Appropriate Assessment Screening Report

For Proposed Open Cycle Gas Turbine (OCGT) Generating Plant

SSE Platin, Platin, Co. Meath

prepared for PM Group

on behalf of SSE Generation Ireland Ltd.

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Appendix I

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the vicinity of the Proposed Development site

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Air Dispersion Modelling Report 2023, SSE Generation Ireland Ltd.

1 Introduction

1 This report, which contains information to assist the competent authority (in this instance Meath County Council) to undertake a screening for Appropriate Assessment (AA), has been prepared by Scott Cawley Ltd., on behalf of the applicant. It provides information on, and assesses the potential for, in view of best scientific knowledge for the Proposed Development to impact on the Natura 2000 network (hereafter referred to as European sites)[1]. The Proposed Development consists of a proposed Open Cycle Gas Turbine (OCGT) Generating Plant on lands at Carranstown and Caulstown, Duleek, Co. Meath.

2 An AA is required if significant effects on European sites arising from a Proposed Development cannot be ruled out at the screening stage, either alone or in combination with other plans or projects. It is the responsibility of the competent authority to make a decision as to whether or not the Proposed Development is likely to have significant effects on European sites, either individually or in combination with other plans or projects.

For the reasons set out in detail in this AA Screening Report, it is respectfully submitted that a Stage Two **Appropriate Assessment of the Proposed Development is required in this instance** as it can be concluded, in view of best scientific knowledge and on the basis of objective information, that the Proposed Development, either individually or in combination with other plans or projects, will have a significant effect on the following European site(s): **River Boyne and River Blackwater SAC [002299], River Boyne and River Blackwater SPA [004232], Boyne Estuary SPA [004080], Boyne Coast and Estuary SAC [001957], and River Nanny Estuary and Shore SPA [004158].**

2 Methodology

2.1 Scientific and Technical Competence Relied Upon

3 This report was authored by Siofra Quigley and reviewed by Tim Ryle and Andrew Speer of Scott Cawley Ltd. The background and experience of the author and contributors to this report are set out below.

4 Síofra Quigley is a Senior Ecologist with Scott Cawley Ltd.. She obtained an honours degree in Zoology, from National University of Ireland Galway, and a Master's degree in Wildlife Biology and Conservation from Edinburgh Napier University. She has five years' professional experience working in the UK and Ireland on a range of projects, from residential to large-scale infrastructure. Síofra is experienced in carrying out field surveys in several protected species; bat, otter, badger, birds, red squirrel, reptile, pine marten, and undertakes and manages surveys for a range of projects. She has also been involved in radio tracking mountain hares and bats, bat call analysis, badger bait marking, has acted as an Ecological Clerk of Works role on construction projects. Síofra is experienced in habitat classification (Joint Nature Conservation Committee, 2010, EU Habitats Directive and Fossitt classification) and mapping (QGIS and ArcGIS). Síofra's work in Scott Cawley involves project management, and the preparation of reports, including Ecological Impact Assessment (EcIA) Appropriate Assessment (AA) Screening reports, and Natura Impact Statements

[1] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (as amended) (the "Habitats Directive", which comprises both special areas of conservation and special protection areas. Special Areas of Conservation (SACs) are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special Protection Areas (SPAs) are established under Article 4 of the Birds Directive 2009/147/EC on the conservation of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats.

In Ireland these sites are designed as *European sites* - defined under the Planning and Development Act 2000 (as amended) and/or the European Communities (Birds and Habitats) Regulations 2011 as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

(NIS) for residential, commercial, and infrastructure projects across Ireland. Síofra has also been involved in the preparation of bat derogation licence applications, prepared habitat management plans and advised on enhancement measures for planning applications.

5 Tim Ryle is a Principal Ecologist with Scott Cawley Ltd. He holds an honours degree in Botany from University College Dublin and was later awarded a Ph.D. from the same institution. He is a full Member of the Institute of Environmental Scientists. Tim is an experienced ecological consultant with twenty years' experience in private consultancy in designing, undertaking and managing a wide range of ecological survey and in assessing impacts and designing mitigation measures and biodiversity enhancements, in particular for protected species including badgers, otters, bats, birds, amphibians as well as habitats of conservation importance. He is also experienced in undertaking Appropriate Assessment for small-scale development projects and larger infrastructural projects, land plans as well as national/government plans.

6 Andrew Speer is a Chief Technical Officer at Scott Cawley Ltd., with over 14 years' professional ecological consultancy experience in ecological impact assessment. Andrew is a Full Member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds an honours degree in Zoology from NUI Galway, a Postgraduate Diploma in Geographic Information Systems (GIS) from the University of Ulster and an Advanced Diploma in Planning and Environmental Law from Kings Inns. He has extensive experience in the Appropriate Assessment (AA) process and has been the lead author for the preparation of numerous Screening for Appropriate Assessment Reports, Natura Impact Statements (NISs) and Natura Impact Reports (NIRs). Andrew also provides technical review and due diligence of Appropriate Assessment documentation for public and local authorities to aid their decision-making process as well as peer review of AA documentation prior to lodgement of planning applications.

2.2 Guidance

7 This Appropriate Assessment Screening Report has been prepared with regard to the following guidance documents, as relevant:

- *OPR Practice Note PN01. Appropriate Assessment Screening for Development Management* (Office of the Planning Regulator, 2021);
- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*. (Department of Environment, Heritage and Local Government, 2010 revision);
- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities*. Circular NPW 1/10 & PSSP 2/10;
- *Assessment of Plans and Projects in Relation to Natura 2000 sites: Methodological Guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2021);
- *Communication from the Commission on the precautionary principle* (European Commission, 2000);
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC* (European Commission, 2019); and
- EC (2013) *Interpretation Manual of European Union Habitats*. Version EUR 28. European Commission.

2.3 Assessment Methodology

8 The above referenced guidance sets out a staged process for carrying out Appropriate Assessment. To determine if an Appropriate Assessment is required, documented screening is required. Screening identifies the potential for effects on the conservation objectives of European sites, if any, which would arise from a proposed plan or project, either alone or in combination with other plans and projects (i.e. likely significant effects).

9 Significant effects on a European site are those that would undermine the conservation objectives supporting the favourable conservation condition of the Qualifying Interest (QI) habitats and/or the QI/Special Conservation Interest (SCI) species of a European site(s).

10 There is no necessity to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment (AA) has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether a Stage Two AA must be undertaken by the competent authority on the implications of the Proposed Development for the conservation objectives of a European site. Therefore, where significant effects are likely, uncertain or unknown at screening stage, a second stage AA will be required.

11 Screening for Appropriate Assessment involves the following steps:

12 If the conclusions at the end of screening are that there is no likelihood of significant effects occurring on any European sites as a result of the proposed plan or project, either alone or in combination with other plans and projects, then there is no requirement to undertake a Stage Two Appropriate Assessment.

13 In establishing which European sites are potentially at risk (in the absence of mitigation) from the Proposed Development, a source-pathway-receptor approach was applied. In order for an impact to occur, there must be a risk enabled by having a source (e.g. water abstraction or construction works), a receptor (e.g. a European site or its QI(s) or SCI(s)[2]), and a pathway between the source and the receptor (e.g. pathway by air for airborne pollution, or a pathway by a watercourse for mobilisation of pollution). For an impact to occur, all three elements must exist; the absence or removal of one of the elements means there is no possibility for the impact to occur.

14 The identification of source-pathway-receptor connection(s) between the Proposed Development and European sites essentially is the process of identifying which European sites are within the Zone of Influence (ZoI) of the Proposed Development, and therefore potentially at risk of significant effects. The ZoI is the area over which the Proposed Development could affect the receiving environment such that it could potentially have significant effects on the QI habitats or QI/SCI species of a European site, or on the achievement of their conservation objectives[3].

15 The identification of a source-pathway-receptor link does not automatically mean that significant effects will arise. The likelihood for significant effects will depend upon the characteristics of the source (e.g. extent and duration of construction works), the characteristics of the pathway (e.g. direction and strength of prevailing winds for airborne pollution) and the characteristics of the receptor (e.g. the sensitivities of the European site and its QIs/SCIs).

16 The 'likely significant effects' test is based on the precautionary principle[4]. The precautionary principle means that, based on the most reliable available information, where there is uncertainty or doubt as to the absence of significant effects, the project cannot be screened out and an appropriate assessment must be carried out.

2.4 Desktop Data Review

17 The desktop data sources used to inform the assessment presented in this report are as follows (accessed in July 2023):

- Online data available on European sites and protected habitats/species as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie[5], including conservation objectives documents;

[2] The term Qualifying Interest is used when referring to the habitats or species for which an SAC is designated; the term Special Conservation Interest is used when referring to the bird species (or wetland habitats) for which an SPA is designated.

[3] As defined in the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018).

[4] The precautionary principle is a guiding principle that derives from Article 191 of the Treaty on the Functioning of the European Union and has been developed in the case law of the European Court of Justice (e.g. ECJ case C-127/02 – Waddenzee, Netherlands).

The guidance document *Communication from the Commission on the Precautionary Principle* (European Commission, 2000) notes that the precautionary principle "*covers those specific circumstances where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the chosen level of protection*"..

[5] The following SAC and SPA GIS boundary datasets are the most recently available at the time of writing: SAC_ITM_2023_07 and SPA_ITM_2023_07.

- Online data available on protected species as held by the National Biodiversity Data Centre (NBDC) from www.biodiversityireland.ie;
- Information on the surface water network and surface water quality in the area available from www.epa.ie;
- Information on groundwater resources and groundwater quality in the area available from www.epa.ie and www.gsi.ie;
- Ordnance Survey of Ireland mapping and aerial photography available from www.osi.ie;
- Information on the location, nature and design of the Proposed Development supplied by the applicant's design team; and

2.5 Baseline Surveys

18 A baseline ecological survey was undertaken as necessary to inform environmental assessments of the proposed works. This section describes the ecological surveys carried out to inform the assessment of likely significant effects on European sites. Whilst surveys for this planning application were undertaken in 2022 and 2023, surveys have previously been undertaken by Scott Cawley Ltd., on the same lands in 2019 for a separate planning application on this site for the same client. Survey details for both planning applications are included below. For all of the receptors/survey types described below, the area within the Red Line boundary of the Proposed Development site was surveyed, as shown in Figure 1.

