2015 Air Quality Updating and Screening Assessment for *Royal Borough of Kingston upon Thames*

In fulfillment of Part IV of the
Environment Act 1995
Local Air Quality Management

August 2015

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Executive Summary

The Council's Updating and Screening Assessment reviews and assesses air quality against the objectives in the Air Quality Regulations 2000 and amendment regulations and is one part of a rolling three-year cycle that is currently planned to end in 2017. The air quality objectives to be assessed by local authorities are for the following seven pollutants: carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide and particles (PM_{10}).

The role of the local authority Review and Assessment process is to identify any relevant areas where it is considered that the government's air quality objectives for the above air pollutants will be exceeded. The Council has previously undertaken the earlier rounds of Review and Assessment of local air quality management and identified areas where some of the objectives are exceeded and where there is relevant public exposure.

This report concerns the round Updating and Screening Assessment of air quality in the Royal Borough of Kingston upon Thames. For this, pollution sources have been re-examined and recent air quality monitoring checked in the Borough in accordance with Defra LAQM guidance.

The report identifies that:

For carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide there is not a significant risk of the objectives being exceeded in the Council's area.

For nitrogen dioxide and particles (specifically PM_{10}) the Council has previously designated an AQMA across the Borough. The findings from this report indicate that the AQMA should be maintained.

In view of the findings from the report the Council will undertake the following actions:

1. Undertake consultation with the statutory and other consultees as required.

2. Maintain the existing monitoring programme.

3. Continue with the implementation of its Air Quality Action Plan in pursuit of the AQS objectives.

4. Prepare for the submission of its next Air Quality Progress Report.

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1 Introduction

1.1 Description of Local Authority Area

The Royal Borough of Kingston upon Thames is the seventh smallest of the London Boroughs geographically (covering 38.66 square kilometres). It comprises four Neighbourhood areas: Kingston Town, Surbiton, Maldens and Coombe, and South of the Borough. The total population is around 170,000 and this figure is expected to grow further over the next decade.

The main sources of atmospheric pollutants are from road transport; the Borough is positioned with access both in and out of London to the M25, making it a good location for many commuters, visitors and shoppers. The A3 runs through the Borough, which is one of the major routes into the centre of London. The Royal Borough of Kingston upon Thames is responsible for inspecting and maintaining 326km of the boroughs roads, less than 30km of which are main distributor (A) roads.

There are relatively few industrial sources in the Borough. Other sources within the Borough include boilers within commercial and domestic buildings. Air quality in the Borough is also influenced by pollutants outside of its boundaries, which contribute to background concentrations.

1.2 Purpose of Report

This report fulfils part of the requirements of the Local Air Quality Management regime as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. This placed an obligation on local authorities to review and assess air quality in their areas on a regular basis and determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment (USA) is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g\ m^{-3}$ (milligrammes per cubic metre, $mg\ m^{-3}$ for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu g\ m^{-3}$	Running annual mean	31.12.2003
	5.00 $\mu g\ m^{-3}$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g\ m^{-3}$	Running annual mean	31.12.2003
Carbon monoxide	10.0 $mg\ m^{-3}$	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g\ m^{-3}$	Annual mean	31.12.2004
	0.25 $\mu g\ m^{-3}$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g\ m^{-3}$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g\ m^{-3}$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g\ m^{-3}$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g\ m^{-3}$	Annual mean	31.12.2004

Sulphur dioxide	350 μg m^{-3}, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 μg m^{-3}, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 μg m^{-3}, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

The Royal Borough of Kingston upon Thames previously completed all earlier stages of air quality review and assessment as required under the LAQM regime. As part of its earlier duties the Council completed a Detailed Assessment for nitrogen dioxide (NO_2) and particles (PM_{10}). The aim of this was to determine with reasonable certainty whether or not there is a likelihood of the AQ objectives being achieved. The assumptions used were therefore in depth and the data used were quality assured to a high standard. This allowed the Council to have confidence in reaching a decision whether to declare an Air Quality Management Area or not. When carrying out its Detailed Assessment the Council applied its best estimates to all components used to produce the estimated future concentrations.

Modelled predictions confirmed that the annual mean NO_2 and PM_{10} objectives were exceeded. These predictions highlighted that the objectives were exceeded in areas close to busy roads and junctions throughout the Borough. Relevant public exposure was identified in these areas and on the basis of the findings **the Council designated the whole Borough an Air Quality Management Area (AQMA) for the NO_2 and PM_{10}** in 2003.

The Council's subsequent Updating and Screening Assessments were also completed and the findings were in accordance with those of the earlier Detailed Assessment.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

For almost all of the period of this Updating and Screening Assessment (2012 up to 2015) no automatic monitoring was undertaken in the Council's area, however in March 2015, two automatic Air Quality Monitoring sites were were taken on hire and are measuring NO_2 and PM_{10}.

The sites are located in Kingston Town Centre (Sopwith Way at its junction with Kingsgate Road (grid reference 518157,169664)and at 132 Tolworth Broadway (grid reference 519713,165874).

Both monitoring stations were subject to technical problems during the first few weeks of their operation, and there are therefore no no initial results to report in this Updated Screening and Assessment. Results for these sites will be provided in subsequent Council reports.

The Council previously undertook the continuous monitoring of NO_2 and PM_{10} (plus ozone) at two automatic monitoring sites. These sites however were closed in 2006 due to a lack of funding. Defra also operated an automatic monitoring site in the Borough adjacent to the A3. This site however was also closed in mid-2007. The results for these closed sites were reported in previous Council reports.

