Carmarthenshire County Council

2020 Air Quality Progress Report

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

September 2020

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Executive Summary: Air Quality in Our Area

Air Quality in Carmarthenshire

The main air quality pollutant relevant to Carmarthenshire is Nitrogen Dioxide (NO_2) and the main source of NO_2 emissions in the County is road traffic. We have developed a monitoring network that follows some of our busiest roads and most congested streets to enable us observe trends in NO_2 concentrations and assess the effectiveness of any changes made in attempt to improve air quality in those areas.

The trends observed over the last year have continued to decrease in comparison to 2017 and 2018 however one site within the Carmarthen Air Quality Management Area has exceeded the Air Quality Objective for 2019. Three sites also remain marginal compliant of exceeding the Air Quality Objective they include one in Llanelli, one in Carmarthen and one in Llandeilo. This is an improvement from 2018 where it was reported four sites had exceeded the AQO and eight further sites remained marginally compliant. Although this trend is promising, there are many factors that may influence these results, such as the weather along with vehicles generally getting cleaner as older ones are replaced.

Although we are observing a marginal downward trend, year on year, it's reasonable to imply that there has not been a significant reduction identified over the last three years that would warrant further action at this time, with regard to our Air Quality Management Areas. In particular, the influence of the weather can play a significant part. Wind and rain can help to disperse pollutants more readily, and increased sunshine can also reduce the levels of Nitrogen Dioxide in the air through chemical reactions.

Although November was colder than average, overall, 2019 was warmer than average, but slightly less so than in 2017 and 2018. Record breaking warm spells in February and July, Easter and August Bank holiday were also recorded, with February reported to be was the second sunniest since 1929. Yet, the year experienced a lot of heavy rainfall during February, March, April, June and July onwards, having felt the brunt of five named storms. This type of climate will have some influence over the results that we are observing.

It is likely that we will observe a much greater reduction during 2020 because the COVID-19 lockdowns have reduced much non-essential travel and encouraged more home working during this year. However, this will not reflect the typical travel behaviours pre-COVID-19 and so it will be important to continue to monitor the AQMA's beyond the pandemic period. It is too early to predict whether we will continue to see this downward trend at the end for 2021 onwards once travel behaviour changes again.

Carmarthenshire currently has three Air Quality Management Areas (AQMA) in Llandeilo, Carmarthen and Llanelli. Further details can be found on our website: https://www.carmarthenshire.gov.wales/home/council-services/environmental-health/air-quality/#.W46Mg-mQzIU

The Llandeilo AQMA was designated in 2011 and an action plan was later developed in 2014. The fourth-year review of the Llandeilo action plan was conducted in 2019 and included in the 2019 Air Quality Progress Report. The outstanding options of the Llandeilo Action plan are largely under consideration within the Llandeilo and Ffairfach Transport Study commissioned by Welsh Government due to the function of the Strategic Trunk Road of the A483. The COVID-19 pandemic has unfortunately delayed progress on this work and the review the Llandeilo Action Plan. It is planned to conduct this review in 2021 and we will continue to work closely with partners involved in this study to monitor progress with those outstanding options.

The AQMA's for the towns of Carmarthen and Llanelli were designated and Orders issued in August 2016. Action Plans for both towns were subject to public consultation during 2017. Responses were reviewed and draft Action Plans were submitted to Welsh Government late 2017. Although work has already began to assess and deliver some of the proposed measures in these Action Plans, the final Action Plan for Carmarthen and Llanelli was submitted to Welsh Government late 2019.

No new major sources of uncontrolled pollution or fugitive emissions have been identified within the County during 2019 and although many developments are underway, some of which have required air quality impact assessments to be conducted, no significant impacts have been identified. The requirement to adhere to an approved dust/construction management plan can be quite effective in reducing the risk to a negligible impact. Nevertheless, collaboration work with planners and

developers continues and wherever possible further measures are encouraged to mitigate any impact that development may pose on air quality.

Four locations incorporating Biomass boilers have been identified through the planning process and three have been screened to assess any impacts they may pose on the environment and local air quality, whilst one has been conditioned to provide further information for this exercise to be conducted. The sites are in rural areas and not within any of the AQMA's and the three plants are operating under the Renewable Heat Incentive scheme.

We continue to work closely with our partners to manage local air quality in Carmarthenshire, including Natural Resources Wales, the Planning Authority, the Highways Authority, SWTRA and local schools.

Actions to Improve Air Quality

During 2019 Llanelli Crematoria replaced its main Cremator whilst retaining the old one for emergency purposes only. The Environmental Permit was varied to reflect this to control emissions to air. However, this the new cremator is much more efficient with improved monitoring controls which should reduce overall emissions to air compared to the exiting cremator. The site is located outside of the Llanelli Air Quality Management Area and is not expected to cause any problems if it continues to operate in accordance with the Permit.

Carmarthenshire also received eleven planning applications for new developments that carried out Air Quality Assessments, all of which stated that any impact would be negligible. One additional application carried out a screening assessment and was able to justify that no AQA was necessary. However, in support of the sustainable development principles of the Well-being of Future Generations (Wales) Act 2015 and Welsh Government policy guidance to reduce air pollution as far as possible, every opportunity is taken to implement measures to improve air quality through the development process. For example, by promoting the use of sustainable transport methods, with cycle parking, pedestrianised access routes, travel plans and the provision of Electric Vehicle infrastructure. The four developments that were granted permission during 2019 included additional measures to help improve air quality.

Air quality screening exercises were performed during 2019 at various locations and details of these exercises can be found in Appendix G of this report. Monitoring did not identify any breach of the Objectives. Further monitoring at other locations is being performed through 2020 and the results will be reported in the 2021 Progress Report.

Unannounced visits to check on the compliance with restricted steam locomotive idling times for Gwili Railway Company were carried out and identified compliance during two out of three visits. However, no emissions of dark smoke were observed during the time of the visits.

A number of improvements have been delivered to improve air quality during 2019:

- A significant programme of pedestrian and cycling infrastructure improvements.
- 20mph zones introduced around our schools and shopping areas.
- The Carmarthen Western Link Road opened.
- The first section of the Tywi Valley Cycle route opened
- Work began to install 29 electric vehicle charging points across 24 carparks
- The Llandeilo bypass options were shortlisted and consulted on.
- Travel plans adopted by all schools to promote sustainable travel.

No PM_{10} monitoring was carried out during 2019 because no significant dust issues have been identified within the previous 12 months.

Local Priorities and Challenges

In Carmarthenshire, the main pollution sources relate to traffic emissions and this is where the air quality work is concentrated. However, industrial sources are kept under review along with the working practices at Gwili Railway Station.

Priorities for the coming year in Carmarthenshire will largely be focussed on assessing the feasibility of the proposed actions for the Carmarthen and Llanelli AQMA's, whilst also working with Welsh Government and South Wales Trunk Road Agency to progress the outstanding measures outlined in the Action Plan for Llandeilo.

Screening exercises will also be planned to monitor and assess the positive impact that should be brought by the Cross Hands Economic Link Road and further monitoring

of NO_2 will be carried out in Carmarthen to ensure that any action plan work carried out does not move the problem to another location.

Where possible, efforts will be made to engage with schools located within our AQMA's to raise awareness of local air pollution and encourage active travel. It is planned to monitor levels of Nitrogen Dioxide around the school gates for schools within the County that are located within our AQMA Towns.

The COVID-19 pandemic will also focus much of our attention on improving active travel routes, and support residents and visitors to travel sustainably and in a socially distance manner.

How to Get Involved

There are many ways that you can help improve their local air quality in your area. Try reducing the use of cars for single person journeys, by car sharing, using other sustainable modes of transport such as electric vehicles and public transport, cycling or walking to work. Travel more actively by getting involved in national walking and cycling weeks and make good use of the improved cycle routes across the Carmarthenshire. Improve pollution at the school gates by not idling car engines and improve walking and cycling routes for schools by signing up to schemes such as living streets to encourage children to travel actively. Anyone can all get involved on National Clean Air Day, and participate in a global effort to make the air cleaner and healthier for everyone, Find out more on https://www.cleanairday.org.uk/wales

For further information on air quality within Carmarthenshire please visit:
https://www.carmarthenshire.gov.wales/home/council-services/environmental-health/air-quality/#.W46Mg-mQzIU

Or contact 01267 234567

Use of an AQMesh Automatic Analyser to monitor pollution levels at a school.

Use of a diffusion tube to monitor roadside NO2 levels from the façade of a property.

Use of a AQ mesh Automatic Analyser to monitor roadside pollution levels.

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1. Actions to Improve Air Quality

1.1 Previous Work in Relation to Air Quality

Carmarthenshire County Council's first Air Quality Review and Assessment went to consultation in draft form during the summer of 2001. Assessment was made with reference to the Air Quality Regulations 2000. Only sulphur dioxide and nitrogen dioxide were identified in the Stage 1 assessment as requiring a Stage 2 assessment. The Draft Review concluded that a 3rd stage assessment was not necessary for any pollutant.

In response to consultation comments received from the National Assembly for Wales in respect of nitrogen dioxide levels from road traffic, Carmarthenshire County Council commissioned consultants to undertake a 3rd stage Review and Assessment in respect of nitrogen dioxide levels from road traffic along a particular route.

The final report of the 3rd stage review and assessment was produced in March 2002 and concluded that it was unlikely that nitrogen dioxide levels from road traffic sources would exceed objectives and that there was no need at that time to declare an Air Quality Management Area. It was considered, however, that for future assessments further investigation of street canyon effects would be advisable.

An Updating and Screening Assessment was started in 2003 and submitted to the Welsh Assembly Government in 2004. A number of conclusions were reached but progress on any of the recommendations was delayed until confirmation of guidance. Prioritisation of workloads within Carmarthenshire County Council meant that no further formal documentation was produced until the next Updating and Screening Assessment.

An Updating and Screening Assessment was undertaken in 2006, which included the Progress Report for 2005 (submitted to the Welsh Assembly Government in 2007) and concluded that there was no need to progress to a Detailed Assessment for carbon monoxide, benzene, 1,3 butadiene, lead, nitrogen dioxide, sulphur dioxide or PM_{10}. However, the report concluded that a nitrogen dioxide co-location study was needed to validate the results. Also, to reduce the potential for public exposure of sulphur dioxide at the Gwili Railway Station, the Public Protection Department of

Carmarthenshire County Council needed to work with the management of the railway company. This has been on-going with a work instruction relating to the idling time of steam engines to be less than 15 minutes when alongside the platform.

The original 2008 Progress Report that was submitted to the Welsh Assembly Government concluded that there had been an increase in the number of tube sites that had exceeded the annual objective. In total, eight sites had failed to meet the objective which was more than expected and had been predicted. It was noted that there was a significant change in the tube bias adjustment figure used compared to the previous couple of years. The figure was 0.90.

However, after submission of the report the authority received correspondence from the Welsh Assembly Government that detailed the latest bias adjustment figure had been reviewed and subsequently changed to 0.77. Also, that using the new "NO_2 with Distance from Roads" tool effectively reduced the number of tube sites that failed to meet the annual mean objective. The 2008 report was amended internally to reflect the changes and provide accurate historical information. The net result of this was that only one relevant tube location was identified as exceeding the air quality objective.

The Updating and Screening Assessment 2009 identified the need to proceed to a Detailed Assessment for NO_2 in Llandeilo, based on the annual mean objective of 40µg/m^3 being exceeded for the last two years and that work on the proposed relief road was not likely to begin for at least the next five years. The USA also recommended a full review of the diffusion tube network and assessments for the additional criteria detailed in Technical Guidance (09).

The Progress Report 2010 provided details of the Detailed Assessment that had been set up in Llandeilo, along with providing information on how the diffusion tube network had changed following the review in 2009. Further reviews of the tube network were recommended.

The Llandeilo Detailed Assessment Report 2010 was submitted and accepted by the Welsh Assembly Government in 2010. The report concluded that a public consultation should begin for the proposed designation of an Air Quality Management Area within the town and that a Further Assessment should follow on from the Detailed

Assessment. The consultation took place and an Air Quality Management Area Order declared in November 2011.

The Progress Report 2011 provided further details for modifications to the diffusion tube network and proposals for the potential Detailed Assessments that may be required for the towns of Carmarthen and Llanelli.

The 2012 Updating & Screening Assessment Report reviewed the work in Llandeilo since the designation of the AQMA. It reported that an Action Plan was to be developed and this would be achieved by setting up a Steering Group and Action Planning Group. The Action Plan was due to be submitted later in 2013. Included in the USA were the proposal reports for the Detailed Assessments that were to be carried out for the towns of Carmarthen and Llanelli, along with details of further modifications that had taken place with respect to the diffusion tube network in the rest of the county.

The Llandeilo Further Assessment Report was submitted and concluded that the authority was justified in designating an AQMA for the town and that the boundary of the AQMA was appropriate. Source apportionment work was carried out and the necessary reduction in NO_2 identified. The results from the Further Assessment work were used to assist the development of the Action Plan.

Detailed Assessment Reports for the towns of Carmarthen and Llanelli were submitted and concluded that the monitoring results had not identified the area of exceedance and that more work was needed to identify potential boundaries. Modifications to the Detailed Assessment monitoring networks for both towns were proposed and implemented from January 2013.

The modified Detailed Assessments continued through 2013 for both towns and a review of results established that the areas of exceedance were very localised and likely to be attributable to the location characteristics. Reports for both extended Detailed Assessments were submitted in February 2014 and the conclusions and recommendations accepted by Welsh Government.

Work on the Llandeilo AQMA continued through 2013 with a draft Action Plan being developed encompassing feedback from various stakeholders and a Report of the work, along with the proposals in the draft Action Plan being put out to public

consultation in September 2013. Drop-in centres were set up in two locations (Ffairfach and Llandeilo) over a two-week period and comments received during the consultation have been used to review the draft Action Plan. The Llandeilo AQMA Boundary map can be found in Appendix D.

In 2014 the Action Plan was finalised and published with work continuing the Phase 1 proposals. The designation process for the AQMA's in the towns of Carmarthen and Llanelli also begun with reports being submitted to the various council committees for approval. Whilst it had been hoped to have the Orders issued by the end of 2015, work commitments meant this was not possible.

The 2015 Updating and Screening Assessment was submitted and accepted.

Work on designating the AQMA's for Carmarthen and Llanelli continued in 2016 with the Orders being signed and issued on the 2nd August 2016. The Llanelli and Carmarthen AQMA Boundary maps can be found in Appendix D. Subsequent Action Plans for both Carmarthen and Llanelli were drafted in 2017 encompassing feedback from various stakeholders. A report of the work along with the proposals in the draft Action Plan were then put out to public consultation in July 2017 until September 2017, comments received during the consultation were used to review the draft Action Plan and a report was submitted to Welsh Government in December 2017.

Improvements were made to the Action Plans incorporating feedback from Welsh Government appraisal, the revised plan was then consulted with stakeholders from the action plan steering group in July 2018 and included in the 2018 Annual Progress Report. The final Action Plan for Llanelli and Carmarthen was submitted to Welsh Government for approval December 2019.

Table 1.1 – Summary of LAQM Reporting

Air Quality Report	Submitted
1st Air Quality Review (2001)	2002
Updating & Screening Assessment (2003)	2004
Progress Report (2005)	2007
Updating & Screening Assessment (2006)	2007
Progress Report (2008)	2008
Updating & Screening Assessment (2009)	2009
Progress Report (2010)	2010

Llandeilo Detailed Assessment (2010)	2010
Progress Report (2011)	2011
AQMA Declaration (Llandeilo) (11/11/11)	2011
Updating & Screening Assessment (2012)	2012
Llandeilo Further Assessment (2012)	2012
Carmarthen Detailed Assessment (December 2012) + appended Modified DA Network Report (for January 2013)	2013
Llanelli Detailed Assessment (December 2012) + appended Modified DA Network Report (for January 2013)	2013
Progress Report (2013)	2013
Draft Action Plan Report for Llandeilo (Public Consultation)	2013
Extended Detailed Assessment Report for Carmarthen	2014
Extended Detailed Assessment Report for Llanelli	2014
Llandeilo Action Plan Report	2014
Llandeilo Action Plan	2014
Progress Report (2014)	2014
Updating & Screening Assessment (2015)	2015
Llandeilo Action Plan First Review (2016)	2016
Progress Report (2016)	2016
AQMA Declaration (Carmarthen and Llanelli) (02/08/16)	2016
Carmarthenshire AQ Screening Review Report (2016)	2017
Llandeilo Action Plan Second Year Review (2016)	2017
Carmarthen and Llanelli Draft Action Plan report	2017
Progress report (2017)	2018
Carmarthenshire AQ Screening Review Report (2017)	2018
Llandeilo Action Plan Third Review Feasibility of Phase 1 outstanding options (2017)	2018
Annual Progress report (2018)	2019
Carmarthenshire AQ Screening Review Report (2018)	2019
Llandeilo Action Plan fourth year review (2018)	2019
Final Action Plan for Carmarthen and Llanelli AQMA's	2019
Annual Progress report (2019)	2020

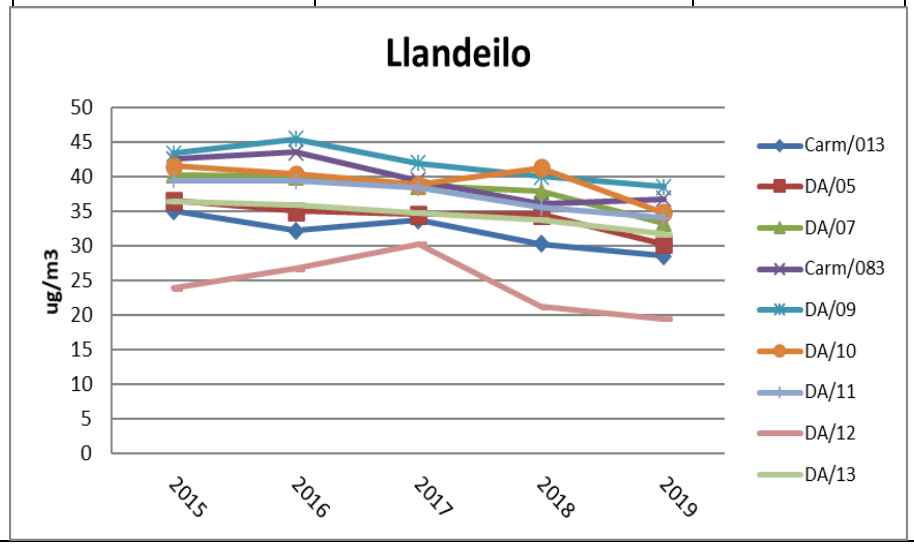
1.2 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when air quality is close to or above an acceptable level of pollution (known as the air quality objective (Please see Appendix A)). After declaring an AQMA the authority must prepare an Air Quality Action Plan (AQAP) within 18 months setting out measures it intends to put in place to improve air quality to at least the air quality objectives, if not even better. AQMA(s) are seen by local authorities as the focal points to channel resources into the most pressing areas of pollution as a priority.

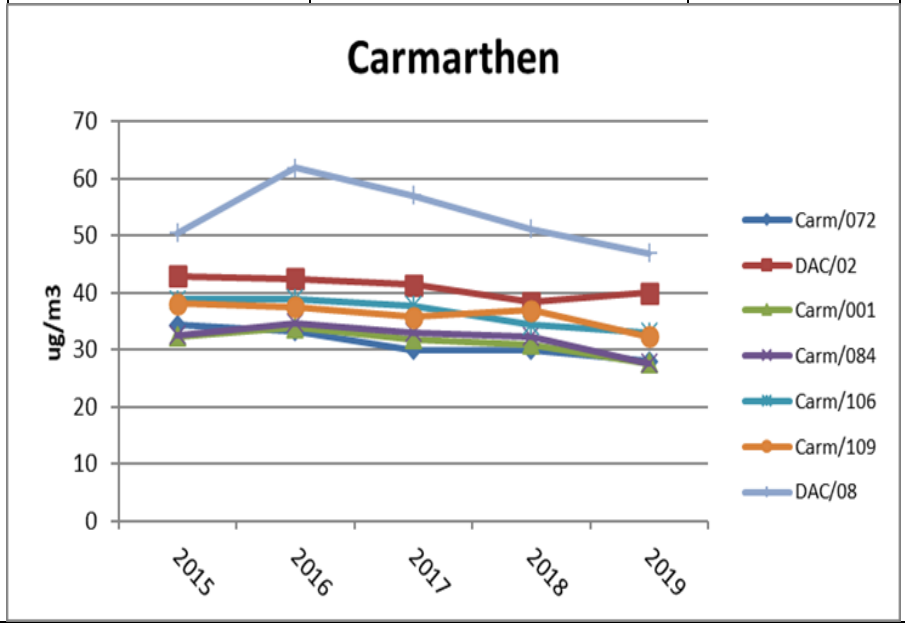
A summary of AQMAs declared by Carmarthenshire County Council can be found in Table 1.2. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=395 see full list at http://uk-air.defra.gov.uk/aqma/list

Table 1.2 – Declared Air Quality Management Areas

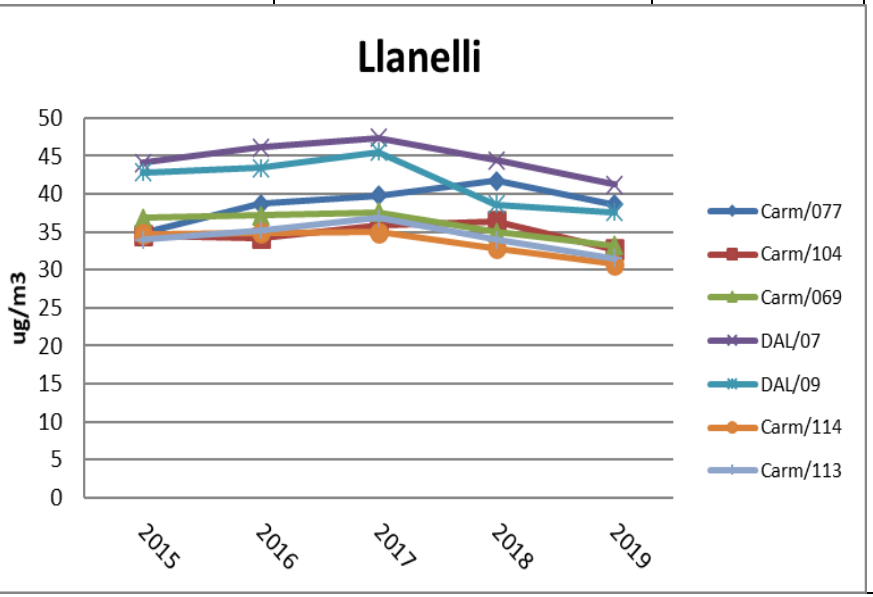
AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	Town	Description	Action Plan
AQMA Llandeilo	NO_2 annual mean	This year's monitoring results indicate a marginal improvement in air quality compared to previous years.	Llandeilo	The length of the A483 from the roundabout junction of A483 with A476 Ffairfach north along Towy Terrace across Llandeilo Bridge into Bridge St then Rhosmaen St through the town centre until the roundabout junction of the A483 with the A40.	Llandeilo AQMA Action Plan



AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	Town	Description	Action Plan
AQMA Carmarthen	NO_2 annual mean	There has been no discernible improvement in air quality in the AQMA for the last 3 years. The most significant improvement is observed at DAC/08, however it continues to exceed the Air Quality Objective.	Carmarthen	The designated area incorporates the Jobs Well Road junction on the B4312 in Johnstown and travels in an easterly direction up Monument Hill and down Picton Terrace to meet the St Catherine's Street roundabout. It continues along St Catherine's Street, spurring north up Water Street to the junction with Glannant Road and Pentrefelin Street, on to Barn Road and Francis Terrace and continuing to Richmond Terrace before bearing right along Old Oak Lane and reaching Old Oak roundabout. The boundary spurs east along Priory Street, through Abbey Mead and as far as Tanerdy roundabout on the A484, being the eastern extent of the AQMA. At Old Oak roundabout the boundary also spurs right along Priory Street and through Church Street, Spilman Street and on to the junction on the A484 below County Hall. The boundary travels south over Towy Bridge as far as the Towy Bridge roundabout, which is the southern extent of the AQMA. From the junction below County Hall the boundary travels west along Coracle Way and on to Morfa roundabout before heading north up Morfa Lane to meet up with St Catherine's Street roundabout and then heads west back to the Jobs Well Road junction completing the AQMA boundary.	Carmarthen AQMA Action Plan



AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	Town	Description	Action Plan
AQMA Llanelli	NO_2 annual mean	There has been a marginal but no significant improvement in air quality in the AQMA for the last 3 years.	Llanelli	The designated area starts from the section of the A484 known as Bassett Terrace from the far west at the junction with Waun Eos Road travelling easterly through Sandy Road and incorporating Sandy Road roundabout, continues to follow an easterly direction along the A484 Pembrey Road before turning north up New Road as far as the mini round-about in Furnace, and then travels back south along Old Road as far as the junction with Thomas Street on the A476. The boundary then travels north east along the A476 through Felinfoel Road and Panteg, as far as the mini roundabout joining Farmers Row. The boundary travels back south west along the A476 right down to Thomas Street bearing left along the A484 continuing on to the roundabout and bearing right following the A4214 along Stepney Place. The boundary continues along the series of mini roundabouts going through Upper Robinson Street and Murray Street before turning right at the junction with Station Road. The boundary continues along the A4214 through Church Street, Hall Street, West End on to Pembrey Road, again incorporating Sandy Road roundabout before travelling back west along Sandy Road and on through Bassett Terrace before completing the boundary at the far west junction with Waun Eos Road.	Llanelli AQMA Action Plan



AMQA boundary maps within Carmarthenshire can be viewed at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=395 and are included in Appendix D.

1.3 Implementation of Action Plans

Carmarthenshire County Council has taken forward several measures during 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 1.3. More detail on these measures can be found in the Air Quality Action Plan relating to any designated AQMAs.

Air Quality Action Plans are continuously reviewed and updated whenever deemed necessary, but no less frequently than once every five years. Such updates are completed in close consultation with local communities.

Key completed measures completed in 2019 are:

- The Carmarthen and Llanelli action plan was finalised and published late 2019. An action plan steering group has been set up to work in collaboration with partners across the Council along with external partners to consider the proposals and where possible deliver improvements to air quality in these Towns. The measures have been prioritised High – Medium – Low in Table 1.3 – Progress on Measures to Improve Air Quality based on the expected impact and effectiveness of the proposed interventions. Progress had already commenced on many of the actions.
- Improvements to shared cycle and footpaths has been designed and mapped in a master plan for Llanelli and £1.7m funding bid has been submitted to construct them.
- Carmarthenshire County Council carried out a significant programme of pedestrian and cycling infrastructure improvements in the Llanelli 'Sandy Road' area and this work is continuing. This is part of a 3-year project for safer routes in communities. Improvements have also been made to advertise them and promote their use.
- Glangwilli Hospital, Carmarthen introduced a new Car Park Management system in September 2018 and later commenced ANPR enforcement during 2019, because of increased parking pressures resulting from increased demand and a reduction in parking spaces. Alterations had also been made to the timings of the Park and Ride service to better accommodate hospital staff shift patterns, which has resulted in a greater uptake of staff usage.
- Carmarthenshire County Council has secured £100,000 funding from (OLEV) Office for Low Emission Vehicles via the on-street residential charge point scheme

and a further £220,000 from Welsh Government via the Local Transport Fund. Work has been carried out to install more electric vehicle charging points across the County, totalling 26 charge points across 24 carparks and work will be completed by 2020.

- Carmarthenshire County Council has Electric Vehicle pool cars in Parc Myrddin and Dewi Sant, Carmarthen and a Bicycle pool scheme commenced in Parc Myrddin Carmarthen for staff to cycle to meetings etc. Both these offices are located within the Carmarthen AQMA.
- Further public and stakeholder consultation was conducted between April - May 2019 on the Llandeilo and Ffairfach Transport Study, it requested feedback on the WelTAG Stage 1: Outline Case which shortlisted the following highest scoring options:

  NB1: Traffic lights, no bypass
  NB2: Removal of parking, no bypass
  NB5: HGV Restriction (legal sanction) plus one-way system
  NB6: Combined No bypass Option (with HGV restriction)
  NB7: Combined No bypass (No HGV restriction)
  TC1A: One-way system and bypass
  BE1A: Eastern Bypass Option 1 (A)
  BE1B: Eastern Bypass Option 1 (B)
  BE1C: Eastern Bypass Option 1 (C)
  BE4D: Mid Rhosmaen Eastern Bypass Option 4 (D)
  BE6: Eastern Bypass Option 6

  These proposed measures were also included in the Llandeilo Action Plan and progress is heavily reliant on external partners to deliver this work given the strategic function of the trunk road.

- The Carmarthen Western Link Road has now officially opened in May 2019 and provides a new link between Carmarthen and the A40 West. The road connects the A40 at Travellers Rest with College Road, providing direct access to the trunk road network for key employment sites at St David's Park, Hywel Dda Health Board's Hafan Derwen and the University of Wales Trinity St David's Carmarthen Campus. It also serves the new S4C headquarters 'Yr Egin', a major project for the Swansea Bay City Region. Given the road has been open for less than a year,

the wider benefits of this new highway infrastructure have not yet been realised or quantified.

- The first section of the ambitious Tywi Valley Path; a 16-mile stretch running alongside the River Tywi between Carmarthen and Llandeilo opened in January 2019. It includes over 750m of pathway linking Carmarthen Museum in Abergwili with Bwlch Bach to Fronun, and on to Whitemill, offers cyclists and walkers beautiful scenery including views of the Bishops Palace gardens and ponds.

Carmarthenshire County Council expects the following measures to be completed over the course of the next reporting year:

- Further work will also be conducted to monitor progress of delivering the outstanding intervention proposals of the Llandeilo Action Plan in conjunction with the Llandeilo and Ffairfach Transport Study, commissioned by Welsh Government. The remaining actions are under consideration within this study. The WelTAG Stage Two: Outline Business Case study is scheduled for 2020, shortlisting the proposed measures where a preferred option will be identified upon its review. The WelTAG Guidance ensures that the selected scheme:

  - shows value for money
  - provides transport, economic, social and environmental benefits
  - delivers maximum benefit with minimal impact

- It was planned to review the Llandeilo action plan during 2020, however the COVID19 Pandemic has unfortunately delayed this progress. There is a significant overlap in the options considered in the Welsh Government Llandeilo Transport Study with the measures proposed in the Action Plan, so it is prudent to review the action plan work in parallel. This is now planned for 2021 once as further decisions will be announced on the preferred delivery options.

- Impacts from the Carmarthen Western Link Road will be assessed. Diffusion tubes are located on the alternative route (old St Clears Road& Jobs Well Road) travelling through the Carmarthen AQMA, to identify whether there has been a reduction of traffic and subsequent NO_2 along these roads. Along with College Street so that we can identify whether the link road has resulted in any increase in traffic and pollution travelling through this area.

- Carmarthen has recently adopted a Business Improvement District for the Town Centre and one of their key objectives is to improve parking the area. The town Centre sits within the Carmarthen AQMA and so Carmarthenshire Council will engage with the 'BID' members to help identify sustainable solutions that can both enhance visitor experience without contradicting the objectives of our action plan.
- A traffic modelling study has been commissioned for Llanelli Town, which will consider the impact on new developments on the highway network along with a signage strategy planned to improve the routes taken by drivers, this work should be completed by 2021.
- In Llanelli, Traffic flows freely during large periods of the day but during peak periods traffic volumes spike leading to congestion on key routes and junctions. The town centre along with its A484 and A476 approaches form part of the Llanelli Air Quality Management Area (AQMA). Options to improve the A484 and A4138 have recently been developed with work progressing to determine preferred schemes.
- Bike Hire schemes for Llanelli and Carmarthen were explored and 3 docking stations for Brompton electric bike hire have been ordered for Carmarthen Bus Station, Llanelli Train Station, Pembrey and Burry Port Multi Modal Interchange. It is planned to have these installed in 2020.
- Electric vehicle raid charging points are planned for the Cross Hands EV Charging Hub with £370,000 secured via the Ultra Low Emission Vehicle Transformation Fund, work should be completed in 2021. Progress will be reported next year, Cross Hands is not located within an AQMA, however it is a key connection point between Llanelli, Carmarthen and Ammanford.
- The development of an Electric Vehicle Strategy was planned, however progress on this has been postponed pending the outcome of the Welsh Government EV Strategy. We will report the progress of this in the next report.
- Construction of the Cross Hands Economic Link Road will continue – derived from the transformational project at the Cross Hands Growth Zone, a 3-phased transport project opening up access to key strategic employment sites and the wider Cross Hands area including Penygroes and the Gwendraeth Valley.

- Rural Connectivity – connectivity to the County's market towns and rural conurbations is critical to the lifeblood of Carmarthenshire. Collaboration with Traveline Cymru and other key stakeholders will ensure the continuation of Bwcabus – the Transportation Model for Rural Wales in Carmarthenshire providing access into neighbouring Powys and Ceredigion. The Bwcabus service enables people to travel between local towns and villages within the Bwcabus zone or connect to the main line bus services to travel further afield to places such as Aberaeron, Aberystwyth, Cardigan and Carmarthen.

- Carmarthenshire County Council are collaborating with the other three Local Authorities in the region to deliver what is being termed as the South West Wales METRO. The South West Wales METRO is a set of multi modal infrastructure and service enhancements to improve transport provision and integration across the region, facilitating a shift to sustainable modes of travel. Through implementation of the South West Wales METRO, it is intended new developments will be required to contribute towards the scheme, increasing inward investment into Carmarthenshire.

  In order to assist in assessing and quantifying the impacts of new proposed developments and wider schemes (inclusive of the South West Wales METRO), a new regional multi-modal transport model is being developed by Transport for Wales for the south-west Wales region, which will also assist in identifying transport improvements necessary to facilitate / unlock future development.

Table 1.3 – Progress on Measures to Improve Air Quality

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
	CARMARTHEN High Priority										
C1	Improve cycle routes in and around the town.	Provide alternative to car journey	County Council	2018	2018 - 2022	Usage of cycle routes by counter	0.1%	Safer routes in Communities (Johnstown)	Cycle routes advertised on website. First section of Tywi Valley Cycle path opened	TBC	Impossible to identify reduction in emissions
C3	Improve car parking issues at Glangwili Hospital.	Reduce congestion on and around the site	Local Health Board / County Council	2017	2018	Reduced congestion / traffic counts	1%	Cycle space compound, Additional parking spaces and promotes use of park and ride scheme	Car park Management contract started Sept 2018, APNR enforcement started August 2019.	TBC	Impossible to identify reduction in emissions
C6	Review the Park & Ride provision for the town.	Improve service and increase uptake	County Council / Partners	2019-2020	2020 - 2022	Usage data / monitoring data	0.5%	Timings of P&R reviewed and improved to support hospital staff	Staff uptake of park and ride increased.		
C7	Introduce a 20mph speed limit in the town (possibly part time)	Reduce emissions, improve road safety, less congestion, encourage walking, improve health	County Council	2018	2018 - 2019	Monitoring data	1%	20mph zones introduced around schools and shopping areas	Ongoing,	?	Too early to identify reduction in emissions

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
C 13	Review pedestrianisation across town and extend it.	Improve where possible and reduce emissions	County Council	2016	2020 -	Area coverage	?	Consultation carried out for King Street	Consideration to part time pedestrianisation of shopping areas	?	
	Medium -High Priority										
C2	Promote use of Carmarthen by-pass through media resources.	Reduce number of vehicles travelling through town unnecessarily	County Council	2019	TBC	Traffic counts	0.5%	None	None	TBC	
C4	Install AQMA signage (suggest alternative routes?).	Reduce number of vehicles travelling through AQMA unnecessarily	County Council / SWTRA / WG	2019	TBC	Traffic counts	1%	None	None	?	Improvements may be identified through monitoring results
C5	Assess positive / negative impacts of Western Link once opened.	Reduce congestion, improve traffic flow, reduce emissions	County Council	2018	2019	Traffic counts / monitoring data	3%	Western Link construction completed	Western Link Road opened March 2019	2020	
	Medium Priority										

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
C8	Promote more car sharing / dedicated car parks (involve supermarkets?)	Reduced vehicles trips	County Council / Partners	2018	2019	Use of car sharing spaces?	0.1%	Promotion of car share website. Dedicated parking through planning.	Travel Plans have been introduced in schools. A lift sharing app for parents is being developed.	?	Impossible to identify reduction in emissions
C 11	Investigate bike hire scheme for the town.	Reduced vehicle trips	County Council / Partners	2018-2019	2020	Uptake of bike hire	0.1%	Bike Hire in Carmarthen Park	Investigating additional options	?	Impossible to identify reduction in emissions
	Medium-Low Priority										
C 10	Introduce electric/low emission buses, and introduce smaller buses at off-peak times.	Emissions reduction	County Council / Bus Operators	2019	TBC	Change in bus fleet	1%	Unsuccessful application for electric bus bid for the park and Ride scheme.	None	On going	Difficult to identify reduction in emissions
C9	Johnstown bridge scheme feasibility study.	Reduce traffic congestion and emissions on Llansteffan Road, and relieve congestion on connecting routes	County Council / SWTRA / WG	2019	2020	Traffic counts / monitoring data	2%	Scheme planned to improve traffic flows on Llansteffan Rd.	Consideration to slip road improvements	2021	
	LLANELLI High Priority										

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
L1	Assess traffic light sequencing for Thomas Street/Gelli Onn junction.	Reduced / displaced congestion	County Council	2017	2019	Traffic counts / monitoring data	5%	Monitoring in place to help inform source apportionment	Real-time indicative monitoring project in collaboration with Swansea University	?	This project forms part of a wider collaboration with Swansea University on Action Planning interventions
L5	Introduce a 20mph speed limit in the town (possibly part time)	Reduce emissions, improve road safety, less congestion, encourage walking, improve health	County Council	2018	2019 - 2020	Monitoring data	1%	Safe routes in Communities Fund -20mph zones introduced around schools and some others areas	Additional zones in place Part of 3 year project	2021	Too early to identify reduction in emissions
L9	Improve footpath / cycle route connectivity for the Sandy Road area.	Provide alternative to car journey	County Council	2018	2019 - 2021	Usage of cycle routes by counter	0.1%	Local Transport Fund/Active Travel Fund.	Plans designed, improvements made and ongoing	2021	Impossible to identify reduction in emissions
L10	Determine impacts / opportunities from the Graig College development.	Traffic flow, congestion, pollution	County Council / Graig Campus	2019	2020	Changes in traffic flow, congestion	?	Planning reviewed	Planned as part of a traffic modelling study for the Town	2021	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
L11	Determine opportunities from the Wellbeing Village development.	Sustainable travel, travel plan, EV charging etc.	County Council / Partners	2018	2019	Implementation of alternative travel options	?	Use of policy guidance to reduce pollution impact from development	Outline Planning consent granted, signage strategy conditioned.	2023	
	Medium-HIgh Priority										
L3	Install AQMA signage (suggest alternative routes?).	Reduce number of vehicles travelling through AQMA unnecessarily	County Council / SWTRA / WG	2018-19	2020	Traffic counts	1%	None	Explored signage options	2022	Improvements may be identified through monitoring results
L4	Promote use of Coast road through media resources.	Reduce number of vehicles travelling through town unnecessarily	County Council	2018 - 2019	2020 - 22	Traffic counts	0.5%	None	Signage Strategy planned as part of Traffic modelling study for the Town	2023	
L6	Review the Park & Ride provision for the town.	Improve service and increase uptake	County Council / Partners	2019	2020 - 21	Usage data / monitoring data	0.5%	P&R currently operated for Parc Y Scarlets match days	Investigating options, No current demand, currently low-cost parking available within AQMA	TBC	Impossible to identify reduction in emissions
L8	Feasibility study for a by-pass for Sandy Road.	Reduce congestion	County Council	2018	2020 - 2021	N/A	2%	Under consideration	Options under consideration	None	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
L16	Assess parking in and around Pentip School.	Reduce congestion, improve road safety	County Council	2018	2019	Options to promote active travel	0.5%	Limited parking for permit holders only	Improvements to footways and waiting shelter	2021	
L17	Feasibility study for weight and speed restrictions on Pembrey Road.	Reduce emissions, improve road safety	County Council	2019	TBC	Monitoring results	0.5%	Monitoring started in conjunction with school project	Limited alternative routes	TBC	
L18	Feasibility study for creating a roundabout at Felinfoel/Thomas Street/Old Road junction.	Improve traffic flow and reduce emissions	County Council	2019 - 2020	2021 - 2022	Monitoring results	0.5%	None	Traffic modelling considered, improvements to bus stop considered	2022	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
L21	Feasibility study for creating a one-way system for Sandy Road with traffic flow from the west only along Sandy Road and traffic flow east using Sandpiper Road off Sandy Roundabout and re-join at Sandy Water Park roundabout.	Reduce congestion, reduce emissions and improve road safety	County Council	2019	2020	Traffic counts and monitoring results	1%	No through traffic currently available on Sandpiper Road.	Traffic modelling study planned for Llanelli Town, (Additional consideration to be given to a bus only link between Sandpiper Rd and Sandy Road)	2021	
	Medium Priority										
L2	Implement traffic survey for Llangennech / Dafen / Thomas Street to establish why that route is used.	Understand driver habit / route choice	County Council	2019	2020	Survey results	0%	None	Traffic Modelling Study to include surveys	2021	Information gathering to help inform other potential interventions

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
L13	Feasibility study of closing the turning junction from Felinfoel Road to Old Road.	Reduce congestion & emissions, improve road safety	County Council	2019	2021	Monitoring results	1 -2%	None	Traffic modelling study considered	?	
L14	Identify and review HGV delivery timings to businesses in and around the town centre.	Reduce congestion and emissions	County Council / Partners	2020	2021	Possibly traffic counts / monitoring results	0.5%	None	Developments within the AQMA conditioned to avoid peak times.	2021	
L19	Feasibility study for creating a one-way section of Old Road between Thomas Arms and Bowls Club. (Link to L13)	Reduce congestion & emissions, improve road safety	County Council	2019	2020 - 2021	Monitoring results and traffic counts	1%	Traffic counts conducted	Under consideration with proposals to improve to bus stop and junction	2021	
L20	Feasibility study for using Stradey Park Avenue for school start and finish times only.	Reduce congestion on Sandy Road and area.	County Council	2021	TBC	Traffic counts and monitoring results	0.5%	None (Link with L9)	None	?	
	Medium-Low Priority										