2.5.1 Habitats and Flora Survey

19 A habitat survey was undertaken of the Proposed Development site on the 12th April 2023 by Nicholas Fettes B.Sc. which followed on from an earlier survey on the 21st May 2019 by Colm Clarke B.Sc. M.Sc., both of Scott Cawley Ltd., following the methodology described in *Best Practice Guidance for Habitat Survey and Mapping*[6]. All habitat types were classified using the *Guide to Habitats in Ireland*[7], recording the indicator species and abundance using the DAFOR scale[8] and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of *The National Vegetation Database*[9], having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles*[10] and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide*[11].

2.5.2 Fauna Surveys

2.5.2.1 Terrestrial Mammals (excluding Bats)

20 A terrestrial fauna survey (excluding bats) was undertaken on the 12th April 2023 by Nicholas Fettes following on from a previous survey on the 21st May 2019 by Colm Clarke. The presence/absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats within the Proposed

[6] Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.

[7] Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

[8] The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant, Abundant, Frequent, Occasional and Rare.

[9] Weekes, L.C. & FitzPatrick, Ú. (2010) The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

[10] Stace, C. (2019) *New Flora of the British Isles*. *4th Edition*. C&M Floristics.

[11] Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.

Development site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. Surveys to check for the presence of badger setts within the study area, and to record any evidence of use, were undertaken.

2.5.2.2 Breeding Birds

21 Breeding bird surveys were undertaken on the 30th March 2023 by Wayne Daly B.Sc. (Scott Cawley Ltd.), on the 12th April 2023 by Nicholas Fettes, and on the 21st and 31st May 2019 by Colm Clarke, using a methodology adapted from the *Bird Monitoring Methods - A Manual of Techniques for Key UK Species* [12]. The habitats within the Proposed Development site were slowly walked in a manner allowing the surveyor to come within 50m of all habitat features. Birds were identified by sight and song, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

2.5.2.3 Wintering Birds

22 Wintering bird surveys were undertaken by Scott Cawley Ltd., ecologists on the following dates:

- 9th and 22nd December 2022 by Cathal O'Brien and Wayne Daly;
- 10th and 26th January 2023 by Camilla Casella and Sorcha Shanley;
- 10th February 2023 by Cathal O'Brien; and
- 3rd, 14th and 22nd March 2023 by Shane Brien[13].

23 All surveys were undertaken using a methodology based on the *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*. Lands were initially surveyed visually using binoculars/scope from a vantage points at the edge of the Proposed Development site followed by a walkover of the site to identify birds which may not be visible from a distance (e.g. waders) and evidence of usage by wildfowl such as swans or geese (e.g. droppings). Birds were identified by sight and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

3 Provision of Information for Screening for Appropriate Assessment

24 The following sections provide information to facilitate the Appropriate Assessment screening of the Proposed Development to be undertaken by the competent authority.

25 A description of the Proposed Development and the receiving environment is provided to identify the potential ecological impacts. The environmental baseline conditions are discussed, as relevant to the assessment of ecological impacts where they may highlight potential pathways for impacts associated with the Proposed Development to affect the receiving ecological environment (e.g. hydrogeological, hydrological and air quality data).

26 The potential impacts are examined in order to define the potential zone of influence of the Proposed Development on the receiving environment. This then informs the assessment of whether the Proposed Development will result in significant effects on any European sites; i.e. affect the conservation objectives supporting the favourable conservation condition of the European site's QIs or SCIs.

[12] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*. RSPB: Sandy

[13] Wintering bird survey season generally consists of monthly visits between September – March (i.e. one survey a month), based on guidance found in Bird Monitoring Methods - A Manual of Techniques for Key UK Species. Whilst early season visits were not completed for this application, due to the distance from the Proposed Development and large estuaries and the SPA sites therein, and as additional surveys were undertaken between December – March to supplement missing the start of the season, this is not a limitation to the development. In addition, early arrival species such as geese and swans, would still be picked up later in the season, should they be using the development site.

3.1 Description of the Proposed Development

27 A full description of the Proposed Development is also provided in Chapter 2 of the Environmental Report accompanying the planning application for the Proposed Development.

28 The proposed OCGT Generation Plant site is 10.55ha in size and located 4.8km south-west of the centre of Drogheda and 2.7km north-east of the centre of Duleek (refer to Figure 1).

29 The site is currently a greenfield site and used for agriculture tillage. The land is situated approximately 450m to the south of a large cement manufacturing plant and its associated quarry (Irish Cement Ltd), at its nearest point to the site. In addition, the Indaver Waste to Energy facility lies immediately northwest of the site across the R152 road. Directly adjacent to the proposed OCGT Generating Plant is a cluster of commercial and residential buildings including a commercial vehicle servicing centre and CVRT (Commercial Vehicle Roadworthiness Testing) centre. Residential development in the vicinity of the site is scattered, typical of the rural location.

30 The Proposed Development will comprise a 170MW (electrical output) Open Cycle Gas Turbine (OCGT) Power Plant. The Proposed Development will comprise an electricity generating plant which will use Hydrotreated Vegetable Oil (HVO) as fuel and will be connected to a previously permitted 110kV substation (ABP-303678-19) and associated site works and improved access from the R152. The development comprises the following elements:

a) Three gas turbine buildings (each 990m2) each housing 1 no. turbine, 1 no. generator and auxiliary equipment with a total of 269 MWth (thermal output) generating capacity all on concrete plinths.

b) The power plant will have three exhaust stacks (25m in height), one exhaust stack per OCGT. Therefore, each OCGT will comprise a standalone Large Combustion Plant. The power plant may need to utilise, selective catalytic reduction (SCR) (18m high, 4.5 width, 14m length) for nitrogen oxide (NOx) abatement.

c) Water treatment plant comprising:

- a 275m2 Deionising Building (6m high x 11m wide x 25m long)
- a raw water treatment tank of 2,262m3 (12.8m high)
- a deionised water tank (max. volume of 3,925m3) 15.4m high
- a processed water tank of 450m3 (9m high)
- 1 no. 20m2 firefighting water tank of 45m3 (2m high)
- 1 no. 25m2 firewater module (4m high x 5m wide x 5m long)
- 1 no. sanitary foul water cesspool tank of 79m3 located underground (1.98m high x 2.5m wide x 16m long)
- a bulk chemical storage area (4.75m wide x 7.75m long)

d) 2 no. HVO tanks (max. storage of 2300 m3 of HVO per tank),13m high with a diameter of 15m and associated fuel pumping and filtering equipment and pipework, within a 43.5m L x 45.5m W x 1.5m Bund capacity is 2970m3

e) 1 ammonia tank –1.8m high 3.5m length with bund 2.5 m x 5 m with a height of 1.5 m

f) 1 no. fuel polishing system (3m high x 6m wide x 24m long)

g) 2 no. transformers each 160m2, and each measuring (5m high x 10m wide x 15m long). 3 no. Lightning Masts (18m in height) and cable gantry connection to the adjoining consented 110kV Substation.

h) a 520m2 services building (6m high x 13m wide x 40m long)

i) a 160m2 Switchgear (MV) building (5m high x 6.1m wide x 26.3m long)

j) all other miscellaneous and ancillary site works, including: 12 no. Car parking spaces and 1 No. unloading bay, one lowered site platform area, internal circulation road, internal access road and hard and soft landscaping including a material berm (1.2m high), a temporary construction compound, temporary security building, staff welfare facilities, and palisade fencing (2.4m high).

k) New road markings, including deceleration lane approaching the site, on the R152

31 The Proposed Development will include connection to public water mains and wastewater provision, supplied by Uisce Éireann. Foul water produced will be less than 1m^3 per day from the Services building sinks/toilets and will be stored in a separate c. 79m^3 underground tank (subject to detailed design) pending collection by an appropriately licensed waste collector for treatment off-site. With 1m^3 of waste being produced each day it is estimated a maximum of 1 tanker per month should be adequate to remove the foul waste water from the site. All underground waste water storage tanks will be supplied by a specialist manufacturer and installed with a concrete surround to the manufacturer's specification. The waste will be transported by a specialist waste contractor to a suitable licensed waste facility for treatment.

32 The Proposed Development will connect to a previously consented 110 kV substation which will be located adjacent and to the south-west of the proposed OCGT Power Plant.

33 The application relates to a development which comprises or is for the purposes of an activity requiring an Industrial Emissions Directive (IED) licence, and full details of the Proposed Development and its anticipated environmental impacts will be notified to the Environmental Protection Agency. This is a site to which the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015) applies.

34 Storm water from the Proposed Development will be discharged from the site at two outfall points: one at the eastern boundary toward the north of the Proposed Development site, and a second at the eastern boundary in the centre of the site. The storm water system include the provision of a hydro-brake to limit the volume of discharge to the receiving drainage ditch to 1.24 l/s and 7.33 l/s, respectively, in line with greenfield run-off rates. All storm water runoff from hard-standing areas will pass through a full retention oil separator. The Proposed Development will include 6 no. full retention separators.

3.1.1 Grid Connection

35 Power generated from the Proposed Development will ultimately feed into the national grid controlled. This will occur, with separate approval of the Commission for Regulation of Utilities (CRU) and in accordance with the requirements of Eirgrid, via a connection to the consented substation (This consent process is separate from the planning process).

3.1.2 Landscaping

36 As the main construction elements draw to a close, the landscaping of the site includes enhancement planting and the seeding of a wildflower planting along the road verge and constructed embankment.

3.1.3 Estimated Construction Duration

37 Pending the grant of planning permission, the construction is expected to commence in Q4 2023 and expected to last 30 months and will employ 60-80 construction personnel.

3.1.4 Decommissioning

38 In the event the Proposed Development is decommissioned at the end of its operational lifetime (expected to be at least 20 years), a specific Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval. The decommissioning phase would return the area to the levels at this time, including any other changes from other plans/projects in the environment.

