Carmarthenshire County Council
2018 Air Quality Progress Report

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

September 2018

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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 slightly decreased in comparison to 2016, however four sites within our Air Quality Management Areas (AQMA's) (two in Llanelli, one in Carmarthen and one in Llandeilo) have exceeded the Air Quality Objective for 2017 with a number of sites remaining borderline. There has not been a significant reduction identified over the last three years and during 2017, the winter months experienced a warmer climate which may account for this reported trend. Therefore it is too early to predict whether we will continue to see a downward trend at the end of 2018.

Carmarthenshire currently has three Air Quality Management Areas 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 second year review of phase 1 of the Llandeilo action plan was conducted in 2017 and included in the 2017 Air Quality Progress Report. The outstanding options of the Llandeilo Action plan phase 1 has been assessed and is included in Appendix H of this progress report.

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 the final draft Action Plans were submitted to Welsh Government late 2017.

No new major sources of uncontrolled pollution or fugitive emissions have been identified within the County during 2017 and although a number of developments are underway, some of which have required air quality impact assessments to be conducted, no significant impacts have been identified. 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.

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

Actions to Improve Air Quality

During 2017 one new process for a mobile plant was granted an Environmental Permit in order to control emissions. However, as it is a mobile plant with the flexibility to move locations, it has the potential to move to other locations outside of the County depending on where it is used.

Carmarthenshire also received nine planning applications for new developments that carried out Air Quality Assessments, of which eight stated that any impact would be negligible and one was refused. An additional seven applications were also able to justify no that 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 and the consideration of Electric Vehicle infrastructure.

Air quality screening exercises were performed during 2017 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 2018 and the results will be reported in the 2019 Progress Report.

Three 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 was observed during the time of the visits.

No PM_{10} monitoring was carried out during 2017 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 trying to progress the measures outlined in the Action Plan for Llandeilo.

Screening exercises will also be planned to 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 in order to raise awareness of local air pollution and encourage active travel. By working in partnership with Swansea University, it is planned to monitor levels of Nitrogen Dioxide around the school gates for a couple of schools within the County that are located within our AQMA Towns.

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.

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
https://www.sirgar.llyw.cymru/cartref/gwasanaethaur-cyngor/iechyd-yr-amgylchedd/ansawdd-aer/#.W46YkumQzIU

Or contact 01267 234567

Use of an AQMesh Automatic Analyser to monitor road side Pollution levels.

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

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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 of the 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 on 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. 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. The Llanelli and Carmarthen AQMA Boundary maps can be found in Appendix D.

Table 1.0 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

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 . 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 1.1 – Declared Air Quality Management Areas

AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	Description	Action Plan
Llandeilo AQMA	NO_2 annual mean	There has been no discernible improvement in air quality in the AQMA for the last 3 years	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 http://aqma.defra.gov.uk/action-plans/14.11---llandeilo-aqma-action-plan.pdf
Carmarthen AQMA	NO_2 annual mean	There has been no discernible improvement in air quality in the AQMA for the last 3 years	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	Carmarthen AQMA Action Plan

AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	Description	Action Plan
			west back to the Jobs Well Road junction completing the AQMA boundary.	
Llanelli AQMA	NO_2 annual mean	There has been no discernible improvement in air quality in the AQMA for the last 3 years	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 County Council can be viewed at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=395 and are also included in Appendix D.

1.3 Implementation of Action Plans

Carmarthenshire County Council has taken forward a number of measures during 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table . 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 2017 are:

Action plans were developed for the newly declared Carmarthen and Llanelli Air Quality Management Areas.

Work has been conducted on assessing the feasibility of the outstanding proposals listed within Phase 1 of the Llandeilo action plan, including:

8 – Promote cycling and walking to school more.
9 – Promote car sharing to work / school.
21 – Publicise alternative routes (possibly through haulage associations) to destinations north of Llandeilo so that vehicles can avoid the town.
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.
C4 – Assess feasibility of a six month trial of HGV diversion away from the town (except for deliveries).

Traffic Orders restricting waiting times in Bridge Street, Llandeilo were implemented and took effect on 17th March 2017.

Further details on the progress on the feasibility of the outstanding actions for Phase 1 of the Llandeilo Action plan can be found in Appendix H.

Over the next year Carmarthenshire County Council will focus on considering the proposals on the Carmarthen and Llanelli action plans. An action plan 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 in Table 1.2 as

highlighted in Green (High), Amber (medium) and red (low) based on the expected impact and effectiveness of the proposed measure.

Further work will also be conducted to review the feasibility of Phase 2 proposals contained within the Llandeilo action plan, which can be found in Appendix I.

Table 1.2 – 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										
C1	Improve cycle routes in and around the town.	Provide alternative to car journey	County Council	TBC	TBC	Usage of cycle routes by counter	0.1%	Safer routes in Communities etc.	Johnstown	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	TBC	?	Reduced congestion / traffic counts	1%	?	Planning Application received.	?	Impossible to identify reduction in emissions
C6	Review the Park & Ride provision for the town.	Improve service and increase uptake	County Council / Partners	TBC	?	Usage data / monitoring data	0.5%	?	?	?	Impossible to identify reduction in emissions
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	TBC	Monitoring data	1%	20mph zones introduced around schools and shopping areas	20mph zone implemented for Ysgol Treioan (School monitoring project in place)	?	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	TBC	?	Area coverage	?	None	None	?	
C 14	Assess extended use of the Tesco Shoppers bus.	Reduced vehicle trips	County Council / Tesco	2018	?	Number of trips / uptake	0.1%	Liaison with Tesco	None	?	Impossible to identify reduction in emissions
C2	Promote use of Carmarthen by-pass through media resources.	Reduce number of vehicles travelling through town unnecessarily	County Council	TBC	?	Traffic counts	0.5%	None	None	?	
C4	Install AQMA signage (suggest alternative routes?).	Reduce number of vehicles travelling through AQMA unnecessarily	County Council / SWTRA / WG	2018-19	?	Traffic counts	1%	None	None	?	Improvements may be identified through monitoring results

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
C5	Assess positive / negative impacts of Western Link once opened.	Reduce congestion, improve traffic flow, reduce emissions	County Council	TBC	?	Traffic counts / monitoring data	3%	Western Link partially complete	?	?	
C8	Promote more car sharing / dedicated car parks (involve supermarkets?)	Reduced vehicles trips	County Council / Partners	TBC	?	Use of car sharing spaces?	0.1%	None	None	?	Impossible to identify reduction in emissions
C 12	Assess use of 'dummy' speed bumps painted on roads.	Reduced speed and emissions	County Council	TBC	?	?	?	None	None	?	Impossible to identify reduction in emissions (may increase emissions)
C 11	Investigate bike hire scheme for the town.	Reduced vehicle trips	County Council / Partners	2018-19	TBC	Uptake of bike hire	0.1%	None	None	?	Impossible to identify reduction in emissions
C 10	Introduce electric/low emission buses, and introduce smaller buses at off-peak times.	Emissions reduction	County Council / Bus Operators	TBC	?	Change in bus fleet	1%	None	None	?	Difficult 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
C9	Johnstown bridge scheme feasibility study.	Reduce traffic congestion and emissions on Llansteffan Road, and relieve congestion on connecting routes	County Council / SWTRA / WG	TBC	?	Traffic counts / monitoring data	2%	?	?	?	
	LLANELLI										
L1	Assess traffic light sequencing for Thomas Street/Gelli Onn junction.	Reduced / displaced congestion	County Council	2017	?	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

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
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	?	?	Monitoring data	1%	20mph zones introduced around schools and some others areas(?)	**TBC**	?	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	?	?	Usage of cycle routes by counter	0.1%	Safer routes in Communities grant application - Awarded.		?	Impossible to identify reduction in emissions
L10	Determine impacts / opportunities from the Graig College development.	Traffic flow, congestion, pollution	County Council / Graig Campus	?	?	Changes in traffic flow, congestion	?	None	Review planning	?	
L11	Determine opportunities from the Wellbeing Village development.	Sustainable travel, travel plan, EV charging etc.	County Council / Partners	?	?	Implementation of alternative travel options	?	?	?	?	
L12	Assess potential impact from the development of Parc Howard.	Ensure minimal impacts	County Council	2017	2017/18	Monitoring results	N/A	AQA performed – identified negligible impact	Planning consultation response		

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
L3	Install AQMA signage (suggest alternative routes?).	Reduce number of vehicles travelling through AQMA unnecessarily	County Council / SWTRA / WG	2018-19	?	Traffic counts	1%	None	None	?	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	TBC	?	Traffic counts	0.5%	None	None	?	
L6	Review the Park & Ride provision for the town.	Improve service and increase uptake	County Council / Partners	TBC	?	Usage data / monitoring data	0.5%	?	?	?	Impossible to identify reduction in emissions
L7	Feasibility study for re-opening Bridge Street.	Reduce congestion	County Council	2018	?	N/A	?	None	None	?	
L8	Feasibility study for a by-pass for Sandy Road.	Reduce congestion	County Council	2018	?	N/A	?	None	None	?	
L16	Assess parking in and around Pentip School.	Reduce congestion, improve road safety	County Council	2018	?	?	?	None	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
L17	Feasibility study for weight and speed restrictions on Pembrey Road.	Reduce emissions, improve road safety	County Council	2019	?	Monitoring results	0.5%	None	None	?	Pembrey Road not currently monitored
L18	Feasibility study for creating a roundabout at Felinfoel/Thomas Street/Old Road junction.	Improve traffic flow and reduce emissions	County Council	2019	?	Monitoring results	?	None	None	?	
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	?	Traffic counts and monitoring results	?	None	None	?	
L2	Implement traffic survey for Llangennech / Dafen / Thomas Street to establish why that route is used.	Understand driver habit / route choice	County Council	?	?	Survey results	0%	?	None	?	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	?	?	Monitoring results	1 -2%	None	None	?	
L14	Identify and review HGV delivery timings to businesses in and around the town centre.	Reduce congestion and emissions	County Council / Partners	?	?	Possibly traffic counts / monitoring results	?	None	None	?	
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	?	?	Monitoring results and traffic counts	1%	None	None	?	
L20	Feasibility study for using Stradey Park Avenue for school start and finish times only.	Reduce congestion on Sandy Road and area.	County Council	?	?	Traffic counts and monitoring results	0.5%	None	None	?	
L15	Review/improve signage to M4 (link to L3), identify preferred routes through town.	Reduce congestion	County Council / SWTRA / WG	?	?	Traffic counts	?	None	None	?	
	GENERAL										

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
A	Feasibility study for Low Emission Zones.	Reduce emissions	County Council / SWTRA	?	?	Monitoring results	?	None	None	?	
B	Feasibility study for Congestion Zones.	Improve traffic flow, reduce emissions	County Council	?	?	Monitoring results	?	None	None	?	
C	Introduce Taxi Idling Ban.	Reduce emissions	County Council	?	?	?	?	None	None	?	
D	Implement Idling Ban outside of schools etc.	Reduce emissions	County Council	2018	?	?	?	Enquiries being made (suggested as an All-Wales approach through WG Consultation)	-	?	
E	Introduce Supplementary Planning Guidance (e.g. provision of EV Charging points (– what criteria?).	Emissions reduction	County Council	?	?	?	?	None	None	?	
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	?	

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
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	?	?	?	?	None	None	?	
H	Introduce dummy speed cameras to aid traffic calming. (Possibly part time live on rotational basis?)	Behavioural change to reduce emissions & improve road safety	County Council / Partners	?	?	?	?	None	None	?	
I	Feasibility study for shared use footpaths. (with markings?)	Increase uptake of alternative travel	County Council	?	?	?	?	None	None	?	
J	Advertise cycle paths.	Alternative transport	County Council	?	Already being done	Cycle path counters	?	On-going	Various routes introduced	?	Impossible to determine
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	?	?	Use of facilities	?	None	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
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).	?	County Council	?	?	?	?	None	None	?	
M	Check tourist route maps / websites for advised routes (avoid AQMA's where relevant)	Appropriate travel routes used	County Council / SWTRA	?	?	?	?	None	None	?	
N	Review & improve timings of bin collections & road sweeping	Improve congestion	County Council	?	?	?	?	None	None	?	
O	Feasibility study of making towns and villages vehicle free.	Reduce emissions	County Council	?	?	Monitoring	?	None	None	?	
P	Establish communications network with haulage contractors to improve service delivery.	Reduce emissions	County Council / Partners	?	?	?	?	None	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
Q	Assess reward scheme for people who rarely use cars or for those that walk/cycle frequently.	Reduce emissions	County Council	?	?	Uptake	?	None	None	?	
R	Facilitate retrofitting buses / coaches to gas fuel.	Reduce emissions	County Council / Partners	?	?	Uptake	?	None	None	?	
S	Diesel engine vehicle ban.	Reduce emissions	County Council / Partners	?	?	?	?	None	None	?	
T	Enhance walking routes.	Alternative travel	County Council	?	On-going	Path counters	?	On-going	Various routes introduced	?	
U	Improve access to M4 through Llangennech area.	Reduce congestion and emissions	County Council / SWTRA / WG	When started	?	?	?	?	?	?	
V	Introduce green infrastructure or urban planting schemes. (possibly through Planning)	Emissions reduction	County Council / Partners	?	?	?	?	None	None	?	
W	Discuss with WG barriers / opportunities to transfer road freight from ferries to rail freight.	Emissions reduction	County Council / WG	?	?	?	?	None	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
X	Liaise with 'Car Club' facilitators for opportunities to introduce across the County.	Emissions reduction	County Council / Partners	?	?	?	?	None	None	?	
Y	Feasibility study of bike hire schemes.	Emissions reduction / alternative travel	County Council / Partners	?	?	?	?	None	None	?	

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

2.1 Summary of Monitoring Undertaken in 2017

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 81 sites during 2017. Table presents the details of the sites.

Two new sites were set up within Llanelli AQMA boundary in 2017; Carm/138 - 2 Bres Road (ASDA), was set up as a 12 month screening exercise to monitor the impact of the new Petrol Station at ASDA. Carm/141 was also set up at 3 Old Road, which is located adjacent to Felinfoel road, one of the hotspot areas.

Two new sites were also set up in Carmarthen, but located just outside of the AQMA boundary in Abergwili. These sites are located in close proximity to the bypass which lies south of the town. Proposals in the Action Plan for Carmarthen aims to get more vehicles to use the bypass instead of travelling through town, monitoring will ensure that we do not move the problem to another location.

Additional sites were also set up in 2017 as part of two separate screening exercises. Carm/137 was set up in Garnant to monitor the impact of speed cushions in the road for a period of six months. Further details about this screening exercise can be found in Appendix G.

Ten new diffusion tube sites referenced Carm/ELR# were also set up in the existing routes surrounding the proposed Cross Hands Economic Link Road to enable a baseline assessment of the current levels of NO_2 and a further assessment of the impact the economic link will make following its completion in 2019.

Details of all the 2017 NO_2 diffusion tube sites can be found in Table 2.1 below.

Maps showing the location of the monitoring sites are provided in Figure 2.1.1.-2.1.7. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Table 2.2 – 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 Kerb to Nearest Relevant Exposure (m) [1]	Distance from Kerb to Monitor (m) [2]
				X	Y				
Ammanford									
Carm/089	Ammanford - Tir Y Dail Lane (2)	Kerbside	N/A	262804	212204	2.55	N	1.45	0.5
Carm/064	Ammanford – Wind Street	Roadside	N/A	262936	212285	2.85	N	3.00	2
Carm/090	Ammanford -High St (2)	Roadside	N/A	263028	212324	2.75	N	2.95	2.95
Llanelli									
DAL/20	19 Stradey Road	Roadside/Façade	N/A	250270	201328	2.85	N	1.70	1.70
DAL/21	Denham Avenue	Other	N/A	249565	201286	2.95	N	9.75	1.75
DAL/14	10 Sandy Road	Roadside/Façade	Llanelli	249701	200598	2.77	N	4.92	4.92
DAL/15	33 Sandy Road	Roadside/Façade	Llanelli	249727	200608	2.53	N	4.66	4.66
Carm/077	Sandy Rd (2)	Roadside	Llanelli	249606	200638	2.75	N	5.70	1.70
DAL/22	44 Sandy Road (3)	Roadside/Façade	Llanelli	249610	200632	2.75	N	5.55	5.55
DAL/26	123 Sandy Road	Roadside/Façade	Llanelli	249483	200713	2.55	N	7.45	7.45
DAL/27	Sandy Road (4)	Roadside	Llanelli	249483	200709	2.90	N	7.45	3.25
DAL/16	96 Sandy Road	Roadside/Façade	Llanelli	249456	200706	2.68	N	5.09	5.09
DAL/17	131 Sandy Road	Roadside/Façade	Llanelli	249463	200724	2.81	N	5.30	5.30
DAL/07	nr 13 Felinfoel Road	Kerbside	Llanelli	250717	200818	2.80	N	1.25	0.75
DAL/23	50 Felinfoel Road	Roadside/Façade	Llanelli	250754	200870	2.90	N	2.05	2.05
DAL/09	Thomas St (Barnados)	Roadside/Façade	Llanelli	250709	200673	2.77	N	2.66	2.66
Carm/104	Thomas St (2)	Roadside/Façade	Llanelli	250719	200689	2.95	N	1.70	1.70
DAL/10	Thomas St (Bridal Shop)	Roadside/Façade	Llanelli	250734	200603	2.73	N	1.62	1.62
Carm/069	West End	Kerbside	Llanelli	250458	200603	2.80	N	6.20	0.20
DAL/12	West End (Creative Cakes)	Kerbside	Llanelli	250411	200616	2.81	N	1.85	0.20
DAL/04	51 Panteg Road	Roadside	N/A	251623	201976	2.8	N	1.32	1.00
Carm/114	Panteg Road	Roadside	N/A	251665	202013	2.70	N	1.56	1.20

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) (1)	Distance from Kerb to Monitor (m) (2)
				X	Y				
Carm/113	Swiss Valley	Roadside	N/A	251951	202411	2.85	N	1.50	1.10
Carm/135	23 Bassett Terrace	Roadside/Façade	Llanelli	248512	200892	2.54	N	1.73	1.73
Carm/138	2 Bres Road (Asda)	Other	Llanelli	250781	200142	2.88	N	10.0	9.50
Carm/141	Llanelli - 3 Old Road	Roadside/Façade	Llanelli	250649	200786	2.85	N	1.50	1.50
Carmarthen									
DAC/06	Glenholme Nursery - Richmond Terrace	Kerbside	Carmarthen	241546	220536	2.70	N	2.97	0.77
DAC/13	Carmarthen - 72 Richmond Terrace (2)	Kerbside	Carmarthen	241559	220554	2.73	N	1.23	0.95
Carm/109	Carmarthen - Richmond Terrace	Kerbside	Carmarthen	241596	220563	2.70	N	0.83	0.63
DAC/08	Carmarthen - 85 Priory Street (E)	Roadside	Carmarthen	241876	220565	2.70	N	1.54	1.10
DAC/14	Carmarthen - 50 Priory Street	Roadside	Carmarthen	241932	220583	2.90	N	1.65	1.25
DAC/15	Carmarthen - Old Oak rdbt (E)	Roadside	Carmarthen	241816	220519	2.90	N	3.90	2.40
Carm/111	Carmarthen - Church Street	Roadside	Carmarthen	241539	220179	2.96	N	3.53	2.80
DAC/12	Carmarthen - 24 Spilman Street	Roadside/Façade	Carmarthen	241492	220171	2.75	N	3.00	3.00
DAC/04	Carmarthen - Water Street (Probation Office)	Kerbside/Façade	Carmarthen	240931	220144	2.80	N	0.90	0.90
Carm/072	Carmarthen - St. Catherine St rdbt	Roadside	Carmarthen	240688	220057	2.75	N	3.25	3.00
DAC/02	Carmarthen - 15 Park Terrace	Kerbside	Carmarthen	240618	220041	3.00	N	1.35	0.95
DAC/16	Carmarthen - 6 Park Terrace	Roadside/Façade	Carmarthen	240557	220026	2.65	N	1.35	1.35

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) (1)	Distance from Kerb to Monitor (m) (2)
				X	Y				
Carm/001	Carmarthen - St. Catherine St	Roadside	Carmarthen	240798	220155	2.75	N	1.95	1.70
Carm/084	Carmarthen - Water Street	Kerbside	Carmarthen	240831	220272	2.75	N	1.15	0.90
DAC/05	Carmarthen - 44 Water Street	Roadside/Façade	Carmarthen	240797	220297	2.68	N	1.25	1.25
Carm/106	Carmarthen - St Catherine St (A)	Roadside/Façade	Carmarthen	240979	220244	2.85	N	1.40	1.40
Carm/134	Carmarthen - 2 College Road	Other/Façade	N/A	240377	220397	3.00	N	5.60	5.60
Carm/126	Johnstown - 2 Jobs Well Road	Roadside	N/A	239914	219829	2.75	N	2.90	2.10
Carm/132	Johnstown - 7 Old St Clears Road	Roadside/Façade	N/A	239865	219745	2.60	N	7.00	7.00
Carm/133	Johnstown - 72 Llansteffan Road	Roadside/Façade	N/A	240039	219080	2.44	N	9.30	9.30
Carm/139	Abergwili - Laurels	Other	N/A	242895	221047	2.20	N	13.50	10.00
Carm/140	Abergwili - Dragons Lair	Other/Façade	N/A	242963	221101	2.28	N	12.00	12.00
Llandeilo									
FA/01	North roundabout (No 8 Rhosmaen St)	Roadside	Llandeilo	263190	223000	2.55	N	3.10	1.6
DA/15	Rhosmaen Street (No 15) (north)	Roadside/Façade	Llandeilo	263150	222763	2.64	N	3.10	3.10
DA/01	Rhosmaen Street (No. 69)	Roadside	Llandeilo	263076	222596	2.70	N	4.25	1.25
DA/03	Rhosmaen Street (No. 87)	Roadside/Façade	Llandeilo	263021	222503	2.90	N	4.35	4.35
Carm/013	Llandeilo - Rhosmaen Street	Kerbside	Llandeilo	263006	222505	2.80	N	2.90	0.40

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) (1)	Distance from Kerb to Monitor (m) (2)
				X	Y				
DA/05 (A), (B) & (C)	Rhosmaen Street (Evans Butchers)	Roadside/Façade	Llandeilo	262982	222445	2.95	N	1.50	1.50
DA/07	Rhosmaen Street (Castle Hotel)	Roadside/Façade	Llandeilo	262966	222412	2.85	N	1.70	1.70
Carm/083	Llandeilo - Rhosmaen Street (2)	Roadside	Llandeilo	262959	222396	2.75	N	2.45	1.45
DA/09	Rhosmaen Street (No. 123)	Roadside/Façade	Llandeilo	262951	222375	2.90	N	1.20	1.20
DA/10	Rhosmaen Street (No. 133) (Craft Shop)	Kerbside/Façade	Llandeilo	262933	222345	2.90	N	0.75	0.75
DA/11	Rhosmaen Street (No. 74) (Style Shop)	Roadside/Façade	Llandeilo	262924	222346	3.00	N	1.70	1.70
DA/12	Stryd Y Brenin (Travel House)	Roadside/Façade	Llandeilo	262908	222329	2.85	N	0.95	0.95
DA/13	Rhosmaen Street (Park Area)	Kerbside	Llandeilo	262906	222299	2.90	N	4.85	0.85
DA/14	Rhosmaen Street (Bin post by Bus stop)	Roadside	Llandeilo	262902	222250	2.75	N	4.15	1.15
DA/16	Bridge Street (N Trust) (south)	Roadside/Façade	Llandeilo	262848	222170	2.59	N	2.30	2.30
FA/03	South roundabout (40 Towy Terrace)	Roadside/Façade	Llandeilo	262854	221504	2.70	N	3.24	3.24
FA/07	Heol Bethlehem (Opp School)	Roadside	N/A	262980	221490	2.87	N	17.45	1.45
FA/06	10 Heol Myrddin, Ffairfach	Kerbside	N/A	262780	221469	2.69	N	5.85	0.85
FA/04	Ffairfach Chapel	Roadside/Façade	N/A	262869	221274	2.75	N	1.45	1.45
FA/05	Cennen Road (No 43)(Old Creamery)	Kerbside	N/A	262903	221105	2.95	N	5.95	0.95
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 Kerb to Nearest Relevant Exposure (m) (1)	Distance from Kerb to Monitor (m) (2)
				X	Y				
Carm/127	41 New Street, Burry Port	Kerbside	N/A	244999	200840	2.95	N	2.90	0.45
Carm/128	Lloyds Bank, New Street, Burry Port	Kerbside	N/A	244857	200828	2.90	N	1.40	0.90
Garnant									
Carm/137	Garnant - 74 Cwmamman Road	Roadside/Façade	N/A	268951	213111	2.73	N	4.00	4.00
Cross Hands Economic Link Road									
Carm/ELR1	Cross Hands (2) (N)	Roadside	N/A	256458	213067	2.73	N	7.67	1.54
Carm/ELR2	Cross Hands (House) (N)	Roadside/Façade	N/A	256465	213085	2.66	N	6.00	6.00
Carm/ELR3	Gorslas Sixways	Roadside	N/A	257027	213774	2.58	N	5.13	1.68
Carm/ELR4	Gorslas Sixways (2)	Roadside/Façade	N/A	257022	213777	2.73	N	6.85	6.85
Carm/ELR9	Gate Road (nr No. 81)	Roadside	N/A	257837	214594	2.65	N	5.27	1.82
Carm/ELR10	Norton Road (nr No. 43)	Roadside	N/A	257563	213717	2.8	N	6.80	2.30
Carm/ELR11	Norton Road (nr ELR jnc DP 24)	Roadside	N/A	257752	213562	2.5	N	6.25	1.75
Carm/ELR12	Norton Road (nr No. 94)	Kerbside	N/A	258269	213646	2.74	N	1.80	0.10
Carm/ELR21	Black Lion Road (nr Helyg)	Roadside	N/A	257564	212950	2.55	N	16.65	1.55
Carm/ELR22	Black Lion Road (nr Gorse Villa)	Roadside	N/A	257666	212864	2.8	N	5.40	2.2

