mitigation measures included with this EIAR. The plan will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site, CIRIA 2005. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent conditions relevant to the proposed development.

8.6.1.1 Flood Risk to Surrounding Areas

- The attenuation storage and the required outlet control to attenuate the discharge flow will be constructed as early as possible in the construction stage; and
- During construction the surface runoff will be directed through the existing storm water drainage system. This will ensure that the discharge to the Santry River shall not exceed greenfield runoff rates.

Following implementation of mitigation, no significant residual impacts are predicted.

8.6.1.2 Water Quality

The following mitigation measures have been identified in the outline Construction Environmental Management Plan (CEMP), the Construction Management Plan (CMP) and the Construction Waste Management Plan (CWMP), all of which have been prepared by J.B.Barry and Partners Limited for planning stage. These reports will form the bases of a construction stage Construction Environmental Management Plan (CEMP) to be prepared by the contractor which will include measures for reduction or elimination of pollution and the schedule of mitigation measures in this EIAR

- Contractor Guidance set out in the Control of Water Pollution from Construction Sites (CIRIA, 2001) shall be adhered to. Good construction management practices will be employed. During the construction stage, all potentially harmful substances (e.g. oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds.
- Foul drainage from all site facilities will be to a public sewer.
- When cast in-place concrete is required, all work must be done in the dry and effectively isolated from any flowing water (or water that may enter rivers or streams) for a period sufficient to ensure no leachate from the concrete;
- No direct discharges to be made to waters where there is potential for cement or other contaminant residues in discharges;
- Designated impermeable cement washout areas must be provided;
- Within the site boundary fence, temporary earth bunds will be constructed to contain surface water run-off and channel it to a silt trap or settlement pond before discharge to the drainage network;
- Any excavated vegetation, soil and subsoil will be temporarily stockpiled away at least 20 m from any surface water features in order to reduce the likelihood of any suspended solids reaching them;
- Discharge points to the drainage network will entail a mechanism for containment of runoff in the event of accidental spillage, to enable clean-up and appropriate disposal through licensed facilities.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996-2012.
- Following implementation of mitigation, the significance of the impact on water quality will be imperceptible.

8.6.2 Mitigation Measures: Operational Phase

Potential operational impacts are substantially mitigated through avoidance by the implementation of good management systems and sensible practices.

8.6.2.1 Flooding

The design of the drainage system has inbuilt mitigation as outlined **Section 8.4.4**. No flooding of the site and surrounding area are predicted. Consequently, no further mitigation is proposed.

8.6.2.2 Water Quality

The incorporation of hydrocarbon interceptors will ensure that any spill is contained before reaching the Santry River.

Following implementation of mitigation, the significance of the impact on water quality will be imperceptible

8.7 Cumulative Impact

The stormwater flows from the adjacent Bridgefield and Blackwood Square apartment developments, and the Cedarview housing development all discharge to the existing attenuation tank located north of Gullivers Retail Park, prior to discharge to the Santry River. The stormwater flows from the proposed development will also discharge this attenuation tank prior to discharge to the Santry River.

The stormwater from the proposed adjacent Whitehaven development (currently under consideration by An Bord Pleanala) which is located to the east of the proposed development site, will not flow to the same tank and will connect to the existing surface water system on Northwood Avenue which flows to the attenuation pond at the east side of Santry Demense before discharge to the Santry River.

As the impacts are imperceptible and unlikely to interact with the impacts of other existing or permitted projects, there are no cumulative impacts predicted.

8.8 Residual Impacts

The predicted overall residual impact of the proposed development on hydrology both during construction and operational stage will be imperceptible.

8.9 References

- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Advice Notes for Preparing Environmental Impact Statements (Draft) (EPA, September 2015); and
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).
- Base maps – Ordnance Survey of Ireland
- Topographical Survey;
- Office of Public Works flood mapping data (www.floodmaps.ie);
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports;
- Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB);
- Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council;
- Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0 (Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council); and
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001);
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));

- Catchments.ie - Water quality data;
- www.GSI.ie - Mapping; and
- Water quality data from the Environmental Protection Agency website (https://gis.epa.ie/EPAMaps/)
- Water Services Report, prepared by JB Barry and Partners Limited.
- Site Specific Flood Risk Assessment Report, prepared by JB Barry and Partners Limited.

9 AIR QUALITY

9.1 Introduction

Chapter 9 (Air Quality) assesses the likely significant air quality impacts associated with the proposed development at Northwood Avenue, Santry, Dublin 9. A description of the development can be found in **Chapter 5** (Project Description) of Volume 2 of this EIAR.

9.1.1 Author Information

This chapter was completed by Niamh Nolan, an environmental consultant in the air quality section of AWN Consulting Ltd. She has two years' experience working in environmental consultancy focussing on air quality. She holds a BSocSci (Hons) in Social Policy and Geography from University College Dublin. She is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Science. She has experience in mapping software primarily in QGIS and she specialises in air quality, climate and sustainability. She has prepared air quality and climate impact assessments for numerous EIARs for a range of projects including commercial, residential and industrial developments.

9.2 Assessment Methodology

9.2.1 Criteria for Rating of Impacts

9.2.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022), which incorporate European Commission Directive 2008/50/EC, which has set limit values for a number of pollutants with the limit values for NO_2, PM_{10} and $PM_{2.5}$ being relevant to this assessment (see **Table 9.1**). Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC).

Table 9.1: Ambient Air Quality Standards & TA Luft

Pollutant	Regulation Note [1]	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/(m^2*day)
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$

Note 1: EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

9.2.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined in **Section 9.2.1.1** have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the Bergerhoff limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from the construction of the proposed development.

9.2.1.3 Fingal Development Plan 2023-2029

The Fingal Development Plan outlines a number of objectives with regards air quality. The the main objective ensures the protection of human health and the environment from harmful emissions, in particular from transport, residential heating, industry and agriculture. The elements of the Plan have been reviewed in reference to the proposed development.

9.2.2 Construction Phase

9.2.2.1 Air Quality

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2014) outlines an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development in order to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site-specific mitigation required. The UK guidance is recommended for use in the Transport Infrastructure Ireland (TII) guidance document *PE-ENV-01106 'Air Quality Assessment of Specified Infrastructure Projects'* (2022).

Construction phase traffic also has the potential to impact air quality. The TII guidance document *PE-ENV-01106 'Air Quality Assessment of Specified Infrastructure Projects'* (2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. This approach is considered best practice and can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic has been reviewed against the above criteria to determine whether a detailed air quality assessment is required for the construction phase. It was determined that as the construction stage traffic does not meet any of the above criteria, a detailed air quality assessment is not required as there is no potential for significant impacts to air quality from traffic emissions.

9.2.3 Operational Phase

9.2.3.1 Air Quality

Operational phase traffic has the potential to impact air quality. The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2022) and using the methodology outlined in the guidance documents published by TII (2022). This approach is considered best practice and can be applied to any development that causes a change in traffic.

The TII PE-ENV-01106 (2022) scoping criteria outlined in **Section 9.2.2.1** of this chapter was used to determine the road links required for inclusion in the modelling assessment. As none of the road links impacted by the proposed development met the scoping criteria a detailed assessment was scoped out as there is no potential for significant impacts to air quality from traffic emissions.

