# CHAPTER 15: AIR QUALITY AND DUST

## Introduction

15.1 This chapter assesses the impact of the proposed development on air quality and dust. In particular, it considers the potential effects of dust during construction, and the potential effects of vehicle traffic emissions (nitrogen dioxide and particulate matter) during both the construction and operational phases on local air quality and sensitive receptors.

15.2 The chapter describes the methodology used to assess the impacts, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect impacts of the development arising from dust generated by construction activities and traffic emissions from construction and operational traffic, the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts. It has been written by WSP Environmental Ltd.

15.3 A glossary of terms is provided in **Appendix 15.1** and a summary of legislation and guidance is provided in **Appendix 15.2**.

## Planning Policy Context

### National Planning Policy

***Planning Policy Wales Edition 2 Chapter 13: Minimising and Managing Environmental Risks and Pollution (June 2010)***

15.4 Policy guidance for local planning authorities in Wales regarding local air quality and new development is provided in Chapter 13 of Planning Policy Wales. This Chapter advises on the policies and practices that should be taken into account by those involved in the planning of any development that has the potential to cause pollution.

### Local Planning Policy

***Gwynedd Structure Plan1993***

15.5 The Gwynedd Structure Plan's policy D20 states:

*'There will be a presumption against development which will ….ii. Increase levels of air or odour pollution.'*

***Isle of Anglesey Local Plan 1996***

15.6 The IOACC Local Plan's General Policy states that *'the Council will determine planning applications in accordance with policies and proposals in this Plan. In considering planning applications, the Council will take into account…..pollution and nuisance problems.'*

***Ynys Môn Unitary Development Plan 2001***

15.7 The UDP's Infrastructure Policy SG8 – Air Quality states *'development that would pose an unacceptable adverse risk to air will not be permitted.'*

## Approach

### Assessment Methodology

#### *Consultation and Scope of the Assessment*

15.8 Discussions have been undertaken with the Environmental Health Officer at IOACC regarding the Proposed Development, the assessment methodology that would be followed and to obtain air quality information. Following these consultations and a desk top review of the site and its surroundings, the following potential impacts were identified for assessment:

Construction Phase

- Increase in annoyance due to dust soiling and harm to ecological receptors associated with site clearance, excavation and construction activities;
- Increase in $PM_{10}$ concentrations and risk of health effects associated with site clearance, excavation and construction activities; and
- Increase in concentrations of $PM_{10}$ and $NO_2$ and risk of health effects associated with emissions from construction vehicles leaving or accessing the site.

Operational Phase

- Increase in concentrations of $PM_{10}$ and $NO_2$ associated with emissions from the road traffic generated by the proposed development at existing and proposed sensitive receptors.

- Increase in emissions of $NO_2$ and $PM_{10}$ arising from the proposed Combined Heat and Power (CHP) plant and boilers.

#### *Extent of the Study Area*

15.9 This air quality assessment has considered the site and the immediate surrounding area. The assessment for the construction phase will be limited to an area up to 350m from the site boundary and 500m from the site access in accordance with the guidance provided by the Institute of Air Quality Management.

15.10 For the operational phase assessment, the dispersion modelling has included emissions from roads predicted to experience the greatest change in total traffic flow as a result of the proposed development. Sensitive receptors located in the immediate vicinity of the site and adjacent to each of the road links considered have also been included in this assessment.

#### *Desk Study*

15.11 A desk study was undertaken, which consisted of:

- A review of air quality data for the area surrounding the Site, including data from the DEFRA local air quality management support website[1], the Environment Agency's (EA's) website[2] and IOACC's air quality review and assessment reports/monitoring data, to collate baseline and background information of existing air quality; and

- A review of the Site and surroundings and the proposals to confirm the location of nearby areas and receptors that may be sensitive to changes in local air quality.

***Construction Phase***

Dust and $PM_{10}$

15.12 A qualitative assessment of the potential impacts due to the generation and dispersion of dust and $PM_{10}$ during the construction phase has been undertaken using information in guidance documents produced by the following organisations:

- Building Research Establishment (BRE)[3];
- Quality of Urban Air Review Group (QUARG)[4];
- Department of the Environment (DoE)[5]; and
- Institute of Air Quality Management (IAQM)[6].

15.13 The following have been considered in the assessment:

- the size of the site, and the area of which construction activities are likely to take place;
- the construction activities associated with the proposed redevelopment that could generate dust and $PM_{10}$ and their likely duration;
- the proximity and type of sensitive receptors (e.g. schools, residential properties) to the construction site boundary;
- the local meteorological conditions (wind speed, direction and rainfall) in the area in which the site is located;
- the current $PM_{10}$ concentration in the area in which the site is located;
- the presence of vegetation surrounding the site, which might act as a buffer; and
- the potential distance which the construction traffic will travel across unpaved roads on the construction site, prior to accessing the local road network (referred to as 'trackout').

15.14 **Appendix 15.3** summarises the assessment procedure given in the guidance published by the IAQM for the consideration of potential dust and $PM_{10}$ impacts from demolition; earthworks; general construction activities and track-out.

Road traffic exhaust emissions ($PM_{10}$ and $NO_2$)

15.15 Exhaust emissions from construction vehicles will have an effect on local air quality both on-site and adjacent to the routes used by these vehicles to access the Application Site. As information on the number of construction vehicles associated with construction phase is not available, a qualitative assessment of their emissions on local air quality has been undertaken by considering:

- the level of construction traffic likely to be generated by this phase of the proposed development;
- the number and distance of sensitive receptors in the vicinity of the Site and along the likely routes to be used by construction vehicles; and
- the likely duration of the site preparation, earthworks and construction phase and the nature of such activities undertaken.

***Operational Phase***

Road traffic exhaust emissions ($PM_{10}$ and $NO_2$)

15.16 For the prediction of impacts due to emissions arising from road traffic during operation, the Highways Agency Design Manual for Roads and Bridges (DMRB) Assessment of Local Air Quality spreadsheet (version 1.03c, 2007) has been used, as requested by IOACC. The spreadsheet uses information regarding total Annual Average Daily Traffic (AADT) flows, the percentage of Heavy Goods Vehicles (HGV), average speed and distance to sensitive receptors to predict pollutant concentrations at specific locations selected by the user.

15.17 Six scenarios were assessed; these scenarios are as follows:

- 2010 "model verification";
- 2012 "baseline";
- 2017 "without proposed development";
- 2017 "with proposed development";
- 2022 "without proposed development"; and
- 2022 "with proposed development".

15.18 A summary of the traffic data used in the assessment can be found in **Appendix 15.4**.

15.19 For the purposes of this assessment and for consistency with the traffic flows predicted for the supporting Transport Assessment the "with development" scenarios represent the following as a worst case assessment:

- 2017 with development: full build-out of Penrhos and Cae Glas and 150 dwellings at Kingsland; and
- 2022 with development: full build-out of Penrhos, Cae Glas and Kingsland.