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

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

Figure 2.1.1 Map of Llandeilo and Ffairfach NO_2 Non-Automatic Monitoring Sites

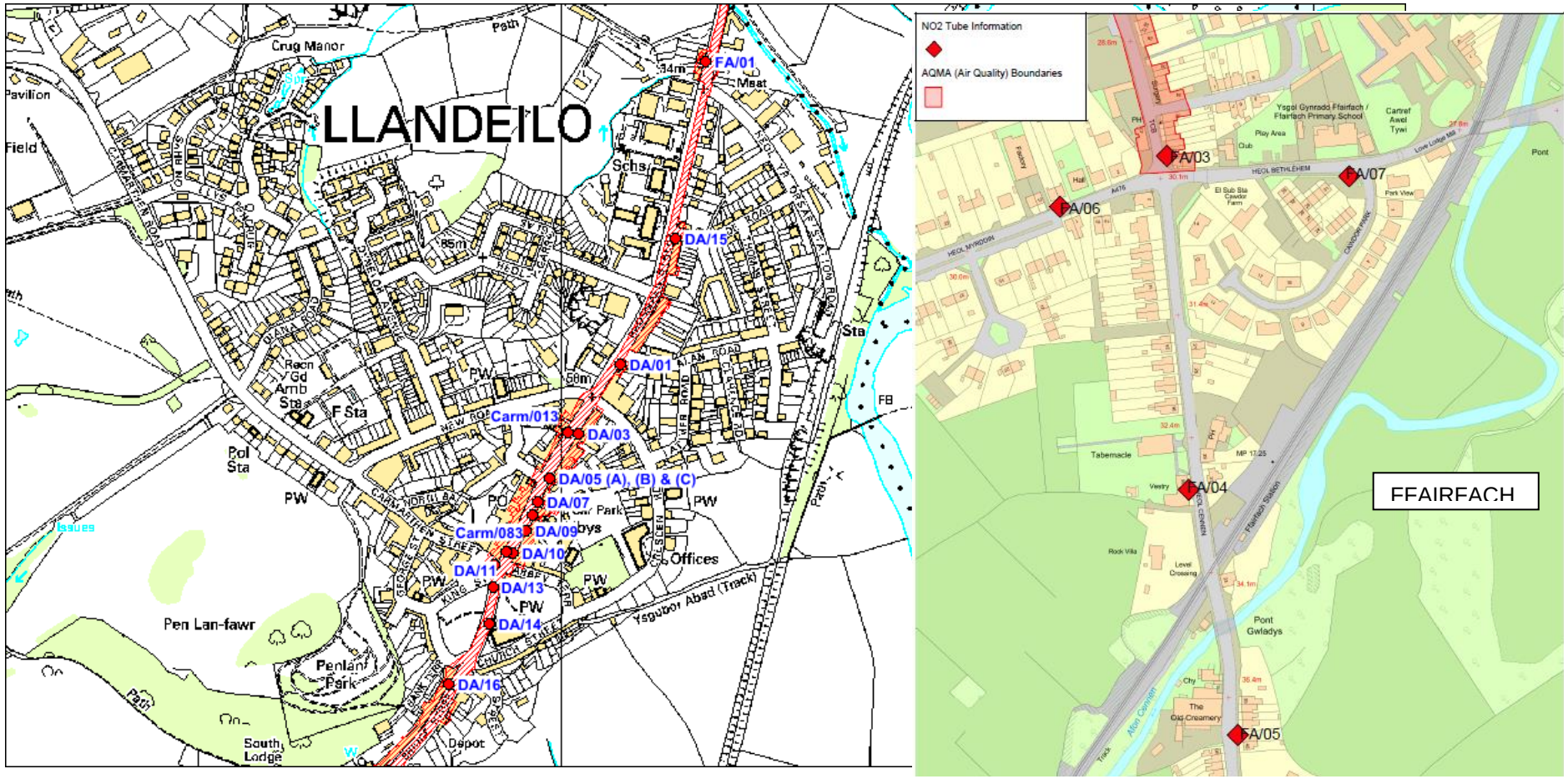


Figure 2.1.2 Map of Carmarthen NO_2 Non-Automatic Monitoring Sites

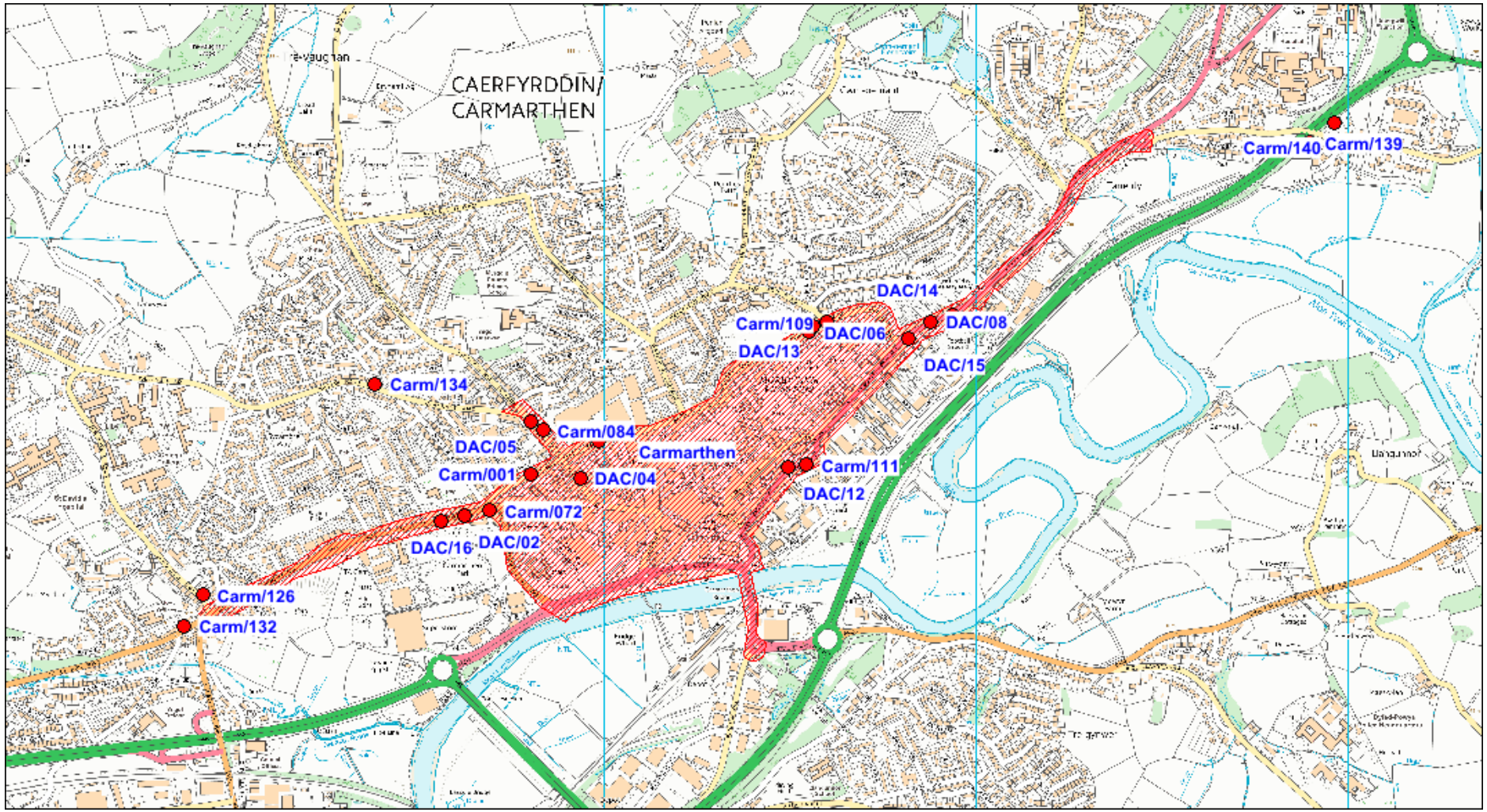


Figure 2.1.3 Map of Llanelli NO_2 Non-Automatic Monitoring Sites

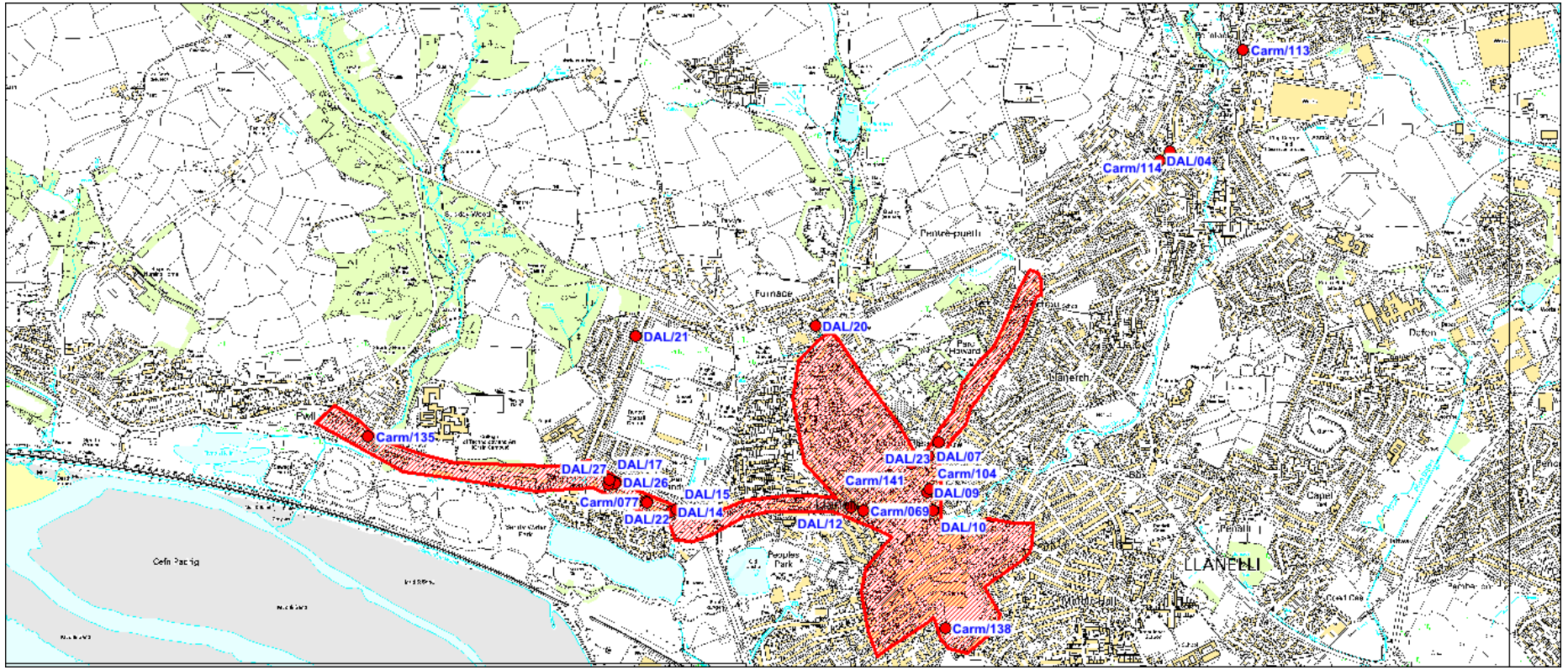


Figure 2.1.4 Map of Burry Port NO_2 Non-Automatic Monitoring Sites

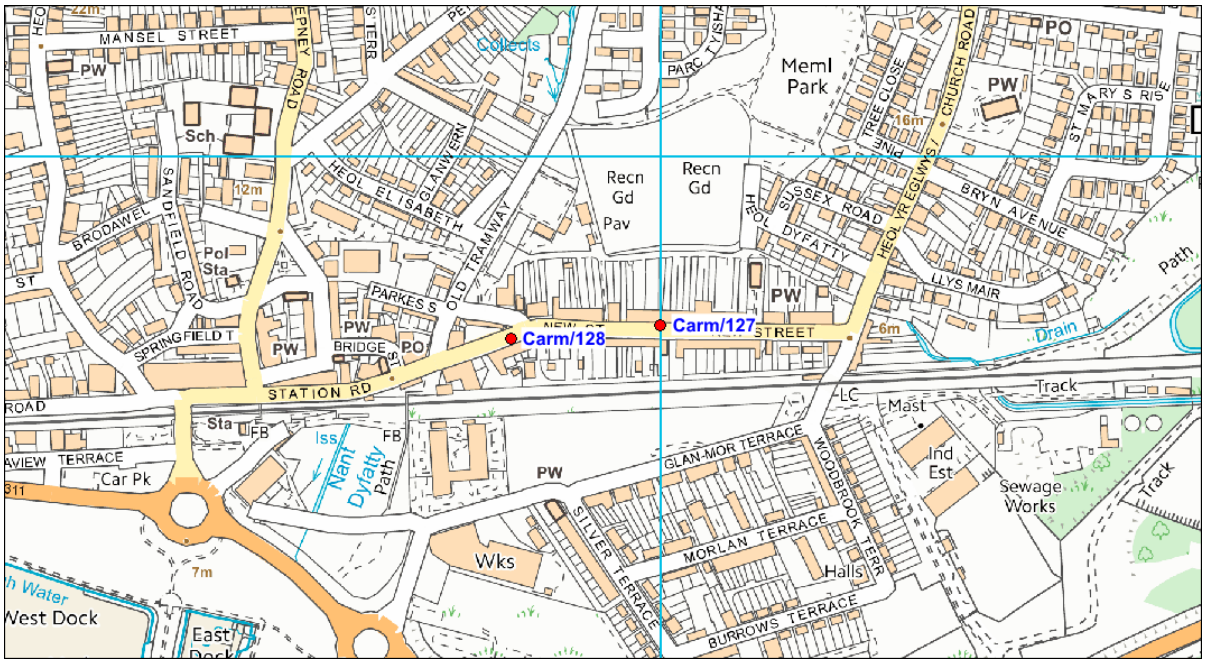


Figure 2.1.5 Map of Ammanford NO_2 Non-Automatic Monitoring Sites

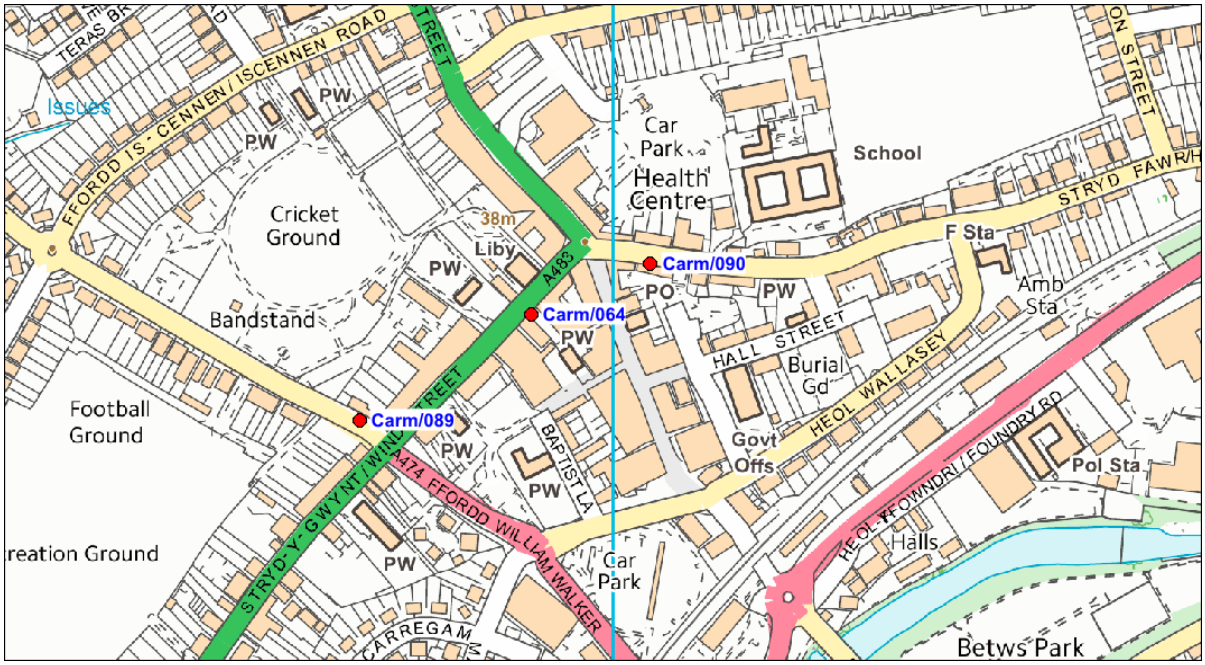


Figure 2.1.6 Map of Cross Hands Economic Link Road NO_2 Non-Automatic Monitoring Sites

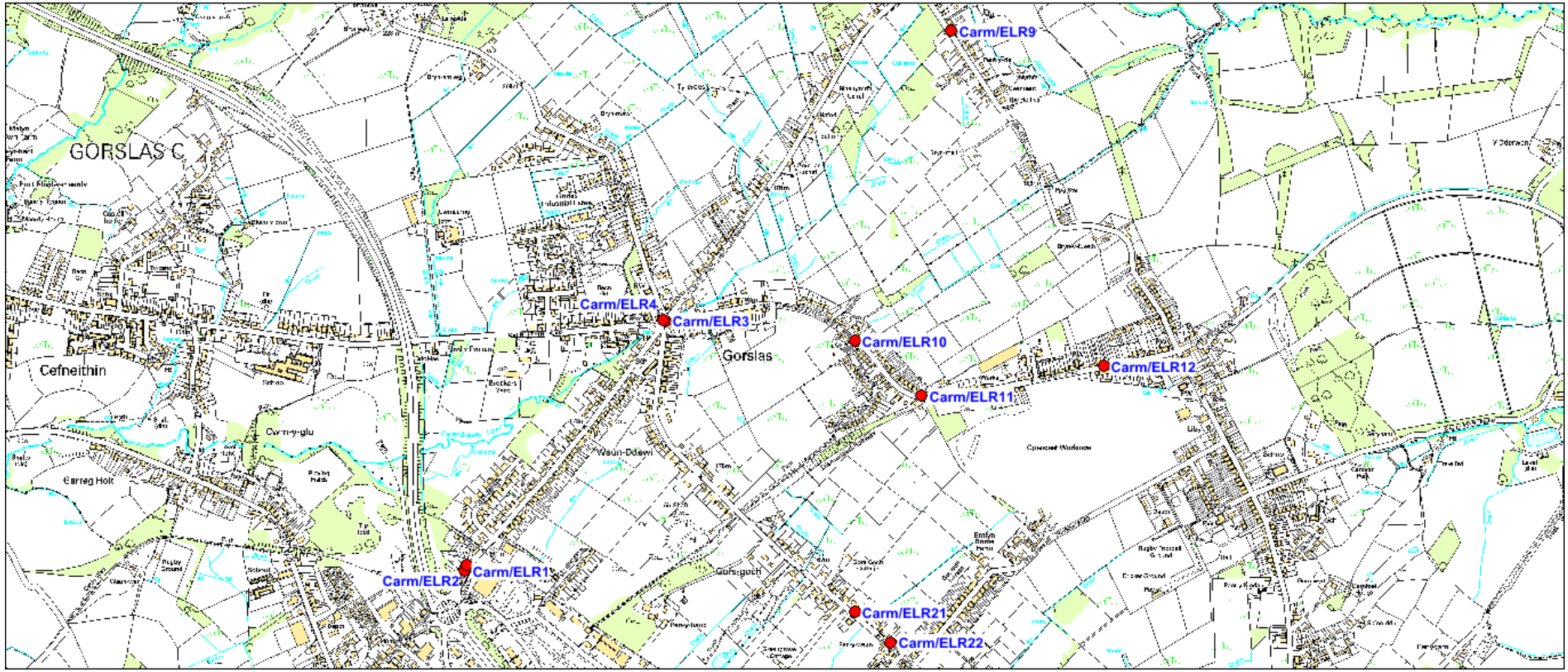


Figure 2.1.7 Map of Garnant NO_2 Non-Automatic Monitoring Site

2.2 2017 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 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
AMMANFORD									
Carm/089	Kerbside	Diffusion Tube	100	100	26.2	24.3	22.4	26.2	23.6
Carm/064	Roadside	Diffusion Tube	92	92	27.8	25.3	25.5	25.0	24.8
Carm/090	Roadside	Diffusion Tube	100	100	28.1	28.5	27.9	28.0	27.8
LLANELLI									
DAL/20	Roadside/Façade	Diffusion Tube	75	75	22.0	20.3	20.0	19.7	20.4
DAL/21	Other	Diffusion Tube	100	100	12.9	11.7	11.3	12.2	11.5
DAL/14	Roadside/Façade	Diffusion Tube	75	75	25.5	28.1	26.3	25.5	28.4
DAL/15	Roadside/Façade	Diffusion Tube	100	100	23.4	21.5	20.9	23.0	22.8
Carm/077	Roadside	Diffusion Tube	100	100	37.7	37.9	33.4	38.7	39.8
DAL/22	Roadside/Façade	Diffusion Tube	100	100	31.2	30.4	29.5	30.3	32.1
DAL/26	Roadside/Façade	Diffusion Tube	100	100	-	21.5	19.5	25.6	22.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
DAL/27	Roadside	Diffusion Tube	83	83	-	27.1	22.7	31.3	27.2
DAL/16	Roadside/Façade	Diffusion Tube	100	100	21.3	18.0	20.3	22.3	21.7
DAL/17	Roadside/Façade	Diffusion Tube	100	100	22.7	19.5	19.6	25.0	22.9
DAL/07	Kerbside	Diffusion Tube	83	83	**49.1**	**50.6**	**44.1**	**46.1**	**47.4**
DAL/23	Roadside/Façade	Diffusion Tube	100	100	24.9	23.7	22.5	22.7	20.9
DAL/09	Roadside/Façade	Diffusion Tube	92	92	**46.5**	**44.8**	**42.8**	**43.4**	**45.5**
Carm/104	Roadside/Façade	Diffusion Tube	100	100	38.5	38.6	34.6	37.2	35.9
DAL/10	Roadside/Façade	Diffusion Tube	100	100	38.1	35.8	35.1	37.1	34.3
Carm/069	Kerbside	Diffusion Tube	100	100	36.5	36.0	36.8	37.2	37.6
DAL/12	Kerbside	Diffusion Tube	100	100	29.0	30.9	26.7	30.0	30.2
DAL/04	Roadside	Diffusion Tube	100	100	34.4	32.4	31.3	32.4	31.0
Carm/114	Roadside	Diffusion Tube	100	100	38.0	33.8	34.7	34.9	35.0
Carm/113	Roadside	Diffusion Tube	92	92	37.7	35.1	34.0	35.2	36.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
Carm/135	Roadside/Façade	Diffusion Tube	100	100	-	-	-	27.6	28.4
Carm/138	Other	Diffusion Tube	100	100	-	-	-	-	14.2
Carm/141	Roadside/Façade	Diffusion Tube	91	92	-	-	-	-	30.1
CARMARTHEN									
DAC/06	Kerbside	Diffusion Tube	100	100	30.3	32.6	30.6	30.1	30.5
DAC/13	Kerbside	Diffusion Tube	100	100	32.7	33.5	32.6	34.2	33.1
Carm/109	Kerbside	Diffusion Tube	92	92	40.1	40.9	38.1	37.5	35.8
DAC/08	Roadside	Diffusion Tube	92	92	**58.0**	**55.5**	**50.5**	**61.9**	**57.0**
DAC/14	Roadside	Diffusion Tube	92	92	35.3	35.4	36.1	33.4	34.0
DAC/15	Roadside	Diffusion Tube	100	100	30.6	30.1	30.1	29.0	30.3
Carm/111	Roadside	Diffusion Tube	100	100	34.2	33.7	30.7	32.0	32.4
DAC/12	Roadside/Façade	Diffusion Tube	100	100	35.6	34.4	33.7	34.2	34.2
DAC/04	Kerbside/Façade	Diffusion Tube	100	100	23.9	23.7	22.7	24.5	21.6

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
Carm/072	Roadside	Diffusion Tube	100	100	32.7	30.9	34.4	33.3	30.0
DAC/02	Kerbside	Diffusion Tube	100	100	**43.4**	**43.5**	**42.9**	**42.5**	**41.4**
DAC/16	Roadside/Façade	Diffusion Tube	92	92	39.1	39.7	36.1	38.7	37.2
Carm/001	Roadside	Diffusion Tube	100	100	33.1	30.5	32.3	33.9	31.9
Carm/084	Kerbside	Diffusion Tube	100	100	36.4	36.5	32.6	34.7	33.1
DAC/05	Roadside/Façade	Diffusion Tube	100	100	33.9	34.7	34.6	32.9	32.9
Carm/106	Roadside/Façade	Diffusion Tube	100	100	36.6	37.9	38.8	38.9	37.8
Carm/134	Other/Façade	Diffusion Tube	100	100	-	-	-	12.8	12.1
Carm/126	Roadside	Diffusion Tube	100	100	25.0	22.7	22.0	23.8	22.5
Carm/132	Roadside/Façade	Diffusion Tube	92	92	-	-	-	18.2	17.1
Carm/133	Roadside/Façade	Diffusion Tube	100	100	-	-	-	14.6	13.0
Carm/139	Other	Diffusion Tube	100	100	-	-	-	-	16.9
Carm/140	Other/Façade	Diffusion Tube	100	100	-	-	-	-	16.2

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
LLANDEILO									
FA/01	Roadside	Diffusion Tube	100	100	15.6	15.3	14.0	16.2	15.1
DA/15	Roadside/Façade	Diffusion Tube	100	100	24.9	24.0	24.5	24.4	25.2
DA/01	Roadside	Diffusion Tube	100	100	25.8	25.5	25.2	24.9	24.2
DA/03	Roadside/Façade	Diffusion Tube	92	92	24.6	26.4	26.1	24.9	25.2
Carm/013	Kerbside	Diffusion Tube	100	100	29.8	33.2	35.1	32.2	33.7
DA/05 (A), (B) & (C)	Roadside/Façade	Diffusion Tube	100	100	32.6	37.5	36.6	35.1	34.6
DA/07	Roadside/Façade	Diffusion Tube	100	100	35.4	**43.3**	**40.3**	**40.1**	38.7
Carm/083	Roadside	Diffusion Tube	100	100	37.9	**46.7**	**42.6**	**43.6**	39.5
DA/09	Roadside/Façade	Diffusion Tube	100	100	38.1	**46.4**	**43.4**	**45.5**	**42.0**
DA/10	Kerbside/Façade	Diffusion Tube	100	100	35.9	**41.7**	**41.6**	**40.4**	38.9
DA/11	Roadside/Façade	Diffusion Tube	100	100	32.8	39.5	39.5	39.4	38.4
DA/12	Roadside/Façade	Diffusion Tube	83	83	25.4	25.9	23.9	26.7	30.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
DA/13	Kerbside	Diffusion Tube	100	100	33.3	35.8	36.5	36.0	34.8
DA/14	Roadside	Diffusion Tube	92	92	24.5	22.8	23.3	23.4	22.9
DA/16	Roadside/Façade	Diffusion Tube	100	100	37.7	33.8	36.4	36.2	33.4
FA/03	Roadside/Façade	Diffusion Tube	100	100	19.9	18.7	17.9	19.2	19.1
FA/07	Roadside	Diffusion Tube	100	100	10.9	10.0	9.7	9.8	8.6
FA/06	Kerbside	Diffusion Tube	83	100	17.1	16.9	16.2	18.1	17.2
FA/04	Roadside/Façade	Diffusion Tube	100	100	14.7	14.1	14.1	14.9	14.3
FA/05	Kerbside	Diffusion Tube	100	100	17.9	16.4	15.5	15.4	15.8
BURRY PORT									
Carm/127	Kerbside	Diffusion Tube	100	100	-	-	12.2	14.8	12.0
Carm/128	Kerbside	Diffusion Tube	100	100	-	-	15.3	15.6	15.4
GARNANT									
Carm/137	Roadside/Façade	Diffusion Tube	100	50	-	-	-	-	16.1
CROSS HANDS ECONOMIC LINK ROAD									