2.1.2 Non-Automatic Monitoring Sites

The Council carried out monitoring of levels of NO_2 through the use of diffusion tubes for the period of this Updating and Screening Assessment (2012-2015). Table 2.1 includes a list of the diffusion tube locations in the Borough.

In total 40 locations throughout the Borough were deployed at any one time, however locations did from time to time change. The diffusion tubes were fixed to lampposts or signposts along both busy and quiet residential roads across the four neighbourhoods in the Borough. The sampling heights were mostly 3m or more above ground level. The diffusion tubes used were supplied by and analysed by Gradko International (2012-13) using a preparation method of 20% TEA in water and West Yorkshire Analytical Services (2013-14 and 2014-15) using a preparation method of 50% TEA in water.

A major disadvantage of undertaking monitoring using diffusion tubes is that the method is less precise and accurate than continuous monitoring. The recommended methods to reduce errors include the use of good QA/QC practices and bias adjustment factors that are derived from co-location studies between continuous analysers and diffusion tubes.

The bias adjustment factors are specific to each year, each analysing laboratory, each method of analysis and location. The factors are therefore also limited to the data supplied. The Review and Assessment website advises that “in many cases, using an overall correction factor derived from as many co-location studies as possible will provide the ‘best estimate’ of the ‘true’ annual mean concentration, it is important to recognise that there will still be uncertainty associated with this bias adjusted annual mean. One analysis has shown that the uncertainty for tubes bias adjusted in this way is ± 20% (at 95% confidence level). This compares with a typical value of ± 10% for chemiluminescence monitors subject to appropriate QA/QC procedures.”

The bias correction factor was obtained using the most recent default factor spreadsheet from Defra’s helpdesk. These default factors are based on statistical analyses of reported data provided by other local authorities.

Year	Bias Default factor
2015	75(8 studies)

The Council used West Yorkshire Analytical Services laboratory for analysis of diffusion tubes for the months between May 2014 and May 2015. The laboratory only has a comparatively small number of co-location studies from which to derive a bias factor, which ought to be noted when seeking to draw inferences from the figure.

The analysis methodology used for these samples (50% TEA in acetone) is also not as widely used as other methods. It is noted that the bias correction factor of this laboratory, whilst appearing lower than would usually be expected, it is consistent with other laboratories using the same methodology.

This bias factor indicates the diffusion tube results for the Borough overestimate concentrations by around a quarter when compared to continuously monitored concentrations. The bias corrected results are reported below.

Table 2.1 Details of NO_2 Non - Automatic Monitoring Sites

Site Name	Site Type	Easting	Northing	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
17-19 Penrhyn Road	Roadside	518078	168679	Y	N	Y (3)	2	Y
Queen Elizabeth Rd/London Rd	Roadside	518534	169379	Y	N	Y (2)	4	Y
41 Kingston Hill	Kerbside	519348	169921	Y	N	Y (3)	1	Y
Fire Station, Richmond Road	Roadside	517814	171445	Y	N	N (12)	1	N
Richmond Road / Kings Road	Roadside	518177	170067	Y	N	Y (4)	1.5	Y
14-16 Cromwell Road	Roadside	518451	169490	Y	N	Y (2)	2	Y
Cambridge Rd/Hawks Rd	Roadside	519036	169234	Y	N	Y (1.5)	1.5	Y
Cambridge Rd/Gloucester Rd	Kerbside	519406	169088	Y	N	Y (1)	8	Y
Guildhall Complex	Roadside	517873	169084	Y	N	N (15)	1	N
40 Fife Road	Kerbside	518162	169446	Y	N	Y (4)	1	Y
Kingston Road (by Carpet Right)	Roadside	520436	168451	Y	N	Y (15)	2	Y
248 Malden Road Near A3	Kerbside	521659	167418	Y	N	Y (12)	0.5	Y
96 Burlington Road	Kerbside	521874	168107	Y	N	Y (4)	2	Y
66 New Malden High St/ HSBC	Roadside	521443	168374	Y	N	Y (7)	0.5	N
38 Coombe Lane West Nr A3 Jn	Roadside	520040	169636	Y	N	Y (3)	2	Y
240 Kingston Vale nr Robin Hood Lane	Kerbside	521110	172036	Y	N	Y (8)	0.5	Y
Coombe Hill School	Roadside	520601	169861	Y		Y (2.5)	10	Y
113-115 Clarence Avenue	Roadside	520709	169266	Y	N	Y (4)	1.5	Y
51 Elm Rd	Kerbside	518653	169945	Y	N	Y (1)	7	Y
297 Hook Rd, St Paul's Primary School	Roadside	518030	164770	Y	N	Y (2.5)	4	Y
353 Malden Rushett Crossroads	Roadside	517254	161566	Y	N	Y (2)	2.5	Y
Hook Rise North / Tolworth Rec Centre	Roadside	519659	165784	Y	N	Y (3)	1.5	Y

