# THIRD WAVE LOCAL AUTHORITIES – TARGETED FEASIBILITY STUDY TO DELIVER NITROGEN DIOXIDE CONCENTRATION COMPLIANCE IN THE SHORTEST POSSIBLE TIME

| | |
|---|---|
| **Local authorities covered** | Plymouth City Council |

# Part 1: Understanding the problem

### 1.1 Overview of air quality in Plymouth

Plymouth has a population of approximately 256,000 and is a city situated on the south coast. As a coastal city, it is subject to prevailing south westerly winds, which aids dispersion of pollutants, particularly in the elevated areas of the city. As such, air quality in Plymouth is mainly good as there were only two monitoring sites where levels of nitrogen dioxide ($NO_2$) were above government objectives during 2016 at relevant exposure locations, both situated along Mutley Plain.

However, due to these and previous exceedances an Air Quality Management Area (AQMA) was declared in 2014 for $NO_2$.This replaced and expanded an earlier declared AQMA. This AQMA includes Exeter Street, Mutley Plain, Stoke Village, Royal Parade and Tavistock Road and their connecting roads. Pollutant concentrations in the AQMA are primarily related to road traffic emissions. Plymouth City Council has produced a joint Air Quality Action Plan (AQAP)/ Transport Plan to implement various schemes to control traffic and pollution levels.

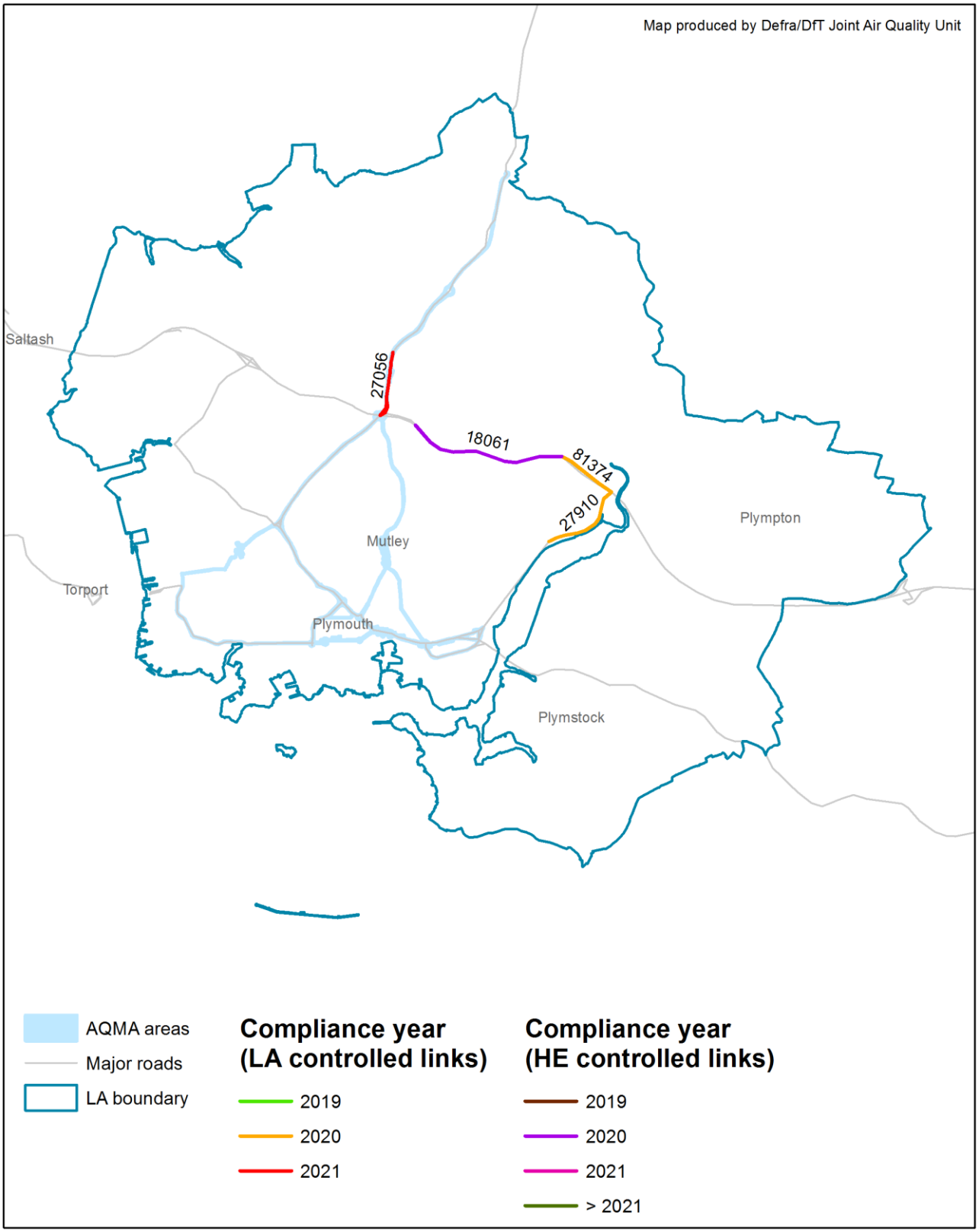
In addition to the AQMA, national modelling in relation to compliance with the European Air Quality Directive (AQD) has identified 3 roads, that are the responsibility the City Council, that are estimated to show exceedances of the $NO_2$ limit value up to 2020/2021. One of these roads, the A386, is disputed by the City Council as being in exceedance, based on local monitoring data available. These are:

- A386 Tavistock Road (Census ID 27506);
- the A374 feeder roads alongside the A38 Expressway (Census ID 81374);
- and the A374 Plymouth Road (Census ID 27910)

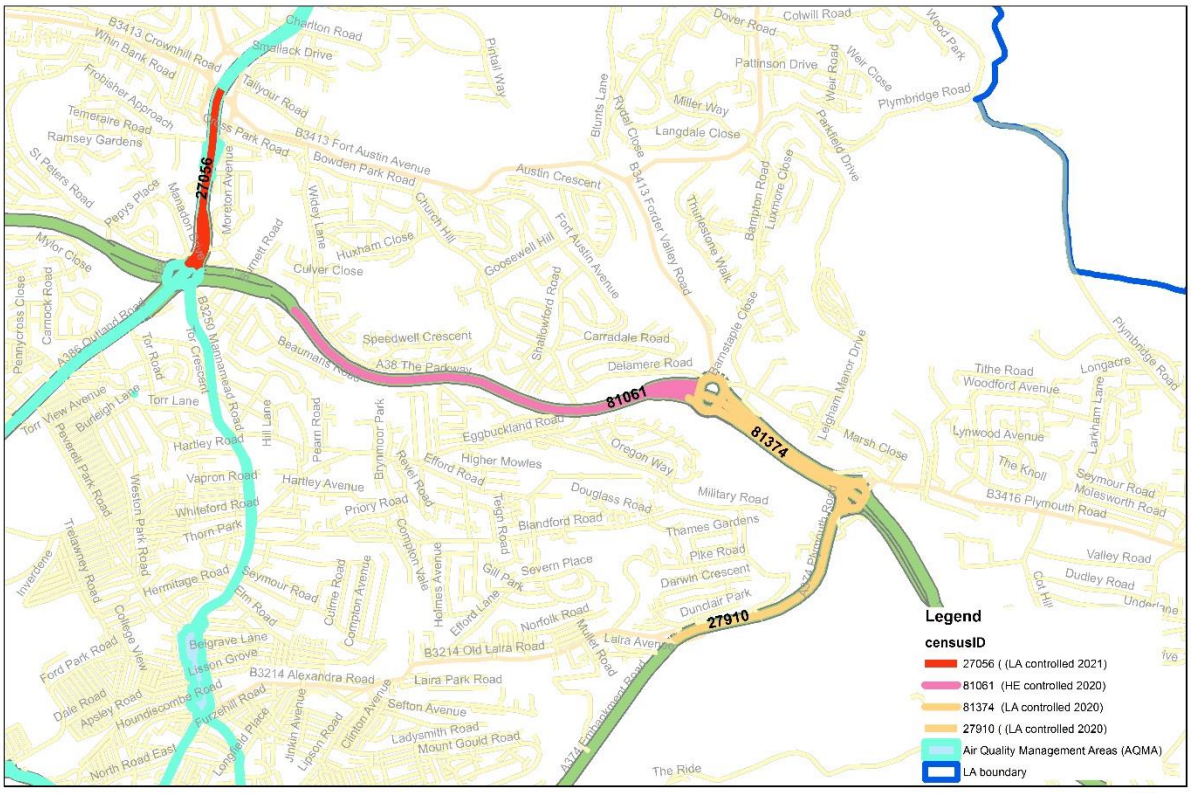
The exceedance roads in relation to the AQD and the AQMA are shown in Figure 1 and 2 below. The A386 Tavistock Road is both an exceedance link and falls within the AQMA. The estimated $NO_2$ concentrations for the AQD exceedance links are shown in Table 1.