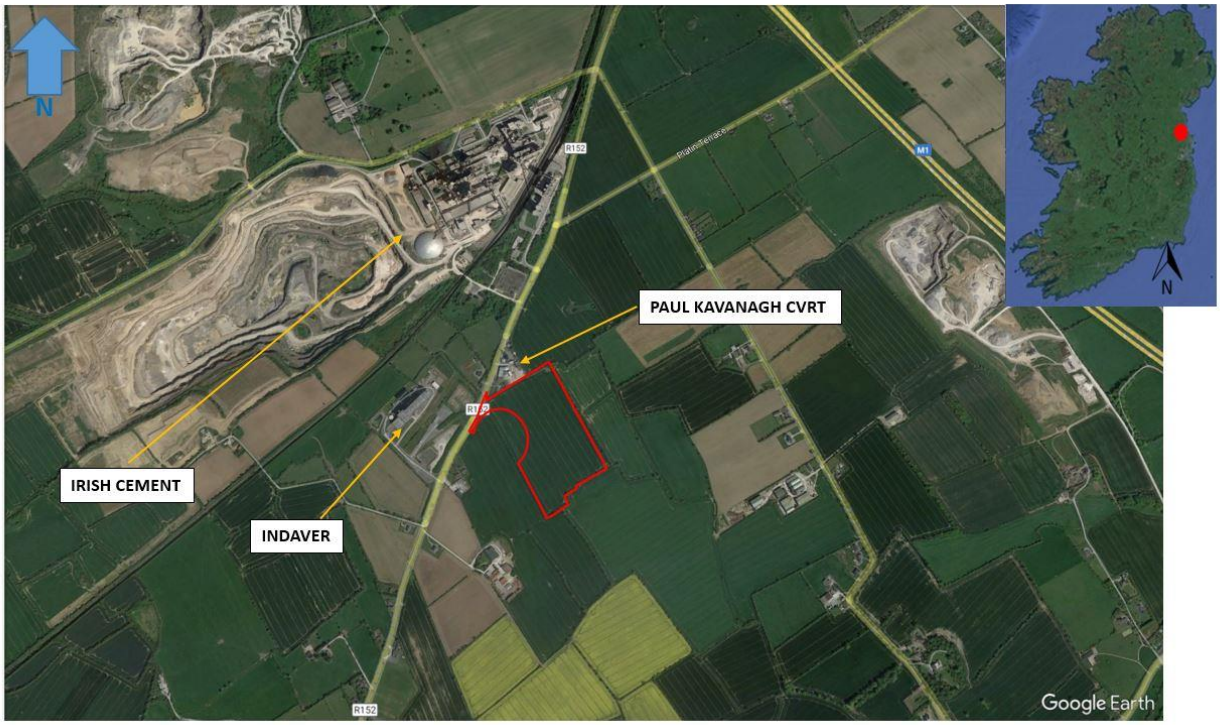

Figure 1 Site Location and Red line boundary of the Proposed Development[14]

[14] Outline Construction Environmental Management Plan SSE Generation Ireland Ltd., PM Group (2023).

3.2 Overview of the Receiving Environment

3.2.1 European sites

39 There are no European sites within or adjacent to the Proposed Development site. The closest European sites are the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA, located *c.* 3.5km to the north. The Proposed Development is not hydrologically linked or connected to the River Boyne or any of its tributaries.

40 All of the European sites present in the vicinity of the Proposed Development are shown on **Figure 2** below. The QIs/SCIs of the European sites in the vicinity of the Proposed Development are provided in **Appendix I**.

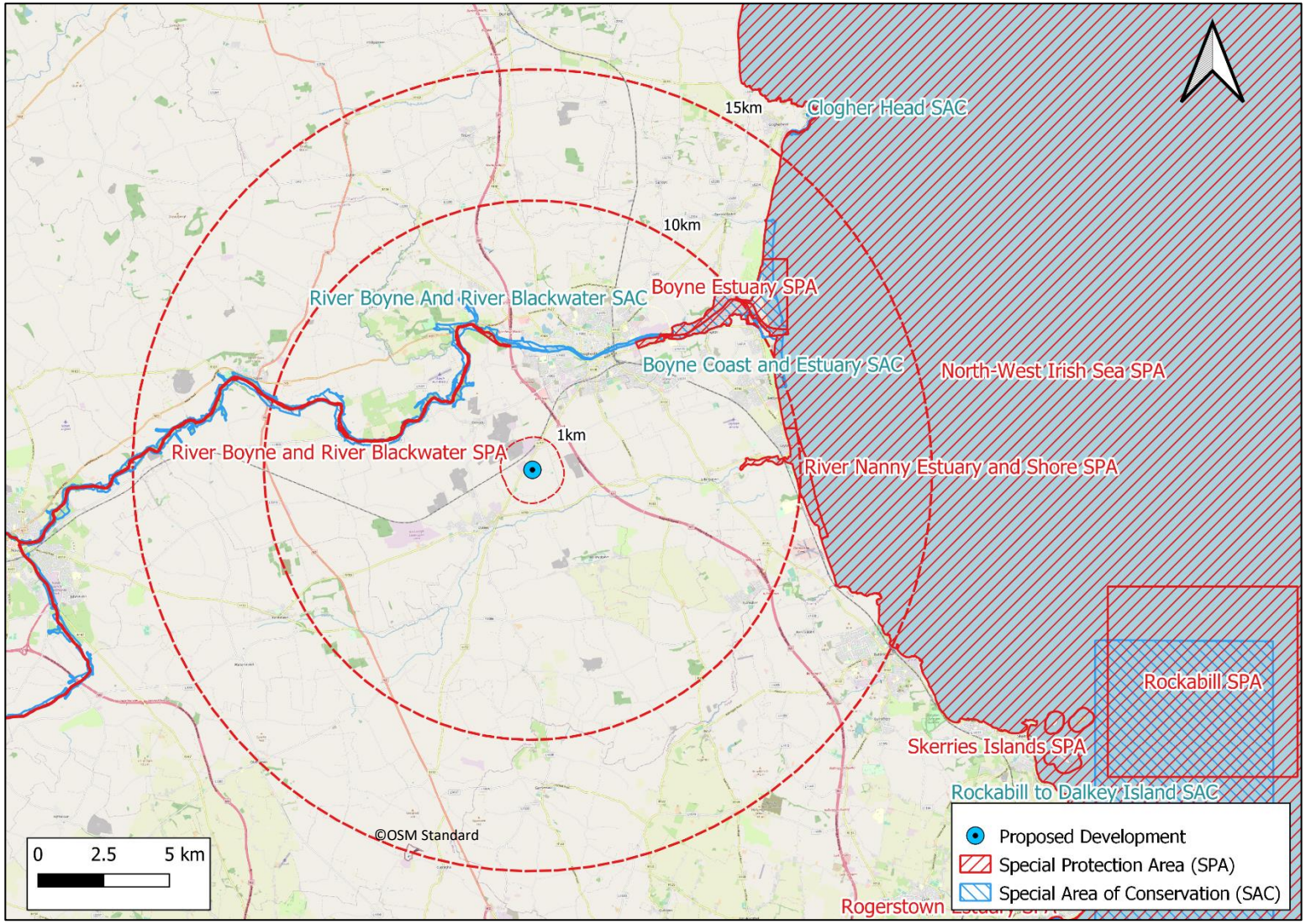

Figure 2: European sites in the vicinity of the Proposed Development

3.2.2 Habitats and Flora

3.2.2.1 Habitats

41 The Proposed Development is located in the 10km Grid Square O07, at O 06670 70776 on lands at Carranstown and Caulstown, Duleek, Co. Meath. The lands are comprised of a single large arable field (BC1), bordered by hedgerows (WL1) and treelines (WL2). Drainage ditches (FW4) and a grassy verge (GS2) are also present along the boundaries of the site. The hedgerow habitat is approximately 1-2m in height, but well established and dominated by hawthorn *Crataegus monogyna,* with bramble *Rubus fruticosus* agg., ivy *Hedera helix,* and elder *Sambucus nigra* also noted in this habitat. The southern and eastern boundary contain a mosaic of hedgerow and treeline habitat, with ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus* present in the canopy layer, and hawthorn in the understory.

42 A grassy verge (GS2) separates the hedgerow/treeline habitat from the arable crop field habitat, and is dominated by rank grassland species such as false oat-grass *Arrhenatherum elatius*, Cock's-foot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus*, cleavers *Galium aparine,* and other tall ruderals including nettle *Urtica dioica*, broad-leaved dock *Rumex obtusifolius* and hogweed *Heracleum sphondylium*.

43 A number of drainage ditches also border the boundaries of the site. The western and most of the southern ditches were dry during visits in April 2023, while the northern and eastern ditches contained water. Water appears to enter the lands from the adjacent vehicular facility to the north of the lands, and likely flows into the Nanny (Meath)_050 watercourse located c. 130m east of the Proposed Development.

44 Overall, the habitats located within the Proposed Development site have limited ecological value in terms of flora. None of these habitats corresponds to Annex I habitats, provide a supporting role to any Annex I habitats connected with any European site and none of the QI habitats of European sites within the ZoI of the Proposed Development occur in or in close proximity to the Proposed Development site.

3.2.2.2 Rare and Protected Flora

45 The NBDC desktop study of records within *c.* 2km of the Proposed Development site contained no records for any species listed on the Flora (Protection) Order, 2022 (FPO). The habitat survey did not identify any rare or protected flora within the Proposed Development site.

3.2.2.3 Invasive species

46 The NBDC desktop study of records within *c.* 2km of the Proposed Development site contained no records for any species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended). No non-native invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended) were identified during any of the surveys undertaken within the Proposed Development site.

3.2.3 Fauna Species

3.2.3.1 Birds

47 The desktop study found a total of seven Special Conservation Interest (SCIs) birds associated with European sites illustrated in **Figure 2** and also listed in Table 1 and **Appendix I** of this report. With the exception of kingfisher, all of the other six species are wintering species of wader, duck, and gull which overwinter in the estuaries on the eastern coastline, *i.e.* River Boyne Estuary, and the River Nanny Estuary, and therefore the European sites therein. Whilst all of these species forage and roost within estuaries,

lapwing, golden plover and herring gull can also use agricultural grasslands and arable land for foraging[15]. Kingfisher is a SCI species for the River Boyne and River Blackwater SPA, located *c.* 3.7km north west of the Proposed Development. Kingfisher are only found along rivers, streams and canals, where they nest in burrows along vertical banks, and forage and commute along watercourses, rarely venturing inland [16]. The Proposed Development therefore does not have any suitable habitat for kingfisher species.

48 During wintering bird surveys carried out in 2022 and 2023, lapwing (an SCI species of Boyne Estuary SPA) were observed foraging within the lands during the survey on the 9th December 2022, with a peak count of 12. They were not observed during subsequent surveys. Herring gull, an SCI species of the River Nanny Estuary and Shore SPA and the North-West Irish Sea cSPA, were observed during all of the wintering bird surveys either foraging within the site or flying over the site, with a peak count of 124 birds observed foraging in the central area of the site in January 2023. Therefore the Proposed Development provides suitable *ex-situ* habitat for SCI species of the River Boyne Estuary SPA, River Nanny Estuary and Shore SPA and the North-West Irish Sea cSPA.