Site Name	Site Type	Easting	Northing	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Hook Road South / Hunters Road	Roadside	518118	165181	Y	N	Y (6)	1	Y
Opp 148 Leatherhead Road	Roadside	517695	163475	Y	N	Y (2)	3	Y
Garrison Lane / Reynolds Ave	Kerbside	518215	163427	Y	N	Y (5)	0.5	Y
Kingston Rd near Station	Kerbside	519870	165649	Y	N	Y (0.5)	14	Y
136 Tolworth Broadway / Service Road	Roadside	519710	165874	Y	N	Y (3)	5	Y
Sundial Ct. Roundabout, Tolworth	Roadside	519806	165832	Y	N	Y (1.5)	3	Y
Garrison Lane / Reynolds Ave	Kerbside	518215	163427	Y	N	Y (5)	0.5	Y
Victoria Road nr Surbiton Station	Roadside	518039	167345	Y	N	Y (2)	0.5	Y
Ewell Road nr jct Elgar Avenue	Roadside	519415	166237	Y	N	Y (3)	3	Y
88 Brighton Road	Kerbside	517583	167279	Y	N	Y (4)	0.5	Y
Upper Brighton Rd/Langley Rd	Roadside	518326	166693	Y	N	Y (2.5)	15	Y
52 Portsmouth Road	Roadside	517578	167708	Y	N	Y (5)	2	Y
A240 Kingston Rd/Old Kingston Rd	Kerbside	520011	165513	Y	N	Y (0.5)	30	Y
53 Elgar Avenue	Kerbside	519659	166534	Y	N	Y (6)	0.5	Y
199 Douglas Road / Thornhill Road	Roadside	518730	165791	Y	N	Y (5)	0.5	Y
St. Mark's Hill/Ewell Rd	Roadside	518413	167596	Y	N	Y (2.5)	5	Y
Victoria Rd/Brighton Rd	Kerbside	517779	167150	Y	N	Y (1)	3	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

The monitoring reported below represents the non-continuous results for financial years' monitoring 2012-13, 2013-14 and 2014-15. The results are reported in accordance with the requirements of TG09. (Note -).

2.2.1 Nitrogen Dioxide

The following table (Table 2.2) provides the nitrogen dioxide monitoring results for the period May 2014 to May 2015 incusive. The results shown are the bias adjusted values for each of the diffusion tube sites. The results are compared to the 40 µg m^{-3} annual mean NO_2 objective and the annual mean concentrations that exceeded the objective are highlighted in bold. The result that exceeded 60 µg m^{-3} is also underlined to indicate that the hourly objective is potentially exceeded. Sites have not been corrected for distance to establish an estimated concentration at the nearest façade, however the table shows those that are deemed to be representative of relevant exposure.

The measurement sites include areas described as roadside/ kerbside locations; these are close to both some of the busy major roads, as well as quieter minor roads across the Borough. The sites in the quietest residential areas measured the lowest concentrations and hence these sites are considered representative of background concentrations.

Data capture for 2014-2015 at the sites was almost 100% - only two sites suffered from missing data, and each of those only missed one month out of 13. The majority (38) sites achieved 100% data capture.

There was therefore no need to annualise results using factors derived from nearby LAQN background sites.

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The South of Borough neighbourhood had the lowest concentrations of the four neighbourhoods, with an average annual mean concentration of almost 31 µg m^{-3}. All of the reported results for the sites in this neighbourhood met the AQS annual mean objective of 40 µg m^{-3} for 2011. The highest concentration of around 37 µg m^{-3} was recorded at a site on the A43 Leatherhead Road, which is one of the busiest roads in this part of the Borough. One other site (at Hook Road South) exceeded the objective at the roadside but, when distance adjusted to the nearest façade, met the objective. The South of Borough neighbourhood lies furthest from the centre of London and therefore has lower concentrations than those parts that are closer to the central London.

The measurements in the Maldens and Coombe neighbourhood mostly met the objective; with an average annual mean concentration of just over 33 µg m^{-3}. The one site that exceeded the objective, based on a distance adjusted result, was at Burlington Road. The annual mean concentration was slightly more than 41 µg m^{-3}s. The area, where the measurement site is, comprises a small, but busy area of shops, mixed with residential properties. Two other sites (at Malden Road and Kingston Vale) exceeded the objective at the roadside but, when these were distance adjusted to the nearest façade they met the objective. The Maldens and Coombe neighbourhood also included in Warren Road, one of the areas of the Borough with the lowest measured concentrations of around 22 µg m^{-3}.

The average annual mean concentration of the measurement sites in the Surbiton neighbourhood were also just over 33 µg m^{-3}. There was however a slight divergence in this neighbourhood between the sets of measurements, with four sites recording less than 30 µg m^{-3} (including one site in Woodlands Road recording 20.7 µg m^{-3}, which was the lowest in the Borough) and two other sites exceeding 45 µg m^{-3}. The two sites exceeding the objective were in the centre of Surbiton near the railway station at just over 50 µg m^{-3} and close to the heavily trafficked A240 Ewell Road towards Tolworth.

The Kingston Town neighbourhood had the highest concentrations in the Borough, with an average annual mean concentration of over 34 µg m^{-3}. Note this average excluded the site with highest measured concentration in the Borough. This is because the site measured an extraordinarily high concentration, which even with a

distance correction was almost 100 µg m^{-3}. This site is located very close to residential properties and was more than double the government's annual mean objective of 40 µg m^{-3}. This measurement also indicates that the government's hourly objective, i.e. a one hour mean of 200 µg m^{-3} that does not arise more than 18 times over a calendar year, may be exceeded. (Note – this can only be fully determined if continuous monitoring is undertaken at the site). The site is close to the Kingston bus terminal and is on the one way system in Kingston.

Two other sites in the Kingston Town neighbourhood exceeded the annual mean objective; on Penrhyn Road and Kingston Hill (with adjusted measurements of almost 43 and 48 µg m^{-3} respectively).

