Greater Dublin Drainage Project Addendum

Environmental Impact Assessment Report Addendum: Volume 3A Part A of 6

Chapter 14A Air Quality, Odour and Climate

Uisce Éireann

October 2023

Contents

14. Air Quality, Odour and Climate

14.1 Introduction

As detailed in Chapter 1A (Introduction) in Volume 2A Part A of this Environmental Impact Assessment Report (EIAR) Addendum, we have reviewed Chapter 14 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR submitted with the original 2018 planning application, in the light of:

- Changes to the baseline environment;
- The requirement for updated surveys; and
- Changes to the law, policy, and industry standards and guidance in the intervening period.

Table 14.1 presents a summary of the project elements which were incorporated into the planning design for the Greater Dublin Drainage Project (hereafter referred to as the Proposed Project) following direction at the Oral Hearing in 2019 and the subsequent planning conditions applied to the 2018 planning application submission. A full description is included in Chapter 4A (Description of the Proposed Project) in Volume 2A Part A of the EIAR Addendum. The remaining elements of the Proposed Project included in the 2018 planning application remain unchanged.

Table 14.1: Updated Proposed Project Elements

Updated Element	Outline Description of Updated Element
Ultraviolet (UV) Treatment	• UV Treatment is to be included in the treatment process at the proposed wastewater treatment plant (WwTP) in the northern section of the WwTP site. • The UV treatment system will be designed for the expected flows at the plant and will be installed on the final effluent line. UV treatment will be in operation 24 hours a day, 365 days a year. • The UV system will consist of a minimum of three and a maximum of four treatment units located below or partially below ground level with an above-ground Motor Control Centre (MCC) (in a kiosk) along with minor maintenance and control equipment (e.g. shut-off button, frame for supporting, retracting and cleaning of UV lamps etc.).
River Mayne Culvert Extension	• Extension of the River Mayne Culvert on the proposed access road to the WwTP by 4m (from 21m to 25m) to cater for the full width of the future north south link road.

This Addendum Chapter should be read in conjunction with Chapter 14 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR submitted with the original 2018 planning application.

Please note that the Addendum to the air quality and climate impact assessment of the proposed Regional Biosolids Storage Facility (RBSF) aspect of the Proposed Project is addressed in Section 8A (Air Quality and Climate) in Volume 4A Part A of this EIAR Addendum. The Addendum to the odour impact assessment of the proposed RBSF aspect of the Proposed Project is addressed in Chapter 10A (Odour) in Volume 4A Part A of this EIAR Addendum.

14.2 Methodology

An updated desk-based review was undertaken in January to August 2023 for this Addendum Chapter. The review considered changes in legislation, policy, standards and industry guidance, and in particular, considered whether any such changes warranted an updated or amended approach to the assessments. Updated published sources of information in relation to the existing environment in the study area were also identified and reviewed.

14.2.1 Study Areas

There are no changes to the study areas or the information that was presented in this Section of the EIAR in the 2018 planning application, as there are no changes to the Proposed Project boundary.

14.2.2 Impact Assessment Methodology

The following updated guidance, legislation and plans have been considered in this Addendum Chapter.

General Approach

In 2022, the Environmental Protection Agency (EPA) published an updated set of Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the updated EPA Guidelines) (EPA 2022). The updated EPA Guidelines were considered in this Addendum Chapter and it was determined that there was no materially significant difference in either the methodology or approach adopted for the assessment for the 2018 planning application, which was based on the previous Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Draft EPA Guidelines) (EPA 2017).

There are no materially significant changes to the methodologies adopted in this Section of Chapter 7 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR in the 2018 planning application, as a result of the updated EPA Guidelines.

Construction Phase

The Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition (IAQM 2014a) remains the most up-to-date guidance, and therefore, there are no changes to the information presented in this Section of EIAR submitted in the 2018 planning application.

Operational Phase

The Guidance on the Assessment of Odour for Planning (IAQM 2014b) remains the most up-to-date guidance, and therefore, there are no changes to the information presented in this Section of EIAR submitted in the 2018 planning application.

Climate Impact Assessment Methodology

In 2021, Number 32 of 2021 – Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) was published, and like the previous Number 46 of 2015 - Climate Action and Low Carbon Development Act 2015, provides for new arrangements aimed at achieving a transition to a low-carbon, climate-resilient and environmentally sustainable economy by 2050. The 2021 Climate Act requires that Uisce Éireann consider and reduce their carbon footprint in all aspects of the activities they undertake. This objective was also recognised in the previous Fingal Development Plan 2017 - 2023 (Fingal County Council (FCC) 2017), and also in the latest Fingal Development Plan 2023 - 2029 (FCC 2023) which was formally adopted in 2023.

A full assessment of the impact of greenhouse gas (GHG) emissions from the Proposed Project on climate during both the Construction and the Operational Phases has been completed and is reported in full in Appendix A14.1 in Volume 3A Part B of this EIAR Addendum. The GHG assessment within Appendix A14.1 recognises and responds to developments in climate-related legislation, policy, and guidance which have emerged since the submission of the original planning application in 2018. Please refer to Appendix A14.1 in Volume 3A Part B of this EIAR Addendum for full details of this assessment.

14.2.3 Impact Assessment Criteria

There is no change to the principal assessment criteria and Air Quality Standards (AQS) that were presented in this Section of the EIAR in the 2018 planning application.

In 2020, the EPA published the Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (hereafter referred to as the 2020 EPA Air Guidance) (EPA 2020), which provided an update to the 2010 Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (EPA 2010), which both include guidance on appropriate odour standards against which odour emissions may be evaluated. The 2020 EPA

Air Guidance was considered in this Addendum Chapter. Further detail of the changes in the 2020 EPA Air Guidance and how this affected the assessment methodology are presented in the relevant sections of this Addendum Chapter.

There is no change to the principal assessment criteria outlined in this Section of the EIAR in the 2018 planning application. S.I. No. 180/2011 - The Air Quality Standards Regulations 2011, as amended by S.I. No. 659/2016 - Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016 were revoked in 2022 and replaced by S.I. No. 739/2022 - Ambient Air Quality Standards Regulations 2022. Although the Regulations were updated in 2022, the Air Quality Standards remained the same as those considered in the EIAR in the 2018 planning application.

In addition to the principal assessment criteria described in S.I. No. 739/2022 - Ambient Air Quality Standards Regulations 2022 and the standards included in Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (hereafter referred to as the CAFE Directive), it is also appropriate to consider the World Health Organization (WHO) Air Quality Guidelines. These Air Quality Guidelines were developed by the WHO and while the WHO Air Quality Guidelines are not mandatory, they represent the current informed opinion on the levels to which we should be aspiring in order to minimise the adverse health impacts of air pollution. The previous Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide Global Update 2005 (hereafter referred to as the previous WHO Guidelines) (WHO 2006) were updated in 2021 by the Global Air Quality Guidelines: Particulate Matter ($PM_{2.5}$ and PM_{10}), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide (hereafter referred to as the Updated WHO Guidelines) (WHO 2021). The Updated WHO Guidelines are summarised in Table 14.2, together with previous WHO Guidelines for comparison. The Updated WHO Guidelines set out a series of interim targets to guide countries in their progression to achieving the updated guidelines and targets, as set out in Table 14.2.