15.20 The traffic flows for the "without proposed development" scenarios in 2017 and 2022 include flows for one committed development in the locality of the proposed development site but do not include any contribution to road traffic from the proposed development itself. The traffic flows for the "with proposed development" scenarios in 2017 and 2022 include flows for one committed development and contributions to road traffic from the proposed development (as described above). The committed development included in the traffic flows is the Parc Cybi employment scheme located south of the A55 between the Cae Glas and Kingsland proposed development sites. Traffic associated with the Renewable Energy Plan was minimal and flows for the Holyhead Waterfront development were not included within the transport assessment in accordance with IOACC requirements. This approach is defined in greater detail in the Transport Assessment at Appendix 14.1.

15.21 2010 background concentrations and emission factors were used for the 2012, 2017 and 2022 assessment scenarios to reflect the results of a recent analysis of historical monitoring data collected within a number of areas in the UK by DEFRA, which has identified a disparity between measured concentrations and the projected decline in concentrations associated with the DEFRA estimates. This approach was agreed with the Environmental Health Officer at IOACC.

15.22 Following model verification, the modelled road contribution to oxides of nitrogen ($NO_x$) concentrations were converted to annual mean $NO_2$ concentrations using the methodology given in LAQM.TG(09) and the $NO_x$:$NO_2$ calculator available from DEFRA's website. The calculator provides a method of calculating $NO_2$ from $NO_x$

wherever $NO_x$ emissions from road traffic are predicted using dispersion modelling or, as in this case, the DMRB screening spreadsheet.

15.23 For $PM_{10}$, the verified modelled road contribution to annual mean $PM_{10}$ concentrations were added to the relevant background concentrations, which were then used to calculate the number of exceedences of the 24-hour mean objective for direct comparison with the relevant AQS objective, following the methodology given in LAQM.TG(09).

15.24 LAQM.TG(09) does not provide a method for the conversion of annual mean $NO_2$ concentrations to 1 hour mean $NO_2$ concentrations. However, research carried out in 2003[7], determined that exceedences of the 1 hour mean objective were unlikely to occur where annual mean concentrations were below 60µg/$m^3$. Further research carried out in 2008[8] generally supported this relationship and as a result this criterion has been adopted for the purposes of local air quality review and assessment.

15.25 Quantitative assessments of the impacts on local air quality from road traffic emissions associated with the operation of the development have been completed against the current statutory standards and objectives for $NO_2$ and $PM_{10}$ set out in **Appendix 15.2**.

Model verification

15.26 The DMRB spreadsheet has been widely validated for this type of assessment and is considered to be fit for purpose. However, validation undertaken in its development will not have included validation in the vicinity of the development considered in this assessment. To determine the performance of the DMRB spreadsheet at a local level it is therefore advisable to perform a comparison of predicted results with local monitoring data at one or more relevant locations. This process of verification attempts to minimise uncertainty and systematic error by correcting predicted results by an adjustment factor to gain greater confidence in the final results.

15.27 Suitable local monitoring data for the purpose of model verification is available for concentrations of $NO_2$ at the locations shown in **Table 15.1**.

Table 15.1: Local monitoring data sources suitable for model verification

| Location & Site Classification | O.S. Grid Reference | Distance to Site | 2010 Monitored $NO_2$ |
|---|---|---|---|
| London Road (Roadside Diffusion tube) | 225664, 381550 | 800m | 18.4 |

15.28 Model verification has been undertaken following the methodology specified in Annex 3 of LAQM.TG(09) using the $NO_x$:$NO_2$ calculator available from DEFRA's website to calculate the roadside $NO_x$ component of the annual mean $NO_2$ concentrations measured at the diffusion tube site. Details of the verification calculations are presented in **Appendix 15.5.**

15.29 A factor of 1.25 was obtained during the verification process and this factor has been applied to the modelled $NO_x$ roads component before addition of the relevant background $NO_x$ concentrations and conversion to annual mean $NO_2$ concentrations.

15.30 Local monitoring data is not available for concentrations of $PM_{10}$; as such final modelling results for this pollutant have been verified using the factor calculated

for adjusting the modelled $NO_x$ roads concentrations. This approach is considered to be appropriate according to guidance given in LAQM.TG(09).

Emissions arising from the CHP Plant and boilers

15.31 Details regarding the size of the boilers and emissions are not known however a qualitative assessment of the potential impact of emissions on local air quality has been included in this assessment.

15.32 The potential effect of air emissions from the proposed energy generation has been assessed qualitatively taking into account the following:

- The likely generation of air emissions from the proposed energy generation;
- The prevailing wind direction;
- The existing air pollutant background concentrations; and
- The number and distance of sensitive receptors in the vicinity of the site.

## Significance Criteria

15.33 The following levels of significance have been used in the assessment:

- Major Beneficial/Adverse: where the proposed development could be expected to have a very significant impact (either beneficial or adverse) on dust and air quality;
- Moderate Beneficial/Adverse: where the proposed development could be expected to have a noticeable impact (either beneficial or adverse) on dust and air quality;
- Minor Beneficial/Adverse: where the proposed development could be expected to result in a small, barely noticeable impact (either beneficial or adverse) on dust and air quality; and
- Negligible: where no discernible impact is expected as a result of the proposed development on dust and air quality.

### *Construction Phase*

Dust and $PM_{10}$

15.34 The significance of impacts associated with the construction phase of the proposed development has been determined qualitatively using the significance criteria provided by the IAQM (**Appendix 15.3**).

15.35 The significance of effects has been assessed against the risk and sensitivity of the receptors in accordance with the IAQM methodology, as shown in **Table 15.2** (assessment pre-mitigation) and **Table 15.3** (assessment following mitigation).

15.36 The significance criteria terminology has been amended to fit with the descriptions of significance used in this ES and detailed in paragraph 15.32.

Table 15.2: Significance of Effects of Each Activity Pre Mitigation

| Sensitivity of surrounding area | Risk of site giving rise of dust effects | | |
|---|---|---|---|
| | High | Medium | Low |
| Very High | Major adverse | Moderate adverse | Moderate adverse |
| High | Moderate adverse | Moderate adverse | Minor adverse |
| Medium | Moderate adverse | Minor adverse | Negligible |

| | | | |
|---|---|---|---|
| Low | Minor adverse | Negligible | Negligible |

Table 15.3: Significance of Effects of Each Activity with Mitigation

| Sensitivity of surrounding area | Risk of site giving rise of dust effects | | |
|---|---|---|---|
| | High | Medium | Low |
| Very High | Minor adverse | Minor adverse | Negligible |
| High | Negligible | Negligible | Negligible |
| Medium | Negligible | Negligible | Negligible |
| Low | Negligible | Negligible | Negligible |

Road traffic exhaust emissions ($PM_{10}$ and $NO_2$)

15.37 The significance of the effect of exhaust emissions ($NO_2$ and $PM_{10}$) during the construction phase on local air quality has been undertaken by considering the sensitivity of the receptor and the magnitude of change using the methodology detailed above. The significance of the impact has been assessed against the change of magnitude and sensitivity of the receptors, as shown in **Table 15.4**.