9.3 Baseline Scenario (Existing Environment)

9.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants, and for ground-level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport meteorological station, which is located approximately 2.2 km north of the site. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see **Figure 9-1**). For data collated during five representative years (2017 - 2021), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.3 m/s over the period 1981 - 2010 (Met Eireann, 2023).

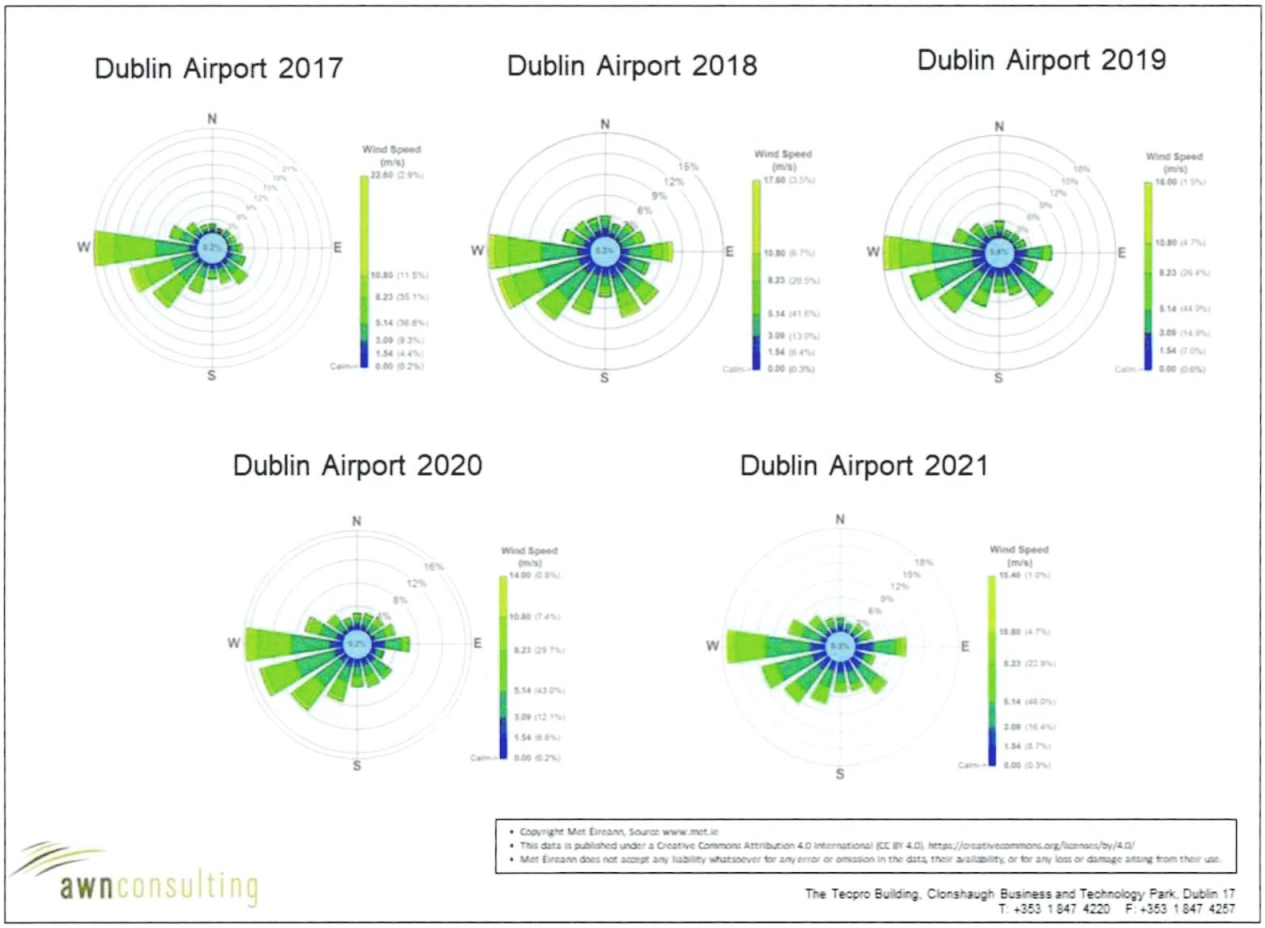

Figure 9-1: Dublin Airport Windrose 2017 – 2021

Source: Met Eireann, 2023

9.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2021*" (EPA, 2022a). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2022b).

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2022b). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone A (EPA, 2022b). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

In 2020 the EPA reported (EPA, 2022a) that Ireland was compliant with EU legal air quality limits at all locations, however this was largely due to the reduction in traffic due to Covid-19 restrictions. The EPA *Air Quality in Ireland 2020* report details the effect that the Covid-19 restrictions had on air monitoring stations, which included reductions of up to 50% at some monitoring stations which have traffic as a dominant source. 2020 concentrations are therefore predicted to be an exceptional year and not consistent with long-term trends. The EPA *Air Quality in Ireland 2021* report details a return to pre-COVID-19 traffic levels where monitoring stations had traffic as a dominant source and as such, is once again can be used to determine baseline levels of pollutants in the vicinity of the proposed development.

9.3.2.1 NO_2

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2022a), at suburban Zone A background locations in Rathmines, Dun Laoghaire, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 11 – 22 µg/m^3 over the period 2017 – 2021 (see **Table 9.2**). Swords is the closest representative monitoring station to the proposed development. Based on these results, an estimate of the current background NO_2 concentration in the region of the proposed development is 16 µg/m^3.

Table 9.2: Trends In Zone A Air Quality – Nitrogen Dioxide (µg/m^3)

Station	Averaging Period	Year				
		2017	2018	2019	2020	2021
Rathmines	Annual Mean NO_2 (µg/m^3)	17	20	22	13	14
	99.8th%ile 1-hr NO_2 (µg/m^3)	86	87	102	81	69
Ballyfermot	Annual Mean NO_2 (µg/m^3)	17	17	20	12	13
	99.8th%ile 1-hr NO_2 (µg/m^3)	112	101	101	83	73
Dun Laoghaire	Annual Mean NO_2 (µg/m^3)	17	19	15	14	16
	99.8th%ile 1-hr NO_2 (µg/m^3)	101	91	91	78	73
Swords	Annual Mean NO_2 (µg/m^3)	14	16	15	11	11
	99.8th%ile 1-hr NO_2 (µg/m^3)	79	85	80	65	63

Note 1: Annual average limit value of 40 µg/m^3 and hourly limit value of 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

Note 2: Data for 2020 shown for representative purposes only, not used in determining background concentrations

9.3.2.2 PM_{10}

Long-term PM_{10} monitoring was carried out at the suburban Zone A locations of Rathmines, Dún Laoghaire, Tallaght, Phoenix Park and Ballyfermot. Concentrations over the 2017 – 2022 period are in compliance with both the annual and daily limit values (EPA, 2022a). The average annual mean concentrations range from 9 – 16 µg/m^3 over the period 2017– 2022 (see **Table 9.3**). In addition, there were at most 9 exceedances (in Rathmines in 2019) of the daily limit value of 50 µg/m^3, albeit 35 exceedances are permitted per year. Based on the above information, an estimated background concentration of 14 µg/m^3 has been used in this assessment.