The focus of this study is to consider measures that will bring the AQD exceedance links into compliance in the shortest possible time. However, as a secondary objective it will also be important to consider measures that could support wider air quality improvements in the AQMA.

**Figure 1 Overview of AQMA and AQDF exceedance links in Plymouth**



## Figure 2 Detail of AQD exceedance roads in Plymouth




Plan of roads with NO2 Exceedances for Plymouth City Council

## Table 1 Estimated $NO_2$ level on the AQD exceedance roads

| Local authority | Exceedance road | Census ID | Road length | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| Plymouth City Council | A386 | 27056 | 2196m | 47 | 45 | 43 | 41 | 38.6 |
| Plymouth City Council | A374 | 27910 | 1298m | 46 | 43 | 41 | 39 | 37 |
| Plymouth City Council | A38/A374 | 81374 | 909m | 44 | 42 | 41 | 39 | 37 |
| Plymouth City Council | A38 (HE) | 18061 | 2372m | 45 | 43 | 41 | 39 | 37 |

The following sections provide more detail on each of the AQD exceedance roads.

## 1.2 A386 Tavistock Road – ID27056

The A386 (Tavistock Road) is Plymouth's principal north / south arterial road and is the main route connecting the city and locations to the North, including Tavistock and Okehampton. It also serves as the major road connecting the northern and southern halves of the city, and to destinations in the west and east of the city and beyond via the A38 Expressway. The high volume of traffic carried by the A386 between Manadon and Crownhill is comprised of a mix of both local and non-local journeys travelling to and from a wide range of destinations. The city centre to the south and Derriford Hospital and adjacent employment and educational destinations to the north, are the two greatest trip generating destinations for traffic on the A386, and account for the unusual feature that northbound and southbound flows on the A386 at this location are similar during both the a.m. and p.m. peak periods.

The section of the A386 identified in the PCM model runs from Manadon junction to Crownhill junction – a distance of just under 1km – between which there are a number of junctions to the local road network. Traffic volumes on individual sections of the A386 through Plymouth increase as the road progresses southward towards the city centre (see Table 2 below). DfT traffic data for this Census ID of concern suggests average daily traffic flows of around 60,000 vehicles a day as shown in Table 3. Around 85% of this is cars, 10% is vans, 2% is HGVs and 1.2% buses.

### Table 2 Changes in traffic flow along the A386

| | **A386 traffic count locations** | **AADT** | **Source** |
|---|---|---|---|
| **City boundary**  **City Centre** | Just south of the George Junction | 29,203 | DfT (47060) |
| | Just North of William Prance Road | 42,264 | Local ATC |
| | Just North of Plumer Road / Budshead Road jcts. | 47,852 | Local ACT |
| | Between Crownhill junction & Manadon junction | 56,774 | DfT (27056) |
| | Just south of Manadon junction | 38,250 | Local ACT |

**Table 3 Traffic flows on the A386 Tavistock road**

| | Motorcycle | Cars/Taxis | Bus/ Coach | LGVs | HGV-Rigid | HGV Artic | All |
|---|---|---|---|---|---|---|---|
| 2011 | 925 | 50306 | 727 | 5484 | 862 | 185 | 58489 |
| 2012 | 949 | 51955 | 823 | 6603 | 831 | 180 | 61341 |
| 2013 | 1323 | 50803 | 710 | 5631 | 553 | 210 | 59230 |
| 2014 | 664 | 51413 | 704 | 6124 | 619 | 156 | 59680 |
| 2015 | 1014 | 51918 | 803 | 6130 | 703 | 227 | 60795 |
| 2016 | 851 | 49096 | 705 | 5465 | 444 | 215 | 56776 |

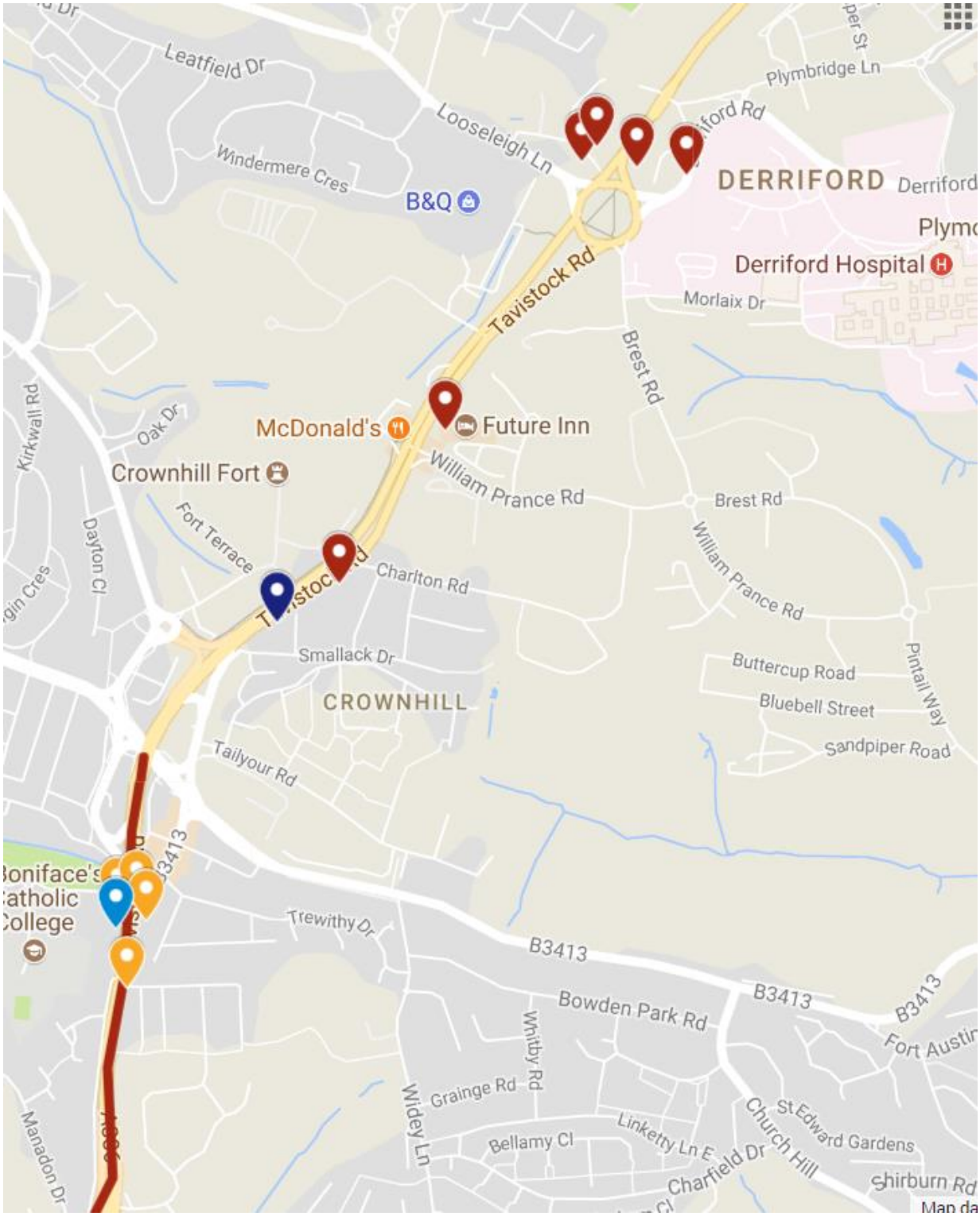
These traffic flows relate to the estimated road traffic $NO_2$ source apportionment as shown below in Table 4. This shows diesel cars and vans to be the largest contributors to $NO_2$ concentrations followed by petrol cars and buses.