The lowest measurement in the Kingston Town neighbourhood was around 24 and this was close to the Guildhall complex. Three other measurements were also lower than 30 µg m^{-3} in the neighbourhood.

Table 2.2 Results of Nitrogen Dioxide Diffusion Tubes (for 2014-15)

Site ID	Location	Site Type	Data Capture (Number of Months)	Data has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.75) 2014-15 (μg m^{-3})
17-19 Penrhyn Road	Kingston Town	R	13	N	**43.10**
Queen Elizabeth Rd / London Rd	Kingston Town	K	12	N	**44.19**
41 Kingston Hill / Wolverton Ave.	Kingston Town	K	13	N	**56.42**
Fire Station, Richmond Road	Kingston Town	R	13	N	33.95
Richmond Road / Kings Road	Kingston Town	R	13	N	35.58
14-16 Cromwell Road	Kingston Town	R	13	N	**93.85**
Cambridge Rd / Gloucester Rd	Kingston Town	K	13	N	**49.48**
Cambridge Rd / Hawks Rd	Kingston Town	R	13	N	**43.08**
Guildhall Complex	Kingston Town	B	13	N	24.58
40 Fife Road	Kingston Town	K	13	N	35.99
325 South Lane south of A3	Maldens & Coombe	K	13	N	24.17
51 Elm Rd	Maldens & Coombe	R	13	N	25.60
113-115 Clarence Avenue	Maldens & Coombe	R	13	N	30.10
66 New Malden High St/ HSBC	Maldens & Coombe	K	13	N	36.81
Kingston Rd by Carpet Right	Maldens & Coombe	R	13	N	31.32
Coombe Hill School	Maldens & Coombe	K	13	N	39.60
38 Coombe Lane West nr A3 Jcn	Maldens & Coombe	K	13	N	36.42
248 Malden Road Near A3	Maldens & Coombe	R	13	N	**41.15**
240 Kingston Vale nr Robin Hood Lane	Maldens & Coombe	R	13	N	36.78
96 Burlington Road	Maldens & Coombe	K	12	N	**40.96**
Garrison Lane/Reynolds Ave	South of the Borough	K	13	N	27.63
297 Hook Rd, St Paul's Primary School	South of the Borough	R	13	N	36.59
353 Malden Rushett Crossroads	South of the Borough	R	13	N	34.06

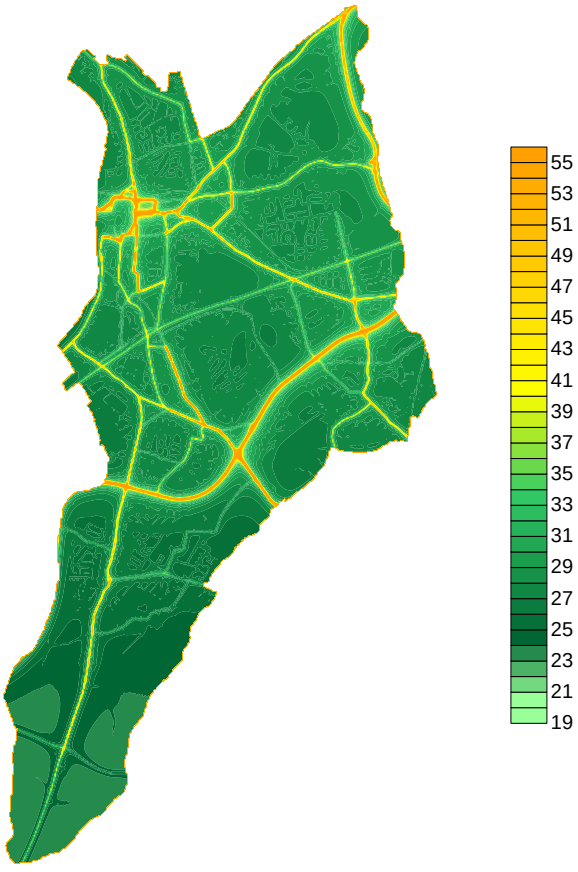
Site ID	Location	Site Type	Data Capture (Number of Months)	Data has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.75) 2014-15 ($\mu g\ m^{-3}$)
Hook Rise North / Tolworth Rec. Centre	South of the Borough	R	13	N	**51.13**
Hook Rd South/Hunters Rd	South of the Borough	R	13	N	**41.67**
Opp 148 Leatherhead Rd/Harrow Cl	South of the Borough	R	13	N	36.45
Hook Centre Hook Rd	South of the Borough	K	13	N	46.78
Kingston Rd near Station	South of the Borough	K	13	N	**58.39**
136 Tolworth B'way/ Service Rd	South of the Borough	R	13	N	**62.45**
Sundial Ct. Tolworth Roundabout	South of the Borough	K	13	N	**72.62**
A240 Kingston Rd/Old Kingston Rd	Surbiton	R	13	N	**45.04**
199 Douglas Rd/ Thornhill Rd	Surbiton	R	13	N	24.40
53 Elgar Ave (mid way along)	Surbiton	R	13	N	28.39
88 Brighton Road	Surbiton	R	13	N	28.34
52 Portsmouth Road	Surbiton	R	13	N	33.72
Upper Brighton Rd/Langley Rd	Surbiton	K	13	N	**41.77**
Ewell Road jcn Elgar Ave	Surbiton	K	13	N	**48.37**
St. Mark's Hill/Ewell Rd	Surbiton	R	13	N	**40.14**
Victoria Rd/Brighton Rd	Surbiton	K	13	N	29.56
Victoria Rd nr Surbiton Station	Surbiton	K	13	N	**47.22**

2.2.1 Air quality predictions for Kingston

The latest air quality predictions for the Borough, based on the LAEI 2010 (produced for the GLA), are shown below. Figure 2.1 shows that concentrations in the Borough are predicted to exceed the air quality standard for this objective in 2015. Those areas with highest predicted concentrations are towards the north of the Borough in the Kingston Town neighbourhood and along the A3, which runs south west to north east through the Borough and crosses the other three neighbourhoods of Maldens and Coombe, South of the Borough and Surbiton.