Table 9.3: Trends in Zone A Air Quality – PM_{10} (µg/m^3)

Station	Averaging Period	Year				
		2017	2018	2019	2020	2021
Ballyfermot	Annual Mean PM_{10} (µg/m^3)	12	16	14	12	12
	24-hr Mean > 50 µg/m^3 (days)	1	0	7	2	0
Dún Laoghaire	Annual Mean PM_{10} (µg/m^3)	12	13	12	12	11
	24-hr Mean > 50 µg/m^3 (days)	2	0	2	0	0
Tallaght	Annual Mean PM_{10} (µg/m^3)	12	15	12	10	10
	24-hr Mean > 50 µg/m^3 (days)	2	1	3	0	0

Rathmines	Annual Mean PM_{10} (µg/m³)	13	15	15	11	12
	24-hr Mean > 50 µg/m³ (days)	5	2	9	2	0
Phoenix Park	Annual Mean PM_{10} (µg/m³)	9	11	11	10	10
	24-hr Mean > 50 µg/m³ (days)	1	0	2	0	0

Note 1: Data for 2020 shown for representative purposes only, not used in determining background concentrations

9.3.2.3 $PM_{2.5}$

Annual mean concentrations of $PM_{2.5}$ monitoring at the Zone A location of Rathmines over the period 2017 – 2021 (EPA, 2022a) ranged from 8 - 10 µg/m³ and indicated an average $PM_{2.5}/PM_{10}$ ratio ranging from 0.60 – 0.75. Based on this information, a conservative ratio of 0.8 was used to generate a background $PM_{2.5}$ concentration of 11.2 µg/m³.

Based on the above information the air quality in the Dublin area is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2, with the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2022a).

9.3.3 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document 'Guidance on the Assessment of Dust from Demolition and Construction' (2014) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high-sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

In terms of receptor sensitivity to dust soiling, there are approximately 40 high-sensitivity residential properties within 20 - 50m of the main works area of the proposed development site. Based on the IAQM criteria outlined in **Table 9.4**, the worst-case sensitivity of the area to dust soiling is considered *medium.*

Table 9.4: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	**<50**	**<100**	**<350**
High	>100	High	High	Medium	Low
	10-100	High	**Medium**	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. In terms of receptor sensitivity to human health impacts, the IAQM guidance defines high-sensitivity receptors as "*locations where* members *of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day)*" (IAQM, 2014). Examples include

residential properties, schools and hospitals. Office and shop workers are considered of medium sensitivity. Low sensitivity receptors are areas where exposure is transient such as public footpaths and shopping streets.

A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 14 µg/m^3 and there are approximately 40 high-sensitivity receptors located within 50m of the proposed development site. Based on the IAQM criteria outlined in **Table 9.5**, the worst-case sensitivity of the area to human health impacts is considered *low*.

Table 9.5: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	**Low**	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low	Low

Ecological sites within 50 m of the proposed development site need to be considered in relation to dust impacts (IAQM, 2014). There are no designated ecological sites within 50m of the boundary of the site and as such, the sensitivity of the area to dust-related ecological impacts is not applicable.

9.4 Impact Assessment

9.4.1 Do Nothing

In the Do Nothing scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc.). The Do Nothing scenario is considered neutral in terms of air quality and climate.

9.4.2 Construction Phase

9.4.2.1 Air Quality

The construction phase has the potential to impact air quality through construction dust emissions. The following determines the potential dust impacts as a result of the proposed development. **Section 9.6** determines the cumulative construction dust impacts as a result of the overlapping construction phases of the proposed development and other proposed and permitted developments within 350m of the site.

While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Dublin Airport meteorological data (see **Section 9.3.1**) indicates that the prevailing wind direction is westerly to south-westerly, and wind speeds are generally moderate in nature. In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30 year average data for Dublin Airport indicates that on average 191 days per year have rainfall over 0.2 mm (Met Eireann, 2023), and therefore it can be determined that over 50% of the time dust generation will be reduced.

In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust-generating activity needs to be taken into account, in conjunction with the

previously established sensitivity of the area (see **Section 9.3.3**). The major dust-generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts.

These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

The proposed development includes the demolition of a car park and associated features. However, this is more in line with earthworks in the context of dust generation and as such has been included in the following earthworks analysis. No other demolition works are proposed.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **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 – 8 m in height, total material moved 20,000 – 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.

Following the IAQM guidance (2014), the proposed earthworks can be classified as 'large' as a worst case. When combining this with the previously established sensitivity of the area (**Section 9.3.3**) this results in an overall medium risk of dust soiling impacts and a low risk of human health impacts as a result of earthworks activities (see **Table 9.6**).

Table 9.6: Risk of Dust Impacts - Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **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).

The dust emission magnitude from construction associated with the proposed works can be classified as 'large', as a worst case estimate. Therefore, there is an overall medium risk of dust soiling impacts and a low risk of human health impacts as a result of the proposed construction activities (**Table 9.7**).

Table 9.7: Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium:** 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small:** < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

The dust emission magnitude for the proposed trackout can be classified as 'large' as worst-case there will be greater than 50 outward HGV movements per day at peak times. As outlined in **Table 9.8**, combining this with a medium sensitivity to dust soiling results in an overall medium risk of impacts as a result of the proposed trackout activities in the absence of mitigation. There is an overall low risk of human health impacts as a result of trackout activities as the overall sensitivity of the area to human health impacts is low (**Section 9.3.3**).

Table 9.8: Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed development are summarised in **Table 9.9** for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity in order to prevent significant impacts from occurring.

There is at most a medium risk of dust impacts as a result of the proposed construction phase. Therefore, in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities, dust mitigation measures associated with medium-risk impacts will be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter (**Section 9.5**) are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors. In the absence of mitigation, there is the potential for short-term, localised, slight dust related impacts to air quality as a result of the proposed development.

Table 9.9: Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium Risk	Medium Risk	Medium Risk
Human Health	N/A	Low Risk	Low Risk	Low Risk

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfies the TII assessment criteria in **Section 9.2.2.1.**

It can therefore be determined that the construction stage traffic will have an *imperceptible, direct, neutral* and *short-term* impact on air quality.

9.4.2.2 Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per **Section 9.3.3** the surrounding area is of low sensitivity to dust-related human health impacts. It was determined that there is an overall low risk of dust-related human health impacts as a result of the construction phase of the proposed development. Therefore, in the absence of mitigation there is the potential for *imperceptible*, *direct*, *neutral*, *short-term* impacts to human health as a result of the proposed development.

9.4.3 Operational Phase

9.4.3.1 Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, PM_{10} and $PM_{2.5}$.

Traffic flow information obtained from the consulting engineers on this project, was reviewed prior to assessing the impact of the proposed development. It was concluded that further assessment of impacts from the aforementioned pollutant emissions can be screened out using the TII PE-ENV-01106 (2022) guidance.

The proposed development will not increase traffic levels by more than the scoping criteria (see **Section 9.2.2.1**), therefore, an assessment of the impact of traffic emissions during the operational phase on ambient air quality is not necessary as no significant impacts are likely. The traffic data included the proposed development in addition to other permitted developments in the vicinity of the site where such information was available. It can be concluded that the impact of the proposed development in terms of air quality is *long-term, localised, direct, neutral* and *imperceptible*.

9.4.3.2 Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, the change in traffic associated with the proposed development is not of the magnitude to result in significant impacts. Levels of all pollutants are predicted to be below the ambient air quality standards set for the protection of human health (**Table 9.1**) once the proposed development is operational. It can be determined that the impact to human health during the operational stage is *long-term, direct, neutral* and *imperceptible.*

9.5 Mitigation Measures

9.5.1 Construction Phase

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following mitigation measures have been recommended by drawing on best practice guidance from Ireland, the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These

measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

Site Management

The aim is to ensure good site management by preventing dust from becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see **Figure 9-1** for the windrose for Dublin Airport). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production, and the site is active for an extensive period.

- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 20 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and the burning of waste materials.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to the control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation measures can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

9.5.2 Operational Phase

There are no mitigation measures proposed for the operational phase of the proposed development.

9.6 Cumulative Impact

9.6.1 Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other development within 350m, then there is the potential for cumulative construction dust impacts. Permitted and existing developments under construction within 350m of the site have been reviewed in conjunction with the impacts of the proposed development to determine the potential for cumulative construction dust impacts.

There are no developments within 350m of the site that have the potential for cumulative construction dust impacts on air quality. Should the construction phases of any development coincide with that of the proposed development, then there is the potential for cumulative construction dust impacts to nearby receptors.

However, provided the mitigation measures outlined in **Section 9.5** are in place for the duration of the construction phase, cumulative dust related impacts to nearby sensitive receptors are not predicted to be significant. Cumulative impacts to air quality will be direct, short-term, localised, negative and imperceptible.

9.6.2 Operational Stage

The traffic data provided for the operational stage impacts to air quality included the cumulative traffic associated with other existing and permitted developments in the local area where such information was available. Therefore, the cumulative impact is included within the operational stage impact for the proposed development (see **Section 9.4.3**). The impact is predicted to be long-term, direct, neutral and imperceptible in relation to air quality.

9.7 Residual Impact

9.7.1 Construction Stage

9.7.1.1 Air Quality

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared (**Section 9.5.1**). Provided the dust minimisation measures outlined are adhered to, the predicted residual air quality impacts during the construction phase are direct, short-term, negative, localised and imperceptible.

9.7.1.2 Human Health

The measures outlined in **Section 9.5.1** are mitigation measures for medium risk sites. They will focus on the proactive control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during the construction of the proposed development will ensure that the development complies with all EU ambient air quality legislative limit values, which are based on the protection of human health (see **Table 9.1**). Therefore, the predicted residual impact of the construction of the proposed development is *direct, negative, short-term and imperceptible* with respect to human health.

9.7.2 Operational Stage

9.7.2.1 Air Quality

As the traffic generated by the proposed development does not meet the criteria detailed in **Section 9.2.2.1** for requiring a detailed air quality assessment, the residual impact to air quality from traffic emissions during the operational stage is predicted to be *direct, neutral, long-term* and *imperceptible.*

9.7.2.2 Human Health

Emissions of air pollutants are predicted to be significantly below the ambient air quality standards which are based on the protection of human health (**Table 9.1**). Impacts to human health are *long-term, direct, neutral* and *imperceptible.*

9.8 Monitoring

9.8.1 Construction Phase

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting

vessel located approximately 2 m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days).

9.8.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be *imperceptible.*

9.9 References

- X BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites
- Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Dublin City Council (2018) Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition
- Environmental Protection Agency (2015) Advice Notes for Preparing Environmental Impact Statements – Draft
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Environmental Protection Agency (2022) Air Quality Monitoring Report 2021 (& previous annual reports)
- Fingal County Council (2023) Fingal Development Plan 2023-2029
- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1
- Met Éireann (2023) Met Eireann website: https://www.met.ie/
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- Transport Infrastructure Ireland (2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106
- Transport Infrastructure Ireland (2022b) TII Road Emissions Model (REM): Model Development Report – GE-ENV-01107
- UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)

10 MICROCLIMATE: SUNLIGHT AND DAYLIGHT

10.1 Introduction

ARC Architectural Consultants Ltd has been retained by the Applicant to prepare this Sunlight and Daylight Access Analysis of the proposed Large-Scale Residential Development 'Swift Square Apartments' on lands located to the north of Swift Square Office Park and Northwood Avenue, Santry, Dublin 9.

10.1.1 Author Information

This chapter was prepared by Amy Hastings BCL BL MSc (Spatial Planning) MIPI, who has worked as a partner in ARC Consultants since 2004. She is qualified as a planner and a barrister and has worked as a planning consultant in private practice since 2002. Her role in ARC is the provision of environmental assessment services, planning services and planning legal services. Since 2004, Amy has undertaken hundreds of assessments of sunlight and daylight access, as part of planning applications, planning enforcement matters and rights to light cases. She conducted research into the relationship between rights to light law and modern town planning (see, for example, *'Rights to Light Law and the Potential for Use of its Principles in the Assessment of Planning Applications under the Planning and Development Act 2000, as amended'* (2011) 18(2) IPELJ 74. She has also delivered continuous professional development lectures on the subject of sunlight and daylight access analysis to planning professionals and was an occasional lecturer on the subject of sunlight and daylight access analysis to the UCD School of Architecture, Planning and Environmental Policy.

10.1.2 Scope

This chapter assesses the impact of the proposed development on sunlight and daylight access to lands outside the application site as part of the EIAR. Sunlight and daylight access within the application site is assessed in the document entitled *Assessment of Sunlight & Daylight Access within the Proposed Development*, which is submitted separately as part of the application.

In assessing sunlight and daylight access analysis, Irish practitioners tend to refer to the relevant *Site layout planning for daylight and sunlight: a guide to good practice* for the Building Research Establishment (the BRE Guide, a third edition of which was published in June 2022).

Section 1.7 of the BRE Guide provides: *"The guidance here is intended for use in the UK and Republic of Ireland"*. The *Fingal Development Plan 2023-2029* (Fingal Development Plan) states that *"Development shall be guided by the principles of "Site Layout Planning for Daylight and Sunlight, A Guide to Good Practice – (Building Research Establishment Report) 2011" and/or any updated guidance."*

Its use in assessing impacts on sunlight and daylight access as part of the planning process is supported by national government planning policy[11] including:

- The Guidelines for *Planning Authorities on Sustainable Residential Development in Urban Areas*, which, at Section 7.2 states: *"Planning authorities should require that daylight and shadow projection diagrams be submitted in all such proposals. The recommendations of "Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice" (B.R.E. 1991)[12] or B.S. 8206 "Lighting for Buildings, Part 2 1992: Code of Practice for Daylighting" should be followed in this regard."*
- The *Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities*, which, at Section 6.6, states: *"Planning authorities should avail of appropriate expert advice where necessary and have regard to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2019 and the associated BRE guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context, when undertaken by development proposers which offer the capability to satisfy minimum standards of daylight provision."*

[11] For the avoidance of doubt, please note that planning policy guidelines were not considered when classifying the magnitude and extent of potential impact of the proposed development on sunlight and daylight access.

[12] The Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas refer to the first edition of the BRE Guide as published in 1991. A second edition of the Guide was published in 2011.

- The *Urban Development and Building Height Guidelines*, which, at Section 3.2, states: "*Appropriate and reasonable regard should be taken of quantitative performance approaches to daylight provision outlined in guides like the Building Research Establishment's 'Site Layout Planning for Daylight and Sunlight' (2nd edition) or BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'. Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.*"

The standards for daylight and sunlight access in buildings (and the methodologies for assessment of same) suggested in the BRE Guide have been referenced in preparing this chapter. The *BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting'* was withdrawn in May 2019, while *BS EN 17037: Daylight in Buildings* was adopted in the United Kingdom in May 2019. Given this, this Chapter does not refer to BS 8206-2: 2018. In the interests of clarity, it should further be noted that this Chapter does not refer to *IS EN 17037: Daylight in Buildings* or *BS EN 17037: Daylight in Buildings* as the recommendations of those documents relate to the design of new buildings. Neither IS EN 17037 nor BS EN 17037 provide any guidance on the assessment of impacts on sunlight and daylight access within existing buildings.

