

10.0 AIR QUALITY & CLIMATE

10.1 Introduction

This Chapter of the EIS considers the potential and likely significant air quality and climate effects of the proposed alterations to the permitted development. The purpose of this chapter is to identify and describe any likely significant air quality and climate effects as a result of the proposed alterations in the context of the permitted development.

Full details of the proposed alterations are detailed in Chapter 3 Project Description of this EIS.

10.2 Methodology

10.2.1 Construction Stage

The main potential impacts to the atmosphere from the construction stage of the proposed alterations are:

- **Container Berth:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction dust.
- **Surfacing of existing port lands to provide operational areas:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction dust.
- **Dredging of the seabed:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction odour from dredging.
- **Installation of container handling cranes and terminal transport equipment:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction dust.
- **Maintenance building, administrative buildings and entrance kiosks:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction dust.
- **Ancillary car parking, lighting and fencing:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction dust.
- **Road Improvements:** Potential sources of air pollution: emissions to the air during the construction phase of particulate matter, nitrogen dioxide and construction dust.

10.2.2 Operational Stage

10.2.2.1 *Emissions from Engines and Plant*

Current port activity involves the berthing, loading and unloading of ships in the Ringaskiddy Basin. The air quality impacts of the traffic using the existing Port area can be divided into two categories of emission; (i) those resulting from traffic and (ii) those resulting from port activity.

Emissions from road traffic (there is no change in traffic arising from the proposed alterations when compared to the permitted development) and port activity (operational movement and machinery type for the proposed alterations have changed from the permitted development) have been assessed in terms of their potential for local impact on human health and sensitive ecosystems. The main pollutants of concern from traffic emissions in terms of local impact are nitrogen oxides and particulate matter PM₁₀, and these are compared to the relevant statutory limits on air quality. Specifically, with regard to the proposed alterations the operational stage potential emissions are set out overleaf:

- **Container Berth:** No significant operational effect in terms of atmospheric pollution.
- **Surfacing of existing port lands to provide operational areas:** Potential sources of air pollution: emissions to the air during the operational phase of particulate matter and nitrogen dioxide.
- **Dredging of the seabed:** No significant operational effect in terms of atmospheric pollution – this is a construction phase activity.
- **Installation of container handling cranes and terminal transport equipment:** Potential sources of air pollution: emissions to the air during the operational phase of particulate matter and nitrogen dioxide.
- **Maintenance building, administrative buildings and entrance kiosks:** Potential sources of air pollution: emissions to the air during the operational phase of particulate matter and nitrogen dioxide.
- **Ancillary car parking, lighting and fencing:** Potential sources of air pollution: emissions to the air during the operational phase of particulate matter and nitrogen dioxide.
- **Road Improvements:** Potential sources of air pollution: emissions to the air during the operational phase of particulate matter and nitrogen dioxide.

10.2.2.2 Shipping Emissions

There is no change to shipping emissions due to the proposed alterations. The proposed alterations will have no significant effect in terms of shipping emissions. These are not assessed further in this chapter.

10.2.3 Assessment Criteria

10.2.3.1 Dust Dispersion and Particulate Matter (PM10)

Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level. This approach has continued to evolve and in 2014, the IAQM published guidance on the assessment of construction air quality effects.

Assessment criteria is used by determining the size of the development and determining the distance to the nearest sensitive receptors. Risk assessment criteria is set out in Table 10.1 and determined for four phases of the construction phase, which are:

- Demolition,
- Earthworks,
- Constructing,
- Trackout.

Table 10.1 Risk Category from IAQM used in the Construction Assessment for the proposed alterations

Distance to Nearest Receptor (m) ^a		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 100	<20	High Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Low Risk Site
200 – 350	40 – 100	Medium Risk Site	Low Risk Site	Negligible

An 'ecological receptor' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats).

For the sensitivity of people and their property to soiling & people to the health effects of PM10 the IAQM guidance recommends that receptors are identified between:

- High Sensitivity Receptor,
- Medium Sensitivity Receptor;
- Low Sensitivity Receptor.

For the purposes of this assessment of the proposed alterations all receptors have been considered as highly sensitive.

10.2.3.2 Potential Odours

A qualitative assessment is made of the likely impacts from odour from the dredging operation in the proposed alteration to the permitted Ringaskiddy Port Redevelopment.

As with construction dusts, Ireland, does not currently have any legislative limit for odours in place and standard industry guidelines are typically applied. In this case an odour marker compound such as hydrogen sulphide will be used to determine odour nuisance during all dredging works.

Hydrogen sulphide (H₂S) is one of the key odour compounds that can cause odour nuisance impacts. H₂S is a colourless, flammable, extremely hazardous gas with a "rotten egg" odour. It occurs naturally in crude petroleum and natural gas. In addition, H₂S is produced by bacterial breakdown of organic materials and may be released during dredging works if there is organic material disturbed.

There are no statutory limits for the protection of human health for H₂S so guidelines are applied. Two thresholds are employed in this instance - the threshold for odour nuisance and the threshold for health impacts as presented below in Table 10.2.