Table 14.2: WHO Recommended Air Quality Guidelines and Targets

Pollutant	Limit Type	Previous WHO Guidelines (2005)	Updated WHO Guidelines (2021), µg/m³ (mg/m³ CO)				
			Interim Target				Air Quality Guideline
			1	2	3	4	
Nitrogen Dioxide, µg/m³	Annual limit for protection of human health	40µg/m³	40	30	20	NS	10
	24-hour limit for protection of human health [1]	NS	120	50	NS	NS	25
	Hourly limit for protection of human health	200µg/m³	NS	NS	NS	NS	NS
Sulfur dioxide (SO_2)	24-hour limit for protection of human health[1]	20µg/m³	125	50	NS	NS	40
	10-minute limit for protection of human health	500µg/m³	NS	NS	NS	NS	NS
Particulate matter (PM) (as PM_{10}), µg/m³	Annual limit for protection of human health	20µg/m³	70	50	30	20	15
	24-hour limit for protection of human health [1]	50µg/m³	150	100	75	50	45
Particulate matter (PM) (as $PM_{2.5}$), µg/m³	Annual limit for protection of human health	10µg/m³	35	25	15	10	5
	24-hour limit for protection of human health [1]	25µg/m³	75	50	37.5	25	15
Carbon monoxide (as CO), mg/m³	24-hour limit	NS	7	NS	NS	NS	4

Note

[1] Expressed as the 99th percentile

[2] NS Not Specified

In addition to updated regulations, the Government published the Clean Air Strategy for Ireland (Government of Ireland 2023) in April 2023, which provides a strategic policy framework for the measures needed to reduce air pollution. The Clean Air Strategy for Ireland commits Ireland to achieving the Updated WHO Guidelines Interim Target (IT3) by 2026, IT4 targets by 2030 and the achievement of the final WHO targets by 2040. The Clean Air Strategy for Ireland acknowledges the challenges of meeting the Updated WHO Guidelines targets, and envisages that Ireland will revise the air quality standards and legislation to align with the proposed

European Union (EU) revisions to the CAFE Directive when they arise with a target date in 2030 for aligning EU and WHO targets and guidelines.

14.3 Baseline Environment

14.3.1 Meteorological Conditions

The magnitude of potential impacts of the Proposed Project on air and climate will largely be influenced by the local meteorological conditions, in particular by wind speed and direction and by precipitation rates. For the purpose of obtaining reliable information about the climatological conditions at the Proposed Project site, a full set of three years of meteorological data for the period 2012 to 2016 recorded at Dublin Airport were analysed in the EIAR in the 2018 planning application. The data were then used as input data for the dispersion modelling assessment.

Wind speed and direction in particular is important in determining how emissions associated with the activity are dispersed. The prevailing wind direction determines which areas are most significantly affected by the emissions from the activity, and wind speed determines in part the effectiveness of the dispersion of the emissions. The windroses for Dublin Airport for each of the years from 2012 to 2022 were analysed. The dominant wind direction for Dublin Airport is from the west and there were no significant changes observed in the annual wind roses for each of the years examined. The wind speed is below 5.14m/s (metres per second) for 64% of the time over the period assessed and there was no significant difference between the average wind speed for the 2014 to 2016 data used in the EIAR in the 2018 planning application and the more recent data for the period 2019 to 2022. The average long-term wind speed over the period 1985 to 2010 is 5.3m/s. An updated windrose for the period 2018 to 2022 is included for information in Image 14.1.

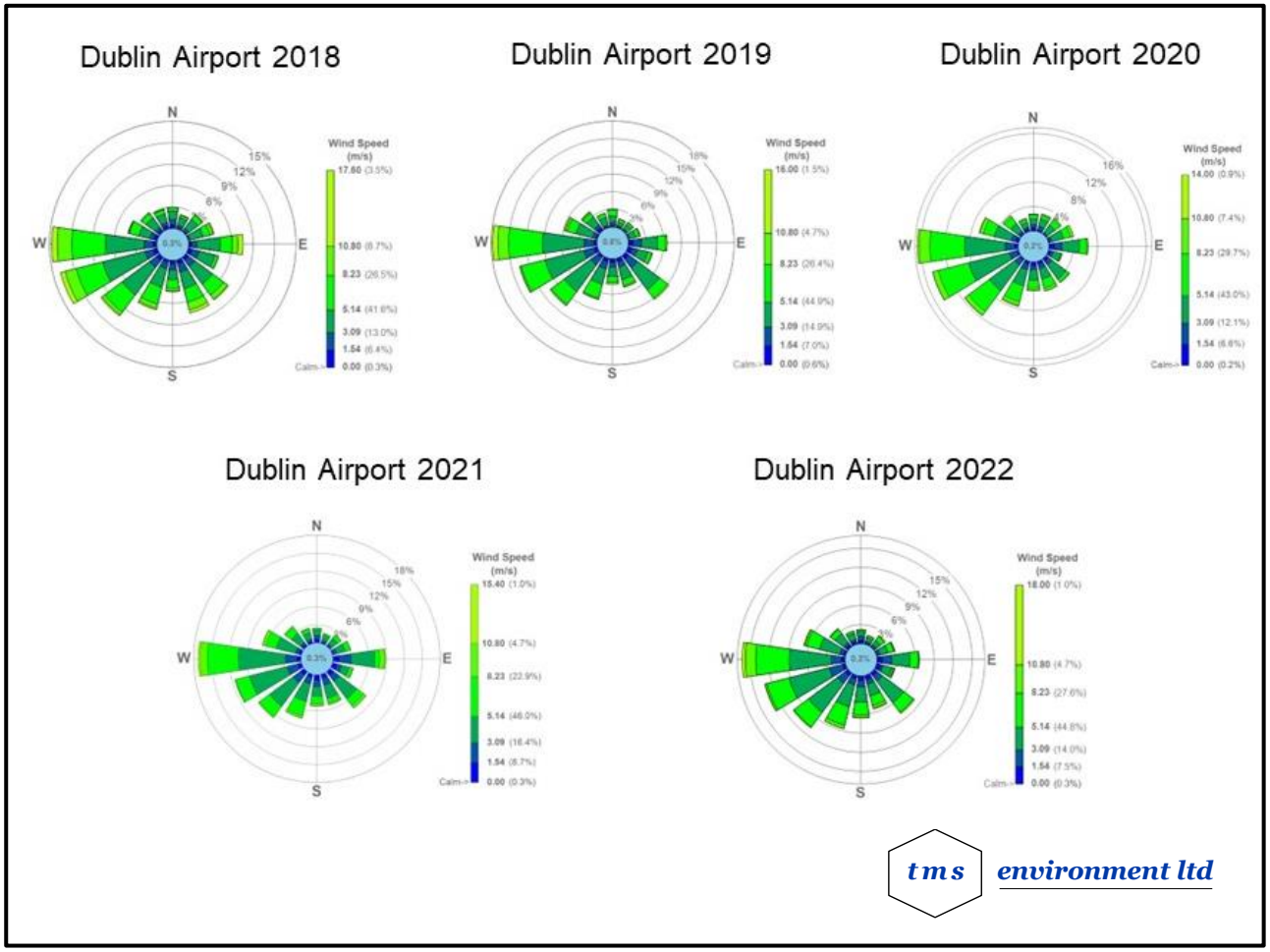

Image 14.1: Windroses for Dublin Airport (2018 to 2022)

14.3.2 Influences on Ambient Air Quality

There is no change to the information presented in this Section of the EIAR in the 2018 planning application, as the influences on ambient air quality remain the same as those described in the EIAR in the 2018 planning application.

14.3.3 Existing Ambient Air Quality

The main substances which are of interest in terms of existing air quality in all areas potentially affected by the Proposed Project remain as SO_2 (sulfur dioxide), NO_x (nitric oxide (NO) and nitrogen dioxide (NO_2), collectively referred to as NO_x), fine particulate matter (PM) including PM_{10} and $PM_{2.5}$ which could originate from combustion sources, traffic and the existing commercial and industrial activities in the study areas. Carbon monoxide (CO) is also potentially of interest, and benzene may also be of interest from traffic sources. There is no change to this information relative to the EIAR in the 2018 planning application.

Baseline air quality was described in the EIAR in the 2018 planning application using a combination of data from the National Ambient Air Quality Network and from site-specific surveys carried out in 2016 and 2017. This Section of the EIAR Addendum provides an update of the available data.

The EPA publishes Ambient Air Quality Reports every year, which detail the air quality throughout the country. The most recent report, published by the EPA in 2022, is the Air Quality in Ireland 2021 report (EPA 2021) which contains monitoring data collected during 2021. Data for 2014 to 2016 was reviewed in the EIAR in the 2018 planning application and in this Addendum Chapter. The updated data for the period 2019 to 2021 has been reviewed and is presented alongside the data considered in the EIAR in the 2018 planning application for comparison. Some monitoring stations have been discontinued and there has been an increase in the number of air quality monitoring stations operated by the EPA since the EIAR in the 2018 planning application was prepared, so additional data has been considered in this Addendum Chapter. The monitoring stations reviewed in the EIAR in the 2018 planning application and those reviewed for the updated EIAR Addendum assessment are listed in Table 14.3, together with the pollutants monitored at each station.

