145706	1.5	7.57	7.74	0.17	2%	76%	77%	Slight
4a 1st Floor	436317	145706	4	7.50	7.60	0.10	1%	75%	76%	Negligible
5 Ground Floor	436323	145680	1.5	7.54	7.58	0.05	0%	75%	76%	Negligible
5a 1st Floor	436323	145680	4	7.49	7.52	0.03	0%	75%	75%	Negligible
6 Ground Floor	436309	145672	1.5	7.53	7.53	0.00	0%	75%	75%	Negligible
6a 1st Floor	436309	145672	4	7.50	7.49	-0.01	0%	75%	75%	Negligible
7 Ground Floor	436300	145707	1.5	7.57	7.72	0.15	2%	76%	77%	Slight
7a 1st Floor	436300	145707	4	7.51	7.60	0.09	1%	75%	76%	Negligible
8 Ground Floor	436284	145703	1.5	7.59	7.71	0.12	1%	76%	77%	Negligible
8a 1st Floor	436284	145703	4	7.53	7.60	0.07	1%	75%	76%	Negligible
9 Ground Floor	436293	145669	1.5	7.56	7.52	-0.04	0%	76%	75%	Negligible
9a 1st Floor	436293	145669	4	7.52	7.49	-0.04	0%	75%	75%	Negligible
10 Ground Floor	436456	145753	1.5	7.77	7.77	0.00	0%	78%	78%	Negligible
10a 1st Floor	436456	145753	4	7.74	7.74	0.00	0%	77%	77%	Negligible
11 Ground Floor	436455	145746	1.5	7.82	7.82	0.00	0%	78%	78%	Negligible
11a 1st Floor	436455	145746	4	7.79	7.79	0.00	0%	78%	78%	Negligible
12 Ground Floor	436475	145756	1.5	7.39	7.39	0.00	0%	74%	74%	Negligible
12a 1st Floor	436475	145756	4	7.30	7.30	0.00	0%	73%	73%	Negligible
13 Ground Floor	436476	145743	1.5	7.40	7.40	0.00	0%	74%	74%	Negligible
13a 1st Floor	436476	145743	4	7.31	7.30	0.00	0%	73%	73%	Negligible
14 Ground Floor	436223	145447	1.5	7.66	7.77	0.11	1%	77%	78%	Negligible
14a 1st Floor	436223	145447	4	7.58	7.64	0.07	1%	76%	76%	Negligible
14b 2nd Floor	436223	145447	6.5	7.47	7.49	0.02	0%	75%	75%	Negligible
14c 3rd Floor	436223	145447	9	7.38	7.38	0.00	0%	74%	74%	Negligible
14d 4th Floor	436223	145447	11.5	7.31	7.30	-0.01	0%	73%	73%	Negligible
15 Ground Floor	436214	145490	1.5	7.84	8.04	0.20	2%	78%	80%	Slight
16 Ground Floor	436186	145556	1.5	7.85	8.07	0.22	2%	78%	81%	Slight
17 Ground Floor	436123	145687	1.5	7.63	7.71	0.07	1%	76%	77%	Negligible
18 Ground Floor	436092	145743	1.5	7.52	7.53	0.01	0%	75%	75%	Negligible

## Green Space Receptors

NO <sub>2</sub>					
Receptor Name	X(m)	Y(m)	Z(m)	2040 DN	2040 DS
19	436207	145679	1.5	13.49	9.95
20	436237	145600	1.5	14.54	9.72
21	436271	145524	1.5	16.85	8.79
22	436172	145708	1.5	12.54	19.3
23	436184	145676	1.5	10.55	11.34
24	436218	145595	1.5	10.8	10.44
25	436252	145518	1.5	10.78	9.99
26	436262	145486	1.5	11.87	10.23
27	436163	145670	1.5	14.86	20.61
28	436197	145587	1.5	14.68	17.55
29	436230	145509	1.5	14.92	17.75

PM <sub>10</sub>					
Receptor Name	X(m)	Y(m)	Z(m)	2040 DN	2040 DS
19	436207	145679	1.5	14.33	12.79
20	436237	145600	1.5	14.23	12.77
21	436271	145524	1.5	15.66	12.56
22	436172	145708	1.5	13.89	14.77
23	436184	145676	1.5	13.24	13.27
24	436218	145595	1.5	13.23	13.19
25	436252	145518	1.5	13.32	13.07
26	436262	145486	1.5	13.73	13.14
27	436163	145670	1.5	15.15	16.53
28	436197	145587	1.5	15.04	16.38
29	436230	145509	1.5	15.18	16.50

PM <sub>2.5</sub>					
Receptor Name	X(m)	Y(m)	Z(m)	2040 DN	2040 DS
19	436207	145679	1.5	8.53	7.73
20	436237	145600	1.5	8.48	7.72
21	436271	145524	1.5	9.22	7.61
22	436172	145708	1.5	8.30	8.78
23	436184	145676	1.5	7.96	7.98
24	436218	145595	1.5	7.96	7.93
25	436252	145518	1.5	8.00	7.87
26	436262	145486	1.5	8.22	7.91
27	436163	145670	1.5	8.95	9.69
28	436197	145587	1.5	8.90	9.59
29	436230	145509	1.5	8.97	9.65



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