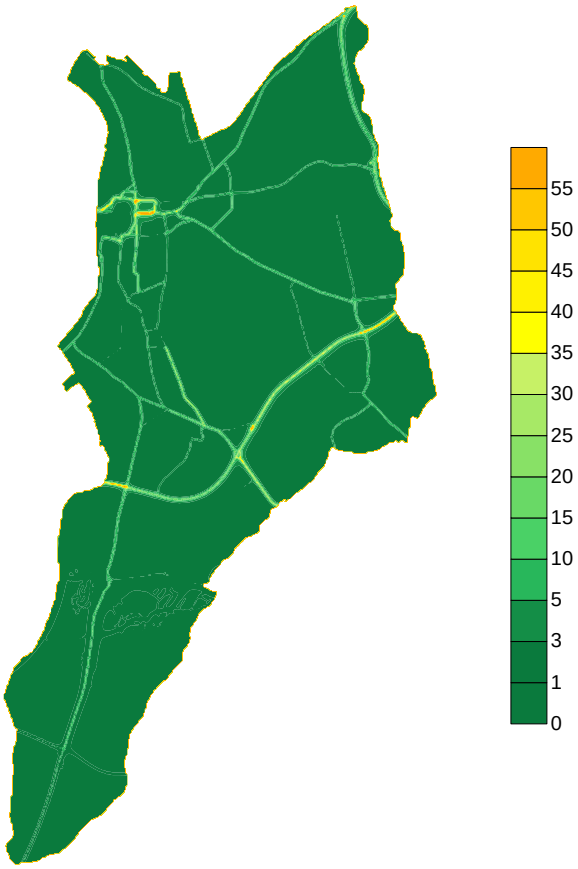
It is mainly those areas closest to busy and congested roads that exceed the objective, as is typical for other Boroughs outside of central London. Those roads predicted to exceed include main trunk and other main roads across the Borough, including the A3, plus the A240 and A2043. Other roads that exceed the objective include the A243 and A308

Figure 1 Annual mean NO_2 concentrations (µg m^{-3}) for 2015



Similar to NO_2, predictions of days exceeding the daily mean air quality standard for PM_{10} are also related closely to roads across the Borough. Figure 2.2 shows the number of days that exceed the 50µg m^{-3} standard. Those areas coloured yellow exceed the objective of more than 35 days exceeding the standard. The area exceeding the objective is closely located on the A3 only and in Kingston Town.

Figure 2 Daily mean PM_{10} (number of days exceeding 50µg m^{-3}) for 2015



2.2.2 Summary of Compliance with AQS Objectives

The Council has examined the results from monitoring and modelling across the Borough. Concentrations are above the objectives for annual mean nitrogen dioxide, plus daily mean PM_{10} within the designated Borough wide AQMA; therefore there is no need to proceed to a Detailed Assessment based on monitoring and modelling.

3 Road Traffic Sources

The focus of attention for road traffic sources is on those relevant locations close to busy roads, especially in congested areas and near to junctions, where traffic emissions are higher, and in built up areas where the road is canyon like and buildings restrict the dispersion and dilution of pollutants. Only those locations, which have not been assessed during the earlier rounds or where there has been a change or new development, are assessed.

The London Atmospheric Emissions Inventory (LAEI) has been used to identify changed flows and as reported earlier the Council previously designated the whole of the Borough as an AQMA.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Concentrations are often higher where traffic is slow moving, with stop/start driving, and where buildings on either side reduce dispersion. Screening models so far have not proved helpful at identifying potential exceedences, which have only been identified by monitoring. This assessment is for NO_2 only.

Previous Review and Assessments undertaken by the Council investigated the presence of narrow roads with residential properties close to the kerb. The TG09 guidance requires the identification of residential properties within 2 m of the kerb. The roads previously identified are all within the Council's AQMA and this situation has not changed.

The Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

These include some street locations where individuals may regularly spend 1-hour or more, for example, streets with many shops and streets with outdoor cafes and bars, close to road traffic where there may be high concentrations of NO_2. (Note - those people that are occupationally exposed are not included, as they are not covered by the regulations). The assessment is for NO_2 only.

Busy streets where people may spend an hour or more close to traffic were examined in previous assessments. There has been no change to the previous findings since then and no new roads have been constructed with traffic flows greater than 10,000 vehicles per day in the Council's area.

The Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

These include street locations in the Borough where traffic flows are not necessarily high (i.e. fewer than 20,000 vehicles per day) but where there are an unusually high proportion of buses and/or HGVs. The assessment is for both NO_2 and PM_{10} and is dependent on the proximity of relevant exposure within 10 m of the kerbside. The Council in earlier Review and Assessments identified those roads within the Borough with high flows of heavy-duty vehicles. No new roads relevant to this section have been identified in the Borough.

The Council confirms that there are no new/ newly identified roads with high flows of buses/HGVs.