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
Carm/ELR1	Roadside	Diffusion Tube	100	66.7	-	-	-	-	**41.3**
Carm/ELR2	Roadside/Façade	Diffusion Tube	100	66.7	-	-	-	-	23.3
Carm/ELR3	Roadside	Diffusion Tube	75	66.7	-	-	-	-	19.1
Carm/ELR4	Roadside/Façade	Diffusion Tube	100	66.7	-	-	-	-	15.7
Carm/ELR9	Roadside	Diffusion Tube	100	66.7	-	-	-	-	8.2
Carm/ELR10	Roadside	Diffusion Tube	62.5	66.7	-	-	-	-	13.3
Carm/ELR11	Roadside	Diffusion Tube	87.5	66.7	-	-	-	-	10.9
Carm/ELR12	Kerbside	Diffusion Tube	87.5	66.7	-	-	-	-	14.1
Carm/ELR21	Roadside	Diffusion Tube	100	66.7	-	-	-	-	11.3
Carm/ELR22	Roadside	Diffusion Tube	100	66.7	-	-	-	-	16.9

Notes:

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

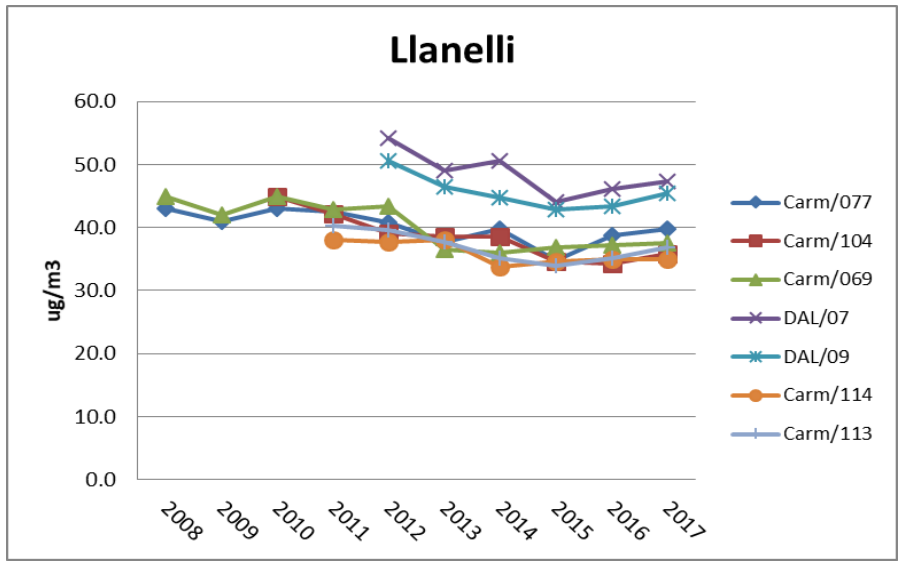
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

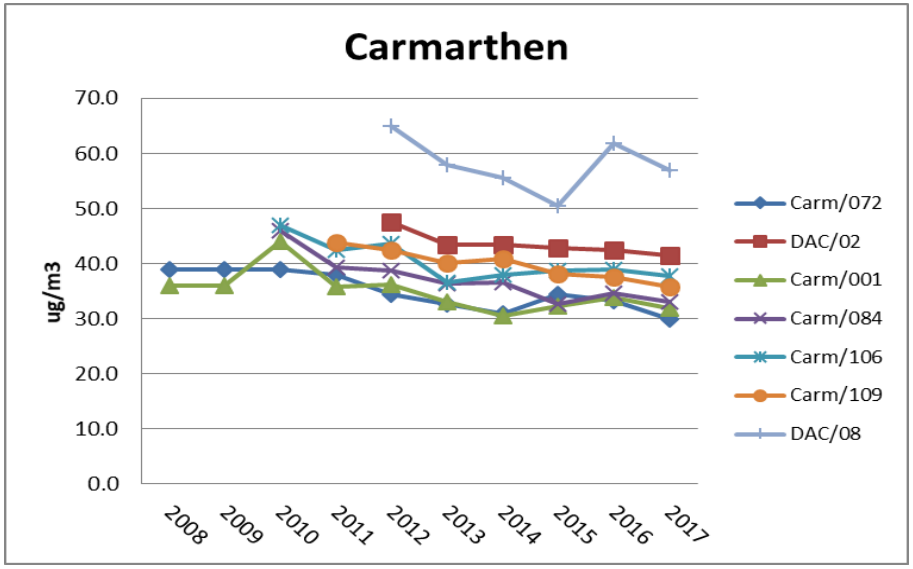
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

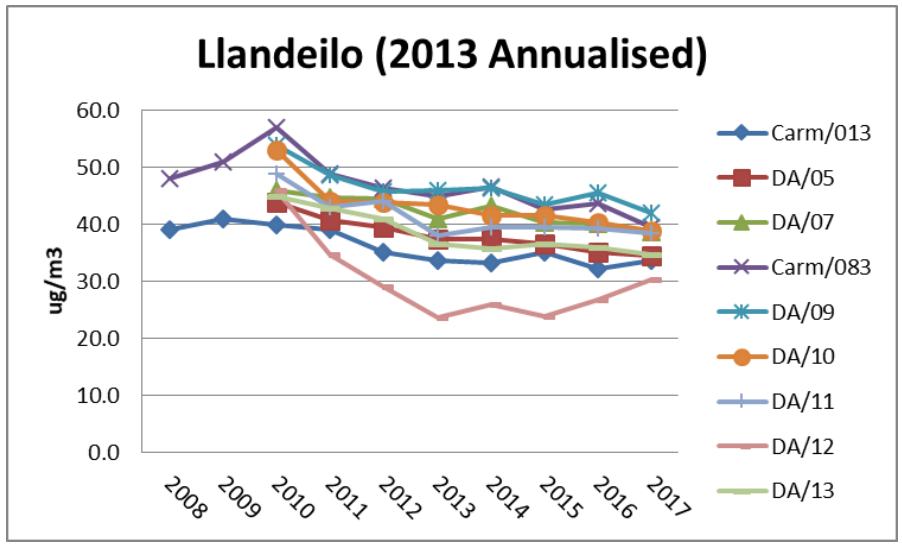
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

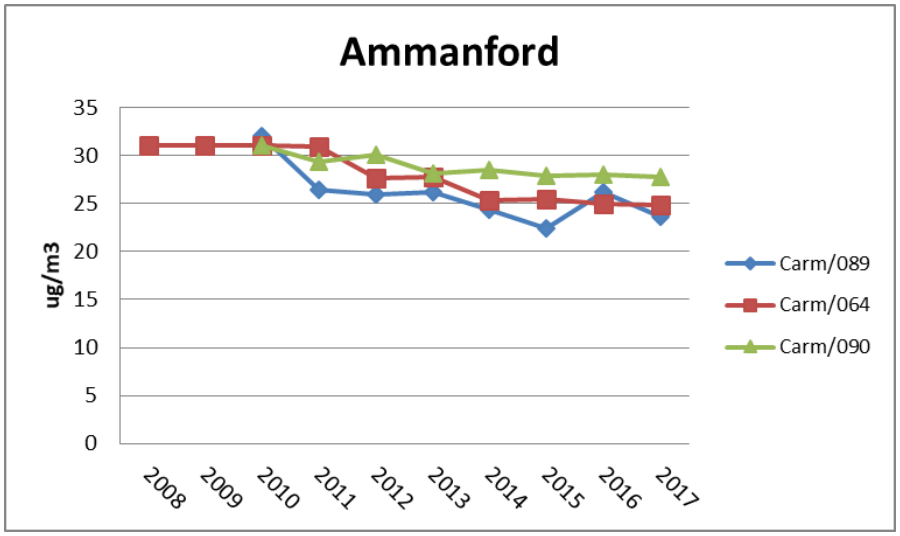
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.2 – Trends in Annual Mean NO_2 Concentrations









2.3 Comparison of 2017 Monitoring Results with Previous Years and the Air Quality Objectives

The network of diffusion tube monitoring in Ammanford, Carmarthen, Llanelli, Burry Port, Llandeilo and Ffairfach was set up for the full calendar year, with tubes changes coinciding with the recommended exposure periods suggested by the LAQM helpdesk. Fifteen 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. Despite this reduction in valid data capture, the bias adjusted annual mean did not require annualisation because more than 75% of the full calendar year was captured.

It was however necessary to annualise the results of the single site in Garnant and the ten Cross Hands Economic Link Road sites because the monitoring periods for these screening exercises was 50% (January to June) and 66.7% (May to December) respectively. 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.

There are a number of diffusion tube locations that exceeded the annual mean AQO in 2017 and some that were borderline. This was not surprising since the work has concentrated on areas of concern such as the AQMA's in Llandeilo and in the towns of Carmarthen and Llanelli. Those sites that have exceeded the AQO are detailed below with the relevant data presented in Tables 2.2 above and in the raw data Table A.1 located in Appendix A.

Two sites in Llanelli exceeded the AQO which were Thomas Street (Barnados) (DAL/09) and nr 13 Felinfoel Road (DAL/07). Both of these sites have exceeded in the previous five years and are considered as hotspots within the Llanelli AQMA. Westend (Carm/069) has increased slightly to 37.6µg/m^3 and Sandy Road (2)(Carm/077) was borderline at 39.8µg/m^3, which is an increase from 38.7µg/m^3 in 2016 and 33.4µg/m^3 in 2015 but both these sites are not a worst case location being located some metres from relevant receptors. Swiss Valley (Carm/113), which is located outside of the Llanelli AQMA also saw an increase in concentrations

reporting 36.8µg/m^3. Interestingly, all five of these sites have demonstrated an increase in concentrations since 2015, whereas 11 of the 23 sites in Llanelli saw a decrease concentrations.

In Carmarthen there were two locations that exceeded the AQO and these were 15 Park Terrace (DAC/02) and 85 Priory Street (E) (DAC/08), both of which have exceeded for the last five years. There were two borderline sites which were St Catherine Street (A)(Carm/106) at 37µg/m^3 and 6 Park Terrace (DAC/16) at just below 38µg/m^3. Richmond Terrace was just below 36µg/m^3 this year. All five of these sites, however have seen a reduction in concentration compared to 2016. The sites associated with Carmarthen town centre Water Street junction, namely St Catherine Street, Water Street, 44 Water Street and Water Street (Probation Office) all had results that again were below the objective and saw a decrease in levels compared to 2016.

The highest reading tube in the county was for the sixth year running was 85 Priory Street (E)(DAC/08). The annual result was 57µg/m^3 which is lower than last year which had 61.9µg/m^3. The majority of sites within Carmarthen AQMA, however, experienced a reduction in NO_2 compared to 2016.

Llandeilo had one site 123 Rhosmaen St (DA/09) which breached the AQO at 42µg/m^3. Three other sites (Castle Hotel (DA/07), Rhosmaen Street (2)(Carm/083) and No 133 (DA/10) however remain borderline between 38-40µg/m^3 alongside (No 74 Style Shop) DA/11) which were also reported borderline in 2016. Work will continue on Phase 2 of the Action Plan and the feasibility of outstanding options report is included within this report at Appendix H.

The trends for Llanelli, Carmarthen and Llandeilo AQMA monitoring is illustrated in figure 2.2 above. Most of the diffusion monitoring sites are largely experiencing a slight downward trend.

2.3.1 Nitrogen Dioxide (NO_2)

Diffusion Tube Monitoring Data

Nine sites in the diffusion tube network were corrected for distance because the post bias (and annualised) annual mean exceeded the AQO or fell within 10% of the AQO. This included Llanelli – Sandy Road (2)(Carm/077), Llanelli – nr 13 Felinfoel Road (DAL/07), Carmarthen – Richmond Terrace (Carm/109), West End (Carm/069), Swiss Valley (Carm/113), Carmarthen - 85 Priory Street (E) (DAC/08), Carmarthen - 15 Park Terrace (DAC/02), Llandeilo - Rhosmaen Street (2) (Carm/083), Cross Hands (2) (N) (Carm/ELR1).

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 distance.

After using the online calculator to calculate the fall-off distance, two of the sites assessed DAL/07 (Felinfoel Road, Llanelli) and DAC/08 (Priory Street, Carmarthen) remain high with a predicted concentration of NO_2 exceeding the Annual Air Quality Objective of 40ug/m^3. This is a reduction from the four exceedances reported once the data was bias adjusted and annualised. However, DAC/02 (15 Park Terrace) remains on the border of meeting the AQO at 39 ug/m^3. Further details relating to the distance calculations are contained in Appendix F.

This total number of sites exceeding the AQO has therefore reduced from six to four, two sites in Llanelli, one site in Carmarthen and one site in Llandeilo. All sites are considered to be hotspots within the Llandeilo, Carmarthen and Llanelli AQMA's.

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 all had results well below the AQO, as was expected, but the two sites will be maintained in use as developments around the town continue.

The monthly raw data results for the 2017 data, including the distance calculated prediction is contained in Table 2.2 in Appendices A.

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 2017 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 a number of years and is still being monitored.

It has been agreed that Carmarthenshire County Council will carry out three unannounced compliance visits to confirm that the requirements of the fixed work notice are being maintained. Three compliance visits were carried out during 2017 and one out of three of these identified a breach of the fixed work notice during the visits by idling for a total of 20mins. This was due to late passengers arriving as a

result of limited parking spaces available. No dark smoke was emitted during this visit and a following unannounced visit a month later demonstrated compliance.

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 2017

Carmarthenshire County Council has examined the results from monitoring in the district. Concentrations within the Carmarthen, Llandeilo and Llanelli AQMA's 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 2017.

An application was received for a 48 space car park within the grounds of the Parc Howard Mansion House (S/35541) with improved access to the site gained from Old Road, Llanelli, which is located directly adjacent to the Llanelli AQMA. As all vehicular access to the proposed car park would have to use roads within the AQMA, an Air Quality Assessment was required and concluded that the impact from the extra traffic generated as a result of the development is negligible.

The AQA was performed despite the various triggers set in guidance not being met, and additionally a further step of a cost damage analysis was performed. The cost damage analysis identified that the impact of additional NO_2 and PM_{10} equated to £563.00 in the opening year. Mitigation is offered in the report by way of Electric Vehicle charging points being installed in the car park development, along with tree / vegetation planting on the site to mitigate the additional minimal pollutant loading from the development.

A residential development for 27 apartments and 10 houses with communal parking (W/34929) located on the boundary of the Carmarthen AQMA conducted an AQA screening assessment and travel plan and concluded a negligible impact on air quality.

An AQA was requested for a development of 51 residential units in Clos-Y-Benallt Fawr, Fforest (S/35215). The assessment concluded a negligible impact on air quality.

The construction of 280 residential properties (S/34991) on land at Cefncaeau, adjacent to the A484 and on the opposite side of the Tata Plate included an AQA which concluded that the proposed development will have a negligible impact on air quality. Spatial separation from the busy road and electric vehicle charging points were recommended.

An AQA was received along with a travel plan following an application to introduce a range of uses associated with the existing University of Wales Trinity St David's facilities (W/34951). Although, this site is not located within the Carmarthen AQMA access to the site is via routes that travel through the AQMA, The assessment however concluded a negligible impact.

An AQA was requested for an application for a permanent carpark in Old Station Road, Carmarthen (W/34827) as it was considered it may have a significant adverse impact on air quality because all of the vehicles that access the site have to travel through the newly designated Carmarthen AQMA. The application was refused.

A review of planning conditions for The Phase 2 Cross Hands Link Road (E/32266) for a corridor route to run from the East Strategic Employment site crossing Black Lion Road and Norton Road, that previously required and AQA included a construction environmental management plan. This should move a significant number of vehicles off the Llandeilo Road and reduce the potential impact on the SSSI and vehicles on most of the existing routes around the Link Road. This should result in less traffic pollution and noise for those living along the routes, although it is acknowledged that there could be adverse impacts for those closest to the new proposed junctions where the Link Road will cross Black Lion Road and Norton Road. An air quality monitoring programme has been set up to assess the nitrogen dioxide (NO_2) levels along the existing roads, proposed junctions and new Link Road to encompass the before, during and post Link Road construction project. This will help determine the overall NO_2 impact of the development.

An AQA was requested for a development of 14 affordable houses in Garreglwyd Pembrey, (S/36380). The assessment concluded a negligible impact on air quality.

An AQA was requested for a development (S/36465) proposing the construction of 34 energy efficient and sustainable homes in Llanelli, located 2.8km from the AQMA The assessment concluded a negligible impact on air quality.

An AQA was submitted for a development (W/35730) for three commercial units in the former Cartref Tawelan, Ash grove, Carmarthen. The assessment concluded a negligible impact on air quality.

An AQA was requested for a development (W/35903) proposing the construction of 29 residential properties in Lluest, Y Bryn, Llanelli, located 350m from the AQMA. The assessment concluded a negligible impact on air quality but offered mitigation measures through a travel plan.

A proposal for a development of 20 apartments with limited parking (S/36519) located 250m from the Llanelli AQMA Llanelli, concluded a negligible impact on air quality, due its close proximity to the town centre.

3.1 Road Traffic Sources (& other transport)

Late in 2016, queries in respect of traffic related air pollution at different locations were received in respect of Abergwili, Cwmamman Road Garnant and near Asda Petrol Filling Station in Llanelli. It was considered that all three of these sites would benefit from monitoring during 2017. In addition traffic counts and screening exercises were conducted for Genwen Farm development and Old Road, Llanelli to assess whether there may be potential for air quality impacts. The results and further details for the air quality screening exercises can be found in the '2017 Carmarthenshire AQ Screening Review Report' in Appendix F. There was no breach of the AQO at the 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 12 month exercise can be found in Appendix F, however the conclusions will be reported in 2020 after the new road has been built (completion is planned for 2019).

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

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

- **Industrial installations:** new or proposed installations for which an air quality assessment has been carried out.
- **Industrial installations:** existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- **Industrial installations:** new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms.

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

- Landfill sites.
- Quarries.
- Unmade haulage roads on industrial sites.
- Waste transfer stations, etc.
- Other potential sources of fugitive particulate matter emissions.

It has been identified that quite a number of Biomass Boiler have been installed across the county, much of which has not been consulted on through the Planning Consultation process. Much of the plant is 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. One particular location near Llanelli has been identified as a '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:

- Biomass combustion plant – individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.
- 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 2.3 below summarises these details.

Table 2.3 Planning Applications

Reference	Description	Information Request	Response	Status	Update
W/34929	113-117 Priory Street, Carmarthen	AQA Screening traffic & construction	Negligible impact Condition travel plan	Granted	No work
W/34955	Land adj A48 Heol Y Parc, Cefneithin		Advised on Spatial separation from A48	Outline Planning Granted	
W/34951	UWTSD, College Road (S4C)	AQA – traffic & construction	Negligible impact Condition Travel Plan	Granted	Dust mitigation plan accepted
S/34991	Land at Cefncaeau, Llwynhendy	AQA – traffic Request EV points & Spatial	Negligible impact	Awaiting decision	Revised plans

		separation			
S/35215	Land off Clos Y Benallt Fawr, Fforest	AQA – traffic	Negligible impact	Full Refusal	
W/34827	Car Park, Old Station Rd, Carmarthen	Air Quality Assessment	Potential impact on AQMA	Discharge of conditions refused	
E/32266	Phase 2 Cross Hands Link Road	Air Quality Assessment Real time monitoring survey performed.	Potential ecological impact	Granted Work in progress	Dust mitigation plan accepted. NO_2 Screening exercise on existing routes.
W/35450	Laugharne Primary School	Justification for no AQA Dust Assessment	AQA state negligible impact Dust Management Plan	Outline planning refused	
S/35541	Mansion House, Parc Howard	Air Quality Assessment	AQA state negligible impact Condition mitigation measures	Awaiting decision	Damage cost analysis conducted and mitigation measures offered.
W/35730	Former Cartref Tawelan, Ash Grove	Air Quality Assessment	Negligible impact	Full Refusal	
W/35903	Land off Lluest Y Bryn, Carmarthen	Air Quality Assessment	Negligible impact	Awaiting decision on outline	
W/36307	Land Adj The Paddocks, Feolgastell	Spatial separation from A48 Trunk Road	Negligible impact	Awaiting decision	
S/36380	Land at Garreglwyd, Pembrey	Consider EV infrastructure	Negligible impact	Granted	
W/36350	Glangwili General Hospital		AQA Justification for not required.	Granted	Work with Carmarthen AQMA action plan group
S/36465	Land Adj Dylan Housing Estate, Llanelli	Consider EV infrastructure	Negligible impact	Awaiting decision	
S/36519	The Maltings, Llanelli (former Brewery)	Consider EV infrastructure	Negligible impact	Granted	Work started

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. Polices 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 in Llandeilo 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

The 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 - which is 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.

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 in to 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 also 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 number of 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

We are not aware of any Green Infrastructure Plans and Strategies that will impact on Air Quality within Carmarthenshire.

4.7 Climate Change Strategies

Following work undertaken to formulate Carmarthenshire's Well-being Assessment, the Public Services Board has now 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.

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.

5. Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

In total four exceedances of the Annual Air Quality Objective for NO_2 were identified in 2017, all of which are located within an AQMA. Extensive monitoring in the towns of Carmarthen and Llanelli has confirmed the continued exceedance of the AQO in 'hot spot' areas and justifying the need to designate AQMA's for both towns.

The two sites in the Llanelli AQMA that exceeded the AQO which were Thomas Street (Barnados) (DAL/09) with a concentration of 45.5µg/m^3 and nr 13 Felinfoel Road (DAL/07) which reported 43.7µg/m^3 (after calculating the NO_2 fall-off distance). Both of these sites have exceeded the AQO for the last five years

One location in the Carmarthen AQMA exceeded the AQO and this was the highest reading in the County for the sixth year running; 85 Priory Street (E) (DAC/08. The annual concentration was 53.6µg/m^3 after calculating the NO_2 fall-off distance which is lower than last year which reported 61.9µg/m^3.

Llandeilo AQMA also had one site 123 Rhosmaen St (DA/09) which breached the AQO with 42µg/m^3, and has exceeded the AQO for the last four years. However, a number of sites remain borderline and will require further monitoring and work to ensure that levels of NO_2 do not exceed the AQO.

All other areas of the county where diffusion tube monitoring is performed have not identified any other areas of exceedance. However, a number of sites remain borderline and monitoring will continue for these locations as future development is planned.

5.2 Conclusions relating to New Local Developments

Work continues on a number of new developments sites across the county that have been previously reported, but as yet no impacts on air quality have been identified. Cross Hands is progressing with some of the development proposals now working at pace, whilst others are yet to begin. Elements of the Carmarthen Western Link road have been completed but the overall project still has significant work and no

timescale for completion has yet been determined due to delays in purchasing outstanding pockets of land. Phase 1 of the Cross Hands Economic Link Road development has been completed and is operating well, and Phase 2 is making good progress with completion aimed for 2019. The road will open up the Cross Hands East Strategic employment site benefitting existing infrastructure whilst improving traffic flows.

5.3 Other Conclusions

The implementation of measures contained within Phase 1 of the Llandeilo AQMA Action Plan was reviewed and again concluded that it was difficult to determine whether there had been any positive impact on reducing the nitrogen dioxide levels along Rhosmaen Street. There was certainly no evidence to suggest any single intervention had made any perceivable difference. Measures contained in Phase 2 of the Action Plan will be considered in 2018/19.

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 in to the Joint Transport Plan for South West Wales which incorporates the Local Transport Plan (LTP), and 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 vision of being the cycling hub for Wales continues to progress with the re-development of the Carmarthen Velodrome and the Pembrey Closed Circuit track now complete and proving popular. 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 give appropriate consideration to 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. Carmarthenshire County Council responded with its comments on the Planning Policy Wales consultation that closed in May 2018.

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 two out of three separate 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 the five remaining intervention options in Phase 1 of the Action Plan have been assessed and where viable implementation will begin. Work will begin on the implementation (where possible) of Phase 2 intervention options.

Action Plans have been developed for the towns of Carmarthen and Llanelli.

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.

The monitoring of Nitrogen dioxide at one of the County's Primary Schools commenced in January 2018, and we would expect to be reporting on any findings in our Progress Report of 2019.