Table 10.2: Health and Odour Guidelines for H₂S

Parameter	Averaging Period	Guideline	Source
Health Effects	24 hours	150 µg/m ³	World Health Organisation
Odour Annoyance	30 mins	7 µg/m ³	World Health Organisation

10.2.3.3 Legislative Context - Combustion Gases

A European directive on ambient air quality and cleaner air for Europe (2008/50/EC) was implemented in 2008; replacing previous EU directives on the topic. Directive 2008/50/EC has been subsequently transposed into Irish legislation in the form of the Air Quality Standards Regulations 2011 (S.I. 180 of 2011). These Regulations are presented in Table 10.3 below and represent the main assessment criteria for the operation phase of the proposed alterations and in the context of the permitted Ringaskiddy Port Redevelopment.

The relevant Irish ambient air standards have been adopted from the European Commission Directives 1996/62/EC, 1999/30/EC and 2000/69/EC and are cited as the Air Quality Standards Regulations, which came into force on 17th June 2002 (Irish Legislation S.I. No. 271 of 2002). In May 2008, these European Directives on air quality were replaced with a new Directive on ambient air quality and cleaner air for Europe (2008/50/EC). The Clean Air for Europe Directive (2008/50/EC) (now transposed into Irish Law) and the Fourth Daughter Directive (2004/107/EC) set limits and target values for ambient concentrations of air pollutants harmful to human health and the environment. The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999. The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

The Air Quality Standards Regulations specify limit values in ambient air for sulphur dioxide (SO₂), lead, benzene, particulate matter (PM₁₀ and PM_{2.5}) and carbon monoxide (CO), nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x). These limits are for the protection of human health and are largely based on review of epidemiological studies on the health impacts of these pollutants.

Table 10.3 Air Quality Standards Regulations 2011

Pollutant	Criteria	Value
Nitrogen Dioxide	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu\text{g}/\text{m}^3$ NO_2
	Annual limit for protection of human health	40 $\mu\text{g}/\text{m}^3$ NO_2
	Annual limit for protection of vegetation	30 $\mu\text{g}/\text{m}^3$ $\text{NO} + \text{NO}_2$
Benzene	Annual limit for protection of human health	5 $\mu\text{g}/\text{m}^3$
Carbon Monoxide	Maximum daily 8-hour running mean	10 mg/m^3
Lead	Annual limit for protection of human health	0.5 $\mu\text{g}/\text{m}^3$
Sulphur dioxide	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 $\mu\text{g}/\text{m}^3$
	Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 $\mu\text{g}/\text{m}^3$
	Annual limit for protection of vegetation	20 $\mu\text{g}/\text{m}^3$
Particulate Matter PM_{10}	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 $\mu\text{g}/\text{m}^3$ PM_{10}
	Annual limit for protection of human health	40 $\mu\text{g}/\text{m}^3$ PM_{10}
Particulate Matter $\text{PM}_{2.5}$	Annual target value for the protection of human health	25 $\mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$

The limits presented in the EU Directives on air quality consider people with respiratory illness and the limits include a margin of tolerance for such conditions, as well as children and the elderly. The limits mimic those based on World Health Organisation (WHO) review of epidemiological studies on health impacts around the world. For example, oxides of nitrogen (NO , NO_2 and NO_x) are known to affect the pulmonary function of the lungs in short term doses. Of all of the medical literature reviewed by the WHO, the lowest adverse affect of exposure was recorded at about 560 $\mu\text{g}/\text{m}^3$ which showed a reduced lung function in asthmatics. The WHO uses this lowest adverse impact and apply a margin of tolerance (usually 50%) to generate a limit of 200 $\mu\text{g}/\text{m}^3$ for 1-hour human exposure to oxides of nitrogen. This approach is then replicated for all pollutants.

10.2.3.4 Significance of Air Pollution Impacts

An adoption is made of the IAQM guidance (as advised by the TII) for the rationale for describing the impact of the proposed development is derived from the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance (EPUK & IAQM) "Land-Use Planning & Development Control: Planning for Air Quality (May 2015)" (paragraphs 6.25-6.39), which has replaced "Development Control: Planning for Air Quality (2010 Update)".

There is a two stage process to be followed in the assessment of air quality impacts

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts

The suggested framework for describing the impacts is set out in Table 6.3 of the EPUK & IAQM guidance document and is shown in Table 10.4 below. The term Air Quality Assessment Level (AQAL) has been adopted as it covers all pollutants, i.e. those with and without formal standards. AQAL is used to include air quality objectives or limit values where these exist. The Environment Agency uses a threshold criterion of 10% of the short term AQS as a screening criterion for the maximum short term impact. The EPUK & IAQM guidance adopts this as a basis for defining an impact that is sufficiently small in magnitude to be regarded as having an insignificant effect.

Table 10.4: Impact descriptors for individual receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Moderate
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.
3. The Table is only designed to be used with annual mean concentrations.
4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

The rationale for the assessment of significance is derived from the EPUK & IAQM Guidance (paragraphs 7.1-7.12 referring to Table 6.3) and relates to Table 10.4.

Impacts on air quality, whether adverse or beneficial, will have an effect on human health that can be judged as 'significant' or 'not significant'. An 'impact' is the change in the concentration of an air pollutant, as experienced by a receptor. This may have an 'effect' on the health of a human receptor, depending on the severity of the impact and other factors that may need to be taken into account. The impact descriptors set out in Table 10.4 are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

Any judgement on the overall significance of effect of a development will need to take into account such factors as:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.

The impacts descriptor table acknowledges this and points to a conclusion of significant effect in cases where concentrations of a regulated pollutant are in excess of the objective value. Where the baseline concentrations are close to the objective value at a receptor, but not exceeding it, a case may be made for the development's predicted contribution being significant. It will always be difficult, however, to attribute the exceedance of an objective to any individual source.