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
L15	Review/improve signage to M4 (link to L3), identify preferred routes through town.	Reduce congestion	County Council / SWTRA / WG	2019	2020	Traffic counts	?	None	Signage Strategy planned	2022	
	GENERAL ACTIONS FOR CARMARTHEN & LLANELLI										
A	Feasibility study for Low Emission Zones.	Reduce emissions	County Council / SWTRA	2022	?	Monitoring results	?	None	WG Clean Air Plan has proposal for all new cars and LGV's in public sector to be ULE by 2025	?	
B	Feasibility study for Congestion Zones.	Improve traffic flow, reduce emissions	County Council	2022	?	Monitoring results	?	None	None	?	
C	Introduce Taxi Idling Ban.	Reduce emissions	County Council	2021	?	?	?	No areas identified as a problem	None	?	
D	Implement Idling Ban outside of schools etc.	Reduce emissions	County Council	2019	2020 - 2021	Monitoring results	?	Enquiries being made (suggested as an All-Wales approach through WG Consultation)	Liaison with Schools WG looking to strengthen powers under Clean Air Act	?	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
E	Introduce Supplementary Planning Guidance (e.g. provision of EV Charging points (– what criteria?).	Emissions reduction	County Council	2019	2020 - 2021	Number of EV charging points	?	None	26 additional charging points in 24 carparks installed across County. Electric vehicle Strategy under consideration, paused pending WG's release	?	
F	Engagement with SAT NAV providers to highlight AQMA's	Emissions reduction and improve congestion	County Council / WG	2016	WG included in Consultation document		?	Working with WG / WAQF	Introduced in WG AQ policy	?	Reducing traffic speed in built up areas may help Sat Nav's recognise alternative routes as fastest route
G	Feasibility study for messaging system that alerts of road works that may increase pollution levels over short periods.	Health Protection at very local level	County Council / Partners	2019	?	Number of users on system	?	None	Investigating options	?	
I	Feasibility study for shared use footpaths. (with markings?)	Increase uptake of alternative travel	County Council	2018	2020	?	?	Sustainable Transport Fund (£1.7m)	Funding secured for design. Bid submitted for funding the construction.	2022	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
J	Advertise cycle paths.	Alternative transport	County Council	On going	Already being done	Cycle path counters	?	Cycle routes advertised on internet. Funding secured promote further.	Cycle routes advertised on internet and discovercarmarthenshire.com Improvements to be made as additional new paths created	?	Impossible to identify reduction in emissions.
K	Advertise offices that have facilities for cyclists. (Increase number of offices/buildings providing cycle safe storage)	Encourage staff to use alternative transport	County Council	2019	2020	Use of facilities / Uptake of Cycle to work scheme	?	None	Pool bicycles available to Council staff in Carmarthen Cycle parking facilities at staff offices under review	2021	
L	Produce and distribute car stickers with messages (e.g. – turn engine off when parked/idling, slow down, consider air quality, stay back from car in front).	Public Information	County Council	2021	?	?	?		Social media messages as parts of National Clean Air Days	?	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
M	Check tourist route maps / websites for advised routes (avoid AQMA's where relevant)	Appropriate travel routes used	County Council / SWTRA	2022	?	?	?	None	None	?	
N	Review & improve timings of bin collections & road sweeping	Improve congestion	County Council	2022	?	?	?	None	WG Clean Air Plan has proposal for all HGV's in public sector to be ULE by 2030, so focus may be redirected here.	?	
O	Feasibility study of making towns and villages vehicle free.	Reduce emissions	County Council	2022	?	Monitoring	?	None	Clean Air Zone Framework to be published by WG Spring 2021	?	
P	Establish communications network with haulage contractors to improve service delivery.	Reduce emissions	County Council / Partners	? (Link with G)	?	?	?	None	None	?	
Q	Assess reward scheme for people who rarely use cars or for those that walk/cycle frequently.	Reduce emissions	County Council	2019	2019	Uptake	?	None	2019 cycle to work day competition (Opportunities to reward staff for participating in active travel days/ Air Campaigns)	ongoing	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
R	Facilitate retrofitting buses / coaches to gas fuel.	Reduce emissions	County Council / Partners	2021	?	Uptake	?	None	Clean Air plan target for all buses to have zero exhaust emissions by 2028	?	
S	Diesel engine vehicle ban.	Reduce emissions	County Council / Partners	?	?	?	?	None	Government proposals to phase out sales of Diesel and Petrol cars and vans by 2040.	?	
T	Enhance walking routes.	Alternative travel	County Council	2017	On-going	Path counters	?	Various routes introduced	Improvements to footpaths planned for Llanelli. Pedestrianised routes improved, introduced through planning development	?	
U	Improve access to M4 through Llangennech area.	Reduce congestion and emissions	County Council / SWTRA / WG	When started	2018	?	?	Funding allocated by WG	Partnership working to improve junction 48 Case made to link with Rail improvements, active travel routes, park and ride or park and share options	?	
V	Introduce green infrastructure or urban planting schemes. (possibly through Planning)	Emissions reduction	County Council / Partners	On going	?	Number of schemes / Sec. 106 schemes	?	Included through planning developments	Consideration to developing a Green Infrastructure strategy	?	Co-benefits of GI - reducing pollution levels and improving Health and Wellbeing

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
W	Discuss with WG barriers / opportunities to transfer road freight from ferries to rail freight.	Emissions reduction	County Council / WG	2021	?	?	?	None	Increasing rail freight options considered within study to reduce traffic to M4 and rail network improvements	?	
X	Liaise with 'Car Club' facilitators for opportunities to introduce across the County.	Emissions reduction	County Council / Partners	2018	2019	Uptake of Lift sharing	?	No car clubs currently operate in Carmarthenshire	Considering options. DolenTeifi community have 9 EV minibuses 4 EV's and 2 and MPV's available for the community to hire.	?	
Y	Feasibility study of bike hire schemes.	Emissions reduction / alternative travel	County Council / Partners	2019	2020 - 21	Uptake	?	Currently available in Carmarthen Park and Pembrey Country Park	Brompton electric bike hire docking stations ordered for Llanelli train station, Carmarthen Bus station and Pembrey Burry Port multimodal interchange	2021	
	LLANDEILO Phase 1										

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
3a	Assess and reduce parking provision along Bridge Street if possible. [Gerwyn's Fruit & Veg]	Improve congestion	WG / SWTRA	2015	2017	Monitoring data	2-4%	Assessed within first year review, no action possible at this time.	WG Transport Study considering option	2017	Link with 3d
3b	Assess and reduce parking provision along Rhosmaen Street if possible. [St Teilo's Church].	Improve congestion	WG / SWTRA	2015	2017	Monitoring data	2-4%	Traffic Orders issued in March 2017 Traffic Enforcement ongoing	WG Transport Study considering option	2017	
3c	Assess and reduce parking provision along Rhosmaen Street if possible. [Cawdor Hotel].	Improve congestion	WG / SWTRA	2015	2017	Monitoring data	6-10%	Assessed within first year review, removal of loading only bays would result in parking on the carriageway	None	2017	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
3d	Assess and reduce parking provision along Rhosmaen Street if possible. [Opposite Principality Building Society].	Improve congestion	WG / SWTRA	2015	2017	Monitoring data	2-4%	Traffic Order issued March 2017	Traffic Enforcement ongoing		
C2	Review parking provision in town with respect to removing residents parking during the day to allow shared use thereby alleviating the need to park on Rhosmaen Street and supplementing Crescent Road car park.	Improve congestion	WG / SWTRA / CCC	2015	2017	Monitoring data	?	Traffic orders issued providing shared used of spaces, Coaches now drop off in Crescent Road carpark rather than Rhosmaen Street	Traffic Enforcement ongoing		

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
C3	Assess parking charges in the town to determine any benefits from reduction or removal of charges particularly to encourage more appropriate parking.	Improve congestion	CCC	2015	2017	Use of Carpark	?	Review of charges carried out.	Pilot of free parking Monday, Tuesdays and Wednesdays started Oct 2018		Insufficient evidence that it will identify improvement in AQ.
7	Look at possibility of service delivery to rear of business premises rather than along Rhosmaen Street.	Improve traffic flow, reduce emissions	CCC	2015	2016	Monitoring data	6-8%	Survey carried out, 10 out of 14 properties benefit and use rear access for deliveries	None	2016	

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
8	Promote cycling and walking to school more. Provide incentives such as free cycle helmets if children cycle to school more than 75 times in a year.	Emissions reduction / alternative travel	CCC	2015	2017	Monitoring data	?	Links with Living Streets and walking to school campaigns promoted.	School Travel plans to encourage sustainable travel Council's Cycling Strategy 2018		
9	Promote car sharing to work/school. Website has been set up for the rural heartland north of Llandeilo for people commuting to Swansea / Llanelli / Carmarthen etc.	Emissions reduction / alternative travel	CCC	2015	2017	Uptake of car sharing	?	Share Cymru promoted on Council website	Increase in use of Llandeilo Train station		

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
11	Improve parking issues on the street with additional or more frequent enforcement.	Improve traffic flow, reduce emissions	CCC	2015	2017	Monitoring data	4-6%	Traffic orders issued March 2017	Enforcement ongoing		
20	Identify if bus stops along the street can be improved to allow free flow of traffic.	Improve traffic flow, reduce emissions	CCC with WG / SWTRA	2015	2017	Monitoring data	?	Assessed in first year review, no other suitable locations for main bus route, however coaches now drop off in Crescent Road carpark	None	2017	
21	Publicise alternative routes (possibly through haulage associations) to destinations north of Llandeilo so that vehicles can avoid the town.	Reduce number of vehicles travelling through AQMA unnecessarily	CCC with WG / SWTRA	2015	Once other routes available	Monitoring data / Traffic Counts	3-6%	No alternative routes available	Proposals for alternative routes under consideration in Llandeilo and Ffairfach Transport Study		Link with actions C1 and C4

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
22	Identify peak use of the road e.g. school run, mart days and markets – then target improvements / restrictions / alternative routes during these times.	Improve traffic flow, reduce emissions	CCC with WG / SWTRA	2015	2017	Monitoring data	?	Assessed in second year review	None	2017	
C4	Assess feasibility of a six month trial of HGV diversion away from town (except for deliveries).	Reduce traffic congestion emissions	CCC with WG / SWTRA	2015	2017	Traffic Count monitoring data	3-6%	Discussions with Welsh Government and SWTRA	WG Transport Study considering option Under consideration require re-routing		Link with C1 and 3d

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
C1	Assess the feasibility of implementing a 15t weight limit on bridge below Bridge Street to ensure that larger vehicles were diverted away from the town.	Reduce traffic, congestion and emissions	WG / SWTRA	2015	2017	Traffic Count monitoring data	3-6%	Discussions with Welsh Government and SWTRA	Under consideration requires re-routing		Link with C4 and 3d
	Phase 2										
5	Improvements to street layout i.e. pedestrian crossing, pavement width improvements.	Reduce traffic Improve pedestrian safety	WG / SWTRA	2018 - 2020	TBC	Monitoring data	8-12%	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		Opportunity for Green Infrastructure if delivered
6	School buses arriving / leaving at definitive staggered times and their routes using the Bethlehem / Llangadog, Llangathen option.	Reduce traffic Improve pedestrian safety	CCC	2018-2020	TBC	Alternative route used monitoring data	2-4%	Ysgol Bro Dinefwr has large catchment area and many coach movements	Under consideration as part of re-routing HGV's		

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
	Phase 3										
16	Encourage a park and ride scheme.	Reduce traffic and emissions	CCC	2018-2020	TBC	Introduction of a scheme	?	Train option from Ffairfach to Llandeilo,	None		
	Phase 4										
1	Diversion of HGV's to other routes and/or their restriction to certain hours through the town e.g. to avoid commuting and school run.	Reduce number of vehicles travelling through AQMA unnecessarily	WG / SWTRA	2018-2020	TBC	Traffic Count monitoring data	8-12%	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		
2	One-way system with vehicles diverted around King Street.	Improve traffic flow, reduce emissions	WG / SWTRA with CCC	2018-2020	TBC	Traffic Count monitoring data	10-17%	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		
4	Traffic light system at peak times to reduce the fumes problem at pinch points in the centre of town.	Reduce congestion and emissions	SWTRA	2018-2020	TBC	Monitoring data	?	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
12	Implementation of traffic lights either end of Rhosmaen Street to regulate single stream of traffic thereby improving free flow.	Reduce congestion and emissions	WG / SWTRA	2018-2020	TBC	Monitoring data	?	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		
17	Build a by-pass.	Reduce number of vehicles travelling through AQMA unnecessarily	WG	2018-2020	**TBC**	Traffic Count monitoring data	40%	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		
18	Close Rhosmaen Street to traffic (except deliveries).	Reduce number of vehicles travelling through AQMA unnecessarily	WG / SWTRA with CCC	2018-2020	TBC	Traffic Count monitoring data	50%	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		
19	Remove parking bays and loading bays	Improve traffic flow, reduce emissions	WG / SWTRA	2018-2020	TBC	Monitoring data	?	Under consideration	Included as option for the Llandeilo and Ffairfach Transport study		Link with action 5 under phase 2

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
23	Variable diversion within set NO_2 limits (using continuous monitoring equipment.	Reduce emissions	WG / SWTRA with CCC	2020	TBC	Monitoring data	?	Still to be considered	Sensor equipment explored		

Table 1.4 – Action Plan Measures Not Pursued and the Reasons for that Decision

The following measures have been removed from Table 1.3 and the action plans after further consideration by the Action Plan Steering group.

Action category	Action description	Reason action is not being pursued
Traffic Management	L7 - Feasibility study for re-opening Bridge Street.	Closing Bridge Street has reduced emissions near relevant receptors where previously they exceeded the national objective. Re-opening would likely raise emission levels in this area and would therefore counteract the purpose of this action plan. It is not perceived that outcome of reducing levels of NO_2 would be achieved through this action.
Traffic Management	C12 – Assess use of 'dummy' speed bumps painted on roads	The economical effectiveness of using dummy bumps over real bumps has been assessed. In the short- term dummy bumps may slow traffic but it's considered ineffective in the longer term, once drivers recognise them. Where a reduction in speed is necessary for road safety reasons, it is considered more economically effective to use real bumps in conjunction with 20mph limits to prevent sever braking and hard acceleration. This method is considered more effective for areas near schools.
Traffic Management	General (H) - Introduce dummy speed cameras to aid traffic calming. (Possibly part time live on rotational basis?)	For the same reasons as dummy bumps above, it is considered ineffective the longer period. Efforts are instead being made to reduce speed limits around schools and sopping areas for safer communities. Mobile working cameras can also be deployed in areas where there are continuing concerns about speeding.
Reduced vehicle Trips	C14 - Assess extended use of the Tesco Shoppers bus.	Attempts have been made with Tesco to identify scope for extending the service and uptake has not been forthcoming. There is an added risk that continuing the service during peak times could lead to congestion and longer waiting times by a diesel bus within the AQMA area, which could increase emissions.
Policy Guidance and Development Control	L12 - Assess potential impact from the development of Parc Howard, Llanelli	This option has been removed because the planning application to which this related was withdrawn

2. Air Quality Monitoring Data and Comparison with Air Quality Objectives

2.1 Summary of Monitoring Undertaken in 2019

2.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how results compare with the objectives.

Carmarthenshire County Council has no automatic (continuous) monitoring sites within its administrative area.

2.1.2 Non-Automatic Monitoring Sites

Carmarthenshire County Council undertook non- automatic (passive) monitoring of NO_2 at 93 sites during 2019. Table 2.1 presents the details of the sites.

Details of screening exercises

One new site was set up within Llanelli AQMA boundary in 2018; DAL/28 – Pentip School which was set up as a screening exercise to monitor exposure from the roadside adjacent to the school. This exercise started late 2018 and only captured 2 months of data and therefore the annual results could not be determined. Nonetheless, the exercise continued into 2019 and was located with an AQMesh automatic analyser until August 2019. The results and further details about the exercise can be found in Appendix G.

Three new diffusion tube sites were set up in Llangennech, Llanelli, a village that lies some distance away from the Llanelli AQMA boundary. Nonetheless, the main road travelling though the village is quite narrow in parts with several terraced properties, and the restricted space on the road creates difficulties for two-way traffic to pass at the same time which can result in congestion during peak times. The 9-month exercise was set up to monitor roadside emissions on Bridge Street (LLG3) and Afon Road (LLG2), along with Llangennech School (LLG1), to monitor any impact from school related traffic. No exceedances of the Air Quality Objective were observed as all three sites reported a concentration level below 19µg/m^3. The tube site at the school has been removed but it was considered appropriate to continue to monitor at two sites on the main road, to monitor any changes that may arise from future developments.

Four new sites were set up in Margaret Street, Ammanford, MAMM/1, MAMM/2, MAMM/3 & MAMM/4 in July 2019 to monitor any impact form school related traffic over a 6-month period. No exceedances of the Air Quality Objective were observed, and all four monitoring sites have been removed for 2020.

Six new sites referenced YGL1, YGL2, YGL3, YG4, YGL5 and YGL6 were set up in and around Llandeilo Primary School as part of a project to monitor NO_2 levels in and around the school gates. This area is located within the Llandeilo AQMA boundary in Rhosmaen Street. The project enabled us to observe the levels of exposure in the school yard arising from the A483 Trunk Road, along with the side access road and carpark too.

Monitoring continued alongside the proposed Economic Link Road in Cross Hands (Carm/ELR 14, 15, 16 18, 19 & 20) and three within the SSSI (Carm/ELR6, 7 & 8) located alongside. Carm/ELR 14, 15, and 18 had to be removed because they were located alongside the new link road and were in the way of its construction. This screening exercise will enable us to monitor the current levels of NO_2, monitor any impacts during construction and assess the impact the economic link will make following its completion in 2020-21.

Further details about these screening exercises and the results can be found in Appendix G.

Maps showing the location of the monitoring sites are provided in Figures 2.1. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C: Air Quality Monitoring Data QA/QC.

Table 2.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
AMMANFORD										
Carm/089	Ammanford - Tir Y Dail Lane (2)	Kerbside	N/A	262804	212204	2.55	N	0.50	1.45	0.95
Carm/064	Ammanford – Wind Street	Roadside	N/A	262936	212285	2.85	N	1.00	3.00	2.00
Carm/090	Ammanford - High St (2)	Roadside	N/A	263028	212324	2.75	N	0	2.95	2.95
LLANELLI										
DAL/14	10 Sandy Road	Roadside/Façade	Llanelli	249701	200598	2.77	N	0	4.92	4.92
DAL/15	33 Sandy Road	Roadside/Façade	Llanelli	249727	200608	2.53	N	0	4.66	4.66
Carm/077	Sandy Rd (2)	Roadside	Llanelli	249606	200638	2.75	N	4.00	5.70	1.70
DAL/22	44 Sandy Road (3)	Roadside/Façade	Llanelli	249610	200632	2.75	N	0	5.55	5.55
DAL/26	123 Sandy Road	Roadside/Façade	Llanelli	249483	200713	2.55	N	0	7.45	7.45
DAL/27	Sandy Road (4)	Roadside	Llanelli	249483	200709	2.90	N	4.20	7.45	3.25
DAL/16	96 Sandy Road	Roadside/Façade	Llanelli	249456	200706	2.68	N	0	5.09	5.09
DAL/17	131 Sandy Road	Roadside/Façade	Llanelli	249463	200724	2.81	N	0	5.30	5.30
Carm/141	Llanelli - 3 Old Road	Roadside/Façade	Llanelli	250649	200786	2.85	N	0	1.50	1.50
DAL/07	nr 13 Felinfoel Road	Kerbside	Llanelli	250717	200818	2.80	N	0.50	1.25	0.75

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
DAL/23	50 Felinfoel Road	Roadside/Façade	Llanelli	250754	200870	2.90	N	0	2.05	2.05
DAL/09	Thomas St (Barnados)	Roadside/Façade	Llanelli	250709	200673	2.77	N	0	2.66	2.66
Carm/104	Thomas St (2)	Roadside/Façade	Llanelli	250719	200689	2.95	N	0	1.70	1.70
DAL/10	Thomas St (Bridal Shop)	Roadside/Façade	Llanelli	250734	200603	2.73	N	0	1.62	1.62
Carm/069	West End	Kerbside	Llanelli	250458	200603	2.80	N	6.00	6.20	0.20
DAL/12	West End (Creative Cakes)	Kerbside	Llanelli	250411	200616	2.81	N	1.65	1.85	0.20
DAL/04	51 Panteg Road	Roadside	N/A	251623	201976	2.8	N	0.32	1.32	1.00
Carm/114	Panteg Road	Roadside	N/A	251665	202013	2.70	N	0.36	1.56	1.20
Carm/113	Swiss Valley	Roadside	N/A	251951	202411	2.85	N	0.40	1.50	1.10
Carm/135	23 Bassett Terrace	Roadside/Façade	Llanelli	248512	200892	2.54	N	0	1.73	1.73
DAC/28	West End, Pentip School	Roadside	Llanelli	250344	200631	2.41	N	0.40	2.80	2.40
CARMARTHEN										
DAC/06	Glenholme Nursery - Richmond Terrace	Kerbside	Carmarthen	241546	220536	2.70	N	2.20	2.97	0.77

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
DAC/13	Carmarthen - 72 Richmond Terrace (2)	Kerbside	Carmarthen	241559	220554	2.73	N	0.30	1.23	0.95
Carm/109	Carmarthen - Richmond Terrace	Kerbside	Carmarthen	241596	220563	2.70	N	0.20	0.83	0.63
DAC/08	Carmarthen - 85 Priory Street (E)	Roadside	Carmarthen	241876	220565	2.70	N	0.44	1.54	1.10
DAC/14	Carmarthen - 50 Priory Street	Roadside	Carmarthen	241932	220583	2.90	N	0.40	1.65	1.25
DAC/15	Carmarthen - Old Oak rdbt (E)	Roadside	Carmarthen	241816	220519	2.90	N	1.50	3.90	2.40
Carm/111	Carmarthen - Church Street	Roadside	Carmarthen	241539	220179	2.96	N	0.73	3.53	2.80
DAC/12	Carmarthen - 24 Spilman Street	Roadside/Façade	Carmarthen	241492	220171	2.75	N	0	3.00	3.00
DAC/04	Carmarthen - Water Street (Probation Office)	Kerbside/Façade	Carmarthen	240931	220144	2.80	N	0	0.90	0.90
Carm/072	Carmarthen - St. Catherine St rdbt	Roadside	Carmarthen	240688	220057	2.75	N	0.25	3.25	3.00
DAC/02	Carmarthen - 15 Park Terrace	Kerbside	Carmarthen	240618	220041	3.00	N	0.40	1.35	0.95

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
DAC/16	Carmarthen - 6 Park Terrace	Roadside/Façade	Carmarthen	240557	220026	2.65	N	0	1.35	1.35
Carm/001	Carmarthen - St. Catherine St	Roadside	Carmarthen	240798	220155	2.75	N	0.25	1.95	1.70
Carm/084	Carmarthen - Water Street	Kerbside	Carmarthen	240831	220272	2.75	N	0.25	1.15	0.90
DAC/05	Carmarthen - 44 Water Street	Roadside/Façade	Carmarthen	240797	220297	2.68	N	0	1.25	1.25
Carm/106	Carmarthen - St Catherine St (A)	Roadside/Façade	Carmarthen	240979	220244	2.85	N	0	1.40	1.40
Carm/134	Carmarthen - 2 College Road	Other/Façade	N/A	240377	220397	3.00	N	0	5.60	5.60
Carm/126	Johnstown - 2 Jobs Well Road	Roadside	N/A	239914	219829	2.75	N	0.80	2.90	2.10
Carm/132	Johnstown - 7 Old St Clears Road	Roadside/Façade	N/A	239865	219745	2.60	N	0	7.00	7.00
Carm/133	Johnstown - 72 Llansteffan Road	Roadside/Façade	N/A	240039	219080	2.44	N	0	9.30	9.30

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
Carm/142	Johnstown Llansteffan Road (2)	Roadside	N/A	240048	219077	2.47	N	8.40	10.65	2.25
Carm/139	Abergwili - Laurels	Other	N/A	242895	221047	2.20	N	3.50	13.50	10.00
Carm/140	Abergwili - Dragons Lair	Other/Façade	N/A	242963	221101	2.28	N	0	12.00	12.00
LLANDEILO										
FA/01	North roundabout (No 8 Rhosmaen St)	Roadside	Llandeilo	263190	223000	2.55	N	1.50	3.10	1.6
DA/15	Rhosmaen Street (No 15) (north)	Roadside/Façade	Llandeilo	263150	222763	2.64	N	0	3.10	3.10
DA/01	Rhosmaen Street (No. 69)	Roadside	Llandeilo	263076	222596	2.70	N	3.00	4.25	1.25
DA/03	Rhosmaen Street (No. 87)	Roadside/Façade	Llandeilo	263021	222503	2.90	N	0	4.35	4.35
Carm/013	Llandeilo - Rhosmaen Street	Kerbside	Llandeilo	263006	222505	2.80	N	2.50	2.90	0.40
DA/05 (A), (B) & (C)	Rhosmaen Street (Evans Butchers)	Roadside/Façade	Llandeilo	262982	222445	2.95	N	0	1.50	1.50

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
DA/07	Rhosmaen Street (Castle Hotel)	Roadside/Façade	Llandeilo	262966	222412	2.85	N	0	1.70	1.70
Carm/083	Llandeilo - Rhosmaen Street (2)	Roadside	Llandeilo	262959	222396	2.75	N	1.00	2.45	1.45
DA/09	Rhosmaen Street (No. 123)	Roadside/Façade	Llandeilo	262951	222375	2.90	N	0	1.20	1.20
DA/10	Rhosmaen Street (No. 133) (Craft Shop)	Kerbside/Façade	Llandeilo	262933	222345	2.90	N	0	0.75	0.75
DA/11	Rhosmaen Street (No. 74) (Style Shop)	Roadside/Façade	Llandeilo	262924	222346	3.00	N	0	1.70	1.70
DA/12	Stryd Y Brenin (Travel House)	Roadside/Façade	Llandeilo	262908	222329	2.85	N	0	0.95	0.95
DA/13	Rhosmaen Street (Park Area)	Kerbside	Llandeilo	262906	222299	2.90	N	4.00	4.85	0.85
DA/14	Rhosmaen Street (Bin post by Bus stop)	Roadside	Llandeilo	262902	222250	2.75	N	3.00	4.15	1.15
DA/16	Bridge Street (N Trust) (south)	Roadside/Façade	Llandeilo	262848	222170	2.59	N	0	2.30	2.30
BURRY PORT										

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
Carm/127	41 New Street, Burry Port	Kerbside	N/A	244999	200840	2.95	N	2.45	2.90	0.45
Carm/128	Lloyds Bank, New Street, Burry Port	Kerbside	N/A	244857	200828	2.90	N	0.50	1.40	0.90
LLANGENNECH										
LLG1	Ysgol Gymraeg Llangennech	Roadside	N/A	256534	202453	2.31	N	20.00	21.7	1.70
LLG2	Llangennech – 28 Afon Road	Roadside	N/A	256144	201792	2.45	N	0.00	2.10	2.10
LLG3	Llangennech – 26 Bridge Street	Roadside	N/A	256050	201600	2.36	N	0.32	2.24	1.92
CROSS HANDS ECONOMIC LINK ROAD										
Carm/ELR1	Cross Hands (2) (N)	Roadside	N/A	256458	213067	2.73	N	6.13	7.67	1.54
Carm/ELR2	Cross Hands (House) (N)	Roadside/Façade	N/A	256465	213085	2.66	N	0	6.00	6.00
Carm/ELR3	Gorslas Sixways	Roadside	N/A	257027	213774	2.58	N	3.45	5.13	1.68
Carm/ELR4	Gorslas Sixways (2)	Roadside/Façade	N/A	257022	213777	2.73	N	0	6.85	6.85
Carm/ELR6	SSSI (B)(5m)	Other	N/A	257550	214505	2.26	N	-	-	-
Carm/ELR7	SSSI (C)(10m)	Other	N/A	257553	214503	2.43	N	-	-	-
Carm/ELR8	SSSI (D)(20m)	Other	N/A	257562	214497	2.3	N	-	-	-
Carm/ELR9	Gate Road (nr No. 81)	Roadside	N/A	257837	214594	2.65	N	3.45	5.27	1.82
Carm/ELR10	Norton Road (nr No. 43)	Roadside	N/A	258269	213646	2.8	N	4.5	6.80	2.30

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
Carm/ELR11	Norton Road (nr ELR jnc DP 24)	Roadside	N/A	257752	213562	2.5	N	4.5	6.25	1.75
Carm/ELR12	Norton Road (nr No. 94)	Kerbside	N/A	257563	213717	2.74	N	1.2	1.80	0.10
Carm/ELR14	ELR (west) (B) (5m)	Other	N/A	257693	214093	2.68	N	-	-	5.00
Carm/ELR15	ELR (west) (C) (10m)	Other	N/A	257683	214091	2.51	N	-	-	10.00
Carm/ELR16	ELR (west) (D) (20m)	Other	N/A	257664	214087	2.56	N	-	-	20.00
Carm/ELR18	ELR (east) (B) (5m)	Other	N/A	257720	214098	2.55	N	-	-	5.00
Carm/ELR19	ELR (east) (C) (10m)	Other	N/A	257730	214100	2.61	N	-	-	10.00
Carm/ELR20	ELR (east) (D) (20m)	Other	N/A	257749	214104	2.68	N	-	-	20.00
Carm/ELR21	Black Lion Road (nr Helyg)	Roadside	N/A	257564	212950	2.55	N	15.1	16.65	1.55
Carm/ELR22	Black Lion Road (nr Gorse Villa)	Roadside	N/A	257666	212864	2.8	N	3.2	5.4	2.2
LLANDEILO PRIMARY SCHOOL										
YGL1	Llandeilo School Flagpole	Roadside	Llandeilo	263138	222781	2.40	N	0	4.6	4.6
YGL2	Llandeilo School Nursery Yard	Other	Llandeilo	263127	222805	2.40	N	0	21.0	21
YGL3	Llandeilo School Main Yard	Other	Llandeilo	263082	222766	2.45	N	0	20.0	20

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
YGL4	Llandeilo School Carpark	Other	Llandeilo	263058	222776	2.40	N	5.5	7.75	2.25
YGL5	2 Heol Garreg Las	Roadside	Llandeilo	263049	222723	2.50	N	3.9	6.66	2.76
YGL6	Forest Garden, Heol Garreg Las	Roadside	Llandeilo	263085	222710	2.40	N	0.75	3.65	2.9
AMMAN VALLEY SCHOOL, AMMANFORD										
MAMM/1	Margaret St, School Busstop	Kerbside	N/A	263050	212531	2.37	N	3.6	3.96	0.36
MAMM/2	Margaret Street, School gates	Roadside	N/A	263088	212541	2.33	N	0.5	2.85	2.35
MAMM/3	25 Margaret Street	Kerbside	N/A	263067	212525	2.30	N	3.3	3.66	0.36
MAMM/4	51/49 Margaret Street	Roadside	N/A	263163	212543	2.52	N	2.8	4.2	1.40

Notes:

(1) 0m indicates that the sited monitor represents exposure and as such **no distance calculation is required**.