Data from the EPA's air quality monitoring annual reports for 2014 to 2016 were reviewed for the EIAR in the 2018 planning application, and a summary of the data for representative stations is presented for each parameter of interest in Table 14.5. The updated data for the period 2019 to 2021 is also presented in Table 14.5 for comparison. The measurements for 2020 are consistently lower than those for the other years for which data was reviewed which is consistent with expectations since this was the height of the COVID-19 pandemic and restrictions in activities clearly exerted an impact on air quality. The data for 2021 shows that ambient concentrations of pollutants are again in line with pre-pandemic levels. The three-year average for 2019 to 2021 is lower than expected due to the COVID-19 pandemic influences, but for most parameters there is no materially significant difference in the air quality data, as shown in Table 14.7 for the two periods evaluated. The three-year average NOx concentration is lower for the 2019 to 2021 period than it is for the 2014 to 2016 period, which is entirely consistent with expectations given the changes, especially in transport, brought about by the COVID-19 pandemic. Since this situation is not expected to continue, the potential effect of this on the impact assessment is considered by way of a sensitivity analysis rather than making an assumption that the reduction will continue. Utilisation of the slightly higher background concentrations for NO_x from the 2014 to 2016 dataset will overestimate the significance of the impact of emissions, and this is therefore considered a prudent and conservative approach in the assessment.

A targeted site-specific survey of air quality was also undertaken in 2016 and 2017 at 12 representative locations near the Proposed Project sites. The complete monitoring reports are presented in Appendix A14.2 and Appendix A14.3 in Volume 3 Part B of the EIAR in the 2018 planning application. A summary of the results is presented in Table 14.5 and Table 14.6 in Chapter 14 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR in the 2018 planning application, as updated by Table 14.3 and Table 14.4 in this Addendum Chapter. The baseline surveys were repeated in 2022 and the complete monitoring report is presented in Appendix A14.2 in Volume 3A Part B of the EIAR Addendum, with summaries of the data presented in Table 14.5 and Table 14.6 in the EIAR in the 2018 planning application, as updated by Table 14.3 and Table 14.4 in this EIAR Addendum. The 2022 data show broadly similar patterns to those observed in the earlier surveys

with good agreement between the datasets obtained during the winter periods for which data are available for comparison.

The limited data acquired on the sites for NO_2 and benzene, toluene, ethylbenzene and xylenes is consistent with the data recorded by the EPA over much longer term monitoring periods for similar locations. The average values recorded during the survey were compared with the chosen data from the long-term EPA monitoring, and the agreement is within expected tolerances. A summary of the available data is presented in Table 14.7. There is excellent agreement between the data from the long-term EPA air quality monitoring, which was selected for the assessment, and the site-specific survey. It is therefore concluded that the long-term EPA data is a reliable indicator of air quality in the selected locations.

Table 14.3: EPA Ambient Air Monitoring Stations in Dublin

Monitoring Station	Area Classification	Station Classification	Pollutants Monitored	
			2015	2021
Ballyfermot Library	Suburban	Background	NO_2, NO_x, PM_{10}	NO_2, NO_X, PM_{10}, $PM_{2.5}$
Blanchardstown River Road	Suburban	Traffic	NO_2, NO_x, PM_{10}	NO_2, NO_X, PM_{10}, $PM_{2.5}$
Clonskeagh Road Richview	Suburban	Not applicable	O_3	O_3, PM_{10}, $PM_{2.5}$
Clonskeagh Rosemount	Suburban	Not applicable	Metals	Metals, PAH
Dublin Airport Authority (DAA)	Airport	Not applicable	Not applicable	NO_2, NO_X, PM_{10}, $PM_{2.5}$, O_3, SO_2, CO
Coleraine Street	Urban	Traffic	SO_2, CO, NO_2, NO_x, PM_{10}, $PM_{2.5}$	Discontinued
Davitt Road	Suburban	Not applicable	PM_{10}	PM_{10}, $PM_{2.5}$
Dublin Port	Port	Not applicable	Not applicable	NO_2, SO_2, PM_{10}, $PM_{2.5}$
Dun Laoghaire The Glen	Suburban	Traffic	NO_2, NO_x, PM_{10}	NO_2, NO_X, PM_{10}, $PM_{2.5}$
Finglas	Suburban	Not applicable	$PM_{2.5}$	PM_{10}, $PM_{2.5}$
Marino Brian Road	Suburban	Not applicable	$PM_{2.5}$	PM_{10}, $PM_{2.5}$
Pearse Street	Urban	Not applicable	Not applicable	PM_{10}, $PM_{2.5}$
Phoenix Park Ordnance Survey Road	Suburban	Not applicable	PM_{10}	PM_{10}, $PM_{2.5}$
Rathmines Wynnefield Rd	Urban	Background	SO_2, O_3, NO_2, NO_x, PM_{10}, $PM_{2.5,}$ Benzene, Toluene, Ethylbenzene and Xylene	NO_2, SO_2, O_3, PM_{10}, $PM_{2.5}$
Ringsend	Urban	Traffic	Not applicable	NO_2, SO_2, PM_{10}, $PM_{2.5}$
St Anne's Park	Suburban	Background	NO_2, NO_x, PM_{10}	PM_{10}, $PM_{2.5}$
St John's Road	Urban	Traffic	Not applicable	NO_2, PM_{10}, $PM_{2.5}$
Swords Watery Lane	Suburban	Background	NO_2, NO_x, O_3	NO_2, O_3
Tallaght Old Bawn Road	Suburban	Not applicable	SO_2, PM_{10}	NO_2, PM_{10}, $PM_{2.5}$
Winetavern Street	Urban	Traffic	SO_2, CO, NO_2, NO_x,	NO_2, SO_2, CO

Table 14.4: Background Air Quality Data for Suburban Background Stations in Zone A

Pollutant	Station	Annual Mean (µg/m^3)							
		2014	2015	2016	Average (2014-2016)	2019	2020	2021	Average (2019-2021)
Nitrogen dioxide, NO_2	St Anne's Park; Swords	12	14	16	14	15	11	11.4	12
Nitrogen dioxide, NO_2	Blanchardstown	29	31	30	30	31	12	30.6	25
Nitrogen oxides, NO_x	St Anne's Park; Swords	22	22	25	23	20.9	15.5	15.4	17
Nitrogen oxides, NO_x	Blanchardstown	62	67	76	69	69.9	62.4	75.6	69
Sulfur dioxide, SO_2	Tallaght	4	6	2	4	2.5	NM	NM	2.5
Sulfur dioxide, SO_2	Rathmines	2	3	2	2	1.3	1.4	1.1	1
PM_{10}	Phoenix Park	19	17	11	16	11	10	9.6	10
PM_{10}	Blanchardstown (Tallaght 2012)	20	18	18	19	19	15	14.1	16
$PM_{2.5}$	Marino	9	8	7	8	9	8	7.9	8
$PM_{2.5}$	Rathmines	11	9	10	10	8	8	9.3	8
Carbon monoxide	Balbriggan	0.6	05	0.5	0.5	NM	NM	NM	NM
Benzene	Rathmines	0.94	0.94	1.0	1.0	0.26	0.52	0.35	0.37
Toluene	Rathmines	1.9	2.07	2.1	2.0	0.53	0.82	0.72	0.69
Ethylbenzene	Rathmines	0.31	0.28	0.20	0.23	0.05	0.14	0.11	0.1
Xylenes	Rathmines	1.33	2.02	1.2	1.5	0.55*	0.66*	0.46*	0.56

Note: There are no data for benzene, toluene, ethylbenzene or xylenes for suburban monitoring station