Magnitude (scale of change) is determined by considering the predicted deviation from baseline conditions. Quantifiable assessment of magnitude has been undertaken. Impacts of the proposed alterations on air quality have been assessed with reference to the baseline conditions and environmental assessment criteria.

10.2.3.5 Greenhouse Gases

There are no project specific limits or guidelines that apply to new developments in relation to Greenhouse Gas emissions. There are a number of national and local policy documents that apply including The National Climate Change Strategy 2007-2012. The changes in Greenhouse Gases will be compared with the existing emissions for context in the absence of specific limits. The proposed alterations due not change the traffic associated with the permitted Ringaskiddy Port Redevelopment there will be no significant changes in greenhouse gas emissions and they will remain as per the predictions for the extant approval.

10.3 Existing Environment

10.3.1 Receiving Environment

The site of the proposed alterations is at the existing Port of Cork facility. The port landside entrance/exit is at Ringaskiddy. The site is bordered to the south by Ringaskiddy village and further south by agricultural lands and industrial facilities. Haulbowline Island is located to the northeast of the port. The Irish Naval base and the decommissioned Irish steel plant are located on Haulbowline Island. Across Cork Harbour, to the northwest and northeast are Monkstown and Cobh respectively.

The site is located in a suburban setting surrounded by various existing port business and commercial properties. Ringaskiddy consists of a wide main road with residential dwellings situated adjacent to the road and further back onto elevated lands. The main road carries local traffic, naval staff traffic as well as heavy goods vehicles using the Port and other commercial businesses. The level of traffic in the town centre is likely to generate amounts of dust and traffic-derived pollution (i.e. nitrogen oxides, benzene and sulphur dioxide from diesel exhausts) under the existing conditions. The nearest sensitive receptors to the proposed container terminal are approximately 180m from the proposed alterations. These receptors consist of terraced dwellings, housing estates and associated amenities. The naval college is approximately 400m from the existing site. Monkstown and Cobh are at their closest point, 800m and 500m from the site perimeter respectively.

Identifying sensitive receptor locations is an important step in locating areas that may be more susceptible to potential impacts from changes in air pollution concentrations. In general, sensitive receptors include areas such as residential housing, school, hospitals, places of worship, sports centres and shopping areas. The longer-term standards, such as the 24-hour and annual means, would not apply at such kerbside locations, as they would not reasonably represent longer-term public exposure. There are a number of environmental designations, including Cork Harbour Special Protection Area (SPA) and Monkstown Creek proposed Natural Heritage Area (pNHA). Sensitive receptor locations are highlighted in Table 10.15 of this Chapter.

10.3.2 Existing Sources of Atmospheric Pollution

The main existing sources of pollution in the area around Ringaskiddy Port are from road traffic, shipping traffic, space heating, industrial emissions, residential emissions and fugitive emissions from fuel/gas storage. Existing Port operations including shipping emissions (both docked emissions and at sea emissions) and land operations (cranes, trucks, etc.) will also give rise to combustion emissions. These emissions are dependent on the fuel employed, the size of the vessel and the duration of the operations.

Sources of nuisance dust in the area include bulk cargo unloading operations at the existing DWB and bulk grain storage facilities at Ringaskiddy West. There are also bulk grain warehouses located to the east along the N28 east of Ringaskiddy village Main Street. Depending on operational conditions and prevailing wind conditions, these sources have the potential to impact on nuisance dust levels in the area.

10.3.2.1 Existing Operations – Operational Procedures

The environmental objectives of the Port of Cork is to manage cargo handling, cargo storage and port industry activities to minimise emissions to air, particularly odour, dust and noxious fumes. These objectives will be applied to the proposed alterations as they were to the extant approval. Port of Cork currently operates an Environmental Management System (EMS) which complies with ISO 14000. The current adopted practices are detailed below:

- Maintaining an Environmental Management System compliant with European Sea Ports Organisation ECOPORTS criteria and certified to ISO 14001.
- The principle of ‘pollution prevention’ through operational best practice, emissions management, waste minimisation, efficient resource use, and conservation awareness.
- Compliance with relevant environmental legislation, regulations and industry codes of practice.
- Continual environmental performance improvement, by achieving realistic objectives and targets in the context of a systematic management programme.
- Communicating and implementing this environmental policy statement with all employees and providing appropriate training.
- Making the EMS available to our stakeholders and the general public, and supporting local community liaison.
- Public reporting on environmental performance.
- Ensure the availability of necessary resources to implement this policy.

These objectives will be applied to the proposed alterations as they were to the extant approval