**Table 4: Source apportionment for total $NO_x$ (%) from Defra PCM model**

| link | Regional BG | Urban BG (non-traffic) | Urban BG (traffic) | Diesel Cars | Petrol Cars | Diesel LGV | Petrol LGV | rHGV | aHGV | Bus |
|---|---|---|---|---|---|---|---|---|---|---|
| A386 | 3 | 5 | 12 | 36 | 9 | 16 | 0 | 6 | 2 | 10 |

Air quality data has been collected along the Tavistock Road for a number of years as one of the key focuses of concern in the AQMA. A map showing the key monitoring locations is provided below in Figure 3. The dark blue marker is the current AURN site, the light blue marker is an automatic site running from 2010 to 2014, the orange markers are diffusion sites running to 2014 and the red markers are diffusion tube sites from 2015. The road highlighted in red is the road link of concern.

**Figure 3 Monitoring locations on the Tavistock Road**




The monitoring locations on the link of concern are all historic covering the period up to 2014. The results for diffusion tube data is shown in Figure 4 below. Diffusion tube sites 47, 48, 49 and 50 all fall on the link of concern and show that the monitoring results dropped below the 40 µg/m$^3$ limit in 2012 and have remained below this since then. The automatic site (in light blue) showed results dropping from 37.7 µg/m$^3$ to 27.8 µg/m$^3$.

The monitoring locations were rationalised in 2015 to support monitoring in relation of major road

works in the area (location shown in red). Figures 5 below shows the monitoring results post 2015 for the new sites.

**Figure 4 $NO_2$ Monitoring data for the Tavistock Road up to 2015**

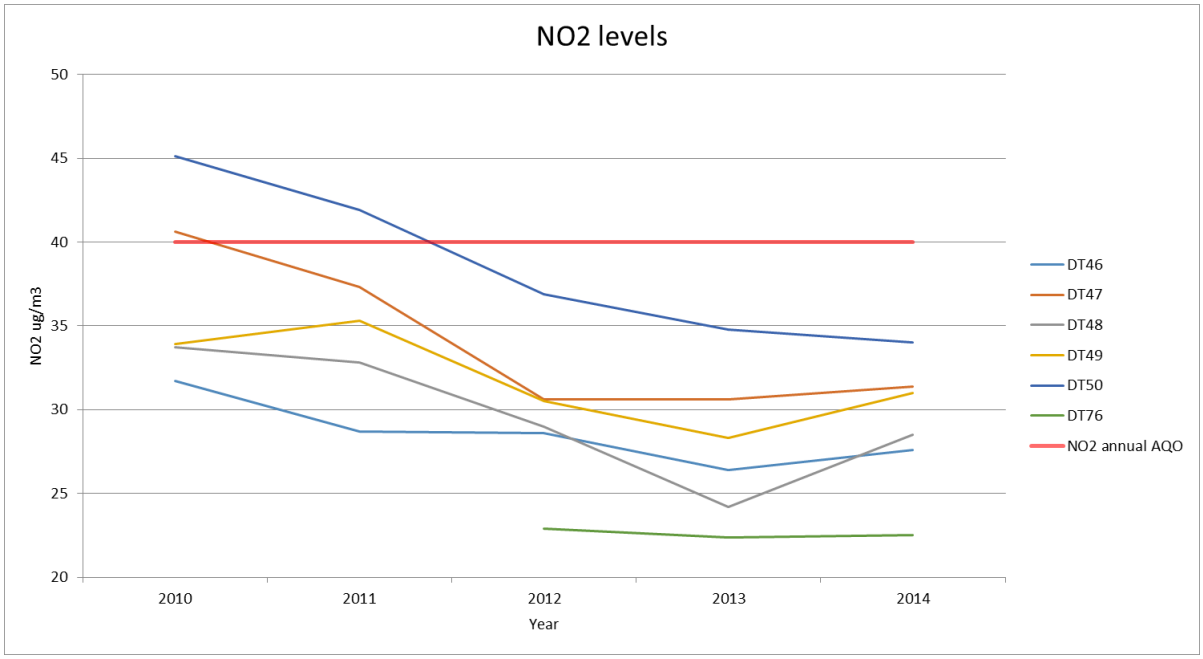
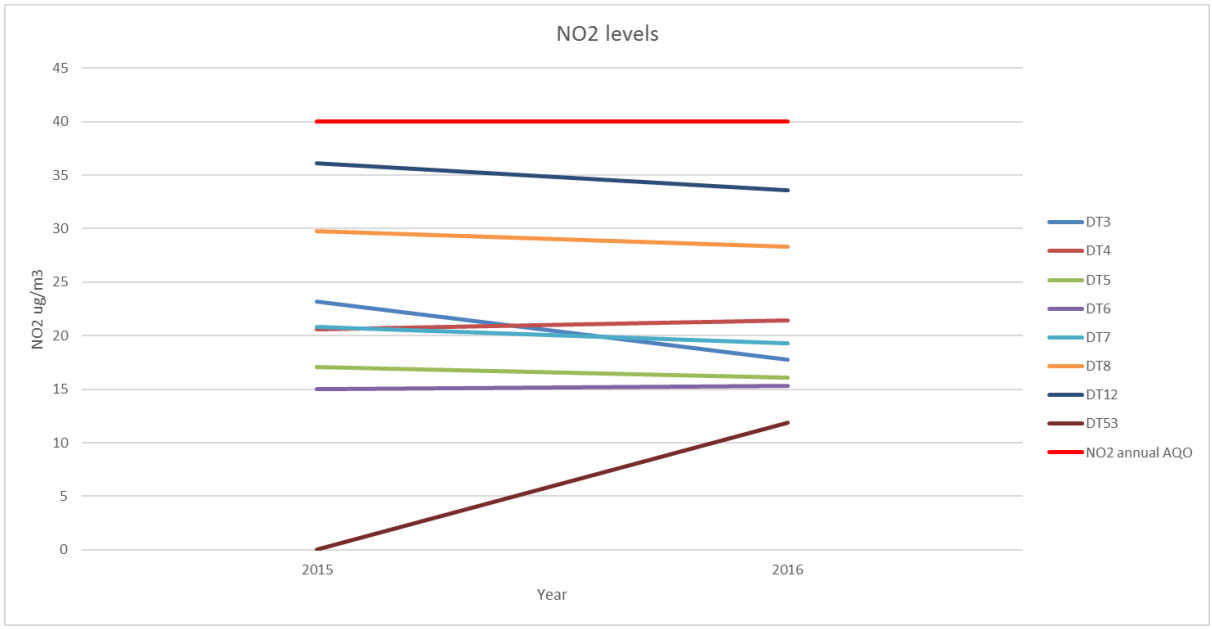