Figures 2.1 – Map(s) of Non-Automatic Monitoring Sites

Figure 2.2 - Map of Llandeilo NO_2 Non-Automatic Monitoring Sites

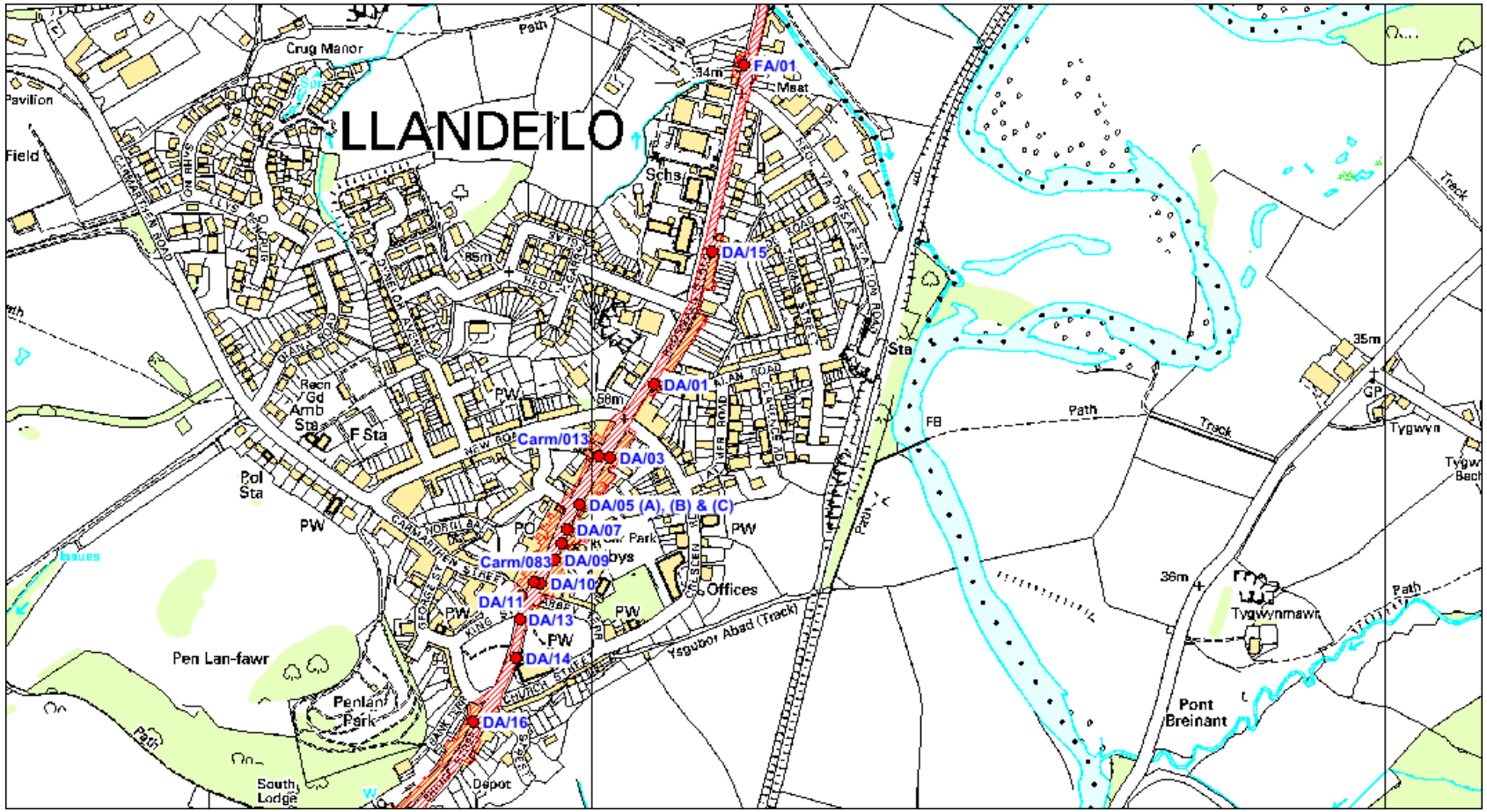


Figure 2.3 - Map of Carmarthen NO_2 Non-Automatic Monitoring Sites

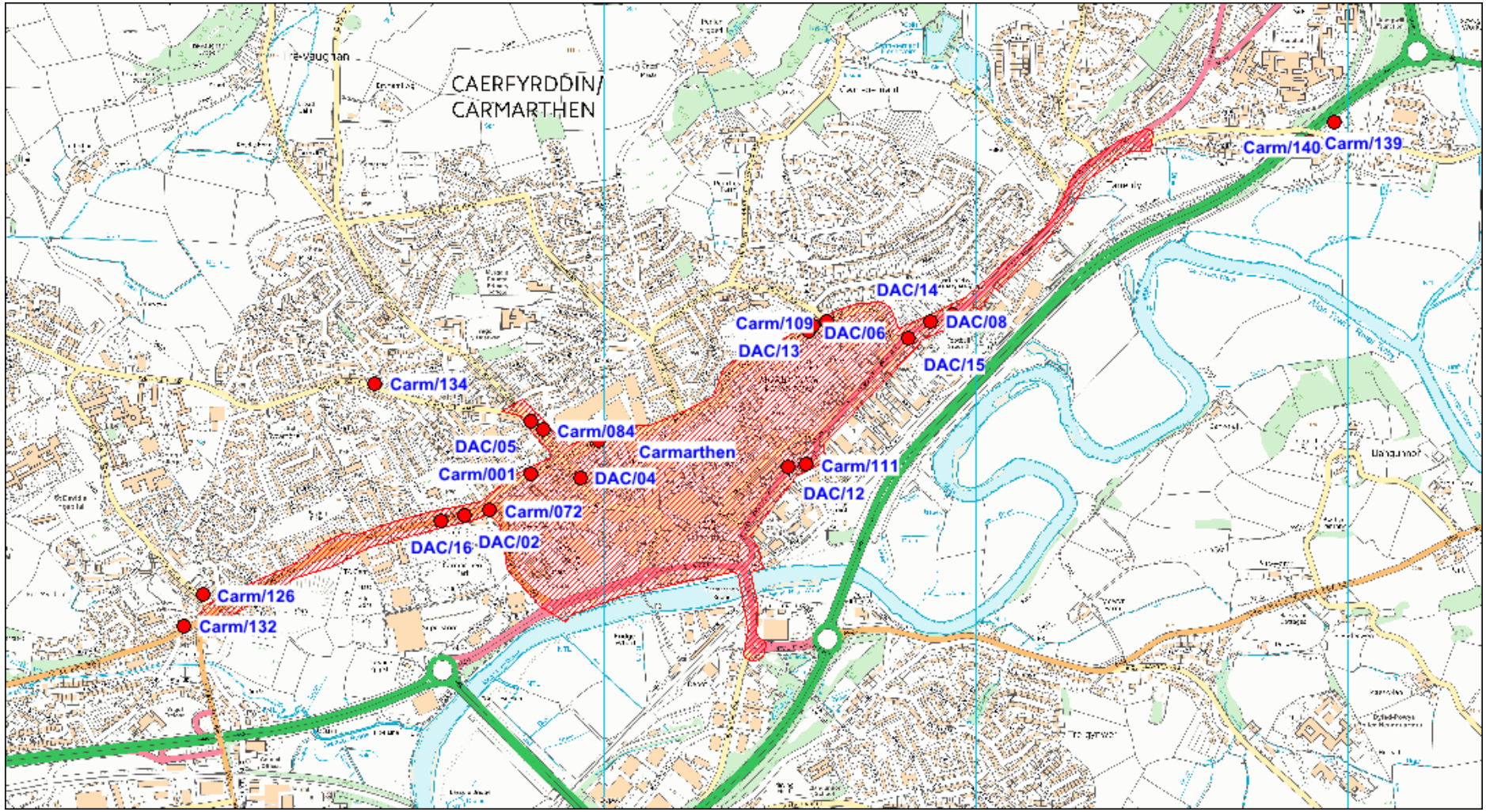


Figure 2.4 - Map of Llanelli NO_2 Non-Automatic Monitoring Sites

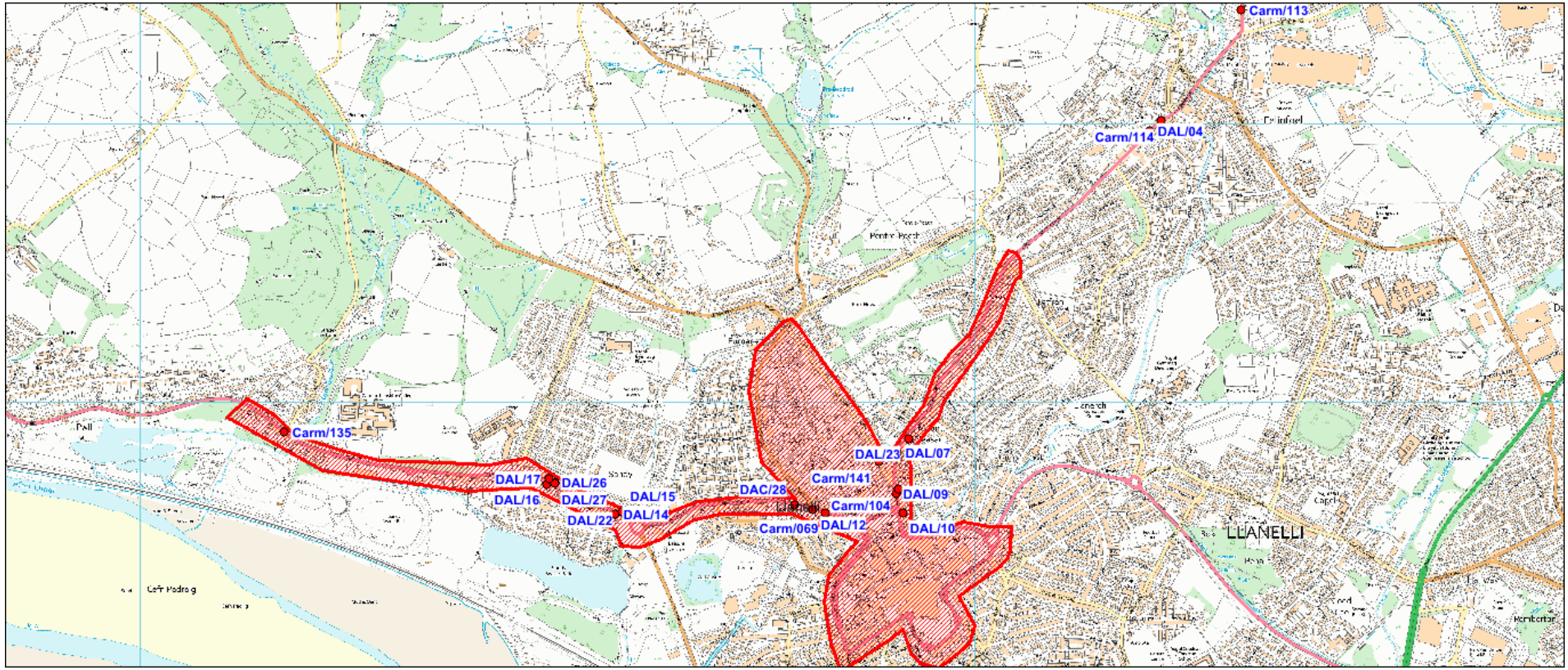


Figure 2.5 - Map of Burry Port NO_2 Non-Automatic Monitoring Sites

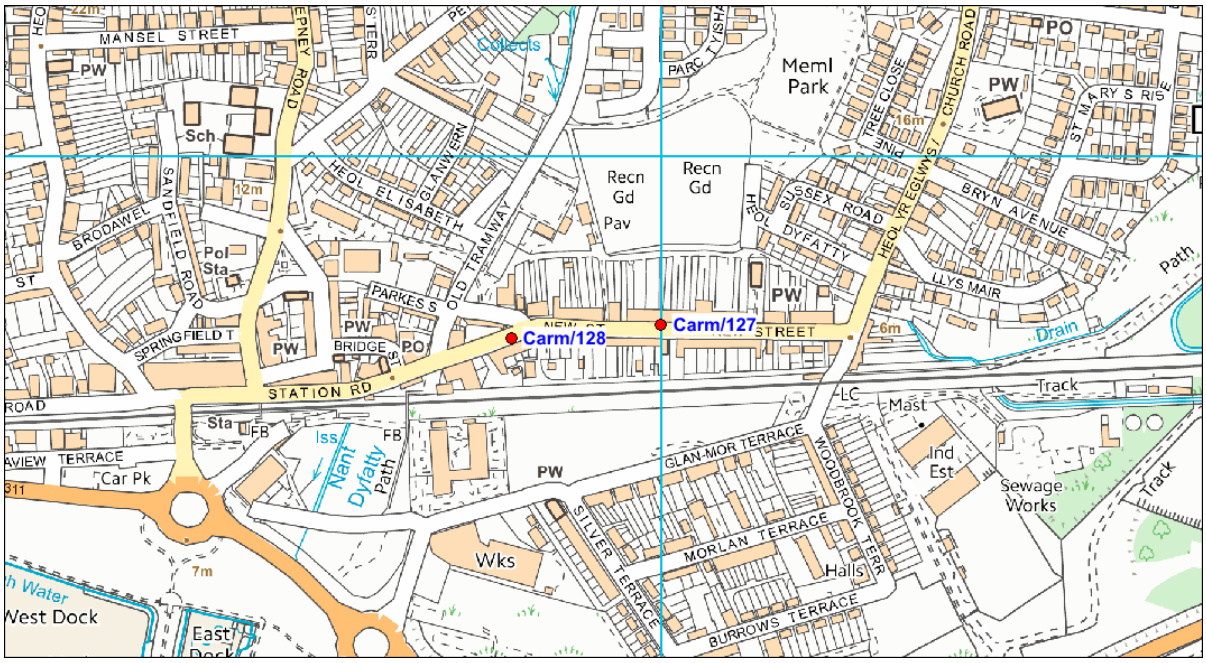


Figure 2.6 - Map of Ammanford NO_2 Non-Automatic Monitoring Sites

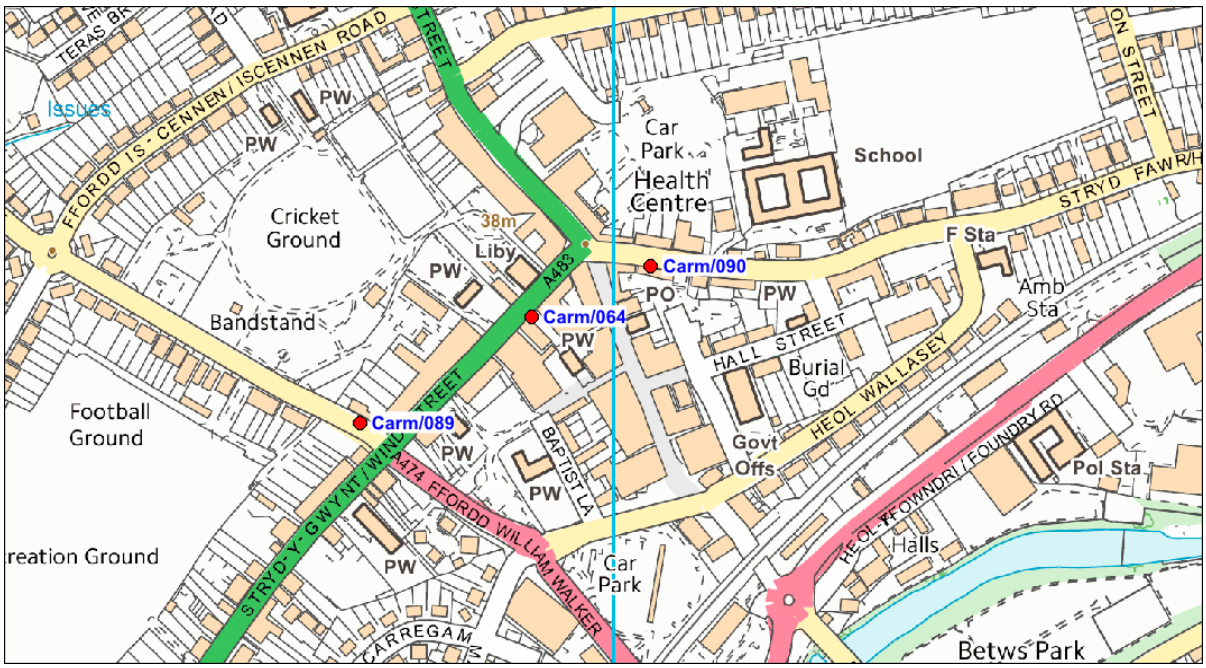


Figure 2.7 - Map of Llangennech, Llanelli NO_2 Non-Automatic Monitoring Sites

Figure 2.8 - Map of Johnstown, Carmarthen NO_2 Non-Automatic Monitoring Sites

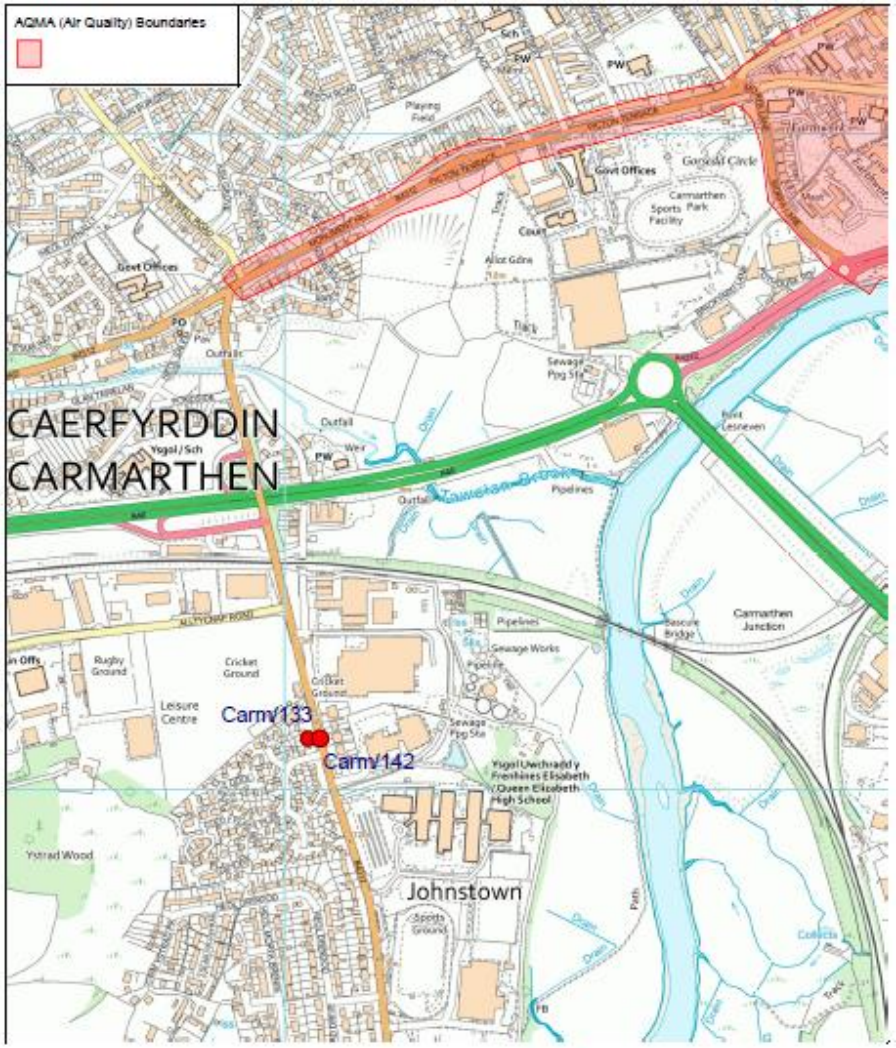
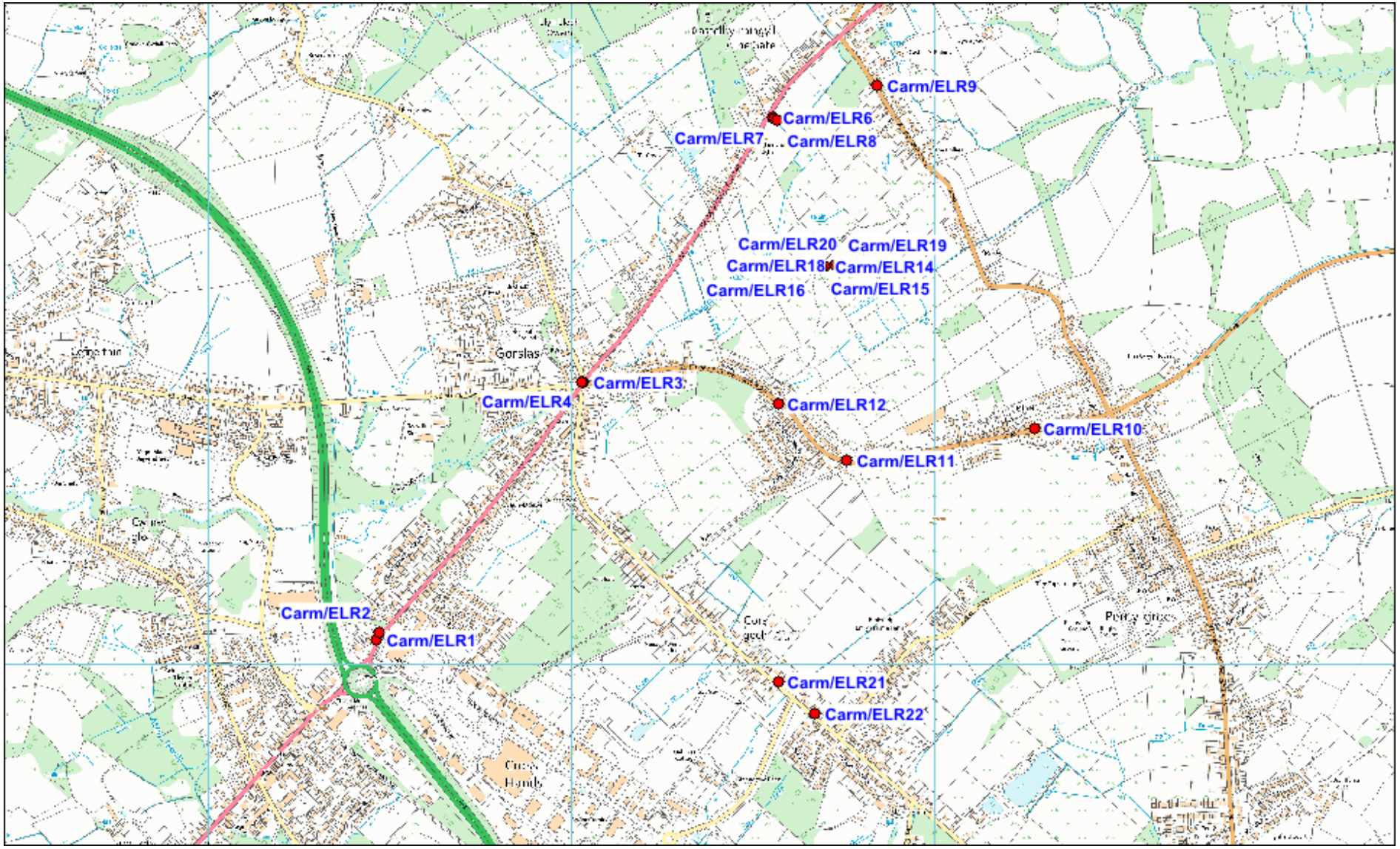


Figure 2.9 - Map of Cross Hands Economic Link Road NO_2 Non-Automatic Monitoring Sites



2.2 2019 Air Quality Monitoring Results

Table 2.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
AMMANFORD									
Carm/089	Kerbside	Diffusion Tube	100	100	22.4	26.2	23.6	23.0	18.6
Carm/064	Roadside	Diffusion Tube	100	100	25.5	25.0	24.8	23.2	21.3
Carm/090	Roadside	Diffusion Tube	100	100	27.9	28.0	27.8	27.0	24.9
LLANELLI									
DAL/14	Roadside/Façade	Diffusion Tube	92	92	26.3	25.5	28.4	25.3	22.8
DAL/15	Roadside/Façade	Diffusion Tube	100	100	20.9	23.0	22.8	21.3	20.2
Carm/077	Roadside	Diffusion Tube	100	100	33.4	38.7	39.8	**41.7**	38.6
DAL/22	Roadside/Façade	Diffusion Tube	100	100	29.5	30.3	32.1	33.9	29.7
DAL/26	Roadside/Façade	Diffusion Tube	100	100	19.5	25.6	22.3	22.8	20.7
DAL/27	Roadside	Diffusion Tube	92	92	22.7	31.3	27.2	26.2	24.3
DAL/16	Roadside/Façade	Diffusion Tube	100	100	20.3	22.3	21.7	22.6	19.8
DAL/17	Roadside/Façade	Diffusion Tube	83	83	19.6	25.0	22.9	22.8	21.6
Carm/141	Roadside/Façade	Diffusion Tube	100	100	-	-	30.1	26.1	24

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
DAL/07	Kerbside	Diffusion Tube	83	83	**44.1**	**46.1**	**47.4**	**44.4**	**41.2**
DAL/23	Roadside/Façade	Diffusion Tube	100	100	22.5	22.7	20.9	22.2	20.1
DAL/09	Roadside/Façade	Diffusion Tube	100	100	**42.8**	**43.4**	**45.5**	38.6	37.6
Carm/104	Roadside/Façade	Diffusion Tube	83	83	34.6	37.2	35.9	36.4	32.7
DAL/10	Roadside/Façade	Diffusion Tube	83	83	35.1	37.1	34.3	33.7	31.6
Carm/069	Kerbside	Diffusion Tube	92	92	36.8	37.2	37.6	35.0	33.2
DAL/12	Kerbside	Diffusion Tube	100	100	26.7	30.0	30.2	27.9	27.4
DAL/28	Roadside	Diffusion Tube	100	100	-	-	-	25.0	20.4
DAL/04	Roadside	Diffusion Tube	92	92	31.3	32.4	31.0	30.4	26.6
Carm/114	Roadside	Diffusion Tube	83	83	34.7	34.9	35.0	32.9	30.8
Carm/113	Roadside	Diffusion Tube	100	100	34.0	35.2	36.8	34.0	31.5
Carm/135	Roadside/Façade	Diffusion Tube	100	100	-	27.6	28.4	25.7	23.6
CARMARTHEN									
DAC/06	Kerbside	Diffusion Tube	100	100	30.6	30.1	30.5	27.0	28.3
DAC/13	Kerbside	Diffusion Tube	92	92	32.6	34.2	33.1	31.1	29.9
Carm/109	Kerbside	Diffusion Tube	100	100	38.1	37.5	35.8	36.9	32.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
DAC/08	Roadside	Diffusion Tube	83	83	**50.5**	**61.9**	**57.0**	**51.2**	**46.9**
DAC/14	Roadside	Diffusion Tube	100	100	36.1	33.4	34.0	32.4	30.8
DAC/15	Roadside	Diffusion Tube	100	100	30.1	29.0	30.3	27.7	25.7
Carm/111	Roadside	Diffusion Tube	100	100	30.7	32.0	32.4	30.3	28.6
DAC/12	Roadside/Façade	Diffusion Tube	100	100	33.7	34.2	34.2	31.5	29.8
DAC/04	Kerbside/Façade	Diffusion Tube	92	92	22.7	24.5	21.6	23.1	21.2
Carm/072	Roadside	Diffusion Tube	100	100	34.4	33.3	30.0	30.0	28.0
DAC/02	Kerbside	Diffusion Tube	83	83	**42.9**	**42.5**	**41.4**	38.3	**40.0**
DAC/16	Roadside/Façade	Diffusion Tube	100	100	36.1	38.7	37.2	37.9	32.8
Carm/001	Roadside	Diffusion Tube	100	100	32.3	33.9	31.9	30.9	27.7
Carm/084	Kerbside	Diffusion Tube	75	75	32.6	34.7	33.1	32.3	27.6
DAC/05	Roadside/Façade	Diffusion Tube	92	92	34.6	32.9	32.9	32.4	31.5
Carm/106	Roadside/Façade	Diffusion Tube	100	100	38.8	38.9	37.8	34.4	33.1
Carm/134	Other/Façade	Diffusion Tube	100	100	-	12.8	12.1	12.5	11.5
Carm/126	Roadside	Diffusion Tube	100	100	22.0	23.8	22.5	22.2	19.6
Carm/132	Roadside/Façade	Diffusion Tube	100	100	-	18.2	17.1	16.8	15.5

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
Carm/133	Roadside/Façade	Diffusion Tube	100	100	-	14.6	13.0	13.6	12.8
Carm/142	Roadside	Diffusion Tube	83	83	-		-	17.1(1)	15.3
Carm/139	Other	Diffusion Tube	100	100	-	-	16.9	16.4	15.0
Carm/140	Other/Façade	Diffusion Tube	100	100	-	-	16.2	14.6	13.8
LLANDEILO									
FA/01	Roadside	Diffusion Tube	100	100	14.0	16.2	15.1	14.9	13.6
DA/15	Roadside/Façade	Diffusion Tube	100	100	24.5	24.4	25.2	22.9	22.0
DA/01	Roadside	Diffusion Tube	92	92	25.2	24.9	24.2	23.5	20.4
DA/03	Roadside/Façade	Diffusion Tube	100	100	26.1	24.9	25.2	23.5	22.1
Carm/013	Kerbside	Diffusion Tube	100	100	35.1	32.2	33.7	30.3	28.6
DA/05 (A), (B) & (C)	Roadside/Façade	Diffusion Tube	100	100	36.6	35.1	34.6	34.6	30.3
DA/07	Roadside/Façade	Diffusion Tube	100	100	**40.3**	**40.1**	38.7	37.9	33.3
Carm/083	Roadside	Diffusion Tube	100	100	**42.6**	**43.6**	39.5	**40.1**	36.8
DA/09	Roadside/Façade	Diffusion Tube	100	100	**43.4**	**45.5**	**42.0**	**40.1** (1)	38.6
DA/10	Kerbside/Façade	Diffusion Tube	92	92	**41.6**	**40.4**	38.9	**41.3**	34.8
DA/11	Roadside/Façade	Diffusion Tube	100	100	39.5	39.4	38.4	35.6	34.1

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
DA/12	Roadside/Façade	Diffusion Tube	92	92	23.9	26.7	30.3	21.2	19.5
DA/13	Kerbside	Diffusion Tube	100	100	36.5	36.0	34.8	33.8	31.7
DA/14	Roadside	Diffusion Tube	92	92	23.3	23.4	22.9	22.2	22.7
DA/16	Roadside/Façade	Diffusion Tube	100	100	36.4	36.2	33.4	31.4	27.1
BURRY PORT									
Carm/127	Kerbside	Diffusion Tube	92	92	12.2	14.8	12.0	12.6	11.6
Carm/128	Kerbside	Diffusion Tube	100	100	15.3	15.6	15.4	14.7	14.0
LLANGENNECH									
LLG1	Roadside	Diffusion Tube	89	67	-	-	-	-	11.0(3)
LLG2	Roadside	Diffusion Tube	100	75	-	-	-	-	18.3
LLG3	Roadside	Diffusion Tube	78	58	-	-	-	-	18.0(3)
CROSS HANDS ECONOMIC LINK ROAD									
Carm/ELR1	Roadside	Diffusion Tube	100	100	-	-	**41.3**	34.3	33.0
Carm/ELR2	Roadside/Façade	Diffusion Tube	100	100	-	-	23.3	22.4	20.3
Carm/ELR3	Roadside	Diffusion Tube	67	67	-	-	19.1	17.3	16.5(3)
Carm/ELR4	Roadside/Façade	Diffusion Tube	100	100	-	-	15.7	15.0	14.0
Carm/ELR6	Other	Diffusion Tube	83	83	-	-	-	10.2	9.7

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
Carm/ELR7	Other	Diffusion Tube	92	92	-	-	-	8.6	8.5
Carm/ELR8	Other	Diffusion Tube	92	92	-	-	-	8.2	7.0
Carm/ELR9	Roadside	Diffusion Tube	100	100	-	-	8.2	7.7	7.2
Carm/ELR10	Roadside	Diffusion Tube	33	33	-	-	13.3	12.6(1)	12.5(3)
Carm/ELR11	Roadside	Diffusion Tube	100	100	-	-	10.9	9.6	9.8
Carm/ELR12	Kerbside	Diffusion Tube	83	83	-	-	14.1	12.2	12.2
Carm/ELR14	Other	Diffusion Tube	N/A	N/A	-	-	-	7.9	-
Carm/ELR15	Other	Diffusion Tube	N/A	N/A	-	-	-	8.6	-
Carm/ELR16	Other	Diffusion Tube	92	92	-	-	-	6.9	5.6
Carm/ELR18	Other	Diffusion Tube	N/A	N/A	-	-	-	6.6(1)	-
Carm/ELR19	Other	Diffusion Tube	100	100	-	-	-	6.5	5.9
Carm/ELR20	Other	Diffusion Tube	100	100	-	-	-	6.2	5.9
Carm/ELR21	Roadside	Diffusion Tube	100	100	-	-	11.3	10.2	9.7
Carm/ELR22	Roadside	Diffusion Tube	92	92	-	-	16.9	15.8	15.2
LLANDEILO PRIMARY SCHOOL									
YGL1	Roadside	Diffusion Tube	100	75	-	-	-	-	16.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
YGL2	Other	Diffusion Tube	89	67	-	-	-	-	7.8(3)
YGL3	Other	Diffusion Tube	100	75	-	-	-	-	6.1
YGL4	Other	Diffusion Tube	78	58	-	-	-	-	6.2(3)
YGL5	Roadside	Diffusion Tube	89	67	-	-	-	-	7.8(3)
YGL6	Roadside	Diffusion Tube	67	50	-	-	-	-	8.9(3)
AMMAN VALLEY SCHOOL, AMMANFORD									
MAMM/1	Kerbside	Diffusion Tube	50	25	-	-	-	-	15.1(3)
MAMM/2	Roadside	Diffusion Tube	100	50	-	-	-	-	12.8(3)
MAMM/3	Kerbside	Diffusion Tube	100	50	-	-	-	-	16.7(3)
MAMM/4	Roadside	Diffusion Tube	100	50	-	-	-	-	16.4(3)

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

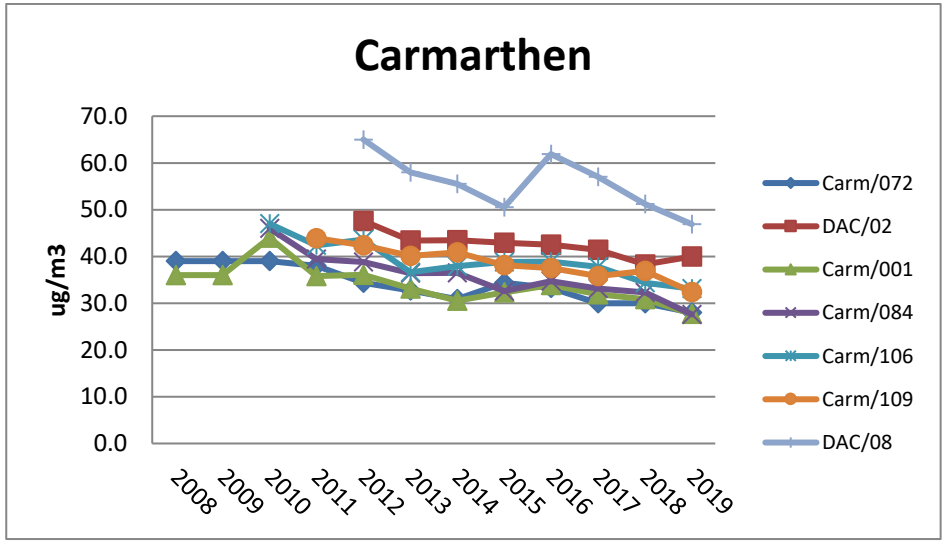
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

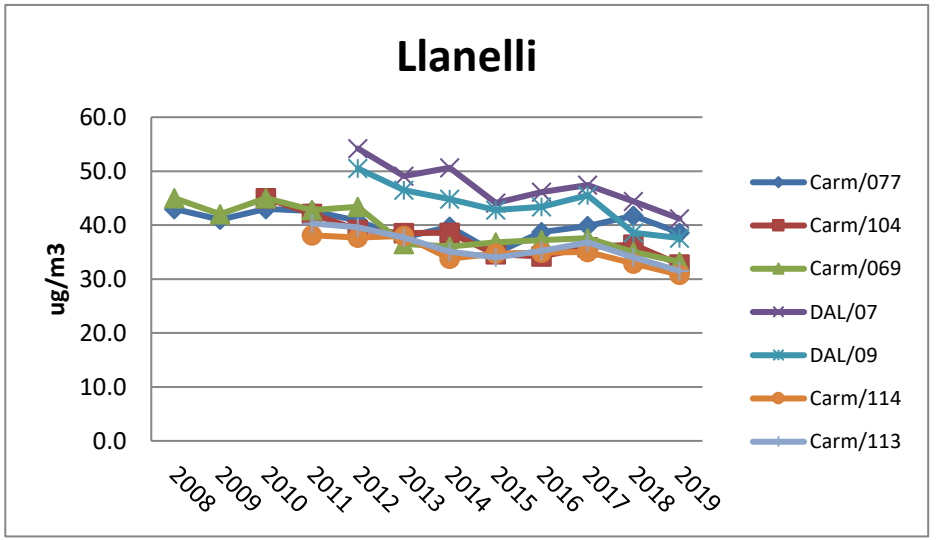
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

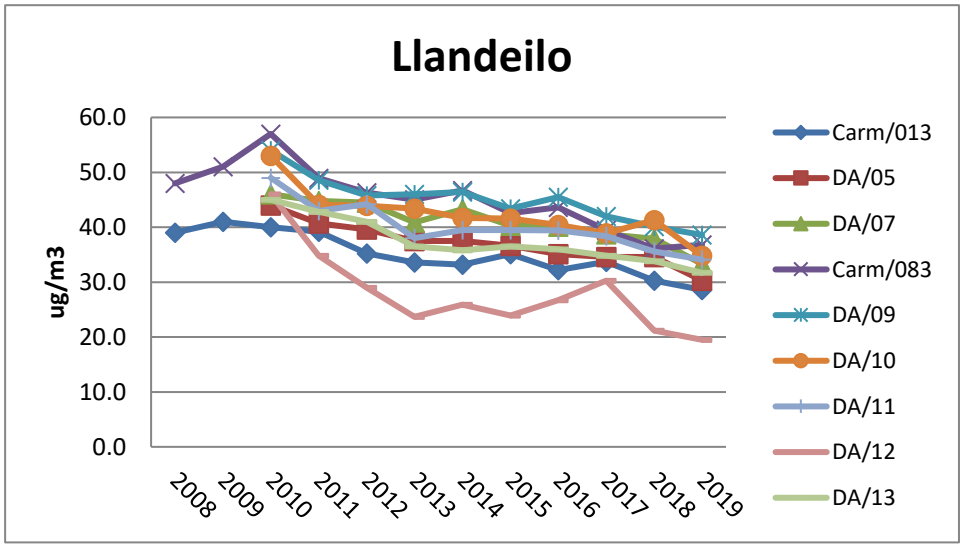
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

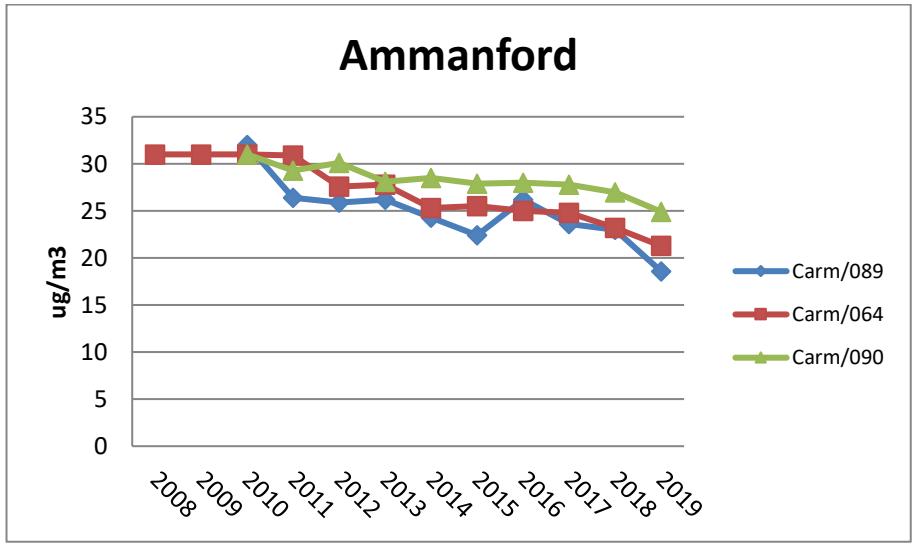
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.10 – Trends in Annual Mean NO_2 Concentrations









2.3 Comparison of 2019 Monitoring Results with Previous Years and the Air Quality Objectives

Monitoring periods and valid data capture

The network of diffusion tube monitoring in Ammanford, Carmarthen, Llanelli, Burry Port, Llandeilo and Cross Hands was set up for the full calendar year, with tube changes coinciding with the recommended exposure periods suggested by the LAQM helpdesk. 29 of these sites experienced missing tubes which lowered the percentage of valid data that was captured for the full calendar year. This is illustrated on Table 2.2 – Annual Mean NO_2 Monitoring Results. Despite this reduction in valid data capture, the bias adjusted annual mean did not require annualisation for 27 of the sites because more than 75% of the full calendar year was captured.

It was however necessary to annualise the results for two of the Cross Hands Economic Link Road sites because data capture for these sites was less than 75%, thin incudes ELR/3 and ELR/10.

Three sites in Llangennech, Llanelli started in March 2019 for a nine-month period, two of these sites LLG1 and LLG3 also suffered from missing tubes which resulted in less than 75% valid data capture and so these results were also annualised.

A monitoring project with Llandeilo school started in March 2019 for nine-month period, and four of the six sites YLG2, YLG4, YLG5 and YLG6 had missing tubes which resulted in less than 75% valid data capture and therefore requiring annualisation.

In July 2019, a six-month screening exercise was set up in Margaret Street, Ammanford with four tube sites MAMM/1, MAMM2, MAMM3 and MAMM/4. All of which need to be annualised, having less than 75% valid data capture for the calendar year. MAMM/1 only captured three months of valid data dues to two missing tubes and one found on the ground during collection, nevertheless this was enough to perform calculate the annualised results.

Further details on the approach taken on annualising this data can be found in Appendix E and the annualised post data bias end result has been used in Table 2.2 above.

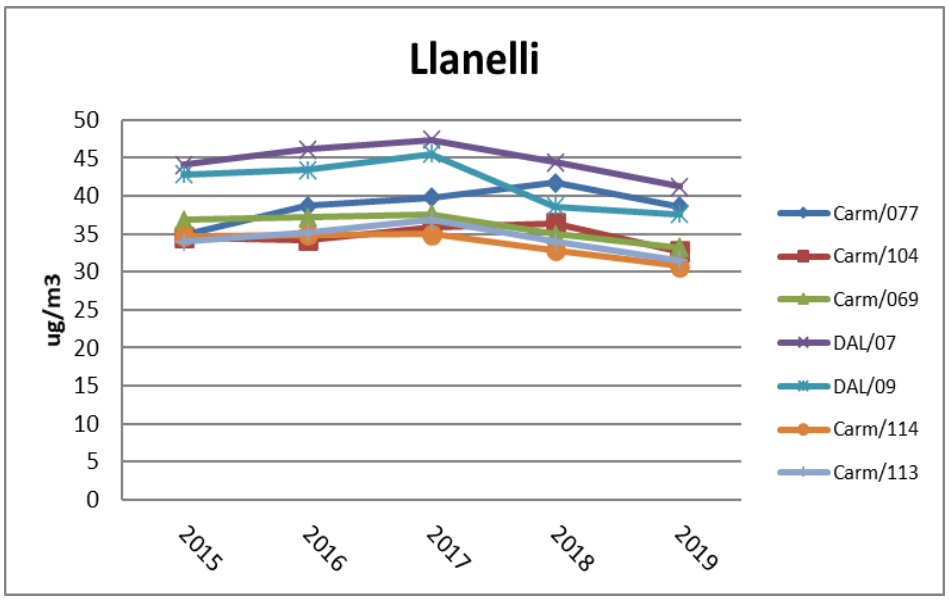
Monitoring results exceeding / close to the Annual Air Quality Objective

There are three diffusion tube locations that exceeded the annual mean AQO in 2019 (before any calculation of NO_2 fall off with distance was conducted) and four more that were borderline. Those sites that have exceeded the AQO are detailed below with the relevant data presented in Table 2.2 above. The raw data for 2019 can be found Table A.1 located in Appendix A: Monthly Diffusion Tube Monitoring Results.

One site in Llanelli exceeded the AQO which was 13 Felinfoel Road (DAL/07), which has exceeded the AQO in the previous seven years but has experienced decreases over the last 2 years from 47.4µg/m^3 (2017) to 44.4µg/m^3 (2018) to 41.2µg/m^3 (2019). Carm/077 in Sandy Road (2) previously exceeded the AQO for the first time in 2018 after observing a gradual increase over the last three years, however during 2019 results remained borderline at 38.9µg/m^3. Notably, this site is located near the kerb and some meters away from the relevant receptor.

Thomas Street (Barnados) (DAL/09) which previously exceeded the AQO in 2017 remains borderline at 37.6µg/m^3, as observed in 2018 after experiencing a decrease below the AQO for the first time in the previous five years. It's positive to report that Thomas Street(2) Carm/104 which has observed a marginal increases in 2017 and 2018, reporting within 10% of AQO last year has reported 32.7µg/m^3 for 2019 and is no longer considered borderline of exceeding the AQO. These sites are considered as hotspots within the Llanelli AQMA.

Figure 2.11 : Five Year Trend in Llanelli AQMA



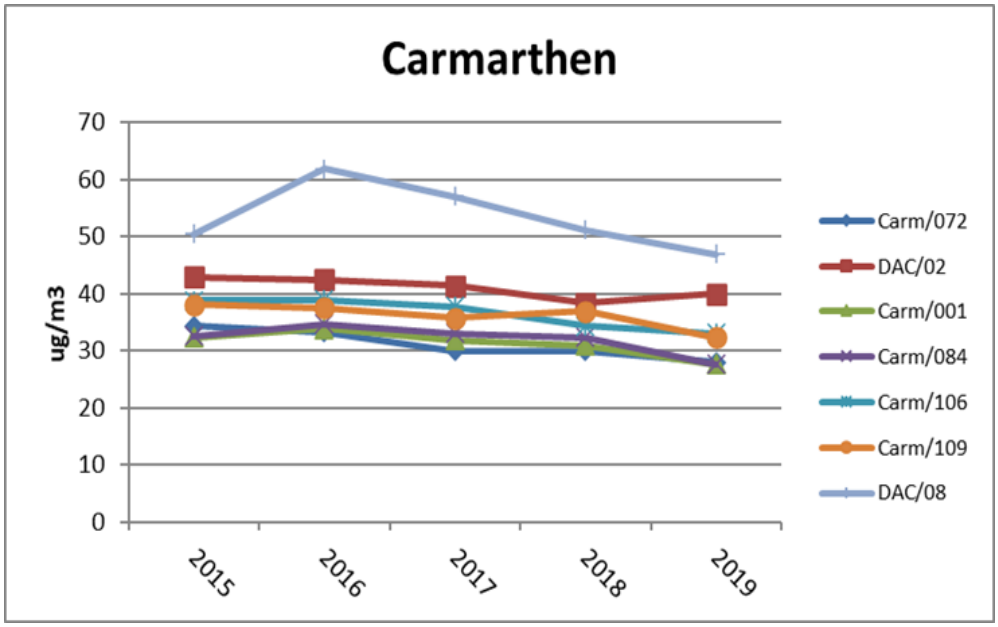
All sites in Llanelli observed a small decrease in NO_2, so this trend appears consistent across the whole monitoring network in Llanelli's AQMA.

In Carmarthen there were two locations that exceeded the AQO, 85 Priory Street (E) (DAC/08), which has exceeded the AQO for the last seven years and 15 Park Terrace (DAC/02), which reported borderline at 38.3µg/m^3 in 2018, but sadly increased this year meeting the objective at 40µg/m^3. In contrast, 6 Park Terrace (DAC/16) which observed 37.9µg/m^3 during 2018 has improved with an annual mean of 32.4µg/m^3 for 2019.

Richmond Terrace (Carm/109) which was just below 37µg/m^3 in 2018, has reduced to 32.4µg/m^3 in 2019 and no longer reported borderline. Only two sites in Carmarthen experienced a marginal increase, they were 15 park Terrace (DAC/02) and Glenhome Nursery, Richmond Terrace (DAC/06) whereas all the other sites have seen a reduction in concentration compared to 2018.

The highest reading tube in the county was for the seventh-year running was 85 Priory Street (E)(DAC/08). The annual result was 51.2µg/m^3, which is decreasing steadily, reporting 51.2µg/m^3 (2018) and 57µg/m^3 (2017).

Figure 2.12 : Five Year Trend in Carmarthen AQMA

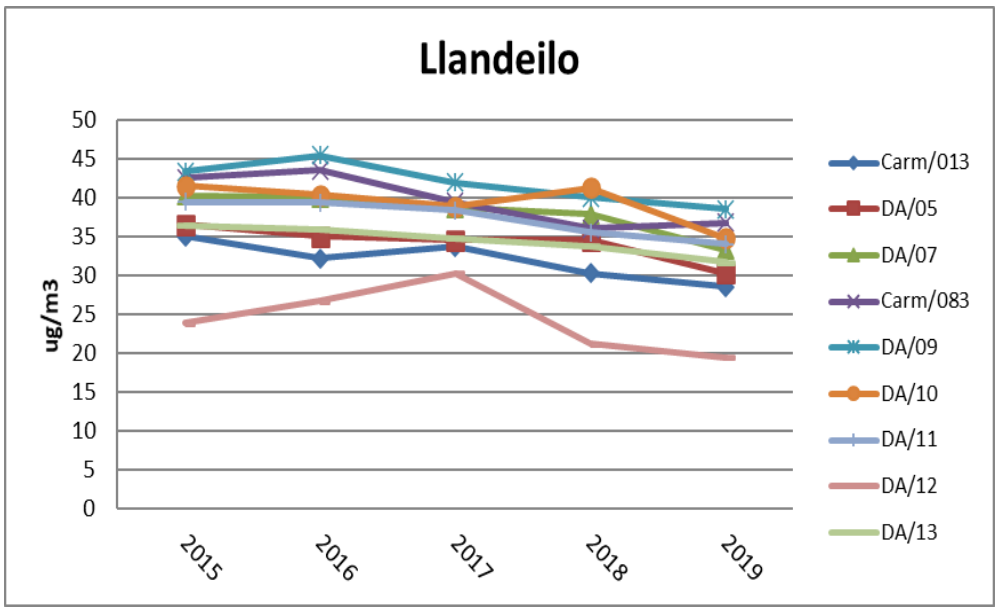


Similarly, to Llanelli, most sites within Carmarthen AQMA, experienced a reduction in NO_2 compared to 2018 and 2017.

During 2019, Llandeilo had no sites that exceeded the AQO, although two locations remain borderline. This is a great improvement on last year where it was reported that three sites breached the AQO before any NO_2 fall off with distance calculations were

conducted. They included; 123 Rhosmaen St (DA/09) and Rhosmaen Street (2) (Carm/083) both reporting 40.1µg/m^3 (2018), which are now borderline between 36-38µg/m^3 and No 133 (DA/10) reported 41.3µg/m^3 in 2018, but has decreased to 34.8µg/m^3. Two other sites (Castle Hotel (DA/07) and (No 74 Style Shop) DA/11) were reported to be borderline in 2018 and 2017 but have now reduced further to 33-34µg/m^3. Work will continue to work on the remaining actions of the Action Plan for the Llandeilo AQMA.

Figure 2.13 : Five Year Trend in Llandeilo AQMA



2019 is the first year that has observed all monitoring locations in Llandeilo AQMA to fall below the Annual Air Quality Objective.

The trends over the last ten years for Llanelli, Carmarthen and Llandeilo AQMA monitoring network are illustrated in FiguresFigure 2.10 – Trends in Annual Mean NO_2 Concentrationsabove. Most of the diffusion monitoring sites are largely experiencing a marginal downward trend.