10.3.3 Baseline Air Quality

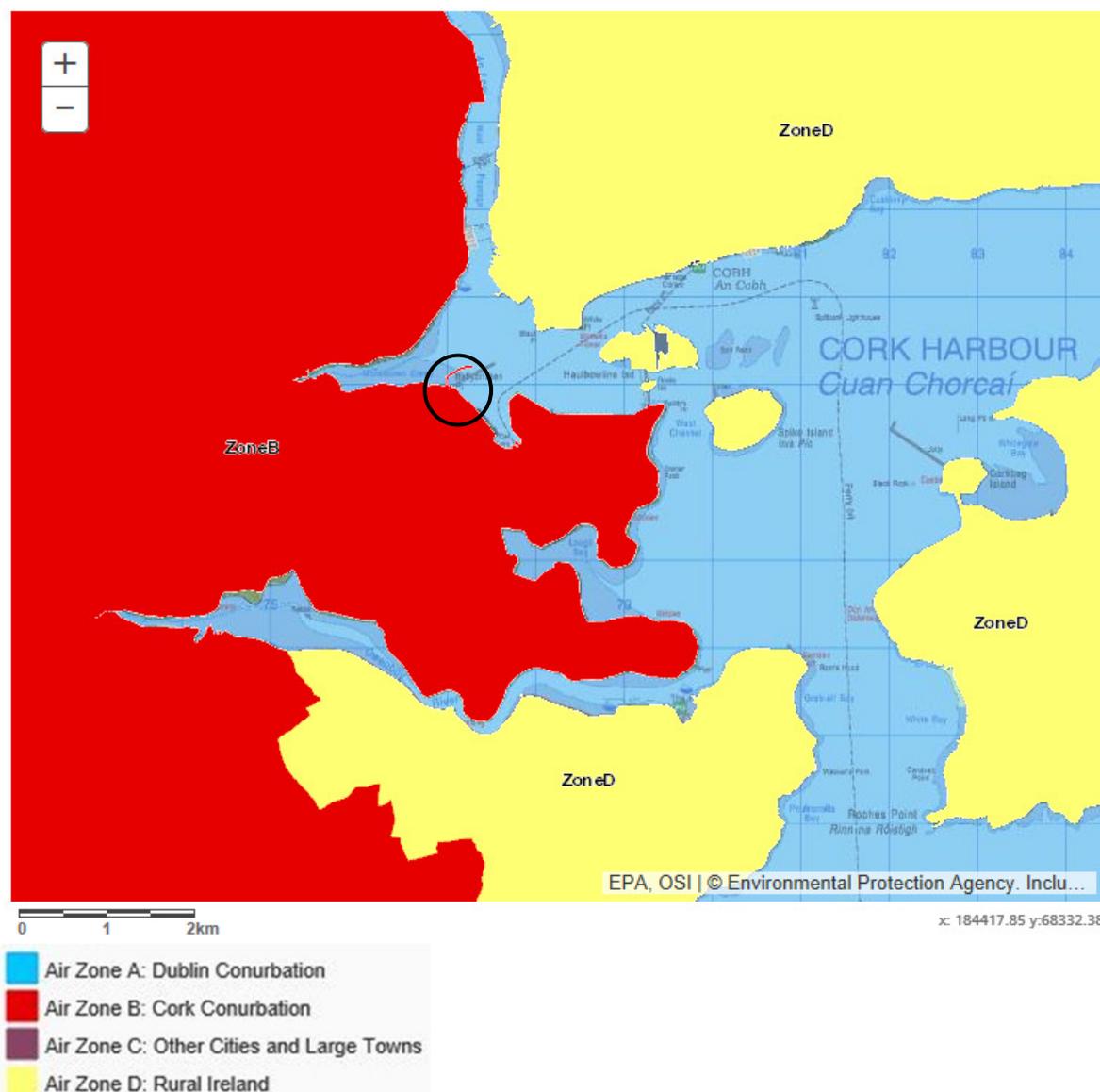
Under the Clean Air for Europe Directive, EU member states must designate "Zones" for the purpose of managing air quality. For Ireland, four zones were defined in the Air Quality Standards Regulations (2011). The zones (see table 10.5) were amended on 1 January 2013 to take account of population counts from the 2011 CSO Census and to align with the coal restricted areas in the 2012 Regulations (S.I. No. 326 of 2012).

Table 10.5: Air Quality Zones

Zone	Location
Zone A	Dublin
Zone B	Cork
Zone C	Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.
Zone D	Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

The proposed alterations are located within Zone B. Figure 10.1 shows a zoomed location on the Port of Cork detailing the proposed development in Zone B and the surrounding coastal area in Zone D.

Figure 10.1 Proposed Development Air Quality Zone (indicative site location highlighted by a black circle)



Source: www.epa.ie

10.3.3.1 RPS Site Specific Monitoring Results

A total of 10 monitoring locations were selected for the air quality assessment of the alterations, the same as for the permitted development in order to ascertain baseline air quality conditions by monitoring for Benzene, NO₂ and SO₂ concentrations. Background levels are significantly under relevant Irish/EU limit values.

10.3.3.2 Update on background air quality monitoring

EPA Monitoring in Cork

An assessment of air quality was carried out at Monkstown, Cork Harbour from August 2007 - March 2008. No limit values were exceeded during the measurement period. Current monitoring in the wider Cork area is undertaken at South Link Road, CIT Bishopstown and Heatherton Park. A brief summary of current air quality conditions is given below for each site.

South Link Road - The South Link Road site is located on the South side of Cork City, at the Cork City Council landfill. Monitoring is done using continuous monitors for sulphur dioxide, nitrogen

oxides, carbon monoxide and ozone. Continuous sample were also taken for particulates (PM₁₀), and benzene. Current air quality conditions are described as good for November 2016.

Cork Institute of Technology, Bishopstown - The Bishopstown site is located on the grounds of CIT. The site is operated by CIT. Monitoring is done using continuous monitors for sulphur dioxide and ozone. Current air quality conditions are described as good for November 2016.

Heatherton Park - The PM₁₀ and PM_{2.5} monitors are located in a suburban housing estate 1 mile south of the City Centre. It is operated by Cork City Council. Benzo (a) Pyrene and heavy metals are also monitored at this site. Current air quality conditions are described as good for November 2016.