**Figure 5 Monitoring data for the Tavistock Road post 2015**




Although not directly on the link of concern they fall on an adjacent road link with similar road characteristics. These diffusion tube results again shown consistently levels below the 40 µg/m$^3$ limit. An additional automatic monitoring site operated on behalf of DEFRA (shown in dark blue in Figure 3) was also established in the area in December 2016 and the results for 2017 (ratified data) show $NO_2$ levels at 20 µg/m$^3$ well below the limit value. This was during a time of significant road improvement measures and the route was heavily congested during the whole year.

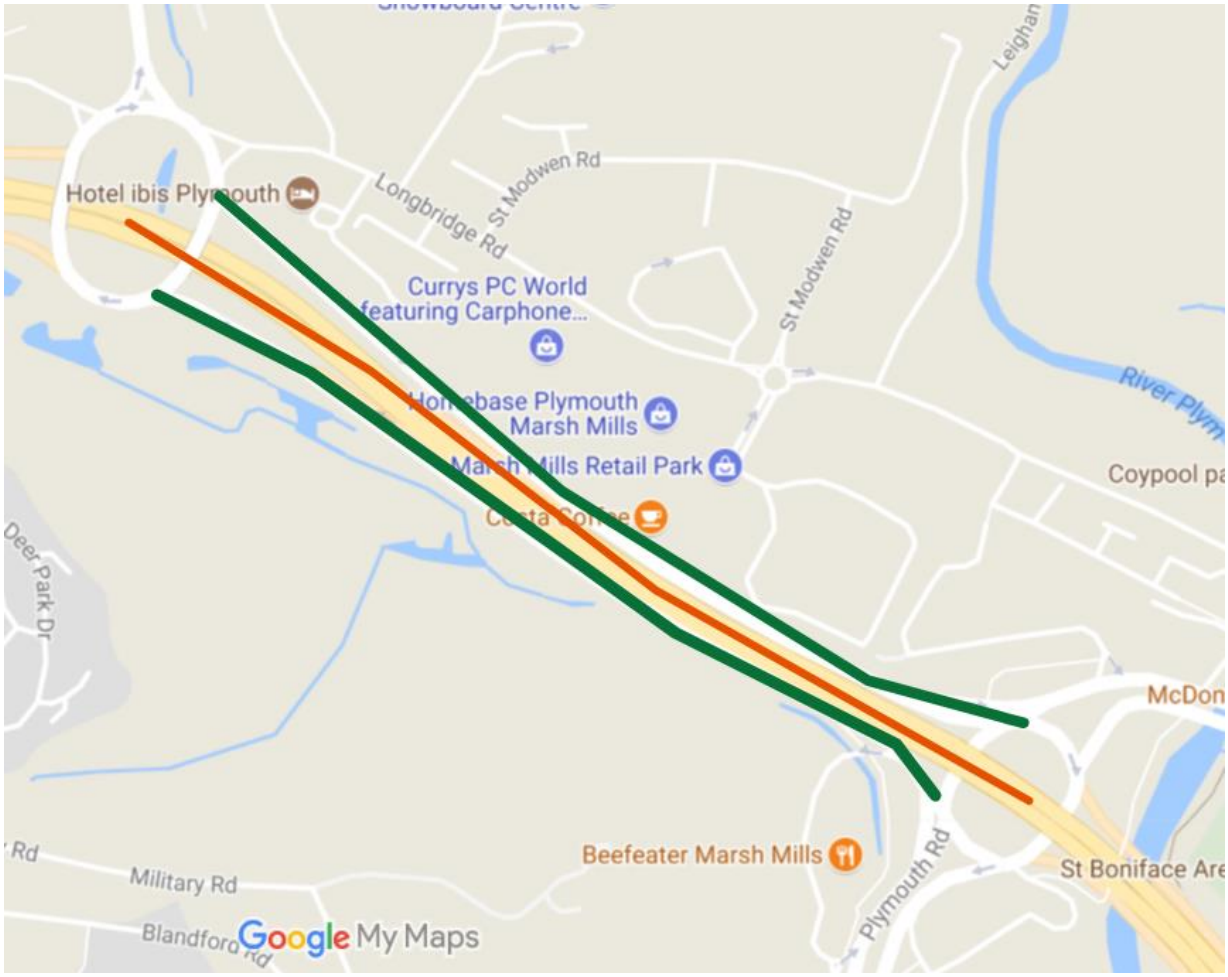
As a result of this monitoring data showing compliance with the limit values in the last two to three

years the Council has been looking to revoke the AQMA along Tavistock Road. These data sets also clearly demonstrate that the link of concern is measuring $NO_2$ concentrations well below the 40 µg/m$^3$ limit and so is in compliance with the AQD. *As such according to local monitoring data this link should not be considered further in this study as it is already in compliance.*

### 1.3 A38 feeder roads – ID81374

This is a stretch of road that comprises feeder links alongside the main A38 Expressway linking the Marsh Mills junction with the A374 Plymouth Road (described below) and the Forder Valley junction with the B3413 as shown in more detail in Figure 6 below. The green lines are the feeder roads and the orange line is the Expressway. The feed roads (ID81374) are the responsibility of the Council and the main A38 (ID81373) is the responsibility of Highways England.

**Figure 6 Details of the A38 Expressway and feeder roads**




The highway configuration here is unusual – up to ten lanes of traffic (including filter lanes), three central reservations, a shared use foot and cycle path, and 64m across at its widest point. This is partly the result of local topography – very steep sided valleys have influenced the way that the city's neighbourhoods and the local roads connecting them evolved since the mid-20th century. It is also the result of having to accommodate the A38 dual carriageway (a vital component of the south west's strategic road network) running east / west through the heart of the city, alongside adequate local highway routes and safe, practical interchange opportunities between the two.

The exposure location in relation to this road link is a cycle way alongside the feeder road to the

North side of the expressway. The impact of these roads on concentrations along the cycle way will be complex as the Expressway is elevated at this point. Exposure on this small section of cycle way would account for minimal exposure time and is used infrequently.