The BRE Guide does not set out rigid standards or limits, but is preceded by the following very clear warning as to how the design advice contained therein should be used:

> *"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design."* [Emphasis added.]

10.2 Baseline Scenario (Existing Environment)

The application site comprises a largely vacant site, incorporating the existing surface car parking area associated with Swift Square Office Park, located to the north of Northwood Avenue and to the south of Cedarview at Santry, Dublin 9. To the south, the site is bounded by 2 no. five storey commercial blocks at Swift Square.

Lands to the north and south of Northwood Avenue are largely in residential use. To the north, Cedarview is a housing development of two storey terraced houses. The eight storey Blackwood Square residential development (also developed by the Applicant under ABP Ref. ABP-306075-19) was recently completed and is located to the north west separated from the application site by a band of mature trees. Planning permission was granted for a residential development in eight and nine storey blocks on the adjoining site to the east at Whitehaven (ABP Ref. TA06F.313317), but this development has yet to be constructed. It is also noted that, to the south of Northwood Avenue, there are several large apartment developments including Lymewood Mews (four to six storeys) and the four to six storey apartment development at Carrington.

10.3 Daylight Access Impact Analysis

10.3.1 Assessment Methodology

Daylight is defined in *Site layout planning for daylight and sunlight: a guide to good practice for the Building Research Establishment (*the BRE Guide) as "combined skylight and sunlight". For the purpose of this analysis, **Section 10.3** assesses the impact of the construction of the proposed development on daylight reaching defined opes in existing buildings (e.g., windows or other openings in existing buildings, such as patio doors) when the weather is overcast.

The impact of the proposed development on rays of the sun reaching neighbouring lands is described in **Section 10.4** below.

10.3.2 Assessment Approach

In identifying receptors particularly sensitive to changes in the daylight environment, ARC considered two factors:

- (i) the use of receptors (i.e. buildings) surrounding the application site: Section 2.2.2 of the BRE Guide provides: "The guidelines given here are intended for use for rooms in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas, and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight; this would normally include schools, hospitals, hotels and hostels, small workshops and some offices";
- (ii) the location of receptors relative to the application site: as set out in section 2.2.23 of the BRE Guide "If any part of a new building or extension, measured in vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends to an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected." (Emphasis added).

Section 2.2.23 of the BRE Guide suggests that:

> *"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if ...*
>
> - *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value*
> - *the area of the working plane in a room which can receive direct skylight is reduced to less than 0.80 times its former value."*

[PLEASE NOTE: calculation of the area of the working plane in a room within an existing building, which can receive direct skylight, can only be carried *"where room layouts are known (for example if they are available on the local authority's planning portal)."*]

Section 2.2.4 of the BRE Guide states: *"Loss of light to existing windows need not be analysed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window. In these cases the loss of light will be small. Thus if the new development were 10 m tall, and a typical existing ground floor window would be 1.5 m above the ground, the effect on existing buildings more than 3 x (10-1.5) = 25.5 m away need not be analysed."*

Applying the tests set out in Sections 2.2.23 and 2.2.4 of the BRE Guide (2022), the receptors most sensitive to changes in the daylight environment as a result of the construction of development on the application site would be windows facing towards the proposal at low levels of accommodation in buildings in residential use in close proximity to the site. Therefore, ARC identified a representative sample of rooms and windows in existing residences at Cedarview and Blackwood Square for detailed quantitative analysis. Please note that analysis of the potential impact of development on sunlight access to additional windows (i.e. Windows 91-101) at Blackwood Square is carried out under Section 10.4 below. However, as the tests at Sections 2.2.23 and 2.2.4 do not apply to Windows 91-101, those windows have not been included in detailed analysis under this section. It is further noted that there are no structures on the existing site to the west, which is the subject of a planning permission for a residential development in eight and nine storey blocks on the adjoining site to the east at Whitehaven (ABP Ref. TA06F.313317). As this development has not been constructed, analysis of the impact of the proposal on this envisaged developments is not included in this section. In the interests of completeness, ARC also undertook assessment of a number of windows within the non-residential buildings to the south at Swift Square. Existing buildings or windows were omitted from the sample where there was sufficient data within the sample to allow a reasonable inference to be made about the likely impact on that existing building (e.g. where the impact on an existing building closest to a new structure was included in the sample, windows in more distant buildings could be excluded from the sample).

A three-dimensional digital model of the proposed development, the permitted Whitehaven development on the adjoining site to the east and of existing buildings in the area was constructed by ARC Consultants based on drawings and three dimensional models supplied by the Design Team. Where survey data of surrounding context was not available, assumptions were made, with reference to on-site, satellite and aerial photography and to the online planning register, where relevant, in the creation of the three-dimensional model. At paragraph G1.2, the BRE Guide states: *"It is generally more difficult to calculate the effects of trees on daylight because of their irregular shapes and because some light will generally penetrate through the tree crown. Where the effect of a new building on existing buildings nearby is being analysed, it is usual to ignore the effect of existing trees."* Given this, existing and proposed landscaping was not included in this model.

ARC assessed the Vertical Sky Component of each sample window at a point at the centre of each sample window. Having regard to the extreme variability in sky luminance over the course of any given day depending on weather conditions and the changing seasons, this daylight access analysis uses the Commission Internationale de l'Eclairage (CIE) Standard Overcast Sky Distribution model in its calculations, which is the standard sky most commonly used in daylight access analysis and the sky recommended by the BRE Guide for use in assessing Vertical Sky Component. This model assumes that sky luminance varies from horizon to zenith and is considered to correspond to an overcast day. As such, calculation of daylight levels in a room in circumstances where the sky luminance corresponds to the CIE Standard Overcast Sky Distribution could be considered to represent a worst case scenario.

10.3.3 Definition of Study Area

The study area for the overview assessment of the potential impact of the proposed development on daylight access to existing buildings considered an area 200 m around the application site. For the purposes of detailed analysis, ARC undertook detailed quantitative analysis of the potential impact of the proposed development on daylight access to a sample of receptors in existing buildings with that sample being chosen with reference Section 2.2.4 of the BRE Guide and the factors outlined in **Section 10.3.2** above.

Section 2.2.4 of the BRE Guide states: *"Loss of light to existing windows need not be analysed if the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window. In these cases the loss of light will be small. Thus if the new development were 10 m tall, and a typical existing ground floor window would be 1.5 m above the ground, the effect on existing buildings more than 3 x (10-1.5) = 25.5 m away need not be analysed."*

10.3.4 Assessment Criteria

The assessment of the impact of the proposed development on daylight access had regard to the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency (2022), and to Directive 2011/92/EU (as amended by Directive 2014/52/EU) on the assessment of the likely effects of certain public and private projects on the environment.

In assessing whether a predicted effect of the proposal on daylight access is likely to be "imperceptible", "not significant", "slight", "moderate", "significant", "very sign

ificant" or "profound" within the meaning of the EPA's *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, ARC referred to Appendix H of the BRE Guide sets out advice on environment impact assessment. It states:

H4 The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied.