Table 15.4: Matrix for Determining the Significance of Effects

| | | Sensitivity of Receptor/Receiving Environment to Change/Effect | | | |
|---|---|---|---|---|---|
| | | High | Medium | Low | Negligible |
| Magnitude of Change/Effect | High | Major | Moderate to Major | Minor to Moderate | Negligible |
| | Medium | Moderate to Major | Moderate | Minor | Negligible |
| | Low | Minor to Moderate | Minor | Negligible to Minor | Negligible |
| | Negligible | Negligible | Negligible | Negligible | Negligible |

***Operational Phase***

Road traffic exhaust emissions ($PM_{10}$ and $NO_2$)

15.38 The effect of the proposed development on local air quality once operational have been evaluated against the significance criteria published by Environmental Protection UK[9] and presented in **Tables 15.5** and **15.6** below.

15.39 The significance criteria terminology has been amended to fit with the descriptions of significance used in this ES and detailed in paragraph 15.32.

15.40 The following criteria relate to changes in annual mean $NO_2$ and $PM_{10}$ concentrations and 24-hour mean $PM_{10}$ concentrations resulting from the proposed development.

Table 15.5: Significance Criteria for Annual Mean $NO_2$ and $PM_{10}$ Concentrations

| *Significance Criteria | Definition |
|---|---|
| Neutral | The development causes no change in concentrations. |
| Negligible Impact | The development gives rise to a IMPERCEPTIBLE change in concentrations or; |

| *Significance Criteria | Definition |
|---|---|
| | The development gives rise to a SMALL change in concentrations and predicted concentrations are below 36μg/m$^3$; or<br>The development gives rise to a MEDIUM change in concentrations and predicted concentrations are below 30μg/m$^3$; |
| A Minor Adverse Impact | The development gives rise to a SMALL increase in concentrations and predicted concentrations with the development in place are above 36μg/m$^3$; or<br>The development gives rise to a MEDIUM increase in concentrations and predicted concentrations with the development in place are between 30-36μg/m$^3$; or<br>The development gives rise to a LARGE increase in concentrations and predicted concentrations with the development in place are less than 36μg/m$^{3.}$ |
| A Moderate Adverse Impact | The development gives rise to a MEDIUM increase in concentrations and predicted concentrations with the development in place are above 36μg/m$^3$; or<br>The development gives rise to a LARGE increase in concentrations and predicted concentrations with the development in place are between 36-40μg/m$^3$. |
| A Major Adverse Impact | The development gives rise to a LARGE increase in concentrations and predicted concentrations with the development in place exceed the objective level of 40μg/m$^3$. |
| A Minor Beneficial Impact | The development gives rise to a SMALL decrease in concentrations and predicted concentrations without the development in place are above 36μg/m$^3$; or<br>The development gives rise to a MEDIUM decrease in concentrations and predicted concentrations without the development in place are between 30-36μg/m$^3$; or<br>The development gives rise to a LARGE decrease in concentrations and predicted concentrations without the development in place are less than 36μg/m$^3$. |
| A Moderate Beneficial Impact | The development gives rise to a MEDIUM decrease in concentrations and predicted concentrations without the development in place are above 36μg/m$^3$; or<br>The development gives rise to a LARGE decrease in concentrations and predicted concentrations without the development in place are between 36-40μg/m$^3$. |
| A Major Beneficial Impact | The development gives rise to a LARGE decrease in concentrations and predicted concentrations without the development in place exceed the objective level of 40μg/m$^3$. |

*Where the magnitude of change in concentration for annual mean $NO_2$ and $PM_{10}$ has been defined as follows:

- An IMPERCEPTIBLE change is a change of <0.4μg/m$^3$;
- A SMALL change is a change of less than 0.4 – 2μg/m$^3$;
- A MEDIUM change is a change of 2 - 4μg/m$^3$; and
- A LARGE change is a change of > 4μg/m$^3$.
- An EXCEEDENCE is defined as a concentration that is predicted to be above the standard (40μg/m$^{3)}$ in, or after the objective achievement year (2005 for NO2 and 2004 for $PM_{10}$) at a location where members of the public are likely to be exposed over the averaging period (1 year).

Table 15.6: Significance Criteria for Daily Mean $PM_{10}$ Concentrations

| *Significance Criteria | Definition |
|---|---|
| Neutral | The development causes no change in the number of days of exceedence. |
| Negligible Impact | The development gives rise to a IMPERCEPTIBLE change in the number of days of exceedence; or<br>The development gives rise to a SMALL change and the |

| *Significance Criteria | Definition |
|---|---|
| | predicted number of days of exceedence is below 32 days; or<br>The development gives rise to a MEDIUM change and the predicted number of days of exceedence is below 26 days. |
| A Minor Adverse Impact | The development gives rise to a SMALL increase and the predicted number of days of exceedence is above 32 days; or<br>The development gives rise to a MEDIUM increase and the predicted number of days of exceedence is between 26 and 32 days; or<br>The development gives rise to a LARGE increase and the predicted number of days of exceedence is below 32 days. |
| A Moderate Adverse Impact | The development gives rise to a MEDIUM increase and the predicted number of days of exceedence is above 32 days; or<br>The development gives rise to a LARGE increase and the predicted number of days of exceedence is between 32 and 35 days. |
| A Major Adverse Impact | The development gives rise to a LARGE increase and the number of days of exceedence with the development in place is above 35 days. |
| A Minor Beneficial Impact | The development gives rise to a SMALL decrease and the predicted number of days of exceedence without the development is above 32 days; or<br>The development gives rise to a MEDIUM decrease and the predicted number of days of exceedence without the development is between 26 and 32 days; or<br>The development gives rise to a LARGE decrease and the predicted number of days of exceedence without the development is between 32 and 35 days. |
| A Moderate Beneficial Impact | The development gives rise to a MEDIUM decrease and the predicted number of days of exceedence without the development is above 32 days; or<br>The development gives rise to a LARGE decrease and the predicted number of days of exceedence without the development is between 32 and 35 days. |
| A major Beneficial Impact | The development gives rise to a LARGE decrease and the number of days of exceedence without the development in place is above 35 days. |

*Where the magnitude of change is defined as the number of days of exceedence of a daily mean $PM_{10}$ concentration of 50µg/m3:

- An IMPERCEPTIBLE change is a change of < 1 day;
- A SMALL change is a change of 1- 2 days;
- A MEDIUM change is a change of 2 - 4 days; and
- A LARGE change is a change of > 4 days.
- An EXCEEDENCE is defined as predicted 24-hour mean concentrations in excess of 50µg/m3 for more than 35 days per year, in, or after the objective achievement year (2004) at a location where members of the public are likely to be exposed over the averaging period (24-hours).