The A38 carries traffic between the far south west peninsula and the M5 at Exeter, and has its highest daily flows during the summer months reflecting the large number of people traveling to the area for holidays. The A38 and / or the parallel local roads on this 800m link are also used by local traffic predominantly making journeys to and from destinations in north and north-east Plymouth, Plympton and Plymstock. Traffic flows along the feeder road are shown in Table 5 below. These data show about 80% of the traffic is cars, with 14% being vans, 2.3% being HGVs and very little bus traffic.

**Table 5 DfT traffic flows on feeder roads – ID81374**

| | Motorcycle | Cars/Taxis | Bus/Coach | LGVs | HGV-Rigid | HGV Artic | All |
|---|---|---|---|---|---|---|---|
| 2011 | 634 | 28897 | 86 | 3669 | 355 | 343 | 33984 |
| 2012 | 274 | 15921 | 94 | 3043 | 302 | 90 | 19724 |
| 2013 | 288 | 15924 | 106 | 2819 | 299 | 93 | 19529 |
| 2014 | 769 | 45540 | 203 | 7867 | 1073 | 382 | 55834 |
| 2015 | 817 | 45798 | 239 | 8309 | 1017 | 444 | 56624 |
| 2016 | 728 | 46751 | 189 | 8133 | 972 | 349 | 57122 |

These traffic flows relate to the estimated road traffic $NO_2$ source apportionment as shown below in Table 6. This shows diesel cars and vans to be the largest contributors to $NO_2$ concentrations followed by petrol cars and HGVs.

Since the road was not included in the AQMA and has no specific exposure for local air quality assessment purposes, no specific monitoring data is available to compare with the national modelling results. However, in part 3 of the study we will develop a local model with the best available local data to explore the complexities of this road link and validate the national model results.

**Table 6: Source apportionment for total $NO_x$ (%) from Defra PCM model**

| link | Regional BG | Urban BG (non-traffic) | Urban BG (traffic) | Diesel Cars | Petrol Cars | Diesel LGV | Petrol LGV | rHGV | aHGV | Bus |
|---|---|---|---|---|---|---|---|---|---|---|
| A38 | 3 | 7 | 13 | 31 | 7 | 22 | 0 | 9 | 4 | 3 |

## 1.4 A374 Plymouth Road – ID27910

The A374 is one of two arterial roads into Plymouth from the east. Trips made into the city from the east via the A38 (Ivybridge, Newton Abbott, Exeter) and from Plympton continue via this road. It also handles local trips between Plympton and neighbourhoods west of the A374 and south of the A38 (Efford, Laira, Greenbank).

This road link is adjacent to the one above and is the main route into the city centre serving city centre employment and retail locations. It runs alongside the estuary and is very open in relation to dispersion of pollutants. There are limited exposure points along this route covering a few dwellings, a foot path and retail site. There is also a diesel main line railway alongside this road which may influence $NO_2$ concentrations.

The section of the A374 identified in the PCM model runs from Marsh Mills to the junction with the B3214 (Old Laira Road) – a distance of 1km, between which there are several junctions to the local road network and a large Sainsbury's supermarket. The 2016 AADT (DfT) for this link was 58,710. The 2016 AADT (DfT) recorded further south along the A374 adjacent to Blagdons Storage yard was lower - 45,607 – which reflects the fact that some trips enter and exit the A374 at Old Laira Road and at Lanhydrock Road.

The DfT traffic flow data for this link is shown in Table 7 below. Like the other road links being considered here the traffic flows are dominated by cars and vans, and again cars and vans are the main source of $NO_2$ concentrations.

**Table 7 DfT traffic flows on A374 – ID27910**

| | Motorcycle | Cars/Taxis | Bus/Coach | LGVs | HGV-Rigid | HGV Artic | All |
|---|---|---|---|---|---|---|---|
| 2011 | 1206 | 42725 | 742 | 6663 | 1402 | 672 | 53410 |
| 2012 | 631 | 39954 | 670 | 5623 | 1340 | 730 | 48948 |
| 2013 | 917 | 44197 | 717 | 8304 | 1237 | 639 | 56011 |
| 2014 | 884 | 45036 | 901 | 8822 | 1096 | 652 | 57391 |
| 2015 | 751 | 46326 | 784 | 7822 | 1409 | 723 | 57815 |
| 2016 | 947 | 47840 | 589 | 7463 | 1102 | 770 | 58711 |

**Table 8: Source apportionment for total $NO_x$ (%) from Defra PCM model**

| link | Regional BG | Urban BG (non-traffic) | Urban BG (traffic) | Diesel Cars | Petrol Cars | Diesel LGV | Petrol LGV | rHGV | aHGV | Bus |
|---|---|---|---|---|---|---|---|---|---|---|
| A374 | 3 | 6 | 12 | 28 | 7 | 18 | 0 | 11 | 6 | 9 |

As with the other road links a local model will be developed for the A374 to explore concentrations in more detail in part 3 of this study. This local model will be joint with the A38 Expressway and feeder roads as they are continuous roads.

# Part 2: Developing a long list of measures for addressing the exceedances

As set out later in this document, the road links are compliant with legal limits and therefore no measures would bring forward compliance further.

For information the sections below explore each of the links in a little more detail in terms of measures that have been put in place since 2015 or are already committed.

## 2.1 Tavistock Road – ID27056

*Existing and planned measures*

There has been considerable emphasis on measures along the A386 Tavistock corridor providing a key North-South route through the city. This route has been affected by congestion resulting in poor bus service reliability. These schemes have and continue to impact on traffic flows on the link of concern and include:

- *Derriford hospital bus interchange* – which is now complete is the second busiest in the city

with its importance to achieving the aim of greater public transport use expected to increase as the north of the city supports more homes and jobs.

- *The Derriford transport scheme* – completed March 2018 provides improved bus priority alongside highway capacity enhancements and cycling and walking infrastructure. This scheme provides congestion reduction benefits alongside supporting increased travel by bus, foot and cycle.
- *Northern Corridor Junction Improvements Programme (NCJIMP)* - The NCJIMP is a rolling programme of improvement works targeted at the key traffic signal junctions on the principal roads that connect the city centre with the north of the city and will include increased bus priority, cycling and walking facilities and the renewal and upgrade of traffic signal equipment. The first scheme in this programme was completed in early 2017 and focuses on the Weston Park Road and Tor Lane junctions of the A386 Outland Road.
- *Retrofitting of Buses* - In 2016 Plymouth Citybus introduced its 'Red Flash' bus service, which uses Euro VI compliant Enviro 400 buses, and also introduced gas buses on their No. 14 bus service. Both these bus services run along the A386 between Manadon junction and Crownhill junction and will have resulted in a reduction in bus-related NOx emissions along that road link.

In addition to these specific measures on the A386 corridor the Council secured c£1.5 million from the Department for Transport Sustainable Travel Access Fund to continue our successful Plymotion green travel programme for another three years to support access to employment, education and training by bike and on foot whilst reducing congestion. This next phase of Plymotion will focus on the city's three strategic growth areas: the city centre and waterfront, Derriford and the northern corridor and the eastern corridor, with a focus on businesses and schools.

The City Council also has funding for a new link road, the Forder Valley Link Road, which will link the A386 at Derriford to the Forder Valley Road providing an alternative route from the A38 Expressway to the Derriford area of the city. This road is due for completion in 2020 and should reduce traffic flows on the current A386 by an estimated 7000 vehicles.