H5 Where the loss of skylight or sunlight fully meets the guidelines in this document, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines, and a larger number of windows or open space area are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.

H6 Where the loss of skylight or sunlight does not meet the guidelines in this document, the impact is assessed as minor, moderate or major adverse. Factors tending towards a minor adverse impact include:

- *only a small number of windows or limited area of open space are affected*
- *the loss of light is only marginally outside the guidelines*
- *an affected room has other sources of skylight or sunlight*
- *the affected building or open space only has a low level requirement for skylight or sunlight*

- *there are particular reasons why an alternative, less stringent, guideline should be applied, for example an overhang above the window or a window standing unusually close to the boundary.*

H7 Factors tending towards a major adverse impact include:

- *a large number of windows or large area of open space are affected*
- *the loss of light is substantially outside the guidelines*
- *all the windows in a particular property are affected*
- *the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children's playground.*

Having considered the factors outlined in Appendix H of the BRE Guide, ARC's assessment classifies the impact of the proposed development on daylight access within existing buildings with reference to the list of definitions set out at Table 3.3: Descriptions of Effects contained in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* prepared by the Environmental Protection Agency. The definitions from the EPA document are in italics, while some comment is also given below on what ARC considers these definitions might imply in the case of daylight access (e.g. having regard to Appendix H of the BRE Guide). Please note that, for the purpose of this report, the word "effect" is taken to have the same meaning as the word "impact".

- *Imperceptible: An effect capable of measurement but without significant consequences.* The definition implies that the development would cause a change in the daylight received at a location, capable of measurement, but not noticeable to the casual observer. If the development caused no change in daylight access, there could be no effect. Examples of "imperceptible" impacts on daylight access would include:

e. a scenario where the proposed development is predicted to reduce the Vertical Sky Component received by a sample window, but the sample window will continue to receive the relevant recommended level of Vertical Sky Component after the construction of the proposed development; and

f. a scenario where the proposed development is predicted to reduce the Vertical Sky Component to not less than 0.8 times its former value (i.e. the BRE Guide threshold for an adverse impact).

- *Not Significant:* An effect which causes noticeable changes in the character of the environment but without significant consequences. The definition implies that the development would cause a change in the daylight received at a location, which is capable of measurement and capable of being noticed by an observer who is taking an active interest in the extent to which the proposal might affect daylight access.

- *Slight: An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.* For this definition to apply, the amount of daylight received at a location would be changed by the construction of the development to an extent that is both capable of measurement and is noticeable to a minor degree. However, the daylight environment within an existing building should remain largely unchanged. An example of a "slight" impact would be a scenario where, although the impact of the proposed development is not predicted to reduce the amount of daylight received by a sample window to less than 0.8 times its former value, the amount of light received by the sample window is predicted to fall below a key recommended level, whether that is the BRE Guide recommended target value or an alternative target value. A further example of a "slight" impact would be where, although the construction of the proposed development is predicted to reduce the amount of light received to a level below the BRE Guide threshold for an adverse impact, the predicted reduction is just outside that BRE Guide threshold (e.g. the amount of daylight received by a sample window or sunlight received by a sample window or garden falls to not less than 0.7 times its existing value*). A "slight" impact could also occur where there is a more considerable reduction in daylight or sunlight by a sample window within an existing building, but only a small number of windows within that property are affected to that extent.

- *Moderate: An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.* In this case, a development must bring about a change in the daylight environment within an existing building; and this change must be consistent with a pattern of change that is already occurring, is likely to occur. A moderate effect would occur where other developments were bringing about changes in daylight access of similar extent in the area. A "moderate" impact might also be considered to occur where the level of daylight received by a sample

window falls below the BRE Guide recommended level and to between 0.5 and 0.7 times its existing value, subject to consideration of other factors*.

- *Significant: An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.* The definition implies that the existence of the development would change the extent of daylight access in a manner that is not *"consistent with existing and emerging baseline trends"*. For example, a development resulting in a *"significant"* diminution of daylight access would reduce daylight to the extent that minimum standards for daylighting are not met and artificial lighting is required for part of the day. A "significant" impact could occur where the predicted reduction in daylight access is greater than what is envisaged to occur if the application site were developed in line with existing and emerging baseline trends. Subject to consideration of other factors, a "significant" impact could occur where daylight access to the sample window falls to between 0.25 and 0.5 times its former value*.
- *Very Significant: An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.* The definition implies that the existence of the development would change the extent of daylight access to a considerable degree and in a manner that is not *"consistent with existing and emerging baseline trends"*. For example, a *"very significant"* effect would occur where a development would result in daylight received in a room falling well below the minimum standards for daylighting and where artificial lighting would be required in that room as the principal source of lighting all the time. A "very significant" impact could occur where the predicted reduction in daylight access is considerably greater than what is envisaged to occur if the application site were developed in line with existing and emerging baseline trends. Subject to consideration of other factors, a "very significant" impact could occur where daylight access to the sample window or sunlight access to the sample window or garden falls to between 0.01 and 0.25 times its former value[13]*.
- *Profound: An effect which obliterates sensitive characteristics.* Examples of development resulting in a *"profound"* effect on daylight access would include facilitating daylight access to a room in an existing building where the existing room has none (e.g. as a result of the demolition of a building) or by removal of all access to daylight within an existing building.

The character of impacts may be positive, negative or neutral. In relation to daylight access, it is conceivable that a development could result in positive effects, but this implies that a development would involve a reduction of the size or scale of built form (e.g. such as the demolition of a building, which might result in an increase in daylight access). Though that is possible, it is usually unlikely as most development involves the construction of new obstructions to daylight access. Please note that, as the BRE Guide tends to refer to "adverse" impacts, the terms "adverse" and "negative" impact are used interchangeably.

10.3.5 Impact Assessment

10.3.5.1 Do Nothing

In a "do nothing" scenario, the existing daylight environment within neighbouring buildings will remain unchanged.

10.3.5.2 Construction Phase

The potential impact of the construction phase of the proposed development on daylight access is likely to be, initially, lesser than the potential impact of the completed development. As the proposed development nears completion, the potential impact of the emerging development is likely to be similar in all material respects to that of the completed development. It is noted that temporary structures and machinery (e.g., hoarding, scaffolding, cranes, etc.) have the potential to result in changes in daylight access in buildings, although any additional impacts arising from temporary structures or machinery are likely to be temporary and minor.

[13] Please note that, while this section sets out indicative quantitative ranges that could apply to each type of impact, this assessment considers a range of factors (such as relevant target values, the use of the affected building, the number of rooms affected within the building, etc) in classifying impacts.

10.3.5.3 Operational Phase

Section 2.1.1 of the BRE Guide provides that "The quantity and quality of daylight inside a room will be impaired if obstructing buildings are large in relation to their distance away". Generally speaking, new development is most likely to affect daylight access in existing buildings in close proximity to the application site.

Overview of the potential impact of the proposed development on daylight access to existing buildings outside the application site

ARC's analysis indicates a potential for the proposed development to result in "imperceptible" to "slight" impacts on daylight access to opposing houses at Cedarview (e.g. Nos. 31-42 Cedarview), with a potential for "slight" to "moderate" impacts on daylight access within a small number of rooms at No. 33 Cedarview. The potential for the proposed development to result in impacts on daylight access within other houses at Cedarview is low with potential impacts on daylight access within dwellings ranging from none to "imperceptible".