Table 14.5: Baseline Air Quality Data for Nitrogen Oxides and Sulfur Dioxide

Monitoring Location	Monitoring Data	NO_2 (µg/m^3)	NOx (µg/m^3)	SO_2 (µg/m^3)
AQ1 St. Francis' Hospice, Connolly Hospital, north of proposed Abbotstown pumping station	Jan – Feb 2016	18.3	21.6	NM
	June 2017	14.8	NM	<1.5
	June – July 2017	14.1	NM	<2.66
	November 2022	24.8	NM	< 3.17
	Nov – Dec 2022	30.3	NM	< 2.95
AQ2 Elm Green Nursing Home, south-east of proposed Abbotstown pumping station	Jan – Feb 2016	26.3	38.6	NM
	June 2017	14.1	NM	<1.5
	June – July 2017	12.7	NM	<2.65
	November 2022	22.0	NM	< 3.13
	Nov – Dec 2022	27.0	NM	< 2.95
AQ3 St. Michael's House, south of proposed WwTP	Jan – Feb 2016	22.5	23.9	NM
	June 2017	15.2	NM	<1.5
	June – July 2017	19.4	NM	<2.65
	November 2022	25.1	NM	< 3.17
	Nov – Dec 2022	33.6	NM	< 2.95
AQ4 In the vicinity of the proposed WwTP site	Jan – Feb 2016	25.5	28.1	NM
	June 2017	13.2	NM	3.7
	June – July 2017	15.3	NM	<2.64
	November 2022	27.4	NM	< 3.38
	Nov – Dec 2022	39.4	NM	< 3.18
AQ5 In the vicinity of the proposed WwTP site	Jan – Feb 2016	14.6	17.4	NM
	June 2017	10.6	NM	<1.5
	June – July 2017	11.0	NM	<2.64
	November 2022	21.0	NM	< 3.38
	Nov – Dec 2022	33.1	NM	< 2.95
AQ6 In the vicinity of the proposed WwTP site	Jan – Feb 2016	18.3	26.0	NM
	June 2017	9.1	NM	<1.5
	June – July 2017	9.3	NM	<2.64
	November 2022	17.4	NM	< 3.15
	Nov – Dec 2022	18.9	NM	< 2.95
AQ7 In the vicinity of the proposed WwTP site	Jan – Feb 2016	21.0	20.3	NM
	June 2017	11.6	NM	<1.5
	June – July 2017	10.3	NM	<2.64
	November 2022	27.6	NM	< 3.38
	Nov – Dec 2022	25.5	NM	3.19
AQ8 In the vicinity of the proposed WwTP site	Jan – Feb 2016	25.9	25.6	NM
	June 2017	14.5	NM	<1.5
	June – July 2017	10.4	NM	<2.64
	November 2022	20.2	NM	< 3.38
	Nov – Dec 2022	34.2	NM	< 3.19
AQ9 In the vicinity of the proposed WwTP site	Jan – Feb 2016	24.5	51.3	NM
	June 2017	12.4	NM	<1.5
	June – July 2017	11.9	NM	<2.64
	November 2022	16.0	NM	< 3.38
	Nov – Dec 2022	30.1	NM	< 3.19
AQ10 In the vicinity of the proposed WwTP site	Jan – Feb 2016	21.5	23.8	NM
	June 2017	13.8	NM	<1.5
	June – July 2017	13.7	NM	<2.64

Monitoring Location	Monitoring Data	NO_2 (µg/m^3)	NOx (µg/m^3)	SO_2 (µg/m^3)
	November 2022	17.8	NM	< 3.38
	Nov – Dec 2022	26.4	NM	< 3.19
AQ11 Grange	Jan – Feb 2016	12.9	16.5	NM
	June 2017	9.0	NM	<1.5
	June – July 2017	11.6	NM	<2.65
	November 2022	30.9	NM	< 3.16
	Nov – Dec 2022	33.3	NM	< 2.95
AQ12 Grange	Jan – Feb 2016	20.1	21.1	NM
	June 2017	14.0	NM	<1.5
	June – July 2017	16.9	NM	<2.65
	November 2022	21.2	NM	< 3.16
	Nov – Dec 2022	23.0	NM	< 2.95

Note: NM = not measured

Table 14.6: Baseline Air Quality Data for Benzene, Toluene, Ethylbenzene and Xylene

Monitoring Location	Date	Benzene (µg/m^3)	Toluene (µg/m^3)	Ethylbenzene (µg/m^3)	m-,p-xylene (µg/m^3)	o-Xylene (µg/m^3)
AQ1	Jan – Feb 2016	<0.19	13.6	<0.24	<0.24	<0.24
	June 2017	<0.38	2.03	<0.51	0.56	<0.51
	June – July 2017	0.60	2.34	1.36	1.92	0.75
	November 2022	0.45	0.85	<0.51	1.4	<0.51
	Nov – Dec 2022	0.57	0.85	<0.48	0.70	<0.48
AQ2	Jan – Feb 2016	0.68	1.66	0.28	0.94	0.32
	June 2017	<0.38	1.23	2.75	2.53	1.02
	June – July 2017	<0.39	0.64	0.69	0.67	<0.51
	November 2022	NR	NR	NR	NR	NR
	Nov – Dec 2022	0.45	0.50	<0.47	<0.47	<0.47
AQ3	Jan – Feb 2016	0.59	0.96	<0.25	0.48	<0.25
	June 2017	<0.38	1.56	1.56	1.55	0.58
	June – July 2017	<0.39	<0.43	<0.51	<0.51	<0.51
	November 2022	<0.39	<0.43	<0.51	<0.51	<0.51
	Nov – Dec 2022	0.79	1.09	<0.47	0.96	<0.47
AQ4	Feb 2016	<0.21	0.32	<0.27	0.30	<0.27
	June 2017	<0.38	0.72	<0.51	<0.51	<0.51
	June – July 2017	0.53	<0.43	<0.51	<0.51	<0.51
	November 2022	0.61	0.99	<0.54	1.4	0.56
	Nov – Dec 2022	0.93	0.83	<0.51	0.56	<0.51
AQ5	Jan – Feb 2016	0.59	1.38	<0.25	0.38	<0.25
	June 2017	<0.38	0.56	0.80	0.94	<0.51
	June – July 2017	<0.38	0.93	1.23	1.11	<0.51
	November 2022	0.55	0.73	<0.55	1.2	<0.55
	Nov – Dec 2022	0.68	0.72	<0.51	0.56	<0.51
AQ6	Jan – Feb 2016	0.43	0.77	<0.25	0.44	<0.25
	June 2017	0.77	3.98	<0.51	0.67	<0.51
	June – July 2017	0.59	1.70	<0.51	2.05	0.52
	November 2022	0.41	0.89	10	12	6.2
	Nov – Dec 2022	0.52	0.82	<0.61	1.0	<0.47
AQ7	Feb 2016	0.59	2.81	0.36	1.08	0.34
	June 2017	<0.38	2.85	2.14	2.02	0.83
	June – July 2017	<0.38	0.66	<0.51	<0.51	<0.51

Monitoring Location	Date	Benzene (µg/m³)	Toluene (µg/m³)	Ethylbenzene (µg/m³)	m-,p-xylene (µg/m³)	o-Xylene (µg/m³)
	November 2022	0.45	0.71	<0.54	0.89	<0.54
	Nov – Dec 2022	0.66	0.62	<0.51	0.54	<0.51
AQ8	Feb – Mar 2016	0.59	2.12	0.28	0.98	0.30
	June 2017	0.45	4.30	3.78	3.02	1.32
	June – July 2017	0.67	1.54	<0.51	<0.51	<0.51
	November 2022	0.46	0.89	<0.54	1.1	<0.54
	Nov – Dec 2022	0.56	NR	NR	NR	NR
AQ9	Feb 2016	0.71	2.99	0.34	1.01	0.31
	June 2017	<0.38	10.01	1.35	2.69	0.92
	June – July 2017	<0.38	<0.43	<0.51	<0.51	<0.51
	November 2022	0.53	0.83	<0.54	1.2	<0.54
	Nov – Dec 2022	0.75	0.79	<0.51	0.53	<0.51
AQ10	Feb 2016	0.48	0.83	<0.27	0.73	<0.27
	June 2017	<0.38	<0.43	<0.51	<0.51	<0.51
	June – July 2017	<0.38	2.10	3.61	3.27	1.26
	November 2022	0.71	0.80	<0.54	0.91	<0.54
	Nov – Dec 2022	0.76	NR	NR	NR	NR
AQ11	Jan – Feb 2016	0.45	0.78	<0.25	0.36	<0.25
	June 2017	<0.38	0.81	<0.51	<0.51	<0.51
	June – July 2017	0.42	0.59	<0.51	<0.51	<0.51
	November 2022	0.57	0.84	<0.51	0.95	<0.51
	Nov – Dec 2022	0.52	1.5	2.8	3.4	1.5
AQ12	Jan – Feb 2016	0.80	1.11	<0.25	0.79	0.25
	June 2017	<0.38	4.10	<0.51	0.70	<0.51
	June – July 2017	<0.39	0.68	<0.51	<0.51	<0.51
	November 2022	0.54	0.69	0.85	1.5	0.59
	Nov – Dec 2022	0.53	0.81	<0.47	0.81	<0.47