**2.2 A38 feeder roads – ID81374**

*Existing and planned measures*

The City Council has funding for an Eastern Corridor Junction Improvements Programme (ECJIMP) that will influence traffic coming into this area and will have specific influence at the Marsh Mills junction at the top of the A374 and the A38. The ECJIMP is a rolling programme of improvement works targeted at the key traffic signal junctions on the principal roads that connect the city centre with the east of the city and will include increased bus priority, cycling and walking facilities and the renewal and upgrade of traffic signal equipment including the use of new technology to improve traffic control. Delivery of the first scheme in this programme is planned for 2018.

In addition, the Forder Valley Link Road will be providing an alternative route from the A38 at the B3413 junction, at the Western end of this road link, to the Derriford area and the A386. This is due for completion in 2020 and is likely to affect traffic flows at this junction.

Lastly the wider Plymotion travel behaviour change programme may influence traffic levels in this area.

## 2.3 A374 Plymouth Road – ID27910

*Existing and planned measures*

As described above the A374 is the main road into the city from the east linking with the A38 Expressway and B3416 Plymouth road at the Marsh Mills roundabout. This road link will again be affected by the Eastern Corridor Junction Improvements Programme which is specifically tackling congestion on the B3416 bringing traffic from the Plympton area to the city centre and aiming to improve bus journey performance and options for walking and cycling.

Like the other road links in this study, dominant road traffic relates to cars and vans, though there is a reasonable bus component which will be buses linking the east of the city with the city centre.

### 2.4 Summary

All three of the road links of concern are on major transport routes serving employment, retail and residential sites across the city, with traffic emissions dominated by cars and vans. In most cases link specific measures have already been implemented or are already planned, especially with regards the A386 corridor.

## Part 3: Assessing deliverability/feasibility and delivering a short list

*For each of the measures identified in part 2, local authorities should set out an assessment of deliverability including how long it would take to deliver each measure and whether it is practicably feasible to deliver. Based on this assessment of deliverability and feasibility, the local authority should develop a short list of measures to take forward to part 4 of the report.*

**Baseline Modelling**

A dispersion modelling assessment has been undertaken to assess the concentrations of $NO_2$ along the identified road links based on local data.

**Traffic data**

Traffic counts (AADT) and fleet composition for the A roads within the model domain were taken from the Department for Transport's traffic count data for 2016. Traffic data for the B3250, B3416 and the Royal Parade were available from the local authority. Flows on roundabouts and slip roads were estimated from the available data. Traffic speeds data from the DfT was used for the A roads and speed data for the A38 from the strategic road network. Traffic speeds for the B3250 and the Royal Parade were available from the Council.

Traffic flows were scaled up to 2017 using Tempro factors.

OS Open Roads data were used for road digitisation. Roads widths were estimated from number of carriageways observed in aerial photos from Google maps, assuming carriageway width of 3.65 m.

**Emission model selection**

Emissions rates were calculated using EFT2017_v8.0.1.xlsb, which is based on COPERT 5 emission factors. There were no gradients along the road links of sufficient height to warrant inclusion of their impact on emissions within the model.

**Details of air quality dispersion model.**

The ADMS-Roads 4.1 dispersion model was used. All A roads with in a 6 km by 6 km square (SW corner 247000, 54000) along with the B3250 and Royal Parade have been included in the modelling. Canyon effects were not included in the modelling as the road links were not within street canyons. A section of the A38 at Marsh Mills roundabout and a section of A386 at Manadon roundabout have been modelled as 5m high flyovers, following guidance from JAQU. There are no tunnels within the model domain. A modelling receptor grid: 10 m by 10 m base grid was used plus source-orientated grids including 4m from the kerb along the road links at 10 m spacing and at monitoring locations. The AURN monitoring sites at Plymouth Centre and Tavistock Road were included as specific receptors.