To the west, the proposed development is likely to result in "imperceptible" to "moderate" impacts on daylight access within opposing rooms within the recently constructed, residential development at Blackwood Square, which has also been developed by the Applicant. The proposed development is unlikely to result in material impacts on daylight access within most units at Blackwood Square within the meaning of the BRE Guide.

To the south, the proposed development has the potential to result in "imperceptible" to "slight" impacts on Block 1 and "imperceptible" to "moderate" impacts on daylight access within Block 2 of the office development at Swift Square.

There are no structures on the existing site to the west, which is the subject of a planning permission for a residential development in eight and nine storey blocks on the adjoining site to the east at Whitehaven (ABP Ref. TA06F.313317).

Given that the potential for development to result in impacts on daylight access diminishes with distance, it is the finding of ARC's analysis that the proposed development will have no undue adverse impact on daylight access within buildings in the wider area surrounding the application site.

Detailed analysis of the potential impact of the proposed development on daylight access to existing buildings outside the application site

This chapter assesses the impact of the proposed development to all potential receptors surrounding the application site - these impacts are described in the overview section above. However, by way of example in order to illustrate briefly the findings outlined in the overview section, ARC conducted detailed analysis of the potential for the proposed development to result in impacts on daylight access to a representative sample of sensitive receptors (i.e. rooms) in buildings in proximity to the application site (please see **Figures 10-1, 10-2 and 10-3** below).

Figure 10-1: Overview diagram showing the application lands in the context of surrounding developments

Source: ARC Architectural Consultants Ltd

Figure 10-2: Indicative diagram showing location of sample windows (in yellow) at Cedarview (Zones 01-84) assessed as part of this analysis.

Source: ARC Architectural Consultants Ltd

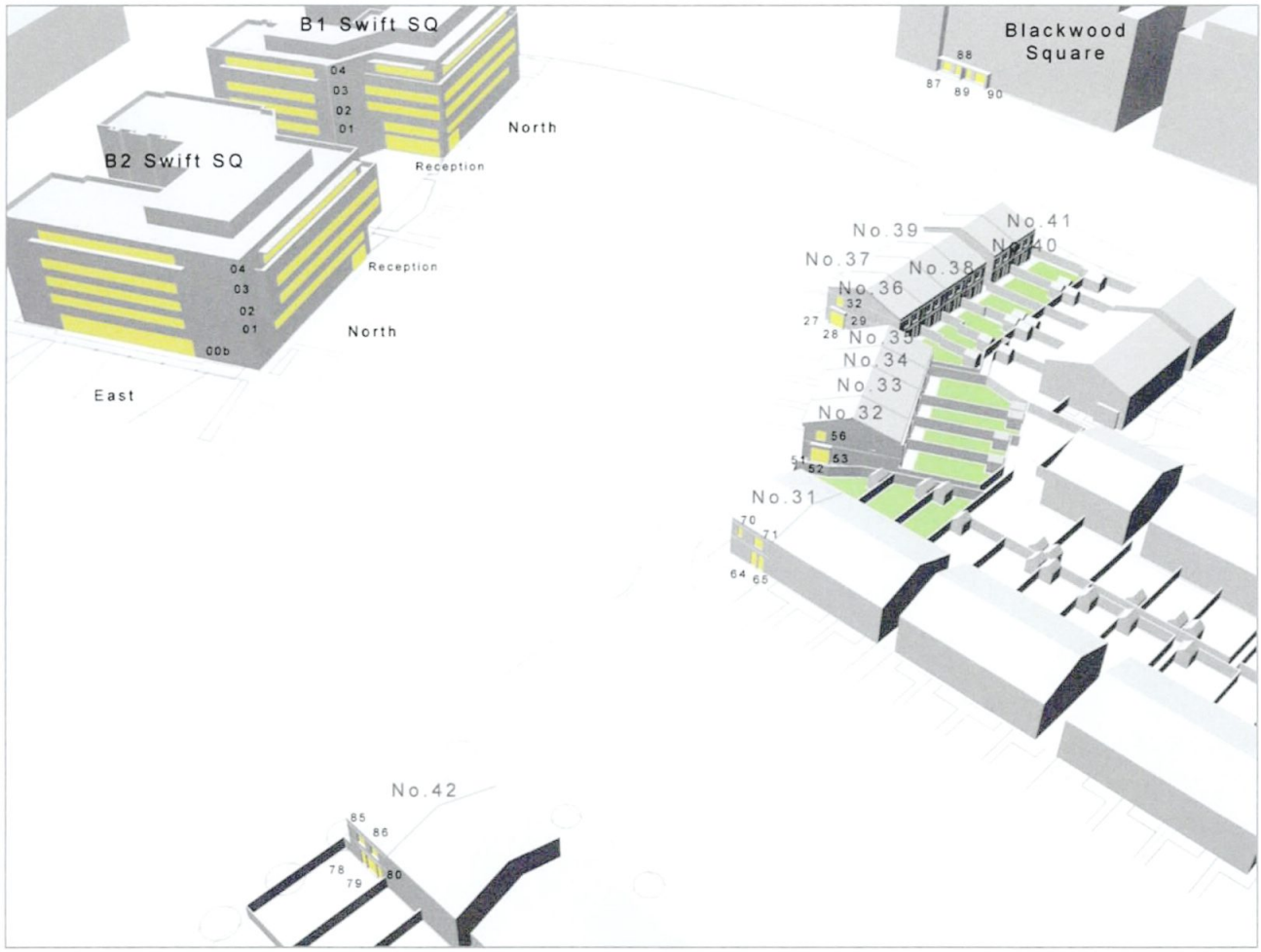

Figure 10-3: Indicative diagram showing location of sample windows (in yellow) at Cedarview, Blackwood Square (Zones 87-90 for daylight) and Swift Square Offices (Zones 102-161) assessed as part of this analysis.

Source: ARC Architectural Consultants Ltd

As explained in **Section 10.3** above, ARC measured daylight access to existing buildings before and after the construction of the proposed development with reference to Vertical Sky Component to identify whether the construction of the proposed development creates the potential for adverse impacts on daylight access. Section 2.2.21 of the BRE Guide suggests that: *"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25 ° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if ...the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value..."*.

The results of ARC's analysis are set out in **Table 10.1** below, together with a short comment on each result.

Table 10.1: Results of ARC's analysis of the potential impact of the proposed development on daylight access to windows within neighbouring existing buildings outside the application site