2.3.1 Nitrogen Dioxide (NO_2)

Diffusion Tube Monitoring Data

Five sites in the diffusion tube network were corrected for NO_2 fall-off with distance because the post bias (and annualised) annual mean either exceeded the AQO or fell within 10% of the AQO. These included Llanelli – Sandy Road (2)(Carm/077), Llanelli – nr 13 Felinfoel Road (DAL/07), Carmarthen - 85 Priory Street (E) (DAC/08), Carmarthen - 15 Park Terrace (DAC/02) and Llandeilo - Rhosmaen Street (2) (Carm/083).

The calculation was carried out in accordance with paragraph 7.78 of LAQM Technical Guidance (16), using the on-line LAQM Helpdesk distance calculator tool (Version 4.2) March 2018 to generate the NO_2 predicted results for the fall-off with distance.

After using the online calculator to calculate the fall-off with distance, just one of the sites assessed DAC/08 (Priory Street, Carmarthen) remained high with a predicted concentration of NO_2 exceeding the Annual Air Quality Objective at 44.3ug/m^3. This is a reduction from the three exceedances reported above once the data was bias adjusted.

The NO_2 fall off with distance calculation reduced the level of exposure of concentrations at (DAL/07) Felinfoel Road, Llanelli) and (DAC/02) 15 Park Terrace, Carmarthen to below the AQO when considering its nearest receptor. However, these two sites do remain within 10% of meeting the AQO at 38.1ug/m^3 and 37.8ug/m^3. Sandy Road (2)(Carm/077) and Rhosmaen Street(2) (Carm/083) were initially borderline, and upon applying this calculation have reduced to 29.6ug/m^3 and 33.1ug/m^3 respectively. Further details relating to the distance calculations are contained in Appendix F.

Overall, the total number of sites exceeding the AQO has reduced from three to one; 85 Priory Street, Carmarthen (E) This site has always been recognised as a hotspot within the Carmarthen AQMA. No sites demonstrated an exceedance of 60ug/m^3 or more which indicates there is unlikely to be any risk of exceeding the 1-hour objective.

There is one triplicate tube site which is in Llandeilo (DA/05 – Rhosmaen Street (Evans Butchers)) and which will be maintained for the continued monitoring and assessment of Action Plan work.

The tube sites associated with Burry Port and Ammanford all had results well below the AQO, as was expected, but the monitoring sites will be maintained in use as developments around the towns continue.

The monthly raw data results for the 2019 data, including the distance calculated prediction is contained in Table A.1 in Appendix A: Monthly Diffusion Tube Monitoring Results.

2.3.2 Particulate Matter (PM_{10})

Carmarthenshire County Council does not monitor PM_{10}.

In previous years PM_{10} monitoring exercises have been carried out in various locations across the county where it has been considered there may be a potential issue or in response to complaints about industrial activities. None of the previous surveys have identified any breaches of the PM_{10} objective levels. Due to the continuing financial constraints it was deemed appropriate to discontinue the annual surveys, unless a specific requirement was identified, and to concentrate on those air quality issues that were known to exist, i.e. traffic related NO_2. There were no specific issues identified during 2019 that required a particulate monitoring survey to be performed.

2.3.3 Particulate Matter ($PM_{2.5}$)

Carmarthenshire County Council does not monitor $PM_{2.5}$.

2.3.4 Other Pollutants Monitored

There has been no formal monitoring of sulphur dioxide by Carmarthenshire County Council. However, previous assessments and reports identified that there was the potential for exceedance of the 15-minute mean by way of idling steam locomotives at a station in Bronwydd, Carmarthen. The locomotives would regularly idle at the platform for periods of greater than 15 minutes where members of the public would be waiting, within 15 meters of the locomotives.

Discussions with the management of the railway company resulted in an agreed fixed work notice being issued that restricted the waiting time at the platform to less than 10 minutes. This agreement has been in place for many years and is still being monitored.

It has been agreed that Carmarthenshire County Council will carry out unannounced compliance visits to confirm that the requirements of the fixed work notice are being maintained. During 2019, compliance was demonstrated as no breaches were identified and no dark smoke emissions were observed.

Carmarthenshire County Council does not carry out monitoring for benzene. There are no requirements for other pollutants to be monitored by Carmarthenshire County Council.

2.4 Summary of Compliance with AQS Objectives as of 2019

Carmarthenshire County Council has examined the results from monitoring in the County. Concentrations in Llandeilo and Llanelli AQMA's have been found to be close to the Objectives, therefore further investigation is required before deciding on whether action is necessary.

Concentrations within the Carmarthen AQMA still exceed the Annual Mean objective for Nitrogen Dioxide therefore these AQMA's should remain.

3. New Local Developments

Below are details relating to planning applications for the key developments that required the submission of an Air Quality Assessment, received in 2019.

An application was received for Land off Clos Y Benallt Fawr, Fforest (S/38255) for a residential development consisting of 35 units. An Air Quality Assessment was submitted as part of a previous application for 51 dwellings which concluded that with 51 dwellings there would be a negligible impact on local air quality from the development. A construction management plan was also submitted to support the application. This application was granted.

An application was received for Land Adj Ty Gwynfa, Bronwydd (W/38292) for a residential development consisting of 10 units, located on the boundary of the Carmarthen AQMA. An Air Quality Assessment was submitted for the consideration of 12 dwellings which concluded there would be a negligible impact on local air quality from the development. This application was granted, and a construction management plan was conditioned.

An Air Quality Assessment (AQA) was performed in support of an application for Land at North Dock, Llanelli (S/38285) for a residential development of up to 210 units. The AQA concluded there would not be a significant impact on air quality from the traffic associated with the proposed development. The development proposal incorporates a detail travel plan for measures to encourage sustainable means of transport, the installation of low NOx boilers where required and the use of either geothermal, solar, air or ground source heat pumps for heating to reduce on site combustion. It was also recommended that the provision of electric vehicle charging points be considered to work towards general air quality improvement as part of the development. This application is yet to be determined and requires further information for a suitable Habitat Regulations Assessment to be conducted in relation to pollution impacts along with a detailed construction traffic management plan and dust mitigation plan.

An application to demolish the former Aman Valley Maternity Hospital and no's 68 and 70 Tir Y Coed Road to facilitate the construction of 28 residential dwellings, Ammanford (E/38266) was received and an AQA screening assessment and construction

management plan was requested. This remains outstanding and this application is yet to be determined.

An outline application for the construction of 14 residential dwellings and 50 car park spaces, at the former MAFF Depot, Abergwili, Carmarthen (W/38323) was received and an AQA screening assessment and construction management plan was requested. The development is located approximately 600m from the boundary of the Carmarthen AQMA. An Air Quality Assessment was submitted, and the report concluded there would be a negligible impact on local air quality from traffic associated with the development. The construction stage was also considered with a dust management plan recommended. This remains outstanding and this application is yet to be determined.

An AQA was performed in support of an application for 16 residential units to the Land opposite Llanddarog Village Hall (W/39220), the report concluded that the additional traffic generated form the development would have a negligible impact and therefore a detail assessment was not required. With regards to the construction a medium risk was identified which would be minimised through mitigation measures, outlined within their Pollution Prevention Plan. This plan focussed on both the protection of nearby habitats and nuisance to residents. This application for approval of reserved matters is still under review.

An application was received for an Aldi superstore and Costa drive through in Trostre, Llanelli ((S/39022). The development site is not located within the Llanelli AQMA, but approximately 1.5km away form the boundary in an industrial/retail area. A transport assessment concluded that the estimated additional trips generated would unlikely pose an adverse effect on local air quality requiring an Air Quality Assessment. The development would include pedestrian access routes, 12 cycle spaces and a staff travel plan to promote sustainable travel. This application is yet to be determined.

An application for 100 residential units to the Land off Garreglwyd, Pembrey (S/21597) was received for further re-consultation. An AQA had been performed in 2010 in support of the original application, which considered much higher traffic levels than the most recent and up-to-date transport study conducted. It concluded that there would be a negligible impact on local air quality. The site is not located within an Air Quality

Management Area. The application was refused on the grounds of highway safety and potential 'in-combination' impacts on a nearby European site.

An application for 60 residential houses at Land at near Cross Hands Retail Park, Cross Hands (S/39436) was received for which an Air Quality Assessment had been conducted in September 2010 in support of its outline planning application S/23696. This was based on modelled emissions considering a total of 240 residential units within the four phases 1a, 1b, 2a and 2b alongside the development proposals of the Cross Hands Retail Park consisting of a supermarket and petrol station. The AQA concluded a negligible impact on the Air Quality Objective for the local area.
Since this time, further planning applications have been submitted and subsequent negotiations had resulted in changes to the original proposed numbers of units, increasing the total residential units from 200 to 256. Regarding this phase 2B, this application was now seeking an increase from 54 to 60 units. A review of the Air Quality Assessment was not requested because consideration was given to the original proposals of the retail park, which included a large supermarket and petrol station which estimated significantly more vehicle trips than its final and current mixed retail use. The proposed development consisting of an additional 6 units is unlikely to adversely impact on the local air quality. The full application was granted.

To east of this residential development an outline application was received for a Health and Well-being Centre, at Cross Hands Retail, which intends to replace the GP surgeries within Penygroes, Tumble and Cross Hands centralising a much larger catchment of the local population, which will require those residing near Penygroes or Tumble to travel much further from their existing local GP. The Transport Assessment submitted estimated that the proposed development will attract an additional 4115 daily vehicle trips. An Air Quality Assessment was submitted, taking into account that the original assessment dated 2010 predicted much greater numbers of additional trips and found no significant impact on local air quality coupled with recent results of local diffusion tube monitoring in the surrounding area.

The AQA also outlined mitigation measures to ensure the development helps to reduce incremental increases in local pollution concentrations, including a travel plan, a bus stop, 52 cycle parking spaces, electric vehicle charging points a bus stop and green infrastructure on site. The application was granted with mitigation measures and 10%

EV charging conditioned, along with the dust management plan to ensure the construction does not adversely impact on nearby receptors.

An AQA was performed in support of an application at Former Cartref Tawelan, Ash Grove, Carmarthen (W/39755) for the construction of 18 residential properties which is located within the Carmarthen Air Quality Management Area. The AQA concluded no significant impact would arise from the development on local air quality in terms of nitrogen dioxide or particulate matter for the nearby receptors and the SSSI. The Transport Plan included areas for the storage of cycles, and a Travel plan was conditioned as part of full planning consent.

3.1 Road Traffic Sources (and Other Transport)

During 2019, traffic related air pollution at different locations were considered in respect of Abergwili in Carmarthen, Llangennech, Llanelli, Pentip School in Llanelli, Llandeilo Primary School and Margaret Street, in Ammanford. It was considered that each of these sites would benefit from monitoring during 2019.

The results and further details of these air quality screening exercises can be found in the '2019 Carmarthenshire AQ Screening Review Report' in Appendix G. There was no breach of the AQO at any of the screening locations in question.

A further ongoing screening exercise, which started in May 2017 monitors NO_2 in existing routes surrounding the proposed Cross Hands Economic Link Road. Details of this first 2 year exercise can be found in Appendix G, however the final conclusions should be reported in 2022 after the new link road has been built and opened (completion was originally planned for 2019 but has since been delayed).

Carmarthenshire Council has not identified any new road traffic sources since the last Assessment relating to:

- Narrow congested streets with residential properties close to the kerb.
- Busy streets where people may spend one hour or more close to traffic.
- Roads with a high flow of buses and/or HGVs.
- Junctions.
- New roads constructed or proposed since the last Assessment.
- Roads with significantly changed traffic flows.

- Bus or coach stations.
- Airports / diesel or steam trains / ports & Shipping
- Major Roadworks / Disruptions

3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

3.2.1 Industrial Sources

3.2.1.1 New or Proposed Installations for which an Air Quality Assessment has been carried out

Bryn Bach Coal which currently hold an Environmental Permit applied for planning permission (E/39917) to extend surface mining operations, to mine 110,000 tonnes of Anthracite from the proposed Glan Nash Extension, north of the existing Glan Nash Mine site, Ammanford over a 6 year period. The extension covers 10.03 Ha of land. An Environmental Impact Assessment was submitted in support of the application and considered the impact of PM_{10} on nearby receptors and local air quality. There are no properties within 200m of the site development and the assessment concluded that the impact would range, depending on the proximity of the receptor from negligible to slightly adverse, however with mitigation measures taken the impact would be negligible in all cases.

A Rapid Health Impact Assessment was also submitted as part of the application because in line with Welsh Government's Planning Policy Guidance (Wales) Edition 10, a coal mining extension should not normally be permitted unless wholly exceptional circumstances can be demonstrated. This application has not yet been determined.

Carmarthenshire County Council has not identified any new developments with fugitive or uncontrolled sources since the last assessment relating to new or proposed installations for which an air quality assessment has been carried out.

3.2.1.2 Existing industrial Installations for where emissions have increased substantially, or new relevant exposure has been introduced

Carmarthenshire County Council has not identified any new developments with fugitive or uncontrolled sources since the last assessment relating to existing industrial

installations where emissions have increased substantially, or new relevant exposure has been introduced.

3.2.1.3 New or significantly changed Industrial Installations with no previous air quality assessment

Carmarthenshire County Council has not identified any new developments with fugitive or uncontrolled sources since the last assessment relating to new or proposed installations for which an air quality assessment has been carried out.

3.2.1.4 Major Fuel Depots Storing Petrol

Carmarthenshire County Council has not identified any new developments with fugitive or uncontrolled sources since the last assessment relating to Major fuel storage depots storing petrol.

3.2.1.5 Petrol Stations

Pontyates Petrol Station at Heol Y Meinciau, Pontyates is currently permitted for a stage 1b is undergoing full refurbishment under new ownership with new tanks, pipework and dispensers will require upgrade to VRII, however it does not introduce a new exposure and once fitted with Vapour recovery stage II system it will reduce emissions further. Works should be completed during 2020.

There have not been any new petrol stations with throughputs greater than 2000m^3 per annum near a busy road (>30,000 vehicle/day) where there is relevant exposure within 10m of the pumps.

Carmarthenshire County Council has not identified any new developments with fugitive or uncontrolled sources since the last assessment relating to Petrol stations.

3.2.1.6 Poultry Farms

A Planning application was received during 2019, for Rectory Farm, Henfwlch, Bancyfelin (Planning reference W/39368) and a dispersion modelling report for ammonia and Nitrogen Deposition was submitted, for the rearing of up to 28,000 Game birds. The report assessed potential impacts on nearby conservation areas and concluded that there would not be a significant impact. This application has not been

determined. No farms exceeding the relevant criteria (turkey units with greater than 100,000 birds, naturally ventilated units with greater than 200,000 birds or mechanically ventilated units with greater than 400,000) have been identified.

Carmarthenshire County Council has not identified any new developments with fugitive or uncontrolled sources since the last assessment relating to Poultry Farms.

3.2.2 Fugitive or Uncontrolled Sources

3.2.2.1 Landfill Sites

Carmarthenshire County Council confirms that there are no new or newly identified potential sources of fugitive or uncontrolled particulate matter, which include Landfill sites.

3.2.2.2 Quarries

Carmarthenshire County Council confirms that there are no new or newly identified potential sources of fugitive or uncontrolled particulate matter, which include Quarries

3.2.1.3 Unmade Haulage Roads

Carmarthenshire County Council confirms that there are no new or newly identified potential sources of fugitive or uncontrolled particulate matter, which include unmade haulage roads on industrial sites.

3.2.2.4 Waste Transfer Stations

A planning consent was granted for the construction of a hard standing and associated works at Land adj to Ty Newydd, Thornhill Road, Cwmgwilli for use as an inert waste transfer station. No crushing or screening or creation of stockpiles will be used on site and skips would be kept covered. The site will be subject to an Environmental Permit by Natural Resources Wales, which should control any impact on the environment by way of conditions. Pollution prevention measures were put forward with a construction management plan to mitigate fugitive emissions form the construction. The site has limited receptors within 200m of the site and it was determined that any adverse impact on the nearby ecological habitats would be unlikely if the construction management plan is followed.

A planning variation application was granted to vary the type of waste that could be accepted at a waste transfer station in Glyngerwyn Quarry, Felinfoel, Llanelli, outside of the Llanelli AQMA) This site already operates a water transfer facility but was restricted to receiving only inert waste under its planning consent. The application would allow scope to apply for a 'Standard Rules Permit by Natural Resources Wales, which would contain conditions aimed at minimising impacts on the environment from site operations. An assessment determined a high risk from fugitive emissions without mitigation, which in compliance with a standard rules permit would be reduced to low.

3.2.2.5 Other potential sources of fugitive particulate emissions

Carmarthenshire County does not have any identified areas with a background PM_{10} >25µg/m^3. Potential receptors within the vicinity of dusty activities like construction or demolition are screened and where relevant, developers are requested to assess the impacts of dust from construction or demolition proposal. Where an assessment is not required Developers are requested to follow good practice measures. In all cases a dust management plan or construction management plan is expected to support such applications, to ensure that any adverse impacts identified by the development are mitigated to a negligible risk.

Carmarthenshire County Council confirms that there are no new or newly identified potential sources of fugitive or uncontrolled particulate matter, which include other potential sources of fugitive particulate matter emissions.

3.2.3 Commercial or Domestic Sources

3.2.3.1 Biomass Combustion Plant - Individual installations

It has been identified that several Biomass Boilers have been installed across the county, much of which has not been consulted on through the Planning Consultation process. Many are associated with agricultural use or commercial settings where the RHI incentive schemes have been a primary reason for installation. Much of the plant is located within the rural setting, although some do appear in the towns. It is not considered that many of these are likely to be having significant impact of local air quality, although relevant details of all the plant are not always obtained.

As part of Section 3.27 LAQM TG(16) it is a requirement to list any installations with the potential to impede on air quality with relevant exposure nearby. Three separate biomass boiler planning consents were granted in 2019 (where relevant plant specification details have been provided), one for Tir Bont Farm, Foelgastell, one for Gateway Resort in Bynea and one for Cerrigyrwyn Quarry, Llangynog. All three installations are to be fed with pelletised virgin wood and the boilers compliant with the Renewable Heat Incentive (RHI) Scheme. Biomass Boiler Information forms were requested to be completed by all three applicants with the quality of the returned information quite variable. An additional fourth planning application was also received for Tir Emmanuel Farm, Five Roads, Llanelli, (planning reference S/39133). The plant however had not yet been purchased and so a consent was conditioned with request to supply information relating to the plant before commissioning.

The details supplied in respect of the three biomass plant were screened using TG(16) Biomass Emission Toolkit v7 (calculator) and TG (16) for calculating actual emission rate. For all three boilers the actual emission rate was lower than the target emission rates. The details relating to the checks are noted below:

Table 3.1: Screening Tir Bont Farm, Foelgastell (Planning Reference W/38383)

Biomass Boiler Type Plant Glenfarrow GF 210 – Model GF210. 210kW

Parameter	PM_{10}	Annual Mean NO_2	1-Hour Mean NO_2	$PM_{2.5}$
Actual Emissions g/s	0.005796	0.0126	0.0126	0.005796
Targeted Emissions g/s	0.0171	0.0752	0.0348	0.0422

Table 3.2: Screening Gateway Resort, Bynea (Planning Reference S/38905)

Biomass Boiler Type: Hertz Firematic 499, 499kW

Parameter	PM_{10}	Annual Mean NO_2	1-Hour Mean NO_2	$PM_{2.5}$
Actual Emissions g/s	0.003992	0.038423	0.038423	0.003992
Targeted Emissions g/s	0.0215	0.1041	0.0477	0.0551

Table 3.3: Screening Cerrignog Quarry, Llangynog (Planning Reference S/39352)

Biomass Boiler Type: EG-Multifuel 600, 600kW

Parameter	PM_{10}	Annual Mean NO_2	1-Hour Mean NO_2	$PM_{2.5}$
Actual Emissions g/s	0.0126	0.0654	0.0654	0.0126
Targeted Emissions g/s	0.0344	0.1663	0.0761	0.0871

3.2.3.2 Biomass Combustion Plant - Combined impact

One location near Llanelli has been identified as a small 'concentration' of biomass boilers where there exists a potential for local impact. Work carried out during 2017 has determined that no Environmental Permits are required, however this will be reviewed should circumstances change.

Carmarthenshire County Council has not identified any other commercial or domestic sources in relation to areas where the combined impact of several biomass combustion sources may be relevant.

3.2.3.2 Other Sources

Carmarthenshire County Council has not identified any other commercial or domestic sources in relation:

- Areas where domestic solid fuel burning may be relevant.
- Combined Heat and
- Power (CHP) plant.

3.3 Planning Applications

There have been a number of planning applications received in the last couple of years for projects that span a number of years and a few more recent applications. Air Quality Assessments have been requested for some of the proposals to determine whether the developments will result in a negative impact on local air quality. Table 3.4 below summarises these details.

Table 3.4 - Planning Applications

Reference	Location	Information Request	Response	Status
W/38125	Land South of Dol Y Dderwen, Llangain	AQA requested at Outline	Screening Assessment conducted for 36 properties	Outline Refused
S/38255	Land off Clos Y Benallt Fawr, Fforest	AQA requested at Outline for traffic & construction	Negligible impact, recommended consideration of EV Infrastructure	Full Granted
W/38292	Land Adj Ty Gwynfa, Bronwydd	AQA Screening traffic & construction Management plan conditioned	Negligible impact, EV Infrastructure recommended	Full Granted
S/38285	Land at North Dock, Llanelli	AQA, traffic & construction HRA assessment	Negligible impact, recommended consideration of EV Infrastructure	Outline consent awaiting decision
E/38266	Former Amman Valley Maternity Hospital	AQA- traffic and construction requested	.	Awaiting decision
W/38323	Former MAFF Depot Abergwili Rd	Air Quality Assessment traffic & construction	Negligible impact, consider EV charging	Awaiting decision
W/39220	Land opposite Llanddarog Village Hall	Air Quality Assessment traffic & construction	Negligible impact of traffic, Medium risk during construction subject to mitigation measures in Pollution prevention plan	Awaiting decision on reserved matters
S/39022	Aldi and Costa Drive Thru, Trostre	AQA Screening traffic	Negligible impact Condition travel plan	Awaiting Decision
S/21597	Land at Garreglwyd, Pembrey	AQA previously submitted for Traffic and construction	AQA 10 years old found negligible impact, and considered higher traffic levels than current transport study	Application Refused
S/39436	Land at Cross Hands Retail Park	AQA traffic and construction	AQA submitted at Outine greater traffic	Application Granted

			numbers stated negligible impact	
W/39441	Health and Wellbeing Centre, Cross Hands	AQA traffic and construction	AQA review from AQA at outline, states negligible impact	Outline Granted
E/39917	Glan Nash Coal Mine	AQA dust for extension activities, Health Impact Assessment	Assessment states negligible impact with mitigation measures	Awaiting Decision

3.4 Other Sources

Carmarthenshire County Council have not identified any bonfires, pollution incidents or domestic wood burns that could contribute to air pollution.

Carmarthenshire County Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Carmarthenshire County Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4. Policies and Strategies Affecting Airborne Pollution

4.1 Local / Regional Air Quality Strategy

Carmarthenshire County Council has not developed a specific Local Air Quality Strategy. The air quality work is based on the National Strategies for monitoring of air quality and this has been used as the county's Air Quality Plan. The air quality work is constantly being reviewed to ensure it remains relevant and appropriate. The designation of the AQMA's in Llandeilo, Llanelli and Carmarthen and the setting up of the Steering and Action Planning Groups has helped to forge the links with internal stakeholders.

Having more internal links has helped to raise the profile of the air quality work such that there is greater collaboration between departments leading to improved communications and working arrangements.

A regional document was developed between Carmarthenshire, Ceredigion, Powys and Pembrokeshire in 2011/12 which was aimed at developers and planners to provide guidance from the air quality perspective on new development. The document was very much based on the Environmental Protection UK guidance document "Development Control: Planning for Air Quality (2010 Update)". The collaborative guidance document was written and agreed between the four authorities and issued in September 2012. It was made available to the Planning Departments of each authority and was used to assist with planning consultations. The document is titled "Mid and West Wales, Air Quality: A Guide for Developers".

Since the review of the EPUK 2010 document (which was issued in May 2015 and more recently January 2017) it has been agreed between the four authorities that the 2017 document would form the basis of the Regional Strategy. As part of Action Planning work we are looking at developing local strategies that can be applied to development with the ultimate aim of minimising air quality impacts from development wherever possible.

In carrying out our functions under Part IV of the 1995 Act, due regard is given to the policy guidance issued by Welsh government 'Local Air Quality Management in Wales' and the five ways of working as set out by the Well-being and Future Generations

(Wales) Act 2015 are adopted when conducting out our functions to manage local air quality.

4.2 Air Quality Planning Policies

Carmarthenshire County Council is in the process of preparing the Revised Local Development Plan (LDP) for its area (excluding that part contained within the Brecon Beacons National Park). Once finalised (adopted), the Revised LDP will supersede the current adopted LDP with decisions on planning permissions primarily based on its content. The current Carmarthenshire Local Development Plan (LDP) was adopted by the County Council on 10th December 2014.

Whilst development proposals should be considered against the policies and provisions of the Plan as a whole (along with other relevant considerations and policies), the most notable LDP policy in relation to Air Quality is EP2: Pollution and TR2: Location of Development – Transport Considerations which are set out below:

Policy EP2 Pollution

Proposals for development should wherever possible seek to minimise the impacts of pollution. New developments will be required to demonstrate that they:

a) Do not conflict with National Air Quality Strategy objectives, or adversely affect to a significant extent, designated Air Quality Management Areas (permitted developments may be conditioned to abide by best practice);

b) Do not cause a deterioration in water quality;

c) Ensure that light and noise pollution are where appropriate minimised;

d) Ensure that risks arising from contaminated land are addressed through an appropriate land investigation and assessment of risk and land remediation to ensure its suitability for the proposed use.

Strategic Objectives Supported: SO4, SO5, SO10 and SO11
This policy should be read in conjunction with other relevant policies and proposals of this LDP.

Policy TR2: Location of Development- Transport Considerations

Proposals which have a potential for significant trip generation will be permitted where:

a. *It is located in a manner consistent with the plans strategic objectives, its settlement framework and its policies and proposals;*
b. *It is accessible to non-car modes of transport including public transport, cycling and walking;*
c. *Provision is made for the non-car modes of transport and for those with mobility difficulties in the design of the proposal and the provision of on site facilities;*
d. *Travel Plans have been considered and where appropriate incorporated.*

Strategic Objectives Supported: SO1, SO2, SO3, SO4, SO5, SO6, SO8, SO9, SO10, SO11, SO12, SO13 and SO14
This policy should be read in conjunction with other relevant policies and proposals of this LDP.

The Air Quality Management Orders for Carmarthen and Llanelli have been signed and Action Plans have been developed. As part of the Action Plan work discussions are ongoing in respect of what opportunities there are to update the supporting text to Policy EP2 (paragraph 6.8.21) and embrace the latest Welsh Government Policy on Air Quality.

It should be noted that clear guidance in respect of a range of Environmental Protection matters are contained within Planning Policy Wales (PPW), notably in relation to the impact of development on Air Quality Management Areas; minimising pollution of air and water. These are not therefore repeated within the LDP. Additional national development management policy statements may be found in PPW.

4.3 Local Transport Plans and Strategies

The authority historically held a Local Transport Plan; however, this was incorporated into a Regional Transport Plan which had been established under the direction of the Welsh Government. The region covers the unitary authorities of Neath-Port Talbot, Swansea, Carmarthenshire and Pembrokeshire. The collective name of the authorities was known as the South West Wales Integrated Transport Consortium (SWWITCH).

The Regional Transport Plan, as issued by SWWITCH is now no longer being utilised in the same way since funding for the consortium was removed. It is now expected that local transport plans will be developed but that will still have to have due regard to the regional transport requirements.

However, the partnership arrangement with the other authorities remains in place and they have developed a combined Local Transport Plan for the Swansea Bay City Region covering the period 2015 – 2020.

The Local Air Quality Management work that fed in to the Regional Transport Plan work has now transferred and is given due regard within the Local Transport Plan and the policy and infrastructure interventions being tailored to help improve air quality and minimise air pollution from transport sources.

Further information on the Local Transport Plan can be found using the link below:
https://www.swansea.gov.uk/localtransportplan

Reference is also made to this in Carmarthenshire's Parking Strategy 2018, which can be found at:
http://democratiaeth.sirgar.llyw.cymru/documents/s20624/Adroddiad.pdf?LLL=1

4.4 Active Travel Plans and Strategies

It is acknowledged that NO_2 from road traffic is the primary cause for concern for Carmarthenshire. Any measures that can encourage and facilitate alternative means of transport are therefore to be welcomed. The Active Travel (Wales) Act 2013 places a statutory requirement on Local Authorities to identify and improve routes for walking and cycling, which includes the publication of maps to identify suitable routes, and to provide links within key locations, such as places of work, education etc

Carmarthenshire County Council has published its integrated network maps, which can be found here: https://www.carmarthenshire.gov.wales/home/council-services/travel-roads-parking/active-travel/#.W832x-aot9B

This ties in with the Council's long term aim of becoming the Cycling Hub of Wales. Further information on Carmarthenshire's cycling strategy can be found here: https://www.carmarthenshire.gov.wales/home/business/tourism/tourism-priorities/cycling/#.W834XOaot9B

4.5 Local Authorities Well-being Objectives

Carmarthenshire's Corporate Strategy 2018-2023 includes its Well-being Objectives for the period. Air Quality can impact on a few the 15 objectives that have been identified, however, Well-being Objective 8 "Live well – Help People Live Healthy Lives", contains a range of actions, one of which specifically relates to the monitoring of Air Quality (nitrogen dioxide).

We track progress on this action through quarterly Performance Monitoring reports.

4.6 Green Infrastructure Plans and Strategies

The Council adopted a supplementary planning guidance in September 2016, 'Placemaking and Design' which encourages developers to adopt a green infrastructure approach to support policy GP1 of the Local Development Plan for 'Sustainability and High-Quality Design'.

The Council's Corporate Strategy 2018-23 also has a Well-being objective to '*Look after the Environment now and in the future*', which reflects the Resilience Goal in the Well-being Future Generations Act that requires public bodies to set objectives to achieve a 'biodiverse natural environment with healthy functioning ecosystems'.

A Forward Plan for Environment (Wales) Act 2016 to protect habitats and biodiversity was revised by Carmarthenshire County Council in February 2019 and its associated actions include action 7bTH: *'Highways and Transportation will work with Rural Conservation section to identify and highlight opportunities in the development and implementation of new infrastructure that positively contributes to ecological resilience.*'

A Pollinator Strategy for Carmarthenshire was recently published in August 2020 to inform positive action for pollinators throughout the council's work. Carmarthenshire Nature Partnership are working to produce a Local Nature Recovery Plan to address the address the issues that are driving the decline in biodiversity, and to support recovery.

These works support the strategic objectives set out in 'Wales Nature Recovery Action Plan' produced by Wales Biodiversity Partnership, the Carmarthenshire Public Service Board Well-being Plan and the Council's Well-being objectives and The Well-being of Future Generations (Wales) Act 2015.

4.7 Climate Change Strategies

Following work undertaken to formulate Carmarthenshire's Well-being Assessment, the Public Services Board produced Carmarthenshire's Well-being plan for 2018-2023. This is very much based on the 7 well-being goals and five ways of working (Wellbeing of Future Generations (Wales) Act 2015).

Carmarthenshire's Corporate Strategy 2018-2023 sets out its Well-being objectives which seeks to continuously improve economic, environmental, social and cultural well-being in the County. This was updated in June 2019 following a consultation in January 2019.

There are several measures contained within this Strategy that relate to Climate Change, specifically around the implementation and promotion of the increased use of renewable energy. In February 2019 Carmarthenshire County Council adopted a zero-carbon motion to become carbon neutral by 2030 in support of well-being objective 12 'Improve the Environment for now and the future'. We have since been the first local authority in Wales to publish a net zero carbon action plan, which was endorsed by full Council in February 2020.

5. Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

In total only one exceedance of the Annual Air Quality Objective (AQO) for NO_2 was identified in 2019 and located within Carmarthen's AQMA. Nevertheless, a further five sites within the Llandeilo, Carmarthen and Llanelli AQMA's also remain borderline (within one exceedance and marginal compliances of the AQO in 'hot spot' areas, justifying the need to designate AQMA's in these areas.

One location in the Carmarthen AQMA exceeded the AQO and this was the highest reading in the County for the eighth year running: 85 Priory Street (E) (DAC/08). The predicted annual concentration was 44.3µg/m^3 after calculating the NO_2 fall-off with distance which is lower than the previous two years which reported 48.5µg/m^3 (2018) and 53.6µg/m^3 (2017). 15 Park Terrace (DAC/02) remains on the border of meeting the AQO at 37.6µg/m^3 which is a small increase from last year which reported 36 µg/m^3 (2018).

No sites in the Llanelli AQMA exceeded the AQO for 2019, compared to one exceedance reported for 2018. This was at nr 13 Felinfoel Road (DAL/07), and although it appeared to exceed the AQO for this year, after calculating the NO_2 fall off distance, the levels were reduced from 41.2 µg/m^3 to 38.1.1µg/m^3 . Although a small reduction compared to 41.1µg/m^3 reported in 2018. It is noted that this site has fallen below the Annual AQO for the first time in the last seven years. Carm/077 Sandy Road(2) appeared to be borderline of AQO, however after calculating the NO_2 fall off distance the levels were reduced from 38.9µg/m^3 to 29.6µg/m^3. Thomas Street (Barnados) (DAL/09) remains borderline with a concentration of 37.6µg/m^3 and for the second time in seven years has not exceeded the AQO.

Llandeilo AQMA also reported no exceedances of the annual AQO and for the first time since the AQMA was declared. Two sites in Llandeilo that breached the AQO during 2018, included sites 123 Rhosmaen St (DA/09) which this year (2019) reported 38.6µg/m^3 after exceeding the AQO for the previous six years, and 133 Rhosmaen St (DA/10) which exceeded the AQO in 2018 with 41.3µg/m^3, however observed a significant reduction for 2019 reporting 34.8µg/m^3. Rhosmaen Street (2) (Carm/083)

appeared to be within 10% of compliance with 36.8 µg/m^3 but finally reported 33.1µg/m^3 after calculating the NO_2 fall-off with distance

All other areas of the county where diffusion tube monitoring is performed have not identified any other areas of exceedance. However, many sites that remain marginally compliant will require further monitoring and work to ensure that levels of NO_2 do not exceed the AQO in the future and as future development is planned.

5.2 Conclusions relating to New Local Developments

Work continues with a number of new development sites across the county that have been previously reported, but as yet no impacts on air quality have been identified. The Carmarthen Western Link road was been completed and opened to the public in May 2019, congestion appears to have improved but continued monitoring of NO_2 will determine if this bypass has had a positive impact and has not moved the problem to another part of Town. This will be reported in 2021.

Phase 2 of the Cross Hands Economic Link Road development is still under construction, Phase 2 will link Black Lion Road to the A476 north of Gorslas (before the junction with the B4297 Gate Road). The first link of Phase 2 from A476 to Norton Road is mostly complete but has not opened due to delays in constructing the second link from Norton Road to the Black Lion Road Once complete, the road will open access to the Cross Hands East Strategic employment site benefitting existing infrastructure whilst improving traffic flows and journey time. It is also aimed to relieve congestion and improve safety at the A48 Cross Hands Roundabout, A476 Llandeilo Road and A476 Gorslas ‘six-ways’ junctions supporting the ‘Safe Routes in Communities Programme and improve air quality on existing residential routes.

5.3 Other Conclusions

A significant amount of work has been carried out to create, improve and promote sustainable travel options for residents and visitors in the County, whether through grant funding or through the development process. However, it is difficult to determine that any single intervention alone has made a positive impact on reducing nitrogen dioxide levels within our County. The collaborative partnership approach taken by different services is key to delivering any impacts, and its recognised that any small gains are collectively beneficial to improving local air quality.

Whilst no 'formal' Air Quality Strategy exists, the use of the Environmental Protection UK Guidance document has increased and has been an agreed update to the regional strategy that had been developed.

Although the Regional Transport Plan no longer exists, as such, many of the elements that were within the plan have been incorporated into the Joint Transport Plan for South West Wales which incorporates the Local Transport Plan (LTP). This has been developed in collaboration with the other local authorities across the region. The Plan recognises the potential impacts from transport sources and is reviewed as more data and information relating to air quality across the region becomes available.

Carmarthenshire's Cycling Strategy holds the vision of being the Cycling Hub of Wales. Work continues to progress with improvements to market more cycling in Carmarthenshire with the re-development of the Carmarthen Velodrome and the Pembrey Closed Circuit track now complete and proving popular. Further work to improve footpaths and map cycle routes is also underway. The Tywi Valley cycle path also continues to progress.

The Local Development Plan (LDP) has been adopted and updated with specific reference to air quality and the need to consider air quality impacts from development. The LDP also references national guidance and policy relating to air quality that has been incorporated into Welsh Planning Policies. Discussions are taking place to update the Plan to incorporate latest policy guidance and ensure air quality impacts are minimised.

Phase 2 of the Cross Hands Economic Link Road is currently under review due to the proximity to a SSSI site and the potential vehicle emission impact is being assessed. Although not strictly within the LAQM remit, in the interests of a holistic approach and taking in to account the WG Future Generations Act it is deemed prudent to report the findings of the work. Monitoring of NO_2 in the area is continuing.

Sulphur dioxide monitoring work at Gwili Railway station identified compliance with the work order in relation to idling steam engines during compliance check visits that were carried out during the year. No emissions of dark smoke were however observed at the time.

5.4 Proposed Actions

There has been no requirement to undertake further assessment / investigation for any pollutant identified during the year, nor is there a need to declare any new AQMAs.

The diffusion tube monitoring in Llandeilo will continue and further work will be carried out to progress the Llandeilo and Ffairfach transport study in consultation with the Public, to improve the highway network and air quality in the Llandeilo AQMA. The Llandeilo AQAP will also be reviewed during 2021 to include the progress of the options included within this study and identify any further work necessary to improve air quality in this area. This review has been postponed from 2020 to 2021, resulting from delays caused by the COVID-19 Pandemic

The diffusion tube monitoring in the towns of Llanelli and Carmarthen will continue along with progress to address the Action Plans with relevant partners. Actions would normally be prioritised on improving the transport network. However, actions to help encourage active travel and sustainable modes of transport will pose particular importance during the COVID-19 Pandemic, at a time where social distancing and increased active travel is paramount as we experience reduced use of public and shared transport.

The Authority will continue to check compliance with the steam engine idling times at Gwili Railway station in Bronwydd by way of unannounced visits.

The Authority, working in partnership with other Public Services has set up a Public Service Board and is working collaboratively with Pembrokeshire and Ceredigion to assess and develop Well-being Plans (WBP) which will work towards the seven Well-Being goals identified in the Well-being of Future Generations (Wales) Act 2015. The LAQM work will be reported and hopefully help raise the profile of health impacts from air quality.

Further monitoring of Nitrogen dioxide at a Primary School in Carmarthen commenced in February 2020, and we would expect to be reporting on any findings in our Progress Report of 2021.

Work will start towards completing aspects for the 2021 Progress Report and the Authority will engage with Welsh Government and the LAQM support helpdesk to deliver improvements to air quality.