Table 1: Desktop result of SCI bird species associated with European sites

Bird Species
Kingfisher *Alcedo atthis*
Common redshank *Tringa totanus*
Shelduck *Tadorna tadorna*
Oystercatcher *Haematopus ostralegus*
Golden Plover *Pluvialis apricaria*
Herring gull *Larus argentatus*
Northern lapwing *Vanellus vanellus*

3.2.3.2 Mammals

49 The NBDC data search returned records of the aquatic and terrestrial mammals species otter *Lutra lutra* within *c.* 2km of the Proposed Development. Otter and their breeding and resting places, are protected under the Wildlife Act 1976 (as amended) (the "Wildlife Acts". Otter are also listed on Annex II and Annex IV of the EU Habitats Directive and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended). Otter have a widespread distribution in Ireland and are expected to inhabit all significant watercourses within the study area. Typically, otter territories are within the range of 7.5km for females and up to 21km for males[17]. Otter is a QI species of the River Boyne and River Blackwater SAC, which is located *c.* 3.5km north of the proposed works. There are no watercourses within the Proposed Development, with the closest being a tributary of the River Nanny (Nanny (Meath)_050), located *c.* 130m west of the Proposed Development site. The Proposed Development is not hydrologically linked to the River Boyne or any of its tributaries.

[15] NPWS (2012). *River Nanny Estuary & Shore Special Protection Area, Conservation Objectives Supporting Document, Version 1.*

[16] Accessed in June 2023: https://birdwatchireland.ie/birds/kingfisher/

[17] Ó'Neill, L., Veldhuizen, T., de Jongh, A. & Rochford, J. (2009). Ranging behaviour and socio-biology of Eurasian otters (*Lutra lutra*) on lowland mesotrophic river systems. European Journal of Wildlife Research. 55:363-370.

3.2.3.3 Other Fauna

50 Desmoulin's whorl snail *Vertigo moulinsiana* is protected through its inclusion on Annex II of the EU Habitats Directive. The NBDC database search of records *c.* 2km from the Proposed Development returned records for this species from 1972 in the O07 10km Grid Square, in an area covering western Drogheda and surroundings. The closest European site for which Desmoulin's whorl snail is a QI species is the Rye Water Valley/Carton SAC, located *c.* 33km southwest and not within the same WFD Catchment of the Proposed Development. The desk study did not return records for any other Annex II fauna within the study area, nor did the Fauna surveys on site.

3.2.4 Hydrology

51 The Proposed Development contains a network of drains which connect it to the Nanny River, *c.* 1.5km south of the Proposed Development via the Platin Stream (located *c.* 130m east of the Proposed Development site), as shown in Figure *3*. From the confluence of the Platin Stream with the Nanny River, *c.* 1.5km downstream of the Proposed Development site, the Nanny River travels for a length of *c.* 6.5km before discharging to the Nanny Estuary transitional waterbody. The Nanny Estuary transitional waterbody in turn discharges to the Northwest Irish Sea coastal waterbody after a distance of a further 3.5km.

52 In light of the location of the Proposed Development in the catchment of the River Nanny and the Nanny Estuary, there is potential for waters generated in the lands to influence the downstream receiving environment in the River Nanny and Nanny Estuary.

53 The EPA collects data on water quality of river, transitional and coastal waterbodies in Ireland and hosts this data on the EPA web database . The following water quality data is available for watercourses in the vicinity of the development site:

- Downstream: There are no EPA water monitoring stations along the Platin Stream. There are however two operational EPA water monitoring stations along the River Nanny downstream of the Proposed Development site: Station Code RS08N010550 (Station Name = NANNY (MEATH) - Br u/s Beaumont Br); and, Station Code RS08N010700 (Station Name = Br at Julianstown). Both stations recorded a Q-Value code of 3 or 'poor' water quality status when last surveyed in 2018 by the EPA. The Nanny Estuary Transitional Waterbody was recorded as being of 'intermediate' status in 2018-2020, while the Northwest Irish Sea coastal waterbody was recorded as being 'unpolluted' in 2018-2020.
- Upstream: There are no water monitoring stations upstream of the Proposed Development site.

54 Separately, the EPA also undertakes monitoring and reporting of the Water Framework Directive (WFD) status of Irish waterbodies. The WFD classification scheme includes five status classes: high, good, moderate, poor and bad[18]. The WFD status of a waterbody reflects the biological, chemical and morphological conditions associated with it. The WFD status of the Platin Stream and the River Nanny downstream of the Proposed Development site is 'Poor' for the period 2016-2021, while for the Nanny Estuary, its 2016-2021 status is 'Moderate'. The WFD status of the Northwest Irish Sea Coastal waterbody is 'Good' for the period 2016- 2021.

55 In addition to monitoring WFD status, the EPA characterises whether waterbodies are at risk of failing to meet their environmental objectives. The River Nanny and the Northwestern Irish Sea are listed as being "At risk", while the Nanny Estuary is listed as being under "review" under the WFD Risk 2nd cycle period covering 2016-2021.

[18] Information on WFD classification categories and characterisation from the EPA website www.epa.ie/water/watmg/wfd/ Accessed June 2023

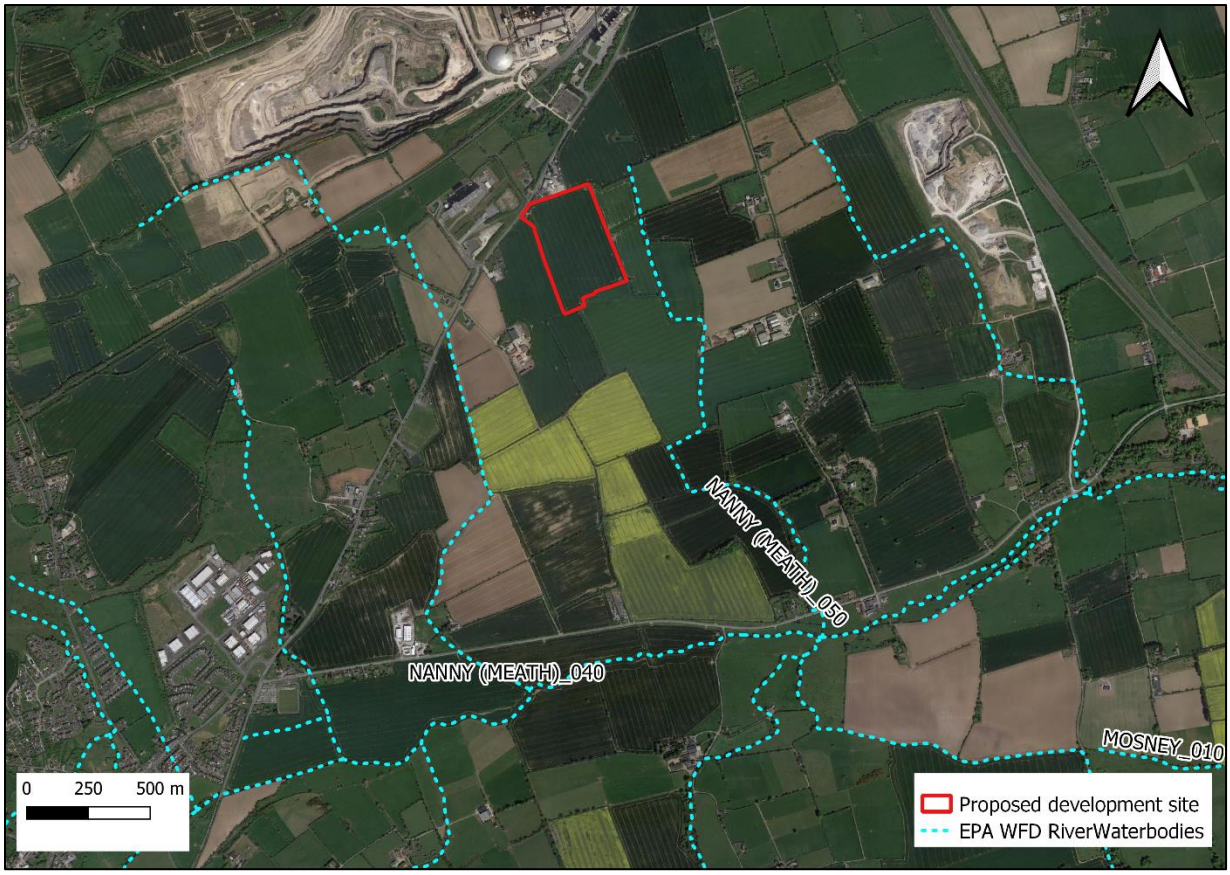

Figure 3. Watercourses in the vicinity of the Proposed Development

3.2.5 Hydrogeology

56 The Geological Survey of Ireland (GSI) data indicates that the site is underlain by a Regionally Important Aquifer - Karstified (diffuse). The site is located in an area of 'Moderate vulnerability', in relation to the underlying aquifer.

57 The Proposed Development is within the 'Bettystown' groundwater body (GWB) and is classified by the EPA as having 'Poor Status' and 'at risk' for the period 2016-2021. The Bettystown GWB overlaps with one European site, the River Nanny Estuary and Shore SPA, designated for overwintering bird species and their associated wetland habitat.

3.2.6 Air Quality

58 The effects of air pollution derived from anthropogenic activities is known to have negative impacts on the environment, either directly by causing vegetation die-back, or indirectly by affecting the acidity and nutrient status of soils and waters[19]. Governments have set limit values for a range of air pollutants in ambient air, known as Air Quality Standards (AQS). The Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) transpose EU Directive 2008/50/EC into Irish law.

[19] Aherne, J. (2021) *Nitrogen–sulfur critical loads: Assessment of the impacts of air pollution on habitats*. Available at: https://www.epa.ie/publications/research/air/Research_Report_390.pdf (Accessed: June, 2023).

59 According to the Air Quality and Climate chapter of the Environmental Report[20] prepared for the Proposed Development, there are two Industrial Emission (IE) licenced facilities within close proximity of the Proposed Development site:

- Indaver Ireland Ltd. (IE Licence no. W0167-03), *c.* 50m north-west of the Proposed Development site; and,
- Irish Cement Ltd. (IE Licence no. P0030-05), *c.* 200m north of the Proposed Development site.

60 The EPA produces an annual report on air quality[21], which includes results from air quality monitoring stations across various Air Quality Zones within Ireland. The Proposed Development site is located within Air Quality Zone D: Rural Ireland, but is very close to Air Quality Zone C: Other Cities and Large Towns. Zone C in this instance is associated with Drogheda. Background pollutant levels in Zone C are elevated relative to Zone D and have been used as a conservative baseline for the purpose of this report. Background levels for aerosols for Zone C are replicated from the Air Quality and Climate chapter of the Environmental Report for the Proposed Development site in Table **2**, below. Table 3 includes the most recent data available for ambient ammonia in the study area.