3.4 Junctions

Air pollutant concentrations are usually higher close to junctions, due to the combined impact of traffic emissions on roads forming the junction, and to the higher emissions due to stop start driving. The assessment is for both NO_2 and PM_{10} and is dependent on the proximity of relevant exposure within 10 m of the kerbside.

There is no change to the previously reported situation concerning junctions and no new or newly identified junctions with relevant exposure within 10 m.

The Council confirms that there are no new/ newly identified busy junctions/ busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

The approach to considering new roads depends on whether or not an assessment was carried out in advance of building the new road. The assessment is for both NO_2 and PM_{10} and is dependent on the proximity of relevant exposure within 10 m of the kerbside.

There have been no new or proposed roads in the Borough where an air quality assessment was required.

The Kingston Council confirms that there are no new/ proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Only roads with significantly changed traffic flows that have not already been considered above were investigated. The assessment is for both NO_2 and PM_{10}.

A comparison of traffic flows from the London Atmospheric Emissions Inventory confirms that there are no new roads with significantly changed traffic flows.

The Council confirms that there are no new/ newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

This section only applies to bus stations or sections of bus stations that are not enclosed, and where there is relevant exposure, including at nearby residential properties. The assessment is for both the annual mean and the 1-hour NO_2 objectives. (Note - the term “bus” in this instance is used to signify both buses and coaches).

Bus stations in Borough were examined in previous USAs and found not to require further investigation. Based on the TG09 guidance if such sources were previously considered and are within an existing AQMA there is no need to proceed further.

The Council confirms that there are no new relevant bus stations in the Borough.

4 Other Transport Sources

4.1 Airports

Aircraft are potentially significant sources of nitrogen oxides (NOx) emissions, especially during takeoff. The TG09 guidance used new information, which has resulted in the criteria to trigger a Detailed Assessment being relaxed, while the requirement to assess PM_{10} has been removed. Thus this section only applies to NO_2. (Note – any road traffic using airports was considered in the previous section.) The nearest airport, Heathrow Airport, is outside the Borough, in west London. It is thus sufficiently distant not to be relevant.

The Council confirms that there are no airports in the Borough.

4.2 Railways (Diesel and Steam Trains)

Stationary locomotives, both diesel and coal fired, can give rise to high levels of sulphur dioxide (SO_2) close to the point of emission. Recent evidence also suggests that moving diesel locomotives, in sufficient numbers, can also give rise to high NO_2 concentrations close to the track where, along busy lines, emissions can be equivalent to those from a busy road.

4.2.1 Stationary Trains

Previous rounds of Review and Assessment also found that there are no areas within the Borough where diesel or steam locomotives are stationary for periods of 15 minutes or more and within 15 m of locations where regular outdoor exposure arises. This situation has not changed.

The Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Diesel locomotives use rail lines that run through the Borough, however these are not included within the list of lines (from Table 5.1 of TG09), which identify those with a "high" usage of diesel locomotives.

The Council confirms that there are no locations with a large number of movements of diesel locomotives and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

The assessment for shipping needs to consider SO_2 only. Part of Borough aligns the river Thames and although there are some boat movements in this area they are not sufficient to require further investigation based on the TG09 guidance.

The Council confirms that there are no ports within the Borough or shipping that meets the specified criteria.

5 Industrial Sources

5.1 Industrial Installations

The Council and the Environment Agency (EA) control industrial and other sources within the Borough under the Environmental Permitting Regulations (England and Wales) 2010, as amended. The Council also has control over some smaller industrial and commercial sources, largely through the Clean Air Act, with its associated control of the stack heights. As a result of these controls, there are relatively few sources that may be relevant under the Local Air Quality Management (LAQM) regime. Many of these sources were also addressed during previous rounds of Review and Assessment. The focus is thus on new installations and those with significantly changed emissions.

Industrial sources are considered unlikely to make a significant local contribution to annual mean concentrations, but could be significant in terms of the short-term objectives in the Borough. Sources in neighbouring authorities and the combined impact of several sources are considered. The approach used is based on use of the planning and permitting processes. The assessment considers all the LAQM pollutants, including those most at risk of requiring further work (SO_2, NO_2, PM_{10} and benzene).

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Since the last round of Review and Assessment there have been no applications received for installations where an Air Quality Assessment has been carried out.

The Council has assessed new/ proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been introduced

Lists of existing Part B installations that are regulated under the Environmental Permitting regime are provided in the Appendices. These are all processes with low emissions of LAQM pollutants. None of these have increased emissions by greater than 30% (as referred to in the TG09 guidance) and no new relevant exposure has been introduced nearby. There are no Part A or A2 installations in the Borough.

The Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Since the last round of Review and Assessment the Council has received no applications for new installations. No other applications have been received for new or proposed sources where it has been determined that the installation is likely to give rise significant pollutant emissions.

The Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

This was previously assessed in earlier rounds of Review and Assessment and it was found that there are no major petrol storage depots in the Borough. This situation has not changed.

There are no major fuel (petrol) storage depots within the Borough.

5.3 Petrol Stations

There is some evidence that petrol stations could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. Some sites in the Borough have however already incorporated petrol vapour recovery (PVR) systems, furthermore those service stations with petrol sales above 3.5 million litres per annum were required to install Stage 2 PVR systems before the 1st January 2010 deadline to comply with UK legislation to reduce petrol vapour (and benzene) from vehicles.