References

Carmarthenshire County Council's website on Air Quality; https://www.carmarthenshire.gov.wales/home/council-services/environmental-health/air-quality/#.W46Mg-mQzIU

Declared AQMA's for Carmarthenshire:

- https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=395
- http://aqma.defra.gov.uk/action-plans/14.11---llandeilo-aqma-action-plan.pdf

Air Quality Management Area Boundary maps; lle.gov.wales/map/airbornepollution

Climate Summaries, (Met Office Website) https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index

Carmarthenshire County Council 2019 Annualised Data Report (September 2020)

Carmarthenshire County Council 2019 AQ Screening Review Report (September 2020)

Carmarthenshire County Council NO_2 Distance Calculator Data (2019) for use with 2020 Progress Report (September 2020)

NO_2 fall-off with distance" calculator (LAQM Helpdesk Website)

Annualisation Tool (LAQM Helpdesk Website)

Biomass Emission Screening Toolkit v7 (calculator) (LAQM Helpdesk Website)

Diffusion Tube Bias Adjustment Factors Spreadsheet for September 2020. v09-20_Final (LAQM Helpdesk Website)

Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users (February 2008) (AEA Environment & Energy)

Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (January 2018 – November 2019). AIR-PT-Rounds 24 to 34 (Jan 2018 - Nov 2019) (LAQM Helpdesk website)

Carmarthenshire Local Development Plan (2014)

Joint Transport Plan for South West Wales 2015 – 2020 (2015)

Local Air Quality Management Technical Guidance TG (09) – Defra (2009)

Local Air Quality Management Technical Guidance TG(16) – Defra (2018)

Summary of Tube Precision Results for NO_2 Diffusion Tube co-location studies 2017-2019 (Reduced) version September-2020 Final (LAQM Helpdesk website)

Defra UK Air Website for AURN Monitoring Networks

https://www.swansea.gov.uk/localtransportplan

Carmarthenshire's Parking Strategy 2018, which can be found at: http://democratiaeth.sirgar.llyw.cymru/documents/s20624/Adroddiad.pdf?LLL=1

Carmarthenshire County Council integrated network maps

Carmarthenshire County Council's Cycling Strategy 2018

Carmarthenshire County Council's Cycling Tourism Toolkit https://www.carmarthenshire.gov.wales/home/business/tourism/tourism-priorities/cycling/#.W834XOaot9B

Carmarthenshire County Council's Strategic Plan for Pollinators 2020

Carmarthenshire County Council's Well-being plan for 2018-2023

Carmarthenshire County Council's Well-being Objectives 2019/20

Carmarthenshire's Corporate Strategy 2018-2023 (revised June 2019)

Local Air Quality Management Policy Guidance Wales LAQM PG 09(W) – Welsh Government (2009)

https://www.carmarthenshire.gov.wales/home/business/development-and-investment/tywi-valley-path/#.W9HGGemQyUk

Appendices

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: AQMA Boundary Maps

Appendix E: Annualised Data Report (2019)

Appendix F: NO_2 Fall Off Distance Calculator Data (2019)

Appendix G: Carmarthenshire 2019 AQ Screening Review Report

Appendix A: Monthly Diffusion Tube Monitoring Results

Table A.1 – Full Monthly Diffusion Tube Results for 2019

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
AMMANFORD															
Carm/089	29.8	25.4	25.2	28.2	22.3	18.0	17.6	14.1	20.7	26.5	37.6	32.0	24.78	18.59	
Carm/064	34.7	30.3	26.4	31.7	25.9	21.9	20.5	20.8	24.6	31.3	35.9	36.4	28.37	21.28	
Carm/090	**42.6**	**48.2**	31.7	31.3	31.1	27.6	24.7	26.1	27.7	33.9	34.7	39.0	33.22	24.91	
LLANELLI															
DAL/14	**42.2**		35.6	34.3	27.7	23.3	23.7	22.8	23.5	29.1	34.1	37.5	30.35	22.76	
DAL/15	**41.0**	26.3	29.7	28.4	24.2	20.6	19.2	16.7	23.2	28.0	37.7	28.0	26.92	20.19	
Carm/077	**59.9**	**65.9**	**62.1**	**58.1**	**45.6**	**43.1**	**45.6**	**46.0**	**40.3**	**50.6**	**47.6**	**52.5**	**51.44**	38.58	29.6
DAL/22	**43.2**	38.7	**50.5**	39.2	38.9	34.4	33.5	34.4	34.5	38.0	**41.0**	**48.2**	39.54	29.66	
DAL/26	**41.0**	29.3	26.8	33.4	24.1	22.4	18.0	15.6	23.6	28.3	**40.4**	29.0	27.66	20.74	
DAL/27	37.0	36.4	34.8	**41.2**	28.9	29.0	22.9	19.1	28.1	-	**46.5**	32.9	32.44	24.33	
DAL/16	35.8	28.9	27.3	34.4	25.1	21.1	20.6	17.8	22.0	25.0	32.5	26.1	26.38	19.79	
DAL/17	**40.4**	28.3	29.7	29.9	25.0	23.4	18.3	-	24.2	-	40.4	28.4	28.80	21.60	
Carm/141	37.2	39.7	32.9	32.1	30.1	26.0	28.7	27.3	26.7	31.6	35.6	36.3	32.02	24.01	
DAL/07	**76.8**	-	**56.6**	-	**50.9**	**45.6**	**48.1**	**43.1**	**49.7**	**52.9**	**67.0**	**58.3**	**54.90**	**41.18**	38.1
DAL/23	36.5	37.2	25.1	35.2	23.6	20.0	18.9	17.1	21.1	26.4	-	33.9	26.82	20.11	
DAL/09	**55.4**	**58.4**	**61.4**	**46.0**	**47.3**	**45.6**	**47.2**	**46.7**	**45.4**	**43.9**	**52.4**	**52.1**	**50.15**	37.61	f
Carm/104	**57.1**		**44.0**	-	39.5	39.1	34.8	31.9	38.0	**43.7**	**59.2**	**48.2**	**43.55**	32.66	
DAL/10	**62.8**	**43.9**	**42.0**	-	35.2	37.5	32.4	28.5	35.1	41.7	62.5	-	**42.16**	31.62	
Carm/069	**58.8**	**-**	**52.1**	**47.8**	**40.5**	36.9	38.3	35.8	38.5	**44.3**	**43.8**	**50.4**	**44.29**	33.22	
DAL/12	**45.5**	**45.8**	**47.8**	**43.8**	30.8	22.2	24.7	22.3	29.6	36.4	**42.5**	**46.2**	36.47	27.35	
DAL/28	37.6	34.4	23.7	30.5	24.5	18.7	17.8	16.9	21.9	27.1	**40.3**	33.0	27.20	20.40	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DAL/04	**-**	**44.4**	36.2	33.9	33.2	29.9	28.5	27.2	32.8	37.6	**45.6**	**40.9**	35.47	26.60	
Carm/114	**54.7**	**49.6**	**46.3**		32.8	33.1	32.1	33.1	35.7	**42.6**	**50.3**	**-**	**41.03**	30.77	
Carm/113	**49.3**	**43.0**	**45.8**	**45.6**	**42.5**	38.8	37.0	32.8	36.6	**40.8**	**46.7**	**44.6**	**41.96**	31.47	
Carm/135	**41.7**	**41.5**	34.2	31.5	26.4	21.9	26.3	33.5	24.4	26.7	35.0	33.8	31.41	23.56	
CARMARTHEN															
DAC/06	**49.6**	41.2	34.0	**42.3**	29.6	26.6	30.7	30.5	33.4	35.6	**47.0**	**53.0**	37.79	28.34	
DAC/13	**49.9**	**45.4**	**41.4**	36.3	32.9	-	30.8	34.9	35.4	**40.4**	**44.4**	**46.6**	39.85	29.89	
Carm/109	**55.9**	**49.6**	**43.0**	**49.1**	36.1	34.4	32.6	34.5	37.3	**45.6**	**46.4**	**54.0**	**43.21**	32.41	
DAC/08	-	**68.4**	**71.2**	**54.6**	**60.9**	**58.3**	**52.6**	**57.6**	**56.9**	**67.1**	**78.0**	-	**62.56**	**46.92**	**44.3**
DAC/14	**53.8**	**55.2**	**44.6**	37.2	32.0	32.2	30.2	39.0	28.1	**43.7**	**41.2**	**55.2**	**41.03**	30.78	
DAC/15	36.7	51.2	37.7	31.9	27.6	25.5	29.2	31.5	29.9	35.3	31.4	**43.8**	34.31	25.73	
Carm/111	**47.1**	39.5	34.4	38.1	30.4	29.4	31.4	35.9	30.9	**41.9**	**45.2**	**53.1**	38.11	28.58	
DAC/12	**53.4**	**46.4**	**42.7**	32.7	32.3	32.9	31.4	33.5	35.6	**42.6**	39.3	**53.7**	39.71	29.78	
DAC/04	40.5	28.9	25.8	24.6	24.3	-	22.8	18.9	25.5	28.4	34.7	37.0	28.31	21.23	
Carm/072	**41.2**	46.7	38.7	32.5	30.4	30.6	30.9	37.3	36.4	39.0	36.4	**48.0**	37.34	28.01	
DAC/02	**64.1**	**65.4**	**43.4**	-	-	**40.3**	**45.4**	**45.3**	**46.7**	**58.1**	**61.3**	**63.7**	**53.37**	**40.03**	37.8
DAC/16	**54.3**	**51.2**	30.1	**49.6**	34.4	36.8	**40.3**	39.7	38.5	**50.6**	**53.7**	**45.8**	**43.75**	32.81	
Carm/001	**54.4**	**42.5**	*35.4*	*37.8*	*28.3*	*27.1*	*30.2*	*27.1*	*35.2*	*37.9*	**47.2**	*39.3*	36.87	27.65	
Carm/084	**56.4**	**41.2**	*35.1*	**40.2**	*32.9*	*31.7*	*30.8*	*28.1*	*35.3*	-	-	-	36.86	27.64	
DAC/05	**50.2**	**53.5**	**43.4**	**40.6**	*38.5*	*31.6*	*34.7*	*35.6*	*36.0*	-	**47.2**	**50.5**	**41.98**	31.49	
Carm/106	**58.7**	**43.7**	**50.9**	*35.9*	*35.6*	*34.2*	*34.1*	*39.0*	**44.0**	**48.8**	**47.2**	**57.7**	**44.15**	33.11	
Carm/134	24.3	17.0	15.6	14.0	11.9	9.0	9.7	8.3	12	17.6	24.3	20.4	15.34	11.51	
Carm/126	**43.1**	27.8	25.1	24.0	23.8	20.4	20.8	16.0	23.6	27.1	34.1	28.0	26.15	19.61	
Carm/132	30.2	21.7	17.9	21.7	18.4	15.3	15.0	13.7	20.5	21.7	26	25.8	20.66	15.49	
Carm/133	24.4	18.5	15.7	17.4	14.8	11.4	11.7	10.7	13.2	19.8	26.3	20.9	17.07	12.80	
Carm/142	-	22.9	19.8	-	20.2	16.7	16.2	12.9	17.4	23.3	30.2	24.9	20.45	15.34	
Carm/139	27.8	22.4	23.1	16.3	17.3	14.8	14.8	12.9	16.5	21.8	25.6	27.2	20.04	15.03	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
Carm/140	25.4	19.2	20.0	14.8	17.1	13.4	13.8	14.0	16.3	20.4	23.2	23.7	18.44	13.83	
LLANDEILO															
FA/01	24.2	17.7	17.0	17.3	13.3	15.5	15.4	15.5	15.5	18.5	24.7	22.4	18.08	13.56	
DA/15	37.2	34.2	28.3	31.5	27.4	22.3	23.7	21.1	25.0	29.8	38.3	32.7	29.29	21.97	
DA/01	-	31.2	28.8	28.1	24.9	24.6	22.5	21.0	21.1	28.9	35.3	33.0	27.22	20.41	
DA/03	34.0	38.2	30.5	30.8	23.3	22.9	23.1	25.7	24.0	30.6	36.1	34.2	29.45	22.09	
Carm/013	**48.8**	**40.9**	**45.9**	30.1	33.3	32.0	33.5	34.3	36.3	38.7	**45.1**	39.0	38.16	28.62	
DA/05 (A), (B) & (C)	**47.4**	39.7	37.1	**47.3**	37.2	35.1	35.4	34.3	36.0	**42.3**	**51.2**	**42.2**	**40.43**	30.33	
DA/07	**45.1**	39.8	**44.7**	**53.1**	**42.5**	**42.2**	39.5	37.0	39.0	**45.7**	**56.4**	**48.1**	**44.42**	33.32	
Carm/083	**55.5**	**51.8**	**46.6**	**60.5**	**44.6**	**44.7**	**42.8**	35.7	**40.7**	**51.1**	**66.5**	**48.5**	**49.08**	36.81	33.1
DA/09	**63.0**	**55.5**	**51.5**	**63.0**	**48.2**	**46.7**	**43.6**	38.6	**43.5**	**49.1**	**68.6**	**47.0**	**51.53**	38.64	f
DA/10	**48.8**	**50.0**	**44.3**	**55.0**	**42.8**	**44.0**	**40.4**	33.2	39.9	**49.6**	**62.1**	-	**46.37**	34.78	
DA/11	**52.2**	**43.8**	**51.4**	**42.2**	**45.0**	**41.9**	**40.3**	35.9	39.9	**46.5**	**51.8**	**54.9**	**45.48**	34.11	
DA/12	31.6	35.7	28.2	26.8	22.4	17.6	21.8	22.1	22.8	22.0	-	34.6	**25.96**	19.47	
DA/13	**46.3**	**50.1**	**41.5**	**41.7**	35.9	38.2	38.4	37.7	37.8	**43.2**	**49.5**	**46.7**	**42.25**	31.69	
DA/14	35.0	34.9	28.1	27.8	25.6	25.2	23.4	-	28.4	31.9	38.5	33.8	**30.24**	22.68	
DA/16	36.2	35.4	**42.4**	34.6	34.9	33.0	33.7	31.4	33.7	36.7	**43.4**	38.4	**36.15**	27.11	
BURRY PORT															
Carm/127	21.9	17.2	14.7	16.6	13.4	9.1	-	8.8	11.9	14.4	24.7	18.0	**15.52**	11.64	
Carm/128	22.7	21.7	18.3	18.7	16.8	13.4	14.8	14.2	15.9	18.6	26.0	22.1	**18.60**	13.95	
LLANGENNECH															
LLG1	-	-	-	15.9	11.5	8.6	8.6	8.4	11	-	24.3	19.9	**13.53**	11.0(1)	
LLG2	-	-	-	31	23.1	18.6	17.8	17.4	20.1	25.0	34.5	32	**24.43**	18.33	
LLG3	-	-	-	-	18.1	16.4	15.0	12.7	-	22.0	35.3	29.9	**21.34**	18.0(1)	
CROSS HANDS / ECONOMIC LINK ROAD															
Carm/ELR1	**46.2**	**52.8**	**40.0**	**46.9**	39.2	32.3	34.9	**40.2**	38.8	**49.8**	**56.3**	**49.9**	**43.94**	32.96	

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
Carm/ELR2	34.8	31.1	23.4	28.1	26.2	19.5	21.2	22.3	22.9	27.1	36.9	30.8	27.03	20.27	
Carm/ELR3	24.4	30.1	19.5	-	19.4	14.4	15.5	-	18.6	-	35.1	-	22.13	16.5(1)	
Carm/ELR4	21.6	23.2	18.6	18.1	16.4	11.6	12.2	13.7	14.6	20.3	29.8	23.4	18.63	13.97	
Carm/ELR6	15.2	15.2	12.8	14.7	10.1	7.8	7.7	--	-	11.7	18.9	14.9	12.90	9.68	
Carm/ELR7	13.8	13.9	11.7	15.0	9.1	-	6.9	8.5	8.2	10.1	14.3	12.5	11.27	8.45	
Carm/ELR8	12.2	11.2	9.6	-	9.0	5.7	6.5	7.8	7.1	9.1	13.7	10.3	9.29	6.97	
Carm/ELR9	13.2	14.5	8.9	8.4	6.6	4.8	5.4	6.9	7.1	9.7	16.0	13.4	9.58	7.18	
Carm/ELR10	-	-	-	-	12.6	10.6	10.4	-	-	-	-	20.4	13.50	12.5(1)	
Carm/ELR11	20.0	15.1	14.0	11.9	8.8	6.1	7.8	10.1	10.3	15.1	21.6	15.4	13.02	9.76	
Carm/ELR12	21.5	18.3	-	13.9	12.3	9.5	10.6	12.9	-	16.3	24.2	23.4	16.29	12.22	
Carm/ELR16	*10.0*	10.9	8.4	7.5	6.0	3.8	3.8	5.5	5.5	7.9	13.2		7.50	5.63	
Carm/ELR19	10.8	11.3	8.0	6.7	5.4	3.6	4.3	6.2	5.2	7.4	12.8	11.9	7.80	5.85	
Carm/ELR20	11.2	12.6	8.7	6.6	6.1	4.0	4.3	6.0	4.9	7.7	12.2	10.4	7.89	5.92	
Carm/ELR21	15.7	18.9	10.9	10.7	10.3	7.0	8.8	10.2	10.7	12.9	19.3	19.6	12.92	9.69	
Carm/ELR22	26.1	25.2		18.5	17.6	12.3	15.0	15.7	18.6	18.5	28.7	27.0	20.29	15.22	
LLANDEILO PRIMARY SCHOOL															
YGL1	-	-	-	23.4	21.8	18.4	18.8	17.0	19.3	24.1	31.6	27.3	22.41	16.81	
YGL2	-	-	-	11.4	8.2	6.7	7.5	7.2	7.0	11.0	15.9	-	9.36	7.8(1)	
YGL3	-	-	-	8.9	6.9	5.3	5.3	5.7	5.7	9.2	16.1	10.5	8.18	6.13	
YGL4	-	-	-	7.9	6.1	4.5	-	-	5.0	8.5	15.4	11.3	8.39	6.2(1)	
YGL5	-	-	-	9.6	8.3	6.5	6.6	6.2	-	11.2	17.0	12.8	9.78	7.8(1)	
YGL6	-	-	-	-	8.8	7.6	7.6	8.4	-	-	15.5	14.7	10.43	8.9(1)	
AMMAN VALLEY SCHOOL, AMMANFORD															
MAMM/1	-	-	-	-	-	-	10.9	-	-	21.0	27.8	-	19.90	15.1(1)	
MAMM/2	-	-	-	-	-	-	6.5	9.9	13.1	15.4	24.7	22.7	15.38	12.8(1)	
MAMM/3	-	-	-	-	-	-	11.4	11.5	16.3	22.0	30.7	28.7	20.10	16.7(1)	
MAMM/4	-	-	-	-	-	-	11.7	12.8	16.8	21.5	28.5	26.9	19.70	16.4(1)	

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure. (f indicates monitor on façade of relevant receptor)

Appendix B: A Summary of Local Air Quality Management

Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995 and associated government guidance. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas and to determine whether or not the air quality objectives are being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) within 18 months of declaration setting out the measures it intends to put in place in pursuit of the objectives. Action plans should then be reviewed and updated where necessary at least every 5 years.

For Local Authorities in Wales, an Annual Progress Report replaces all other formal reporting requirements and have a very clear purpose of updating the general public on air quality, including what ongoing actions are being taken locally to improve it if necessary.

Air Quality Objectives

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table B.1.

The table shows the objectives in units of microgrammes per cubic metre µg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table B.1 – Air Quality Objectives Included in Regulations for the Purpose of LAQM in Wales

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
	40µg/m^3	Annual mean	31.12.2010
Sulphur dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	16.25µg/m^3	Running annual mean	31.12.2003
	5µg/m^3	Annual mean	31 12 2010
1,3 Butadiene	2.25µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m^3	Maximum Daily Running 8-Hour mean	31.12.2003
Lead	0.25µg/m^3	Annual Mean	31.12.2008

Appendix C: Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

SOCOTEC Didcot prepares and analyses the diffusion tubes on behalf of Carmarthenshire County Council. The tube preparation method is acetone:triethanolamine, 50:50 mixtures. The bias adjustment factor chosen was 0.75 and taken from the Review and Assessment Helpdesk Database. The version number of the database was 09/20 (final).

Factor from Local Co-location Studies

Carmarthenshire County Council has not carried out a co-location study.

Discussion of Choice of Factor to Use

The national bias adjustment factor was used because a co-location study has not been carried out locally. The latest version of the tube bias adjustment spread sheet is 09/20 (final), as detailed on the Review and Assessment Helpdesk website. SOCOTEC have 42 studies listed for 2019 that gives an overall bias adjustment figure of 0.75 for 2019. This bias adjustment figure has been applied to all the diffusion tube monitoring results in Carmarthenshire.

PM Monitoring Adjustment

No PM10 monitoring exercise was carried out during 2019 and therefore no relevant details are required here.

Short-Term to Long-Term Data Adjustment

Using the method provided in Technical Guidance TG (16) it is possible to estimate what the annual mean concentration may have been had there been 12 months of data capture for the tube site. This was achieved using the LAQM Annualisation Tool (v.1.0 June 2020) and 2019 automatic monitoring data from other locations within the Country and averaging the data and attaining a ratio figure for use with the sites under review. The sites used for this exercise were Narberth and Cwmbran.

For quality assurance, comparison checks were also conducted using local diffusion tube sites within the County. The sites used for this exercise were; Llandeilo – 8 Rhosmaen Street (FA/01), Carmarthen – 2 College Street (Carm/134), Johnstown – 72 Llansteffan Road (Carm/133), Lloyds Bank,New Street, Burry Port (Carm/128) and

Gorslas - Gate Street (Carm/ELR9). It was not possible to obtain data from local urban background sites, as these are not available therefore a mixture of kerbside and roadside sites was chosen to provide an average background concentration for the area.

Ten separate short-term periods applied for the results that requiring annualisation; where the valid data capture was less than 9 months. Further details can be found in 'Annualised Data Report (2019)' in Appendix E.

Table C.1 – Short-Term to Long-Term Monitoring Data Adjustment for LLG1

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.6	1.00
Cwmbran	Urban Background	11.7	10.0	1.17
Average				1.09

Table C.2 – Short-Term to Long-Term Monitoring Data Adjustment for LLG3

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.1	1.14
Cwmbran	Urban Background	11.7	10.6	1.11
Average				1.13

Table C.3 – Short-Term to Long-Term Monitoring Data Adjustment for Carm/ELR3

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.6	1.01
Cwmbran	Urban Background	11.7	12.0	0.98
Average				0.99

Table C.4 – Short-Term to Long-Term Monitoring Data Adjustment for Carm/ELR10

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.0	1.19
Cwmbran	Urban Background	11.7	9.2	1.27
Average				1.23

Table C.5 – Short-Term to Long-Term Monitoring Data Adjustment for YGL2

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.5	1.01
Cwmbran	Urban Background	11.7	9.6	1.22
Average				1.12

Table C.6 – Short-Term to Long-Term Monitoring Data Adjustment for YGL4

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.8	0.93
Cwmbran	Urban Background	11.7	11.4	1.03
Average				0.98

Table C.7 – Short-Term to Long-Term Monitoring Data Adjustment for YGL5

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.5	1.01
Cwmbran	Urban Background	11.7	10.5	1.11
Average				1.06

Table C.8 – Short-Term to Long-Term Monitoring Data Adjustment for YGL6

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.2	1.13
Cwmbran	Urban Background	11.7	10.3	1.14
Average				1.14

Table C.9 – Short-Term to Long-Term Monitoring Data Adjustment for MAMM/1

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.4	1.06
Cwmbran	Urban Background	11.7	12.2	0.96

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Average				1.01

Table C.10 – Short-Term to Long-Term Monitoring Data Adjustment for MAMM/2, MAMM/3 and MAMM/4

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Narberth	Rural Background	3.6	3.1	1.17
Cwmbran	Urban Background	11.7	11.2	1.05
Average				1.11

QA/QC of Automatic Monitoring

The day to day management of the Automatic Urban and Rural Network (AURN) sites is contracted to Bureau Veritas and Ricardo Energy & Environment undertakes the role of Quality Assurance and Control Unit for the entire AURN. Local experienced organisations are responsible for the operation of individual monitoring sites and calibration gases for the network are supplied by BOC Ltd and are provided with a UKAS certificate of calibration by Ricardo Energy & Environment. Ricardo conducts a QA/QC audit to ratify the data each quarter. Further information can be found on the Defra UK Air Website for Monitoring Networks.

QA/QC of Diffusion Tube Monitoring

Tube Precision

SOCOTEC Didcot using a preparation method of 50% TEA in Acetone and carried out 41 studies in 2019, of which 40 were rated ‘Good’ precision results for Nitrogen Dioxide diffusion tube colocation studies. Tube precision is rated as good where the coefficient of variation (CV) of eight or more diffusion tube replicate periods is less than 20% and the average CV of all monitoring periods is less than 10%. 1 study was rated ‘poor’ precision. The distinction between "good" and "poor" precision is an indicator of how well the same measurement can be reproduced. This precision will reflect the laboratory’s performance/consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field.

This information was obtained from the document ‘Tube Precision 2019 version 09-20 Final’ located on the Defra LAQM Helpdesk website.

AIR PT Results

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air.

AIR PT started in April 2014, which combined two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme. AIR NO2 PT forms an integral part of the UK NO2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM).

The results below are for Environmental Services Group, Didcot [1].

Table C.11 – AIR PT Rounds

AIR PT Round	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034
Round conducted in the period	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019	April – May 2019	July – August 2019	September – November 2019
SOCOTEC [1]	100 %	100 %	100 %	100 %	87.5%	100 %	100 %	100 %

[1] Participant subscribes to two sets of test samples (2 X 4 test samples) in each AIR PT round.

The above details were obtained from the document 'LAQM NO_2 PT Summary - AIR PT Rounds 24 to 34 January 2018 – November 2019 located on the Defra LAQM Helpdesk website.

Appendix D: AQMA Boundary Maps

Figure D.1 – Llandeilo AQMA Boundary Map

Figure D.2 – Carmarthen AQMA Boundary Map

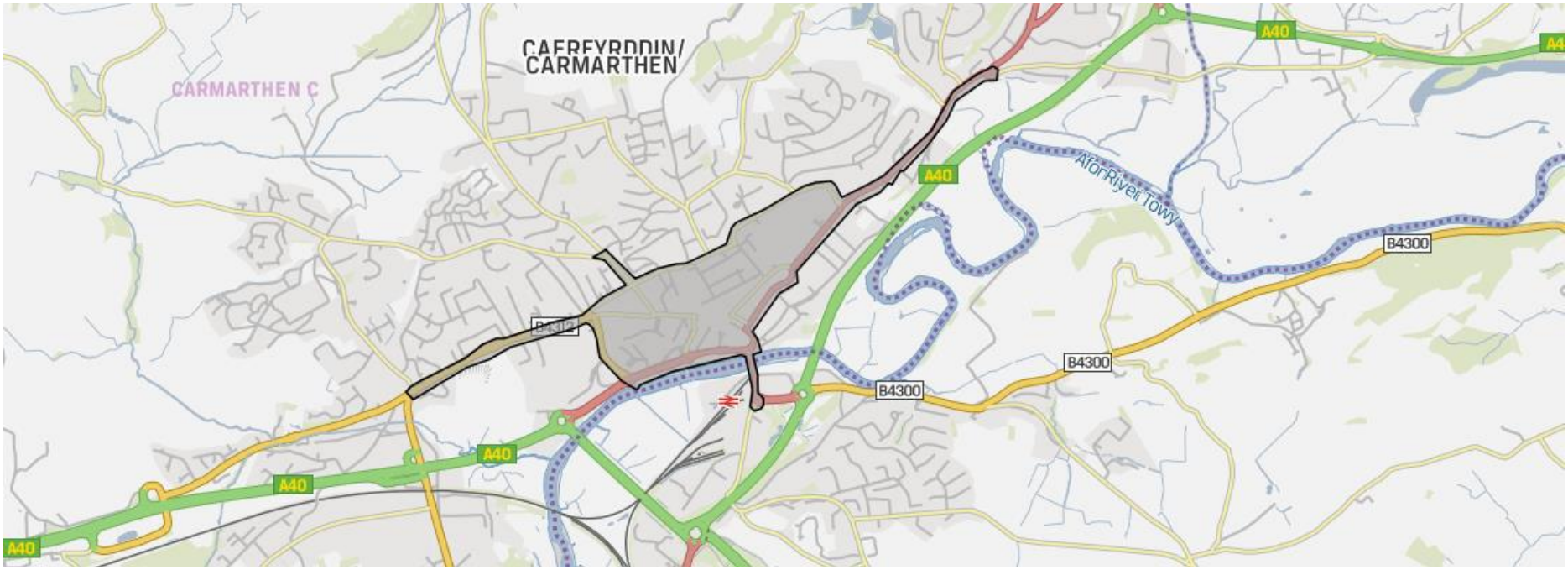
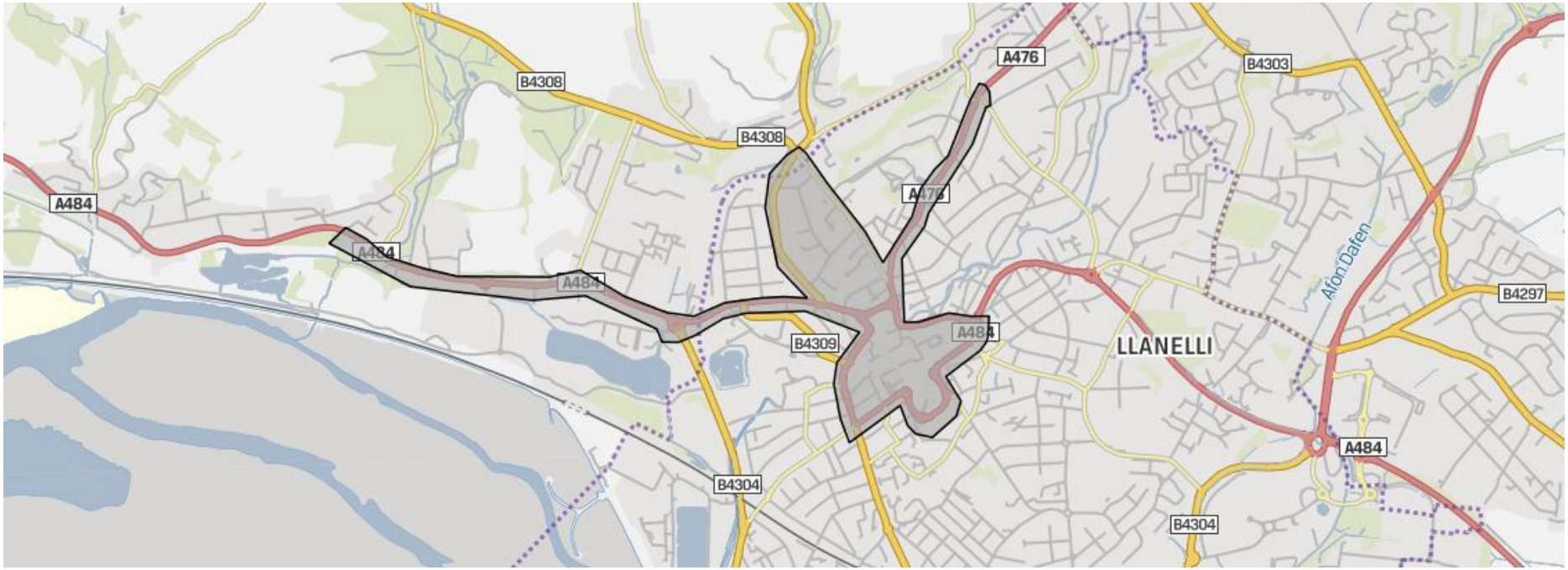


Figure D.3 – Llanelli AQMA Boundary Map



APPENDIX E

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

Annualised Data Report (2019) for use with the 2020 Progress Report

(September 2020)

Cyngor Sir Gâr
Carmarthenshire
County Council

Purpose

This document contains details for the calculations relating to annualised data that has been included in the 2020 Progress Report to obtain a more accurate prediction of what the annual results for tube sites LLG1, LLG3, Carm/ELR3, Carm/ELR10, YGL2, YGL4, YTS5, YGL6, MAMM/, MAMM/2, MAMM/3, MAMM/4 would have been for 2019.

Background

Diffusion tube sites LLG1 at Llangennech School and LLG3 at 26 Bridge Street, Llangennech where new sites set up in to monitor the NO_2 in Llangennech following concerns that traffic is increasing on this area and there is congestion during peak times. This area is outside of the Llanelli Air Quality Management Area. The screening exercise started in April 2019 and unfortunately one tube was missing at LLG1 and two tubes missing at LLG3. It was therefore only feasible to capture just 7-8 months of data for the year and therefore it is considered appropriate to annualise the data in order to obtain a better idea of what the annual mean figure may have been.

In Cross Hands, several diffusion tube monitoring sites were also set up in 2017 to monitor the current levels of NO_2 around the vicinity of the new Economic Link Road, which will travel between Llandeilo Road and Black Lion Road. This link road is intended to relieve the congestion that is currently experienced around the Gorslas six ways junction and Cross Hands Road as vehicles approach the Cross Hands roundabout.
Diffusion Tube Carm/ELR3 (Gorslas Sixways) was missing on four occasions and ELR/10 (Norton Road, nr No. 42), was unfortunately missing on several collection days and only four months of valid data was captured during the year. Nevertheless, more than 3 months of data was captured so it is feasible and necessary to annualise this result.

As part of a 9-month project working with Llandeilo Primary School in Llandeilo, four of the six diffusion tubes sites located around the school had missing tubes on at least one collection date. YGL2 (Nursery Yard) and YGL5 (2 Heol Y Garreg Las) each had one missing tube. YGL4 (Llandeilo School carpark) had one missing tube and another tube found on the ground and YGL6 (Forest Garden, Heol Y Garreg Las) had 3 missing tubes during the monitoring period. It was therefore only possible to capture 6-8 months data at these sites.

As part of a 6-month screening exercise around Amman Valley School in Margaret Street, Ammanford four diffusion tubes sites were placed near the school entrance. One of the sites MAMM/1 (School Bus Stop) unfortunately had a missing tube on two occasions and a tube found on the ground on another occasion, so only 3 months valid data capture was obtained.

Three months data is the minimum period required to enable the results to be annualised and so it is feasible and necessary to annualise this result. The other three sites MAMM/2 (School Gates), MAMM/3 (25 Margaret Street) and MAMM/4 (51/49 Margaret Street) each provided six months valid data capture for the full monitoring period, however as this is still below 75% of the calendar year, it is necessary to annualise the results.

The monthly raw tube data for the months collected for each screening exercise is shown in Tables 1a below, along with the raw measured mean and the bias adjusted result when multiplied by 0.75 (the bias adjusted figure for 2019).

Table 1a – Monthly Raw data (µg/m³) for the sites to be annualised

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Measured Mean	Bias Adjusted
LLG1				15.9	11.5	8.6	8.6	8.4	11.0		24.3	19.9	13.5	10.1
LLG3					18.1	16.4	15.0	12.7		22.0	35.3	29.9	21.3	16.0
Carm/ ELR3	24.4	30.1	19.5		19.4	14.4	15.5		18.6		35.1		22.1	16.6
Carm/ ELR10					12.6	10.6	10.4					20.4	13.5	10.1
YGL2				11.4	8.2	6.7	7.5	7.2	7.0	11.0	15.9		9.4	7.0
YGL4				7.9	6.1	4.5			5.0	8.5	15.4	11.3	8.4	6.3
YGL5				9.6	8.3	6.5	6.6	6.2		11.2	17.0	12.8	9.8	7.3
YGL6					8.8	7.6	7.6	8.4			15.5	14.7	10.4	7.8
MAMM/1							10.9			21.0	27.8		19.9	14.9
MAMM/2							6.5	9.9	13.1	15.4	24.7	22.7	15.4	11.5
MAMM/3							11.4	11.5	16.3	22.0	30.7	28.7	20.1	15.1
MAMM/4							11.7	12.8	16.8	21.5	28.5	26.9	19.7	14.8

Annualised Data

Using the method provided in Technical Guidance TG (16) it is possible to estimate what the annual mean concentration may have been had there been 12 months of data capture for the tube site. This is achieved using 2019 tube data from other locations within the county and averaging the data and attaining a ratio figure for use with the sites under review. The sites used for this exercise were; Llandeilo – 8 Rhosmaen Street (FA/01), Carmarthen – 2 College Street (Carm/134), Johnstown – 72 Llansteffan Road (Carm/133), New Street, Burry Port (Carm/128) and Gorslas - Gate Street (Carm/ELR9)

It was not possible to obtain data from local urban background sites, because these were not available, therefore a mixture of kerbside and roadside sites were chosen to provide a more representative average background concentration for the area.

Table 2a below shows the 2019 raw monthly data for the sites along with the Annual mean (Am) and Tables 2b to 2k provide the raw data for relevant periods in 2019, along with the Period Mean. The data capture for 8 Rhosmaen Street (FA/01), 2 College Street (Carm/134), 72 Llansteffan Road (Carm/133), Lloyds Bank, New Street (Carm/128) and Gate Street (ELR/9) was 100% for 2019.

Table 2a – 2019 raw data for locations with 100% data capture (Annual Mean)

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean (Am)
FA/01	24.2	17.7	17	17.3	13.3	15.5	15.4	15.5	15.5	18.5	24.7	22.4	**18.1**
Carm/134	24.3	17	15.6	14	11.9	9	9.7	8.3	12	17.6	24.3	20.4	**15.3**
Carm/133	24.4	18.5	15.7	17.4	14.8	11.4	11.7	10.7	13.2	19.8	26.3	20.9	**17.1**
Carm/128	22.7	21.7	18.3	18.7	16.8	13.4	14.8	14.2	15.9	18.6	26	22.1	**18.6**
ELR/9	13.2	14.5	8.9	8.4	6.6	4.8	5.4	6.9	7.1	9.7	16	13.4	**9.6**

The Period Mean is calculated below for those sites where a shorter period of valid data is captured. In Tables 2b- 2k below, separate period means have been calculated for the same period of valid data capture applicable to the sites.

Table 2b – 2019 raw data - 8 month Period Mean for Llangennech School, Llanelli, LLG1

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
LLG1				*15.9*	*11.5*	*8.6*	*8.6*	*8.4*	*11*		*24.3*	*19.9*	13.5
FA/01				17.3	13.3	15.5	15.4	15.5	15.5		24.7	22.4	17.5
Carm/134				14	11.9	9	9.7	8.3	12		24.3	20.4	13.7
Carm/133				17.4	14.8	11.4	11.7	10.7	13.2		26.3	20.9	15.8
Carm/128				18.7	16.8	13.4	14.8	14.2	15.9		26	22.1	17.7
ELR/9				8.4	6.6	4.8	5.4	6.9	7.1		16	13.4	8.6

Table 2c – 2019 raw data - 7 month Period Mean for 26 Bridge Street, Llangennech, Llanelli, LLG3

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
LLG3					18.1	16.4	15	12.7		22	35.3	29.9	21.3
FA 01					13.3	15.5	15.4	15.5		18.5	24.7	22.4	17.9
Carm/134					11.9	9	9.7	8.3		17.6	24.3	20.4	14.5
Carm/133					14.8	11.4	11.7	10.7		19.8	26.3	20.9	16.5
Carm/128					16.8	13.4	14.8	14.2		18.6	26	22.1	18.0
ELR/9					6.6	4.8	5.4	6.9		9.7	16	13.4	9.0

Table 2d – 2019 raw data 8 Month Period Mean for Gorslas Sixways, Carm/ELR3

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
Carm/ELR3	24.4	30.1	19.5		19.4	14.4	15.5		18.6		35.1		22.1
FA/01	24.2	17.7	17		13.3	15.5	15.4		15.5		24.7		17.9
Carm/134	24.3	17	15.6		11.9	9.0	9.7		12		24.3		15.5
Carm/133	24.4	18.5	15.7		14.8	11.4	11.7		13.2		26.3		17.0
Carm/128	22.7	21.7	18.3		16.8	13.4	14.8		15.9		26		18.7
ELR/9	13.2	14.5	8.9		6.6	4.8	5.4		7.1		16		9.6

Table 2e – 2019 raw data 8 Month Period Mean for Norton Road,, Gorslas, Carm/ELR10

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
Carm/ELR10					12.6	10.6	10.4					20.4	13.5
FA/ 01					13.3	15.5	15.4					22.4	16.7
Carm/134					11.9	9.0	9.7					20.4	12.8
Carm/133					14.8	11.4	11.7					20.9	14.7
Carm/128					16.8	13.4	14.8					22.1	16.8
ELR/9					6.6	4.8	5.4					13.4	7.6

Table 2f – 2019 raw data 8 Month Period Mean for YGL2

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
YGL2				11.4	8.2	6.7	7.5	7.2	7.0	11	15.9		9.4
FA/01				17.3	13.3	15.5	15.4	15.5	15.5	18.5	24.7		17.0
Carm/134				14	11.9	9	9.7	8.3	12	17.6	24.3		13.4
Carm/133				17.4	14.8	11.4	11.7	10.7	13.2	19.8	26.3		15.7
Carm/128				18.7	16.8	13.4	14.8	14.2	15.9	18.6	26		17.3
ELR/9				8.4	6.6	4.8	5.4	6.9	7.1	9.7	16		8.1

Table 2g – 2019 raw data 7 Month Period Mean for YGL4

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
YGL4				7.9	6.1	4.5			5.0	8.5	15.4	11.3	8.4
FA/01				17.3	13.3	15.5			15.5	18.5	24.7	22.4	18.2
Carm/134				14	11.9	9			12	17.6	24.3	20.4	15.6
Carm/133				17.4	14.8	11.4			13.2	19.8	26.3	20.9	17.7
Carm/128				18.7	16.8	13.4			15.9	18.6	26	22.1	18.8
ELR/9				8.4	6.6	4.8			7.1	9.7	16	13.4	9.4

Table 2h – 2019 raw data 8 Month Period Mean for YGL5

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
YGL5				9.6	8.3	6.5	6.6	6.2		11.2	17	12.8	9.8
FA/01				17.3	13.3	15.5	15.4	15.5		18.5	24.7	22.4	17.8
Carm/134				14	11.9	9	9.7	8.3		17.6	24.3	20.4	14.4
Carm/133				17.4	14.8	11.4	11.7	10.7		19.8	26.3	20.9	16.6
Carm/128				18.7	16.8	13.4	14.8	14.2		18.6	26	22.1	18.1
ELR/9				8.4	6.6	4.8	5.4	6.9		9.7	16	13.4	8.9

Table 2i – 2019 raw data 6 Month Period Mean for YGL6

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
YGL6					8.8	7.6	7.6	8.4			15.5	14.7	10.4
FA/01					13.3	15.5	15.4	15.5			24.7	22.4	17.8
Carm/134					11.9	9.0	9.7	8.3			24.3	20.4	13.9
Carm/133					14.8	11.4	11.7	10.7			26.3	20.9	16.0
Carm/128					16.8	13.4	14.8	14.2			26	22.1	17.9
ELR/9					6.6	4.8	5.4	6.9			16	13.4	8.9

Table 2j – 2019 raw data 3 Month Period Mean for MAMM/1

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
MAMM/1							10.9			21	27.8		19.9
FA/01							15.4			18.5	24.7		19.5
Carm/134							9.7			17.6	24.3		17.2
Carm/133							11.7			19.8	26.3		19.3
Carm/128							14.8			18.6	26		19.8
ELR/9							5.4			9.7	16		10.4

Table 2k – 2019 raw data 6 Month Period Mean for MAMM/2, MAMM/3, and MAMM/4

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
MAMM/2							6.5	9.9	13.1	15.4	24.7	22.7	15.4
MAMM/3							11.4	11.5	16.3	22	30.7	28.7	20.1
MAMM/4							11.7	12.8	16.8	21.5	28.5	26.9	19.7
FA/01							15.4	15.5	15.5	18.5	24.7	22.4	18.7
Carm/134							9.7	8.3	12	17.6	24.3	20.4	15.4
Carm/133							11.7	10.7	13.2	19.8	26.3	20.9	17.1
Carm/128							14.8	14.2	15.9	18.6	26	22.1	18.6
ELR/9							5.4	6.9	7.1	9.7	16	13.4	9.8

The ratio figure Ra can be found by dividing the Annual Mean (Am) by the relevant Period Mean (Pm) for each of the sites and then averaging the results. This is illustrated in Table 3a and 3b below.