15.41 In addition to these quantitative criteria, the Environmental Protection UK report outlines a method for assessing the significance of the air quality issues associated with a proposal in terms of its importance within the planning decision. The method uses textual descriptors to identify the differing levels of relative priority which should be afforded to the air quality considerations of a development proposal in the planning process. A summary of the assessment method is given in **Table 15.7**.

Table 15.7: Summary of method for assessing the significance of air quality effects

| Effect Of Development | Outcome |
|---|---|
| Development would lead to a breach or significant(1) | Air Quality an overriding |

| | |
|---|---|
| worsening of a breach of an EU limit value; cause a new breach to occur, or introduce of new exposure into an exceedence area. | consideration. |
| Lead to a breach or significant (1) worsening of a breach of an AQ Objective, or cause a new AQMA to be declared, or introduce new exposure into an area of exceedence (2). | Air Quality a high priority consideration. |
| Development would interfere significantly with or prevent the implementation of actions within an AQ action plan | Air Quality a high priority consideration. |
| Development would interfere significantly with the implementation of a local AQ strategy. | Air Quality a medium priority consideration. |
| Development would lead to a significant increase in emissions, degradation in air quality or increase in exposure, below the level of a breach of an objective. | Air Quality a medium priority consideration. |
| None of the above. | Air Quality a low priority consideration. |
| (1) Where the term significant is used, it will be based on the professional judgement of the Local Authority officer.<br>(2) This could include the expansion of an existing AQMA or introduction of new exposure to cause a new AQMA to be declared. Where new exposures is introduced this should be with reference to the exceedence area, and not the AQMA boundary. | |

Emissions arising from the CHP Plant and boilers

15.42 The likely significance of the effects of emission from the proposed energy generation has been determined using the criteria in **Table 15.4**.

**Assumptions / Limitations**

***Construction Activities***

15.43 As the planning application is at an outline stage, details regarding the construction traffic/routes, activities and building volume are limited. Assumptions have been made to the potential effects from construction activities based on previous experience of assessment of similar projects.

***Model Limitations and Assumptions***

15.44 Discrepancies can occur between the predicted results and the results measured at local air quality monitoring stations. These discrepancies may be due to a number of reasons including traffic flow uncertainties, including estimates of speeds, total flows and proportions of vehicle types. In addition, local meteorological conditions may affect the concentrations of pollutants that the DMRB spreadsheet will not take into account.

***Verification Monitoring Data***

15.45 No local monitoring data is available for $PM_{10}$, therefore the model results for this pollutant have been verified using the factor obtained from the verification of $NO_2$ in accordance with the recommendations outlined in LAQM.TG(09).

***Assessment of the CHP Plant and boilers***

15.46 The proposed development is likely to include energy generation facilities. However, details of the stack parameters are not known at this stage and the potential impact on air quality can therefore not be considered quantitatively within the air quality chapter at this stage.

## Baseline Conditions

### Local Emission Sources

15.47 IOACC has not declared any AQMAs within their administrative area as part of their review and assessment work.

15.48 The proposed development site is located in an area where air quality is mainly influenced by emissions from road transport. A number of roads such the A5 Holyhead Road and the A55 are located adjacent to the site.

15.49 The Environment Agency's website confirms that the only Part A1 industrial process located in the vicinity of the site is the Anglesey Aluminium Metal Ltd located to the south of the Penrhos site. However, this facility has now ceased operations.

15.50 In addition to air emissions from road traffic, there are several industrial processes in the vicinity of the site. Other industrial processes in the area include the Aluminium Powder Company Ltd located to the north of the A55 approximately 65m south and 130m north of the proposed Penrhos and Cae Glas sites respectively. The process generates emissions to air including carbon dioxide ($CO_2$), particulate emissions and hydrogen fluoride. The Environmental Permit for the process states that following the atomising process, cyclones remove 99.7% of the particulate from the air stream, while the remainder is discharged to the atmosphere which are subject to the permit emission limits. Based on standard atomising conditions it is estimated that the concentration of particulates from each cyclone stack is $<0.05gm^3$. Fugitive dust emissions are retained within the building using a vacuum cleaner system to collect emissions and spillages. It is considered that air emissions from the process are unlikely to significantly affect local air quality.

### Background Air Quality Data

15.51 Background concentrations have been taken from DEFRA's website, where estimated background concentrations of the pollutants included in the AQS have been mapped at a grid resolution of 1x1km grid squares for the whole of the UK. Background concentrations have been taken from the latest 2010 background maps which have been calculated as an alternative to the previous published maps which were based on projections from a base year of 2008, and incorporate updates to the input data used for modelling.

15.52 At the time of the assessment, background concentrations were only available for the year 2010. The assessment therefore included the assumption that there will be no reduction in background pollutant concentrations in future years. Since this time, background concentrations for future years have been released by DEFRA. The use of the 2010 background concentrations for the future assessment years will provide for a worst case assessment.

15.53 The assessment area covers several 1x1km grid squares and the background concentration for each receptor has been taken from the respective grid square.

15.54 However, the $NO_2$ background concentration in the grid square 225500, 381500 (in which the diffusion tube used for verification and Receptors 6 and 7 are located) is substantially higher than all the other grid squares. The DEFRA 2010 background concentration for $NO_2$ is $37.3\mu gm^3$ which is substantially higher than the 2010 monitored roadside concentration of 18.4 $\mu gm^3$ (GR 225660, 381554) which is located within this grid square. Advice provided by the EHO at IOACC

suggested that the elevated concentrations in this grid square may be due to the Anglesey Aluminium site (which has now ceased operation).

15.55 Therefore the background concentrations used for verification and for Receptors 6 and 7 comprise the average of the $NO_2$, $NO_x$ and $PM_{10}$ concentrations from the surrounding 8 grid squares rather than the concentrations presented for the grid square itself as this is considered to be a more realistic concentration as agreed with the EHO.

15.56 **Table 15.8** shows the estimated background concentrations of $NO_X$, $NO_2$, and $PM_{10}$ that were used in the assessment.