The background air quality across Cork and within the vicinity of the proposed alterations show no significant changes from the previous air quality background levels reported the permitted development.

10.3.3.3 *Air Quality in Ireland 2015: Key Indicators of Ambient Air Quality*

This annually produced report summarises monitoring across Ireland undertaken by the EPA. Air monitoring data from 31 stations in the National Ambient Air Quality Monitoring Network was assessed against legislative limit and target values for the protection of human health and vegetation. No levels above the EU limit value were recorded at any of the ambient air quality network monitoring sites in Ireland in 2015. The following sections give a summary of air pollutants in reported in the 2015 report.

Carbon Monoxide - Levels in 2015 are very similar to concentrations observed in from 2005 to 2014 and are below the limit value. Measured concentrations were also below the WHO air quality guideline values. Trends in CO concentrations in Dublin and Cork since 2005, levels have remained low over the period with all levels recorded below the limit value.

Nitrogen Dioxide - NO₂ concentrations were monitored at 15 locations across Ireland in 2015. NO₂ values for all monitoring sites in Ireland were below the annual limit value in 2015.

Sulphur Dioxide - SO₂ was measured at 10 stations in 2015. No exceedances of the daily EU limit values was recorded in 2015. The trend in annual mean SO₂ concentrations across Ireland since 2005 have been consistently low in that period.

Ozone - Ozone concentrations recorded in 2015 were below the EU limit value for human health across Ireland (11 sites).

Particulate Matter (PM10) - PM10 was monitored at eighteen stations across Ireland in 2015. Mean concentrations are below the annual limit value of 40 µg/m³ at all locations.

Particulate Matter (PM2.5) – There have been no exceedances of the EU limit value for PM_{2.5} (25µg/m³) in Ireland across 9 monitoring sites.

Benzene - Routine annual monitoring for Benzene was carried out at two stations in 2015; there was no exceedance of the annual limit of 5 µg/m³.

Heavy Metals - Lead, arsenic, cadmium and nickel in PM10 were measured at five stations in 2015. The annual mean concentrations measured at all stations were all below the respective target or limit values.

The background air quality across Ireland and within the vicinity of the proposed alterations show no significant changes from the permitted development.

10.3.3.4 *Consultation Paper (October 2016) National Ambient Air Quality Monitoring Programme 2017-2022*

This is a new document that sets out future monitoring across Ireland. Following a comprehensive review of the current status of ambient air quality monitoring in Ireland, a new national ambient air quality monitoring programme is proposed under Section 65 of the EPA Act. A consultation paper was

released in October 2016 entitled, National Ambient Air Quality Monitoring Programme 2017-2022. The paper was prepared by the National Ambient Air Quality Team in the Office of Radiological Protection, Environmental Protection Agency. The paper set out future monitoring requirements, long term planning and funding requirements.

The EPA manages and co-ordinates current ambient air monitoring activities in Ireland in cooperation with local authorities and other state bodies. The development of the network into its current configuration and the critical role of the network partners in supporting this national infrastructure have evolved in the absence of an integrated strategy underpinned by medium or long terms plans regarding funding, resources and governance arrangements. The absence of long term planning has hampered the strategic development of air monitoring capacity and the optimisation of available resources. As part of the development of this proposed programme, a new governance platform including multi-annual funding.

It is proposed that the new programme will involve a greatly expanded national air quality monitoring network providing enhanced real-time information to the public, supplemented by an additional increased local authority capacity to conduct indicator monitoring. The network can be supported and augmented by increased modelling and forecasting capability, with the aim of providing an ongoing air quality forecast to the public.

10.3.4 Baseline Climate

The topography of the site is flat reaching sea level at the harbour's edge. Further inland to the southwest, beyond the N28 and Ringaskiddy village, the landscape becomes increasingly rural. The topography also rises steadily to a crest over 50m OD. The even and level nature of the proposed development site for the alterations is contrasted by the steep, rising elevations of lands that surround the inner Cork Harbour at Ringaskiddy, Monkstown, Cobh, Western Great Island, Aghada, Whitegate, and Crosshaven.

The Port of Cork at Ringaskiddy has a weather station that records detailed information every 30 minutes. The information recorded includes; date, time, Temperature, High Temperature, Low Temperature, Humidity, Dew Point, Wind Speed, Wind Direction, High Wind Speed, High Wind Direction, Wind Chill, Heat Index, Pressure, Rainfall and Rainfall Rate. All this data, most importantly wind speed and wind direction can lend to an understanding of fugitive dust behaviour and can aid in addressing a potential dust dispersion episode on sensitive receptors on the peripheries of the working site. The climate (micro and macro) remains the same as for the baseline described for the permitted development.

10.4 Impact Assessment

The following section details each proposed alterations in terms of air quality, dust and odour as required.

10.4.1 Container Berth

Summary of proposed alteration: The alterations to the quay comprise a minor modification to the shape of the southern end of berth 1; Demolition of two existing dolphins; and Provision of three new mooring dolphins.

Assessment: The proposed change in the Container Berth 1 will not have a significant effect on levels of atmospheric pollution. No significant effects to air quality are predicted from the proposed alterations.

10.4.2 Surfacing of existing port lands to provide operational areas

Summary of proposed alteration: Internal arrangement amended to suit new container handling system; Expansion of the terminal areas southwards.