Table 2: EPA Quality Zone C Monitoring Stations: Background Pollutant concentrations (µg/m³) for period 2017 – 2021

Pollutant Parameter	Resultant Estimated Background Concentration
Nitrogen Dioxide (NO_2) Hourly - Annual Mean µg/m³	12.05
Nitrogen Dioxide (NO_2) Hourly – 99.8th Percentile µg/m³	24.10
Carbon Monoxide (CO) 8-Hour - Annual Mean mg/m³	0.22
Particulate Matter (PM_{10}) Daily - Annual Mean µg/m³	13.8
Particulate Matter ($PM_{2.5}$) Daily - Annual Mean µg/m³	8.4
Sulphur Dioxide (SO2) Hourly – Annual Mean µg/m³	2.85
Sulphur Dioxide (SO_2) Hourly – 99.7th Percentile µg/m³	5.7
Sulphur Dioxide (SO_2) Daily – 99.2th Percentile µg/m³	5.7

Table 3 Background Ammonia (NH_3) concentrations (µg/m³) for period 2013 – 2014

Pollutant Parameter	Resultant Estimated Background Concentration
Ammonia (NH_3) Hourly mean µg/m³	3.2
Ammonia (NH3) Hourly – Annual Mean µg/m³	1.6

[20] Chapter 10 Air Quality, Environmental Report, Platin. June 2023

[21] The most recent air quality report is 'Air Quality in Ireland 2021 (2022)'

3.3 Assessment of Effects on European Sites

61 This section identifies all the potential impacts associated with the Proposed Development during construction and operation, and examines whether there are any European sites within the ZoI of effects from the Proposed Development, and assesses whether there is any risk of the Proposed Development resulting in a significant effect on any European site, either alone or in combination with other plans or projects.

62 In assessing the potential for the Proposed Development to result in a significant effect on any European sites, any measures intended to, or that have the effect of, avoiding or reducing the harmful effects of the Proposed Development on European sites (i.e. "mitigation measures") or best practice measures have not been taken into account in the screening stage appraisal intended to avoid or reduce the harmful effects of the project on European sites are not taken into account.

3.3.1 Habitat loss and fragmentation

63 The Proposed Development does not overlap with the boundary of any European site. Therefore, there are no European sites at risk of direct habitat loss impacts.

64 As the Proposed Development does not traverse any European sites there is no potential for habitat fragmentation to occur.

65 Several wetland bird SCIs of European sites in the vicinity of the Proposed Development are known to regularly utilise terrestrial grassland and arable sites for supplementary forage. Wintering bird species are mobile and can regularly travel up to 20km between roosting and feeding sites[22]. The following species have been identified foraging within the Proposed Development site, and/or are known to forage in habitats such as those within the Proposed Development site, e.g. arable fields:

- [A130] Oystercatcher *Haematopus ostralegus* – an SCI species of the Boyne Estuary SPA (004080), River Nanny Estuary and Shore SPA (004158), and Rogerstown Estuary SPA (004015).
- [A140] Golden Plover *Pluvialis apricaria* – an SCI species of the Boyne Estuary SPA (004080) and the River Nanny Estuary and Shore SPA (004158).
- [A141] Grey Plover *Pluvialis squatarola* - an SCI species of the Boyne Estuary SPA (004080) and Rogerstown Estuary SPA (004015).
- [A142] Lapwing *Vanellus vanellus* - an SCI species of the Boyne Estuary SPA (004080).
- [A184] Herring Gull *Larus argentatus* – an SCI species of the Skerries Islands SPA (004122) and the North-West Irish Sea cSPA (004236) (designated for its breeding population).
- [A043] Greylag Goose *Anser anser* – an SCI species of Rogerstown Estuary SPA (004015).
- [A046] Brent Goose *Branta bernicla hrota* – an SCI species of Rogerstown Estuary SPA (004015).

66 Notwithstanding their association with inland suitable foraging/feeding sites, in this instance, there is a large distance of separation between the Proposed Development site and the closest European site for which the any of the aforementioned species have been designated, the Boyne Estuary SPA located *c.* 6km to the north-east. Much of the land separating the Proposed Development and the Boyne Estuary SPA is composed of habitats suitable for foraging wetland birds, e.g. arable land, and improved agricultural grassland. Similarly, there are large distances of separation between the Proposed Development site and the River Nanny Estuary SPA, Skerries Islands SPA, Rogerstown Estuary SPA, and the North-West Irish Sea cSPA respectively, which are largely occupied by similar agricultural and coastal habitats. Therefore there is an abundance of alternative suitable habitat for wintering wetland bird species in the surrounding area. The loss of the Proposed Development site, which is 10.55 ha in area, would not be significant in the context

[22] Scottish Natural Heritage (2016). *Guidance: Assessing connectivity with Special Protection Areas (SPAs). Version 3.*

of the wider environment, given the abundance of similar habitat in the immediate and surrounding area. It is also worth noting that field parcels will change in rotation between grassland, winter crops, stubble etc., year on year, and that this would constitute "natural patterns of variation". The fact that these field parcels are constantly changing from season to season and year to year, means that wintering birds using land in the area are habituated to these changes and are accustomed to moving from field to field in order to find suitable foraging habitat. In this context, the loss of the Proposed Development site would not result in population level effects on SCI bird number and would not adversely affect the integrity of SCI species from distal SPAs identified as being within the ZoI of the Proposed Development.

67 All other species, for which European sites in the potential zone of influence for loss of *ex-situ* habitat (20km from the Proposed Development site), are strongly associated with aquatic or estuarine habitats that do not occur within the Proposed Development site and are therefore not at risk of any effects of habitat loss.

68 On the above basis, and as the Proposed Development does not overlap with the boundary of any European sites, there are no European sites at risk of direct habitat loss impacts.

69 As the Proposed Development will not result in habitat loss or habitat fragmentation within any European site, there is no potential for any in combination effects to occur in that regard.

3.3.2 Habitat degradation as a result of hydrological impacts

Surface Waters

70 Contaminated surface water run-off, or an accidental pollution event during construction, or operation, has the potential to affect water quality in the receiving surface water environment. In this instance, the potential zone of influence of such an event extends to the Platin Stream, River Nanny and Nanny Estuary. Habitats that occur below the high tide line and fauna that use intertidal and marine habitats within the Nanny Estuary are potentially at risk of effects of hydrological impacts.

71 Hydrological impacts are not predicted to cause discernible affects in waters beyond the Nanny Estuary as any pollution event would be temporary in nature, and would be imperceptible considering the dilution factor in the Northwest Irish Sea Coastal Waterbody[23]. Therefore, habitat degradation as a result of hydrological impacts would be limited to European sites located in the Nanny Estuary, i.e. the River Nanny Estuary and Shore SPA.

72 Hydrological impacts with the potential to affect intertidal habitats occurring below the high tide mark in the Nanny Estuary also have the potential to impact fauna associated with these habitats. Such fauna includes wintering birds which feed and roost on intertidal habitats and benthic meiofauna associated with mudflats and sandflats not covered by seawater at low tide [1140].

73 Chapter 11 Water and Waste Water of the Environmental Report for the Proposed Development concluded "in the absence of mitigation measures, construction works for the Proposed Development have the potential to have a medium-term, significant effect on the local water environment". Contaminated surface water run-off or a pollution event, of a sufficient magnitude, has the potential to affect the receiving aquatic and estuarine environments (either alone or in combination with other pressures on water quality) to an extent that could undermine the conservation objectives of the Nanny Estuary and Shore SPA.

Process Waters and Foul Waters

74 In the absence of any mitigation measures, process or foul waters generated from the Proposed Development could adversely effect conditions in the receiving surface water environment in the Platin Stream, River Nanny and Nanny Estuary. The potential zone of influence of such effects would extend to intertidal habitats occurring below the high tide mark in the Nanny Estuary and fauna associated with these

[23] Chapter 11 Water and Waste Water Environmental Impact Assessment Report, 2023. AECOM.

habitats. Therefore, habitat degradation as a result of hydrological impacts would be limited to European sites located in the Nanny Estuary.

75 Hydrological impacts with the potential to affect intertidal habitats occurring below the high tide mark in the Nanny Estuary also have the potential to impact fauna associated with these habitats. Such fauna includes wintering birds which feed and roost on intertidal habitats and benthic meiofauna associated with mudflats and sandflats not covered by seawater at low tide [1140].

76 A leak or release of foul or process waters, of a sufficient magnitude, has the potential to affect the receiving aquatic and estuarine environments (either alone or in combination with other pressures on water quality) to an extent that could undermine the conservation objectives of the River Nanny Estuary and Shore SPA.

3.3.3 Habitat degradation as a result of hydrogeological impacts

77 The Proposed Development lies within the Bettystown GWB. The River Nanny Estuary and Shore SPA is the only European site located within the Bettystown GWB.

78 Based on information published by Geological Survey Ireland (GSI) on the Bettystown GWB[24], 'Regional groundwater flow will be towards the River Nanny and also, in the northeast to the Coast, but on a local scale, groundwater discharges to the streams and rivers crossing the aquifer. Flow path lengths are generally 500-2000 m. The main discharge areas for the aquifer are the coast and the River Nanny.' The River Nanny Estuary and Shore SPA is not designated for groundwater dependent habitats and/or species, and as there will be no dewatering or interactions with the water table, therefore there will be no hydrogeological impacts on European site or their QI species and habitats as a result of the development.

3.3.4 Habitat degradation as a result of introducing/spreading non-native invasive species

79 As the Proposed Development site does not contain any species listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulation 2011 (as amended)*, there is no possibility of spreading non-native invasive species from the lands to any European sites.

3.3.5 Habitat degradation as a result of air quality impacts

80 The effects of sulphur and nitrogen air pollution derived from anthropogenic activities is known to have negative impacts on the environment, either directly by causing vegetation die-back, or indirectly by affecting the acidity and nutrient status of soils and waters[25]. Direct effects are limited to flora and habitats, while indirect effects for fauna may arise from changes to forage availability and habitat quality (e.g. acidification of waters).

81 Although Carbon Monoxide (CO) will be generated by the OCGTs, it does not contribute to air quality impacts to vegetation[26], and is not discussed further.