Table 15.8: 2010 Estimated background concentrations used in the assessment (µg/m$^3$)

| Receptor | Pollutant Grid Square X | y | $NO_X$ | $NO_2$ | $PM_{10}$ |
|---|---|---|---|---|---|
| 3, 4, 5 | 224500 | 381500 | 11.97 | 8.85 | 10.19 |
| 1, 2, D, F | 225500 | 380500 | 12.28 | 9.04 | 9.80 |
| 8, 9, B, C | 226500 | 381500 | 13.85 | 10.08 | 10.50 |
| 10 | 227500 | 381500 | 8.50 | 6.42 | 9.46 |
| 11, A | 227500 | 380500 | 9.96 | 7.47 | 9.78 |
| 12, 13 | 229500 | 379500 | 8.53 | 6.48 | 10.30 |
| 14 | 230500 | 378500 | 8.98 | 6.81 | 10.09 |
| E | 226500 | 380500 | 11.25 | 8.35 | 10.28 |
| Background concentration used in verification process and for receptors 6, 7 | 224500 | 382500 | 13.00 | 9.55 | 11.09 |
| | 224500 | 381500 | 11.97 | 8.85 | 10.19 |
| | 224500 | 380500 | 9.00 | 6.78 | 9.34 |
| | 225500 | 382500 | 14.08 | 10.24 | 10.79 |
| | 225500 | 380500 | 12.28 | 9.04 | 9.80 |
| | 226500 | 382500 | 10.18 | 7.60 | 9.64 |
| | 226500 | 381500 | 13.85 | 10.08 | 10.50 |
| | 226500 | 380500 | 11.25 | 8.35 | 10.28 |
| | Average | | 11.95 | 8.81 | 10.20 |

15.57 The table above shows that for all years estimated background concentrations of $NO_2$ are below the objective limit of 40µg/m$^3$ to be achieved by 2005 and thereafter. Estimated background concentrations of $PM_{10}$ meet the objective limit of 40µg/m$^3$ to be achieved by 2004 and thereafter.

**Local Air Quality Monitoring Data**

15.58 Concentrations of $NO_2$ and $PM_{10}$ measured in the vicinity of the proposed development site are provided in **Table 15.9**.

Table 15.9: IOACC's Monitoring Data (µg/m$^3$)

| Site | Approximate Distance to Site | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| *$PM_{10}$* | | | | |
| Creigiau, Llynfaes (automatic monitor) | 12km east | 20.0 | 18.5 | 17.9 |
| Chwarelau, Brynteg (automatic monitor) | 22km east | 18.7 | 18.7 | 18.7 |
| *$NO_2$* | | | | |
| A55(T) Llanfair P.G .(roadside diffusion tube ) | 26km east | 44.5 | 45.1 | 49.4 |
| A5 Menai Bridge (Intermediate diffusion tube) | 29km east | - | - | 22.6 |
| London Road, Holyhead (roadside diffusion tube) | 800m to Penrhos / Kingsland sites | - | - | 18.4 |

| Site | Approximate Distance to Site | 2008 | 2009 | 2010 |
|---|---|---|---|---|
| RAF Valley (roadside diffusion tube) | 5km south east | - | - | 7.7 |

15.59 The table above shows that all concentrations of annual mean $NO_2$ are well below the objective limit of 40µg/$m^3$ to be achieved by 2005 and thereafter with the exception of the diffusion tube adjacent to the A55 in Llanfair. Concentrations of $PM_{10}$ are also well below the objective limit of 40µg/$m^3$ to be achieved by 2004 and thereafter at both monitoring locations for the last four years.

## Potential Impacts

### Sensitive Receptors

15.60 Sensitive locations are those where the public may be exposed to pollutants from the proposed development. These will include locations sensitive to an increase in dust deposition as a result of on-site construction activities, or exposure to gaseous pollutants from exhaust emissions from construction site traffic and traffic associated with the proposed development, once it becomes operational.

15.61 Examples of locations that are sensitive to dust and particulate matter generated by construction activities are shown in **Table 15.10** below. This table is based on a table of examples provided in the guidance published by IAQM.

Table 15.10: Examples of Receptor Sensitivity to Construction Phase Impacts

| Sensitivity of Area | Examples | |
|---|---|---|
| | Human Receptors | Ecological Receptors(1) |
| Very High | Very densely populated area<br>More than 100 dwellings within 20m<br>Local $PM_{10}$ concentrations exceed the objective<br>Very sensitive receptors nearby (e.g. hospitals)<br>Construction works continuing in one area of the site for more than 1 year | European Designated Site |
| High | Densely populated area<br>10-100 dwellings with 20m of the site<br>Schools, Hi Tech & Food Processing industries nearby<br>Local $PM_{10}$ concentrations are within 10% of the objective<br>Commercially sensitive horticultural land within 20m | Nationally Designated Site |
| Medium | Suburban of edge of town area<br>Less than 10 receptors within 20m<br>Local $PM_{10}$ concentrations between 10-25% below the objective | Locally Designated Site |
| Low | Rural area/industrial area<br>No receptors within 20m<br>Local $PM_{10}$ concentrations are below 75% of the objective<br>Wooded area between site and receptors | No designations |
| Only if there are ecological habitats present that may be sensitive to an increase in dust and particulate deposition. | | |

15.62 Based on the above criteria there are a limited number of receptors in the area that are likely to be affected by dust as a result of the demolition and construction phase. Receptors located within 20m of site are limited to a few properties to the south west of Kingsland, to the south of Cae Glas and to the west of Penrhos. The area is rural in nature and $PM_{10}$ concentrations are in the region of 25% of the standard (see **Table 15.8**). The area is considered to be of low sensitivity with

regards to humans. There is one ecologically designated site (the Beddmanarch – Cymyran SSSI – see **Chapter 10 Ecology and Nature Conservation**) within 500m of the site which includes parts of the Cae Glas site which is of national importance (high sensitivity). Overall, the sensitivity of the area is considered to be low.

15.63 In terms of locations that are sensitive to gaseous pollutants emitted from engine exhausts, these will include places where members of the public will be exposed to pollution over the period of time that they are present, and therefore the most suitable AQS averaging period of the pollutant needs to be used for assessment purposes.

15.64 For instance, on a footpath where exposure will be transient (for the duration of passage along that path) comparison with a short-term standard (i.e. 15 minute mean or 1 hour mean) may be relevant. In a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as 24 hour mean or annual mean) may be more appropriate. In general terms, long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time. LAQM.TG(09) provides examples of the locations where the air quality objectives should/should not apply.

15.65 To complete the assessment of operational phase impacts, a number of 'receptors' were identified at which pollution concentrations were predicted. They include locations adjacent or near to the routes that are likely to experience the greatest change in traffic volume as a result of the proposed development.

15.66 To complete the exposure assessment, pollution concentrations were predicted at a number of locations across the proposed development site. The locations of the assessment receptors are shown on **Figure 15.1** and in **Table 15.11**.