Work will start towards completing aspects for the 2019 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

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

Llandeilo Action Plan Feasibility Assessment - Review of Phase 1 Outstanding Actions (March 2018)

Carmarthenshire County Council 2017 AQ Screening Review Report (September 2018)

Carmarthenshire County Council 2016 Llandeilo AQMA Action Plan Second Year Review (March 2017)

Carmarthenshire County Council NO_2 Distance Calculator Data (2017) for use with 2018 Progress Report (September 2018)

NO_2 fall-off with distance" calculator (http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance for Laboratories and Users (February 2008) (AEA Environment & Energy)

Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (April 2016 – February 2018). AIR-PT-Rounds 13 to 24 (Apr 2016 - Feb 2018) (LAQM Helpdesk website)

Gwili Railway Company Fixed Notice

Carmarthenshire Local Development Plan (2014)

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

Technical Guidance LAQM TG (09) and (16) (Defra)

Tube Precision 2016 version 03-18 Final (LAQM Helpdesk website)

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,

https://www.carmarthenshire.gov.wales/home/council-services/travel-roads-parking/active-travel/#.W832x-aot9B

Carmarthenshire's cycling strategy;

https://www.carmarthenshire.gov.wales/home/business/tourism/tourism-priorities/cycling/#.W834XOaot9B

Well-being plan for 2018-2023

Corporate Strategy 2018-2023

Defra UK Air Website for Monitoring Networks

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 (2017)

Appendix F: NO_2 Fall Off Distance Calculator Data (2017)

Appendix G: Carmarthenshire 2017 AQ Screening Review Report

Appendix H: Llandeilo AQMA Action Plan Feasibility Assessment for Outstanding Phase 1 Options

Appendix I: Llandeilo AQMA action plan (2014)

Appendix A: Monthly Diffusion Tube Monitoring Results

Table A.1 – Full Monthly Diffusion Tube Results for 2017

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) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
Ammanford															
Carm/089	53.4	39.3	31.1	27.7	28.7	16.7	18.2	17.1	25.6	28.7	48.9	31.7	30.59	23.56	
Carm/064	-	44.4	40.2	26.0	29.1	27.1	*23.6*	*23.6*	27.6	35.2	43.2	34.3	32.21	24.80	
Carm/090	47.2	43.7	44.4	31.2	29.8	33.1	26.0	26.5	32.6	39.5	45.3	33.6	36.08	27.78	
Llanelli															
DAL/20	43.9	32.4	32.2	22.2	25.3	20.6	17.8	20.0	24.0	-	-	-	26.49	20.40	
DAL/21	29.5	20.7	17.2	11.4	11.5	9.6	8.5	8.7	12.0	14.2	21.2	14.5	14.92	11.49	
DAL/14	50.1	42.3	41.0	29.9	-	29.3	-	24.9	30.7	-	47.5	36.6	36.92	28.43	
DAL/15	49.3	35.7	29.8	36.6	23.3	15.4	14.9	19.7	26.8	24.3	45.3	34.4	29.63	22.81	
Carm/077	71.5	68.2	62.8	45.6	49.0	43.3	35.3	40.7	42.3	58.5	62.1	41.0	51.69	39.80	30.6
DAL/22	60.3	46.7	50.1	35.8	37.6	34.5	27.5	30.9	36.1	45.9	47.6	47.2	41.68	32.10	
DAL/26	46.5	39.4	32.5	30.7	25.9	14.9	16.3	18.1	25.8	26.0	42.9	29.1	29.01	22.34	
DAL/27	56.6	40.7	41.0	36.3	29.8	19.6	21.6	23.3	32.6	-	51.2	-	35.27	27.16	
DAL/16	44.8	38.6	35.4	23.8	26.1	21.1	17.6	19.7	23.6	28.3	37.3	22.4	28.23	21.73	
DAL/17	50.1	41.6	29.3	30.9	28.7	18.4	18.9	16.7	27.2	25.4	41.5	28.6	29.78	22.93	
DAL/07	86.5	74.0	55.1	60.9	57.4	51.3	43.8	-	-	58.0	73.8	54.6	61.54	**47.39**	**43.7**
DAL/23	46.3	34.7	37.8	23.5	22.6	20.8	16.7	15.2	22.2	24.6	34.4	26.8	27.13	20.89	
DAL/09	70.2	68.6	62.6	-	50.4	59.1	48.9	53.6	56.7	53.7	68.4	57.2	59.04	**45.46**	**45.5 (f)**
Carm/104	64.3	50.6	59.1	45.3	44.8	37.1	31.5	34.9	38.6	42.8	64.0	46.3	46.61	35.89	
DAL/10	73.1	46.2	46.9	47.3	40.7	30.2	32.0	32.0	39.9	40.3	55.2	50.3	44.51	34.27	
Carm/069	65.1	52.3	59.6	44.2	37.7	44.2	40.9	39.0	43.1	52.2	62.2	46.0	48.88	37.63	28.4

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) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DAL/12	63.8	53.4	45.4	35.1	34.3	27.0	22.7	23.1	35.3	38.8	53.6	37.4	39.16	30.15	
DAL/04	60.2	47.3	42.7	39.9	31.4	33.2	26.2	28.5	32.8	37.9	53.2	50.3	40.30	31.03	
Carm/114	55.3	57.8	57.1	40.5	34.8	40.0	33.5	32.8	33.3	45.0	66.4	49.5	45.50	35.04	
Carm/113	64.0	51.7	50.6	42.1	47.0	44.9	40.2	-	38.1	46.7	55.3	45.2	47.80	36.81	34.8
Carm/135	53.5	40.0	40.2	36.2	34.2	30.3	25.0	29.5	33.0	36.7	44.3	40.3	36.93	28.44	
Carm/138	36.8	25.2	20.9	13.7	13.0	10.4	10.4	10.7	16.3	16.1	26.2	21.7	18.45	14.21	
Carm/141	-	45.1	46.4	36.4	32.0	33.1	-	30.0	32.9	39.9	50.4	43.6	38.98	30.01	
Carmarthen															
DAC/06	54.4	50.0	46.4	33.5	35.5	29.8	28.8	28.6	33.9	40.5	50.9	42.2	39.54	30.45	
DAC/13	55.1	45.8	51.5	40.0	35.5	36.0	26.8	33.5	36.9	45.2	55.9	53.9	43.01	33.12	
Carm/109	54.0	59.2	50.7	37.9	45.3	39.8	35.4	34.2	40.9	-	62.0	51.5	46.45	35.76	34.4
DAC/08	77.5	78.2	84.2	75.9	65.2	65.3	60.1	59.0	-	74.3	100.3	73.5	73.95	**56.95**	**53.6**
DAC/14	48.4	56.6	59.7	40.6	33.7	25.8	37.8	39.1	41.2	-	58.3	44.7	44.17	34.01	
DAC/15	48.8	44.0	51.4	33.7	31.3	36.3	31.1	32.3	34.3	40.4	48.6	39.4	39.30	30.26	
Carm/111	57.8	51.8	52.0	30.7	36.0	37.0	32.3	33.0	36.5	46.2	51.8	40.1	42.10	32.42	
DAC/12	57.2	50.2	51.5	43.9	39.4	34.6	34.0	32.6	36.6	42.8	61.1	48.9	44.40	34.19	
DAC/04	35.4	37.4	27.3	27.8	23.7	17.8	20.5	21.1	25.3	26.3	42.4	30.9	27.99	21.55	
Carm/072	49.0	47.3	47.4	38.2	34.0	34.7	31.0	31.4	37.1	44.3	29.8	42.7	38.91	29.96	
DAC/02	59.5	73.9	68.3	44.2	43.2	43.6	41.3	39.0	49.7	61.4	64.8	56.0	53.74	**41.38**	39.0
DAC/16	61.6	61.2	61.8	35.8	47.9	41.2	36.8	36.4	41.2	-	57.6	49.6	48.28	37.18	37.2 (f)
Carm/001	52.4	47.9	45.8	39.3	35.1	29.3	27.3	29.1	38.0	43.2	59.6	50.5	41.46	31.92	
Carm/084	58.4	50.2	45.7	40.0	41.5	37.8	31.0	28.0	37.2	44.3	55.2	46.4	42.98	33.09	
DAC/05	62.9	55.3	50.5	39.0	34.0	28.1	28.2	32.7	37.9	46.3	59.7	38.8	42.78	32.94	
Carm/106	61.4	58.7	55.2	45.1	40.6	41.1	34.5	37.4	44.2	51.1	68.0	51.6	49.08	37.79	37.8 (f)
Carm/134	27.5	20.5	17.8	11.3	11.9	7.9	8.7	9.3	13.1	16.6	24.9	18.9	15.70	12.09	
Carm/126	42.7	37.1	31.0	28.6	26.6	19.9	18.4	20.0	26.7	29.9	40.8	28.5	29.18	22.47	
Carm/132	36.7	28.9	24.4	20.0	20.7	13.2	13.6	14.0	18.6	-	28.8	25.6	22.23	17.12	

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) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
Carm/133	31.2	24.7	19.2	14.3	14.4	9.3	10.2	9.9	13.7	15.7	25.4	14.7	16.89	13.01	
Carm/139	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	16.93	
Carm/140	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	16.17	
Llandeilo															
FA/01	32.3	24.1	20.4	15.3	16.7	15.7	13.4	14.7	17.6	19.6	27.7	17.9	19.62	15.10	
DA/15	47.0	34.2	35.9	29.1	31.4	25.9	24.3	24.0	27.4	33.1	47.2	33.4	32.74	25.21	
DA/01	48.4	38.4	35.9	26.2	26.3	24.3	25.0	24.1	27.2	30.7	44.5	25.7	31.39	24.17	
DA/03	46.3	37.6	39.5	28.0	-	25.9	24.0	24.6	28.1	33.7	41.8	30.5	32.73	25.20	
Carm/013	56.5	48.7	51.5	38.5	24.9	39.1	35.1	34.7	41.7	49.3	61.2	44.1	43.78	33.71	
DA/05 (A), (B) & (C)	61.4	53.3	51.6	36.6	41.1	37.1	36.2	36.4	40.5	43.7	57.2	43.9	44.92	34.59	
DA/07	66.5	62.0	57.2	47.6	46.5	43.5	39.9	37.3	44.4	46.4	66.9	44.2	50.20	38.65	38.7(f)
Carm/083	72.0	63.6	49.3	43.4	46.5	37.9	40.1	41.5	47.5	51.6	73.2	48.3	51.24	39.46	35.5
DA/09	77.4	59.8	61.8	36.6	57.0	40.5	44.7	46.1	47.2	53.4	77.0	53.4	54.58	**42.02**	**42.0 (f)**
DA/10	70.0	55.4	60.2	44.8	49.8	37.9	36.5	38.2	47.0	48.4	65.9	51.7	50.48	38.87	38.9 (f)
DA/11	62.4	50.6	56.2	48.8	42.8	42.0	42.6	41.9	41.3	51.5	70.1	47.6	49.82	38.36	38.4 (f)
DA/12	44.6	68.6	45.0	26.8	-	24.3	22.1	24.5	26.1	46.8	64.1	-	39.29	30.25	
DA/13	60.9	54.7	51.3	44.0	32.5	46.1	38.2	27.8	44.3	32.7	60.3	49.5	45.19	34.80	
DA/14	47.7	34.9	32.8	24.7	26.2	23.8	21.5	23.5	31.3	31.5	-	29.8	29.79	22.94	
DA/16	51.1	46.6	44.7	47.1	35.6	37.7	35.3	34.9	41.0	45.5	63.9	37.5	43.41	33.42	
FA/03	34.5	27.8	28.2	22.7	21.1	18.2	18.1	17.6	20.2	24.8	36.9	26.9	24.75	19.06	
FA/07	19.3	14.6	12.2	9.9	9.0	7.4	7.2	6.8	9.6	10.6	16.3	11.6	11.21	8.63	
FA/06	35.1	-	25.6	22.9	20.6	13.7	15.7	16.5	18.5	-	30.6	23.1	22.23	17.12	
FA/04	27.9	25.1	21.5	15.0	13.1	18.4	12.3	12.2	16.4	18.8	23.1	18.3	18.51	14.25	
FA/05	32.7	26.0	23.2	14.8	16.6	16.3	14.6	15.2	17.8	22.5	27.5	18.7	20.49	15.78	
Burry Port															
Carm/127	34.3	26.2	16.6	10.7	13.6	9.4	7.4	8.6	11.6	15.3	20.0	13.1	15.57	11.99	

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) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
Carm/128	32.1	29.6	24.4	16.2	19.1	17.4	12.1	11.3	15.5	17.8	24.6	19.1	19.93	15.35	
Garnant															
Carm/137	37.8	28.8	25.1	15.3	17.7	11.4	-	-	-	-	-	-	22.68	16.1	
Cross Hands / Economic Link Road															
Carm/ELR1	-	-	-	-	44.7	43.8	38.7	40.8	42.7	44.9	61.7	49.7	45.88	**41.3**	29.8
Carm/ELR2	-	-	-	-	23.1	24.0	22.7	24.5	25.4	27.8	32.0	27.4	25.86	23.3	
Carm/ELR3	-	-	-	-	19.7	17.2	14.4	14.4	21.4	-	33.9	-	20.17	19.1	
Carm/ELR4	-	-	-	-	15.3	13.0	12.6	11.7	16.3	19.2	28.9	22.4	17.43	15.7	
Carm/ELR9	-	-	-	-	8.0	6.4	5.5	5.5	8.4	10.4	16.5	12.3	9.13	8.2	
Carm/ELR10	-	-	-	-	12.9	10.8	-	11.4	-	-	-	-	11.70	13.3	
Carm/ELR11	-	-	-	-	10.1	9.7	8.6	-	11.5	14.0	21.1	14.3	12.76	10.9	
Carm/ELR12	-	-	-	-	13.4	-	11.6	13.2	14.5	17.8	26.4	17.9	16.40	14.1	
Carm/ELR21	-	-	-	-	10.1	9.6	8.5	8.2	13.5	13.4	22.0	15.6	12.61	11.3	
Carm/ELR22	-	-	-	-	18.6	16.9	13.6	14.7	18.0	20.2	28.4	19.7	18.76	16.9	

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 that the monitor was located on the façade of the property.

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/m3 (milligrammes per cubic metre, mg/m3 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 7 times a year	24-hour mean	31.12.2010
	18µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10µg/m^3	Annual mean	31.12.2020
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	3.25µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m^3	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

Environmental Scientifics Group Limited (ESG) prepares and analyse 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 0.77 and taken from the Review and Assessment Helpdesk Database. The version number of the database was 06/18.

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 06/18, as detailed on the Review and Assessment Helpdesk website. ESG have 29 studies listed for 2017 that gives an overall bias adjustment figure of 0.77.

PM Monitoring Adjustment

No PM_{10} monitoring exercise was carried out during 2015 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 2017 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; Ammanford - Tir Y Dail Lane (2) (CARM/089), Carmarthen – 2 College Street (CARM/134), Johnstown – 2 Jobs Well Road (CARM/126), 41 New Street, Burry Port (CARM/127) and Denham Avenue, Llanelli (DAL/21). 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 were chosen to provide an average background concentration for the area.

Two separate short term periods applied for the results that require annualisation; January – June 2017 for the screening exercise in Garnant (Carm/137) and May to December 2017 for the Economic Link Road sites. Shorter periods were also applied for four of the economic link road sites where the valid data capture was less than its 8 month screening period. Further details can be found in 'Annualised Data Report (2017)' in Appendix E.

For quality assurance, comparison checks were also conducted using data from automatic monitoring sites across Wales.

Table C.1a – Short-Term to Long-Term Monitoring Data Adjustment January – June 2017

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
CARM/089	Kerbside	30.6	32.8	0.93
CARM/134	Other	15.7	16.2	0.97
CARM/126	Roadside	29.2	31.0	0.94
CARM/127	Kerbside	15.6	18.5	0.84
DAL/21	Other	14.9	16.6	0.90
Average				0.92

Table C.2b – Short-Term to Long-Term Monitoring Data Adjustment May – December 2017

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
CARM/089	Kerbside	30.6	27.0	1.13
CARM/134	Other	15.7	13.9	1.13
CARM/126	Roadside	29.2	26.4	1.11
CARM/127	Kerbside	15.6	12.3	1.27
DAL/21	Other	14.9	12.5	1.19
Average				1.17

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 Air Liquide 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

ESG Didcot using a preparation method of 50% TEA in Acetone and carried out 23 studies in 2017 which were rated 'Good' precision results for Nitrogen Dioxide diffusion tube colocation studies. Tube precision is rated as good when 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%.

This information was obtained from the document 'Tube Precision 2017 version 03-18 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 NO_2 PT forms an integral part of the UK NO_2 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].

AIR PT AR013	AIR PT AR015	AIR PT AR016	AIR PT AR018	AIR PT AR019	AIR PT AR021	AIR PT AR022	AIR PT AR024
Apr – May 2016	Jul – Aug 2016	Sep – Oct 2016	Jan – Feb 2017	April – May 2017	July – August 2017	September – October 2017	January – February 2018
75 %	75 %	100 %	100 %	100 %	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 13 to 24 Apr 2016 – Feb 2018 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

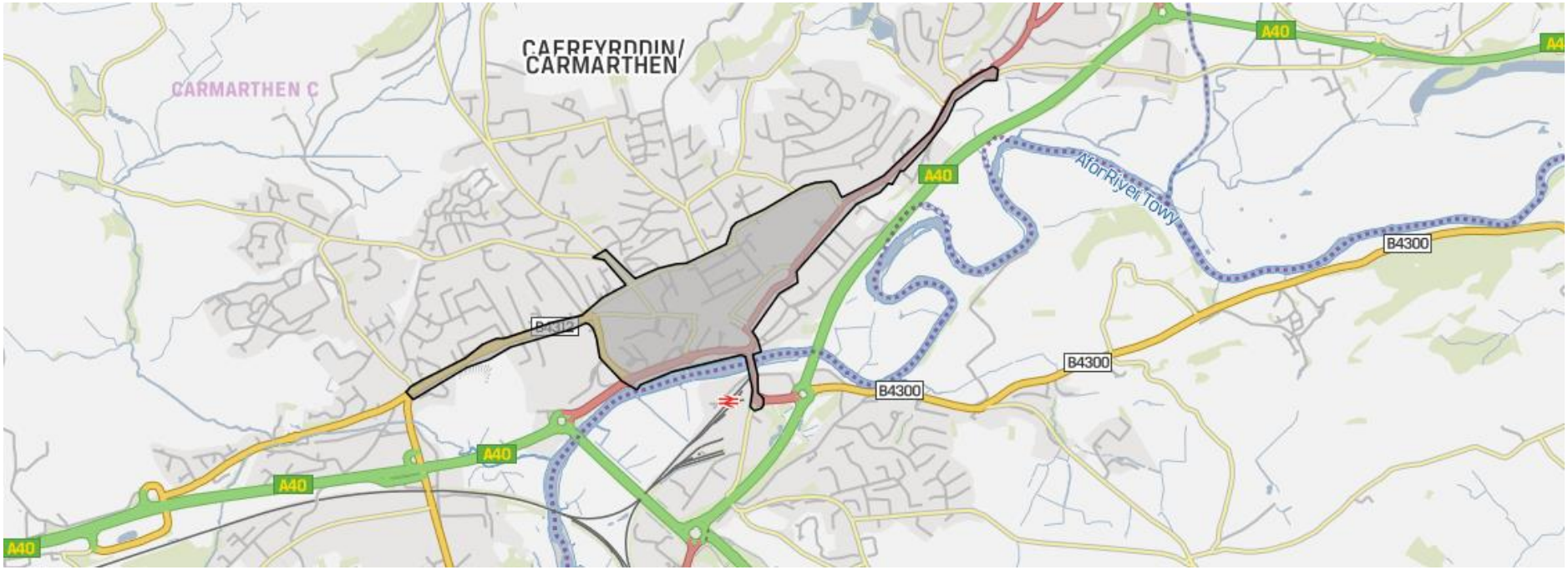
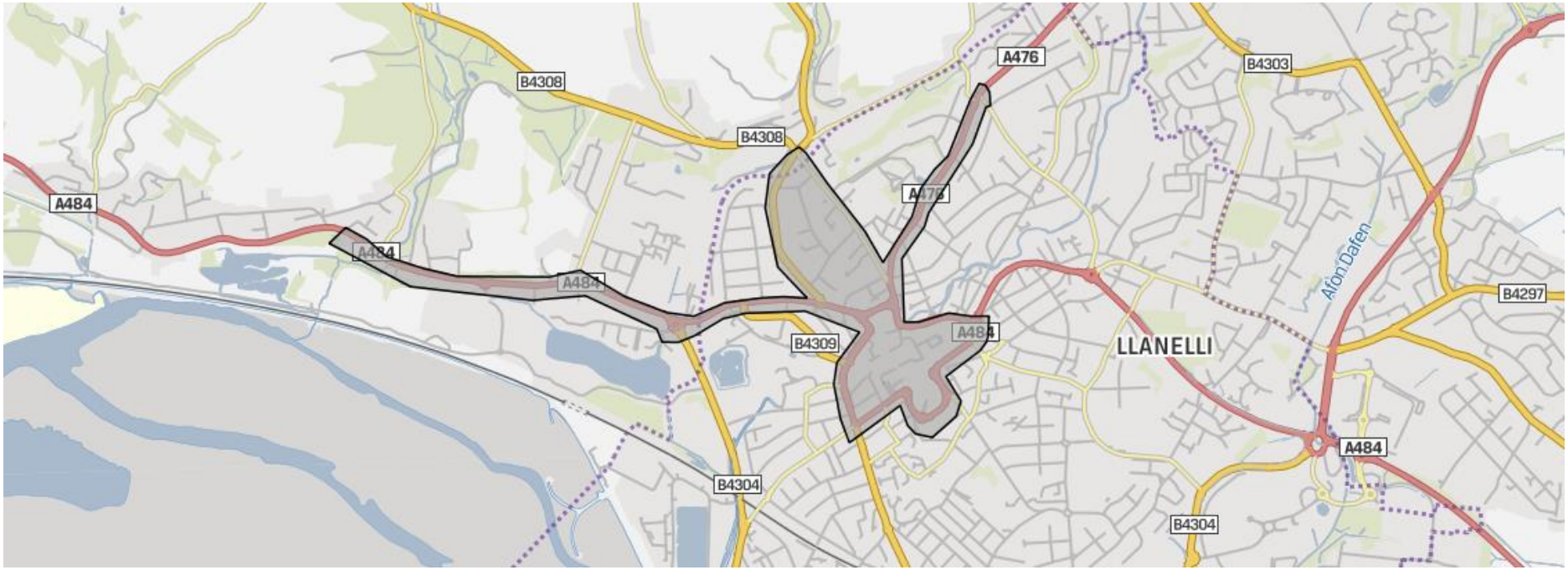


Figure D.3 – Llanelli AQMA boundary map



Appendix E – Annualised Data Report (2017)

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

Annualised Data Report (2017) for use with the 2018 Progress Report

(September 2018)

This document contains details for the calculations relating to annualised data that has been included in the 2018 Progress Report to obtain a more accurate prediction of what the annual results for tube site Carm/137 (Cwmamman Road, Garnant) and the Cross Hands/ Economic Link Road sites Carm/ELR1, 2, 3, 4, 9, 10, 11, 12, 21 & 22 would have been for 2017.

Background

Diffusion tube site Carm/137 was set up to monitor the impact of speed cushions in the road. It was only feasible to capture just six 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, a number of diffusion tube monitoring sites were also set up 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. As this screening exercise started in May 2017, it was only possible to capture 8 months of data and unfortunately for four of these sites the valid data captured was even less. Nevertheless, more than 3 months of data was captured for each monitoring site and therefore it is feasible and necessary to annualise these results.

The monthly raw tube data for the months collected for each screening exercise is shown in Tables 1a and 1b below, along with the raw measured mean.

Table 1a – Monthly Raw data (Garnant site – Carm/137)

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Measured Mean
Carm/137	37.8	28.8	25.1	15.3	17.7	11.4	22.7

If the mean figure in Table 3a above is multiplied by 0.77 (the bias adjusted figure), then the annual mean is 17.5µg/m^3.

Table 1b – Monthly Raw data (Economic Link Road sites)

Tube Id	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Measured Mean
Carm/ELR1	44.7	43.8	38.7	40.8	42.7	44.9	61.7	49.7	45.9
Carm/ELR2	23.1	24.0	22.7	24.5	25.4	27.8	32.0	27.4	25.9
Carm/ELR3	19.7	17.2	14.4	14.4	21.4	-	33.9	-	20.2
Carm/ELR4	15.3	13.0	12.6	11.7	16.3	19.2	28.9	22.4	17.4
Carm/ELR9	8.0	6.4	5.5	5.5	8.4	10.4	16.5	12.3	9.1
Carm/ELR10	12.9	10.8	-	11.4	-	-	-	-	11.7
Carm/ELR11	10.1	9.7	8.6	-	11.5	14.0	21.1	14.3	12.8
Carm/ELR12	13.4	-	11.6	13.2	14.5	17.8	26.4	17.9	16.4
Carm/ELR21	10.1	9.6	8.5	8.2	13.5	13.4	22.0	15.6	12.6
Carm/ELR22	18.6	16.9	13.6	14.7	18.0	20.2	28.4	19.7	18.7

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 2017 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; Ammanford - Tir Y Dail Lane (2) (Carm/089), Carmarthen – 2 College Street (Carm/134), Johnstown – 2 Jobs Well Road (Carm/126), 41 New Street, Burry Port (Carm/127) and Denham Avenue, Llanelli (DAL/21).

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 2017 raw monthly data for the sites along with the Annual mean (Am) and Table 2b provides the raw data for relevant periods in 2017, along with the Period Mean. The data capture for Tir Y Dail Lane (2), 2 College Street, 2 Jobswell Road, 41 New Street and Denham Avenue was 100% for 2017.

Table 2a – 2017 raw data (Annual Mean)

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean (Am)
Carm /089	53.4	39.3	31.1	27.7	28.7	16.7	18.2	17.1	25.6	28.7	48.9	31.7	30.6
Carm /134	27.5	20.5	17.8	11.3	11.9	7.9	8.7	9.3	13.1	16.6	24.9	18.9	15.7
Carm	42.7	37.1	31.0	28.6	26.6	19.9	18.4	20.0	26.7	29.9	40.8	28.5	29.2

/126													
Carm /127	34.3	26.2	16.6	10.7	13.6	9.4	7.4	8.6	11.6	15.3	20.0	13.1	15.6
DAL/ 21	29.5	20.7	17.2	11.4	11.5	9.6	8.5	8.7	12.0	14.2	21.2	14.5	14.9

Table 2b – 2017 raw data (Jan – Jun) Period Mean for Garnant ref Carm/137

Tube Id	Jan	Feb	Mar	Apr	May	Jun	Period Mean (Pm)
Carm/089	53.4	39.3	31.1	27.7	28.7	16.7	32.8
Carm/134	27.5	20.5	17.8	11.3	11.9	7.9	16.2
Carm/126	42.7	37.1	31.0	28.6	26.6	19.9	31.0
Carm/127	34.3	26.2	16.6	10.7	13.6	9.4	18.5
DAL/21	29.5	20.7	17.2	11.4	11.5	9.6	16.6

Table 2c – 2017 raw data (May – Dec) 8 Month Period Mean for Economic Link Road sites

Tube Id	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
Carm/089	28.7	16.7	18.2	17.1	25.6	28.7	48.9	31.7	27.0
Carm/134	11.9	7.9	8.7	9.3	13.1	16.6	24.9	18.9	13.9
Carm/126	26.6	19.9	18.4	20.0	26.7	29.9	40.8	28.5	26.4
Carm/127	13.6	9.4	7.4	8.6	11.6	15.3	20.0	13.1	12.3
DAL/21	11.5	9.6	8.5	8.7	12.0	14.2	21.2	14.5	12.5

The same approach is applied to those sites where a shorter period of valid data is captured. In Tables 2d- 2g below, separate period means have been calculated for the same period of valid data capture applicable to the site.