Table 3a – Ratio Figure Ra from local diffusion tube sites

Tube Id	Annual Mean (Am)	LLG1 Period Mean (Pm)	Ratio Am/ Pm	LLG3 Period Mean (Pm)	Ratio Am/ Pm	Carm/ELR3 Period Mean (Pm)	Ratio Am/ Pm
FA/ 01	18.1	17.5	1.04	17.9	1.01	17.9	1.01
Carm/134	15.3	13.7	1.12	14.5	1.06	15.5	0.99
Carm/133	17.1	15.8	1.08	16.5	1.03	17.0	1.00
Carm/128	18.6	17.7	1.05	18.0	1.03	18.7	0.99
Carm/ ELR9	9.6	8.6	1.12	9.0	1.07	9.6	1.00
Average Ra		**Ra=**	**1.08**	**Ra=**	**1.04**	**Ra=**	**1.00**

Table 3b – Ratio Figure Ra from local diffusion tube sites

Tube Id	Annual Mean (Am)	Carm/ ELR10 Period Mean (Pm)	Ratio Am/Pm	YGL2 Period Mean (Pm)	Ratio Am/Pm	YGL4 Period Mean (Pm)	Ratio Am/Pm
FA/ 01	18.1	16.7	1.09	17.0	1.07	18.2	1.00
Carm/134	15.3	12.8	1.20	13.4	1.15	15.6	0.98
Carm/133	17.1	14.7	1.16	15.7	1.09	17.7	0.96
Carm/128	18.6	16.8	1.11	17.3	1.08	18.8	0.99
Carm/ ELR9	9.6	7.6	1.27	8.1	1.18	9.4	1.02
Average Ra		**Ra=**	**1.17**	**Ra=**	**1.11**	**Ra=**	**0.99**

Table 3c – Ratio Figure Ra from local diffusion tube sites

Tube Id	Annual Mean (Am)	YGL5 Period Mean (Pm)	Ratio Am/ Pm	YGL6 Period Mean (Pm)	Ratio Am/Pm	MAMM/1 Period Mean (Pm)	Ratio Am/ Pm
FA/ 01	18.1	17.8	1.01	17.8	1.02	19.5	0.93
Carm/134	15.3	14.4	1.07	13.9	1.10	17.2	0.89
Carm/133	17.1	16.6	1.03	16.0	1.07	19.3	0.89
Carm/128	18.6	18.1	1.03	17.9	1.04	19.8	0.94
Carm/ ELR9	9.6	8.9	1.08	8.9	1.08	10.4	0.92
Average Ra		**Ra=**	**1.04**	**Ra=**	**1.06**	**Ra=**	**0.91**

Table 3d – Ratio Figure Ra from local diffusion tube sites

Tube Id	Annual Mean (Am)	MAMM/2, MAMM/3 & MAMM/4 Period Mean (Pm)	Ratio Am/ Pm
FA/ 01	18.1	18.7	0.97
Carm/134	15.3	15.4	1.00
Carm/133	17.1	17.1	1.00
Carm/128	18.6	18.6	1.00
Carm/ ELR9	9.6	9.8	0.98
Average Ra		**Ra=**	**0.99**

The Ra figure can then be used with the site tube data for the relevant monitoring period to estimate the annual mean concentration for the site and bias adjusted using 0.75. This is the latest figure for 2019 from spread sheet 09/20 obtained from the Review and Assessment Helpdesk web site.

Table 4 below shows the measured mean multiplied by the ratio figure applicable, as obtained from Tables 3a to 3c above to provide a site mean. The site mean can then be bias adjusted using 0.75 being the latest figure from the Review and Assessment Helpdesk (09/20) and this provides the data post bias in the final column. The final column figure is considered to be more realistic of what the annual mean figure would have been if there had been 12 months of data capture.

Table 4 – Annualisation using data from local diffusion tube monitoring sites

Tube Id	2019 Measured Mean (M)	Ra	Site Mean (S) (MxRa)	Adjust Factor (BAF)	Data Post Bias (SxBAF)
LLG1	13.5	1.08	14.6	0.75	11.0
LLG3	21.3	1.04	22.2	0.75	16.7
Carm/ ELR3	22.1	1.00	22.1	0.75	16.6
Carm/ ELR10	13.5	1.17	15.7	0.75	11.8
YGL2	9.4	1.11	10.4	0.75	7.8
YGL4	8.4	0.99	8.3	0.75	6.2
YGL5	9.8	1.04	10.2	0.75	7.6
YGL6	10.4	1.06	11.1	0.75	8.3
MAMM/1	19.9	0.91	18.2	0.75	13.6
MAMM/2	15.4	0.99	15.2	0.75	11.4
MAMM/3	20.1	0.99	19.9	0.75	14.9
MAMM/4	19.7	0.99	19.5	0.75	14.6

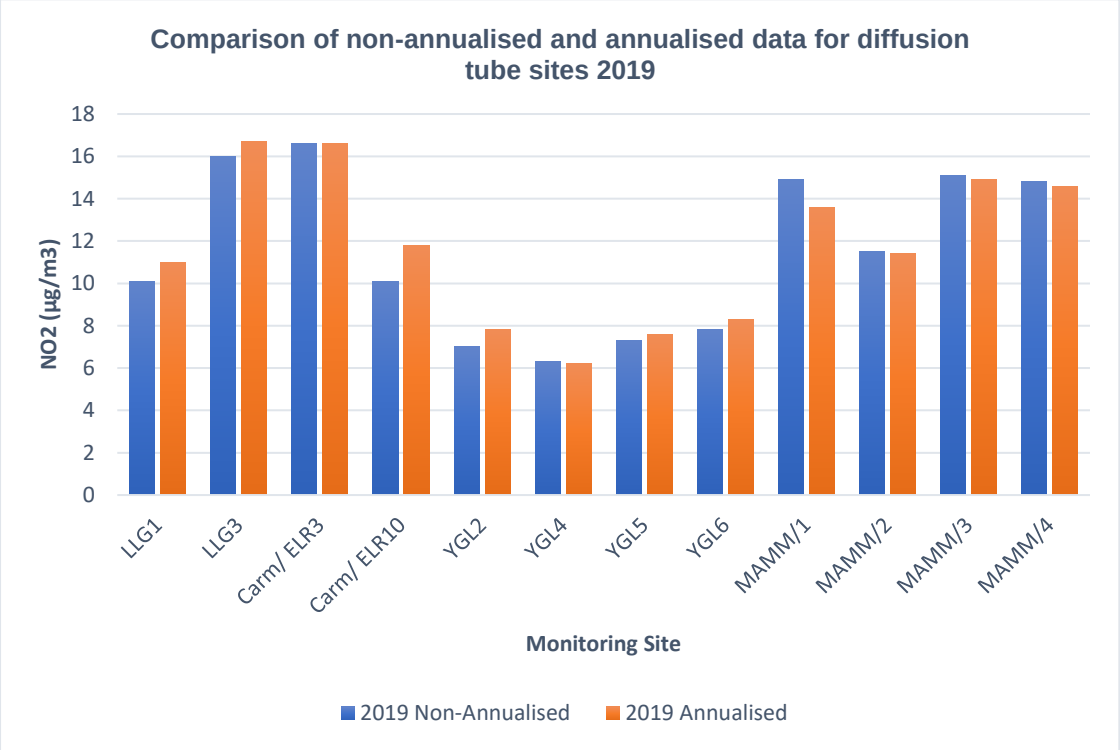
Table 5 below shows the difference between the Data Post Bias (annualised) and non-annualised results for the tube sites requiring annualisation. The Data Post Bias figure in Table 4 above (2019 Annualised) has been included in the final figures of the 2020 Progress Report.

Table 5 – Comparison of non-annualised and annualised results (µg/m^3)

Tube Id	2019 Non-Annualised	2019 Annualised	Difference (µg/m^3)
LLG1	10.1	11.0	0.9
LLG3	16.0	16.7	0.7
Carm/ ELR3	16.6	16.6	0
Carm/ ELR10	10.1	11.8	1.7
YGL2	7.0	7.8	0.8
YGL4	6.3	6.2	-0.1
YGL5	7.3	7.6	0.3
YGL6	7.8	8.3	0.5
MAMM/1	14.9	13.6	-1.3
MAMM/2	11.5	11.4	-0.1
MAMM/3	15.1	14.9	-0.2
MAMM/4	14.8	14.6	-0.2

The results demonstrate a small difference in levels, generally within +/- 2 µg/m^3. The largest differences sitting with tubes Carm/ELR10 for Norton Road, Gorslas and MAMM/1 for Margaret St, School Bus Stop. Both sites captured a smaller amount of valid data 3-4 months). All monitoring sites remain significantly below the annual Air Quality Objective of 40µg/m^3. Figure 1 below illustrates this.

Figure 1 – Comparison of non-annualised and annualised data for diffusion tube sites 2019



Cross Check with Automatic Sites

As a way of checking the accuracy of the annualised calculation and the use of local data from diffusion tubes, a cross check was carried out using data obtained for automatic monitoring sites located across South Wales. Carmarthenshire is largely a rural county with urban market towns and no background automatic monitoring sites are currently available within the County. Therefore, two different background automatic monitoring sites, with relevant data for those periods were chosen across Wales to provide a more typical representation of the background levels in Wales. This would similarly represent the background levels in Carmarthenshire being urban and rural.

The background data was downloaded from the UK-Air website and utilised with the LAQM Annualisation Tool (v.1.0 June 2020), which was obtained from the Review and Assessment Helpdesk. The Narberth and Cwmbran data for the annualisation year 09/01/2019 to 08/01/2020 was entered into the continuous background monitoring inputs in the tool and both sites confirmed to have sufficient >85% annual data capture to complete the annualisation. It is considered too extensive to warrant include the full data in this report, however, the relevant ratio figure obtained from the annual and period means is shown in Tables 6a to 6d below and covers the same time periods as used above with local diffusion tube sites.

Table 6a – Ratio Figure Ra from automatic monitoring sites

AURN	Annual Mean (Am)	LLG1 Period Mean (Pm)	Ratio Am/ Pm	LLG3 Period Mean (Pm)	Ratio Am/ Pm	Carm/ELR3 Period Mean (Pm)	Ratio Am/ Pm
Narberth	3.6	3.6	1.00	3.1	1.14	3.6	1.01
Cwmbran	11.7	10.0	1.17	10.6	1.11	12.0	0.98
Average Ra		**Ra=**	**1.09**	**Ra=**	**1.13**	**Ra=**	**0.99**

Table 6b – Ratio Figure Ra from automatic monitoring sites

AURN	Annual Mean (Am)	Carm/ ELR10 Period Mean (Pm)	Ratio Am/Pm	YGL2 Period Mean (Pm)	Ratio Am/Pm	YGL4 Period Mean (Pm)	Ratio Am/Pm
Narberth	3.6	3.0	1.19	3.5	1.01	3.8	0.93
Cwmbran	11.7	9.2	1.27	9.6	1.22	11.4	1.03
Average Ra		**Ra=**	**1.23**	**Ra=**	**1.12**	**Ra=**	**0.98**

Table 6c – Ratio Figure Ra from automatic monitoring sites

AURN	Annual Mean (Am)	YGL5 Period Mean (Pm)	Ratio Am/ Pm	YGL6 Period Mean (Pm)	Ratio Am/Pm	MAMM/1 Period Mean (Pm)	Ratio Am/ Pm
Narberth	3.6	3.5	1.01	3.2	1.13	3.4	1.06
Cwmbran	11.7	10.5	1.11	10.3	1.14	12.2	0.96
Average Ra		**Ra=**	**1.06**	**Ra=**	**1.14**	**Ra=**	**1.01**

Table 6d – Ratio Figure Ra from automatic monitoring sites

AURN	Annual Mean (Am)	MAMM/2, MAMM/3 & MAMM/4 Period Mean (Pm)	Ratio Am/ Pm
Narberth	3.6	3.1	1.17
Cwmbran	11.7	11.2	1.05
Average Ra		**Ra=**	**1.11**

The Average Ra figure obtained from the automatic monitoring sites were fairly similar to that obtained from the local diffusion tube exercise, and for tube sites LLG1, Carm/ELR3 YGL2, YGL4 and YGL5 the differences were insignificant between 0.01 to 0.02. The largest difference in Ra figure was for MAMM/2, MAMM/3 and MAMM/4 as the AURN sites is 0.12 higher than that obtained from the local diffusion tubes, yet again it's not considered to be significant.

The use of the Ra figure obtained from the Automatic monitoring sites is shown in Table 7 below and contains the tube Ra post bias data (annualised).

Table 7 – Annualisation using data from automatic monitoring sites

Tube Id	2019 Measured Mean (M)	Ra	Site Mean (S) (MxRa)	Adjust Factor (BAF)	Data Post Bias (SxBAF)
LLG1	13.5	1.09	14.7	0.75	11.0
LLG3	21.3	1.13	24.0	0.75	18.0
Carm/ ELR3	22.1	0.99	21.9	0.75	16.5
Carm/ ELR10	13.5	1.23	16.6	0.75	12.5
YGL2	9.4	1.12	10.4	0.75	7.8
YGL4	8.4	0.98	8.2	0.75	6.2
YGL5	9.8	1.06	10.4	0.75	7.8
YGL6	10.4	1.14	11.9	0.75	8.9
MAMM/1	19.9	1.01	20.1	0.75	15.1
MAMM/2	15.4	1.11	17.0	0.75	12.8
MAMM/3	20.1	1.11	22.3	0.75	16.7
MAMM/4	19.7	1.11	21.8	0.75	16.4

The difference between the results in the two 'Data Post Bias' columns in Tables 4 and 7 above illustrate that there is no significant difference between the tube data and automatic monitoring data after it has been annualised, it's largely in agreement within +/- 1-2µg/m^3. The annualised results for LLG1 in Llangennech, YGL2 and YGL4 in Llandeilo were also identical using data from local diffusion tubes and data from the automatic monitoring sites. This is illustrated in the figures 2a and 2b below.

Figure 2a – Comparison of both diffusion tube and automatic monitoring annualised results

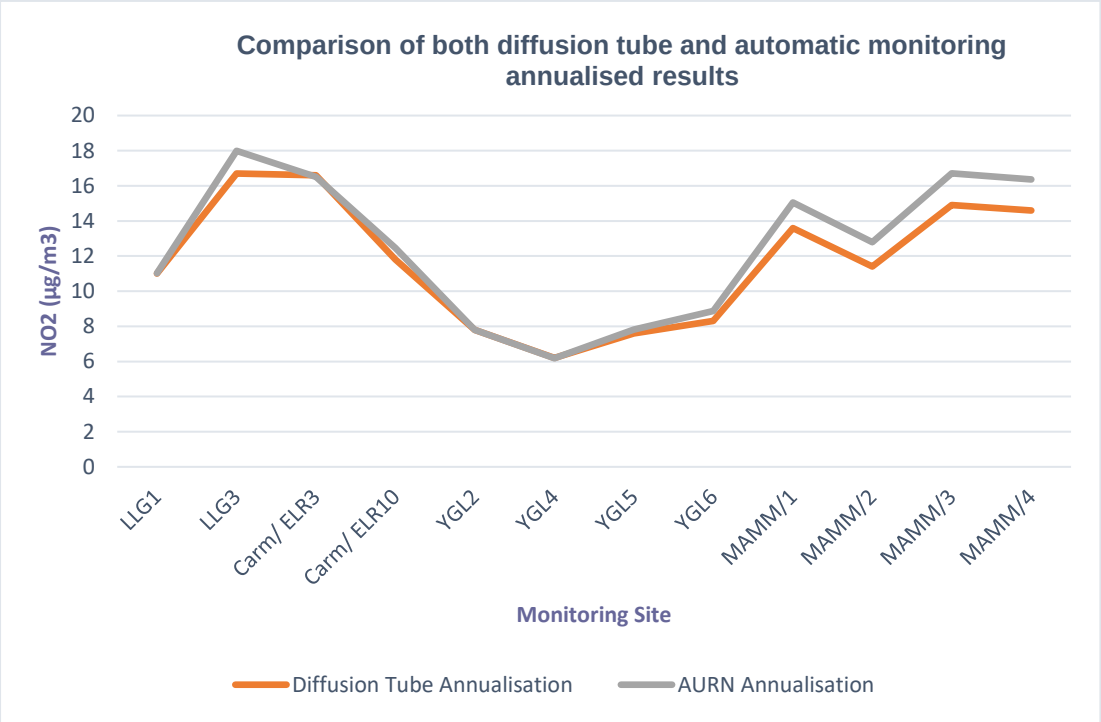
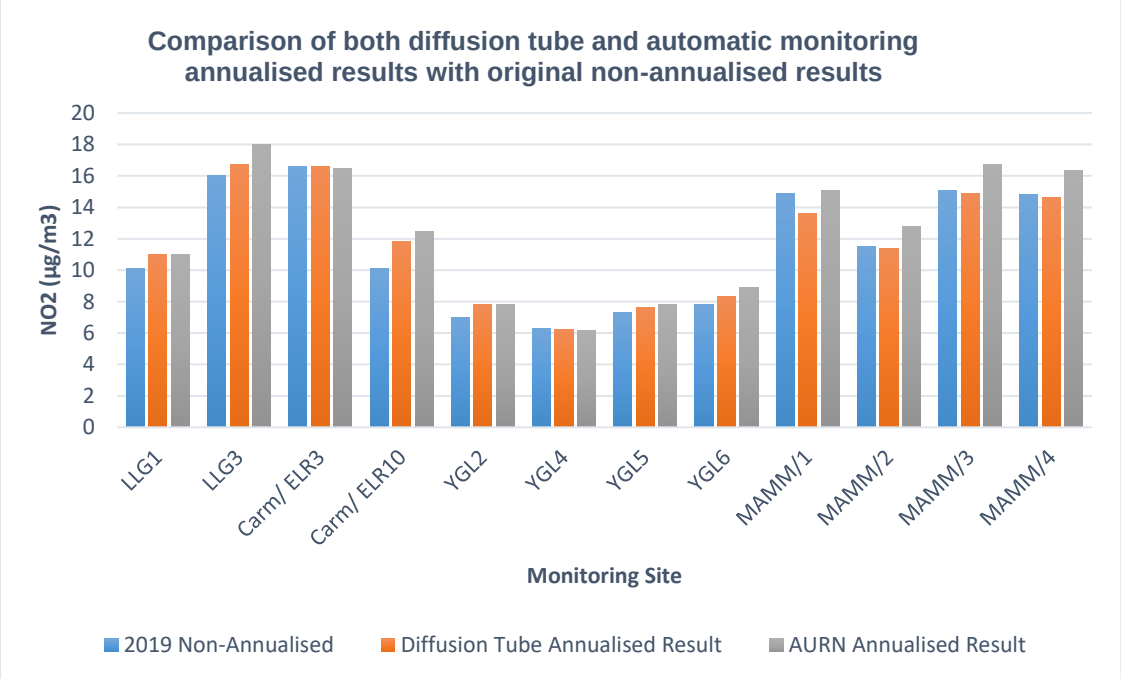


Figure 2b - Comparison of both diffusion tube and automatic monitoring annualised results with original non-annualised results.



Conclusion

The annualisation exercise revealed that minor amendments need to be applied to these final reported results to reflect a more representative annual mean, had there been 12 months valid data capture. None of the tube sites requiring annualisation exceeded the annual air quality objective of 40µg/m^3. There are some minor and insignificant differences between the final readings determined by the annualisation exercises using the local diffusion tube data and the automatic monitoring data. The use of the annualisation tool using the AURN background sites, presented the same final results for four of the monitoring sites and marginally higher results for some of the other sites, still all within 1-2µg/m^3 of that calculated with the diffusion tube annualisation exercise. The AURN annualisation exercise therefore appears to have calculated the worse-case scenario and therefore these results have been chosen for the purpose of reporting within the Annual Progress Report 2020.

APPENDIX F

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

NO_2 Fall off with Distance Calculator Data (2019) for use with the 2020 Progress Report

(September 2020)

Purpose

This document contains details for the calculations relating to predicting the fall off over distance, for NO_2 in relation to four diffusion tubes in the Carmarthenshire monitoring network. The data has been included in the 2020 Progress Report to obtain a more accurate prediction of what the annual results for the four sites in Carmarthenshire would have been for 2019, at the point of relevant exposure.

Background

Carmarthenshire has been subject to diffusion tube monitoring for several years with Air Quality Management Areas declared within the towns on Llandeilo, Carmarthen, and Llanelli. For several years, we have observed diffusion tube monitoring results that exceeded the Air Quality Objective (AQO) level in these areas.

It is not always possible to monitor NO_2 at the relevant point of public exposure e.g. on the façade of a property for practical reasons and therefore kerbside or roadside sites are set up instead. In cases where the diffusion tube is closer to the kerb, this can provide elevated results compared to those on property façades, which can sometimes also misrepresent annual mean results above the Objective.

In such circumstances it is recommended that as a minimum, the distance correction should be applied to all monitoring locations that record an annual mean concentration that is above the NO_2 annual objective of 40µg/m^3. Consideration may also be given to applying the calculation to monitoring locations that record an annual mean concentration that is within 10% of the NO_2 annual objective of 40µg/m^3 (i.e. above 36µg/m^3), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

This has been carried out in accordance with paragraph 7.78 of LAQM Technical Guidance (16), using the on-line LAQM Helpdesk distance calculator tool (Version 4.2) March 2018 to generate the NO_2 predicted results for the fall-off distance.

The diffusion tube locations that have resulted in either exceedances of the AQO or have measured results falling within 10% of the AQO and are being assessed, are detailed in Table 1 below. All monitoring diffusion tubes were positioned in between the receptor and the kerb.

Table 1 – Diffusion Tube Locations

Site Id	Location	X	Y	Background
Carm/077	Llanelli – Sandy Road (2)	249606	200638	5.81
DAL/07	Llanelli – nr 13 Felinfoel Road	250717	200818	9.06
DAC/08	Carmarthen - 85 Priory St (E)	241876	220565	8.92
DAC/02	Carmarthen - 15 Park Terrace	240618	220041	7.52
Carm/083	Llandeilo - Rhosmaen St (2)	262959	222396	4.76

The calculator tool requires certain details relating to the site location, annual mean background concentrations (obtained from the Helpdesk updated Background Maps based on 2018 Background Maps) and the annual mean for the sites in question. This will then provide a predicted annual concentration at the receptor location in question.

Table 2a below shows the details that were used for each single tube site using site CARM/077 as an example and table 2b shows the results of all of the sites detailed in tables 1 above, from using the multiple tube calculator available in the toolkit.

Table 2a – Carm/077 Calculator Details Submitted

How far from the Kerb was your measurement made (in metres)?	1.7
How far from the Kerb is your receptor (in metres)?	5.7
What is the local annual mean background NO_2 concentration (in ug/m^3)?	5.81
What is your measured annual mean NO_2 concentration (in ug/m^3)?	38.6
The predicted annual mean NO_2 concentration (in ug/m^3) at your receptor	**29.6**

Table 2b – Multiple Tube Calculator Details Submitted

Site ID	Distance (m)		NO_2 Annual Mean Concentration (µg/m^3)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
Carm/077	1.7	5.7	5.8	38.6	29.6	
DAL/07	0.8	1.3	9.1	41.2	*38.1*	Predicted concentration at Receptor within 10% the AQS objective.
DAC/08	1.1	1.5	8.9	46.9	**44.3**	Predicted concentration at

						Receptor above AQS objective.
DAC/02	1.0	1.4	7.5	40.0	*37.8*	Predicted concentration at Receptor within 10% the AQS objective.
Carm/083	1.5	2.5	**4.8**	36.8	*33.1*	Warning: Background NO2 concentrations <5µg/m3 or >50µg/m3 are rare in the UK - this calculation will still work, but please check your data. *

*Data was carefully checked, the area surrounding Llandeilo is largely rural and likely to have low background concentrations.

A comparison of results for the 'roadside' and 'kerbside' sites alongside its' raw data annual mean and bias adjusted result is shown in Table 3 below.

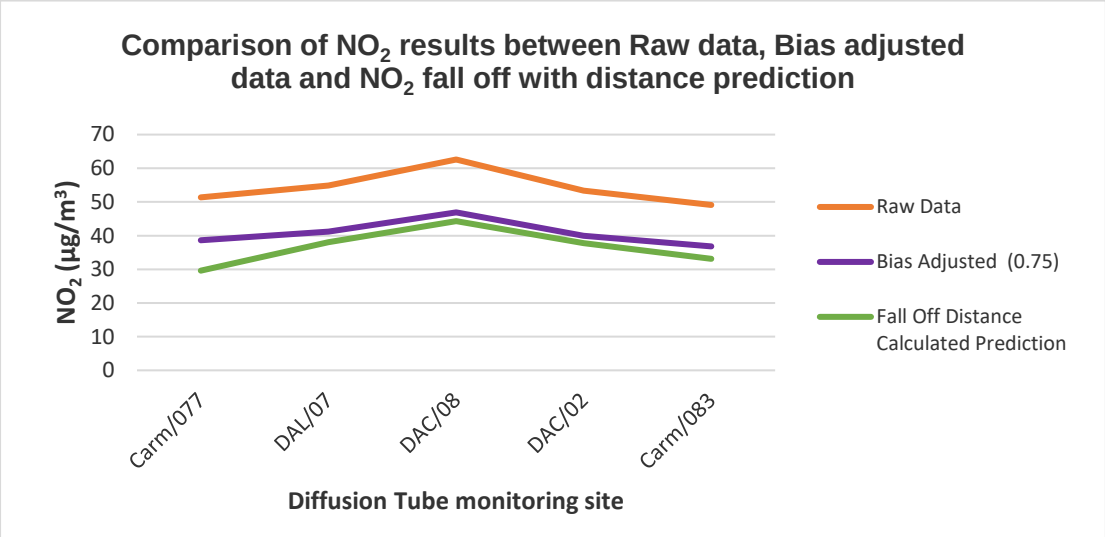
Table 3 – Comparison of Data

Site	Category	Distance of Receptor to monitor (m)	Raw Data	Bias Adjusted (0.75)	Distance Calculated
Carm/077	Roadside	4	**51.4**	38.6	29.6
DAL/07	Kerbside	0.5	**54.9**	**41.2**	38.1
DAC/08	Kerbside	0.4	**62.6**	**46.9**	**44.3**
DAC/02	Kerbside	0.4	**53.4**	**40.0**	37.8
Carm/083	Roadside	1	**49.1**	36.8	33.1

The comparison of data in table 3 above, appears to show just one result DAC/08 (Priory Street, Carmarthen) exceeding the Annual Air Quality Objective of 40ug/m^3, compared to the three exceedances listed in the bias adjusted column (before the fall off with distance was calculated). However, DAL/07 (Felinfoel Road, Llanelli), and DAC/02 (15 Park Terrace) remain within 10% of the border of exceeding the AQO. Sandy Road Carm/077 has experienced the greatest reduction, which is consistent with the fact that out of the five sites, it has the largest distance between the receptor and the monitor. Carm/083, Rhosmaen Street, Llandeilo was assessed because bias adjusted annual mean was above 36ug/m^3, last year (2018 data) following the fall off with distance calculation, the final result remained within 10% of the AQO, so this has improved.

For diffusion tube monitoring, it can also be considered that exceedances of the NO_2 1-hour objective may occur at roadside sites if the annual mean is above 60µg/m^3. Fortunately, none of the monitoring sites in Carmarthenshire have exceeded this 1-hour objective.

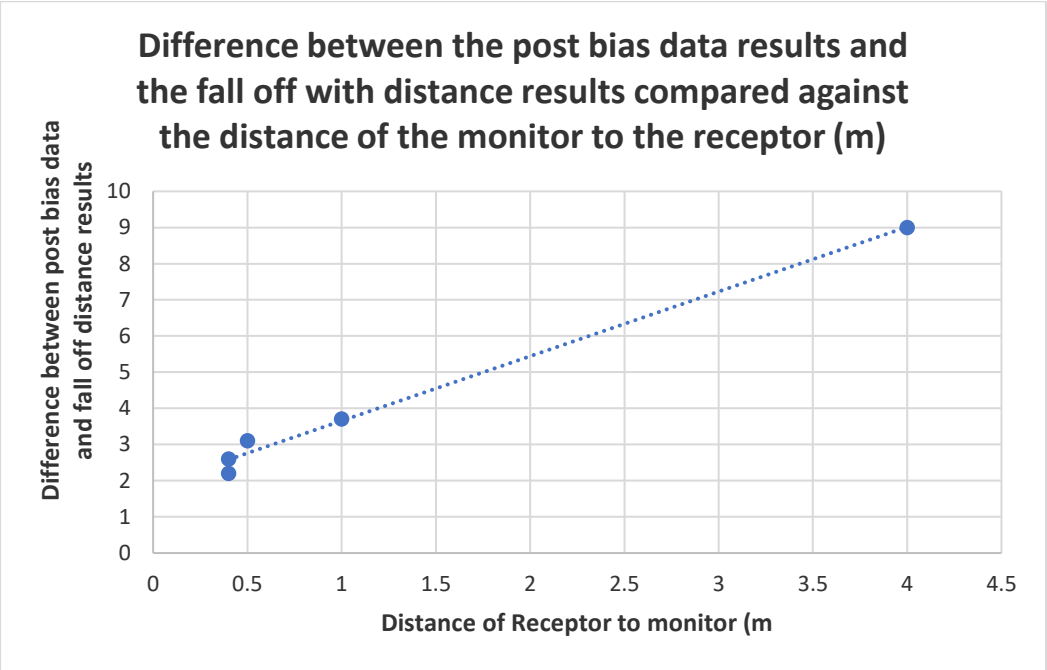
Figure 1 – Comparison of raw data, bias adjusted data with NO_2 fall of with distance results



The comparison of results is illustrated in Figure 1 above. It displays a larger gap between the bias adjusted results and distance calculated results for Carm/077 compared to the other sites. This is due to the site having the monitor positioned 4m away from the receptor, where the other sites are within 1m of the receptor.

Whist all results have, as expected reduced in line with their distance from the kerb, the difference in the decreased results is also relatively consistent with the distance between the monitor to the receptor, as illustrated in Figure 2 below. Geographical location however will also have an impact depending on the background concentrations. This is observed when comparing the difference in the results of DAC/08 and DAC/02, both of which share a distance of 0.4m between the monitor and the receptor.

Figure 2 - Difference between post bias data and fall of with difference results against the distance between the monitor and the receptor.



Cross Check with Mathematical Calculation

As a way of checking the accuracy of the on-line calculator tool the method provided in Box 2.3 of Technical Guidance TG (09) was used. The guidance provides the following calculation:

$C_Z = ((C_y – C_b) / (-0.5476 \times Ln(D_y) + 2.7171)) \times (-0.5476 \times Ln(D_z)+2.7171)+C_b$

Where:

C_z is the total predicted concentration (μ g/m^3) at distance D_z;
C_y is the total measured concentration (μ g/m^3) at distance D_y;
C_b is the background concentration (μ g/m^3);
D_y is the distance from the kerb at which concentrations were measured; and
D_z is the distance from the kerb (m) at which concentrations are to be predicted.
Ln(D) is the natural log of the number D.

So as an example, for tube location Carm/077:

$C_z = ((38.6– 5.81) / (-0.5476 \times Ln(1.7) + 2.7171)) \times (-0.5476 \times Ln(5.7) + 2.7171) + 5.81$

$= (32.79 / 2.42652797) \times (1.764020723) + 5.81$

$= (13.513) \times (1.764)$

$= 23.84 + 5.81$

C_z = **29.6 µg/m^3**

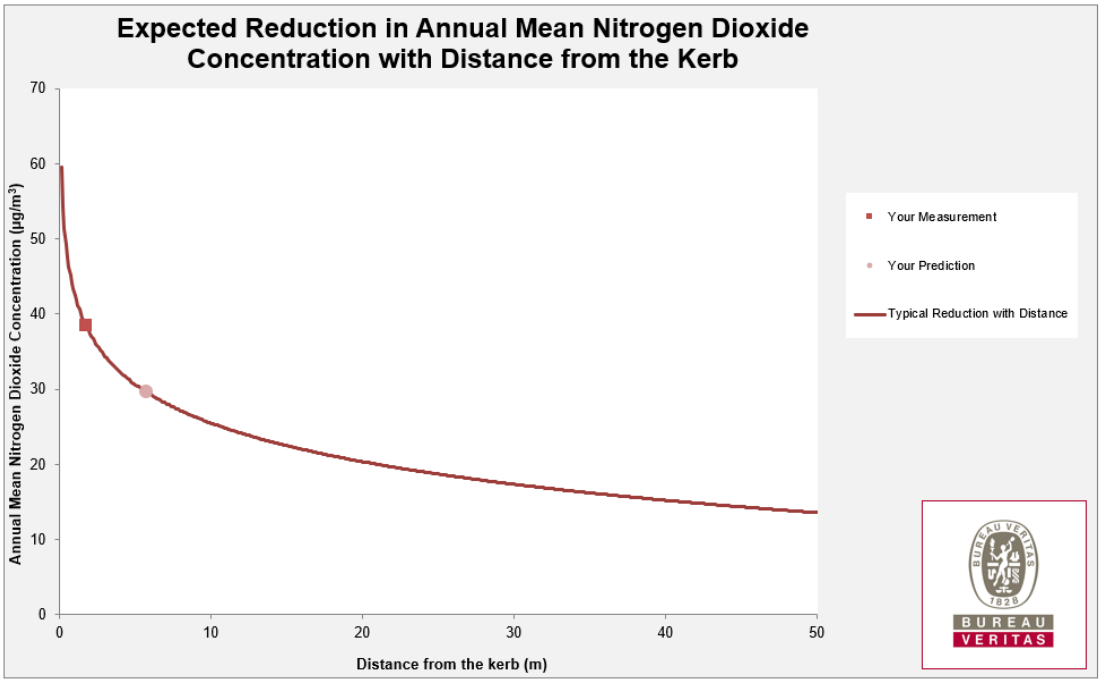
Conclusions

After using the online calculator to calculate the fall-off with distance, one of the sites assessed DAC/08 (Priory Street, Carmarthen) remains high with a predicted concentration of NO_2 exceeding the Annual Air Quality Objective (AQO) of 40ug/m^3. This exercise has reduced the total number of monitoring sites that have exceeded 40ug/m^3. Two of the four exceedances initially listed in the bias adjusted annual mean (before the fall off with distance was calculated) now demonstrate that measurements at the relevant receptor would meet the annual air quality objective.

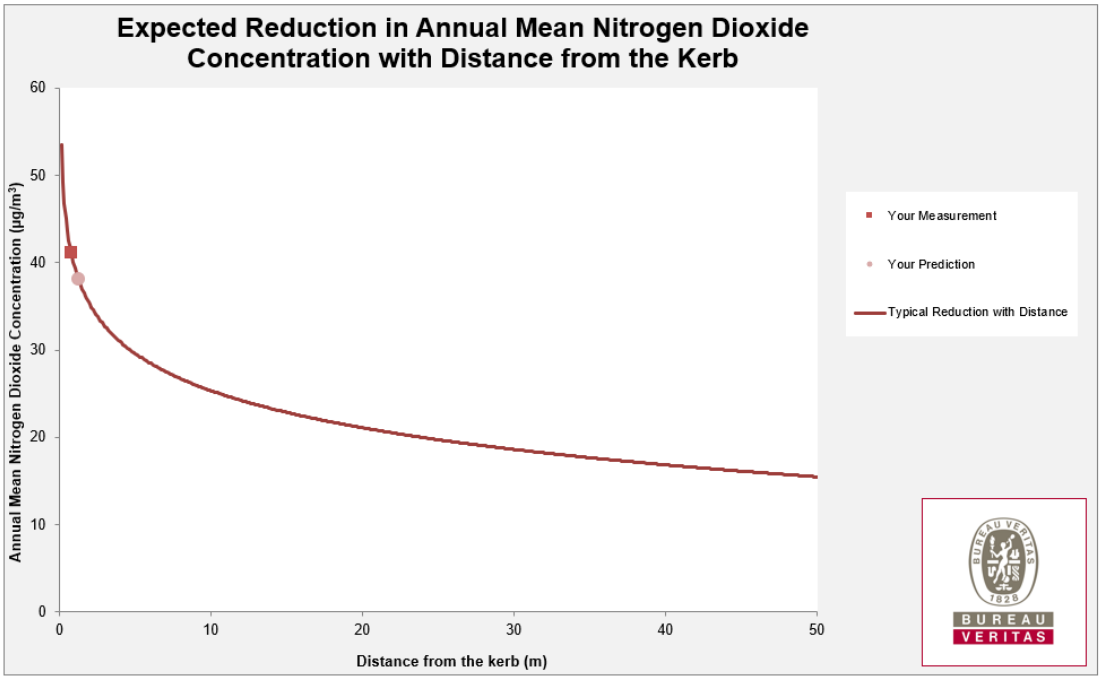
DAL/07 (Felinfoel Road, Llanelli), DAC/02 (15 Park Terrace) although now meet the AQO, they remain within 10% of its border and will continue to be monitored closely. All sites subjected to this exercise are located within an AQMA in Carmarthenshire. The sites that exceed the AQO or fall within 10% of the AQO are considered hotspots within the Carmarthen and Llanelli AQMA's, and fortunately are observing a slow downward trend year on year.

For completeness, the graphs from the on-line calculator tool for all the sites assessed are shown below. Each graph demonstrates that the fall off with distance calculated is consistent with the typical reduction expected with distance.

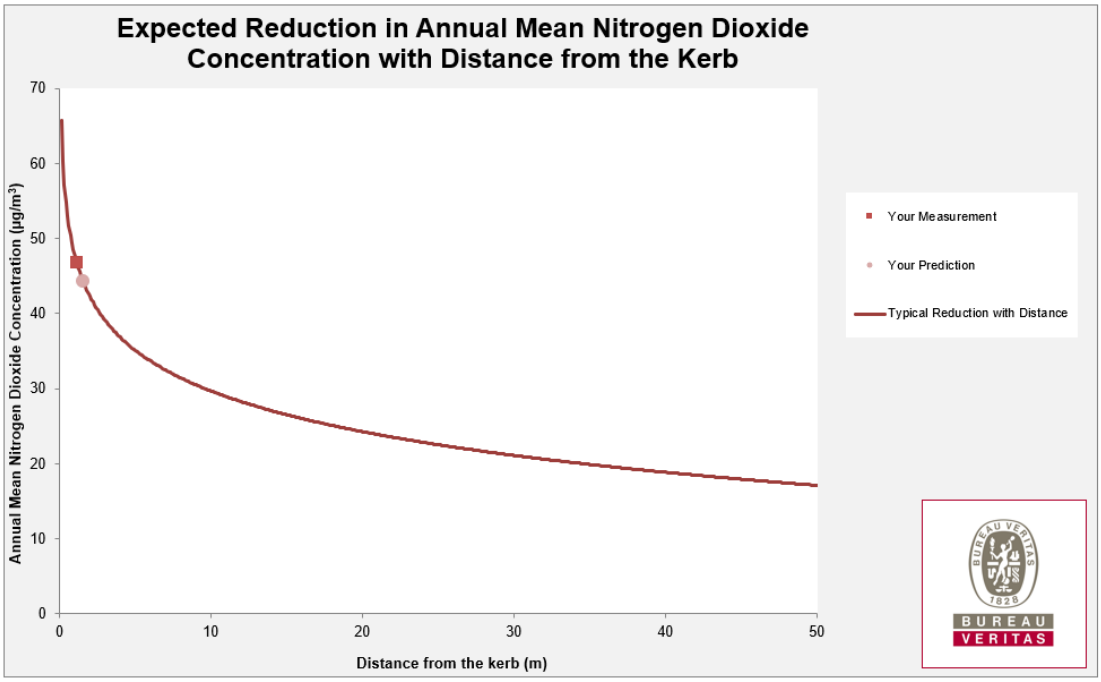
Carm/077



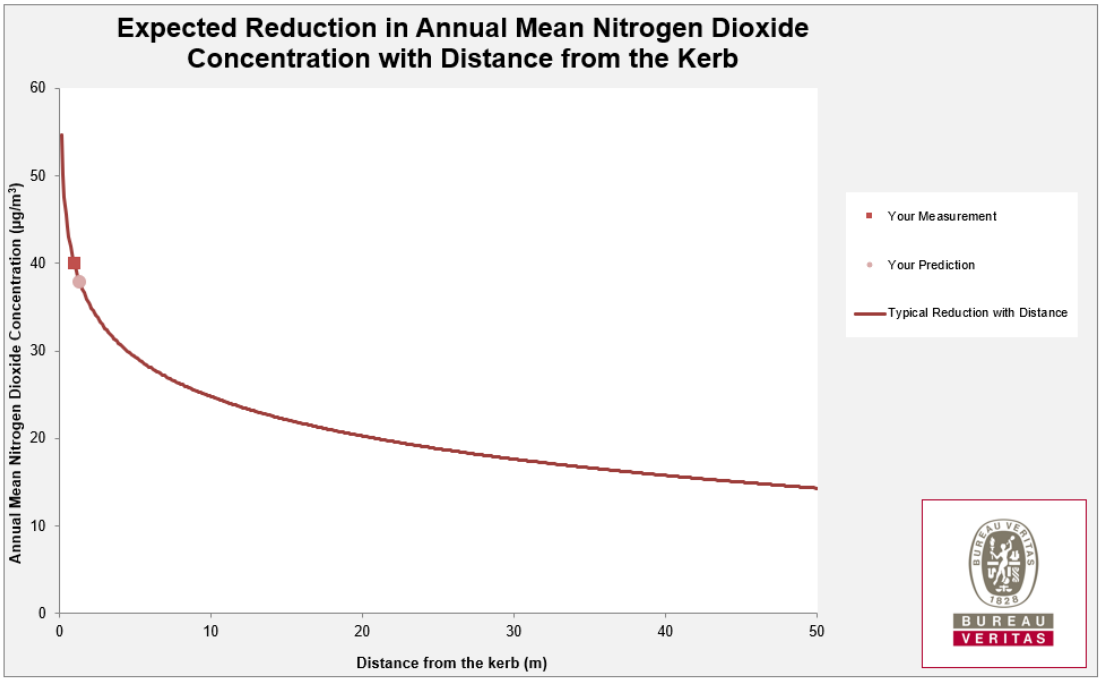
DAL/07


Expected Reduction in Annual Mean Nitrogen Dioxide Concentration with Distance from the Kerb
Annual Mean Nitrogen Dioxide Concentration (µg/m³)
60
50
40
30
20
10
0
0
10
20
30
40
50
Distance from the kerb (m)
Your Measurement
Your Prediction
Typical Reduction with Distance
BUREAU VERITAS

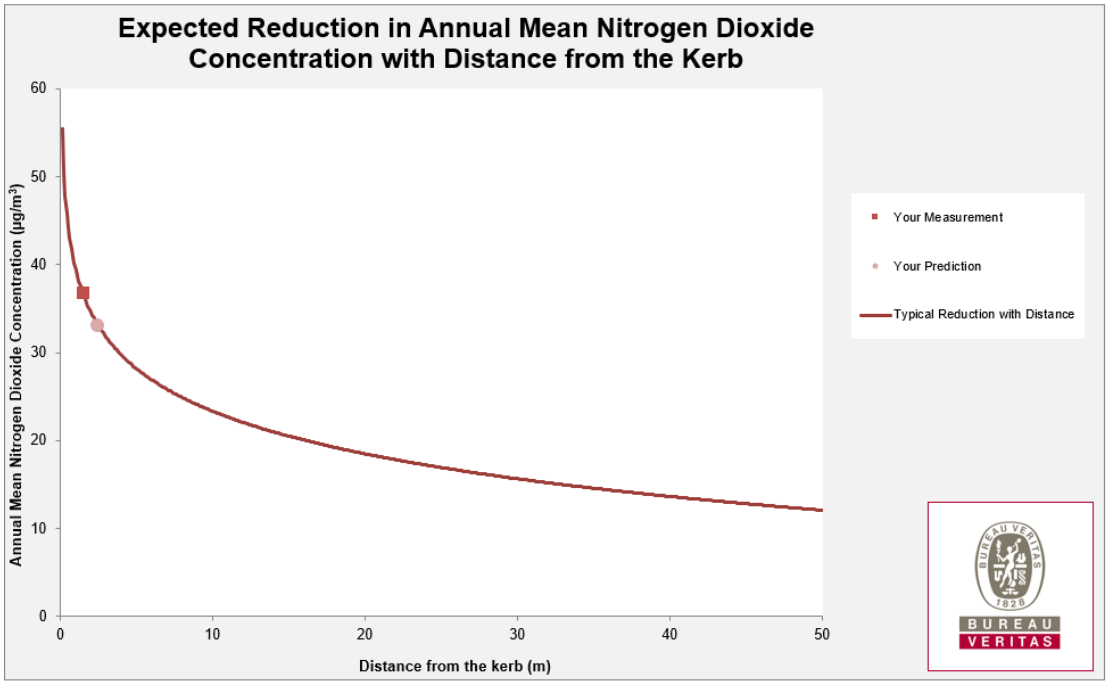
DAC/08


Expected Reduction in Annual Mean Nitrogen Dioxide Concentration with Distance from the Kerb
Annual Mean Nitrogen Dioxide Concentration (µg/m³)
70
60
50
40
30
20
10
0
0
10
20
30
40
50
Distance from the kerb (m)
Your Measurement
Your Prediction
Typical Reduction with Distance
BUREAU VERITAS

DAC/02



Carm/083



APPENDIX G

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

2019 Carmarthenshire AQ Screening Review Report

(September 2020)

Lisa Jones – Environmental Health Practitioner

Contents

1.0 Purpose of Report

This report reviews available traffic count data obtained in response to concerns raised in respect of air quality being affected by traffic pollution along with reporting on some basic diffusion tube screening exercises where it was considered there may be a potential for air quality impacts as a result of development or existing traffic routes. These areas included Llangennech (Llanelli), Abergwili (Carmarthen), Pentip School (Llanelli), Margaret Street (Ammanford) and a school monitoring project with Llandeilo Primary School (Llandeilo). This report also summarises the findings of the screening exercises carried out at sites set up around the proposed Economic Link Road in Cross Hands, to help determine the impact of the new corridor on the SSSI and the nearby residents in surrounding routes.