Table 15.11: Receptor Locations Used in the Assessment

| Receptor No. | Receptor Name | Grid Reference |
|---|---|---|
| *Existing Receptors* | | |
| 1 | Efrog, Kingsland Road | 225103, 380270 |
| 2 | 1 Kingsland Road | 225055, 380920 |
| 3 | Hillandale | 224982, 381041 |
| 4 | 2 Old Post Road | 224836, 381716 |
| 5 | 12 Kingsland Road | 224919, 381474 |
| 6 | 10 Llain Bryniau | 225187, 381477 |
| 7 | 4 London Road | 225643, 381562 |
| 8 | Y Bwthyn | 226478, 381512 |
| 9 | Penrhos Lodge | 226697, 381499 |
| 10 | Gardeners Cottage | 227049, 381060 |
| 11 | The Toll House | 227550, 380408 |
| 12 | 1 Boston Terrace | 229367, 379306 |
| 13 | Hyfrydle | 229320, 379160 |
| 14 | Bod Hedd | 230245, 378837 |
| *On site / Proposed Receptors* | | |
| A | Penrhos site, Footpath (SW of site) | 227455, 380469 |
| B | Penrhos site, Footpath (W of site) | 226771, 381408 |
| C | Penrhos development land (NW of site) | 226702, 381503 |
| D | Cae Glas site, POS (SW of site) | 225781, 380559 |
| E | Cae Glas, development area (NW of site) | 226007, 280756 |
| F | Kingsland Site, Development area (E of site) | 225057, 380748 |

**Demolition and Construction**

***Dust and $PM_{10}$***

15.67 The main sources of dust and $PM_{10}$ during construction activities include:

- demolition (of isolated buildings on site);
- haulage routes, vehicles and construction traffic;
- materials handling, storage, stockpiling, spillage and disposal;
- exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- site preparation and restoration after completion;
- construction and fabrication processes; and
- internal and external finishing and refurbishment.

15.68 The majority of the releases are likely to occur during working hours (08:00 - 18:00 Monday to Friday, 09:00 to 18:00 on Saturday with no working on Sundays or Bank Holidays). However, for some potential release sources, e.g. exposed soil produced from significant earthwork activities, in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

15.69 The sites are proposed to be developed in phases with work starting at theaccess points of each site. Access to the Kingsland site will be from Kingsland Road to the east of the site and will be developed east to west between 2014 and 2022 (50 units delivered per year). Construction of Penrhos will be from the main access point to the north west of the site and will be developed roughly from west to east. Construction of Cae Glas will also commence from the access point off Parc Cybi and will be developed out in a broadly north to south direction.

15.70 Advanced planting will form a key component to the construction process with planting along the boundaries of the site occurring early on in the construction process which will help to minimise dust through vegetation of exposed ground. Planting along the borders of the site will also help to reduce dust from more central parts of the site from being emitted beyond the site boundary.

15.71 As described above, due to the limited number of receptors in close proximity to the site the overall sensitivity of the site is considered to be low. The exception to this is potentially the few receptors located on the north west boundary of the Penrhos site. In addition it is possible that receptors located along the construction routes to and from the site may be affected by track out, although the likelihood of an impact occurring is considered to significantly reduce after 500m from the site access.

15.72 With regards to the Beddmanarch – Cymyran SSSI, much of the site's vegetation will be retained and additional landscaping implemented early on in the construction process, thus reducing the risk of a dust impact occurring. For further assessment of the SSSI see Chapter 10: Ecology and Nature Conservation.

15.73 The dominant wind direction is from the south west. As most sensitive receptors in close proximity to the sites are located to the south and west this will also help to minimise any affects from dust.

15.74 According to the IAQM assessment procedure summarised in **Appendix 15.3**, and based on the available information on the construction phase, the proposed development is considered to be a Low Risk Site overall. **Table 15.12** below provides a summary of the risk for each of the four sources of construction dust

and $PM_{10}$. On this basis, the significance of the construction phase impacts prior to mitigation is considered to be **negligible**, local in effect, direct, short-medium term and temporary.

Table 15.12: Construction Phase Summary Significance Table Prior to Mitigation

| Source | Dust soiling effects | Ecological effects | $PM_{10}$ effects |
|---|---|---|---|
| Demolition | Negligible | Negligible | Negligible |
| Earthworks | Minor Adverse to Negligible | Negligible | Negligible |
| Construction | Negligible | Negligible | Negligible |
| Trackout | Minor Adverse to Negligible | Negligible | Negligible |
| **Overall Significance** | | **Negligible** | |

***Road traffic exhaust emission ($PM_{10}$ and $NO_2$)***

15.75 The impact on air quality from traffic associated with this phase of the proposed development will be in the areas immediately adjacent to the principal means of site access for construction traffic (as described above). Based on the current local air quality in the area (see **Table 15.8**) and the likely volume of construction traffic, the magnitude of change from the increase in $PM_{10}$ and $NO_2$ emissions from construction vehicles is considered to be negligible.

15.76 The sensitivity of the residential receptors along the surrounding road networks is high and the magnitude of change, prior to mitigation is negligible. Therefore, there is likely to be a direct, temporary, short-medium term effect on such residential receptors of **negligible** significance prior to the implementation of mitigation measures.

**Completed Development**

***Road traffic exhaust emission ($PM_{10}$ and $NO_2$)***

15.77 Full results of the dispersion modelling are presented in **Appendix 15.6**.

***Annual mean $NO_2$ concentrations***

15.78 The objective for annual mean $NO_2$ concentrations is 40µg/$m^3$ to be achieved by the end of 2005 and thereafter. The results of the assessment show that in the 2012 baseline case concentrations at all receptor locations comply with the objective. The highest predicted concentration is 17.77µg/$m^3$ at Receptor 7 (4 London Road).

15.79 These results agree with the conclusions of the review and assessment work undertaken by IOACC, which concluded that no AQMAs needed to be designated for this pollutant.

15.80 In 2017, the Penrhos and Cae Glas (construction workforce) will be operational. The highest concentrations in 2017 are predicted at Receptor 7 (4 London Road) where the predicted concentrations are 18.08µg/$m^3$ both without the proposed development and with the proposed development. The greatest increase in concentration due to the proposed development is 0.35µg/$m^3$ at Receptor 2 (1 Kingsland Road).

15.81 By 2022, the Penrhos, Kingsland and Cae Glas refurbishment will be complete and operational. The highest concentrations in 2022 are predicted at Receptor 7 (4 London Road) where the predicted concentrations are 18.31µg/$m^3$ without the proposed development and 18.49µg/$m^3$ with the proposed development. The

greatest increase in concentration due to the proposed development is 0.95g/$m^3$ at Receptor 2 (1 Kingsland Road).

15.82 In both the 2017 and 2022 scenarios all receptors meet the standard of 40µg/$m^3$. Increases in concentrations due to the proposed development are imperceptible at the majority of receptors; at one receptor in 2017 and 2022 there is no change in concentration and at one receptor in 2022 there is a small change in concentration according to the assessment criteria.

15.83 The sensitivity of members of the public is high, and the magnitude of change is small to no change. Therefore, the impact of increased concentrations of $NO_2$ is considered to be a direct, permanent, long term, local impact of **negligible** to **neutral** significance prior to the implementation of mitigation measures.