Note: NR = not reported

Table 14.7: Summary of Available Baseline Air Quality Data

Parameter	Concentration			
	Site-Specific Survey		EPA Long-Term Data	
	2016-2017	2022	2014-2016	2019-2021
NO_2	16	25	14	13
NO_x	26	NM	23	17
SO_2	4	4	4	NM
PM_{10}	NM	NM	16	10
$PM_{2.5}$	NM	NM	8	8
CO	NM	NM	530	NM
Benzene	0.58	0.59	1.0	0.37
Toluene	2.27	0.84	2.0	0.69
Ethylbenzene	1.47	4.55	0.30	0.1
Xylenes	1.92	1.94	1.5	0.56

14.4 Air Quality Impact Identification

14.4.1 Existing Activities

The existing activities in all areas potentially affected by the Proposed Project and the associated potential release of substances remain the same as outlined in this Section of the EIAR in the 2018 planning application.

14.4.2 Potential Construction Phase Impacts

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application. There are no new sources of emissions to atmosphere and no materially significant changes in the potential impacts compared to the assessments undertaken for the EIAR in the 2018 planning application. The extension of the River Mayne Culvert, as outlined in Table 14.1 will not introduce new sources of emissions as the same construction techniques will be used. The introduction of UV treatment, similarly, will not introduce any new sources of Construction Phase emissions at the proposed WwTP site.

14.4.3 Potential Operational Phase Impacts

Potential Sources of Emissions

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application. The proposed UV system will be located below, or partially below, ground level with an above-ground motor control centre (MCC) (in a kiosk). There are no new emission sources associated with the UV system and the enclosure will ensure that potential emissions are contained.

Proposed Abbotstown Pumping Station

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed for the proposed Abbotstown pumping station.

Rising Main Connection from Abbotstown to Gravity Pipeline

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed for the gravity pipeline section of the proposed orbital sewer route.

Proposed Wastewater Treatment Plant Combined Heat and Power System

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed for the Combined Heat and Power (CHP) system.

Proposed Wastewater Treatment Plant

Table 14.1 presents a summary of the new elements of the Proposed Project which were incorporated into the planning design for the Proposed Project since the 2018 planning application. The proposed UV system will be located below, or partially below, ground level with an above-ground MCC (in a kiosk). There are no new emission sources associated with the UV system. The UV system will be enclosed for operational reasons, and while the enclosure will vent to atmosphere, this will not lead to any new emissions of odour or other pollutants. The remaining elements of the Proposed Project included in the 2018 planning application remain unchanged and there are therefore no changes to potential emissions identified in this Section of the EIAR in the 2018 planning application.

Proposed Sludge Hub Centre

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed for the Sludge Hub Centre. The potential emissions to atmosphere therefore remain the same as those identified in this Section of the EIAR in the 2018 planning application.

Predicted Odour Emissions from the Proposed Abbotstown Pumping Station

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed for the proposed Abbotstown pumping station.

Predicted Odour Emissions from the Connection at Dubber Between the Rising Main from the Proposed Abbotstown Pumping Station and the Gravity Pipeline

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed to the proposed orbital sewer route.

Predicted Emissions from the Diesel Generators at the Proposed Abbotstown Pumping Station and the Combined Heat and Power System at the Proposed Wastewater Treatment Plant

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no design changes proposed for either the generators or the CHP system.

Predicted Emissions from the Proposed Wastewater Treatment Plant

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as the design changes proposed at the proposed WwTP will not result in any changes in the emissions already assessed.

Traffic Impacts

There are no changes to the information presented in this Section of the EIAR in the 2018 planning application, as there are no materially significant changes in traffic movements predicted.

14.4.4 'Do Nothing' Impact

There will continue to be no significant change in air quality impacts if the Proposed Project does not proceed, and therefore, there are no changes to the information presented in this Section of the EIAR in the 2018 planning application.

14.5 Impact of the Proposed Project – Construction Phase

14.5.1 Proposed Abbotstown Pumping Station Construction Phase Impact

There are no design changes proposed at the proposed Abbotstown pumping station, and therefore, there are no changes in the emissions or the potential impacts identified in this Section of the EIAR in the 2018 planning application.

14.5.2 Proposed Orbital Sewer Route Construction Phase Impact

There are no design changes proposed to the proposed orbital sewer route, and therefore, there are no changes in the emissions or the potential impacts identified in this Section of the EIAR in the 2018 planning application.

14.5.3 Proposed Outfall Pipeline Route (Land Based Section and Marine Section) Construction Phase Impact

There are no design changes proposed to the proposed outfall pipeline route, and therefore, there are no changes in the emissions or the potential impacts identified in this Section of the EIAR in the 2018 planning application.

14.5.4 Proposed Wastewater Treatment Plant Construction Phase Impact

Table 14.1 presents a summary of the new elements of the Proposed Project which were incorporated into the planning design for the Proposed Project since the 2018 planning application. The extension of the River Mayne Culvert will not introduce new sources of emissions as the same construction techniques will be used. The introduction of UV treatment, similarly, will not introduce any new sources of Construction Phase emissions at the proposed WwTP site.

The remaining elements of the Proposed Project included in the 2018 planning application remain unchanged and there are therefore no changes to the predicted Construction Phase impacts compared to Section 14.5 of Chapter 14 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR in the 2018 planning application.

14.5.5 Construction Phase Climate Impact

A full assessment of the impact of GHG emissions from the Proposed Project on climate during both the Construction and the Operational Phases has been completed and is reported in full in Appendix A14.1 in Volume 3A Part B of this EIAR Addendum. Please refer to Appendix A14.1 in Volume 3A Part B of this EIAR Addendum for full details of this assessment.

14.6 Impact of the Proposed Project – Operational Phase

14.6.1 Dispersion Modelling Impact Assessment

Dispersion Modelling Protocol

The 2020 EPA Air Guidance (EPA 2020) is the principal guidance used for the dispersion modelling assessment. This guidance was updated in 2020 and the principal changes with the potential to affect the current assessment identified are as follows:

- Updated guidance from the EPA, United States EPA and other regulatory authorities was included;
- Guidelines for ecosystem deposition impact assessment were included in an appendix; and
- Guidelines on odour impact assessment were updated to reflect the contents of the new Odour Emissions Guidance Note (Air Guidance Note AG9) (EPA 2019).

The current version of the United States EPA model, AERMOD Prime model (Version 22112) was used for the updated assessments. A series of model runs were executed to compare the results obtained using the previous versions of the AERMOD Model (Version 16216) and to determine whether the new version of the model affects the modelling predictions.

Model Input Data

There is no change to the Model Input Data outlined in this Section of the EIAR in the 2018 planning application.

Site Layout and Topography

There is no change to the site layout or topography, and therefore, there is no change to the information presented in this Section of the EIAR in the 2018 planning application.

Climatological Data

The 2020 EPA Air Guidance (EPA 2020) recommends that five years of meteorological data should be used for the assessment with the most recent year of data having been collected within the last 10 years. In accordance with the 2020 EPA Air Guidance, data were selected for the most appropriate station (Dublin Airport) and five years of data (2012 to 2016) were used for the assessment as presented in the EIAR in the 2018 planning application. In addition, to test the sensitivity of the predictions to varying input data, five years of recent data (2012 to 2016) from Casement Aerodrome were also used for aspects of the assessment. This data meets the requirements of the guidance and there is no change to the data selection.

Averaging Intervals

There is no change to the principal assessment criteria used in the assessment, and therefore, there is no change in the averaging intervals relative to those used in the EIAR in the 2018 planning application.