2.0 Background

As part of the Local Air Quality Management work the authority responds to concerns relating to traffic pollution that may be causing elevated levels of pollution in distinct areas. During 2019 two new enquiries were made known to the division for Llangennech (Llanelli) and Margaret Street (Ammanford) for which traffic counts for each location were considered alongside its location characteristics.

The first step was to assess the areas of concern and look at the potential for air quality problems based on location characteristics. Where it was deemed necessary to carry out a diffusion tube air quality screening exercise, new tube locations were assessed against the LAQM technical guidance TG (09) and TG (16) requirements. The tube preparation, supply and analysis was performed by Socotec Didcot Laboratory and the preparation method is acetone:triethanolamine 50:50.

3.0 Llangennech, Llanelli

An enquiry was received about concerns from the traffic along the main route (B4297) through Llangennech because Bridge Street and Afon Road are quite narrow with parking along one side of the road. The restricted space creates difficulties for two-way traffic to pass at the same time which can result in congestion during peak times. Furthermore, concerns were also raised about the impact of school related traffic congestion near Ysgol Gymraeg Llangennech. No recent traffic counts had been conducted in this area, however a traffic count for B4297 was carried out in 2016 and 2018 approximately 1.2 – 1.5km away and reported AADT of 6809 and 6903 respectively.

It was considered appropriate to identify suitable monitoring locations due to the landscape of the road and terraced houses alongside. Diffusion tubes were set up at three sites Ysgol Gymraeg Llangennech (LLG1), 28 Afon Road (LLG2 and 26 Bridge Street (LLG3) details of which can be found in Table 1a and 1b below. A tube location map is shown in Appendix 1.

Table 1a – Diffusion Tube Location Checklist for Llangennech

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
Ysgol Gymraeg Llangennech	Y	N	N	N	N/A	No number
Llangennech – 28 Afon Road	Y	N	N	Y	Y	N/A
Llangennech – 26 Bridge Street	Y	N	N	N	N/A	201 201

Table 1b – Diffusion Tube Site Details for Llangennech

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
Ysgol Gymraeg Llangennech	LLG1	2.31	1.70	20.00	256534	202453
Llangennech – 28 Afon Road	LLG2	2.45	2.10	0.00	256144	201792
Llangennech – 26 Bridge Street	LLG3	2.36	1.92	0.32	256050	201600

The diffusion tube screening assessment was carried out for period of 9 months. Monitoring started in April 2019 and the monthly monitoring results are shown below in Table 1c.

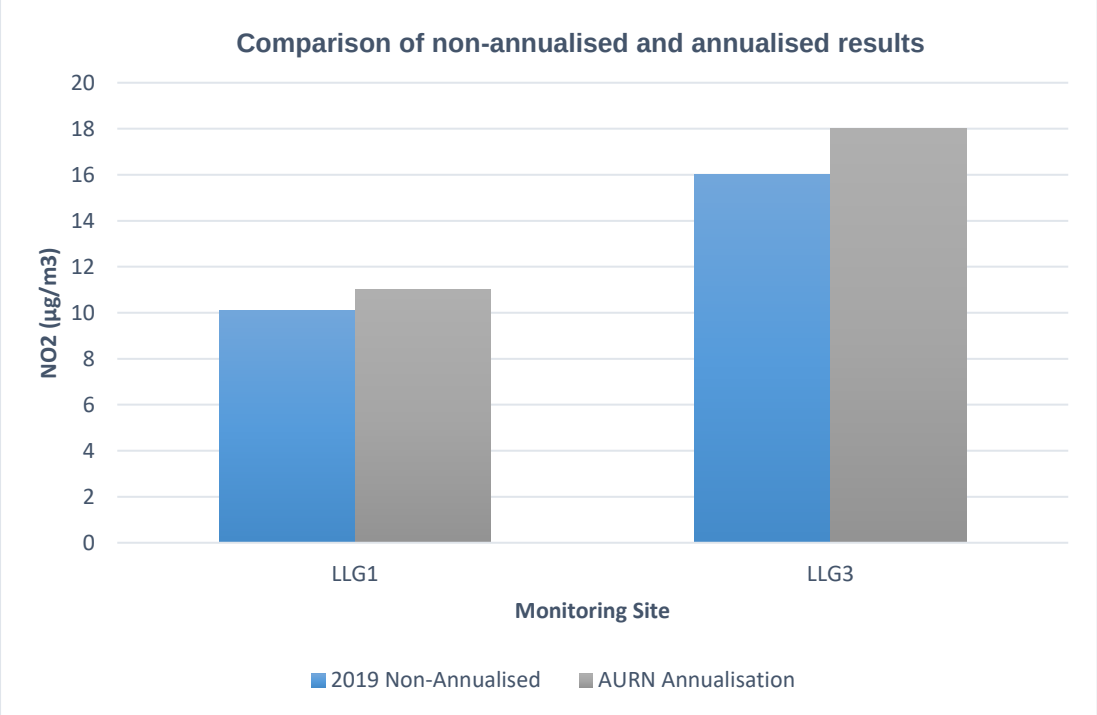
Table 1c – Monthly monitoring results for Llangennech (LLG1, LLG2 & LLG3)

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (factor) (0.75)	Bias adjusted and annualised
LLG1	-	-	-	15.9	11.5	8.6	8.6	8.4	11	-	24.3	19.9	13.53	*10.1*	**11.0**
LLG2	-	-	-	31	23.1	18.6	17.8	17.4	20.1	25	34.5	32	24.43	**18.3**	
LLG3	-	-	-	-	18.1	16.4	15	12.7	-	22	35.3	29.9	21.34	*16.0*	**18.0**

As this screening exercise started in April 2019, it was only possible to capture eight months of data for site LLG1 and seven months of valid data for LLG3 due to missing tubes. It was therefore necessary to annualise these results to obtain a better idea of what the annual mean figure may have been had the monitoring taken place for the full year. This was carried out in the Annualised Data Report (2019) submitted as part of the Air Quality Annual Progress Report 2020.

The annualised results are listed in Table 1c above. Further details about the approach to annualising 2019 data can be found in the Annualised Data Report (2018) for use with the 2020 Progress Report. A comparison of the annualised and non-annualised data can be seen in the graph below in figure 1.

Figure 14 - Comparison of Annualised and Non-Annualised data Llangennech sites



The screening results demonstrate concentrations of Nitrogen dioxide continue to be far below the annual Air Quality objective of 40µg/m^3, and all three sites reported a concentration level below 19µg/m^3 for 2019, including the final annualised results. It was decided that due to the significantly low concentrations found at the school gates, it is unlikely that traffic pollution is a significant concern and therefore the diffusion tube at site ref LLG1 was removed after the 9 month screening assessment However, monitoring in the main road (LLG2 and LLG3) that travels through Llangennech will continue, to monitor any impacts that may arise from future developments.

4.0 Abergwili (Carmarthen)

Abergwili is located on the north east corner of Carmarthen with several roads dissecting the village. There are many properties at the northern tip of the village that are near the Carmarthen bypass that lies to south of the town. In 2016, a couple of residents raised concerns about traffic pollution from the large number of vehicles that use the bypass and the impact this may be having on their health.

This location had not previously been considered, however, early proposals for the Carmarthen AQMA Action Plan are to get more vehicles to use the bypass rather than travelling through the town. The concerns were worth investigating further as we would need to ensure that through action planning, we did not move the problem to another location.

Therefore, a traffic count assessment was carried out and the results are shown in Table 2 below. A location map is shown in Appendix 2.

Table 2a - Traffic Counts for Abergwili, (monitored on Carmarthen A40 bypass)

Date	Time	North			South			Total	AADT	>35
		HGV	LDV	Car	HGV	LDV	Car	2-way	(x143) 5 min	Yes / No
09/11/16	13.40	5	8	47	8	6	42	116	16588	YES
14/11/16	11.30	1	5	29#	3	9	40	87	12441	YES
16/11/16	10.38	0	12	38	2	5	30	87	12441	YES
							Average		13823	**YES**

= motorbike

The location has an estimated traffic flow of greater than 5000 AADT and therefore it was considered appropriate to identify a suitable monitoring location. In 2017 Diffusion tubes were set up at two properties, The Laurels and Dragon's Lair, details of which can be found in Table 2b and 2c below.

Table 2b – Diffusion Tube Location Checklist for Abergwili

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
The Laurels, Abergwili	Y	Y	N	Y	Y	N/A
Dragons Lair, Abergwili	Y	Y	N	Y	Y	N/A

Table 2c – Diffusion Tube Site Details for Abergwili

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
The Laurels, Abergwili	Carm /139	2.20	10.00	3.50	242895	221047
Dragons Lair, Abergwili	Carm /140	2.28	12.00	0.00	242963	221101

Monitoring started in January 2017 and the monthly monitoring results are shown below in Table 2d.

Table 2d – Monthly monitoring results for Abergwili (Carm/139 & Carm/140)

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (factor) (0.77)
Carm/139 (2017)	34.0	24.3	21.6	22.4	15.8	12.3	13.9	15.1	20.3	21.9	35.0	27.3	21.99	16.9
Carm/139 (2018)	29.6	28.8	21.2	19.9	18.1	18.3	15.1	16.8	22.2	23.6	16.9	25.4	21.33	16.4
Carm/139 (2019)	27.8	22.4	23.1	16.3	17.3	14.8	14.8	12.9	16.5	21.8	25.6	27.2	20.04	15.0
Carm/140 (2017)	31.1	25.8	21.5	20.8	13.6	15.0	14.8	16.5	21.8	20.5	31.0	19.6	21.00	16.2
Carm/140 (2018)	21.7	26.1	17.5	14.5	15.9	14.3	14.0	16.5	22.0	21.8	18.6	25.0	18.99	14.6
Carm/140 (2019)	25.4	19.2	20	14.8	17.1	13.4	13.8	14	16.3	20.4	23.2	23.7	18.44	13.8

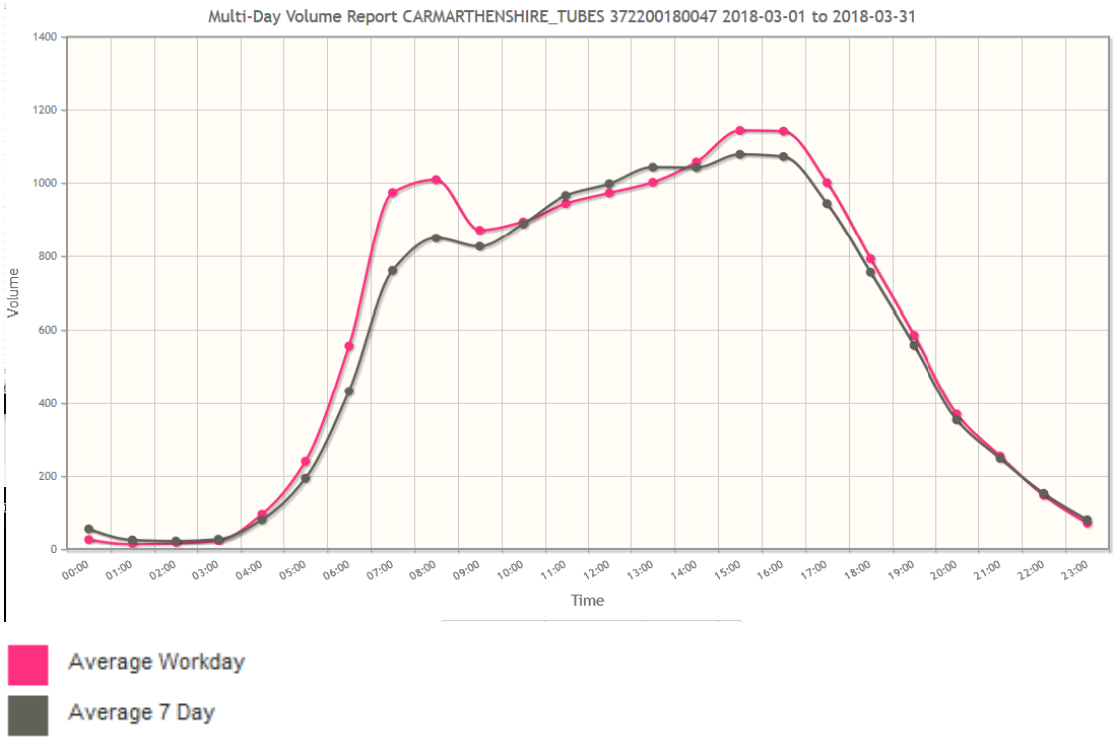
The screening results demonstrate concentrations of Nitrogen dioxide continue to be far below the annual Air Quality objective of 40µg/m^3, and both sites reported a concentration level below 15µg/m^3 for 2019. However, monitoring in these areas will continue to ensure that any changes made in delivering the Carmarthen AQMA action plan proposals does not move the problem elsewhere.

5.0 Pentip School, Pembrey Road (Llanelli)

Pentip School on Pembrey Road (A484) is located on a strategic trunk road in Llanelli and located within the boundary of the Llanelli AQMA. For many travelling from the west this road is a main route to and from Pembrey into Llanelli Town Centre.

A traffic count was performed in 2016 which gave an AADT of 12,829 and a further count in 2018 which gave an AADT of 13,432.

Figure 15 – Automatic Traffic Count in 2018



Occasionally traffic is held up on this road traveling into Llanelli Town Centre and the road is also made up of long rows of Terraced houses, although the area around Pentip school is quite open in its landscape. As many school children also use this road to walk school and it attracts a lot of vehicles during peak times, it was deemed appropriate to carry out a screening exercise to determine exposure levels at the school gates.

A new diffusion tube was set up in Pembrey Road, on the roadside outside the school gates, details of which can be found in Tables 5a and 5b below:

Table 3a – Diffusion Tube Location Checklist for Pentip School (DAL/28)

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
Pentip School	Y	N	N	N	N	106683

Table 3b – Diffusion Tube Site Details for Pentip School, Llanelli

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
Pentip School	DAL/28	2.41	2.40	0.40	250344	200631

Figure 16 – Image of Diffusion tube and AQMesh Monitor outside Pentip School

A location map for the monitoring site is shown in Appendix 4. Monitoring started in November 2018 and an AQMesh automatic monitor was also located on the same lamppost at a height of 3.17m until August 2019, to compare results and observe changes during different times of the day. The monthly monitoring results are shown below in Table 5c below.

Table 3c – Monthly monitoring results for Pentip School, Llanelli (DAL/28)

Site ID		NO_2 Mean Concentrations (µg/m^3)													
		January	February	March	April	May	June	July	August	September	October	November	December	Annual Mean	
														Raw Data	Bias Adjusted (factor)
2018	DAL/28	-	-	-	-	-	-	-	-	-	-	23.9	40.9	32.4	**(0.77)** 25.0
	AQMesh (hrly)	-	-	-	-	-	-	-	-	-	-	24.1	28.0	26.0	
2019	DAL/28	37.6	34.4	23.7	30.5	24.5	18.7	17.8	16.9	21.9	27.1	40.3	33.0	27.2	**(0.75)** 20.4
	AQMesh (hrly)	30.5	32.2	28.4	31	23.5	23.2	20.1						27.0	

It was only feasible to capture just 2 months of data in 2018, and this short period of monitoring meant that it was also too short to annualise the diffusion tube results. Nevertheless, the first diffusion tube was positioned at the same time as an AQMesh automatic monitor, so it was of interest to compare the results and observe any pollution peaks at certain times of the day.

The results of the AQMesh are scaled to take into consideration slope and offset and compared against the same exposure dates as the diffusion tubes. Whilst the results were largely comparable, there were some differences in the results which may be due to a few reasons including the different heights of exposure and the need to adjust the diffusion tube results. The AQMesh is also only an indicative monitor but can prove helpful in demonstrating real-time changes for small projects.

Although the November 2018 monthly results were similar, there was a large difference in the concentrations recorded by the AQMesh and diffusion tube for December 2018. Nevertheless, the difference in the period means for the bias adjusted diffusion tube results in 2018 compared to the AQMesh was only 1µg/m^3.

The diffusion tube period mean for January to July 2019 was 26.7µg/m^3, and once bias adjusted it was 20.07µg/m^3, similar to its bias adjusted annual mean. Yet it demonstrated a larger difference between the two monitoring methods compared to the monitoring results observed in 2018. Nevertheless, the screening results demonstrate concentrations of Nitrogen dioxide far below the annual Air Quality objective of 40µg/m^3, for both monitoring methods. Although this indicates that the pollution levels in this area are not considered a significant risk

to receptors, further monitoring in this area will help identify any impacts from action planning work and developments in the surrounding areas.

The AQMesh is also capable of measuring PM_{10} and $PM_{2.5}$ although there are limitations when interpreting these indicative results. Still it was interesting to note that the 2019 period mean provided for PM_{10} was 9.07µg/m^3 which significantly below the UK annual air quality objective of 40µg/m^3, and only one exceedance of the 50µg/m^3 24 hour mean was recorded on 24th February 2019. It is not clear why this particular day experienced a spike in PM_{10}, as hourly recordings indicated levels above 50µg/m^3 almost every hour between 19:00hrs Saturday 23rd and 11:00hrs Sunday 24th February 2019. Notably it was the warmest day in February on record. For $PM_{2.5,}$ the period mean was 4.09µg/m^3, which is much below the 25µg/m^3 target objective.

6.0 Amman Valley School, Margaret Street, Ammanford

In June 2019, an enquiry was received relating to concerns about the effects of pollution on young children, from standing around a bus stop at their school in Ammanford following the removal of trees alongwith concerns about congestion in the road during peak times. The main front school gates, which run alongside the school bus stop used to include several evergreen trees, however the trees had been removed in 2017 due to safety concerns. Images from 2016 and 2019 can be seen below.

Figure 17 – Image of School bus stop in 2016

Figure 18 – Image of School bus stop in 2019

No traffic count data is available for this area, Margaret Street, Ammanford is largely a quiet residential Street, including Amman Valley School, with access to Ammanford Leisure Centre, Ammanford Bus Station and Ysgol Gymraeg Rhydaman and Ysgol Bro Banw. Monitoring Nitrogen Dioxide has not previously been conducted in the Margaret Street area, and so it was agreed to set up new tube sites to conduct a six-month screening assessment.

Four new diffusion tubes were set up in Margaret Street, Ammanford, details of which can be found in Tables 4a and 4b below:

Table 4a – Diffusion Tube Location Checklist for Margaret Street

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
Margaret St, School Bustop	Y	N	N	N	N	N/A
Margaret St, School Gates	Y	N	N	N	N	N/A
25 Margaret St	Y	N	N	N	N	4013914
51/49 Margaret St	Y	N	N	N	N	4013909

Table 4b – Diffusion Tube Site Details for Margaret Street

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
Margaret St, School Bustop	MAMM/1	2.37	0.36	3.60	263050	212531
Margaret St, School Gates	MAMM/2	2.33	2.35	0.50	263088	212541
25 Margaret St	MAMM/3	2.30	0.36	1.22	263067	212525
51/49 Margaret St	MAMM/4	2.52	1.40	0.20	263163	212543

A location map for the monitoring site is shown in Appendix 4. Monitoring started in July 2019 for a period of 6 months. The monthly monitoring results are shown below in Table 4c below.

Table 4c – Monthly monitoring results for Margaret Street, Ammanford

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	January	February	March	April	May	June	July	August	September	October	November	December	Annual Mean		
													Raw Data	Bias Adjusted (factor) (0.75)	Bias adjusted and annualised
MAMM/1	-	-	-	-	-	-	10.9	-	-	21	27.8	-	19.9	14.9	**15.1**
MAMM/2	-	-	-	-	-	-	6.5	9.9	13.1	15.4	24.7	22.7	15.38	11.5	**12.8**
MAMM/3	-	-	-	-	-	-	11.4	11.5	16.3	22	30.7	28.7	20.1	15.1	**16.7**
MAMM/4	-	-	-	-	-	-	11.7	12.8	16.8	21.5	28.5	26.9	19.7	14.8	**16.4**

It was only feasible to capture just six months of data for the year between July and December 2019 for three of the sites and unfortunately due to some missing tubes, only three months of data was captured for MAMM/1. It is considered appropriate to annualise the data to obtain the predicted annual mean NO_2 figure that may have been obtained had the monitoring taken place for the full year.

All the annualised results were below 17µg/m^3, which is well below the Annual Air Quality Objective. Further details about the approach to annualising this data can be found in the Annualised Data Report (2019) for use with the 2020 Progress Report.

The screening results demonstrate concentrations of Nitrogen dioxide far below the annual Air Quality objective of 40µg/m^3. This indicates that the pollution levels in this area is unlikely to pose any significant risk to receptors. As no data had been collected prior to the removal of the trees, there was no scope to determine what effect this may have had on air pollution, yet, the important factor is that exposure levels of NO_2 in this area remain relatively low. The tube sites were removed at the end of this screening exercise and no further monitoring is planned.

7.0 Llandeilo Primary School Monitoring Project

In support of our action planning work, Carmarthenshire County Council started to work with Ysgol Gynradd Llandeilo, a primary school located within the boundary of the Llandeilo AQMA to monitor NO_2 for a 9-month period using Nitrogen Dioxide diffusion tubes. The school was of interest as it is located alongside a busy trunk road which experiences a lot of through traffic travelling from Swansea to Chester.

It was considered appropriate to carry out a monitoring project at Llandeilo Primary School, not only to develop a better picture of what the levels of NO_2 the children might be exposed to, but also with the view to raise awareness about air quality and how travelling to school via different modes of transport can impact on the air quality at the school gates. The school is located within Llandeilo's Air Quality Management Area so this work would support our actions to improve air quality in this area. This work also supports the Unicef campaigns for knowing your rights, highlighting the right to clean air for our children.

A Council Officer had visited the school and spoken to the children as part of an Assembly on Air Quality and discussing what the study would include. Six tube sites were set up within and around the school grounds. The school children have also participated by helping the Environmental Health Officer to change the tubes each month.

A location map of the tube sites is shown in Appendix 5. The diffusion tube site details can be found in Table 5a and 5b below:

Table 5a – Diffusion Tube Location Checklist for Llandeilo Primary School

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N
Llandeilo School Flagpole	Y	N	N	Y	Y
Llandeilo School Nursery Yard	Y	N	N	Y	Y
Llandeilo School Main Yard	Y	N	N	Y	Y
Llandeilo School Carpark	Y	N	N	Y	Y
2 Heol Garreg Las (Lamppost)	Y	N	N	N	N/A
Forest Garden, Heol Garreg Las	Y	N	N	N	N/A

Table 5b – Diffusion Tube Site Details for Llandeilo Primary School

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
Llandeilo School Flagpole	YGL1	2.40	4.60	0	263138	222781
Llandeilo School Nursery Yard	YGL2	2.40	21.00	0	263127	222805
Llandeilo School Main Yard	YGL3	2.45	20.00	0	263082	222766
Llandeilo School Carpark	YGL4	2.40	2.25	5.50	263058	222776
2 Heol Garreg Las	YGL5	2.50	2.76	3.90	263049	222723
Forest Garden, Heol Garreg Las	YGL6	2.40	2.90	0.75	263085	222710

Monitoring started in April 2019 for a period of 9 months. The monthly monitoring results are shown below in Table 1c below.

Table 5c – Monthly monitoring results for Llandeilo Primary School

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	January	February	March	April	May	June	July	August	September	October	November	December	Annual Mean		
													Raw Data	Bias Adjusted (factor) (0.75)	Bias adjusted and annualised
YGL1	-	-	-	23.4	21.8	18.4	18.8	17.0	19.3	24.1	31.6	27.3	***22.4***	**16.8**	N/A
YGL2	-	-	-	11.4	8.2	6.7	7.5	7.2	7.0	11.0	15.9	M	***9.4***	7.0	**7.8**
YGL3	-	-	-	8.9	6.9	5.3	5.3	5.7	5.7	9.2	16.1	10.5	***8.2***	**6.1**	N/A
YGL4	-	-	-	7.9	6.1	4.5	M	G	5.0	8.5	15.4	11.3	***8.4***	6.3	**6.2**
YGL5	-	-	-	9.6	8.3	6.5	6.6	6.2	M	11.2	17.0	12.8	***9.8***	7.3	**7.8**
YGL6	-	-	-	M	8.8	7.6	7.6	8.4	M	M	15.5	14.7	***10.4***	7.8	**8.9**

M= Tube was missing on collection

G = Tube was found on the ground providing invalid result

A bias adjustment factor is multiplied to the annual mean to improve the accuracy of the diffusion tube results, these factors are specific to the laboratory and the tube preparation method used. The bias represents the overall tendency of the diffusion tubes to depart from the 'true' value i.e. to systematically over-or under-read when compared against the reference method. It is the bias adjusted annual mean that is compared against the annual Air Quality Objective of 40µg/m^3 unless site monitoring data also needs to be annualised.

Summary and Discussion of results

From the results as illustrated in Figures 6 and 7 below, it was interesting to see how the levels compared with each other in different parts of the school. The readings were particularly higher

during winter months, which is expected as background levels tend to rise as more properties in the area have their heating on. There can sometimes be an associated with idling engines too, however it is not evident that idling car engines have contributed towards these readings.

Figure 19: Monthly monitoring results of all sites

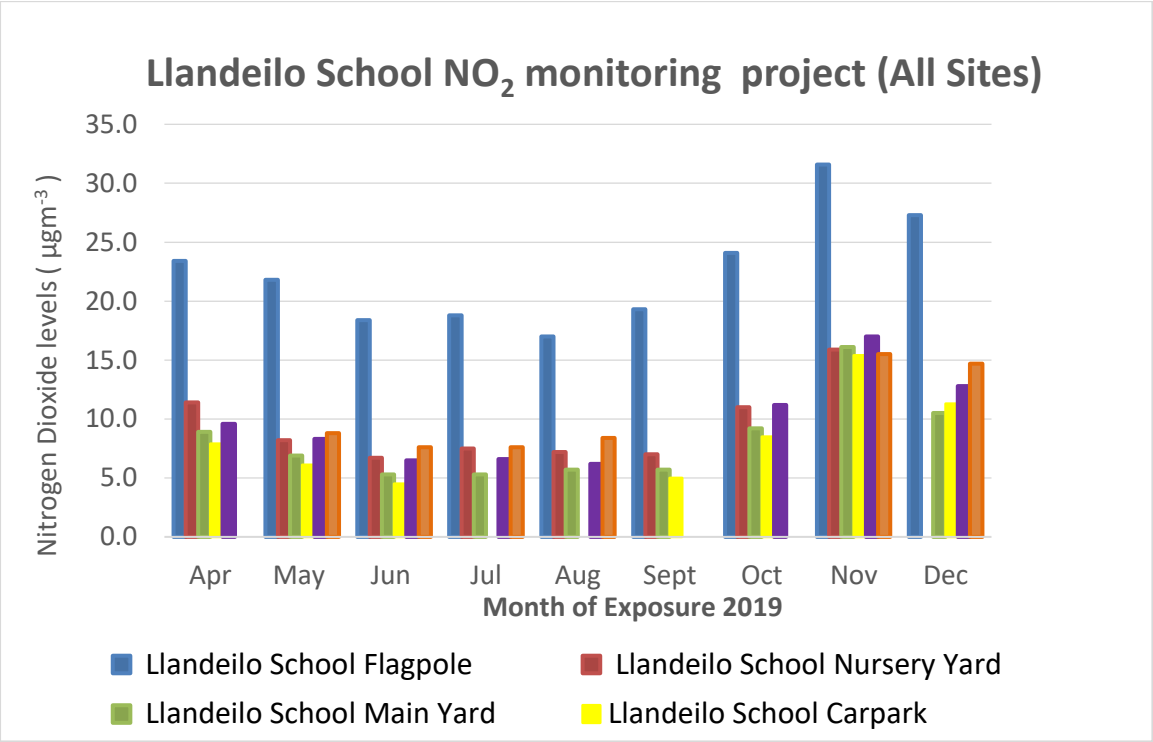
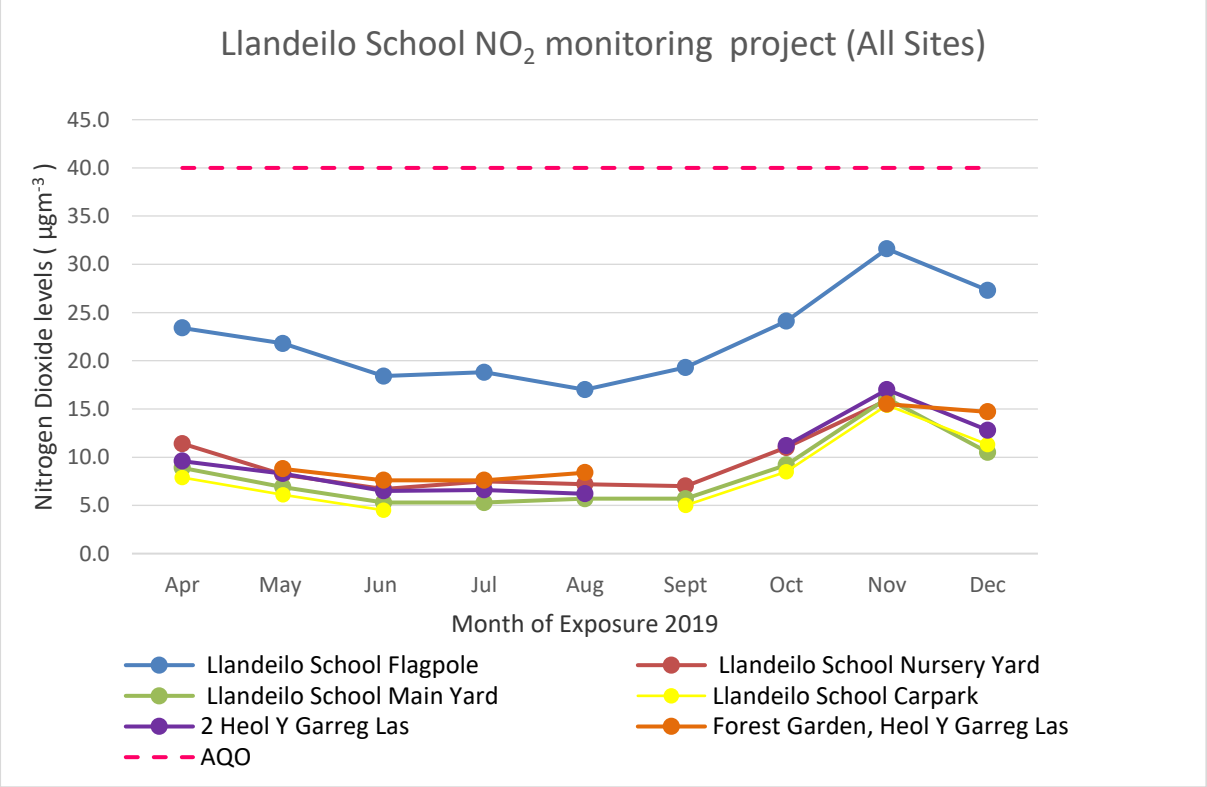


Figure 20: Monthly Trend of all sites

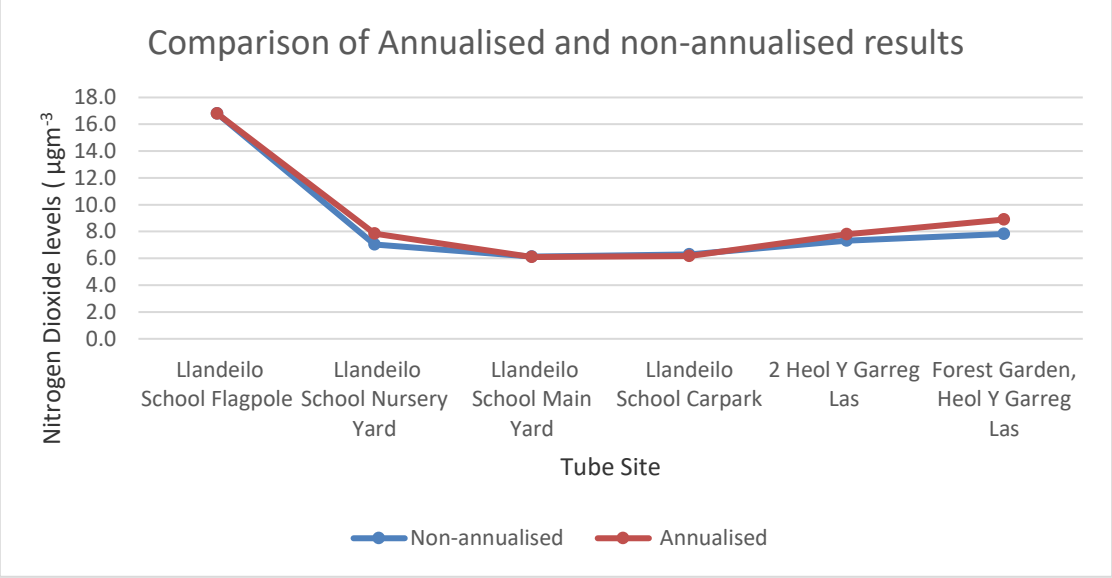


The data obtained did not exceed the annual Air quality Objective of 40µg/m^3, and the levels observed at the different sites were generally consistent with each other, in terms of their monthly trend, this is illustrated in Figure 7 above.

Annualising the data

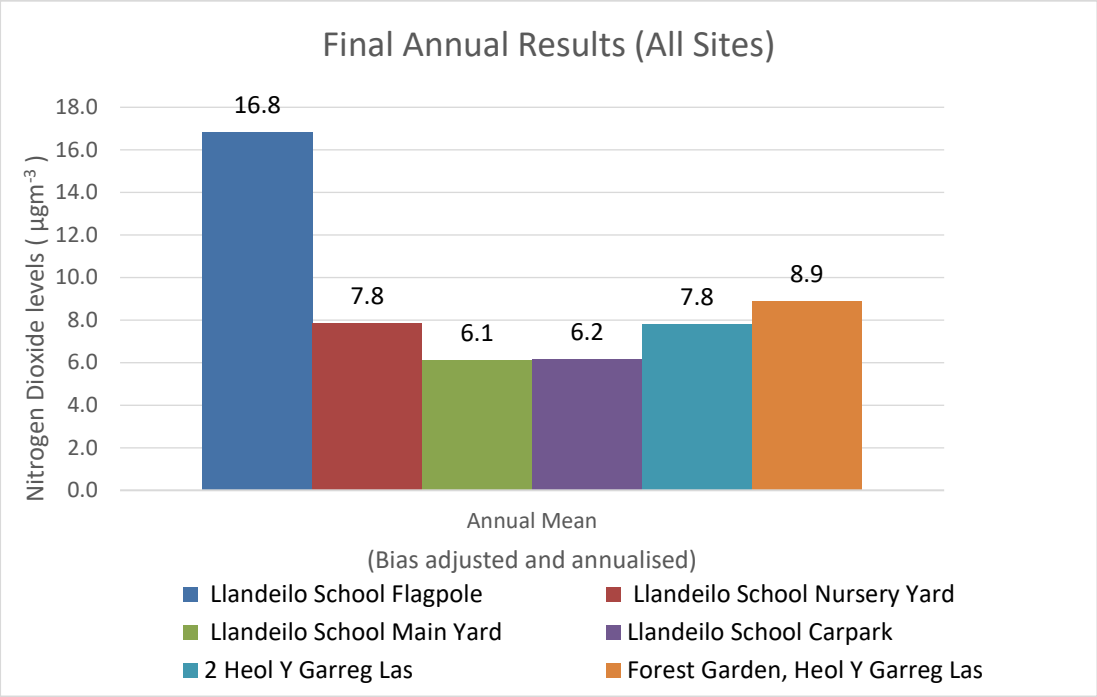
During the monitoring period, a total of six tubes were missing upon collection and one was found on the ground. Where there is less than 9 months valid data capture for the calendar year it is appropriate to annualise the results in order to obtain a better idea of what the annual mean figure may have been had the monitoring taken place for the full year. Less than 9 months of valid data was captured for YGL2, YGL4, YGL5 and YGL6 because some tubes were either missing or found on the ground during collection. It was therefore necessary to annualise those results. The annualised results are listed in Table 5c above. This was calculated using the Defra's Annualisation tool Version 1. Further details about the approach to annualising 2019 data can be found in the Annualised Data Report (2019) for use with the 2020 Progress Report. A comparison of the annualised and non-annualised data can be seen in the graph below in Figure 8.

Figure 21 – Comparison of Annualised and Non-Annualised data



The final annualised results for four of the sites gave margin difference as all four annualised readings were within of 1µg/m^3 of the original non-annualised result.

Figure 22 – Final Annual Means (bias adjusted and annualised where applicable)



The final data obtained did not exceed the annual Air quality Objective of 40µg/m^3. The Main school yard reported the lowest annual mean and very closely followed by the school carpark. The Flagpole gave the highest reading and was 47-63% higher than the other sites.

Readings were expected to be higher in the sites closest to the A483 trunk road; Rhosmaen Street, which runs along the front of the school yard. The flagpole (YGL1) was the site closest to the main road just under 5m away, with Forest Garden, Heol Garreg Las (YGL6) observing the second highest readings and located 39m from the A483. However, it was interesting to observe that the levels of NO_2 measured at the flagpole were more than double the readings taken from all other sites in and around the school. The trend is relatively consistent with what would be expected from a drop of NO_2 with distance, as it disperses and can be observed in Figure 10 below.

Figure 23 – Comparison of NO2 results with distance from A483, Rhosmaen Street

There are some minor exceptions the two sites furthest away from the A483, YGL4 (6.2) and YGL5 (7.8) had slightly higher annual figures than YGL3 (6.1), despite being located further away. However, YGL3 was located within the main yard and not close to any other sources of NO_2, whilst YGL4 was next to the school carpark and YGL5 was on the roadside near 2 Heol Y Garreg Las, an area that parents sometimes park to collect the children. YGL6 had an annual reading of 8.9 which was higher than YGL2 despite being a little further away from the A483, but again this site was located on the roadside at Heol Y Garreg Las, and would likely have been exposed to traffic pollution from vehicles joining the A483. YGL2 (7.8) which was located approximately 21m from the A483 at the Nursery Yard and the second closest site to the A483, benefitted from the usual drop in NO_2, with mostly the A483 traffic being the main source of NO_2. Notably, it received the same annual concentration as YGL5, which was approximately 76m from the A483, but as mentioned YGL5 had additional traffic sources to influence results.

Tube sites nearest to the carpark are sometimes expected to report higher readings and this is evident when comparing distance from the main trunk road, however the carpark did not observe significantly higher levels of NO_2 as would normally be expected. This appears to be a reflection on it use as a small staff only carpark and because it is not used for dropping off and picking up children, this minimises the risk of idling engines close to the main school yard, which can only benefit the children's exposure to traffic pollution.