15.84 Concentrations of annual mean $NO_2$ concentrations predicted at receptors across the Penrhos, Cae Glas and Kingsland Sites range from 18.87µg/$m^3$ to 9.90 µg/$m^3$ in 2017, and 19.19µg/$m^3$ to 9.92µg/$m^3$ in 2022, which is below the objective. Therefore, future occupants of the proposed development will not be exposed to poor air quality.

***Hourly mean $NO_2$ concentrations***

15.85 The annual mean $NO_2$ concentrations predicted by the model were all below 60µg/$m^3$, and therefore exceedences of the hourly mean $NO_2$ concentration objective are unlikely to occur. These results again agree with the conclusions of the review and assessment work undertaken by IOACC, which concluded that no AQMAs needed to be designated for this pollutant.

***Annual mean $PM_{10}$ concentrations***

15.86 The objective for annual mean $PM_{10}$ concentrations is a concentration of 40µg/$m^3$ to be achieved by the end of 2004 and thereafter. The results of the assessment show that in the 2012 baseline case concentrations at all of the receptors considered are predicted to easily meet the objective. The highest predicted concentration is 12.08µg/$m^3$ at Receptor 7 (4 London Road).

15.87 These results agree with the conclusions of the review and assessment work undertaken by IOACC, which concluded that no AQMAs needed to be designated for this pollutant.

15.88 In 2017, the Penrhos and Cae Glas (construction workforce) development will be operational. The highest concentrations in 2017 are predicted at Receptor 12 (1 Boston Terrace) where the predicted concentrations are 12.30µg/$m^3$ without the proposed development and 12.39µg/$m^3$ with the proposed development. The greatest increase in concentration due to the proposed development is 0.10µg/$m^3$ at Receptor 2 (1 Kingsland Road).

15.89 By 2022, the Penrhos, Kingsland and Cae Glas refurbishment will be complete and operational. The highest concentrations in 2022 are predicted at Receptor 12 (1 Boston Terrace) where the predicted concentrations are 12.36µg/$m^3$ without the proposed development and 12.46µg/$m^3$ with the proposed development. The greatest increase in concentration due to the proposed development is 0.27µg/$m^3$ at Receptor 2 (1 Kingsland Road).

15.90 In both the 2017 and 2022 scenarios all receptors meet the standard of 40µg/$m^3$. Increases in concentrations due to the proposed development are imperceptible at

the majority of receptors; at two receptors in 2017 and 2022 there is no change in concentration.

15.91 The sensitivity of members of the public is high, and the magnitude of change is imperceptible to no change. Therefore, the impact of increased concentrations of $PM_{10}$ is considered to be a direct, permanent, long term, local impact of **negligible** to **neutral** significance prior to the implementation of mitigation measures.

15.92 Concentrations of annual mean $PM_{10}$ concentrations predicted at receptors across the Penrhos, Cae Glas and Kingsland Sites range from 12.68µg/$m^3$ to 9.99µg/$m^3$ in 2017, and 12.77µg/$m^3$ to 9.99µg/$m^3$ in 2022, which is below the objective. Therefore, future occupants of the proposed development will not be exposed to poor air quality.

***24 hour mean $PM_{10}$ concentrations***

15.93 The objective for 24 hourly mean $PM_{10}$ concentrations is 50µg/$m^3$ to be exceeded no more than 35 times a year by the end of 2004 and thereafter. The results of the dispersion modelling show that in all assessment years the number of exceedences is a maximum of 3 days at the existing receptors assessed, which is below the objective. In both 2017 and 2022 there are no increases in the number of days predicted.

15.94 These results again agree with the conclusions of the review and assessment work undertaken by IOACC, which concluded that no AQMAs needed to be designated for this pollutant.

15.95 The sensitivity of members of the public is high, and there is no change in the number of days of exceedence due to the proposed development. Therefore, the impact of increased concentrations of $PM_{10}$ is considered to be a direct, permanent, long term, local impact of **neutral** significance prior to the implementation of mitigation measures.

15.96 The maximum number of days of exceedence predicted at receptors across the site in 2017 and 2022 is a maximum of 4 days which is also below the objective.

***Emissions arising from the CHP Plant and boilers***

15.97 The proposed development will include the installation of energy generation facilities. The Penrhos and Cae Glas energy strategy recommends further evaluation of the installation of a natural gas CHP. The Kingsland energy strategy recommends further evaluation of the installation of a gas CHP and biomass heating.

15.98 Details regarding the size of the boilers and emissions they will generate are not known at this stage; however the plant is likely to emit pollutants including $PM_{10}$ and $NO_X$, which will add to exiting pollutant concentrations in the area. It is not possible to determine the magnitude of change to local air pollutants ($NO_X$ and $PM_{10}$) due to emissions from the CHP without information on the stack parameters and emission rates, although given the likely size of the plant it is considered likely to generate small increases in pollutant concentrations.

15.99 In addition to the emissions to air from the energy centre, there is also the potential for the delivery of fuel to increase the number of HGV movements on the local network, which will also contribute to concentrations of $PM_{10}$ and $NO_2$ along the delivery routes.

15.100 However, given the existing background concentrations it is unlikely that the CHP plant or associated vehicle emissions would cause an exceedence of the AQS objectives. Once the required data for the CHP is available, it is recommended that further assessment of the emissions to air is undertaken to confirm that the effects will be acceptable.

15.101 The sensitivity of the receptor (members of the public) is high and the magnitude of change, considering the relatively low background concentrations, is considered to be low to negligible. Therefore there is likely to be a direct, permanent, long term, local effect of **minor adverse** to **negligible** significance prior to the implementation of mitigation measures.

## Mitigation Measures

### Demolition and Construction

#### *Dust and $PM_{10}$*

15.102 A number of mitigation methods should be implemented to minimise effects particularly along the borders of the site adjacent to residential receptors such as the main entrance to the Penrhos site. The mitigation measures should be implemented, as appropriate, through a Construction Environmental Management Plan (CEMP) including:

- vehicles carrying loose aggregate and workings should be sheeted at all times;
- implementation of design controls for construction equipment and vehicles and use of appropriately designed vehicles for materials handling;
- completed earthworks should be covered or vegetated as soon as is practicable (particularly along the borders of the site in line with the landscaping parameter plans;
- regular inspection and, if necessary, cleaning of local highways and site boundaries to check for dust deposits (and removal if necessary);
- minimise surface areas of stockpiles (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up;
- where appropriate, windbreak netting/screening should be positioned around material stockpiles and vehicle loading/unloading areas, as well as exposed excavation and material handling operations, to provide a physical barrier between the site and the surroundings;
- where practicable, stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of prevailing wind directions and seasonal variations in the prevailing wind;
- during dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up;
- use of dust-suppressed tools for all operations;
- ensuring that all construction plant and equipment is maintained in good working order and not left running when not in use;
- restrict on-site movements to well within site and not near the perimeter, if possible; and
- no unauthorised burning of any material anywhere on site.