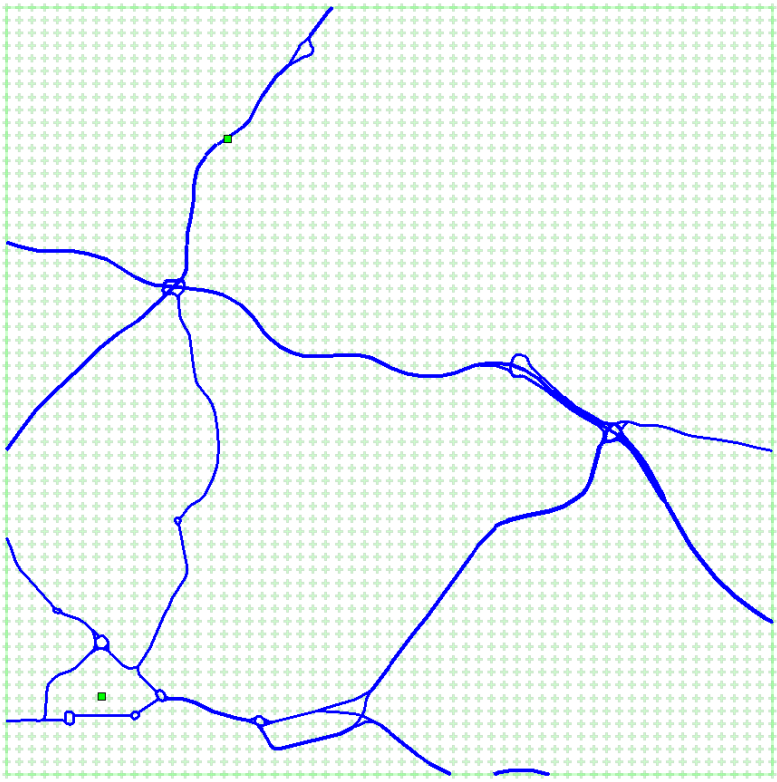


*Figure 7 Model Domain*

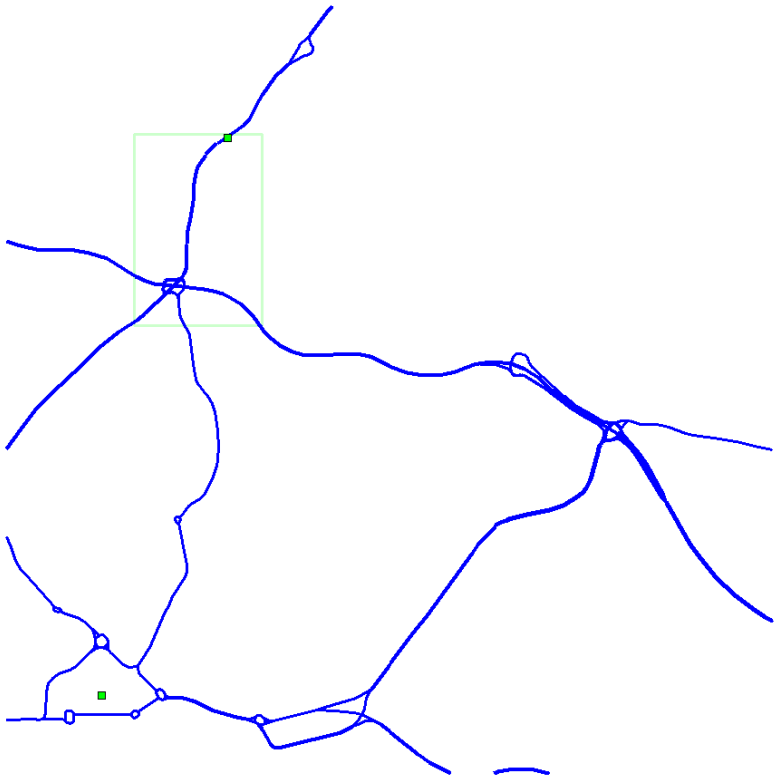


*Figure 8 Receptor grid – A386 (27056)*

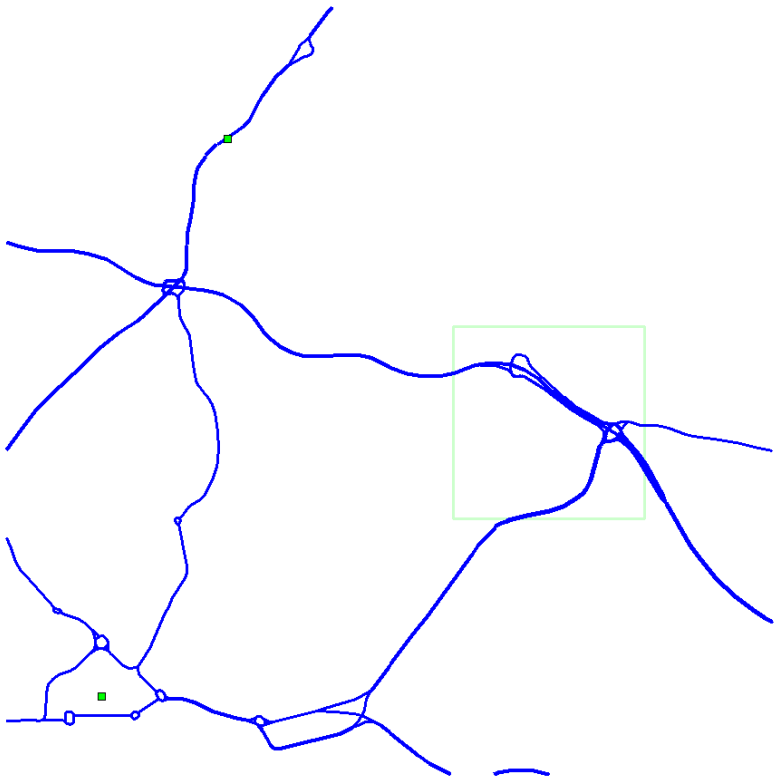


*Figure 9 Receptor grid – A374 (27910) and A38 local access (81374)*

**Non-road transport modelling**

Background concentrations are taken from Defra's background maps for 2017 (base year 2015) with 'in square' emissions from Motorways and trunk and primary roads removed. This does leave a small amount of double counting of 'out-of square' emissions.

**Air quality base year modelling**

The base year modelled was: 2017. Meteorological data from the Plymouth/Mountbatten site for 2017 downloaded from National Oceanic and Atmospheric Administration website. A surface roughness of 0.5 m representing open suburbia has been used in the modelling. A minimum Monin-Obukhov length of 30 m, suitable for cities and large towns, was selected.

**Measurement data for model calibration**

The AURN sites at Plymouth Centre and Tavistock Road have been used to derive calibration factors to apply to background and road contributions to annual mean NOx concentrations.

The urban background site Plymouth Centre was used principally to derive the background calibration factor and Tavistock Road site, which is adjacent to the A386 (Census ID 47060) was used principally to derive the road calibration factor.

A factor of 1.1 was applied to background NOx and a factor of 1.4 applied to road NOx.

**NOx/NO2 emissions assumptions**

Adjusted background and road NOx concentrations were input into Defra's NOx to $NO_2$ Calculator to give annual mean $NO_2$ concentrations. These were in close agreement to the monitoring data (modelled: measured = 1.02 at Plymouth Centre and 0.93 at Tavistock Road), so further adjustment was deemed unnecessary.

**Resulting concentrations**

The maximum $NO_2$ concentrations at 4 m from the kerb are as follows:

A386 (27056) – 33.2 µg/$m^3$

A374 (27910) – 35.1 µg/$m^3$

A38 local access (81374) – 31.9 µg/$m^3$

Concentration contour plots are provided at the end of this section.

**Comparison with National PCM modelling**

The local modelling is predicting considerably lower annual average concentrations compared to the national modelling. The main reason for differences between the local and national modelling results are:

- Correction factors derived from local monitoring within the local study were 1.4 for road NOx and 1.1 for background NOx whereas the national model uses a higher factor of 2.6 for road NOx. The local correction factors are most applicable to Plymouth.
- The local study has recognised some roads (flyovers) as elevated sources. However, the identified roads were not modelled as flyovers in the national model.
- Local meteorological data have been used in this study which is more representative of Plymouth compared to that used in the national model which is based on Waddington data in the Midlands. Surface roughness and Monin-Obukhov length within the local study have been set to be representative of the local Plymouth area.
- The local study has considered the carriageways of the A38 local access roads separately and therefore in more detail.

**Summary**

To assess the air quality along the A386, A374 and A38 the ADMS Roads dispersion model was used based on local data, and the DfT traffic counts and fleet composition. Results at 4m from the kerb are comparable to Defra's national PCM modelling. The local study predicts compliance with the annual mean $NO_2$ limit value in 2017 at all three road links.