Assessment: The changes associated with the proposed alteration in internal arrangements and expansion of the terminal southward are insignificant in term of air quality. All levels of atmospheric pollution are significantly under relevant EU and Irish Limit values and do not alter the conclusions of the previous assessment or mitigation measures enshrined in the extant approval. The surfacing of existing port lands will not have a significant impact on levels of atmospheric pollution. No significant effects to air quality are predicted from the proposed alterations.

10.4.3 Dredging of the seabed

Summary of proposed alteration: Dredge pocket extended to accommodate alterations to Berth 1.

Assessment: There is a relatively low potential for odour generation and nuisance to occur during the construction phase of the proposed dredging for the proposed alterations. The potential exists where decayed organic material has the potential to release sulphurous compounds (such as H₂S) or where solvent contamination is uncovered. Should an odour issue become apparent specific measures can be put in place to address the problem. The mitigation measures for the permitted development are entirely appropriate and do not require any changes. No significant effects from odour are predicted from the proposed alterations.

10.4.4 Installation of container handling cranes and terminal transport equipment

Summary of proposed alteration: Change in the type of container handling system and container stacking arrangements; Change in the extent of the container yard; Use of part of the permitted multipurpose storage area for storage of containers.

Assessment: The proposed alterations in operational machinery will not have a significant impact on levels of atmospheric pollution. The originally proposed Rubber Tyre Gantry Cranes (RTG's) and associated terminal transports will be replaced with a handling system that will initially comprise a Straddle Carrier (SC) operation with a subsequent phase including the introduction of 2 nr Rail Mounted Gantry Cranes. The overall change in atmospheric pollutants from the proposed alterations are not significant. Pollution concentration are well below EU and Irish Limit values. No significant effects to air quality are predicted from the proposed alterations.

10.4.5 Maintenance building, administrative buildings and entrance kiosks

Summary of proposed alteration: New Maintenance Building to south of terminal area; Change in location and use for maintenance building in terminal area; Entrance kiosks omitted.

Assessment: The proposed new Maintenance Building and change in use for the maintenance building in the terminal area will not result in significant impacts in terms of air quality & climate. Where applicable, specific measures are already identified in the schedule of commitments confirmed as part of the extant approval for the Ringaskiddy Port Redevelopment. No significant effects to air quality are predicted from the proposed alterations.

10.4.6 Ancillary car parking, lighting and fencing

Summary of proposed alteration: Changes to accommodate new internal terminal layout; New parking provided at new maintenance building.

Assessment: The proposed change in ancillary car parking will not have a significant effect on levels of atmospheric pollution. No significant effects to air quality are predicted from the proposed alterations.

10.4.7 Road Improvements

Summary of proposed alteration: Minor alterations to internal roads on approach to the existing Ferry Terminal.

Assessment: The proposed minor alterations to the internal roads will not have a significant impact on levels of atmospheric pollution. The changes in pollution concentration are insignificant and are

well below EU and Irish Limit values and reflective of levels predicted in the previous assessment. No significant effects to air quality are predicted from the proposed alterations.

10.4.8 Dumping at Sea

The activities required for the transfer of dredged material to the licensed disposal site will be completed by the dredging vessel. The transfer will require the dredged vessel to move back and forth from Ringaskiddy to the licensed site until completion of dredging works. Dredging and disposal operations will be very temporary in duration and are expected to be undertaken within 25 days.

There are numerous vessels coming and going from Cork Harbour and the addition of the dredging vessel will not cause any significant air quality (including odour) & climate impacts. The proposed alterations will not result in any significant air quality effects above those already predicted for the permitted development.

10.4.9 Overall Assessment of the Construction Phase of Proposed Alterations

The traffic flow generated during the construction phase of the proposed alterations will be associated with the construction traffic, comprising contractor's vehicles and HGVs, diggers, and other diesel-powered vehicles. This traffic flow will result in emissions of nitrogen oxides, fine particles and other combustion related pollutants. The operation of these vehicles will be localised. With regard to local air quality, emissions of combustion related pollutants from the construction phase are expected to be negligible. Residual impacts as a result of the proposal are not expected. Impacts during the construction phase such as dust generation and plant vehicle emissions are predicted to be short-lived and only relevant during the construction phase.

There will be intermittent construction dust plumes of varying magnitude generated during various construction activities such as the movement of construction vehicles during the construction phase. The construction phase will have the potential to result in intermittent short term impacts on air quality. The mitigation measures outlined will reduce the impact magnitude to negligible. The mitigation measures remain the same as those enshrined in the extant approval for the permitted Ringaskiddy Port Redevelopment.

Using the IAQM guidance and on the assumption that appropriate dust mitigation measures are applied commensurate with the risk of potential dust impacts, the potential for residual significant effects is considered to be minimal. The following sections breakdown the likely risk and impact for each IAQM assessment stage.

10.4.9.1 Demolition Activities

The IAQM guidance details that, when it comes to the demolition of an existing structure at the proposed development site, a competent individual must assess site and assign it to one of the three potential dust emission classes:

Table 10.6: IAQM Potential Dust Emission Classes

Class	Description (not all criteria needs to be met)
Large	Total building volume >50,000m ³ , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20m above ground level.
Medium	Total building volume 20,000m ³ – 50,000m ³ , potentially dusty construction material, demolition activities 10-20m above ground level.
Small	Total building volume <20,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months.