15.103 It is recommended that liaison with the local authority be maintained throughout the construction process.

***Road traffic Exhaust Emission ($PM_{10}$ and $NO_2$)***

15.104 Detailed mitigation measures to control construction traffic should be discussed with IOACC to establish the most suitable access and haul routes for the site traffic. The most effective mitigation will be achieved by ensuring that construction traffic does not pass along sensitive roads (residential roads, congested roads, via unsuitable junctions, etc) where possible, and that vehicles are kept clean (through the use of wheel washers, etc.) and sheeted when on public highways. Timing of large-scale vehicle movements to avoid peak hours on the local road network will also be beneficial.

**Completed Development**

***Road traffic exhaust emission ($PM_{10}$ and $NO_2$)***

15.105 Given the nature of the proposed development and the imperceptible increases in $NO_2$ and $PM_{10}$ concentrations that traffic associated with it will generate, no mitigation measures are recommended.

15.106 Sustainable modes of transport, (for example walking, cycling and public transport) will be encouraged through the implementation of a Travel Plan to reduce the number of car journeys associated with the proposed development. Additionally, the site access junctions will be designed to ensure congestion is minimised and that vehicles operate in free flow conditions which will also help to reduce emissions.

15.107 Further information is provided in the supporting Travel Plan and Transport Assessment.

***Emissions arising from the CHP Plant and boilers***

15.108 To mitigate any adverse effects of the CHP / boiler emissions on local air quality, the following mitigation measures should be implemented:

- additional vehicle movements generated through transportation of fuel for biomass boilers will be minimised by sourcing local materials and maximising storage provision;
- air emissions to be minimised through use of best available technology such as modern burner designs and emissions should be assessed at the detailed design stage to ensure negligible effects on local air quality;
- the flue stack height(s) will be optimised to ensure minimal effects on local air quality; and
- an on-going regular inspection and maintenance programme should be implemented for the energy centre plant.

## Residual Impacts

**Demolition and Construction**

***Dust and $PM_{10}$***

15.109 The greatest potential for dust soiling / nuisance problems and increases in $PM_{10}$ concentrations to occur will be within 350 m of the construction site perimeter although there may be limited incidences of increased dust deposited and $PM_{10}$ concentrations at receptors adjacent to the construction route from trackout. The sensitivity of the area overall remains low and with the appropriate use of

mitigation measures and good site management there is likely to be a direct, temporary, short-medium term effect of **negligible** significance.

15.110 The significance of the effects arising from each element of the construction phase of the proposed development following the appropriate use of mitigation measures and good site practice is shown in the Table 15.13 below.

Table 15.13: Construction Phase Summary Significance Table with Mitigation

| Source | Dust soiling effects | Ecological effects | $PM_{10}$ effects |
|---|---|---|---|
| Demolition | Negligible | Negligible | Negligible |
| Earthworks | Negligible | Negligible | Negligible |
| Construction | Negligible | Negligible | Negligible |
| Trackout | Negligible | Negligible | Negligible |
| **Overall Significance** | | **Negligible** | |

***Road traffic exhaust emission ($PM_{10}$ and $NO_2$)***

15.111 The sensitivity of the residential receptors along the surrounding road networks is high and the magnitude of change, following the implementation of mitigation will remain negligible. Therefore, there is likely to be a direct, temporary, short-medium term effect on such residential receptors of **negligible** significance prior to the implementation of mitigation measures.

**Completed Development**

***Road traffic exhaust emission ($PM_{10}$ and $NO_2$)***

15.112 Following implementation of the above mitigation measures the sensitivity of members of the public is high. The magnitude of change is predicted to be imperceptible to no change for annual mean $NO_2$ and $PM_{10}$ and no change for 24 hour $PM_{10}$. Therefore, there is predicted to be a direct, permanent, long term residual effect on residential receptors of **negligible to neutral** significance.

***Emissions arising from the CHP Plant and boilers***

15.113 The sensitivity of the receptor (members of the public) is high and the magnitude of change, following the implementation of mitigation measures, is considered negligible. Therefore there is likely to be a direct, permanent, long term, local effect of **negligible** significance.

## Conclusions

15.114 A qualitative assessment of the potential impacts on local air quality from site demolition and construction activities on the proposed development has been carried out. This showed that during site activities releases of dust and $PM_{10}$ were likely to occur. The greatest potential for nuisance problems to occur will be within 350 metres of the construction site perimeter and 500m from the site access. There may be limited incidences of increased dust deposited on properties bordering the construction route beyond this distance. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and $PM_{10}$ releases will be reduced to acceptable levels (negligible significance).

15.115 The impact on air quality from construction traffic will be in the areas immediately adjacent to the principal means of site access for construction traffic. However,

such increases in pollutant concentrations ($NO_2$ and $PM_{10}$) are considered to be insignificant (negligible) and will only occur over a short-medium term period.

15.116 An air quality assessment of the potential impacts during the operational phase was undertaken using the DMRB spreadsheet to predict the changes in $NO_2$ and $PM_{10}$ concentrations that would occur due to traffic flows associated with the proposed development. The results show that the proposed development would cause imperceptible to no change in concentration. The impact of the proposed development is considered to be negligible to neutral for annual mean $NO_2$ and $PM_{10}$ and neutral for 24 hour $PM_{10}$.

15.117 No exceedences of the AQS objectives are predicted to occur in any scenario assessed and the proposed development is considered to comply with national and local current policy.

15.118 The potential effects of air emissions from the proposed CHP plant / boilers have been assessed. This showed that, given the likely size of the plant proposed and the existing background concentrations that the effect of the CHP plant following the implementation of mitigation measures on local air quality is likely to be negligible.

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[1] http://laqm1.defra.gov.uk/review/tools/background.php

[2] http://www.environment-agency.gov.uk

[3] Kukadia, V., Upton, S. L. and Hall, D. J.; Control of dust from Construction and Demolition Activities. BRE (Feb 2003).

[4] Quality of Urban Air Review Group: Airborne Particulate Matter in the United Kingdom – Third Report of the Quality of Urban Air Review Group. Prepared for the Department of the Environment (May 1996).

[5] Arup Environmental and Ove Arup and Partners: The Environmental Effects of dust from Surface Mineral Workings Volume 2. Prepared for Department of the Environment Minerals Division (Dec 1995).

[6] Institute of Air Quality Management: Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance (January 2012).

[7] D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003).

[8] A Cook: Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedences of the 1-hour mean AQS Objective (2008).

[9] EPUK, April 2010. Development Control: Planning for Air Quality (2010 Update)


PROJECT: Penrhos Leisure Village
PROJECT No: 23765
Client: Land and Lakes Ltd

Drawn: GH
Checked: EE
Approved: EE
Revision: A
Date: May 2012

WSP