Receptor Locations

The receptor locations identified in this Section of the EIAR in the 2018 planning application were re-assessed to ensure that they remain appropriate for the assessment. There were more than 5,000 receptors included in the model which were selected to ensure that potentially affected human and ecological receptors were included in the assessment. It was concluded that the receptors were sufficient in number and appropriately located to ensure that the updated impact assessment remains robust and that the potential impact of emissions is reliably assessed.

Background Ambient Air Quality

The predictions from the dispersion model are evaluated by comparison with Air Quality Standards. The existing background concentrations of the various substances must also be added to the predicted impact of the emissions. The exception is odour, for which background measurements are meaningless and cannot be added to predictions.

As set out in Section 14.3.3, an updated assessment of baseline air quality was completed to consider data acquired since the previous studies were undertaken. A three year average dataset for the period 2014 to 2016 was used in the EIAR in the 2018 planning application. Updated ambient air quality data for the period 2019 to 2021 was reviewed and it was concluded that there is no materially significant difference in the air quality data, as shown in Table 14.7, for most parameters for the two periods evaluated. As noted in Section 14.3.3, NO_x concentrations were slightly lower in the 2019 to 2021 dataset compared with the EIAR in the 2018 planning application, most likely due to the impact of the COVID-19 pandemic. Since this situation is not expected to continue, the potential effect of this on the impact assessment is considered by way of a sensitivity analysis rather than making an assumption that the reduction will continue. Utilisation of the slightly higher background concentrations for NO_x from the 2014 to 2016 dataset will overestimate the significance of the impact of emissions and this is therefore considered a prudent and conservative approach in the assessment.

Impact Assessment Criteria

Impact assessment criteria are discussed in Section 14.2.3, and as noted, there are no changes to the principal assessment criteria since the submission of the EIAR in the 2018 planning application.

Emissions Characteristics

There is no change in the emission characteristic data that were used in the EIAR in the 2018 planning application. The introduction of UV treatment does not result in any change in the emissions characteristics. This conclusion is drawn for each of the pollutants modelled including NO_x, PM (PM_{10} and $PM_{2.5}$), CO, odour and the other substances modelled.

Emissions Modelling Scenarios

There is no change to the modelling scenarios that were considered in the EIAR in the 2018 planning application, as the scenarios selected still represent the optimum and most comprehensive approach for the assessment.

14.6.2 Dispersion Modelling Predictions: Proposed Abbotstown Pumping Station

Proposed Abbottstown Pumping Station Odour Control Unit

The predicted impact of odour emissions from the odour control unit (OCU) at the proposed Abbotstown pumping station was evaluated by comparing the predicted Ground Level Concentrations (GLCs) of odour with

the Air Quality Standards. The modelling predictions are presented in Table 14.28 and Table 14.29 of Chapter 14 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR in the 2018 planning application, together with the Air Quality Standards. In each case, the maximum predicted incremental contribution to GLCs is shown in the tables. The assessment concluded that the predicted ground level odour concentration as a result of the emissions will not exceed the assessment standard of $1.5OU_E/m^3$ (European Odour Unit per cubic metre) for the 98-percentile predictions for stack heights of 9m and 10m. As noted in the EIAR in the 2018 planning application, this is a very conservative assessment criterion and there is therefore confidence that the facility can easily operate within the required performance criteria without causing adverse impacts. Even under peak conditions, the performance standard is achieved.

In order to test the effect of the new AERMOD model (Version 22112 introduced by the US EPA in 2022) on the predictions, a model was run using the new version of AERMOD and the results are presented in Table 14.8 below, alongside the predictions using the then-current model in the EIAR in the 2018 planning application. The results demonstrate that there is no material difference between the impact predictions using the current regulatory version of the AERMOD model compared to the findings presented in the EIAR in the 2018 planning application.

Table 14.8: Proposed Abbotstown Pumping Station: Maximum Predicted Ground Level Concentration of Odour

Air Quality Standard		Predicted GLC (OU_E/m^3)		
		Stack Height (m)	2018 EIAR	2023 Addendum
Scenario 1: Normal Operating Conditions				
1-hour limit not to be exceeded more than 176 hours per year 98th percentile	$1.5OU_E/m^3$	9 10	0.57 0.49	0.57 0.50
Scenario 2: Peak Operating Conditions				
1-hour limit not to be exceeded more than 176 hours per year 98th percentile	$1.5OU_E/m^3$	9 10	0.69 0.59	0.69 0.59

Proposed Abbottstown Pumping Station Generator

This Section of the EIAR in the 2018 planning application presented an assessment of the impact of emissions to atmosphere from the generator that may be used at the proposed Abbotstown pumping station in the event of a power failure. The assessment presented modelling results for all of the principal pollutants that could be emitted as a result of the generator use.

In order to test the effect of the new AERMOD model (Version 22112 introduced by the US EPA in 2022) on the predictions, a series of models were run using the new version of AERMOD, and the results are presented in Table 14.9 below, alongside the predictions using the then-current model in the EIAR in the 2018 planning application. The results demonstrate that there is no material difference between the impact predictions using the current regulatory version of the AERMOD model compared to the findings presented in the EIAR in the 2018 planning application.

Table 14.9: Proposed Abbotstown Pumping Station Generator: Maximum Predicted Ground Level Concentration of Pollutants

Air Quality Standard		Background Concentration (µg/m³)	Predicted GLC Including Background (µg/m³)	
			2018 EIAR	2023 Addendum
PM_{10}				
24-hour limit not to be exceeded more than 35 times/year (90.4th percentile)	50µg/m³	16	16.7	16.7
Annual limit	40µg/m³	16	16.16	16.16
$PM_{2.5}$				
Annual limit	25µg/m³	8	8.16	8.16
NO_2				
Hourly limit – not to be exceeded more than 18 times per year (99.8th percentile)	200µg/m³	28	31.9	31.8
Annual limit for protection of human health	40µg/m³	14	14.2	14.2
NO_x				
Annual limit for protection of vegetation	30µg/m³	23	23.3	23.3

The predicted impact of NO_x emissions from the proposed Abbottstown pumping station on ecological receptors was shown in Table 14.39 in Chapter 14 (Air Quality, odour and Climate) in Volume 3 Part A of the EIAR in the 2018 planning application. In the EIAR in the 2018 planning application, it was demonstrated that there was no measurable impact on ecological receptors from the deposition of NO_x as a result of the emissions. As noted in Section 14.6.1 of this Addendum Chapter, the 2010 Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (EPA 2010) was updated by the 2020 EPA Air Guidance (EPA 2020) and the update included new guidelines for ecosystem deposition impact assessment in an appendix.

The potential impact of nitrogen deposition in sensitive ecosystems was further evaluated in accordance with the 2020 EPA Air Guidance by comparing the modelled nitrogen deposition rate with the critical loads for the relevant habitat. The critical loads in ecologically sensitive areas is determined using the methodology outlined in the United Kingdom Environment Agency (UK EA) publication, AQTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air (UK EA 2014). The approach uses the maximum annual average GLC within the ecologically sensitive area and converts this concentration into a deposition flux based on a chemical species-specific deposition velocity in metres per second (m/s), which for NO_2 is 0.0015m/s or 0.003 m/s for different habitats.

The most sensitive habitat for this assessment purpose is bog ecosystems and a recommendation of 5kg N ha-1 year-1 (kilograms of Nitrogen per hectare per year) has been made (United Nations Economic Commission for Europe (UNECE) 5 to 10 kg N ha-1 year-1 and EPA Report, Research 390: Nitrogen–Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats (EPA 2021) 5kg N ha-1 year-1) as the critical load for habitat protection. Although the ecological sites of interest in this study are not bog ecosystems, since this is the most sensitive category with the lowest critical load for assessment, it is selected as a conservative approach. The maximum rate of deposition of total nitrogen at any of the selected ecological receptors within 50km of the proposed Abbotstown pumping station site was determined from dispersion modelling with data provided for the highest concentration predicted from the five years of meteorological data for each of the designated sites within this radius of the proposed Abbotstown pumping station site.