Room	Window	Vertical Sky Component			Area of the working plane in a room which can receive direct skylight			Potential Impact "Proposed" Scenario on "Existing" Scenario ONLY	Comment Impact of "Proposed" Scenario on "Existing" Scenario ONLY
		Existing (% VSC)	Proposed (% VSC)	Change Change under "Proposed" scenario expressed as "times existing value"	Existing (% of area receiving direct skylight)	Proposed (% of area receiving direct skylight)	Change Change under "Proposed" scenario expressed as "times existing value"		
41 Cedarview									
Living Room	01	14.82%	14.80%	0.999	99.59%	99.52%	0.999	Imperceptible to Not Significant	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on the area weighted mean Vertical Sky Component of windows serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible". While the BRE Guide would suggest that an impact of this extent is not likely to be noticeable, taking a conservative approach, this impact is assessed as "imperceptible" to "not significant" as the construction of the proposed development is likely to reduce the area weighted mean Vertical Sky Component from slightly above the recommended 27% Vertical Sky Component to just below it.
	02	29.31%	29.28%	0.999					
	03	17.72%	15.00%	0.85					
	04	34.12%	27.61%	0.81					
	05	34.15%	27.52%	0.81					
	Area weighted mean	29.22%	26.65%	0.91					
Bedroom 1 (Front)	06	29.54%	29.54%	1.00	96.11%	94.40%	0.98	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on the area weighted mean Vertical Sky Component of windows serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible".
	07	33.39%	28.18%	0.84					
	Area weighted mean	30.94%	29.05%	0.94					
Bedroom 2 (Front)	08	34.90%	29.18%	0.84	98.51%	95.03%	0.96	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. As the Vertical Sky Component at this window and the area of the working plane in this room, which can receive direct skylight, are not likely to fall to less than 0.8 times their respective values, the potential impact of the proposed development on this window/room is assessed as "imperceptible".
40 Cedarview									
Living Room	09	34.32%	27.41%	0.80	98.84%	98.84%	1.00	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on the area weighted mean Vertical Sky Component of windows serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible".
	10	34.12%	27.13%	0.80					
	Area weighted mean	34.22%	27.27%	0.80					
Bedroom 1 (Front)	11	35.01%	28.94%	0.83	98.70%	94.88%	0.96	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. As the Vertical Sky Component at this window and the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times their respective values, the potential impact of the proposed development on this window/room is assessed as "imperceptible".
Bedroom 2 (Front)	12	33.58%	27.56%	0.82	95.32%	80.69%	0.85	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. As the Vertical Sky Component at this window and the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times their respective values, the potential impact of the proposed development on this window/room is assessed as "imperceptible".

39 Cedarview									
Living Room	13	34.42%	26.78%	0.78	98.84%	98.84%	1.00	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to windows serving this room, the construction of the proposed development is unlikely to reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
	14	34.18%	26.45%	0.77					
	Area weighted mean	34.30%	26.62%	0.78					
Bedroom 1 (Front)	15	35.09%	28.34%	0.81	98.70%	96.39%	0.98	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. As the Vertical Sky Component at this window and the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times their respective values, the potential impact of the proposed development on this window/room is assessed as "imperceptible".
Bedroom 2 (Front)	16	33.65%	26.86%	0.80	95.32%	83.97%	0.88	Imperceptible to Not Significant	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on Vertical Sky Component of the window serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible". While the BRE Guide would suggest that an impact of this extent is not likely to be noticeable, taking a conservative approach, this impact is assessed as "imperceptible" to "not significant" as the construction of the proposed development is likely to reduce the area weighted mean Vertical Sky Component from slightly above the recommended 27% Vertical Sky Component to just below it.
38 Cedarview									
Living Room	17	34.17%	25.70%	0.75	98.80%	94.77%	0.96	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to windows serving this room, the construction of the proposed development is unlikely to reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
	18	34.42%	25.76%	0.75					
	Area weighted mean	34.30%	25.73%	0.75					
Bedroom 1 (Front)	19	33.63%	26.64%	0.79	95.62%	79.59%	0.83	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to this window, the construction of the proposed development is unlikely to reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
Bedroom 2 (Front)	20	35.11%	27.55%	0.78	98.51%	92.31%	0.94	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. As the Vertical Sky Component at this window is likely to remain above 27% and the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this window/room is assessed as "imperceptible".
37 Cedarview									
Living Room	21	34.39%	25.22%	0.73	98.84%	97.36%	0.99	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to windows serving this room, the construction of the proposed development is unlikely to reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
	22	34.11%	24.74%	0.73					
	Area weighted mean	34.25%	24.98%	0.73					
Bedroom 1 (Front)	23	35.11%	26.93%	0.77	98.70%	91.19%	0.92	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to this window, the construction of the proposed development is unlikely to

									reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
Bedroom 2 (Front)	24	33.57%	25.21%	0.75	95.32%	74.54%	0.78	Slight	Having regard to factors outlined in Appendix H: Environmental Impact Assessment of the BRE Guide, the likely reduction in Vertical Sky Component at this window to between 0.7-0.8 times its former value and the likely reduction in the area of the working plane receiving direct skylight to between 0.7-0.8 times its former value is assessed as "slight" in extent.
36 Cedarview									
Living Room	25	34.21%	23.67%	0.69	99.67%	98.55%	0.99	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to windows serving this room, the construction of the proposed development is unlikely to reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
	26	34.18%	23.31%	0.68					
	27	16.11%	9.38%	0.58					
	28	33.42%	27.13%	0.81					
	29	10.46%	10.46%	1.00					
	Area weighted mean	30.88%	23.41%	0.76					
Bedroom 1 (Front)	30	35.08%	25.67%	0.73	98.70%	82.29%	0.83	Imperceptible to Slight	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. While the proposed development is likely to result in a "slight" reduction in Vertical Sky Component to windows serving this room, the construction of the proposed development is unlikely to reduce the area of the working plane receiving direct skylight to a noticeable degree. The potential impact of the proposed development is assessed as "imperceptible" to "slight".
Bedroom 2 (Front)	31	33.53%	23.84%	0.71	99.27%	92.73%	0.93	Imperceptible to Not Significant	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on Vertical Sky Component of the window serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible". While the BRE Guide would suggest that an impact of this extent is not likely to be noticeable, taking a conservative approach, this impact is assessed as "imperceptible" to "not significant" as the construction of the proposed development is likely to reduce the area weighted mean Vertical Sky Component to close to the threshold for an adverse impact.
	32	34.75%	29.54%	0.85					
	Area weighted mean	34.31%	27.47%	0.80					
35 Cedarview									
Living Room	33	13.64%	13.64%	1.00	99.59%	99.27%	0.997	Imperceptible	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on the area weighted mean Vertical Sky Component of windows serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible".
	34	23.00%	20.51%	0.89					
	35	16.43%	12.37%	0.75					
	36	34.37%	24.86%	0.72					
	37	34.36%	24.93%	0.73					
	Area weighted mean	25.98%	21.04%	0.81					
Bedroom 1 (Front)	38	29.98%	27.61%	0.92	99.23%	99.23%	1.00	Imperceptible to Not Significant	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on the area weighted mean Vertical Sky Component of windows serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can receive direct skylight, is not likely to fall to less than 0.8 times its former value, the potential impact of the proposed development on this room is likely to be "imperceptible". While the BRE Guide would suggest that an impact of this extent is not likely to be noticeable, taking a conservative approach, this impact is assessed as "imperceptible" to "not significant" as the construction of the proposed development is likely to reduce the area weighted mean Vertical Sky Component from slightly above the recommended 27% Vertical Sky Component to just below it.
	39	33.63%	25.33%	0.75					
	Area weighted mean	31.30%	26.78%	0.86					
Bedroom 2 (Front)	40	35.28%	27.07%	0.77	98.51%	95.69%	0.97	Imperceptible to Not Significant	The BRE Guide suggests that occupants of an existing building are not likely to notice an adverse reduction in daylight access where Vertical Sky Component remains above 27% or falls below 27% Vertical Sky Component but decreases to not less than 0.8 times its former value after the construction of a development or where the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value. The potential impact of the proposed development on the area weighted mean Vertical Sky Component of windows serving this room is not likely to fall within adverse ranges as described at Section 2.2.23 of the BRE Guide. Given this and given that the area of the working plane in this room, which can