The previous round of Review and Assessment assessed all petrol stations for a throughput of more than 2000 m^3 of petrol, and a busy road nearby. Of these none were found to have relevant exposure within 10m of the pumps and therefore it was not necessary to go to a Detailed Assessment. There has been no change in this situation for this round.

The Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Some local authorities in England have identified potential exceedences of the PM_{10} objectives associated with emissions from poultry farms (defined as chickens (laying hens and broilers), turkeys, ducks and guinea fowl). These relate to large farms (> 100,000 birds) that are regulated by the EA. None however exist within the Council's area.

The Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

Biomass burning can lead to an increase in PM_{10} emissions, from the combustion process itself and also by aerosol formation from the volatile materials distilled from the wood. Compared to conventional gas burning, biomass burning can also result in an increase in NOx emissions due to the fuel-derived portion that is not present in gas combustion.

The Borough is a 'Smoke Control Area', meaning that the emission of smoke from chimneys of domestic premises and other buildings in the area is not permitted. Furthermore furnaces, chimneys and industrial processes are monitored carefully and only authorised appliances (as listed under the Smoke Control Area Orders) can be used to burn solid fuels such as coal, coke and wood.

6.1 Biomass Combustion – Individual Installations

The use of biomass to generate energy has potentially significant benefits for the reduction of greenhouse gas emissions. However there are concerns that an increase in biomass combustion in urbanised areas could be detrimental to air quality, particularly with respect to PM_{10} and NO_2. The TG09 guidance includes a procedure to determine the impact of biomass combustion plant to see if there is the potential for the air quality objectives to be exceeded.

Following this the Council has assessed for individual combustion plant burning biomass ranging from 20 MW down to 50 kW units and no new plant have been identified that have not previously been considered.

The Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

As already outlined the Borough is a Smoke Control Area and therefore any biomass burning using non-authorised appliances is considered minimal. There is however the potential that many small biomass combustion installations (including domestic solid-fuel burning), whilst individually acceptable, could in combination lead to unacceptably high PM_{10} concentrations, particularly in areas where PM_{10} concentrations are close to or above the objectives. The impact of domestic biomass combustion in most areas is thought to be small at the time of writing, but could become more important in future. The potential for combined impacts, other than that discussed above, will be assessed should future plant be proposed. Currently there is minimal domestic solid fuel burning as discussed in the next section.

The Council has assessed the combined impact of biomass combustion, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning

The previous rounds of Review and Assessment identified areas where domestic solid fuel burning gives rise to exceedences of the objective for SO_2. PM_{10} from domestic solid fuel burning was also covered above.

The Borough is designated a Smoke Control Area and there are no areas of significant domestic solid fuel use in the Borough. This position has not changed from the previous USA, which confirmed that no areas of significant domestic solid fuel burning were identified. Gas is widely available in the Borough and it remains the predominant fuel used for domestic water and space heating.

The Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Dust emissions from uncontrolled and fugitive sources can give rise to elevated PM_{10} concentrations. These sources can include, but are not limited to the following sites: quarrying and mineral extraction sites, landfill sites, coal and material stockyards, or materials handling, major construction works and waste management sites. Dust can arise from the passage of vehicles over unpaved ground and along public roads that have been affected by dust and dirt tracked out from dusty sites. Other sources of dust are from the handling of dusty materials, the cutting of concrete, etc and wind-blown dust from stockpiles and dusty surfaces.

The Environment Agency permits 6 sites for waste handling (see Appendix 2); none of these however are the cause of complaint regarding dust and other fugitive emissions, although the Thames Water Utilities site has been the cause of odour complaint.

No other additional fugitive and uncontrolled particulate matter emissions have been identified based on local professional knowledge, recent air quality assessments or recent complaints to the Council.

The Council confirms that there are no additional potential sources of fugitive particulate matter emissions in the Borough.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring and Modelling Data

Monitoring within the Borough confirmed that the annual mean nitrogen dioxide objective continues to be exceeded at roadside locations, with the hourly mean objective potentially exceeded at the roadside in Kingston Town. The Council measures nitrogen dioxide at 40 locations continuously across the Borough. The sites monitored are mostly considered to represent relevant exposure. The roadside site on Cromwell Road exceeded the annual mean objective by a very large margin.

The most recent NO_2 and PM_{10} modelling by the GLA of the Council's area indicates that the annual mean NO2 objective and PM_{10} daily mean objective are predicted to be exceeded close to busy roadsides across the Borough. Other more background areas within the Borough have met the objectives. An analysis of trends in London (KCL, 2012) however confirms that concentrations of PM_{10} do not appear to be reducing and there is also evidence indicating that close to roadsides PM_{10} from primary sources may be increasing.

Based on the findings from both monitoring and modelling in the Borough, the Council, having previously designated the whole Borough as an Air Quality Management Area for NO_2 and PM_{10} does not need to undertake a Detailed Assessment.

8.2 Conclusions from Assessment of Sources

The Council has assessed the likely impacts of local developments for road transport, other transport, industrial processes, commercial/domestic, fugitive emissions, plus residential and commercial sources. The findings have indicated that

there are no new changes that require the Council to undertake a Detailed Assessment.

8.3 Proposed Actions

This report follows the technical guidance (TG09) produced for this round of Review and Assessment. It therefore fulfils this part of the continuing LAQM process.

The results, from following this methodology, are that the Council has not identified an additional risk of the air quality objectives for the LAQM pollutants: carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide, being exceeded anywhere in the Council's area. Thus the Council need not proceed beyond the updating and screening assessment for these pollutants. For nitrogen dioxide and particles (PM_{10}) the Council has previously designated the Borough as an AQMA. The findings from this report indicate that the AQMA should be maintained.