Table 2d – 2017 raw data Period Mean for ELR3

Tube Id	May	Jun	Jul	Aug	Sep	Nov	Period Mean (Pm)
Carm/089	28.7	16.7	18.2	17.1	25.6	48.9	25.9
Carm/134	11.9	7.9	8.7	9.3	13.1	24.9	12.6
Carm/126	26.6	19.9	18.4	20.0	26.7	40.8	25.4
Carm/127	13.6	9.4	7.4	8.6	11.6	20.0	11.8
DAL/21	11.5	9.6	8.5	8.7	12.0	21.2	11.9

Table 2e – 2017 raw data Period Mean for ELR10

Tube Id	May	Jun	Aug	Period Mean (Pm)
Carm/089	28.7	16.7	17.1	20.8
Carm/134	11.9	7.9	9.3	9.7
Carm/126	26.6	19.9	20.0	22.2
Carm/127	13.6	9.4	8.6	10.5

DAL/21	11.5	9.6	8.7	9.9

Table 2f – 2017 raw data Period Mean for ELR11

Tube Id	May	Jun	Jul	Sep	Oct	Nov	Dec	Period Mean (Pm)
Carm/089	28.7	16.7	18.2	25.6	28.7	48.9	31.7	28.4
Carm/134	11.9	7.9	8.7	13.1	16.6	24.9	18.9	14.6
Carm/126	26.6	19.9	18.4	26.7	29.9	40.8	28.5	27.2
Carm/127	13.6	9.4	7.4	11.6	15.3	20.0	13.1	12.9
DAL/21	11.5	9.6	8.5	12.0	14.2	21.2	14.5	13.1

Table 2g – 2017 raw data Period Mean for ELR12

Tube Id	May	Jul	Aug	Sep	Oct	Nov	Dec	Period Mean (Pm)
Carm/089	28.7	18.2	17.1	25.6	28.7	48.9	31.7	28.4
Carm/134	11.9	8.7	9.3	13.1	16.6	24.9	18.9	14.8
Carm/126	26.6	18.4	20.0	26.7	29.9	40.8	28.5	27.3
Carm/127	13.6	7.4	8.6	11.6	15.3	20.0	13.1	12.8
DAL/21	11.5	8.5	8.7	12.0	14.2	21.2	14.5	12.9

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)	Garnant Period Mean (Pm)	Ratio Am/Pm	ELR (Full 8 month) Period Mean (Pm)	Ratio Am/Pm
Carm/089	30.6	32.8	0.93	27.0	1.13
Carm/134	15.7	16.2	0.97	13.9	1.13
Carm/126	29.2	31.0	0.94	26.4	1.11
Carm/127	15.6	18.5	0.84	12.3	1.27
DAL/21	14.9	16.6	0.90	12.5	1.19
		Ra=	**0.92**	**Ra=**	**1.17**

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

Tube Id	Annual Mean (Am)	ELR3 Period Mean (Pm)	Ratio Am/Pm	ELR10 Period Mean (Pm)	Ratio Am/Pm	ELR11 Period Mean (Pm)	Ratio Am/Pm	ELR12 Period Mean (Pm)	Ratio Am/Pm
Carm/089	**30.6**	25.9	1.18	20.8	1.47	28.4	1.08	28.4	1.08
Carm/134	**15.7**	12.6	1.24	9.7	1.62	14.6	1.08	14.8	1.06
Carm/126	**29.2**	25.4	1.14	22.2	1.32	27.2	1.07	27.3	1.06

Carm/127	**15.6**	11.8	1.32	10.5	1.49	12.9	1.21	12.8	1.22
DAL/21	**14.9**	11.9	1.25	9.9	1.51	13.1	1.14	12.9	1.16
		Ra=	**1.23**	**Ra=**	**1.48**	**Ra=**	**1.11**	**Ra=**	**1.12**

The Ra figure can then be used with the site tube data for the relevant monitoring period in order to estimate the annual mean concentration for the site and bias adjusted using 0.77. This is the latest figure from spread sheet 06/18 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 and 3b above to provide a site mean. The site mean can then be bias adjusted using 0.77 being the latest figure from the Review and Assessment Helpdesk (06/18) 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	2017 Measured Mean (M)	Ra	Site Mean (S) (MxRa)	Adjust Factor (BAF)	Data Post Bias (SxBAF)
CARM/137	22.7	0.92	20.9	0.77	16.1
Carm/ELR1	45.9	1.17	53.7	0.77	41.3
Carm/ELR2	25.9	1.17	30.3	0.77	23.3
Carm/ELR3	20.2	1.23	24.8	0.77	19.1
Carm/ELR4	17.4	1.17	20.4	0.77	15.7
Carm/ELR9	9.1	1.17	10.6	0.77	8.2
Carm/ELR10	11.7	1.48	17.3	0.77	13.3
Carm/ELR11	12.8	1.11	14.2	0.77	10.9
Carm/ELR12	16.4	1.12	18.4	0.77	14.1
Carm/ELR21	12.6	1.17	14.7	0.77	11.3
Carm/ELR22	18.7	1.17	21.9	0.77	16.9

Table 5 shows that there is difference of 1.4µg/m^3 between the Data Post Bias (annualised) and non-annualised results for the tube site at Garnant. The Data Post Bias figure in Table 4 above (2017 Annualised) has been included in the 2018 Progress Report.

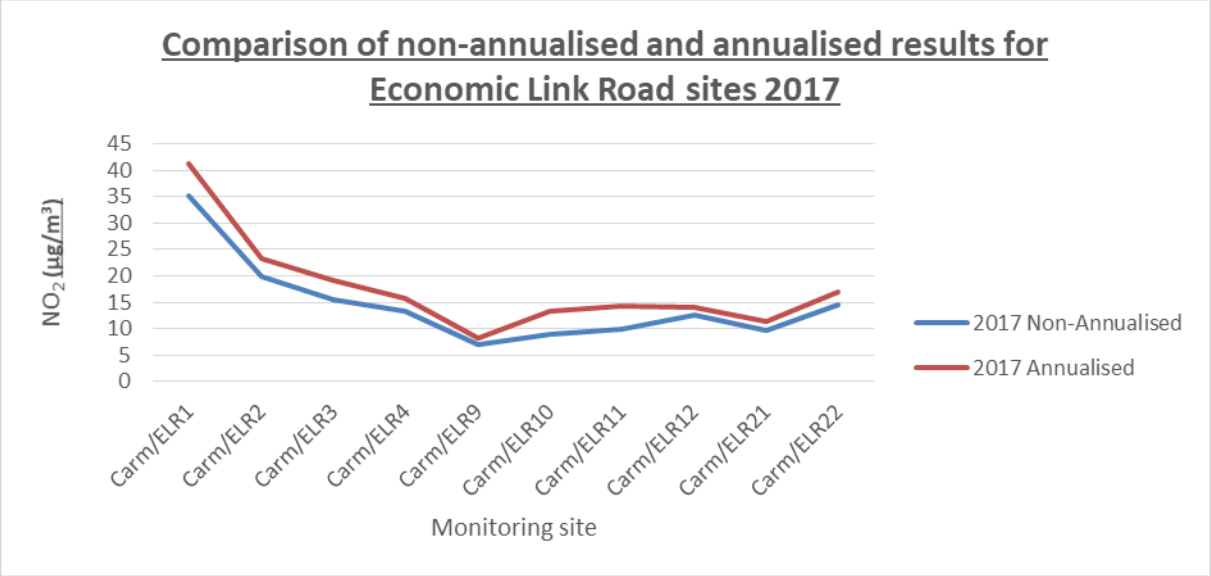
Table 5 – Comparison of non-annualised and annualised results (µg/m^3)

Tube Id	2017 Non-Annualised	2017 Annualised	Difference (µg/m^3)
Carm/137	17.5	16.1	-1.4

Carm/ELR1	35.3	41.3	6
Carm/ELR2	19.9	23.3	3.4
Carm/ELR3	15.5	19.1	3.6
Carm/ELR4	13.4	15.7	2.3
Carm/ELR9	7.0	8.2	1.2
Carm/ELR10	9.0	13.3	4.3
Carm/ELR11	9.9	14.2	4.3
Carm/ELR12	12.6	14.1	1.5
Carm/ELR21	9.7	11.3	1.6
Carm/ELR22	14.4	16.9	2.5

For the Economic Link Road sites, the results demonstrate a small difference in levels, generally within +5 µg/m^3. However, Carm/ELR1 demonstrated a significant difference that is 6 µg/m^3 higher than the non-annualised result. This unfortunately reveals a potential concentration level that exceeds the annual Air Quality Objective of 40 µg/m^3. Figure 1 below illustrates this.

Figure 1



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 available within the County, therefore four different background automatic monitoring sites were chosen across Wales to provide a more typical representation of the background levels in Wales, which

would similarly represent the background levels in Carmarthenshire. The data was downloaded from the UK-Air website but is considered too extensive to warrant including in this report. However, the relevant ratio figure obtained from the annual and period means is shown in Table 6a and 6b below and covers the same time periods as used above with local diffusion tube sites.

Table 6a – Ratio Figure Ra from automatic monitoring sites

	Annual Mean (Am)	Garnant Period Mean January – June (Pm)	Ratio Jan – June Am/Pm	ELR Period Mean May – December (Pm)	Ratio May – Dec Am/Pm
Cardiff Centre	20.24	21.20	0.95	18.31	1.11
Narberth	2.99	3.99	0.75	2.18	1.37
Cwmbran	12.07	12.57	0.96	10.35	1.17
Powys (Aston Hill)	2.97	4.03	0.74	2.26	1.31
Average Ra			**0.85**		**1.24**

Table 6b – Ratio Figure Ra from automatic monitoring sites

Tube Id	**Annual Mean (Am)**	**ELR3 Period Mean (Pm)**	**Ratio Am/Pm**	**ELR10 Period Mean (Pm)**	**Ratio Am/Pm**	**ELR11 Period Mean (Pm)**	**Ratio Am/Pm**	**ELR12 Period Mean (Pm)**	**Ratio Am/Pm**
Cardiff Centre	20.24	16.94	1.19	14.60	1.39	19.04	1.06	19.07	1.06
Narberth	2.99	2.24	1.33	2.33	1.28	2.28	1.31	2.20	1.36
Cwmbran	12.07	9.09	1.33	7.06	1.71	10.79	1.12	10.95	1.10
Powys (Aston Hill)	2.97	2.37	1.25	2.59	1.15	2.38	1.25	2.21	1.34
		Ra=	**1.28**	**Ra=**	**1.38**	**Ra=**	**1.19**	**Ra=**	**1.22**

The Average Ra figure obtained from the automatic monitoring sites for the Garnant monitoring period (January to June) is 0.07 lower than that obtained from the local diffusion tubes and therefore not thought to be significant. The ELR monitoring period for May to December however, is 0.07 higher than that obtained from the local diffusion tubes and again not considered to be significant.

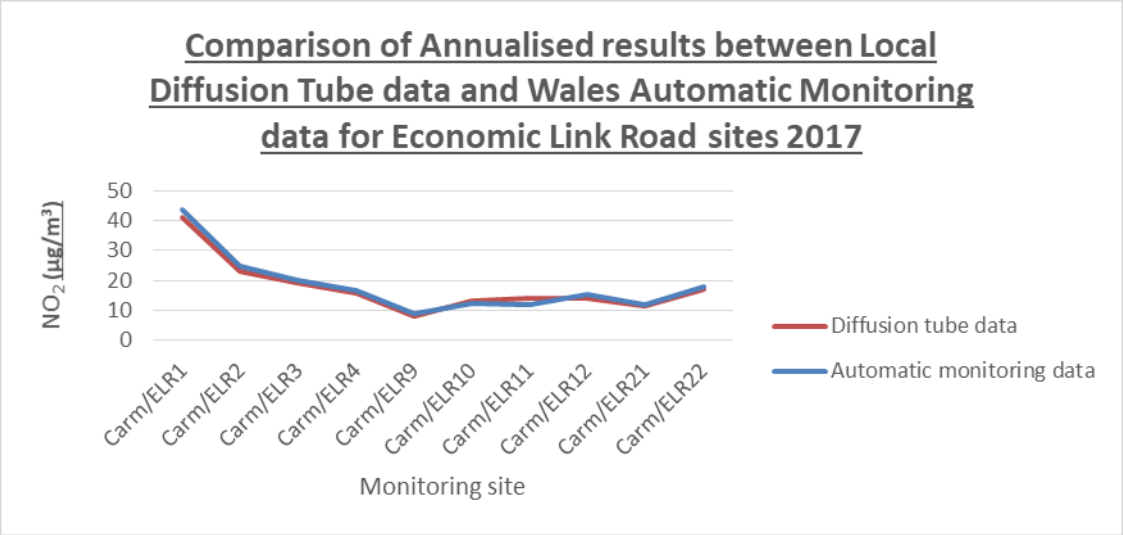
The use of the Ra figure obtained from the Automatic monitoring sites is shown in Table 7 below and also contains the tube Ra post bias data (annualised).

Table 7 – Annualisation using data from automatic monitoring sites

Tube Id	2017 Measured Mean (M)	Ra	Site Mean (S) (MxRa)	Adjust Factor (BAF)	Data Post Bias (SxBAF)
Carm/137	22.7	0.85	19.3	0.77	14.9
Carm/ELR1	45.9	1.24	56.9	0.77	43.8
Carm/ELR2	25.9	1.24	32.1	0.77	24.7
Carm/ELR3	20.2	1.28	25.9	0.77	19.9
Carm/ELR4	17.4	1.24	21.6	0.77	16.6
Carm/ELR9	9.1	1.24	11.3	0.77	8.7
Carm/ELR10	11.7	1.38	16.1	0.77	12.4
Carm/ELR11	12.8	1.19	15.2	0.77	11.7
Carm/ELR12	16.4	1.22	20.0	0.77	15.4
Carm/ELR21	12.6	1.24	15.6	0.77	12.0
Carm/ELR22	18.7	1.24	23.2	0.77	17.9

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 mainly in agreement within 1-2 µg/m^3. This is illustrated in the figure 2 below.

Figure 2



Conclusion

Only one of these tube sites - Carm/ELR1 exceeded the annual air quality objective of 40µg/m^3, with a reading of 41µg/m^3 when annualised against the local diffusion tube data and 43µg/m^3, when annualised using automatic monitoring data. This site is located near to the Cross Hands roundabout, of which it is hoped the Economic Link Road with relieve congestion in the future. Nevertheless, this is not the worst case scenario because this site is not located on a façade of a property/ point of relevant exposure as this diffusion tube is located on the roadside, just over 6 meters away from the receptor, so it is important to conduct further work to calculate the predicted concentration at the receptor using the NO_2 fall of distance calculator provide d by the LAQM helpdesk.

This work was carried out using the 2017 annualised figure of 41 µg/m^3 and further details can be found in the report NO_2 Fall Off Distance Calculator Data (2017). The predicted result at the relevant point of exposure was calculated as 30µg/m^3, which falls significantly below the objective level.

Appendix F - NO_2 Fall Off Distance Calculator Data (2017)

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

NO_2 Fall off Distance Calculator Data (2017) for use with the 2018 Progress Report

(October 2018)

This document contains details for the calculations relating to predicting the drop off over distance for NO_2 in relation to 9 diffusion tubes in the Carmarthenshire monitoring network. The data has been included in the 2018 Progress Report to obtain a more accurate prediction of what the annual results for the nine sites in Carmarthenshire would have been for 2017, at the point of relevant exposure.

Background

Carmarthenshire has been subject to diffusion tube monitoring for a number of years with Air Quality Management Areas declared within the towns on Llandeilo, Carmarthenshire and Llanelli. For a number of 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.

Table 1 – Diffusion Tube Locations

Site Id	Location
Carm/077	Llanelli – Sandy Road (2)
DAL/07	Llanelli – nr 13 Felinfoel Road
Carm/069	West End
Carm/113	Swiss Valley
DAC/08	Carmarthen - 85 Priory Street (E)
DAC/02	Carmarthen - 15 Park Terrace
Carm/083	Llandeilo - Rhosmaen Street (2)
Carm/109	Carmarthen – Richmond Terrace
Carm/ELR1	Cross Hands (2) (N)

The calculator tool requires certain details relating to the site location, annual mean background concentrations (obtained from the Helpdesk updated Background Maps based on 2015 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)?	6.30
What is your measured annual mean NO_2 concentration (in ug/m^3)?	39.8
The predicted annual mean NO_2 concentration (in ug/m^3) at your receptor	**30.6**

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	6.3	39.8	30.6	
DAL/07	0.8	1.3	9.7	**47.4**	**43.7**	Predicted concentration at Receptor

						above AQS objective.
CARM/109	0.6	0.8	8.4	35.8	34.4	
CARM/069	0.2	6.2	9.7	37.6	23.0	
CARM/113	1.1	1.5	6.0	36.8	34.8	
DAC/08	1.1	1.5	8.4	**57.0**	**53.6**	Predicted concentration at Receptor above AQS objective.
DAC/02	1.0	1.4	7.0	**41.4**	*39.0*	Predicted concentration at Receptor within 10% the AQS objective.
CARM/083	1.5	2.5	**4.6**	39.5	35.5	Warning: Background NO2 concentrations <5µg/m3 or >50µg/m3 are rare in the UK
Carm/ELR1	1.5	7.7	8.8	**41.3**	29.8	

A comparison of results for the 'roadside' and 'kerbside' sites alongside it's the 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 and Annualised (0.77)	Distance Calculated
Carm/077	Roadside	4	51.69	39.80	30.6
DAL/07	Kerbside	0.5	61.54	**47.39**	**43.7**
Carm/109	Kerbside	0.2	46.45	35.76	34.4
Carm/069	Kerbside	6	48.88	37.63	28.4
Carm/113	Roadside	0.4	47.80	36.81	34.8
DAC/08	Roadside	0.4	73.95	**56.95**	**53.6**
DAC/02	Kerbside	0.4	53.74	**41.38**	39.0
Carm/083	Roadside	1	51.24	39.46	35.5
Carm/ELR1	Roadside	6.1	45.88	**41.35**	29.8

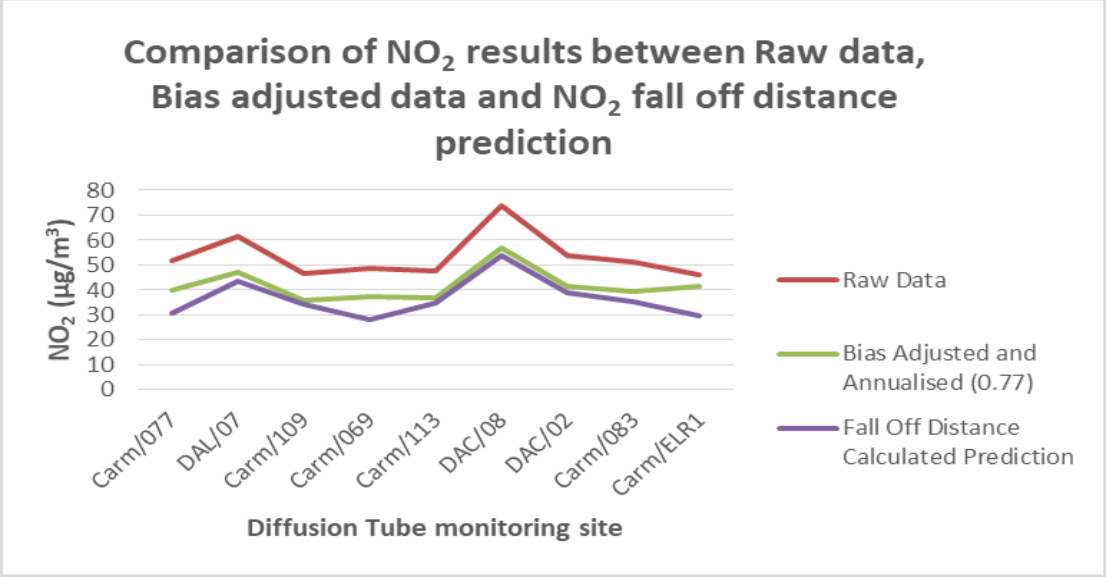
The comparison of data in table 3 above, appears to show just two results DAL/07 (Felinfoel Road, Llanelli) and DAC/08 (Priory Street, Carmarthen) exceeding the

Annual Air Quality Objective of 40ug/m^3, compared to the four exceedances listed in the bias adjusted and annualised data (before the fall off distance was calculated). However, DAC/02 (15 Park Terrace) is also on the border of meeting the AQO. These three sites are considered to be hotspots within the Carmarthen and Llanelli AQMA's.

Although Carm/ELR1 at first appeared to be exceeding the AQO, the fall off distance calculator significantly reduced this result from 41.4 to 29.8ug/m^3. This is a kerbside site and is situated over 6 metres away from the nearest receptor so a larger decrease would be expected when using this tool.

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.

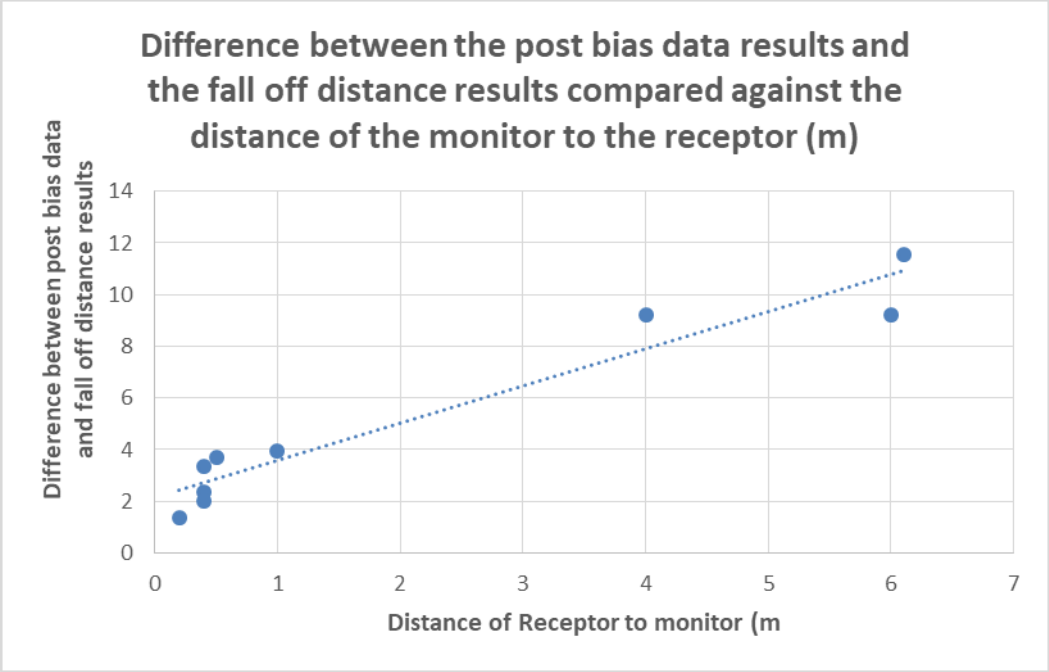
Figure 1



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/069 and Carm/ELR1, compared to the other sites. This is due to both sites having the monitors positioned over 6m away from 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 Carm/113, DAC/08 and DAC/02 all of which share a distance of 0.4m between the monitor and the receptor.

Figure 2



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 =((39.8–6.3)/(-0.5476xLn(1.7)+2.7171))x(-0.5476xLn(5.7)+2.7171)+6.3

C_z = **30.65 μ g/m^3**

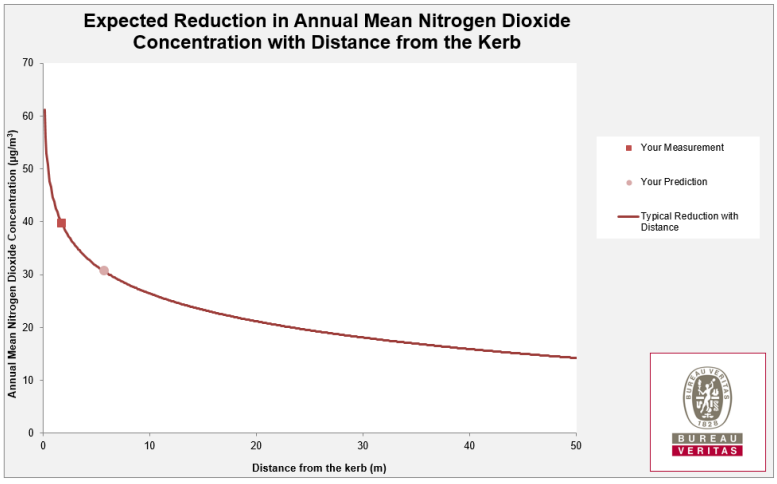
Conclusions

After using the online calculator to calculate the fall-off distance, two of the sites assessed DAL/07 (Felinfoel Road, Llanelli) and DAC/08 (Priory Street, Carmarthen) remain high with a predicted concentration of NO_2 exceeding the Annual Air Quality Objective of 40ug/m^3. This is a reduction to the four exceedances listed in the bias adjusted and annualised data (before the fall off distance was calculated). However, DAC/02 (15 Park Terrace) is also on the border of meeting the AQO. These three sites are considered to be hotspots within the Carmarthen and Llanelli AQMA's.

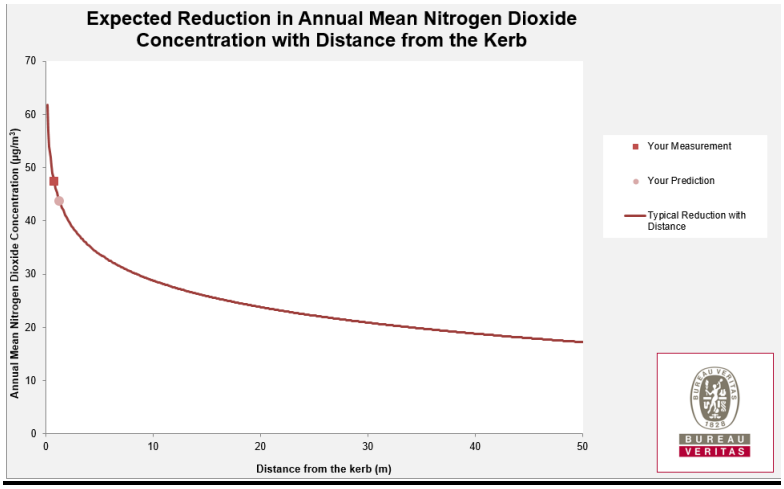
Although Carm/ELR1 at first appeared to be exceeding the AQO, the fall off distance calculator significantly reduced this result from 41.4 to 29.8ug/m^3. This site is not located within any of the AQMA's in Carmarthenshire, however it is part of a screening exercise to monitor to impact of the new Cross Hands Economic Link Road which should be completed in 2019.

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 distance calculated is consistent with the typical reduction expected with distance.