82 A reduction in air quality within the immediate vicinity of the construction works may occur as a consequence of dust deposition associated with these construction activities. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. There are no European or other Designated Sites within 50m of the site boundary, which is the threshold

[24] https://gsi.geodata.gov.ie/downloads/Groundwater/Reports/GWB/BettystownGWB.pdf [Accessed June 2023]

[25] Aherne, J., Henry, J., and Wolniewicz, M. (2017). *Development of critical loads for Ireland: Simulating impacts on systems (SIOS)*. EPA Research Report 2008-CCRP-4.1a. Prepared for the Environmental Protection Agency by Trent University. March 2017. ISBN: 978-1-84095-677-1.

[26] Bignal, K.L., Ashmore, M.R., Headley A.D., Stewart, K., & Weigert, K. (2007). *Ecological Impacts of Air Pollution from Roads on Local Vegetation*. Applied Geochemistry 22:1265-1271.

distance for ecological sensitivity[27]. According to Chapter 5 Traffic and Transportations of the Environmental Report, construction traffic associated with the Proposed Development is not significant[28]. Due to the scale and duration of the construction works, similarly no significant impacts are expected from construction machinery. Therefore associated emissions are not significant. On this basis, there is no possibility of significant effects on any European sites arising from air quality impacts during the construction-phase of the Proposed Development, and this element is not assessed further.

83 The impact of emissions within 20 km of the Proposed Development and existing emission points on ambient ground level concentrations within the following designated habitat sites was assessed using AERMOD (a standardly used dispersion modelling software). The models contained extend to an area of 20km by 20km (coarse grid with 500m grid spacing), and 4km by 4km (fine grid with 100m grid spacing), and cover an area of 10km radius around the Proposed Development site. The Air quality modelling and assessment included the following European sites:

- Special Areas of Conservation (SAC): River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC;
- Special Protection Areas (SPA): River Boyne and River Blackwater SPA, Boyne Estuary SPA, River Nanny Estuary and Shore SPA.

84 In the absence of any mitigation measures (in this instance including the design technology which has the result of the abatement of gases in the emissions from the Proposed Development), and adopting the precautionary principle, the potential for significant effects arising from air quality impacts during operation of the Proposed Development from sulphurous, nitrogenous, ammonia and/or particulate matter emissions, on the QIs/SCIs of the aforementioned European sites and/or their conservation objectives cannot be ruled out.

3.3.6 Disturbance and displacement impacts

85 Construction-related disturbance and displacement of fauna species could potentially occur within the vicinity of the Proposed Development. For mammal species such as otter, disturbance effects would not be expected to extend beyond 150m[29]. There are no European sites designated for otter in the vicinity of the Proposed Development, with the closest European site being the River Boyne and River Blackwater SAC located *c.*3.5km to the north. For birds, disturbance effects would not be expected to extend beyond a distance of *c.*300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance. [30]

86 Noise generated from the Proposed Development does not have the potential to affect any QI or SCI of any European sites as the proposal is separated from European sites by a minimum distance of 3.5km. Noise

[27] Holman, C. *et al*. (2014). IAQM Guidance on the assessment of dust from demolition and construction. Institute of Air Quality Management, London. http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.

[28] Chapter 5 Traffic and Transportations Environmental Report (Environmental Report), Platin (June 2023).

[29] This is consistent with Transport Infrastructure Ireland (TII) guidance (Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (TII 2006) and Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes) (TII 2005) documents. This is a precautionary distance, and likely to be moderated by the screening effect provided by surrounding vegetation and buildings, with the actual ZoI of construction related disturbance likely to be much less in reality.

[30] The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance*, and Wright, M., Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. *Wildfowl* (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise.

generated from the Proposed Development will attenuate to background levels before reaching European sites. In the event that the lands or fields within *c.* 300m of the Proposed Development site (e.g. the potential zone of influence of disturbance or displacements impacts) act as *ex-situ* foraging habitat for wintering bird SCIs of European sites, there is no possibility of significant effects, as there is an abundance of alternative suitable habitat for wintering wetland bird species in the surrounding area. The loss of the Proposed Development site, which is 10.55 ha in area and an additional buffer of *c.* 300m radius around the Proposed Development site, would not be significant in the context of the wider environment. As discussed in Section 3.3.1, field parcels will change in rotation between grassland, winter crops, stubble etc., year on year, and this would constitute "natural patterns of variation". The fact that these field parcels are constantly changing from season to season and year to year, means that wintering birds using land in the area are habituated to these changes and are accustomed to moving from field to field in order to find suitable foraging habitat. In this context, the loss of the Proposed Development site and the *c.* 300m radius surrounding it is not significant.

87 As the Proposed Development does not have the potential to result in the disturbance/displacement of the qualifying/special conservation interest species of any European site, there is no potential for in combination effects to occur.

3.3.7 Collision Risk

88 The power plant will have 3 exhaust stacks, all 25m in height. There will also be 3 gas turbine buildings of 16.9m in height. All other buildings within the site are at a lower height. Therefore, as the surrounding landscape is generally flat, there is potential for direct collision of SCI bird species from the exhaust stacks. However; the Proposed Development will be screened by the existing treelines and hedgerows, and the development is also not on a known flight path for SCI and wintering bird species, with gull species (such as herring gull, an SCI species of the River Nanny Estuary and Shore SPA and the North-West Irish Sea cSPA) typical flying height range up to 250m above sea level while foraging and travelling. Only one other SCI species was observed foraging within the lands (i.e. 12 lapwing, an SCI species of the Boyne Estuary SPA), and this species was only observed on one occasion during a number of site visits with low number of birds observed. It is predicted that there is no potential for the Proposed Development to significantly increase the collision risk to mobile SCI species which are present in the area. Therefore, there is no potential for the Proposed Development to result in significant effects which could have implications for the conservation objectives of the River Nanny and Shore SPA, the Boyne Estuary SPA, the North-West Irish Sea cSPA or any other European site.

3.3.8 Summary

89 Habitat degradation as a result of air quality during the operation phase and hydrological impacts during the construction and operation phase, associated with the Proposed Development have the potential to affect the receiving environment and, consequently, have the potential to affect the conservation objectives supporting the QI / SCIs of a European site(s). Therefore, it cannot be excluded in view of best scientific knowledge and objective evidence, that the Proposed Development is likely to have a significant effect on a European Site(s).

90 As the Proposed Development itself is likely to affect the QIs/SCIs or conservation objectives of a European site(s), there is also the potential for other plans or projects to act in combination with it to result in likely significant effects on European sites.

91 The potential impacts of the Proposed Development on the receiving environment, their ZoI, and the European sites at risk of likely significant effects are summarised in **Table** . In assessing the potential for the Proposed Development to result in a significant effect on any European sites, any measures intended or that have the effect of avoiding or reducing the harmful effects of the project on European sites are not taken into account.

Table 3: Summary of Analysis of Likely Significant Effects on European sites

Potential Direct, Indirect In Combination Effects and the ZoI of the Potential Effects	Are there any European sites within the ZoI of the Proposed Development?
Habitat loss Habitat loss will be confined to the lands within the Proposed Development boundary.	No There are no European sites at risk of direct or ex-situ habitat loss associated with the Proposed Development
Habitat degradation as a result of hydrological impacts Habitats and species downstream of the Proposed Development site and the associated surface water drainage discharge points, and downstream of offsite wastewater treatment plants.	Yes The River Nanny Estuary and Shore SPA is at risk of hydrological effects arising from surface water run-off and pollution associated with the construction and/or operational phases of the Proposed Development.
Habitat degradation as a result of hydrogeological impacts Groundwater-dependant habitats, and the species those habitats support, in the local area that lie downgradient of the Proposed Development site.	No There are no European sites at risk of hydrogeological effects associated with the Proposed Development
Habitat degradation as a result of introducing/spreading non-native invasive species Habitat areas within, adjacent to, and potentially downstream of the Proposed Development site.	No There are no non-native invasive species present on the Proposed Development site and, therefore, no risk associated with the Proposed Development to any European sites from the spread/introduction of non-native invasive species
Disturbance and displacement impacts Potentially up to several hundred metres from the Proposed Development boundary, dependent upon the predicted levels of noise, vibration and visual disturbance associated with the Proposed Development, taking into account the sensitivity of the qualifying interest species to disturbance effects	No There are no European sites within the potential zone of influence of disturbance effects associated with the construction or operation of the Proposed Development
Habitat degradation as a result of air quality impacts QI habitats, and QI/SCI species that rely upon these habitats for forage/roosting within 20km of the Proposed Development site are potentially at risk.	Yes The following European sites are potentially at risk of air quality impacts arising from the proposed: • River Boyne and River Blackwater SAC (002299) • River Boyne and River Blackwater SPA (004232) • Boyne Estuary SPA (004080) • Boyne Coast and Estuary SAC (001957) • River Nanny Estuary and Shore SPA (004158)

4 In Combination effects

92 This section presents the assessment carried out to examine whether other plans or projects have the potential to act in combination with the Proposed Development to have a significant effect on European sites.

93 There are five European sites within the ZoI of the Proposed Development as outlined above. These are: River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, Boyne Estuary SPA, Boyne Coast and Estuary SAC, River Nanny Estuary and Shore SPA.

94 All other European sites fall beyond the ZoI of the Proposed Development. Therefore, there is no potential for any other plans or projects to act in combination with the Proposed Development to adversely affect the integrity of any other European sites.

95 The in combination assessment involved first identifying those plans and projects which have the potential to impact on those European sites within the ZoI of the Proposed Development.