(Source: IAQM, 2014, pg. 14)

A 'small' dust emission class is assigned to the proposed development due to the limited amount of demolition that will be required on the site.

The level of mitigation required differs depending on a number of factors. The potential dust emission class should be used in conjunction with Table 10.7 which assigns the development site a risk category based upon the results of Table 10.6 and the development sites distance to the nearest receptor.

Table 10.7: Risk Category from Demolition Activities

Distance to Nearest Receptor (m) ^a		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 100	<20	High Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Low Risk Site
200 – 350	40 – 100	Medium Risk Site	Low Risk Site	Negligible

^a These distances are from the dust emission source. Where this is not known then the distance should be from the site boundary. The risk is based on the distance to the nearest receptor.

The risk from dust soiling and PM10 from demolition activities is 'medium' (with no mitigation measures in place) due to the proximity of residential receptors to the south of the site. Risk during demolition on ecological receptors are deemed to be 'low' due to protected designated ecological areas in the immediate vicinity.

10.4.9.2 Earthworks Activities

Earthworks activities essentially involve the excavation, haulage, tipping and stockpiling of materials. Also, such activities can include the levelling of the site and landscaping works. Each site is different and as such, should be assessed on a case by case basis.

Table 10.8: IAQM Potential Dust Emission Classes from Earthworks Activities

Class	Description (not all criteria needs to be met)
Large	Total site area >10,000 m ² , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes.
Medium	Total site area 2,500 m ² – 10,000 m ² , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes;
Small	Total site area <2,500 m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.

A 'small' earthworks class is assigned to the proposed alternatives. Table 10.9 below presents the risk categories for earthworks activities with no mitigation.

Table 10.9: Risk Category from Earthworks Activities

Distance to Nearest Receptor (m) ^a		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Negligible
200 - 350	40 – 100	Low Risk Site	Low Risk Site	Negligible

^a These distances are from the dust emission source. Where this is not known then the distance should be from the site boundary. The risk is based on the distance to the nearest receptor.

There is a ‘medium’ risk from earthworks activities as part of the proposed alterations development at the closest receptors. However, this is without mitigation measures in place. Risks during earthworks on ecological receptors are deemed to be ‘low’ due to protected designated ecological areas in the immediate vicinity.

10.4.9.3 Construction Activities

The proposed alterations are determined to be a ‘small’ class in terms of construction activities. The assessment of potential dust emission class; a number of key issues come into consideration;

- Size of the infrastructure;
- Method of construction;
- Materials used during construction; and,
- Duration of build.

As with assessing all risk categories pertaining to a development; each site is different and as such, should be assessed on a case by case basis.

Table 10.10: IAQM Potential Dust Emission Classes from Construction Activities

Class	Description (not all criteria needs to be met)
Large	Total building volume >100, 000 m ³ , on site concrete batching, sandblasting;
Medium	Total building volume 25,000 m ³ – 100,000 m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching;
Small	Total building volume <25,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber).

Table 10.11 below presents the dust emission class categories which should be taken into consideration when determining potential dust emission arising during construction activities.

Table 10.11: Risk Category from Construction Activities

Distance to Nearest Receptor (m)		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Negligible
200 – 350	40 – 100	Low Risk Site	Low Risk Site	Negligible

There is a ‘medium’ risk from earthworks activities as part of this proposed development. Again, this is without any mitigation measures in place. Risks during construction on ecological receptors are deemed to be ‘low’ due to protected designated ecological areas in the immediate vicinity.

10.4.9.4 Trackout

Concerning trackout impacts; the various factors which can assist in predicting trackout effects as a consequence of the development are;

- Vehicle size;
- Vehicle speed;
- Number of vehicles;
- Geology of the site; and,
- The duration of the activity.

As a general rule, it is perceived that significant trackout can occur up to 500 m from the site, 200m for the medium and 50m for the small sites (2014 EIS, pg. 16).

Table 10.12: IAQM Potential Dust Emission Classes from Trackout

Class	Description (not all criteria needs to be met)
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m;
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

In terms of track-out and due to the number of potential HGVs per day and length of unpaved surface the proposed site is deemed to be 'medium'. Table 10.13 below presents the risk categories for trackout.

Table 10.13: Risk Category from Trackout

Distance to Nearest Receptor (m)		Dust Emission Class		
Dust Soiling and PM ₁₀	Ecological	Large	Medium	Small
<20	-	High Risk Site	Medium Risk Site	Medium Risk Site
20 – 50	<20m	Medium Risk Site	Medium Risk Site	Low Risk Site
50 – 100	20-100	Low Risk Site	Low Risk Site	Negligible

There is a 'medium' risk from track-out activities as part of this proposed development with no mitigation measures put in place. Risk during trackout on ecological receptors are deemed to be 'medium' due to protected designated ecological areas in the immediate vicinity.

The four activities have been assessed in relation to the proposed development for the alterations; a summary table (Table 10.14) is below articulating the findings of the risk categories.

Table 10.14: Summary of Dust Emission Magnitude & Risk of Dust Impacts

Source	Dust Emission Magnitude	Risk of Dust Impacts	Ecological Risk of Dust Impacts
Demolition	Small	Medium	Low
Earthworks	Small	Medium	Low
Construction	Small	Medium	Low
Trackout	Medium	Medium	Medium

Mitigation measures as per the extant conditions for the proposed development will help control dust during the construction phase of the proposed alterations. With mitigation measures in place controls on fugitive dust and exhaust emission will reduce the 'medium' to 'low' risk of impact to 'negligible'.