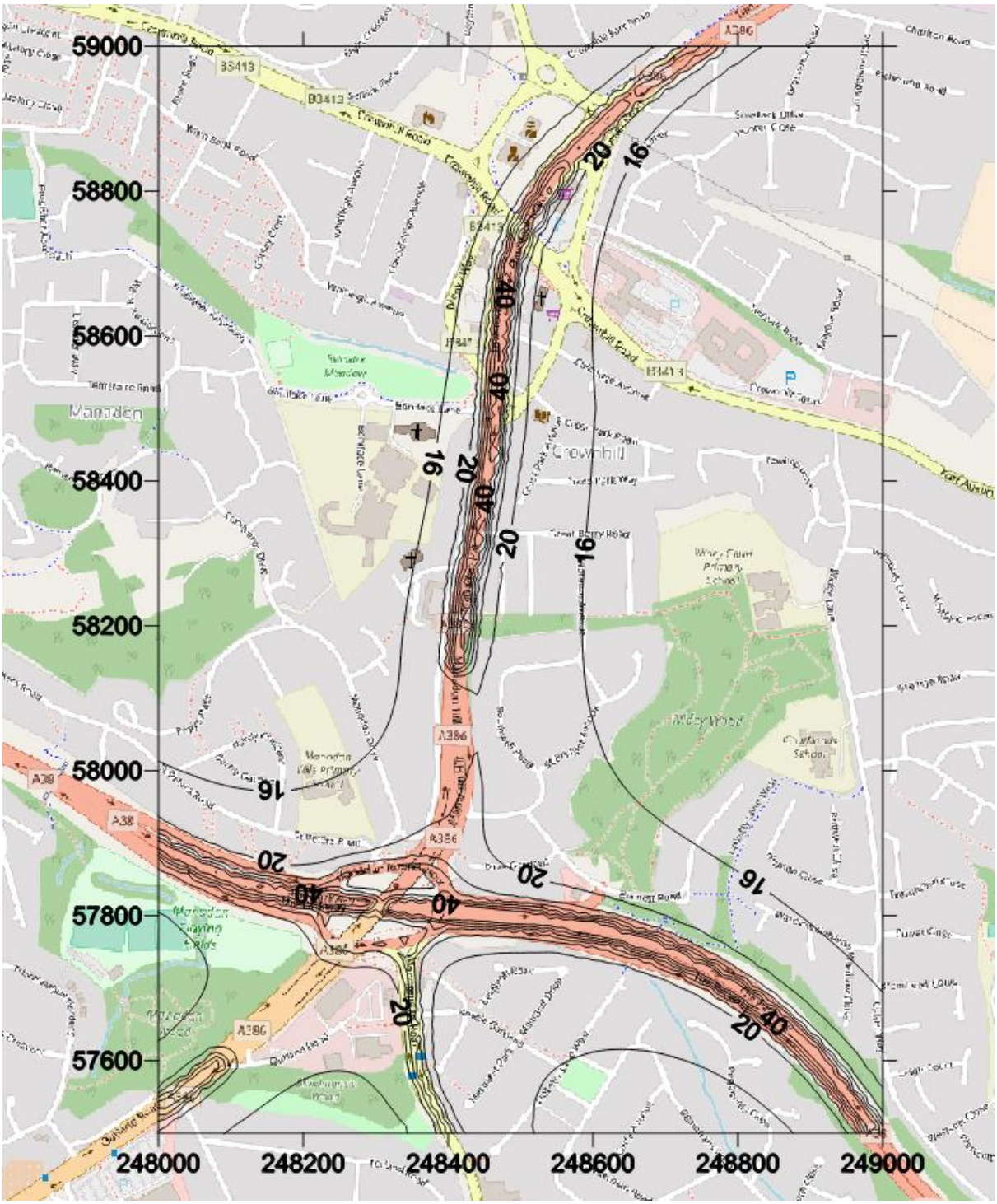



*Figure 10 Annual Mean NO2 - A386 (27056)*

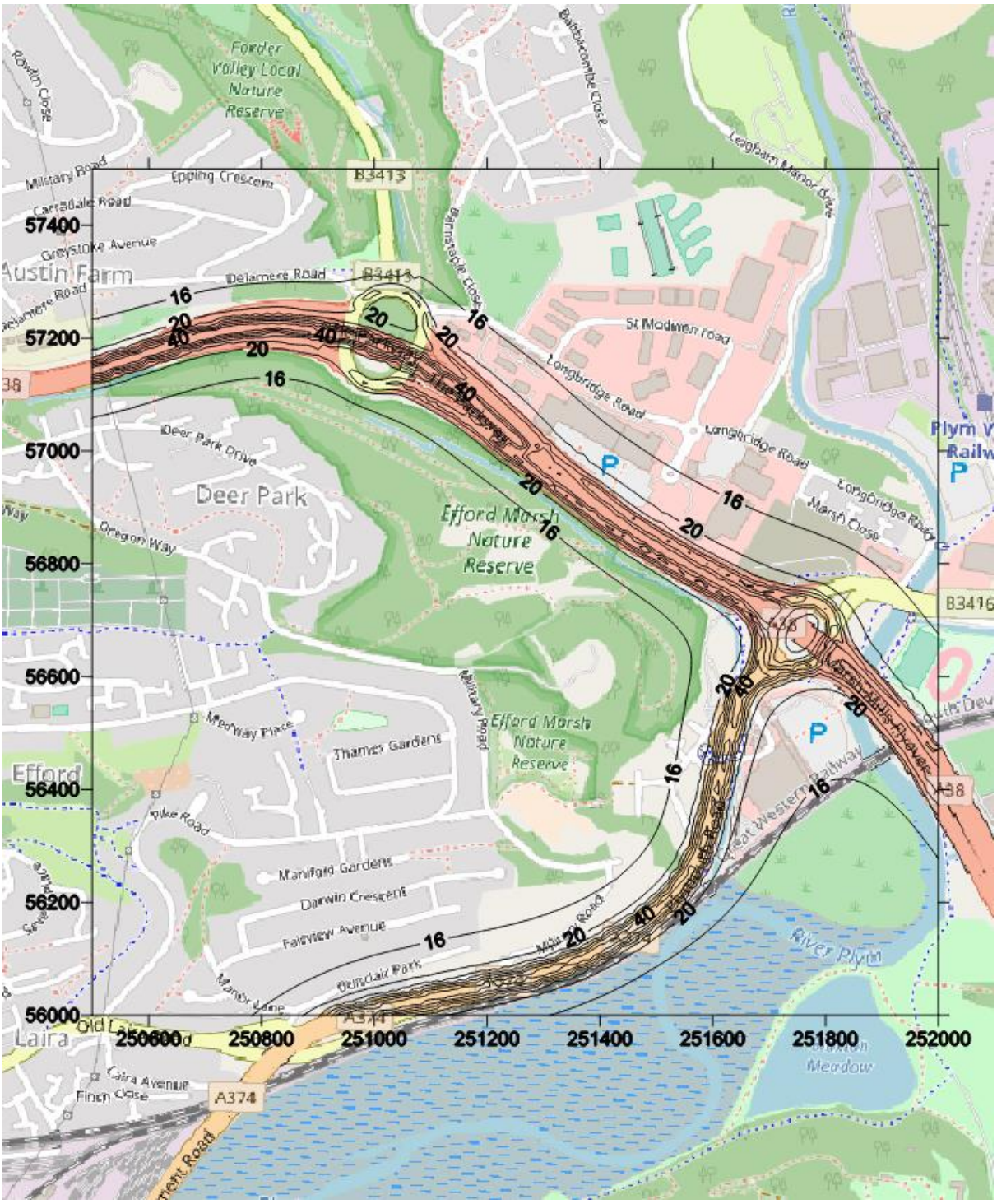



*Figure 11 Annual Mean NO2 - A374 (27910) and A38 local access (81374)*

## Part 4: Evidencing the short listed measures to identify options that could bring forward compliance

*In this section, local authorities should set out the likely effectiveness of the shortlisted measures in bringing forward compliance. Local authorities should assess each option against the Primary Critical Success Factor.*

The local study predicts compliance with the annual mean $NO_2$ limit value in 2017 at all three road links.

Nevertheless, the Council has reviewed all available measures to reduce emissions and improve air quality further along these three road links. The most feasible measure is the implementation of a MOVA traffic light signalling system at Marsh Mills to reduce congestion. This is a committed road scheme improvement and although compliance has been evidenced the Council will deliver this measure during 2018 which is expected to lower emissions and improve air quality further.

## Part 5: Setting out a preferred option

*In this section, local authorities should set out a summary of their preferred option to bringing forward compliance (where such measures exist). Where new measures have been identified that could bring forward compliance, local authorities should also assess a range of Secondary Critical Success Factors in order to identify the preferred option.*

To assess the air quality along the A386, A374 and A38 the ADMS Roads dispersion model was used based on local data, and the DfT traffic counts and fleet composition. The local study predicts compliance with the annual mean $NO_2$ limit value in 2017 at all three road links.

The maximum $NO_2$ concentrations at 4 m from the kerb are as follows:

A386 (27056) – 33.2 µg/$m^3$

A374 (27910) – 35.1 µg/$m^3$

A38 local access (81374) – 31.9 µg/$m^3$