Those plans or projects with the potential to impact upon these European sites are any national, regional and local land use plans or any existing or proposed projects that could potentially affect the ecological environment within the ZoI of the Proposed Development. These are presented in Table 4 and

96 Table 5 below.

Table 4: Land Use Plans and Programmes Considered for the In Combination Assessment

National Plans
National Energy & Climate Plan 2021-2030
Climate Action Plan 2023
Project Ireland 2040 – Building Ireland's Future[31]
National Biodiversity Action Plan 2017-2021
River Basin Management Plan 2018-2021
National Air Pollution Control Programme (NAPCP) 2021
National Marine Planning Framework 2018
Water Services Strategic Plan 2015
National Transport Authority Integrated Implementation Plan 2019-2024
Regional Plans
Regional Spatial & Economic Strategy for the Eastern and Midland Region 2019-2031
Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study 2011-2016
County/Local Plans
Meath County Development Plan 2021-2027 (Meath County Council, 2021)
County Meath Biodiversity Action Plan 2015-2020 (Meath County Council, 2015)

[31] Together the National Development Plan and the National Framework are referred to as Project Ireland 2040: Building Ireland's Future

Table 5 Projects Considered for the In Combination Assessment

Application Reference	Applicant and Brief Description
Indaver (ABP Case reference: PA17.307433)	Alterations to waste-to-energy facility. The applications relate to minor changes to existing operations.
Irish Cement (ABP Case Reference PL17 .PA0050)	To facilitate further replacement of fossil fuels with alternative fuels and allow for the introduction of alternative raw materials in the manufacturing of cement. The Environmental Impact Assessment (EIA) Report which was submitted to An Bord Pleanála states that there will be no residual effects on biodiversity as a result of the development following the implementation of mitigation measures.
SSE (ABP Case Reference PL17.303678)	A 110kV Substation strategic infrastructure development adjacent to the Proposed Development site. The Environmental Report which was submitted as part of the planning application states that there no residual effects on biodiversity as a result of the development following the implementation of mitigation measures
Irish Cement (ABP Case Reference PL17.309308)	20 year permission for a 13.5 hectare extension to existing Overburden Management Facility. A detailed impact assessment was completed as part of the EIA Report submitted with the planning application.
Duleek Quarry (ABP Case Reference PL17.310768)	Continuation of the use and further quarrying of limestone within the site which was granted by Substitute Consent

97 There is the potential for developments listed in Table 5 or those implemented under a range of land use and other plans listed in Table 4, to lie either within European sites, or be situated in a location where they may be within the ZoI of the European sites which also fall within the ZoI of the Proposed Development.

98 The potential for in combination effects between these plans and projects and the Proposed Development arises via the same pathways for potential effects as identified above in **Table** for the proposed works (i.e. hydrological and air quality) which could act in combination with similar effects and pathways arising from the various plans.

99 Therefore, the potential for the following in combination effects arising from plans cannot be ruled out:

- Habitat degradation / effects on QI/SCI species as a result of hydrological impacts (for example reduction in water quality in catchments draining to Nanny Estuary) affecting the conservation objectives supporting aquatic habitats and species in: River Nanny Estuary and Shore SPA.
- Habitat degradation/effects on QI/SCI species as a result of air quality impacts affecting the conservation objectives supporting habitats and species in: River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, Boyne Estuary SPA, Boyne Coast and Estuary SAC, and River Nanny and Shore SPA.

5 Conclusions of Screening Assessment Process

100 Following an examination, analysis and evaluation of all the relevant information and in view of best scientific knowledge, and applying the precautionary principle, it can be concluded that there is the possibility for significant effects on the following European sites, in the absence of mitigation either arising from the project alone or in combination with other plans and projects, as a result of habitat degradation as a result of air quality and hydrological impacts: River Boyne and River Blackwater SAC (002299), River Boyne and River Blackwater SPA (004232), Boyne Estuary SPA (004080), Boyne Coast and Estuary SAC (001957), River Nanny Estuary and Shore SPA (004158).

101 In reaching this conclusion, the nature of the project and its potential relationship with all European sites within the zone of influence, and their conservation objectives, have been fully considered.

102 Therefore, it is the professional opinion of the authors of this report that the application for consent for the Proposed Development does require a Stage Two Appropriate Assessment in respect of the above listed European sites and the preparation of a Natura Impact Statement (NIS).

Appendix I

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the vicinity of the Proposed Development site

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
Special Area of Conservation (SAC)	
River Boyne and River Blackwater SAC (002299) [1099] River Lamprey *Lampetra fluviatilis* [1106] Salmon *Salmo salar* [1355] Otter *Lutra lutra* [7230] Alkaline fens [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* NPWS (2021) Conservation Objectives: River Boyne and River Blackwater SAC 002299. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.	Located *c.* 3.5km north of the Proposed Development
Boyne Coast and Estuary SAC [001957] 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1310 *Salicornia* and other annuals colonising mud and sand 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 2110 Embryonic shifting dunes 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* S.I. No. 433/2021- European Union Habitats (Boyne coast and Estuary Special Area of Conservation 001957) Regulations 2021 NPWS (2012) *Conservation Objectives: Boyne Coast and Estuary SAC 001957.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 6.9km north east of the Proposed Development
Clogher Head SAC [001459] [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts [4030] European dry heaths S.I. No. 610/2019 - European Union Habitats (Clogher Head Special Area of Conservation 001459) Regulations 2019 NPWS (2017) Conservation Objectives: Clogher Head SAC 001459. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	Located c. 15.6km north east of the Proposed Development site
Rockabill to Dalkey Island SAC [003000] [1170] Reefs [1351] Harbour porpoise Phocoena phocoena S.I. No. 94/2019 - European Union Habitats (Rockabill To Dalkey Island Special Area Of Conservation 003000) Regulations 2019	Located c. 22km south east of the Proposed Development

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
NPWS (2013) Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
Rogerstown Estuary SAC [000208] 1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1310 Salicornia and other annuals colonising mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 1410 Mediterranean salt meadows (Juncetalia maritimi) 2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* S.I. No. 286/2018 - European Union Habitats (Rogerstown Estuary Special Area of Conservation 000208) Regulations 2018 NPWS (2013) Conservation Objectives: Rogerstown Estuary SAC 000208. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located c. 23km south east of the Proposed Development
Special Protection Area (SPA)	
River Boyne and River Blackwater SPA [004232] A229 Kingfisher *Alcedo atthis* *S.I. No. 462/2012 - European Communities (Conservation of Wild Birds (River Boyne and River Blackwater Special Protection Area 004232)) Regulations 2012.* NPWS (2022) *Conservation objectives for River Boyne and River Blackwater SPA [004232*]. First Order Site-Specific Conservation Objectives Version 1.0 Department of Housing, Local Government and Heritage.	Located *c.* 3.7km north west of the Proposed Development
Boyne Estuary SPA [004080] A048 Shelduck *Tadorna tadorna* A130 Oystercatcher *Haematopus ostralegus* A140 Golden Plover *Pluvialis apricaria* A141 Grey Plover *Pluvialis squatarola* A142 Lapwing *Vanellus vanellus* A143 Knot *Calidris canutus* A144 Sanderling *Calidris alba* A156 Black-tailed Godwit *Limosa limosa* A162 Redshank *Tringa totanus* A169 Turnstone *Arenaria interpres* A195 Little Tern *Sterna albifrons* A999 Wetlands *S.I. No. 626/2011 - European Communities (Conservation of Wild Birds (Boyne Estuary Special Protection Area 004080)) Regulations 2011.*	Located *c.* 5.7km north east of the Proposed Development

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	**Location Relative to the Proposed Development Site**
NPWS (2013) *Conservation Objectives: Boyne Estuary SPA 004080*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
River Nanny Estuary and Shore SPA [004158] A130 Oystercatcher *Haematopus ostralegus* A137 Ringed Plover *Charadrius hiaticula* A140 Golden Plover *Pluvialis apricaria* A143 Knot *Calidris canutus* A144 Sanderling *Calidris alba* A184 Herring Gull *Larus argentatus* A999 Wetlands *S.I. No. 140/2012 - European Communities (Conservation of Wild Birds (River Nanny Estuary and Shore SPA 004158)) Regulations 2012.* NPWS (2012) *Conservation Objectives: River Nanny Estuary and Shore SPA 004158*. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c*. 8km east of the Proposed Development
North-West Irish Sea cSPA [004236] [A065] Common Scoter *Melanitta nigra* [A001] Red-throated Diver *Gavia stellata* [A003] Great Northern Diver *Gavia immer* [A009] Fulmar *Fulmarus glacialis* [A013] Manx Shearwater *Puffinus puffinus* [A018] Shag *Phalacrocorax aristotelis* [A017] Cormorant *Phalacrocorax carbo* [A177] Little Gull *Larus minutus* [A188] Kittiwake *Rissa tridactyla* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A182] Common Gull *Larus canus* [A183] Lesser Black-backed Gull *Larus fuscus* [A184] Herring Gull *Larus argentatus* [A187] Great Black-backed Gull *Larus marinus* [A195] Little Tern *Sterna albifrons* [A192] Roseate Tern *Sterna dougallii* [A193] Common Tern *Sterna hirundo* [A194] Arctic Tern *Sterna paradisaea* [A204] Puffin *Fratercula arctica* [A200] Razorbill *Alca torda* [A199] Guillemot *Uria aalge*	Located c. 10.1km east of the Proposed Development

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
The North-West Irish Sea cSPA was subject to a Regulation 15 notification on 13 July 2023. No conservation objectives have been published for the site at the time of publication of this report in August 2023.	
Skerries Islands SPA [004122] A017 Cormorant *Phalacrocorax carbo* A018 Shag *Phalacrocorax aristotelis* A046 Light-bellied Brent Goose *Branta bernicla hrota* A148 Purple Sandpiper *Calidris maritima* A169 Turnstone *Arenaria interpres* A184 Herring Gull *Larus argentatus* *S.I. No. 245/2010 - European Communities (Conservation of Wild Birds (Skerries Islands Special Protection Area 004122)) Regulations 2010.* NPWS (2022) *Conservation objectives for Skerries Islands SPA* [004122]. First Order Site-Specific Conservation Objectives Version 1.0 Department of Housing, Local Government and Heritage	Located *c.* 21km south east of the Proposed Development
Rogerstown Estuary SPA [004015] A043 Greylag Goose *Anser anser* A046 Brent Goose *Branta bernicla hrota* A048 Shelduck *Tadorna tadorna* A056 Shoveler *Anas clypeata* A130 Oystercatcher *Haematopus ostralegus* A137 Ringed Plover *Charadrius hiaticula* A141 Grey Plover *Pluvialis squatarola* A143 Knot *Calidris canutus* A149 Dunlin *Calidris alpina* A156 Black-tailed Godwit *Limosa limosa* A162 Redshank *Tringa totanus* A999 Wetlands *S.I. No. 271/2010 - European Communities (Conservation of Wild Birds (Rogerstown Estuary Special Protection Area 004015)) Regulations 2010.* NPWS (2013) *Conservation Objectives: Rogerstown Estuary SPA 004015*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 23km south east of the Proposed Development

Appendix II Air Dispersion Modelling Report 2023, SSE Generation Ireland Ltd.