Receptors were chosen in each of the designated sites. Total nitrogen deposition was modelled, and the predicted total nitrogen deposition rates are shown in Table 14.10, expressed as NO_x in µg/m³ and in Table 14.11, in terms of the nitrogen deposition rate for the worst-case year as kg N per hectare per year. The predicted deposition rates for the worst-case scenarios are well within the critical loads for the most sensitive habitat type which is bogland. The levels may also be considered in the context of measured nitrogen deposition rates at Valentia Observatory (EPA 2021). The study undertaken to inform Research 390: Nitrogen–Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats (EPA 2021) estimated deposition rates of 8.3 kg N ha−1 y−1 for 2006 to 2015, with a maximum deposition of 19.3 kg N ha−1 y−1 during 2009.

The EPA Report, Research 390: Nitrogen–Sulfur Critical Loads: Assessment of the Impacts of Air Pollution on Habitats, found that dry deposition made up 40% of total deposition, which was dominated by reduced species (56%), that is, wet ammonium, dry particulate ammonium and dry gaseous ammonia. None of these species are significant in the current study but it is useful to note that NO_x are not the dominant contributor to nitrogen deposition in Ireland.

Table 14.10: Summary of Proposed Abbotstown Pumping Station Predicted NO_x Impact on Selected Ecological Sensitive Receptors

Sensitive Location	2012	2013	2014	2015	2016
Max Annual Mean NO_x ($\mu g/m^3$)					
Rye Water Valley SAC	0.00009	0.00012	0.0001	0.00009	0.00013
North Bull Island SPA	0.00026	0.00026	0.00024	0.00022	0.00027
South Dublin Bay & Tolka Estuary SPA	0.00029	0.00033	0.00023	0.00022	0.00026
Baldoyle Bay SPA	0.00022	0.00017	0.00021	0.00016	0.00017
Malahide Estuary SPA	0.00016	0.00018	0.00018	0.00018	0.00018
Max Annual Mean NO_x, Percentage of AQS					
Rye Water Valley SAC	0.0003%	0.0004%	0.0003%	0.0003%	0.0004%
North Bull Island SPA	0.0009%	0.0009%	0.0008%	0.0007%	0.0009%
South Dublin Bay & Tolka Estuary SPA	0.0010%	0.0011%	0.0008%	0.0007%	0.0009%
Baldoyle Bay SPA	0.0007%	0.0006%	0.0007%	0.0005%	0.0006%
Malahide Estuary SPA	0.0005%	0.0006%	0.0006%	0.0006%	0.0006%

Table 14.11: Summary of Proposed Abbotstown Pumping Station Predicted NO_x Impact on Selected Ecological Sensitive Receptors (Worst-Case Year 2012-2016)

Sensitive Location	Maximum Total nitrogen deposition, kg N ha^{-1} $year^{-1}$	
	Deposition Velocities	
	0.0015	0.003
Rye Water Valley SAC	0.000019	0.000037
North Bull Island SPA	0.000039	0.000078
South Dublin Bay & Tolka Estuary SPA	0.000047	0.000095
Baldoyle Bay SPA	0.000032	0.000063
Malahide Estuary SPA	0.000026	0.000052

Dubber Odour Control Unit

As shown above for the Odour Control system emissions at the proposed Abbottstown pumping station, the current regulatory version of the dispersion model AERMOD (version 22112) does not lead to any different findings compared with the then current AERMOD version used in the EIAR in the 2018 planning application. There is no difference in the impact assessment predictions for the Dubber OCU relative to the assessment findings in the EIAR in the 2018 planning application.

Discrete Sensitive Receptor Impact Predictions

There is no difference in the impact assessment for discrete sensitive receptors that was presented in this Section of the EIAR in the 2018 planning application. The impact of the emissions is assessed by comparison against the Air Quality Standards for NO_x for the protection of ecosystems and the relevant critical loads for the habitat. There is a screening criterion of 1% increase on a critical load, as being a threshold below which no significant adverse effect is expected to occur (UK EA 2014). The data presented show that the predicted impact is several orders of magnitude lower than the critical level, and therefore, no adverse ecological impact is predicted. Deposition of nitrogen over the marine habitats was also shown to be significantly lower than the significance threshold, and therefore, no adverse impact is predicted.

Proposed Wastewater Treatment Plant – Combined Heat and Power System

There is no difference in the impact assessment that was presented in this Section of the EIAR in the 2018 planning application. As shown above, the current regulatory version of the AERMOD dispersion model has been shown to give the same results as the previous assessment which used the then current version of the model.

Proposed Wastewater Treatment Plant Odour Assessment

As shown above for the Odour Control system emissions at the proposed Abbottstown pumping station, the current version of the dispersion model AERMOD does not lead to any different findings compared with the version used in the EIAR in the 2018 planning application. There is no difference in the odour impact assessment predictions for the proposed WwTP relative to the assessment findings in the EIAR in the 2018 planning application. All of the predicted emissions are well within the relevant Air Quality Standards and no significant adverse impacts are predicted.

Discrete Sensitive Receptor Impact Predictions

Fifty-two sensitive receptors located near the Proposed Project elements were included in the assessment as detailed in Appendix A14.5 in Volume 3 Part B of the EIAR in the 2018 planning application. These data clearly demonstrate that emissions associated with the operation of the proposed WwTP will not cause a breach in any Air Quality Standard or guideline and there is no change in this assessment using the updated AERMOD model.

Operational impacts on sensitive ecological receptors were also considered. As described in Appendix A14.5 in Volume 3 Part B of the EIAR in the 2018 planning application, 40 discrete receptors in ecologically sensitive areas within the study area were included in the model to evaluate the potential impact. A summary of the predicted concentrations of the relevant pollutant, NO_x, is presented in Table 14.50 in Chapter 14 (Air Quality, Odour and Climate) in Volume 3 Part A of the EIAR in the 2018 planning application. The data show that the predicted impact is several orders of magnitude lower than the critical level, and therefore, no adverse ecological impact is predicted. Deposition of nitrogen over the marine habitats was also shown to be significantly lower than the significance threshold, and therefore, no adverse impact is predicted.

The ecological impact was further evaluated using the updated 2020 EPA Air Guidance (EPA 2020), as outlined above. The assessment approach uses the maximum annual average GLC within the ecologically sensitive area and converts this concentration into a deposition flux based on a chemical species-specific deposition velocity (m/s). The maximum rate of deposition of total nitrogen at any of the selected ecological receptors within 50km of the proposed WwTP site was determined from dispersion modelling, with data provided for the highest concentration predicted from the five years of meteorological data for each of the designated sites, within this radius of the proposed WwTP site.

Receptors were chosen in each of the designated sites. Total nitrogen deposition was modelled, and the predicted total nitrogen deposition rates are shown in Table 14.12 (expressed as NO_x in $\mu g/m^3$), and in Table 14.13, in terms of the nitrogen deposition rate for the worst-case year, as kg N per hectare per year. The predicted deposition rates for the worst-case scenarios are orders of magnitude lower than the critical loads for the most sensitive habitat type which is bogland.

Table 14.12: Proposed Wastewater Treatment Plant Summary of Predicted NOx Impact on Selected Ecological Sensitive Receptors

Sensitive Location	2012	2013	2014	2015	2016
Max Annual Mean NO_x ($\mu g/m^3$)					
Rye Water Valley SAC	0.003	0.005	0.003	0.003	0.004
North Bull Island SPA	0.026	0.026	0.024	0.025	0.025
South Dublin Bay & Tolka Estuary SPA	0.010	0.012	0.012	0.018	0.014
Baldoyle Bay SPA	0.063	0.072	0.048	0.048	0.054
Malahide Estuary SPA	0.027	0.031	0.035	0.030	0.038
Max Annual Mean NO_x, Percentage of AQS					
Rye Water Valley SAC	0.009%	0.016%	0.010%	0.011%	0.014%
North Bull Island SPA	0.088%	0.086%	0.081%	0.084%	0.082%
South Dublin Bay & Tolka Estuary SPA	0.035%	0.039%	0.041%	0.059%	0.045%
Baldoyle Bay SPA	0.210%	0.241%	0.162%	0.159%	0.180%
Malahide Estuary SPA	0.090%	0.103%	0.118%	0.100%	0.126%

Table 14.13: Proposed Wastewater Treatment Plant Summary of Predicted NO_x Impact on Selected Ecological Sensitive Receptors

Sensitive Location	Maximum Total Nitrogen Deposition, kg N ha^{-1} $year^{-1}$	
	Deposition Velocities	
	0.0015	0.003
Rye Water Valley SAC	0.000719	0.001439
North Bull Island SPA	0.003740	0.007480
South Dublin Bay & Tolka Estuary SPA	0.002589	0.005179
Baldoyle Bay SPA	0.010357	0.020714
Malahide Estuary SPA	0.005466	0.010933

14.6.3 Operational Phase Traffic Impacts

The updated traffic assessment presented in Chapter 13A (Traffic and Transport) in Volume 3A Part A of this EIAR Addendum concluded that the volume of traffic generated during the Operational Phase will remain the same as that presented in the EIAR in the 2018 planning application. There is therefore no change in the information presented in this Section of the EIAR in the 2018 planning application and the impact of traffic will remain as Negligible for both NO_2 and PM_{10}, which are the principal emissions associated with traffic.