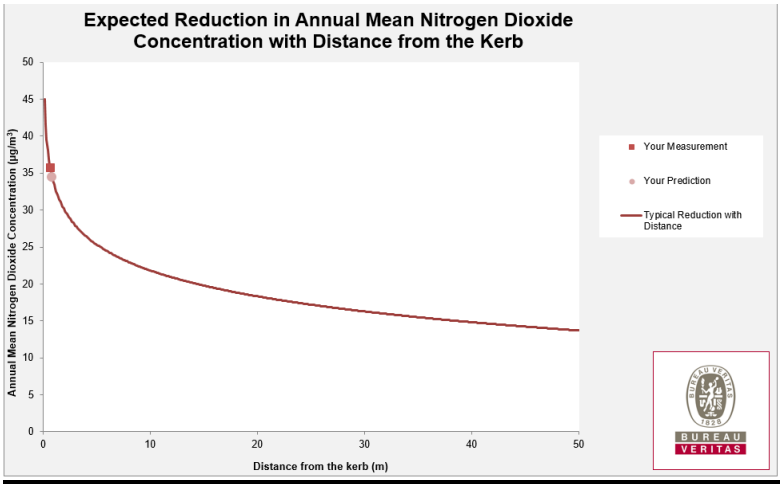
Carm/077



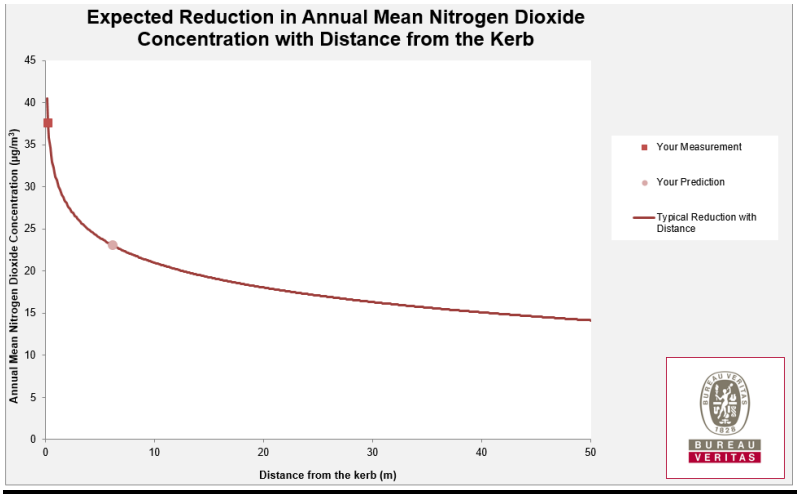
DAL/07



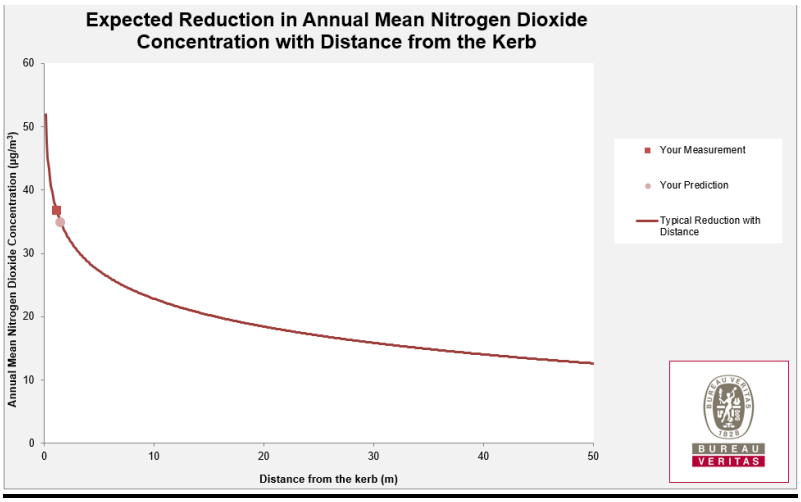
Carm/109



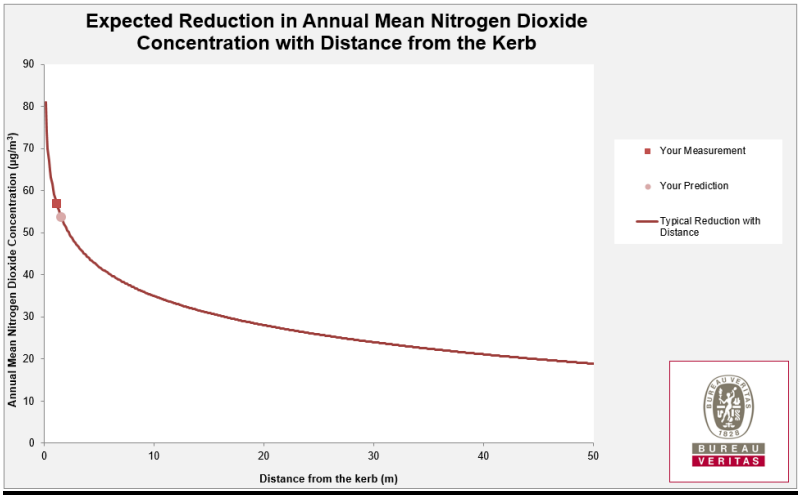
Carm/069



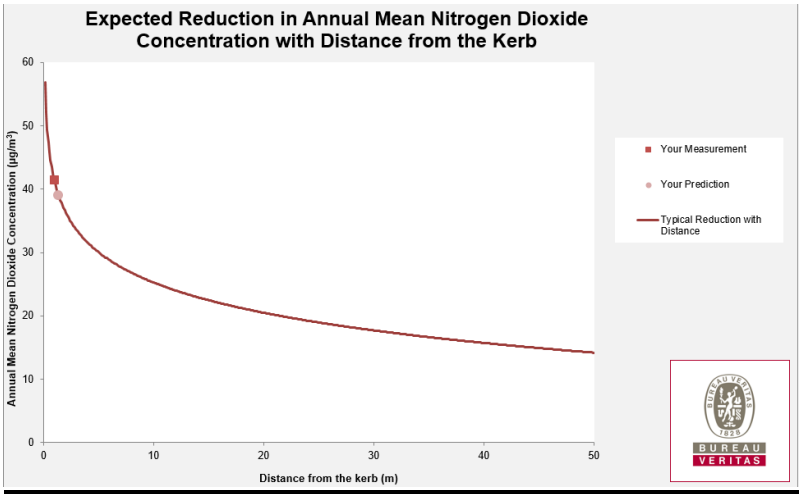
Carm/113



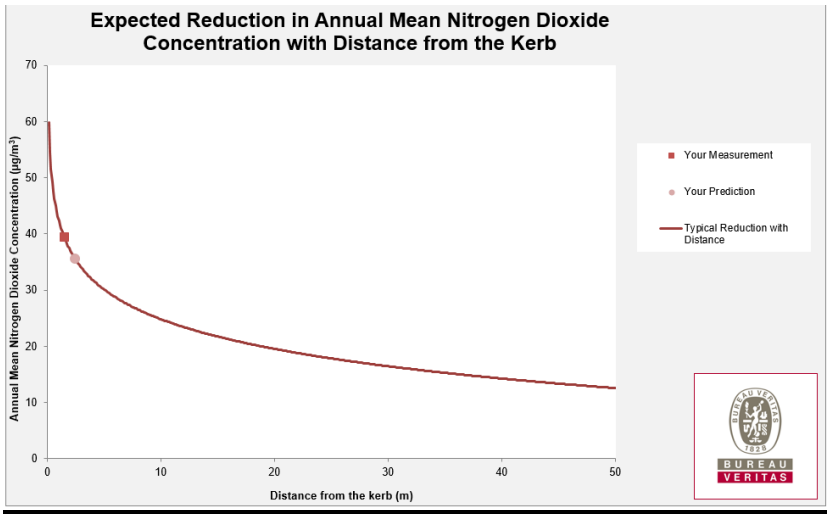
DAC/08



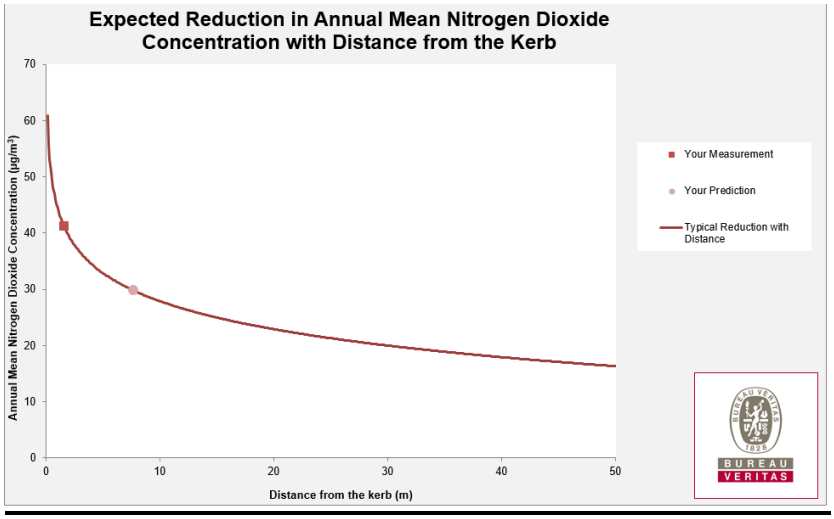
DAC/02



Carm/083



Carm/ELR1



Appendix G: Carmarthenshire 2017 AQ Screening Review Report

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

2017 Carmarthenshire AQ Screening Review Report

(October 2018)

Lisa Jones – Environmental Health Practitioner

Contents

1.0 Purpose of Report

This report reviews the 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. These areas included Genwen Farm in Bynea, Old Road, Llanelli, Abergwili (Carmarthen), Garnant where road calming measures have been introduced and a site near to a new Petrol Station based on the Asda Superstore site in Llanelli. This report also summarises the findings of the screening exercise carried out at sites set up around the proposed Economic Link Road in Cross Hands, to determine the impact on 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 reacts to concerns about specific enquiries relating to traffic pollution that may be causing elevated levels of pollution in distinct areas. During 2017 three such concerns were made known to the division for Old Road, Garnant and Abergwili and a screening exercise for each location was initiated. 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 technical guidance TG (09) requirements. The tube preparation, supply and analysis was performed by ESG Didcot Laboratory and the preparation method is acetone:triethanolamine 50:50.

3.0 Genwen Farm, Bynea

Following receipt of a planning application in 2016 to construct 240 residential properties at Genwen Farm, Bynea, Llanelli. An air quality impact assessment was carried out by the applicant as part of the planning process and this

determined a negligible impact. However, due to the size of the development it attracted a number of objections from members of the public raising concerns about air quality in the area. Therefore a traffic count assessment was carried out and the results are shown in Tables 1 a, 1b and 1c below. A location map is shown in Appendix 1.

Traffic Counts for Genwen Farm Development - Bynea

Table 1a – Station Road (bottom of – near No. 4)

Date	Time	North			South			Total	AADT	>35
		HGV	LDV	Car	HGV	LDV	Car	2-way	(x143) 5 min	Yes / No
07/06/17	14.45	0	3	4	0	3	3	13	1859	NO
14/06/17	14.59	0	1	7	0	1	8 #	18	2574	NO
20/06/17	12.21	0	0	10	0	0	3 #	14	2002	NO
							Average		2145	**NO**

Table 1b – Heol Y Mynydd (north of Genwen Road – near No. 11)

Date	Time	North			South			Total	AADT	>35
		HGV	LDV	Car	HGV	LDV	Car	2-way	(x143) 5 min	Yes / No
07/06/17	15.11	0	7	12	0	1	15	35	5005	YES
14/06/17	14.38	0	3	14	0	2	6	25	3575	NO
20/06/17	12.00	0	1	8	0	0	14 #	24	3432	NO
							Average		4004	**NO**

Table 1c – Genwen Road (East of site access points – near No. 9)

Date	Time	East			West			Total	AADT	>35
		HGV	LDV	Car	HGV	LDV	Car	2-way	(x143) 5 min	Yes / No
07/06/17	15.42	0	2	7	0	1	5	15	2145	NO
14/06/17	14.48	0	0	3	0	0	2	5	715	NO
20/06/17	12.07	0	0	2	0	0	2	4	572	NO
							Average		1144	**NO**

Notes:
Motorbike
Coach

It can be seen from the results that neither location exceeded the guidance value of 5000 AADT, therefore it is unlikely that traffic pollution is a significant concern in this area. Based on these figures, it is not recognised that there is any need to monitor levels of Nitrogen Dioxide is this area at this current moment in time.

4.0 Abergwili (Carmarthen)

Abergwili is located on the north east corner of Carmarthen with a number of roads dissecting the village. There are a number of properties at the northern tip of the village that are located in close proximity to the Carmarthen bypass that lies to south of the town. 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 has 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. 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/141)

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	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	16.93
Carm/140	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	16.17

The screening results demonstrate concentrations of Nitrogen dioxide far below the annual Air Quality objective of 40µg/m^3, as both sites reported a concentration level below 17µg/m^3. 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 Old Road

Old Road in located in Mount Pleasant, Llanelli near the Town centre and within the Llanelli AQMA boundary to the South of the County. It joins onto Felinfoel Road/Thomas Street on the A476 before the Gelli Onn junction to the South and leads towards Stradey Road at the northern end. The A476 is one of the main roads that travels through Llanelli including residential areas and where it leads into Thomas Street and meets the Gelli-Onn junction. The traffic lights can create congestion and air quality concerns in Felinfoel Road where the layout of the properties creates a canyon effect.

Old Road itself is largely a residential area with a Primary School located on it. The speed limit for this road is set at 20Mph.

A complaint was received about the traffic and speed of vehicles using Old Road and therefore concerns raised about its air quality. A diffusion tube was located in Old Road to monitor levels of Nitrogen Dioxide referenced Llanelli – 3 Old Road (Carm/141). The location can be found on the map on Appendix 3 and details of the tube site is given in Table 3a & 3b below.

Table 3a – Diffusion Tube Location Checklist for Old Road

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
3 Old Road	Y	N	N	Y	Yes	N/A

Table 3b – Diffusion Tube Site Details for Old Road

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
3Old Road, Llanelli	Carm /141	2.85	1.50	0.00	250649	200786

Traffic counts were performed on Old Road between 15th and 21st July 2017 and the results are detailed below in Table 3c below, the location is illustrated at site 49 on the map provide in Appendix 3.

Table 3c - Traffic Counts for Old Road, Llanelli (Site 49)

Date	Day	North					South					Total AADT 2-way	>5000 Yes / No
		HGV	LDV	Bus	Car	Motorcycle	HGV	LDV	Bus	Car	Motorcycle		
15/07/17	Mon	30	381	0	4481	34	5	30	0	467	10	5438	YES
16/07/17	Tues	22	350	2	4315	26	6	24	1	444	13	5203	YES
17/07/17	Wed	24	358	3	4356	20	5	35	0	451	3	5255	YES
18/07/17	Thurs	18	350	1	4433	25	5	25	0	456	16	5331	YES
19/07/17	Fri	27	342	5	4464	8	7	36	1	595	5	5490	YES
20/07/17	Sat	20	179	2	3473	8	3	14	0	373	1	4073	NO
21/07/17	Sun	14	131	1	2870	13	4	12	0	280	5	3330	NO
		Total Northbound 30786					**Total Southbound 3334**			5 Day Average		5343	**YES**
										7 Day Average		4874	**NO**

The overall mean speed of the vehicles for two-way traffic was 22Mph, with 22Mph Northbound and 20.4 Southbound. This is surprising given that Southbound is downhill, however 90% of the vehicles using this road travel Northbound as there is a no entry sign at the Northern end of this road, so any vehicle travelling Southbound would have to enter via one of the side streets.

As can be seen from the results the 5 day average exceeded the guidance value of 5000 AADT and the 7 day average was just below the guidance value. It would seem prudent to determine that there is potential that traffic pollution is a significant concern in this road. The road remains busy throughout the day and night by cars as it acts as a shortcut for journeys heading towards Pontyates and Trimsaran.

The Nitrogen Dioxide diffusion tube screening exercise was carried out for 11 months and captured 10 months of valid data. The raw data and annual mean is detail in Table 3d below. The screening exercise reported a bias adjusted annual mean concentration of 30µg/m^3 which is below the Annual Air Quality Objective of 40µg/m^3.

Table 3d: Monthly monitoring results for Old Road, Llanelli (Carm/141)

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/141	-	45.1	46.4	36.4	32.0	33.1	-	30.0	32.9	39.9	50.4	43.6	38.98	30.0

The screening exercise reported a bias adjusted annual mean concentration of 30µg/m^3 which is below the Annual Air Quality Objective of 40µg/m^3. However, some high results were seen during some individual months. In addition, the average daily traffic count is very close to guidance value and the road is situated within our Air Quality Management Area. It would seem appropriate to continue with the screening exercise in this road, to monitor any changes and any impacts that further developments may have, particularly as

work is progressed to deliver improvements to this area through the Llanelli Action Plan.

6.0 Asda PFS (Llanelli)

As part of site improvement work at the Asda Store in Llanelli it was proposed to install an unattended petrol filling station within the existing car park. This would require the removal of a number of parking spaces and works to install the PFS. As part of Planning Consultation a number of objections were received alleging the development would cause more traffic to visit the site and extra congestion, which was already considered a problem.

A complaint was received saying that the extra vehicles would increase air pollution in the area and that would impact on public health. An air quality assessment was requested through the planning process which identified no significant impacts. Previous air quality monitoring within the area had not identified any breach of the nitrogen dioxide air quality objective. However, the location of the PFS was just inside the boundary of the recently issued Llanelli AQMA. It was therefore decided to carry out a screening exercise next to the closest location opposite the site entrance.

No traffic counts were performed but a location map is shown in Appendix 4. A diffusion tube was set up at 3 Bres Road, Llanelli, details of which can be seen in Table 4a and 4b below.

Table 4a – Diffusion Tube Location Checklist for 3 Bres Road

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
2 Bres Road, Llanelli	Y	N	N	N	N/A	901 2578

Table 4b – Diffusion Tube Site Details for 3 Bres Road

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
2 Bres Road, Llanelli	Carm /138	2.88	9.50	0.50	250781	200142

Monitoring started in January 2017 for a period of 12 months. The monthly monitoring results are shown below in Table 4c below.

Table 4c – Monthly monitoring results for 2 Bres Road, Llanelli (Carm/138)

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/138	36.8	25.2	20.9	13.7	13.0	10.4	10.4	10.7	16.3	16.1	26.2	21.7	18.45	14.21

The screening results demonstrate concentrations of Nitrogen dioxide far below the annual Air Quality objective of 40µg/m^3, reporting a concentration level of 14µg/m^3. This indicates that the introduction of a petrol station in the area is unlikely to pose any significant risk of elevated pollution levels. No monitoring will continue on this site.

7.0 Garnant

Garnant is located a few miles east of the town of Ammanford close to the eastern border of the county on the A474. The road provides a link across the valleys just below the Black Mountains. Local concerns about road safety resulted in traffic calming measures being introduced which have consequently led to complaints about the effects on air quality due to vehicles slowing down and speeding up again. Colleagues in the Road Safety Unit requested if an air quality screening exercise could be performed to ascertain if there was any issues.

No traffic counts were performed but a location map is shown in Appendix 5. A diffusion tube was set up in Cwmamman Road, details of which can be found in Table 5a and 5b below:

Table 5a Table 3 – Diffusion Tube Location Checklist for Cwmamman Road

Tube Location	Free Air Y/N	Vegetation Y/N	Flues Y/N	Consent Required Y/N	Consent Obtained Y/N	Lamp Post No.
74 Cwmamman	Y	N	N	Y	Y	N/A

Road, Garnant						

Table 5b – Diffusion Tube Site Details for Cwmamman Road

Tube Location	Tube Id	Height (m)	Distance from kerb (m)	Distance to receptor (m)	X	Y
74 Cwmamman Road, Garnant	Carm /137	2.73	4.05	0.00	268951	213111

Monitoring started in January 2017 for a period of 6 months. The monthly monitoring results are shown below in Table 5c below.

Table 5c – Monthly monitoring results for Cwmamman Road, Garnant (Carm/137)

Site ID	NO_2 Mean Concentrations (µg/m^3)								
	Jan	Feb	Mar	Apr	May	Jun	Annual Mean		
							Raw Data	Bias Adjusted (factor) (0.77)	Bias adjusted and annualised
Carm/137	37.8	28.8	25.1	15.3	17.7	11.4	22.68	17.5	16.1

It was only feasible to capture just six months of data for the year between January and June 2017 and therefore it is considered appropriate to annualise the data in order to obtain the predicted annual mean NO_2 figure that may have been obtained had the monitoring taken place for the full year.

The annualised result was 16µg/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 (2017) for use with the 2018 Progress Report.

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.

A screening exercise was set up and started in May 2017, capturing 8 months of data. 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 a location map is shown in Appendix 6. 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/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/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
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
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.

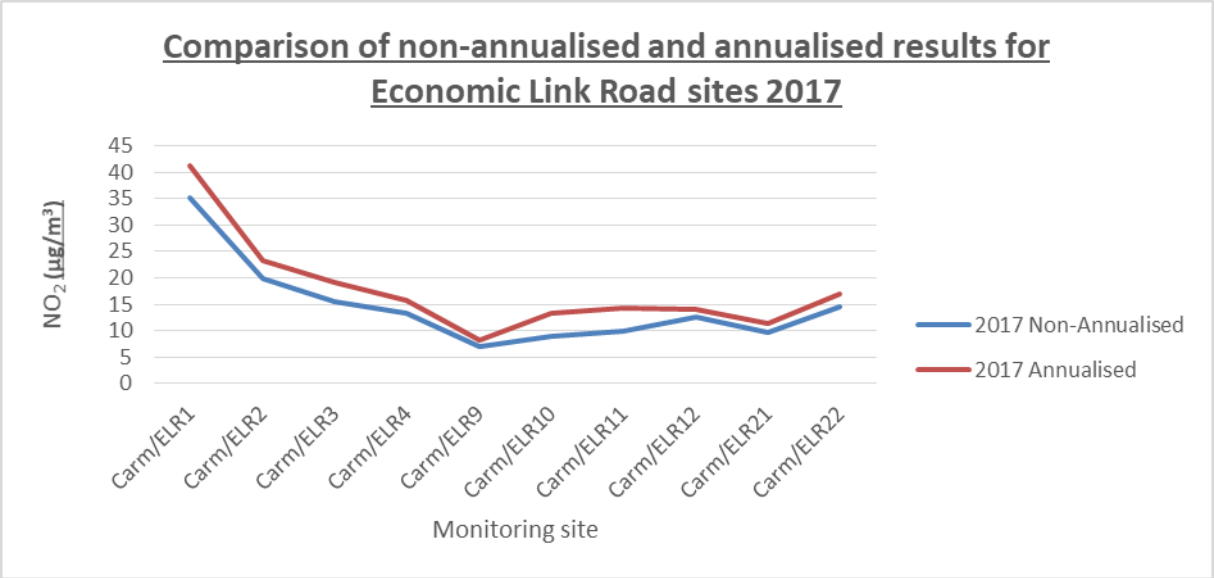
Table 6c – Monthly monitoring results for Economic Link Road sites

Site ID	NO_2 Mean Concentrations (µg/m^3)											
	May	June	July	August	September	October	November	December	Annual Mean			
									Raw Data	Bias Adjusted (factor) (0.77)	Bias adjusted and annualised	Distance corrected to nearest exposure
Carm/ELR1	44.7	43.8	38.7	40.8	42.7	44.9	61.7	49.7	45.9	35.3	41.3	29.8
Carm/ELR2	23.1	24.0	22.7	24.5	25.4	27.8	32.0	27.4	25.9	19.9	23.3	-
Carm/ELR3	19.7	17.2	14.4	14.4	21.4	-	33.9	-	20.2	15.5	19.1	-
Carm/ELR4	15.3	13.0	12.6	11.7	16.3	19.2	28.9	22.4	17.4	13.4	15.7	-
Carm/ELR9	8.0	6.4	5.5	5.5	8.4	10.4	16.5	12.3	9.1	7.0	8.2	-
Carm/ELR10	12.9	10.8	-	11.4	-	-	-	-	11.7	9.0	13.3	-
Carm/ELR11	10.1	9.7	8.6	-	11.5	14.0	21.1	14.3	12.8	9.9	10.9	-
Carm/ELR12	13.4	-	11.6	13.2	14.5	17.8	26.4	17.9	16.4	12.6	14.1	-
Carm/ELR21	10.1	9.6	8.5	8.2	13.5	13.4	22.0	15.6	12.6	9.7	11.3	-
Carm/ELR22	18.6	16.9	13.6	14.7	18.0	20.2	28.4	19.7	18.7	14.4	16.9	-

As this screening exercise started in May 2017, it was only possible to capture 8 months of data 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.

The annualised results are listed in Table 6c above. Further details about the approach to annualising this data can be found in the Annualised Data Report (2017) for use with the 2018 Progress Report. A comparison of the annualised and non-annualised data can be seen in the graph below.

Figure 1 – Comparison of Annualised and Non-Annualised data



Only one of these tube sites - Carm/ELR1 exceeded the annual air quality objective of 40µg/m^3, with a reading of 41µg/m^3 when annualised against the local diffusion tube data and 43µg/m^3, when annualised using automatic monitoring data. This site is located near to the Cross Hands roundabout, of which it is hoped the Economic Link Road with relieve congestion in the future. Nevertheless, this is not the worst case scenario because this site is not located at the point of relevant exposure being positioned just over 6 meters away from the receptor.

Further work was therefore calculated to predict the concentration at the receptor using the NO_2 fall of distance calculator provide d by the LAQM helpdesk. The predicted result was 30µg/m^3, which falls significantly below the objective level.

9.0 Results Discussion and Conclusion

From the traffic count data collected it can be seen from the results that it is unlikely that traffic pollution is a significant concern for the Genwen Farm development because it did not exceed the guidance value of 5000 AADT, therefore it is not currently recognised that there is any need to monitor levels of Nitrogen Dioxide is this area.

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 demonstrated low concentrations of Nitrogen dioxide with both sites reporting a concentration level below 17µg/m^3. Nonetheless, 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.

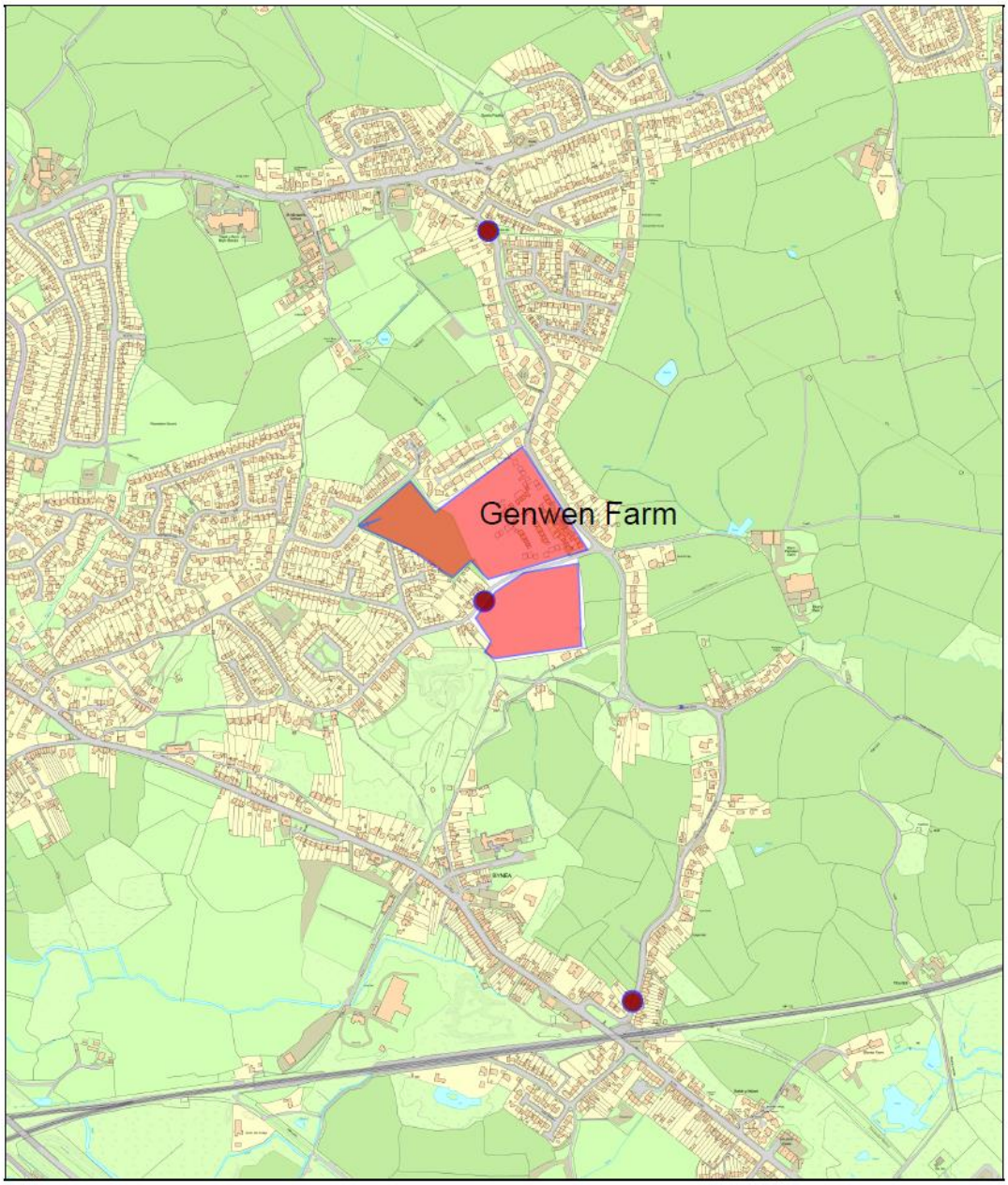
The data of the NO_2 screening exercises illustrates that all of the monitoring sites included in this screening report did not exceed the annual mean Air Quality Objective of 40µg/m^3. Indeed the Asda PFS site and the Cwmamman Road site both reported very low concentrations at 14µg/$m^3$and 16µg/m^3 respectively so it has been decided not to continue with the air quality monitoring at these two locations.