Conclusions

With regards to the project conducted at Llandeilo Primary School, it was interesting to observe how the concentrations of NO_2 were higher nearest to the surrounding roadside and somewhat disappointing to observe that the Nursery Yard was exposed to higher levels of NO_2 than the carpark and the road site near the school rear access (2 Heol Garreg Las), because younger children are more vulnerable to the dangers of air pollution.

This exercise was valuable in raising awareness with the pupils about pollution, its sources and health effects. As well as educating them on what they can do to help reduce pollution at the school gates. Although the readings were far below the Annual Air Quality Objective of 40µg/m^3, there is no safe level and therefore it is always important to strive for the cleanest air quality around schools as young children are more vulnerable to poor air quality whilst their organs are still developing.

8.0 Cross Hands Economic Link Road

Cross Hands Economic Link Road is currently constructing phase 2 of the development. The road will be located approximately 5 miles west of the town of Ammanford close to A48. The road provides a link between Llandeilo Road through to Norton Road and ending at Black Lion Road where it will link the Cross Hands East Strategic Employment site near the A48. This link road is intended to relieve the congestion that is currently experienced around the Gorslas six ways junction and Cross Hands Road as vehicles approach the Cross Hands roundabout. A location map of the Link Road can be found in Appendix 6.

The screening exercise was first set up and started in May 2017, capturing 8 months of data, where diffusion tubes were set up in the existing routes surrounding the link road to gather baseline data in order to assess the impact the economic link road on the receptors at the existing road network. In 2018 additional diffusion tubes were set up to study the impact on the SSSI located near the junction of proposed the link road. A location map is shown in Appendix 6.

Three additional tubes Carm/ELR6, ELR7 and ELR8 were placed in the SSSI adjacent to the construction site entrance of the Link road positioned 5m, 10 and 20m from the existing main roadside, screening started in March 2018.

Six additional tube sites Carm/ ELR14, ELR15, ELR16, ELR18, ELR19 and ELR20 were later erected on each side of the proposed new road positioned 5m, 10m and 20m from the proposed new roadside, in order to compare the levels of NO_2 before and after construction. This additional screening exercise started in February 2018 and 11 months of data was captured for ELR16, ELR19 and ELR20.

During 2019 monitoring continued in the surrounding routes, alongside the proposed Economic Link Road in Cross Hands (Carm/ELR 14, 15, 16 18, 19 & 20) with the three within the SSSI (Carm/ELR6, 7 & 8) adjacent to the road. Sites Carm/ELR 14, 15, and 18 however had to be removed because they were located alongside the new link road and were in the way of its construction.

The diffusion tube site details can be found in Table 6a and 6b below:

Table 6a – Diffusion Tube Location Checklist for ELR sites

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
Carm/ELR1	Y	N	N	N	N/A	103 141
Carm/ELR2	Y	N	N	Y	Y	N/A
Carm/ELR3	Y	N	N	N	N/A	103 163
Carm/ELR4	Y	N	N	Y	Y	N/A
Carm/ELR6	Y	Y	N	Y	Y	
Carm/ELR7	Y	Y	N	Y	Y	
Carm/ELR8	Y	Y	N	Y	Y	
Carm/ELR9	Y	N	N	N	N/A	201 115
Carm/ELR10	Y	N	N	N	N/A	201 1514
Carm/ELR11	Y	N	N	N	N/A	DP 24
Carm/ELR12	Y	N	N	N	N/A	201 1499
Carm/ELR14	Y	N	N	Y	Y	
Carm/ELR15	Y	N	N	Y	Y	
Carm/ELR16	Y	N	N	Y	Y	
Carm/ELR18	Y	N	N	Y	Y	
Carm/ELR19	Y	N	N	Y	Y	
Carm/ELR20	Y	N	N	Y	Y	
Carm/ELR21	Y	N	N	N	N/A	301 239
Carm/ELR22	Y	N	N	N	N/A	301 242

Table 6b – Diffusion Tube Site Details for ELR sites

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
Cross Hands (2) (rdbt)	Carm/ELR1	2.73	1.54	6.13	256458	213067
Cross Hands (House)(N)	Carm/ELR2	2.66	6.00	0	256465	213085
Gorslas Sixways	Carm/ELR3	2.58	1.68	3.45	257027	213774
Gorslas Sixways (2)	Carm/ELR4	2.73	6.85	0	257022	213777
SSSI (B)(5m)	Carm/ELR6	2.26	-	-	257550	214505
SSSI (C)(10m)	Carm/ELR7	2.43	-	-	257553	214503
SSSI (D)(20m)	Carm/ELR8	2.3	-	-	257562	214497
Gate Road (nr No. 181)	Carm/ELR9	2.65	1.82	3.45	257837	214594
Norton Road (nr No. 43)	Carm/ELR10	2.80	2.30	4.50	257563	213717
Norton Road junction (DP 24)	Carm/ELR11	2.50	1.75	4.50	257752	213562
Norton Road (W) (nr No. 94)	Carm/ELR12	2.74	0.10	1.70	258269	213646
ELR (west) (B) (5m)	Carm/ELR14	2.68	-	-	257693	214093
ELR (west) (C) (10m)	Carm/ELR15	2.51	-	-	257683	214091
ELR (west) (D) (20m)	Carm/ELR16	2.56	-	-	257664	214087
ELR (east) (B) (5m)	Carm/ELR18	2.55	-	-	257720	214098
ELR (east) (C) (10m)	Carm/ELR19	2.61	-	-	257730	214100
ELR (east) (D) (20m)	Carm/ELR20	2.68	-	-	257749	214104
Black Lion Road (W) (nr Helyg)	Carm/ELR21	2.55	1.55	15.10	257564	212950
Black Lion Road (E) (nr Gorse Villa)	Carm/ELR22	2.8	2.2	3.20	257666	212864

Monitoring started in May 2017 for a period of 8 months. The monthly monitoring results are shown below in Table 6c below.

Table 6c – Monthly monitoring results for Economic Link Road sites

Site ID	NO2 Mean Concentrations (µg/m3)															
	January	February	March	April	May	June	July	August	September	October	November	December	Annual Mean			
													Raw Data	Bias Adjusted	Bias adjusted and annualised	Distance corrected to nearest exposure
ELR1 (2017)	-	-	-	-	44.7	43.8	38.7	40.8	42.7	44.9	61.7	49.7	45.90	35.30	41.3	29.8
ELR1 (2018)	48.4	39.3	43.6	45.7	47.7	40.2	42.4	41.5	43.4	39.8	49.2	52.6	44.48	34.25		
ELR1 (2019)	46.2	52.8	40.0	46.9	39.2	32.3	34.9	40.2	38.8	49.8	56.3	49.9	43.94	32.96		
ELR2 (2017)	-	-	-	-	23.1	24.0	22.7	24.5	25.4	27.8	32.0	27.4	25.90	19.90	23.3	
ELR2 (2018)	29.1	30.4	32.5	27.1	29.8	28.6	24.5	25.3	-	32.1	29.3	31.2	29.08	22.39		
ELR2 (2019)	34.8	31.1	23.4	28.1	26.2	19.5	21.2	22.3	22.9	27.1	36.9	30.8	**27.03**	**20.27**		
ELR3 (2017)	-	-	-	-	19.7	17.2	14.4	14.4	21.4	-	33.9	-	20.2	15.5	19.1	
ELR3 (2018)	25.8	21.0	27.6	20.7	-	20.2	18.1	17.5	19.8	26.8	25.3	24.5	22.48	17.31		
ELR3 (2019)	24.4	30.1	19.5	-	19.4	14.4	15.5	-	18.6	-	35.1	-	**22.13**	**16.59**	16.5	
ELR4 (2017)	-	-	-	-	15.3	13.0	12.6	11.7	16.3	19.2	28.9	22.4	17.40	13.40	15.7	
ELR4 (2018)	22.4	21.3	22.4	17.6	17.9	16.2	14.3	14.4	17.2	21.1	22.4	26.5	19.48	15.00		
ELR4 (2019)	21.6	23.2	18.6	18.1	16.4	11.6	12.2	13.7	14.6	20.3	29.8	23.4	**18.63**	**13.97**		
ELR6 (2018)	-	-	17.8	11.6	11.2	11.5	9.8	11.3	12.3	12.5	16.6	18.0	13.26	10.21		
ELR6 (2019)	15.2	15.2	12.8	14.7	10.1	7.8	7.7	-	-	11.7	18.9	14.9	**12.90**	**9.68**		
ELR7 (2018)	-	-	-	11.2	9.2	11.2	8.8	9.9	10.1	10.9	13.9	15.5	11.19	8.62		
ELR7 (2019)	13.8	13.9	11.7	15.0	9.1	-	6.9	8.5	8.2	10.1	14.3	12.5	**11.27**	**8.45**		
ELR8 (2018)	-	-	13.2	8.9	10.1	11.3	7.7	8.5	10.3	11.1	-	14.7	10.64	8.20		
ELR8 (2019)	12.2	11.2	9.6	-	9.0	5.7	6.5	7.8	7.1	9.1	13.7	10.3	**9.29**	**6.97**		
ELR9 (2017)	-	-	-	-	8.0	6.4	5.5	5.5	8.4	10.4	16.5	12.3	9.10	7.00	8.2	-
ELR9 (2018)	14.3	7.2	12.8	8.5	7.9	7.7	6.4	8.2	8.7	10.4	14.2	14.3	10.05	7.74		
ELR9 (2019)	13.2	14.5	8.9	8.4	6.6	4.8	5.4	6.9	7.1	9.7	16.0	13.4	**9.58**	**7.18**	12.5	
ELR10 (2017)	-	-	-	-	12.9	10.8	-	11.4	-	-	-	-	11.70	9.00	13.3	-
ELR10 (2018)	-	18.2	20.0	-	12.7	13.4	10.5	12.4	-	-	-	-	14.53	11.19	12.64	
ELR10 (2019)	-	-	-	-	12.6	10.6	10.4	-	-	-	-	20.4	**13.50**	**10.13**		
ELR11 (2017)	-	-	-	-	10.1	9.7	8.6	-	11.5	14.0	21.1	14.3	12.8	9.9	10.9	-
ELR11 (2018)	15.3	7.3	13.3	10.1	9.1	11.2	9.4	11.2	-	16.1	16.1	18.5	12.51	9.63		
ELR11 (2019)	20.0	15.1	14.0	11.9	8.8	6.1	7.8	10.1	10.3	15.1	21.6	15.4	**13.02**	**9.76**		

Site ID	NO2 Mean Concentrations (µg/m3)															
	January	February	March	April	May	June	July	August	September	October	November	December	Annual Mean			
													Raw Data	Bias Adjusted	Bias adjusted and annualised	Distance corrected to nearest exposure
ELR12 (2017)	-	-	-	-	13.4	-	11.6	13.2	14.5	17.8	26.4	17.9	16.4	12.6	14.1	-
ELR12 (2018)	19.3	15.3	19.0	12.9	12.5	12.5	11.7	13.8	16.0	16.8	16.2	24.4	15.87	12.22		
ELR12 (2019)	21.5	18.3	-	13.9	12.3	9.5	10.6	12.9	-	16.3	24.2	23.4	**16.29**	**12.22**		
ELR14 (2018)	-	9.3	11.3	-	-	-	-	-	-	-	-	-	10.30	7.93		
ELR15 (2018)		11.2	11.2	-	-	-	-	-	-	-	-	-	11.20	8.62		
ELR16 (2018)	-	10.3	10.9	5.9	6.1	12.8	5.3	6.7	6.3	8.7	13.6	12.4	9.00	6.93		
ELR16 (2019)	*10.0*	10.9	8.4	7.5	6.0	3.8	3.8	5.5	5.5	7.9	13.2	**-**	**7.50**	**5.63**		
ELR18 (2018)	-	8.8	10.2	6.6	6.7	9.0	-	-	-	-	-	**-**	8.26	6.36	6.61	
ELR19 (2018)	-	9.0	8.4	6.4	5.9	7.1	6.7	7.2	8.3	9.4	12.3	12.1	8.44	6.50		
ELR19 (2019)	10.8	11.3	8.0	6.7	5.4	3.6	4.3	6.2	5.2	7.4	12.8	11.9	**7.80**	**5.85**		
ELR20 (2018)	-	7.0	9.3	7.5	6.5	6.7	6.5	6.9	8.4	8.5	11.3	9.9	8.05	6.20		
ELR20 (2019)	11.2	12.6	8.7	6.6	6.1	4.0	4.3	6.0	4.9	7.7	12.2	10.4	**7.89**	**5.92**		
ELR21 (2017)	-	-	-	-	10.1	9.6	8.5	8.2	13.5	13.4	22.0	15.6	12.6	9.7	11.3	-
ELR21 (2018)	16.5	14.4	14.2	11.0	8.8	8.8	10.0	11.1	11.2	13.5	20.1	19	13.22	10.18		
ELR21 (2019)	15.7	18.9	10.9	10.7	10.3	7.0	8.8	10.2	10.7	12.9	19.3	19.6	**12.92**	**9.69**		
ELR22 (2017)	-	-	-	-	18.6	16.9	13.6	14.7	18.0	20.2	28.4	19.7	18.7	14.4	16.9	-
ELR22 (2018)	24.9	24.3	23.4	15.7	15.1	15.4	15.8	19.2	19.3	21.3	23.1	29.2	20.56	15.83		
ELR22 (2019)	26.1	25.2	-	18.5	17.6	12.3	15.0	15.7	18.6	18.5	28.7	27.0	**20.29**	**15.22**		

As this screening exercise started in May 2017, it was only possible to capture 8 months of data during 2017 and therefore it was necessary to annualise these results in order to obtain a better idea of what the annual mean figure may have been had the monitoring taken place for the full year. This was carried out in the Annualised Data Report (2017) submitted as part of the Air Quality Annual Progress Report 2018.

During 2018, monitoring sites ELR14 and ELR15 were unfortunately removed in April 2018 because they were in the way of constructing the road, therefore only two months of data was captured and sadly not enough to enable the results to be annualised. Monitoring site ELR18 was also removed in August 2018 to aide construction and with a tube missing in July, it was only possible to capture 4 months of valid data. Only 6 months of data was also captured for ELR10 because the tubes were missing on several occasions. Nevertheless, more than 3

months of data was captured so it is feasible and necessary to annualise the results for ELR10 and ELR18. This was carried out in the Annualised Data Report (2018) submitted as part of the Air Quality Annual Progress Report 2019.

During 2019, ELR3 had four missing tubes upon collection and ELR10 only captured four months of data dues to several missing tubes. The results for these two sites therefore also needed to be annualised.

The annualised results are listed in Table 6c above. Further details about the approach to annualising 2019 data can be found in the Annualised Data Report (2019) for use with the 2020 Progress Report.

None of the tube sites surrounding in the Gorslas/Cross Hands area exceeded the annual air quality objective of 40µg/m^3 during 2019, the highest reading was again Carm/ELR1 which is located near to the Cross Hands roundabout, however this year it observed a reduction in comparison to 2017 and 2018. It is hoped the Economic Link Road with relieve congestion to this road in the future once it is operational. Nevertheless, this is not the worse-case scenario because this site is not located at the point of relevant exposure being positioned just over 6 meters away from the receptor. Carm/ELR2 is positioned on the façade of the nearest receptor and therefore more reflective of the relevant exposure.

The sites that are located in the SSSI next to the proposed economic link road include ELR6, ELR7 and ELR8 also observed a reduction in levels during 2019 compared to 2018, where construction was operational during both years. It does not appear from the levels observed that the construction has had an adverse impact on the SSSI Caeau Blaen Yr Orfa as they all remain below 10µg/m^3.

9.0 Results Discussion and Conclusion

The screening results in Llangennech had concentrations of Nitrogen dioxide far below the annual Air Quality objective of 40µg/m^3, and all three sites reported a concentration level below 19µg/m^3. Due to the significantly low concentrations found at the school gates, it is very unlikely that traffic pollution is a significant concern to continue monitoring at this site. However, monitoring in the main road (LLG2 and LLG3) that travels through Llangennech will continue, to monitor any impacts that may arise from future developments whilst taking into consideration that this road does attract more than 5000AADT and is narrow in parts.

The screening results around Amman Valley School, Margaret Street, Ammanford also demonstrate concentrations of Nitrogen dioxide far below the annual Air Quality objective of 40µg/m^3. This indicates that the pollution levels in this area is unlikely to pose any significant risk to receptors and that since the removal of the trees the area does not appear to be experiencing elevated levels of concern.

On the other hand, the Abergwili location had an estimated traffic flow of greater than 5000 AADT and therefore it was considered appropriate to identify a suitable monitoring site. The screening results however continue to demonstrate low concentrations of Nitrogen dioxide with both sites reporting a concentration level below 15µg/m^3. Nonetheless, monitoring in these areas will continue into 2020 ensure that any changes made in delivering the Carmarthen AQMA action plan proposals does not move the problem elsewhere.

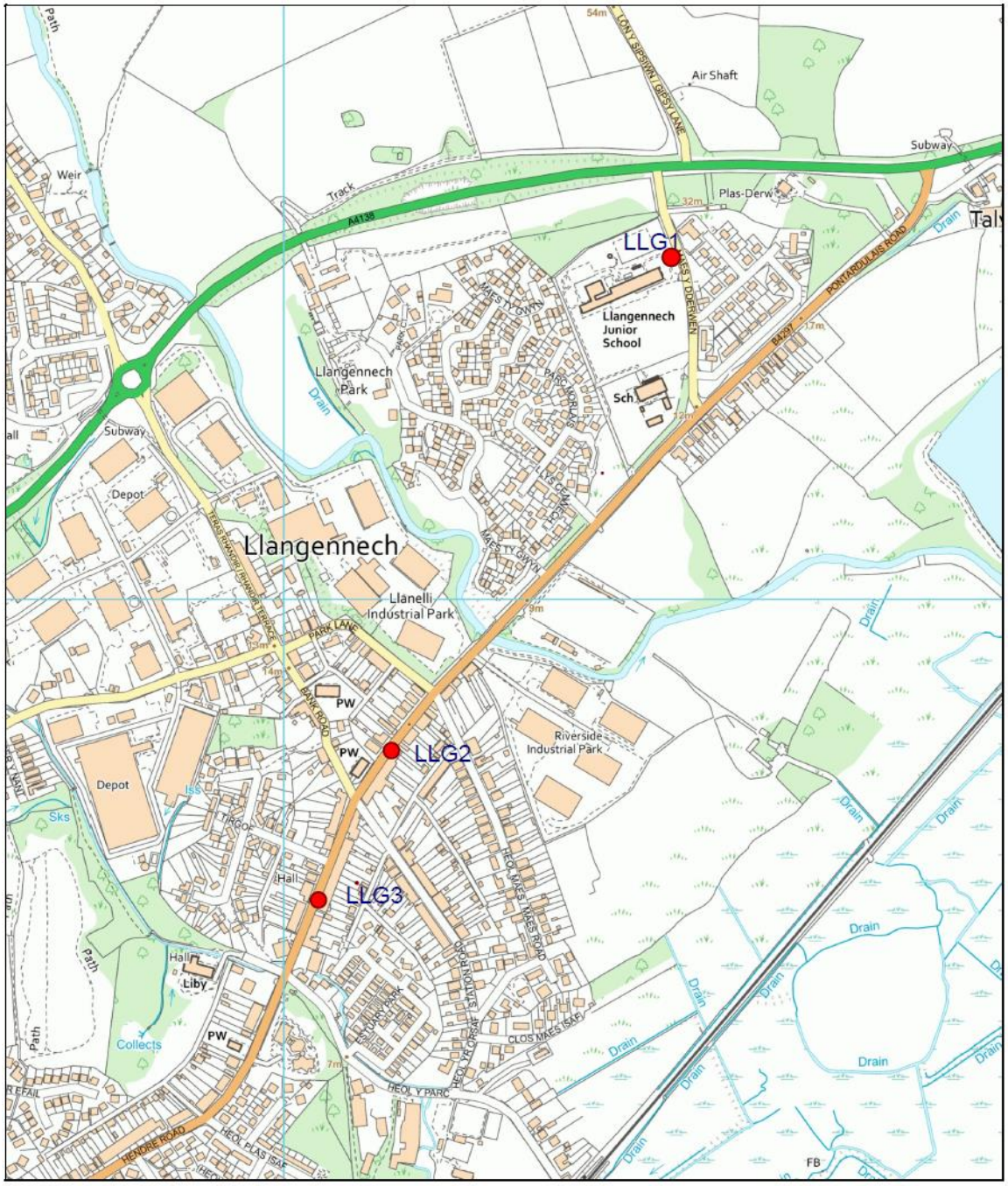
The screening results at the Pentip School site had concentrations of Nitrogen dioxide much below the annual Air Quality objective of 40µg/m^3. It is positive to see that pollution levels in this area are compliant where children attend school next to a busy road. The site is located within the boundary of the Llanelli AQMA, however it is relatively open, allowing pollutants to disperse readily. Monitoring will continue as part of the AQMA network to identify any changes as action planning work continues.

With regards to the project conducted at Ysgol Llandeilo, it was interesting to observe how the concentrations of NO_2 got higher the closer it got to the A483. This exercise was valuable in raising awareness with the pupils about pollution, its sources and health effects. As well as educating them on what they can do to help reduce pollution at the school gates. Although the readings were far below the Annual Air Quality Objective of 40µg/m^3, there is no safe level and therefore it is always important to strive for the cleanest air quality around schools as young children are more vulnerable to poor air quality whilst their organs are still developing.

No sites within the ELR screening exercise reached high levels of concern, and readings in the SSSI area remained low whilst construction was taking place. Nevertheless, monitoring will continue to hopefully observe the full benefits of introducing the link road. It is hoped that once it is operational, it will relieve congestion in this area and bring a positive impact for local residents. Unfortunately, there has been a delay in completing the link road following difficulties in purchase part of the land, so it is planned to report back on this screening exercise once the link road is complete and open to drivers.

Appendix 1 – Llangennech, Tube Location Map

Llangennech tube sites

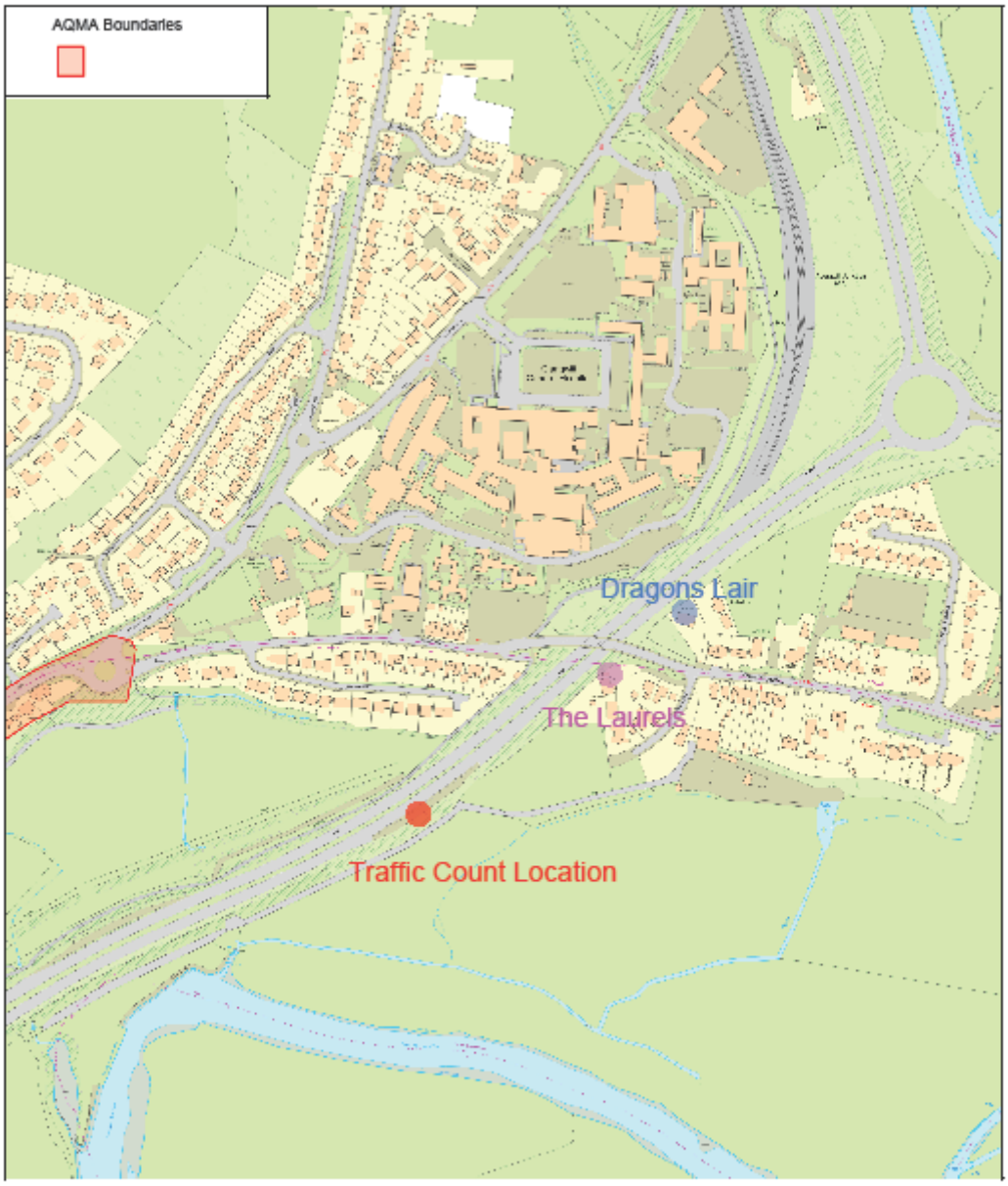


0 100 200 300m

Graddfa	Canol y Map	Dyddiad
Scale	Map Centre	Date
1:7500	[256297.5,202009.5]	10/09/2020

Appendix 2 – Abergwili Tube Location Map

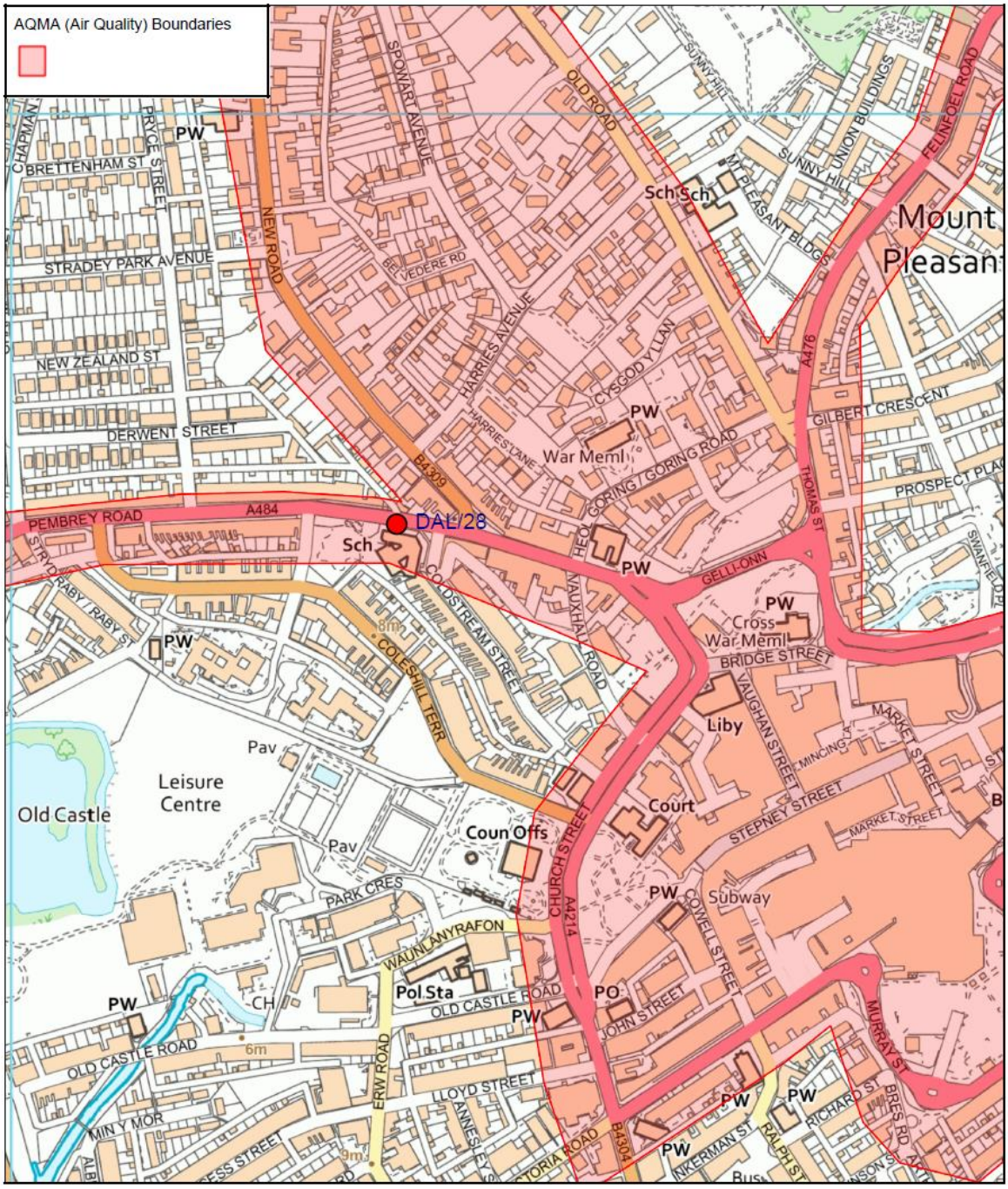
Abergwili



Graddfa Scale	Canol y Map Map Centre	Dyddiad Date
1:5000	[242806.5,221120.2]	17/05/2017

Appendix 3 – Pentip School Tube Location Map

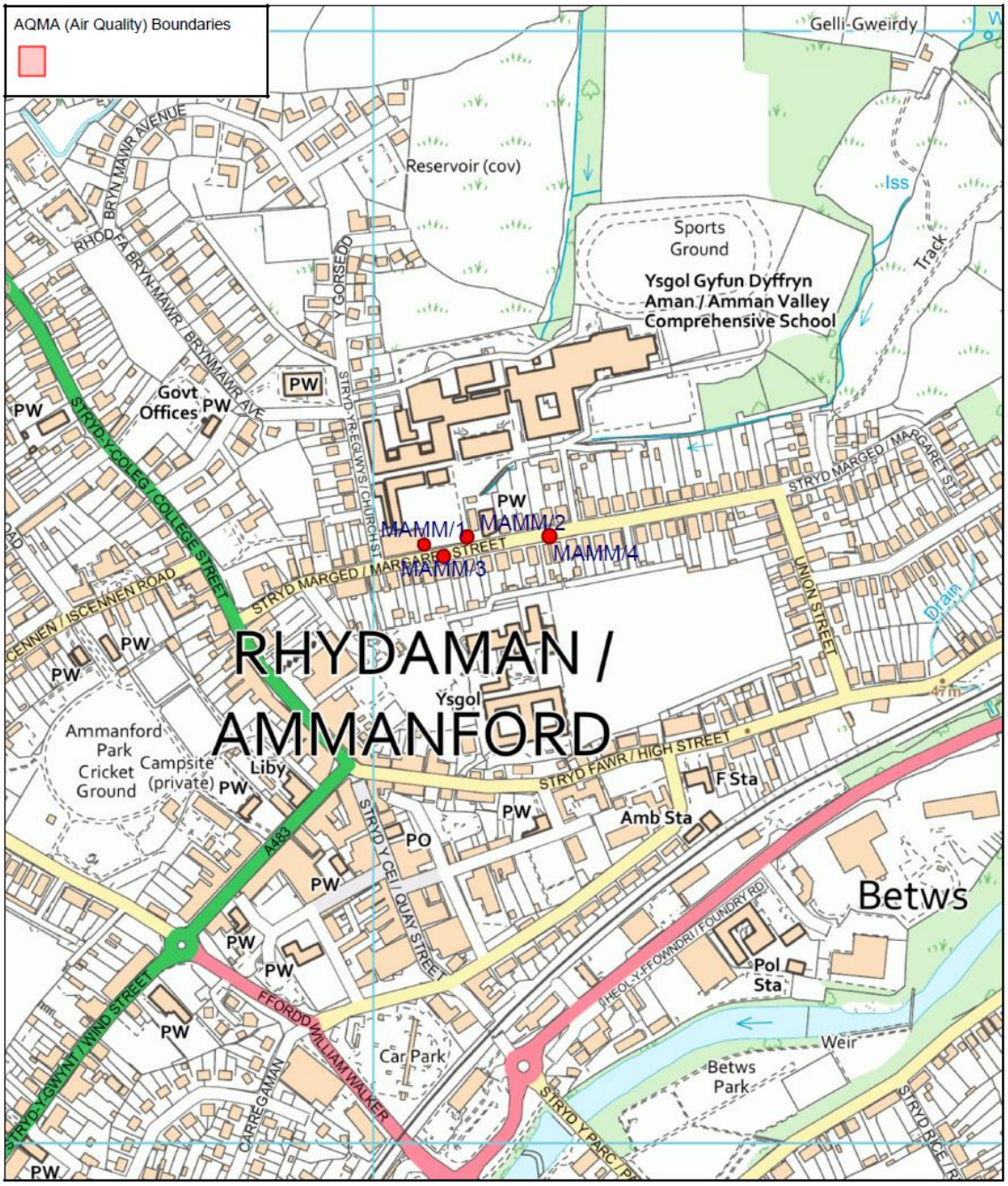
Pentip School Tube Location



Graddfa Scale	Canol y Map Map Centre	Dyddiad Date
1:5000	[250442,200570.5]	25/11/2020

Appendix 4 – Margaret Street, Diffusion Tube Location Map

Margaret St tube sites 2019

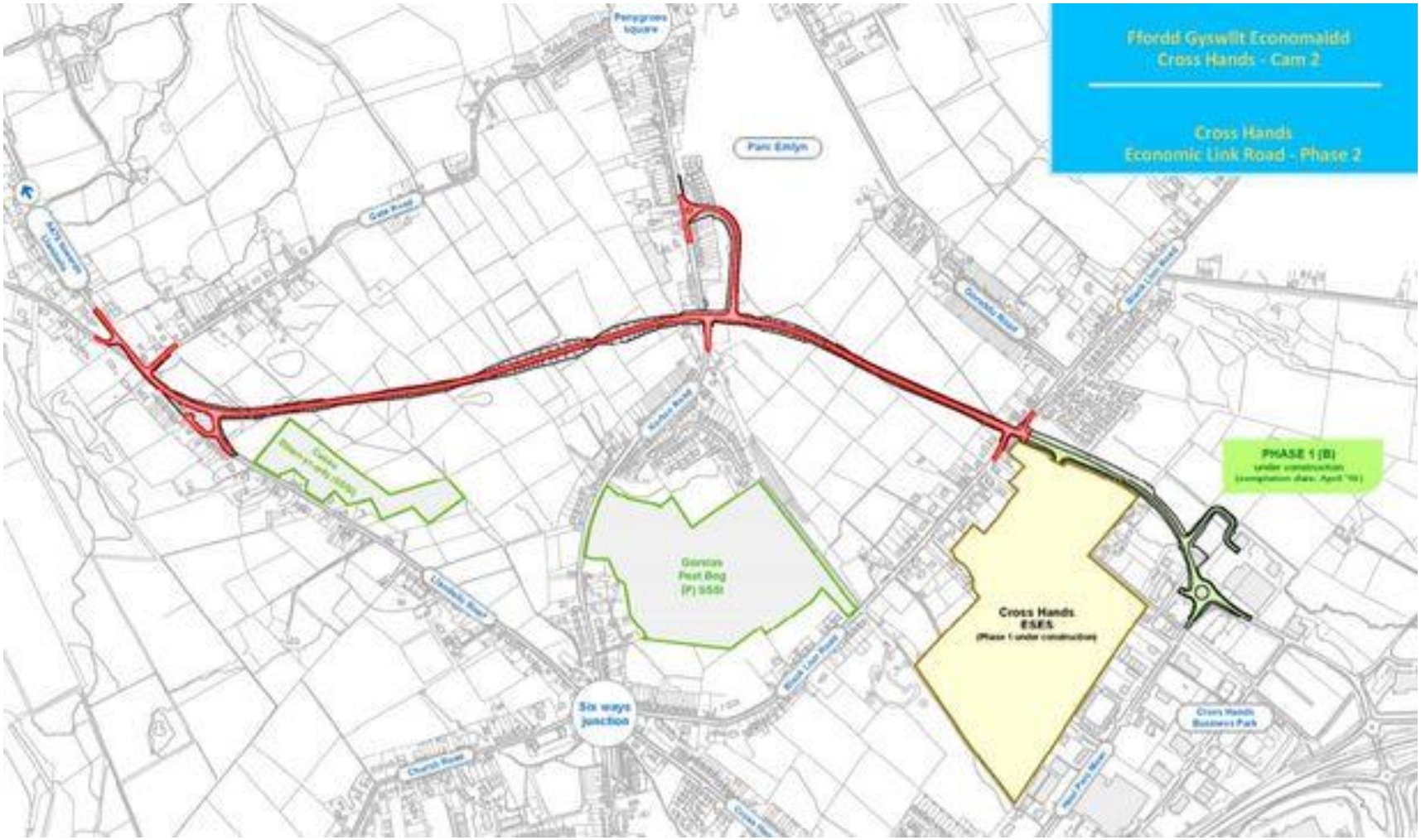


Appendix 5 – Llandeilo School, Location Map

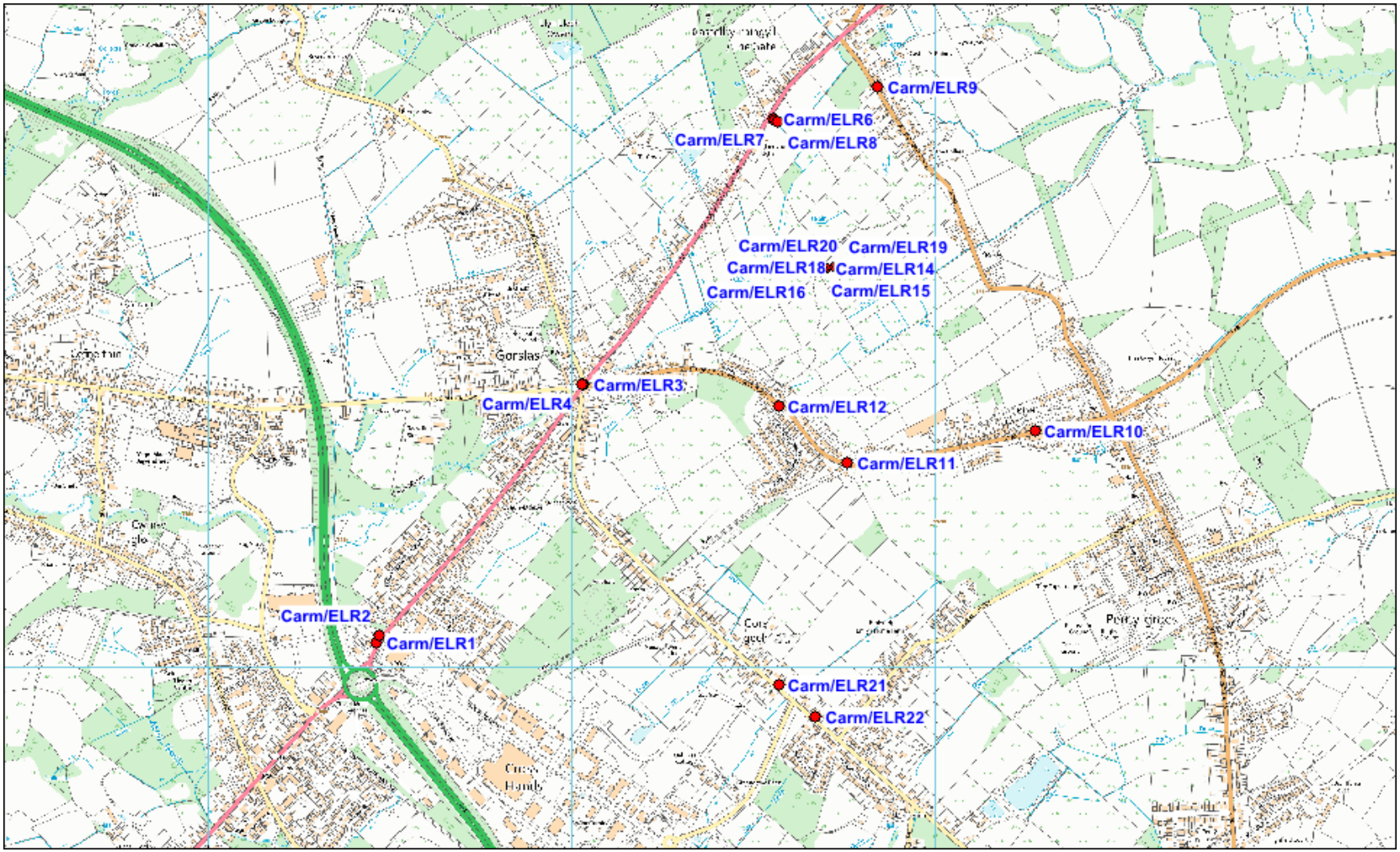
Sites from Top down:

1. On Pergola in middle of Nursery playing yard, (Site Ref YGL2)
2. On telegraph pole next to staff carpark, (Site Ref YGL4)
3. On Flagpole within front yard adjacent to Rhosmaen St, (Site Ref YGL1)
4. On pole in the middle of the main playing yard next to the steps, (Site Ref YGL3)
5. Lamppost at rear school entrance outside no. 2 Heol Garreg Las (cars drop off here), (Site Ref YGL5)
6. Lamppost on Heol Y Garreg Las adjacent to the School's Forest Garden, (Site Ref YGL6)

Appendix 6 – Cross Hands Economic Link Road Location Map



Appendix 6.1 – Cross Hands Economic Link Road Diffusion Tube Location Map



Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
AQO	Air Quality Objective
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
LAQM	Local Air Quality Management
NRW	Natural Resources Wales
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
SWTRA	South Wales Truck Road Agency
WG	Welsh Government