10.4.10 Overall Assessment of the Operational Phase of Proposed Alterations

The Table 10.15 details selected worst case sensitive receptors. The proposed alterations and associated difference in movement from operational machinery and plant are negligible.

Table 10.15: Sensitive Receptor Location

Receptor name	X(m)	Y(m)	Significance
1.Ringaskiddy Main St	177675	64219	Negligible
2.4 Riverview Ringaskiddy	177706	64219	Negligible
3.Ringaskiddy Main St 2	177755	64221	Negligible
4.Ringaskiddy Footpath	177832	64242	Negligible
5.Ringaskiddy Main St 3	177852	64218	Negligible
6.Ringaskiddy Main St 4	177864	64218	Negligible
7.Ringaskiddy Main St 5	177970	64205	Negligible
8.Ringaskiddy Main St 6	178192	64202	Negligible
9.Ringaskiddy Main St 7	178253	64210	Negligible
10.Marello Pk Ringaskiddy	178313	64199	Negligible
11.Harbour 1 Ecological Designation	178010	64803	Negligible
12.Harbour 2 Ecological Designation	177615	64791	Negligible
13.Off Main N28	177611	64052	Negligible
14.Layby N28	177327	64336	Negligible
15.Shanbally Cross 1	175756	64457	Negligible
16.Shanbally Cross 2	175715	64376	Negligible
17.Shanbally Cross School	175670	64363	Negligible
18.Shanbally Cross 3	175635	64439	Negligible
19.Shanbally Cross 4	175608	64436	Negligible
20.Shanbally Cross 5	175481	64392	Negligible

The annual average NO₂ and PM₁₀, 24-hour PM₁₀ and maximum 1 hour NO₂ concentration limit values will not be exceeded in either the 'do minimum' or 'do something' scenario at any sensitive receptor locations. Any impacts are negligible and not significant in terms of relevant atmospheric pollutants. Full model outputs remain as per the outputs for the permitted development. Table 10.16 summarises dispersion model output results.

Table 10.16: Summary of Detailed Dispersion Model Predictions - NO₂ & PM₁₀

CERC ADMS Dispersion Model Output Scenario	Nitrogen Dioxide Summary	Particulate Matter (in relation to relevant PM10 objectives) Summary
2012 Base	<i>No breaches of Irish Air Quality Objectives / European Limit Values for Annual Mean or 1-Hour Mean</i>	<i>No breaches of Irish Air Quality Objectives / European Limit Values for Annual Mean or 24 Hour Mean</i>
2018 Without - Do Minimum		
2018 With - Do Something		
2023 Without - Do Minimum		
2023 With - Do Something		
2033 Without - Do Minimum		
2033 With - Do Something		

10.5 Mitigation Measures

The mitigation measures that formed part of the An Bord Pleanála approval of the permitted development of the Ringaskiddy Port Redevelopment do not require any changes and remain entirely appropriate to offset any potentially significant effects upon air quality and climate. These mitigation measures apply with equal force to the proposed alterations and the same conclusion is reached.

10.6 Residual Impacts

Residual impacts from the proposed alterations are not anticipated as mitigation measures have been identified to control potential air quality impacts. The proposed alterations will not have a significant negative impact on sensitive receptors at Ringaskiddy.

No air quality impacts have been predicted for the proposed alterations. The air quality mitigation measures enshrined in the extant approval for the Ringaskiddy Port Redevelopment remain unchanged by the proposed alterations.

10.7 Cumulative Impacts

Cumulative impacts may arise from the combined effects of a number of different projects, in combination with the project being assessed, on a single receptor/resource. This can include multiple impacts of the same or similar type from a number of projects upon the same receptor/resource.

A review took place of the planning history for the area to establish projects that might have a potential cumulative impact with the proposed alterations as part of the Ringaskiddy Port Redevelopment. Amongst the permitted projects included in the cumulative assessment were the Monkstown Marina; the five large single wind turbines being developed by Cork Lower Harbour Energy Group; Cobh Marina; Cobh Cruise Berth; and Haulbowline Remediation Project. With regards to planned projects the following have been assessed; Spike Island Masterplan; a potential Cobh Second Cruise Berth.

The air quality and climate assessment has taken into consideration cumulative impacts that takes account of all proposed developments or those that are planned. The contribution of airborne contaminants from site vehicles and plant during the construction phase to local air quality is predicted to be negligible, and effects transient. The cumulative impacts from the proposed alterations, permitted development and other permitted projects (Monkstown Marina; the five large single wind turbines being developed by Cork Lower Harbour Energy Group; Cobh Marina; Cobh Cruise Berth; and Haulbowline Remediation Project) and the planned projects (Spike Island Masterplan and Cobh Second Cruise Berth) on air quality and climate are predicted to be negligible.

No significant air quality and climate impacts have been predicted for the proposed alterations. The mitigation measures enshrined in the extant approval for the Ringaskiddy Port Redevelopment remain unchanged by the proposed alterations.

10.8 Conclusion

The air quality and climate assessment has considered the potential and likely significant effects of the proposed alterations to the existing context of the site and its surrounding environment.

The conclusion of this chapter is that the proposed alterations will not result in any significant change to the assessment of effects and conclusions as previously presented in the assessments for the permitted development and that the mitigation measures enshrined in the extant permission remain applicable.