With regard to Old Road Llanelli, however, the screening exercise reported a bias adjusted annual mean concentration of 30µg/m^3 which although is below the Annual Air Quality Objective of 40µg/m^3, the average daily traffic count is very close to guidance value and the road is situated within our Air Quality Management Area. It has therefore been decided appropriate to continue with the screening exercise in this road, to monitor any changes and any impacts that further developments may have, particularly as work is progressed to deliver improvements to this area through the Llanelli Action Plan.

Just one site within the ELR screening exercise reached high levels of concern but this was later reduced to 30µg/m^3 after applying the NO_2 fall off data calculation. The site in question sits along the existing routes surrounding the ELR near to Cross Hands roundabout. It is hoped that the introduction of the new link road will relieve congestion in this area and bring a positive impact for local residents.

Appendix 1 – Genwen Farm, Bynea Location Map

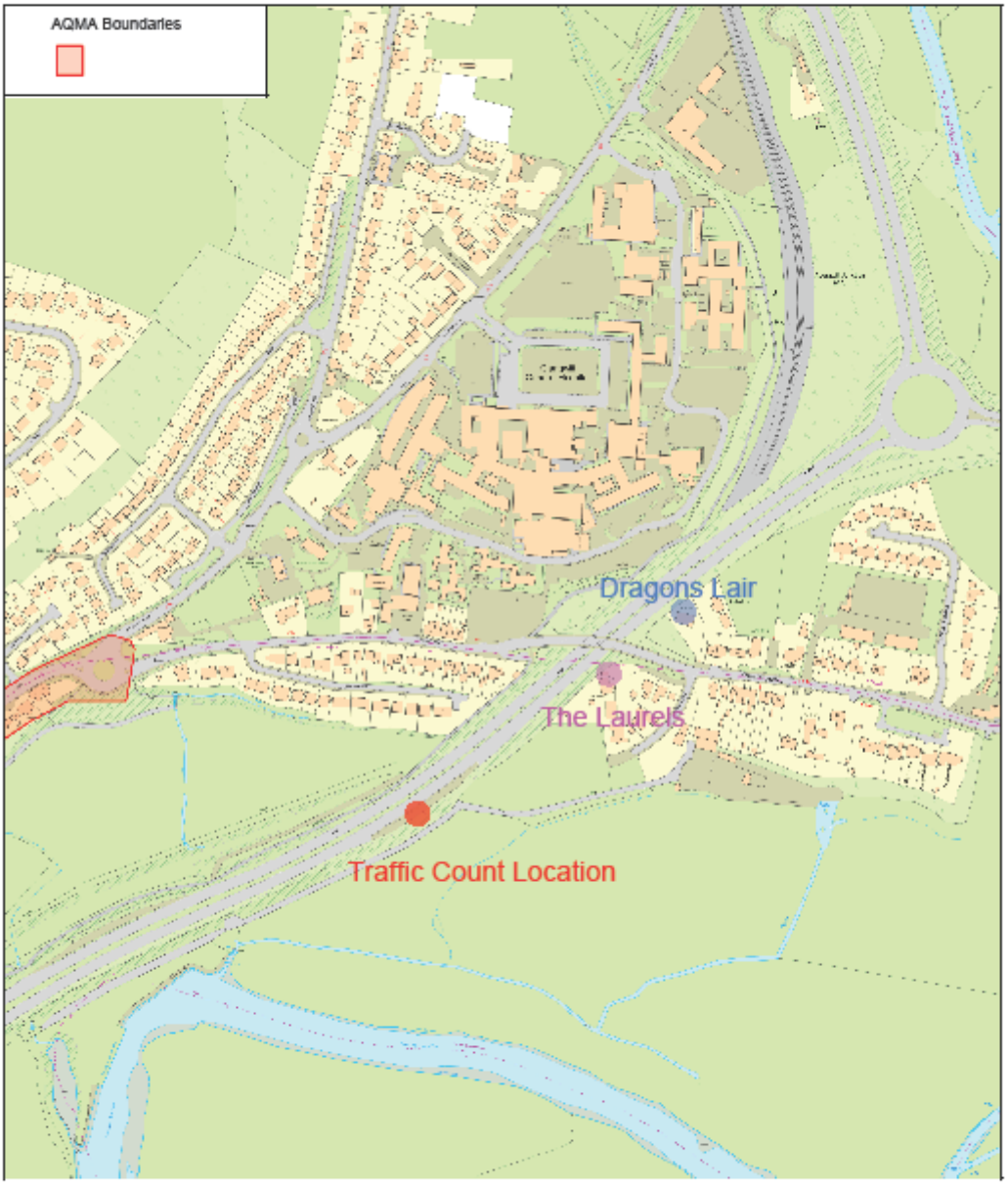
Genwen Farm traffic count points



Appendix 2 – Abergwili Location Map

Sir Gâr Carmarthenshire

Abergwili



0 50 100 150m

Graddfa Scale	Canol y Map Map Centre	Dyddiad Date
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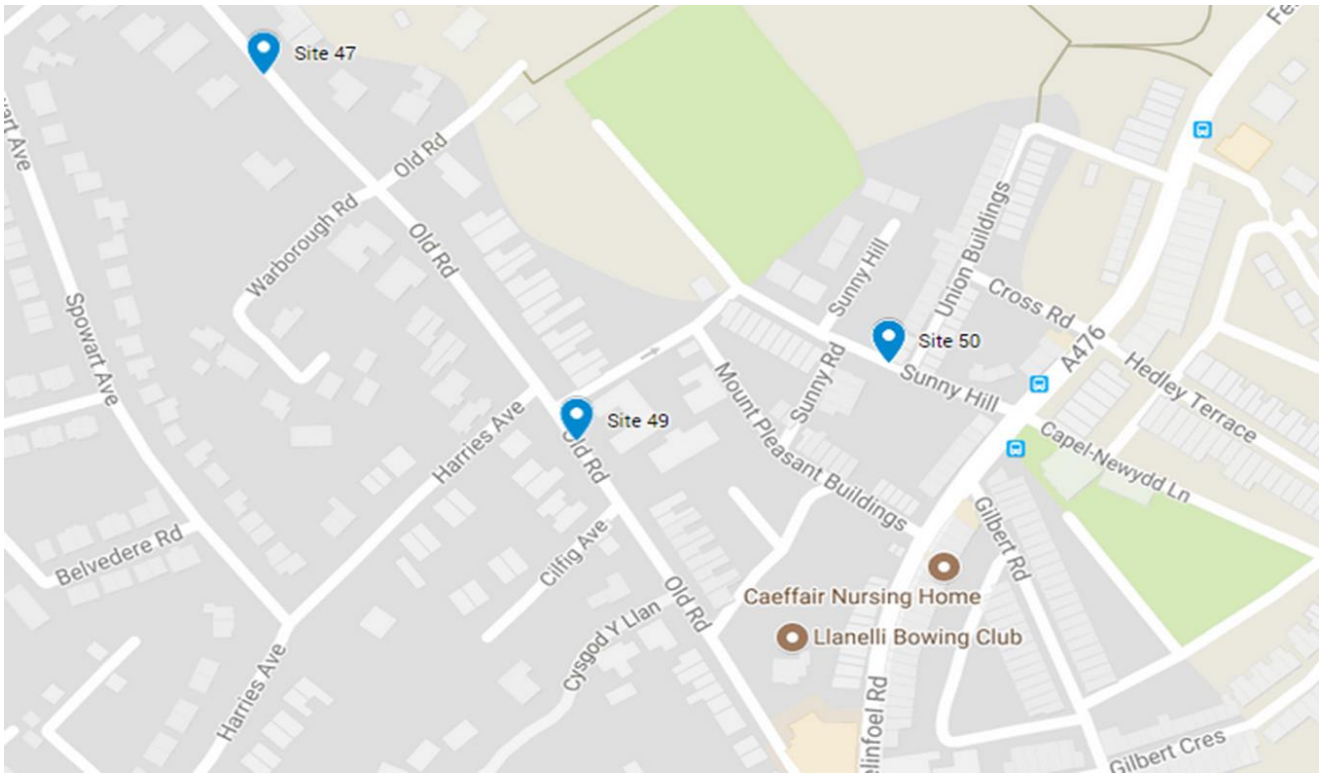
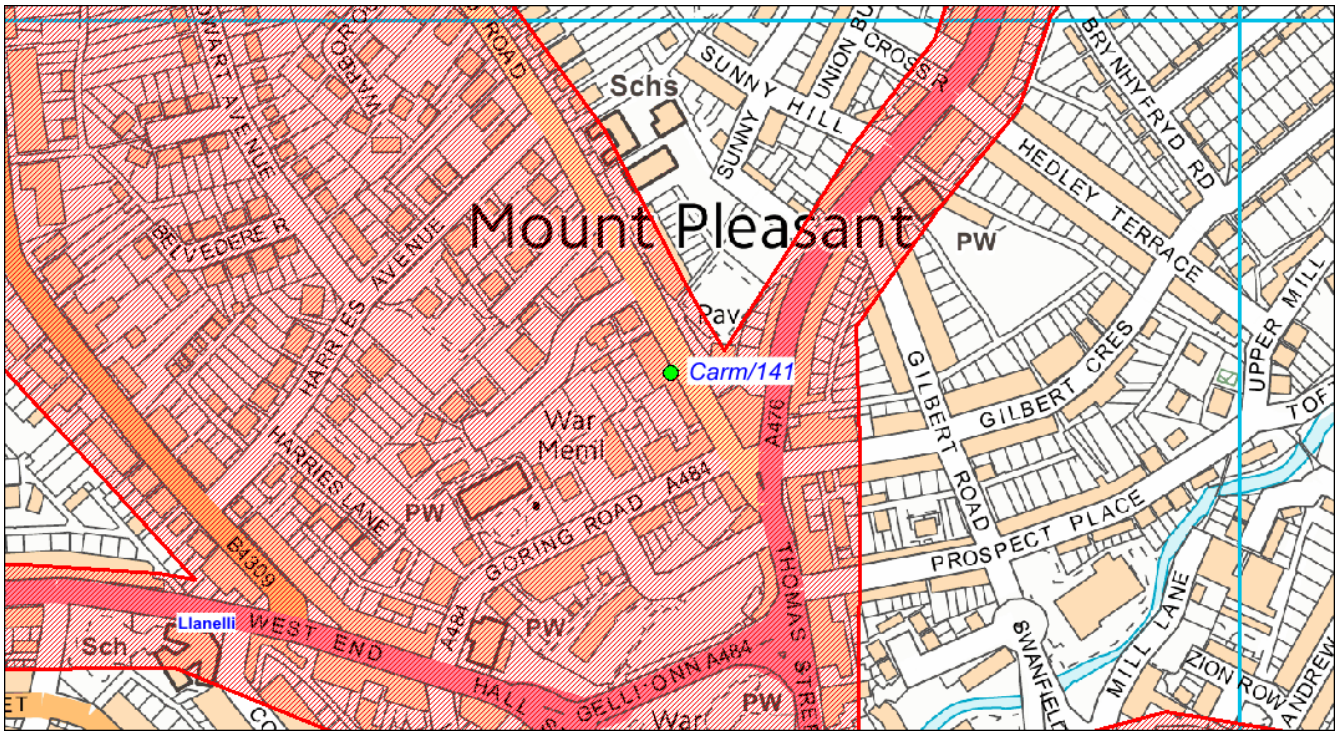
Appendix 3 – Old Road Traffic Count Location Map



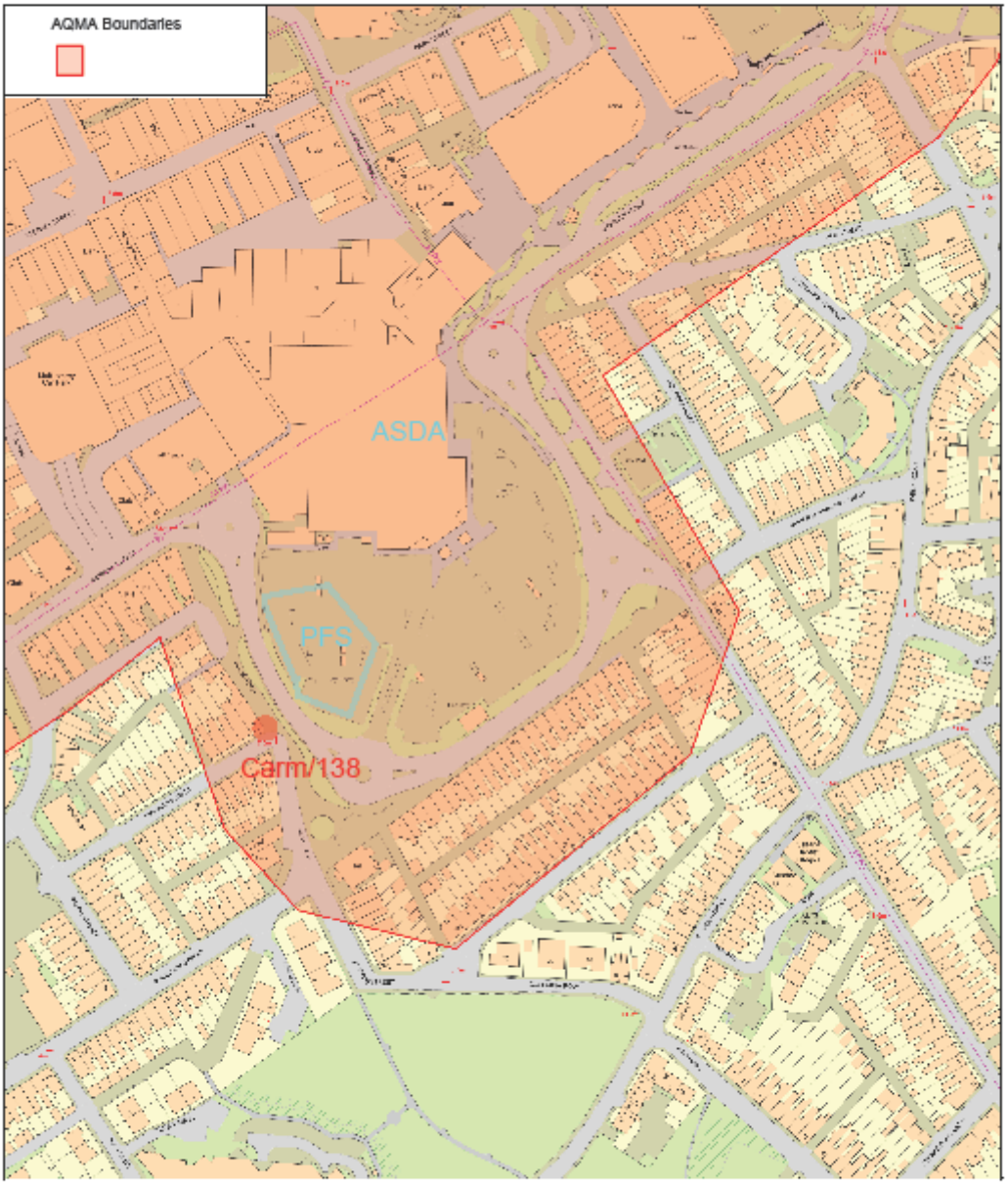
(Traffic Count Location taken from Site 49)

Diffusion Tube location - Llanelli 3 Old Road, Carm/141



Appendix 4 – Asda PFS (Llanelli) Location Map

Asda PFS (Llanelli)



Graddfa Scale	Canol y Map Map Centre	Dyddiad Date
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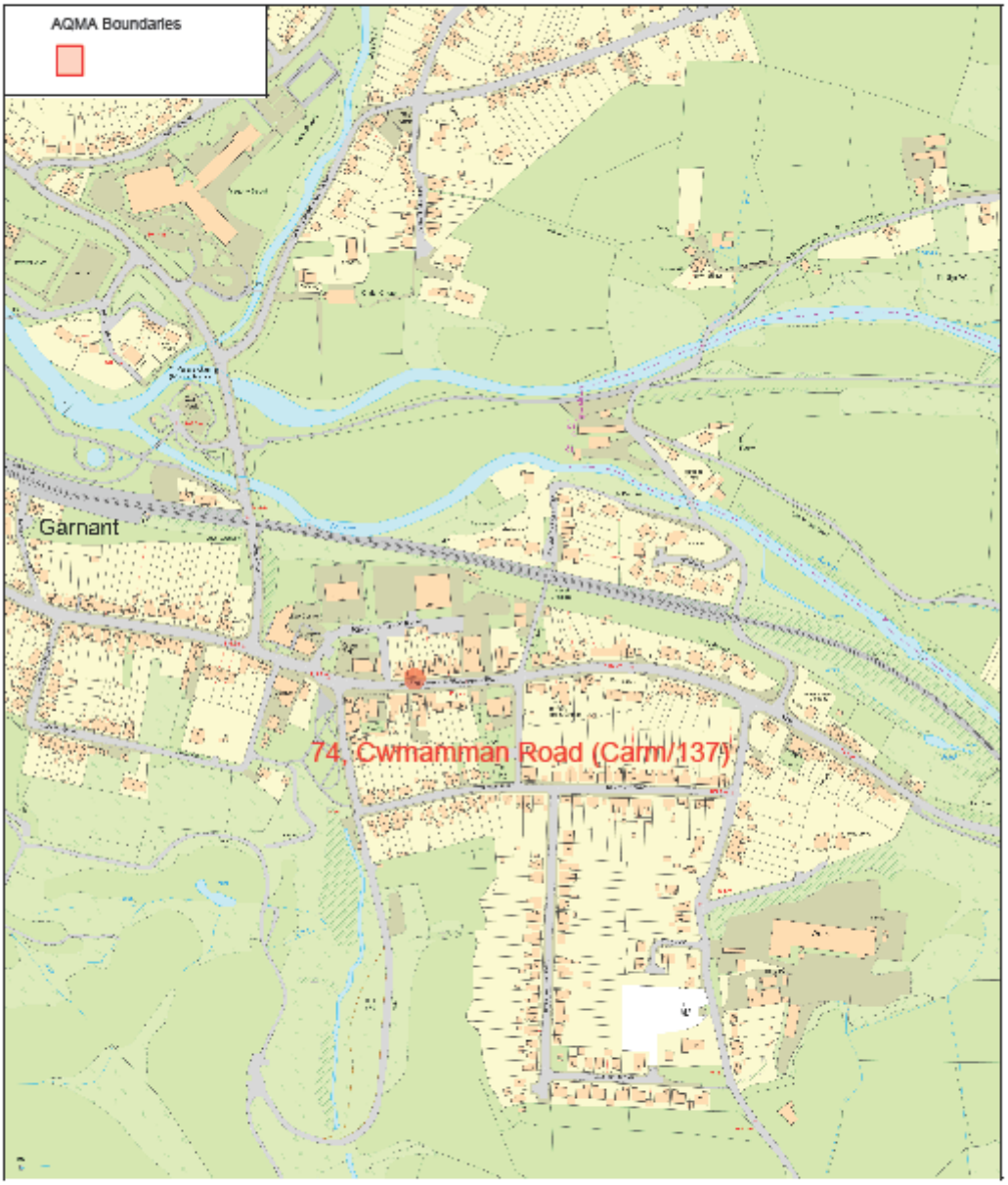
Appendix 5 – Garnant Location Map

Sir Gâr Carmarthenshire

Garnant



Graddfa Scale	Canol y Map Map Centre	Dyddiad Date
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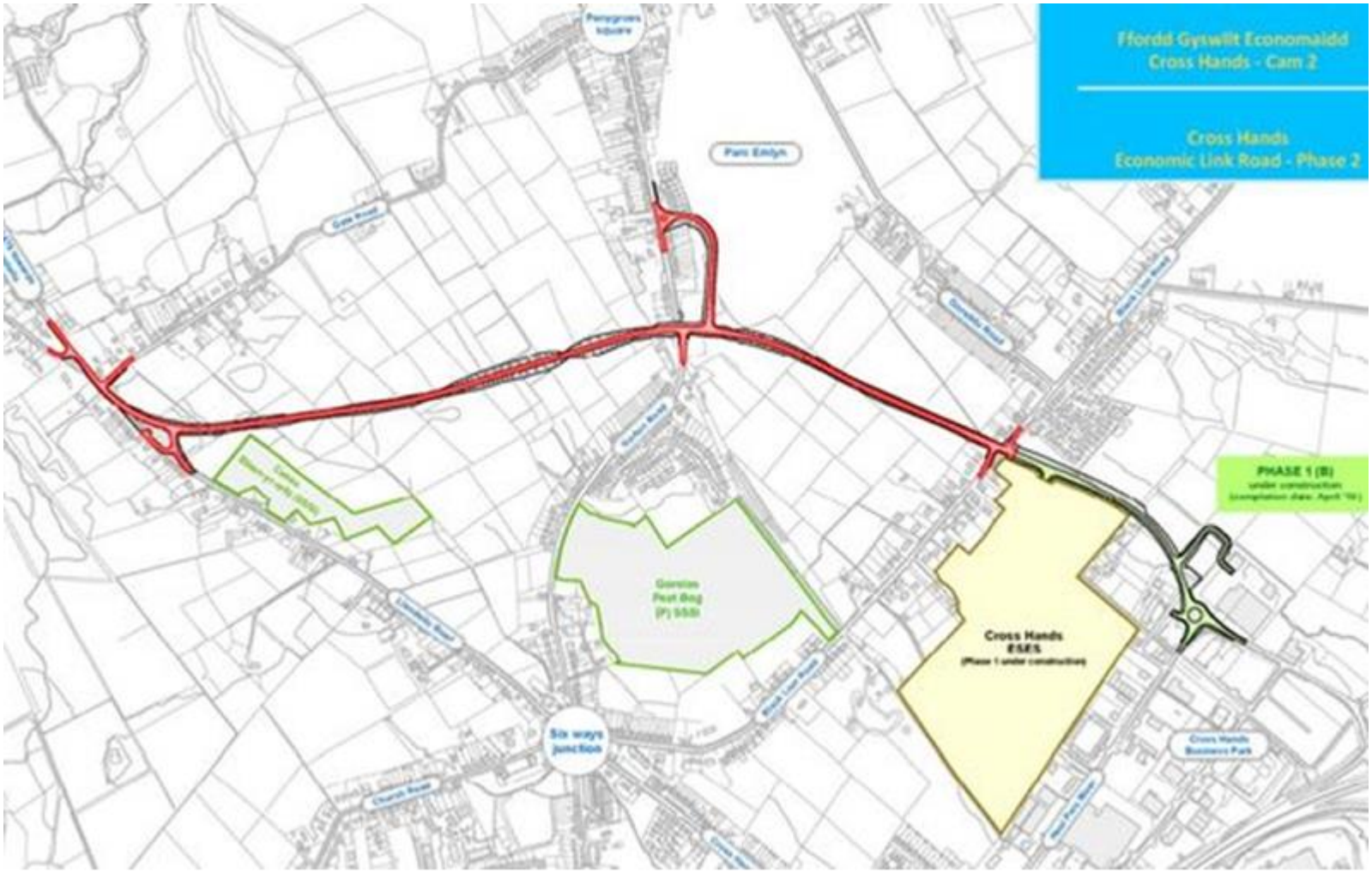
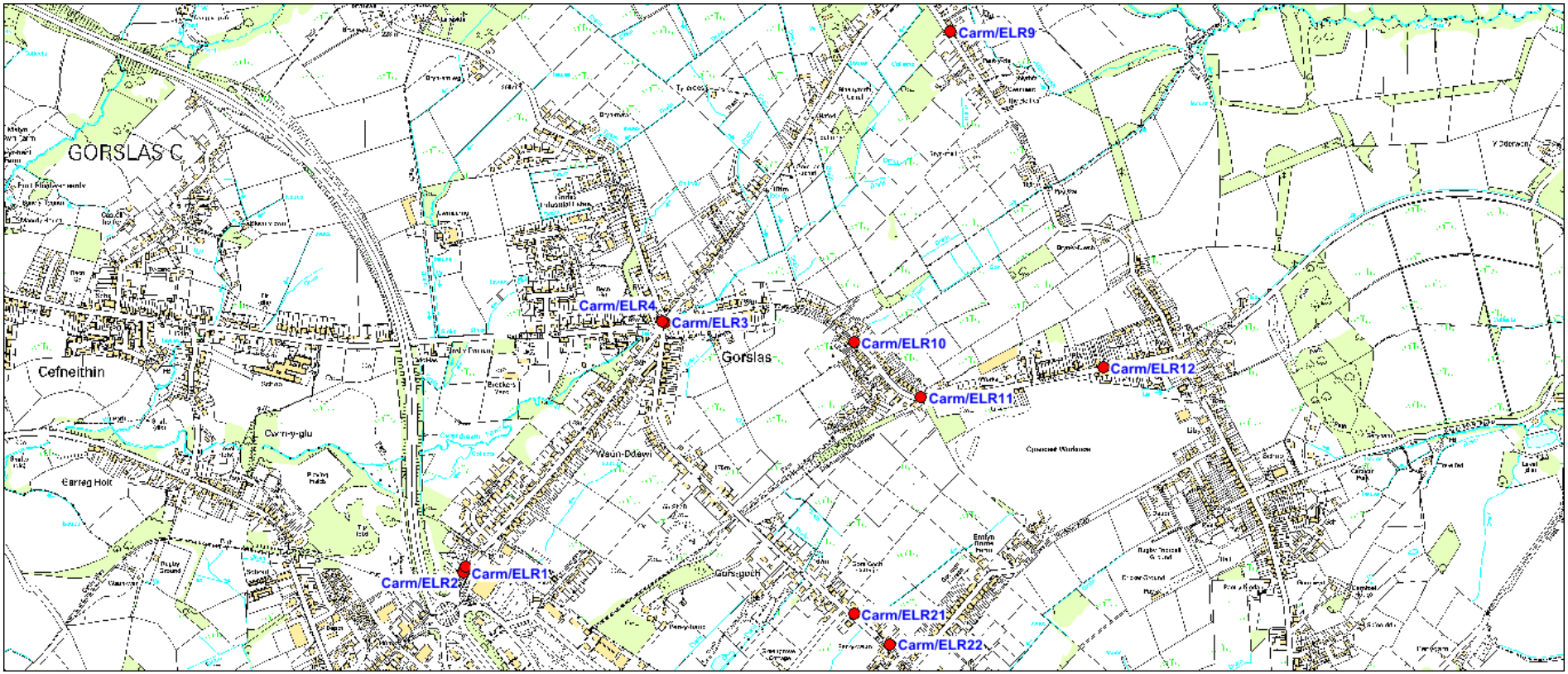
Appendix 6 – Cross Hands Economic Link Road Location Map



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



Appendix H: Llandeilo AQMA Action Plan Feasibility Assessment for Outstanding Phase 1 Options

Carmarthenshire County Council

Environment Act 1995

Local Air Quality Management

2016 Llandeilo AQMA Action Plan
Feasibility Assessment for Outstanding Phase 1 Options

(March 2018)

Llandeilo AQMA Action Planning Group

Contents

1.0 Purpose of the Report

This Report details the feasibility assessments that were performed on the remaining outstanding interventions proposal options from Phase 1 of the Llandeilo Action Plan.