14.6.4 Sensitivity Analyses

The sensitivity of the updated modelling predictions to varying input data was tested to evaluate the robustness of the modelling assumptions. A discussion of the principal findings of this sensitivity analyses is presented here.

Meteorological Data

Data from Dublin Airport was used as the primary dataset in this assessment. Given the close proximity of Dublin Airport to all of the Proposed Project sites of interest, it is considered that the data are a reliable indicator of meteorological conditions at the Proposed Project sites. The robustness of the assessment was strengthened by using five years of recent data (2012 to 2016) for the sensitivity assessment and the sensitivity of the predictions to more recent meteorological data was also tested using the data for 2017 to 2021. There was no significant variation noted between the datasets used in the study.

Stack Height

There is no change to the information presented in this Section of the EIAR in the 2018 planning application. A robust assessment was presented, and the findings remain the same.

Terrain

There is no change to the information presented in this Section of the EIAR in the 2018 planning application. A robust assessment was presented, and the findings remain the same.

Exit Velocity

There is no change to the information presented in this Section of the EIAR in the 2018 planning application. A robust assessment was presented, and the findings remain the same.

Modelling Uncertainty

There is no change to the information presented in this Section of the EIAR in the 2018 planning application. A robust assessment was presented, and the findings remain the same.

Variable Operating Conditions

There is no change to the information presented in this Section of the EIAR in the 2018 planning application. A robust assessment was presented, and the findings remain the same.

Background Ambient Air Quality

As set out in Section 14.3.3 of this Addendum Chapter, an updated assessment of baseline air quality was completed to consider data acquired since the previous studies were undertaken. A three year average data set for the period 2014 to 2016 was used in the EIAR in the 2018 planning application, and an updated assessment using recently acquired data for 2019 to 2021 concluded that there is no materially significant difference in the air quality data for most parameters for the two periods evaluated. As noted in Section 14.3.3 of this Addendum Chapter, NO_x concentrations were slightly lower in the 2019 to 2021 dataset compared with the EIAR in the 2018 planning application. Since this situation is not expected to continue, the potential effect of this on the impact assessment is considered by way of a sensitivity analysis rather than making an assumption that the reduction will continue. Utilisation of the slightly higher background concentrations for NO_x from the 2014 to 2016 dataset overestimates the significance of the impact of emissions relative to the lower background levels, and this is therefore considered a prudent and conservative approach in the assessment.

14.6.5 Climate Impact Assessment

A full assessment of the impact of GHG emissions from the Proposed Project on climate during both the Construction and the Operational Phases has been completed and is reported in full in Appendix A14.1 in Volume 3A Part B of this EIAR Addendum. Please refer to Appendix A14.1 in Volume 3A Part B of this EIAR Addendum for full details of this assessment.

14.7 ‘Do Nothing’ Impact

As outlined in this Section of the EIAR in the 2018 planning application, if the Proposed Project does not proceed, there will be no significant change in air quality at the various locations. Traffic remains a dominant influence on air quality in many of the areas, and if the Proposed Project does not proceed, this will continue to be the case.

14.8 Mitigation Measures and Monitoring

As the potential impacts outlined in Chapter 14 (Air Quality, Odour and Climate) included in Volume 3 Part A of the EIAR in the 2018 planning application have not changed, there are no further requirements to update

the mitigation measures presented in this Section of EIAR in the 2018 planning application. Therefore, there are no further changes to the information presented in this Section of the EIAR in the 2018 planning application.

Please refer to Appendix A14.1 in Volume 3A Part B of this EIAR Addendum for mitigation details for the full assessment of the impact of GHG emissions from the Proposed Project on climate.

14.9 Residual Impacts

The proposed mitigation measures in Chapter 14 (Air Quality, Odour and Climate) included in Volume 3 Part A of the EIAR in the 2018 planning application remain effective in the management of air quality and odour impacts associated with the Proposed Project, including the updated elements outlined in Table 14.1.

Construction will be managed so that there are no residual air quality impacts after completion. The comprehensive mitigation and management proposals for the proposed Abbotstown pumping station and the proposed WwTP will ensure that there are no significant residual impacts. There is therefore no change in the predicted residual impacts compared with those identified in this Section of the EIAR in the 2018 planning application.

Please refer to Appendix A14.1 in Volume 3A Part B of this EIAR Addendum for details of the residual impacts in relation to GHG emissions from the Proposed Project on climate.

14.10 Difficulties Encountered in Compiling Required Information

There were no specific difficulties encountered when carrying out this updated assessment.

14.11 Oral Hearing

During the 2019 Oral Hearing, the Inspector requested further information about the assessment of the impact on St. Francis Hospice. Further clarification was provided in the 'GDD Response to Air Quality and Odour Questions 28 March 2019' brief of evidence delivered to the Inspector and the public. This brief of evidence is included as Appendix A14.3 in Volume 3A Part B of this EIAR Addendum.

However, as part of this Addendum Chapter, additional air quality monitoring surveys and air quality modelling was required to update the baseline for the Proposed Project study area, including St. Francis' Hospice. The updated baseline at this receptor is outlined in Section 14.3, and the updated assessment of impacts during the Construction Phase and Operational Phase is outlined in Section 14.5 and Section 14.6 of this Addendum Chapter, respectively.

14.12 Conclusion

This Addendum Chapter has considered all updates to elements of the Proposed Project, updates to the baseline environment and whether there have been any updates to guidance and reference material since the 2018 planning application submission. Following consideration, there are no material changes to the assessment of air quality and odour as a result of any of the updates discussed in this Addendum Chapter.

As stated in Section 14.2.2, in light of the developments in climate-related legislation, policy, and guidance which have emerged since the submission of the original planning application in 2018, a full assessment of the impact of GHG emissions from the Proposed Project on climate during both the Construction and the Operational Phases has been completed and is reported in full in Appendix A14.1 in Volume 3A Part B of this EIAR Addendum. Please refer to Appendix A14.1 in Volume 3A Part B of this EIAR Addendum for the conclusion of this assessment.

14.13 References

EPA (2010). Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)

EPA (2017). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Draft.

EPA (2019). Guidelines on odour impact assessment were updated to reflect the contents of the new Odour Emissions Guidance Note

EPA (2020). Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)

EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

EPA (2021). Air Quality in Ireland 2021: Indicators of Air Quality.

FCC (2017). Fingal Development Plan 2017-2023

FCC (2023). Fingal Development Plan 2023 – 2029

Government of Ireland (2023). Clean Air Strategy for Ireland

IAQM (2014a). Guidance on the Assessment of Dust from Demolition and Construction.

IAQM (2014b). Guidance on the Assessment of Odour for Planning.

UK EA (2014). AQTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air

WHO (2006). Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide Global Update 2005

WHO (2021). Global Air Quality Guidelines: Particulate Matter ($PM_{2.5}$ and PM_{10}), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide

Directives and Legislation

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

Number 46 of 2015 - Climate Action and Low Carbon Development Act 2015

Number 32 of 2021 – Climate Action and Low Carbon Development (Amendment) Act 2021

S.I. No. 180/2011 - The Air Quality Standards Regulations 2011

S.I. No. 659/2016 - Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016

S.I. No. 739/2022 - Ambient Air Quality Standards Regulations 2022