The Council will therefore undertake the following actions:

1. Undertake consultation on the findings arising from this report with the statutory and other consultees as required.

2. Maintain the existing monitoring programme.

3. Continue with the implementation of its Air Quality Action Plan in pursuit of the AQS objectives.

4. Prepare for the submission of its 2013 Air Quality Progress Report.

9 References

Defra, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1). Defra, London. Cm 7169.

Defra, 2009a. Local Air Quality Management, Technical guidance LAQM.TG09. Defra, London.

Defra, 2012. WASP – Summary of Laboratory Performance in WASP NO2 Proficiency Testing Scheme for Rounds 108-115. March 2012.

KCL, 2012. Air Quality in London GLA Health and Environment briefing note. KCL July 2012.

Kingston, 2013. Census headlines – briefing document. www.Kingston.gov.uk/Services/CouncilDemocracy/StatisticsCensusInformation/.

Appendices

Appendix 1: Part B installations in Kingston

Table 1 List of Part B processes in the Council's area

Ref.	Name	Type of Process
PPC15	Kingston Cemetery & Crematorium, Bonner Hill Road, Kingston Upon Thames, KT1 3EZ	Cremation of human remains
PPC21	Wedd & White (Coachworks) Ltd, 11-14 Wellington Crescent, New Malden, Kingston Upon Thames, KT3 3NE	Respraying of road vehicles
PPC20	London Concrete Limited, Tolworth Station Road, Kingston Road, Tolworth KT5 9NU	Cement batching
PPC16	Braye Demolition & Plant Services Ltd, 36 North Parade, Chessington KT9 1QF	Mobile crushing and screening

Table 2 List of permitted petrol stations in the Council's area

Ref.	Name	Address
PPC01	BP Filling Station	Rushett Filling Station, 411 Leatherhead Road, Chessington, KT9 2NQ
PPC10	Chessington Service Station	248 Hook Road, Chessington, KT9 1PL
PPC08	Total Service Station	187-201 London Road, Kingston Upon Thames, KT2 6PQ
PPC02	Shell Kingstonian Petrol Station	164 Richmond Road, Kingston Upon Thames, KT2 5HD
PPC09	Murco Rose Cottage Service Station	159 Kingston Road, New Malden, KT3 3NS
PPC06	Tesco Express Tolworth	1a Tolworth Broadway, Tolworth, KT6 7DQ
PPC03	Shell Ace of Spades	211 Hook Rise North, Surbiton, KT6 5AT
PPC04	Shell Coombe Road	Coombe Road Service Station, Coombe Road, New Malden, KT3 4QN
PPC07	Total Service Station Surbiton	90-100 Brighton Road, Surbiton, KT6 5PP
PPC05	Esso	North Service Station, Robin Hood Way, Kingston Vale, SW20 0AB

Table 3 List of permitted dry cleaners in the Council's area

Ref	Name	Address
PPC34	Supreme Dry Cleaners	73 Crescent Road, Kingston Upon Thames, KT2 7RE
PPC46	Surbiton Dry Cleaners	21 Brighton Road, Surbiton, KT6 5LR
PPC33	Bourjois	22 Coombe Road, Kingston Upon Thames, KT2 7AG
PPC30	Rapido dry cleaners	66 Fife Road, Kingston Upon Thames, KT1 1SP
PPC43	Hudsons Dry Cleaners	2 Arcade Parade, Elm Road, Chessington, Kingston Upon Thames, KT9 1AB
PPC46	Lucy White Cleaners	173 Kings Road, Kingston Upon Thames, KT2 5JG
PPC39	Berrylands Dry Cleaners	82 Alexandra Drive, Surbiton, KT5 9AG
PPC32	Classic Cleaners	1 Park Road, Kingston Upon Thames, KT2 6BX
PPC41	Du Cane Dry Cleaners	4 Surbiton Parade, St Marks Hill, Surbiton, KT6 4RB
PPC36	Crystal Professional Dry Clean	103 High Street, New Malden, KT3 4BP
PPC44	First Impressions	2 Vale Parade, Kingston Vale, SW15 3PS
PPC35	Total Clean	115 Kingston Road, New Malden, KT3 3NX
PPC42	State Express	108 Tolworth Broadway, Tolworth, KT6 7HT
PPC40	Roberts	16-18 Claremont Road, Surbiton, KT6 4QU
PPC31	Chic Dry Cleaners	6 The Triangle, Kingston, KT1 3RU
PPC47	Concorde Dry Cleaners	115 High Street, New Malden, KT3 4BP
PPC37	Premier Dry Cleaners	400 Ewell Road, Surbiton, KT6 7HF

Appendix 2: Environment Agency permitted waste installations in Kingston upon Thames

Company Name	Site Address
Thames Water Utilities Limited	Hogsmill Sewage Treatment Works, Lower Marsh Lane, Kingston upon Thames
R. B of Kingston upon Thames	Civic Amenities site, Chapel Mill Road, Kingston upon Thames
Viridor Waste Management Ltd	Kingston Waste Transfer Station, Chapel Mill Road, Kingston upon Thames
B L Penwarden Haulage & Demolition Contractors Ltd	Chessington Equestrian Centre, Clayton Road, Chessington
Genuine Solutions Group PLC	Solutions House, Hook Rise South, Surbiton
Kingston Hospital	Galsworthy Road, Kingston upon Thames