The proposals were generated from the Public Consultation that was carried out as part of the work to formulate the Action Plan. It was made clear in the Action Plan Report, which was written to support the Action Plan, that there was no guarantee that any proposed interventions would be implemented, they were all subject to assessment to determine their feasibility and likely success.

The outstanding options have been subject to initial screening however a more detailed assessment of the practicalities and feasibility of them is required. The outstanding options are listed in Section 2.0 below.

2.0 Phase 1 – Outstanding Intervention Options

All options other than those listed below have either been implemented or not progressed further. Reasons have been outlined in Carmarthenshire's Progress Reports of 2017 and 2016.

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.

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.

21 – Publicise alternative routes (possibly through haulage associations) to destinations north of Llandeilo so that vehicles can avoid the town.

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.

C4 – Assess feasibility of a six month trial of HGV diversion away from the town (except for deliveries).

3.0 Phase 1 – Outstanding Interventions Feasibility

Options C1 and C4 are very similar in nature and would both require a similar range of assessment criteria for determining their feasibility, therefore it would make sense to look at the two proposals together.

Option 21 has similarities to C1 and C4 but would require some different considerations so will be dealt with separately. Likewise, options 8 and 9 are sufficiently different to warrant their own assessments.

3.1 Proposals C1 and C4

These two proposals effectively require the re-routing of some, or the majority, of HGV vehicles on to alternative routes that do not pass through the town of Llandeilo. It must be remembered that the A483 that passes through Llandeilo is part of the main trunk route between Manchester and Swansea.

As the road through Llandeilo is a trunk route if falls under the responsibility of the South Wales Trunk Road Agent (SWTRA) who maintain and operate the route on behalf of Welsh Government. As such, SWTRA would have the responsibility for the re-routing of any vehicles off of the route. In doing so, they could only reasonably require re-routed vehicles to use alternative trunk routes. To achieve this requires a number of steps and which result in a range of ramifications which are discussed later.

However, to provide an idea of what the re-routing would require, Figure 1 below shows the road network for the area with Llandeilo in the top right corner and the route effectively from north to south travelling through the town. The only available alternative ‘trunk’ route would require a diversion (if travelling from the north) to right just before Llandeilo on to the A40. Travelling west to the town of Carmarthen but using the eastern bypass to negotiate down to the A48 before heading east along the A48 as far as junction 49 of the M4 motorway.

Sir Gâr Carmarthenshire Road Network

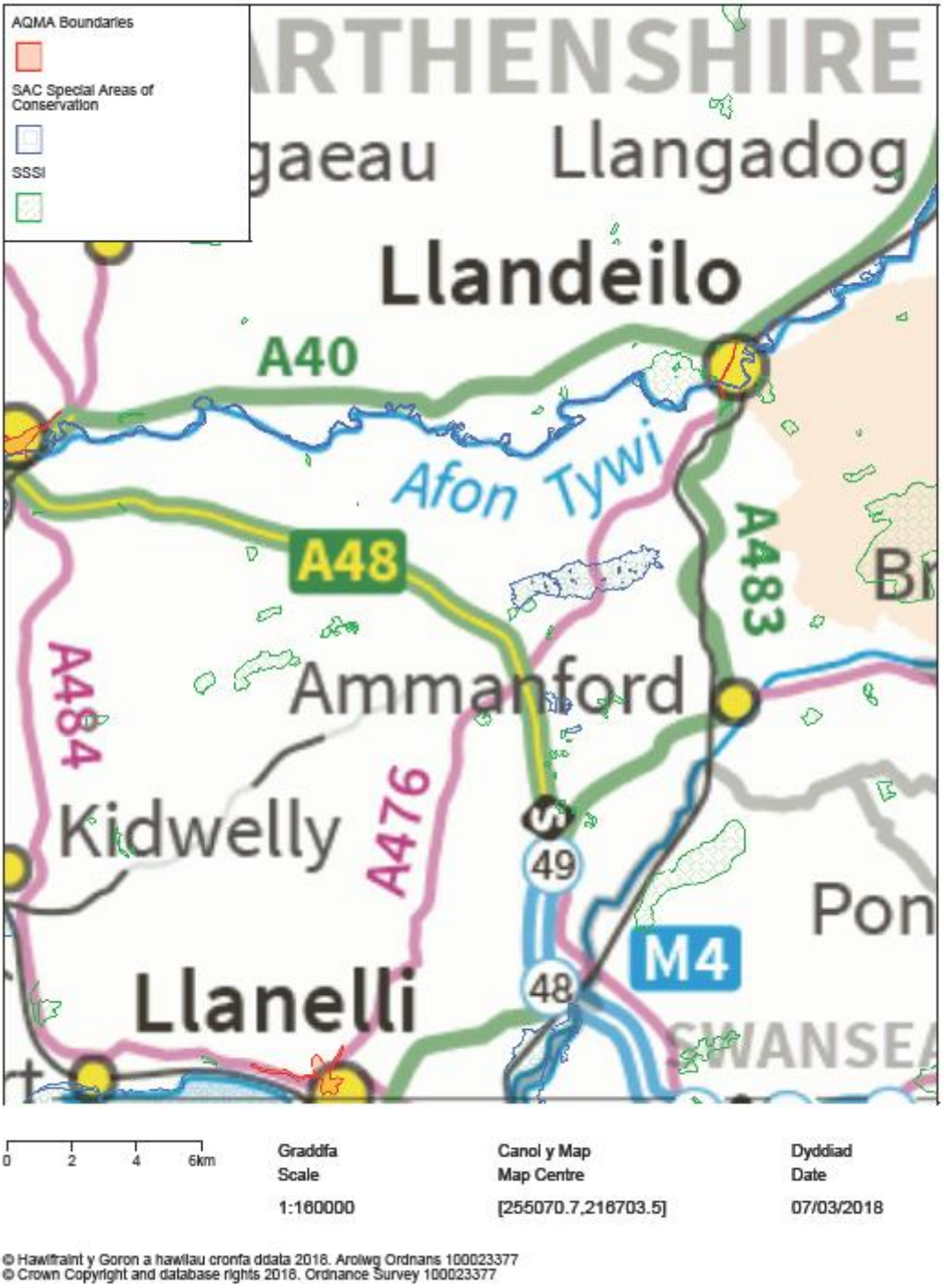


Figure 1 – Road Network

This diversion route is approximately 30 miles and would take about an hour to travel depending on road and traffic conditions. The extra mileage, compared to the north-south A483 route would be approximately 18 miles extra.

A meeting was held to discuss these proposals with South Wales Trunk Roads Agency in January 2018, and, it is clear that these options would result in unfavourable consequential affects, namely, but not limited to:

- The imposition of a weight restriction on the bridge located to the south of Rhosmaen Street, or the diversion of HGVs would require a Traffic Order from Welsh Government. It is highly likely that such an order would receive very strong opposition from hauliers and others, due to the significant additional fuel, time and other associated costs involved in the additional 36 miles associated with a return journey. This distance would be for those hauliers already travelling from the M4 motorway;
- There are known hauliers that already exist on the A483 to the south of Llandeilo. For these, the additional mileage to travel in the opposite direction to joining the alternative route would be significant;
- Enforcement – the imposition of a Traffic Order would need significant enforcement if it were to succeed. It is not clear that the required resources would be available for this;
- In line with the principles of the Wellbeing of Future Generations (Wales) Act 2015, the additional mileage required for these options could not be considered a sustainable and environmentally conscious option;
- Displacement – the alternative route would displace HGV's onto other roads, thereby increasing noise and pollution in existing villages and hamlets along the diversion;
- Logistics of deliveries being made to the Town of Llandeilo – the imposition of a weight restriction and / or a HGV diversion would not facilitate deliveries;
- The weight restriction and / or diversion would have a negative impact on bus services, which in turn may have an impact on social mobility.

3.2 Proposal 21 – publicise alternative routes

Many of the issues highlighted in 3.1 above apply to this proposal also, however, it would relate to all vehicles. As this would not be a traffic order related measure, the publication of alternative routes would be in an informative / advisory capacity. There are currently very few suitable alternative routes allowing for the circumvention of Rhosmaen Street, Llandeilo. The temporary closure of the road in 2013 highlighted

this and displacing vehicles on the narrow roadways only moved the air quality and noise issues elsewhere. Using alternative routes also impacted negatively on the road infrastructure, which is not designed or capable of dealing with the additional amount of traffic.

It is an unrealistic view that road traffic would use any of the currently available routes on a voluntary basis, and those that did would result in a negligible positive impact on Air Quality.

3.3 Proposal 8 – promote cycling and walking to school

There is no Active Travel plan for the Town of Llandeilo, however, the Towy Valley Cycle Path is a future development that will very much facilitate cycling as a viable mode of transport. It will, however be another 18 – 24 months before delivery of this phase commences.

There have been no suitable developments in the area that could provide a mechanism for safe routes to school, but if an opportunity arises where facilities can be put in place (such as improved lighting / footpaths etc) they will be explored.

Links with a school in the area have been forged, and officers have attended the school to discuss opportunities for walking / cycling to school. Projects such as the Living Streets campaign have been highlighted to the school. To date there seems to have been little appetite to significantly change school transport related behaviours in the area, and there is certainly no indication that improvements to Air Quality have been achieved due to this so far.

3.4 Proposal 9 – Promote car sharing to work/school

Car sharing is primarily publicised by Carmarthenshire County Council by signposting to the Share Cymru website. There are no known specific schemes for the Town of Llandeilo.

The table on p9 demonstrates increased usage of the Train Station at Llandeilo, but it is not known if those passenger numbers are commuting to/from work/school, and if so, whether car sharing features on part of their onward journey. It is therefore difficult to attribute any impact on Air Quality from this measure.

4.0 Pre-Action Plan Intervention

4.1 Llandeilo Train Station Improvements

The train station usage data has been reviewed and the 'All Passenger Numbers' figures from 2009/10 to 2015/16 are detailed below in Table 3.

Report Year	All Passenger Numbers (Access/Exit)	
	End of previous	End of reported
2009 / 10	13760	13656
2010 / 11	13656	14518
2011 / 12	14518	15338
2012 / 13	15338	16368
2013 / 14	16368	15786
2014 / 15	15786	17386
2015 / 16	17386	17562
2016 / 2017	17562	18764

The data suggests that the passenger numbers for the station are gradually increasing over the years.

References

Air Quality Management Areas: Turning Reviews Into Action (NSCA) – National Society for Clean Air and Environmental Protection

Carmarthenshire County Council – Llandeilo AQMA Action Plan

Carmarthenshire County Council – 2015 Llandeilo Action Plan First Review (2016)

Carmarthenshire County Council – 2015 Llandeilo Action Plan Second Review (2017)

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

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

http://orr.gov.uk/statistics/published-stats/station-usage-estimates

https://sharecymru.carbonheroes.com/ShareCymru.aspx

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

Appendix 1 – Llandeilo AQMA Action Plan - Phase 1 (Short Timescale and Easy Feasibility)

Proposal No.	Proposal Description	Predicted Reduction in NO_2 ($\mu g/m^3$)	Estimated Cost	Lead	Consequential Effects
3a	Assess and reduce parking provision along Bridge Street if possible. [Gerwyn's Fruit & Veg]	1 - 2	£15K	WG / SWTRA	Possible –ve impact for Fruit & Veg shop. Residents may also complain about removal of parking provision. The removal of parking provision will result in a negative economic impact on local Business.
3b	Assess and reduce parking provision along Rhosmaen Street if possible. [St Teilo's Church].	1 - 2	£15K	WG / SWTRA	May cause issues for grounds maintenance vehicle parking in respect of Park/Church grounds/people visiting graves.
3c	Assess and reduce parking provision along Rhosmaen Street if possible. [Cawdor Hotel].	3 - 5	£15K	WG / SWTRA	May cause issues for hotel deliveries/taxi waiting area/guests dropping off luggage. The removal of parking provision will result in a negative economic impact on local Business.
3d	Assess and reduce parking provision along Rhosmaen Street if possible. [Opposite Principality Building Society].	1 - 2		WG / SWTRA	Could be +ve impact for keeping traffic flowing but issues for removal of disable parking/loading and short stay bays. The removal of parking provision will result in a negative economic impact on local Business.
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	?		WG / SWTRA CCC	+ve impact with improved use of on street parking. This is likely to move the issue of poor air quality elsewhere within the town of

	Rhosmaen Street and supplementing Crescent Road car park.				Llandeilo, and into residential areas. Also likely that people will continue to risk parking contraventions by parking on Rhosmaen Street, thereby making this option ineffective.
C3	Assess parking charges in the town to determine any benefits from reduction or removal of charges particularly to encourage more appropriate parking.	?		CCC	Limited potentials for air quality improvement. The car parking strategy helps to manage demand for highway space. If the reduction in car parking fees occurs, and results in the car parking facility being over-subscribed, this could lead to increased journeys being made within the Town as vehicles look (or wait) for spaces to become available. This would have a negative affect on Air Quality.
7	Look at possibility of service delivery to rear of business premises rather than along Rhosmaen Street.	3 - 4	Not known – feasibility study.	CCC	Should be +ve impact but limited number of businesses that may be able to adopt.
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.	?	£15K	CCC	+ve impact, although road safety issues need to be taken in to account. The A483 Swansea to Manchester route is a Trunk Road that has a higher incidence of HGV's using it. Encouraging children to travel on or in close proximity to this route is likely to increase the risk of road traffic incidents occurring. Both schools in the area also have wide catchment

					areas, which means increased journey times, making walking or cycling to school unrealistic due to journey constraints.
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.	?	Minimal publicity costs	CCC	+ve impact.
11	Improve parking issues on the street with additional or more frequent enforcement.	2 - 3	Cost neutral	CCC	+ve impact and will improve traffic flows.
20	Identify if bus stops along the street can be improved to allow free flow of traffic.	?	£5K	CCC with WG / SWTRA	Assessment of bus stop locations will already have been made, particularly from the road safety perspective. May be very limited options, if any.
21	Publicise alternative routes (possibly through haulage associations) to destinations north of Llandeilo so that vehicles can avoid the town.	?	£10K	CCC with WG / SWTRA	Road signage alerting for Rhosmaen Street road closure highlighted there was little if any reduction in vehicle numbers. The A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available to publicise as alternatives. Very likely that any alternative routes that are publicised would be uneconomical, both financially and in terms of travel times, and that they would

					therefore be ignored, making this option ineffective.
22	Identify peak use of the road e.g. school run, mart days and markets – then target improvements / restrictions / alternative routes during these times.	?	£5K	CCC with WG / SWTRA	Potential +ve impacts but may be logistically difficult to achieve.
C4	Assess feasibility of a six month trial of HGV diversion away from town (except for deliveries).	?		CCC with WG / SWTRA	Potential +ve impacts for AQ. Trial period would have to cover spring/summer or summer/autumn to determine effect on air quality with data then annualised to predict annual data. Problems with enforcement of the diversion may question the effectiveness of the trial. The A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available as alternatives. Very likely that any alternative routes would be uneconomical, both financially and in terms of travel times, and that they would therefore be ignored, making this option ineffective.
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.	Need to review traffic data and base prediction on % vehicles removed.		WG / SWTRA	Potential +ve impacts but may cause problems for business deliveries, additional business transport costs, sustainability concerns. The A483 Manchester to

					Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available as alternatives. Very likely that any alternative routes would be uneconomical, both financially and in terms of travel times, and that they would therefore be ignored, making this option ineffective. Also problems with the enforcement of this option.
Phase 1 – Options assessment and implementation (where possible) within 2 years (review after first year)					

Appendix I: Llandeilo AQMA Action Plan

Llandeilo AQMA Action Plan - Phase 1 (Short Timescale and Easy Feasibility)

Proposal No.	Proposal Description	Predicted Reduction in NO_2 ($\mu g/m^3$)	Estimated Cost	Lead	Consequential Effects
3a	Assess and reduce parking provision along Bridge Street if possible. [Gerwyn's Fruit & Veg]	1 - 2	£15K	WG / SWTRA	Possible –ve impact for Fruit & Veg shop. Residents may also complain about removal of parking provision. The removal of parking provision will result in a negative economic impact on local Business.
3b	Assess and reduce parking provision along Rhosmaen Street if possible. [St Teilo's Church].	1 - 2	£15K	WG / SWTRA	May cause issues for grounds maintenance vehicle parking in respect of Park/Church grounds/people visiting graves.
3c	Assess and reduce parking provision along Rhosmaen Street if possible. [Cawdor Hotel].	3 - 5	£15K	WG / SWTRA	May cause issues for hotel deliveries/taxi waiting area/guests dropping off luggage. The removal of parking provision will result in a negative economic impact on local Business.
3d	Assess and reduce parking provision along Rhosmaen Street if possible. [Opposite Principality Building Society].	1 - 2		WG / SWTRA	Could be +ve impact for keeping traffic flowing but issues for removal of disable parking/loading and short stay bays. The removal of parking provision will result in a negative economic impact on local Business.
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.	?		WG / SWTRA CCC	+ve impact with improved use of on street parking. This is likely to move the issue of poor air quality elsewhere within the town of Llandeilo, and into residential areas. Also likely that people will

					continue to risk parking contraventions by parking on Rhosmaen Street, thereby making this option ineffective.
C3	Assess parking charges in the town to determine any benefits from reduction or removal of charges particularly to encourage more appropriate parking.	?		CCC	Limited potentials for air quality improvement. The car parking strategy helps to manage demand for highway space. If the reduction in car parking fees occurs, and results in the car parking facility being over-subscribed, this could lead to increased journeys being made within the Town as vehicles look (or wait) for spaces to become available. This would have a negative affect on Air Quality.
7	Look at possibility of service delivery to rear of business premises rather than along Rhosmaen Street.	3 - 4	Not known – feasibility study.	CCC	Should be +ve impact but limited number of businesses that may be able to adopt.
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.	?	£15K	CCC	+ve impact, although road safety issues need to be taken in to account. The A483 Swansea to Manchester route is a Trunk Road that has a higher incidence of HGV's using it. Encouraging children to travel on or in close proximity to this route is likely to increase the risk of road traffic incidents occurring. Both schools in the area also have wide catchment areas, which means increased journey times, making walking or cycling to school unrealistic due to journey constraints.
9	Promote car sharing to work/school.	?	Minimal	CCC	+ve impact.

	Website has been set up for the rural heartland north of Llandeilo for people commuting to Swansea/Llanelli/Carmarthen etc.		publicity costs		
11	Improve parking issues on the street with additional or more frequent enforcement.	2 - 3	Cost neutral	CCC	+ve impact and will improve traffic flows.
20	Identify if bus stops along the street can be improved to allow free flow of traffic.	?	£5K	CCC with WG / SWTRA	Assessment of bus stop locations will already have been made, particularly from the road safety perspective. May be very limited options, if any.
21	Publicise alternative routes (possibly through haulage associations) to destinations north of Llandeilo so that vehicles can avoid the town.	?	£10K	CCC with WG / SWTRA	Road signage alerting for Rhosmaen Street road closure highlighted there was little if any reduction in vehicle numbers. The A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available to publicise as alternatives. Very likely that any alternative routes that are publicised would be uneconomical, both financially and in terms of travel times, and that they would therefore be ignored, making this option ineffective.
22	Identify peak use of the road e.g. school run, mart days and markets – then target improvements / restrictions / alternative routes during these times.	?	£5K	CCC with WG / SWTRA	Potential +ve impacts but may be logistically difficult to achieve.
C4	Assess feasibility of a six month trial of HGV diversion away from town (except for	?		CCC with WG	Potential +ve impacts for AQ. Trial period would have to cover

	deliveries).			/ SWTRA	spring/summer or summer/autumn to determine effect on air quality with data then annualised to predict annual data. Problems with enforcement of the diversion may question the effectiveness of the trial. The A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available as alternatives. Very likely that any alternative routes would be uneconomical, both financially and in terms of travel times, and that they would therefore be ignored, making this option ineffective.
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.	Need to review traffic data and base prediction on % vehicles removed.		WG / SWTRA	Potential +ve impacts but may cause problems for business deliveries, additional business transport costs, sustainability concerns. The A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available as alternatives. Very likely that any alternative routes would be uneconomical, both financially and in terms of travel times, and that they would therefore be ignored, making this

					option ineffective. Also problems with the enforcement of this option.
Phase 1 – Options assessment and implementation (where possible) within 2 years (review after first year)					

Llandeilo AQMA Action Plan - Phase 2 (Short Timescale and Moderate Feasibility)

Proposal No.	Proposal Description	Predicted Reduction in NO_2 ($\mu g/m^3$)	Estimated Cost	Lead	Consequential Effects
5	Improvements to street layout i.e. pedestrian crossing, pavement width improvements.	4 - 6	£100K	WG / SWTRA	Road safety issues need to be taken in to consideration and pavement widening only likely to be possible where the road width allows. This would not target the air pollution 'hot spots'. This option could also seriously undermine the strategic highway function, creating a negative economic impact for wider industry. The purpose of the A483 trunk road is to convey traffic effectively, placing restrictions on the road layout would be contrary to this aim.
6	School buses arriving / leaving at definitive staggered times and their routes using the Bethlehem / Llangadog, Llangathen option.	1 - 2	Minimal (bus operator contracts may invoke additional costs)	CCC	May have slight +ve impact although may just prolong the congestion associated with 'school run' over a longer period. May have –ve impacts for school time table, bus and coach operators and schools staff.

Llandeilo AQMA Action Plan - Phase 3 (Medium Timescale and Moderate Feasibility)

Proposal No.	Proposal Description	Predicted Reduction in NO_2 (µg/m^3)	Estimated Cost	Lead	Consequential Effects
16	Encourage a park and ride scheme.	?	£50K + £25K pa ongoing operating costs	CCC	Could have +ve impacts if suitable locations can be found. May need parking facility to the north and the south of the town. Unknown improvement in NO_2. Scheme already exists that runs from the station and there may be scope to build on this. There would be a significant revenue cost for providing this facility and maintaining it. Also, the demand for this service in a Town as small as Llandeilo is likely to be very low.

Llandeilo AQMA Action Plan - Phase 4 Others (longer timescales and Moderate or Difficult Feasibility)

Proposal No.	Proposal Description	Predicted Reduction in NO_2 (µg/m^3)	Estimated Cost	Lead	Consequential Effects
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.	4 - 6	£50K	WG / SWTRA	+ve impacts would result from this proposal. However, could be a lot of opposition from business with increased costs and time. How would it be enforced / controlled. Still require deliveries to the town which usually drop off along Rhosmaen Street, therefore still creating congestion. Restriction of times to HGV may be possible in principle and would help air quality if the majority of HGV went through over night time period. Need to

					consider noise impacts from this. The A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available as alternatives. Very likely that any alternative routes would be uneconomical, both financially and in terms of travel times, and that they would therefore be ignored, making this option ineffective.
2	One way system with vehicles diverted around King Street.	5 - 8	£15K	WG / SWTRA with CCC	The Rhosmaen Street road closure project identified that Kings Street can be used as a diversion route cars and buses (HGV did not use this route) but there were notable increases in NO_2 results at certain locations. This suggests that this is moving the problem into residential areas of the Town rather than solving it. It would also be logistically quite difficult to achieve as a permanent solution. The closure of Rhosmaen Street early in 2013 has already demonstrated that there were other negative effects of this proposal with damage being caused to the road infrastructure, and also to buildings and structures adjacent to alternative routes. The option would also exacerbate journey times.
4	Traffic light system at peak times to	?	£50K	WG /	This is likely to improve traffic flow

	reduce the fumes problem at pinch points in the centre of town.			SWTRA	within the main high street area at certain times during the day, however there are very limited options for the location of traffic lights. It may result in moving the problem rather than solving it. Additionally, there are restrictions on the distance between the traffic light locations along a trunk road.
12	Implementation of traffic lights either end of Rhosmaen Street to regulate single stream of traffic thereby improving free flow.	?	£50K	WG / SWTRA	Similar issues as detailed in Proposal number 4, above.
17	Build a by-pass.	Up to 30	£40 million +	WG	Definite +ve impact in relation to air quality improvement. May be concerns raised about taking trade away from the town. Long term and costly to implement, but would, however, provide an economic benefit to Llandeilo and the wider area. The provision of a bypass will improve journey times which will strengthen the importance of the A483 Swansea to Manchester Trunk Road, by improving links to and from the Swansea Bay City Region. This proposal may also have a positive impact on road traffic incidents and casualty rates, and is likely to make Llandeilo Town a more attractive location for visitors.
18	Close Rhosmaen Street to traffic (except deliveries).	25 - 30	£25K	WG / SWTRA with	Definite +ve impact for air quality, however results from road closure project identified that the use of

				CCC	local diversion routes moved the air quality problem to residential areas. It is questionable whether diversion routes exist further afield within the locality. Logistically difficult to achieve. Likely to create greater demand on parking in the town as those parking bays along Rhosmaen Street would then be removed. Also, the A483 Manchester to Swansea Trunk Road is of major economical importance to wider industry, linking the Swansea Bay City Region with areas to the North. There is a lack of viable economical routes available as alternatives. Very likely that any alternative routes would be uneconomical, both financially and in terms of travel times, making this option ineffective, and placing a burden on the local road network that cannot be accommodated.
19	Remove parking bays and loading bays.	?	£15K	WG / SWTRA	This would help improve the flow of traffic along Rhosmaen Street resulting in a +ve impact on air quality. Removal of loading bays is likely to cause concern for business owners along Rhosmaen Street. Again more pressure on the remaining parking spaces in the town.
23	Variable diversion within set NO_2 limits (using continuous monitoring equipment.	?	£250K for active signage and	CCC with WG / SWTRA	The issue of using diversion routes is raised again however because the system is ‘variable’ this

			monitoring		proposal probably has more scope. The lack of economically viable alternative routes means that during times of greatest use (i.e. when air quality is at it's worst), there is nowhere for traffic to go. This could lead to wider economic impacts due to increased congestion affecting journey times. Also problems relating to the enforcement of this system. Logistically it is difficult to achieve and requires significant investment in real time monitoring and communications equipment.

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
AQO	Air Quality Objective
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
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