Air Dispersion Modelling Report 2023

SSE Generation Ireland Ltd
Planning Support
IE0312377-22-RP-0019, Issue: A

Issue date: 14 Jul 2023

Document Sign Off

Air Dispersion Modelling Report 2023

SSE Generation Ireland Ltd
Planning Support
IE0312377-22-RP-0019, Issue A

File No:IE0312377.22.160

CURRENT ISSUE					
Issue No: A	Date: 14 Jul 2023	Reason for issue: Information			
Sign Off	Originator	Checker	Reviewer	Approver	Customer Approval (if required)
Print Name	Julia Carroll	AINE.MONAGHAN		PAUL.OSULLIVAN	
Signature	**Authorised Electronically**				
Date	14 July 2023	14 Jul 2023		14 Jul 2023	

PREVIOUS ISSUES							
Issue No	Date	Originator	Checker	Reviewer	Approver	Customer	Reason for issue

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Executive Summary

SSE proposes to install an Open Cycle Gas Turbine (OCGT) Generating Plant at its site in Carranstown, Duleek, Platin, Co. Meath. The proposed plant will have a capacity up to 170MW (electrical output), which is designed to support the national electricity network and to operate during peak demand periods. The proposed plant will be a Hydrotreated Vegetable Oil (HVO) fired electrical power generating facility.

The purpose of this air dispersion modelling report was to assess whether the emissions to air from the proposed development would cause a contravention of applicable European and Irish Air Quality Standards (AQSs).

The assessment was carried out using BREEZE air dispersion modelling software (version 9.2.0.4), which implements US EPA AERMOD software version 19191. The air dispersion modelling input data consists of meteorological data, detailed information on the physical environment (including building dimensions and terrain features) and design details from all emission points to air on-site. Using this input data, the model predicts ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological years. The model post-processes the data to identify the location and concentration of the worst-case ground level concentrations. The modelling and reporting methodology was carried out based on the Irish Environmental Protection Agency (EPA) *Air Dispersion Modelling from Industrial Installations Guidance Note* (AG4)(2020).

The following modelling scenario was considered in this air dispersion modelling assessment:

- 3 No. HVO fuelled Open Cycle Gas Turbine (OCGT) units with 3 No. emission points included in the model, as each turbine has its own emission stack.

The turbine units will operate a maximum of 1,800 hours annually with the highest demand occurring during the winter months. However, continuous operation 24 hours a day, 7 days a week was included in the air dispersion modelling as a conservative approach. In addition, relevant emission stacks from the nearby Industrial Emission (IE) licensed facilities, namely Indaver Ireland Ltd. and Irish Cement Ltd., were included in the air dispersion model to allow for a cumulative assessment of emissions.

The maximum predicted ground level concentrations (GLCs) of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), particulates ($PM_{10/2.5}$) and ammonia (NH_3) from the models were compared against the relevant European and Irish Air Quality Standard (AQS) and Environmental Assessment Level (EAL) limit values to assess the impact of atmospheric emissions from the proposed development on ambient air quality.

Results from the modelling assessment show that atmospheric emissions due to the proposed development do not result in ground level concentrations of NO_2, SO_2, CO, $PM_{10/2.5}$ and NH_3 exceeding the relevant AQSs and EALs for the protection of human health and the environment.

It is therefore concluded that atmospheric emissions from the proposed development will have no significant impact on ambient air quality.

1 Introduction

1.1 General

Air dispersion modelling has been carried out to assess the potential environmental impact of atmospheric emissions from the proposed development at the SSE site in Carranstown, Platin, Duleek, Co. Meath. The proposed development is an Open Cycle Gas Turbine (OCGT) Plant with a capacity up to 170MW (electrical output), which is designed to support the national electricity network and to operate during peak demand periods. The proposed plant will be a Hydrotreated Vegetable Oil (HVO) fired electrical power generating facility.

The plant design will allow for flexible operation so the plant can cater for high demand and respond quickly to fluctuations on the electricity grid. Operation over extended periods is not foreseen. The running regime, in terms of load and runtime, will depend on the size of the peak load experienced. It is anticipated that the plant will operate a maximum of 1,800 hours per year with the highest expected demand during winter months. However, a 24/7 operation was included in the air dispersion modelling as a conservative approach.

The currently green-field site location is located is approximately 4.5 km south-west of Drogheda town centre (Figure 1-1).

The purpose of the modelling was to ensure that atmospheric emissions from the proposed development do not cause a contravention of applicable European and Irish Air Quality Standards (AQSs). The modelling assessment was carried out using BREEZE air dispersion modelling software (version 9.2.0.4), which implements US EPA AERMOD software version 19191.

All emissions data for the proposed development has been provided by the SSE design team. Building and tank dimensions were taken from project drawings together with an electronic site plan imported into BREEZE AERMOD.

The maximum predicted ground level concentrations (GLCs) of nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), particulates ($PM_{10/2.5}$) and ammonia (NH_3) were compared against the relevant AQS and Environmental Assessment Level (EAL) limit values to assess the impact of atmospheric emissions from the facility on ambient air quality and human health and the environment.

The purpose of the modelling was to ensure that atmospheric emissions from the proposed facility do not exceed the applicable European and Irish AQSs.

A full assessment against relevant Best Available Techniques (BAT) will be carried out as part of the Industrial Emissions (IE) Licence application which will be submitted for the proposed development to the EPA. This will include an assessment against the requirements of the *Commission Implementing Decision (EU) 2021/2326 For Large Combustion Plants*[1] which sets out BAT-associated emission levels (BAT-AELs) that will be used as a reference to determine the appropriate licence emission limit values (ELVs) for emission parameters.

[1] Commission Implementing Decision (EU) 2021/2326 of 30 November 2021 Establishing Best Available Techniques (Bat) Conclusions, Under Directive 2010/75/EU of the European Parliament And Of The Council, For Large Combustion Plants

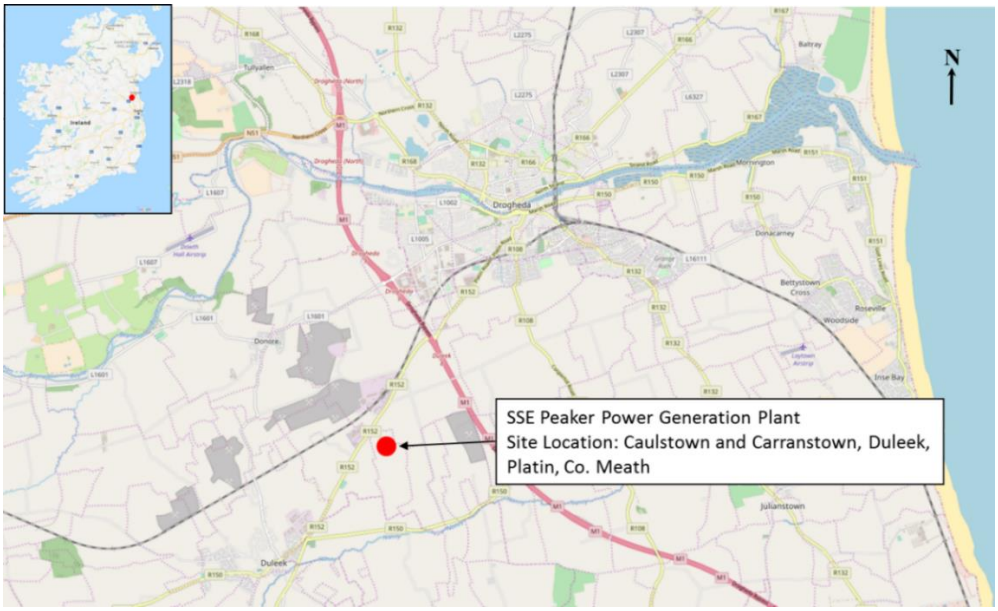

Figure 1-1: **Site Location (Map Source: EPA GIS Map, Basemap: © OpenStreetMap)**

1.2 Proposed Development

The proposed development will comprise a 170MW (electrical output) Open Cycle Gas Turbine (OCGT) Power Plant. The proposed development will comprise an electricity generating plant which will use Hydrotreated Vegetable Oil (HVO) as fuel and will be connected to a previously permitted 110kV substation (ABP-303678-19) and associated site works and improved access from the R152. The development comprises the following elements:

a) Three gas turbine buildings (each 990m^2) each housing 1 no. turbine, 1 no. generator and auxiliary equipment with a total of 269 MWth (thermal output) generating capacity all on concrete plinths.

b) The power plant will have three exhaust stacks (25m in height), one exhaust stack per OCGT. Therefore, each OCGT will comprise a standalone Large Combustion Plant. The power plant may need to utilise, selective catalytic reduction (SCR) (18m high, 4.5 width, 14m length) for nitrogen oxide (NO_x) abatement.

c) Water treatment plant comprising:

- a 275m^2 Deionising Building (6m high x 11m wide x 25m long)
- a raw water treatment tank of 2,262m^3 (12.8m high)
- a deionised water tank (max. volume of 3,925m^3) 15.4m high
- a processed water tank of 450m^3 (9m high)
- 1 no. 20m^2 firefighting water tank of 45m^3 (2m high)
- 1 no. 25m^2 firewater module (4m high x 5m wide x 5m long)
- 1 no. sanitary foul water cesspool tank of 79m^3 located underground (1.98m high x 2.5m wide x 16m long)
- a bulk chemical storage area (4.75m wide x 7.75m long)

d) 2 no. HVO tanks (max. storage of 2300 m^3 of HVO per tank),13m high with a diameter of 15m and associated fuel pumping and filtering equipment and pipework, within a 43.5m L x 45.5m W x 1.5m Bund capacity is 2970m^3

e) 1 ammonia tank –1.8m high 3.5m length with bund 2.5 m x 5 m with a height of 1.5 m

f) 1 no. fuel polishing system (3m high x 6m wide x 24m long)

g) 2 no. 110kV transformers and equipment kiosks each 160m^2, and each measuring (5m high x 10m wide x 15m long). 3 no. Lightning Masts (18m in height) and cable gantry connection to the adjoining consented 110kV Substation.

h) a 520m^2 services building (6m high x 13m wide x 40m long)

i) a 160m^2 Switchgear (MV) building (5m high x 6.1m wide x 26.3m long)

j) all other miscellaneous and ancillary site works, including: 12 no. Car parking spaces and 1 No. fuel unloading bay, one lowered site platform area, internal circulation road, new internal access roads and hard and soft landscaping including a material berms (1.2m to 2m high), a temporary construction compound, temporary security building, staff welfare facilities, and palisade associated fencing (2.4m high).

k) New road markings, including deceleration lane approaching the site, on the R152

2 Receiving Environment and Sensitive Receptors

The proposed development is located in a rural setting approximately 4.5 km south-west of the Drogheda town centre. There are two Industrial Emission (IE) licenced facilities within close proximity (Figure 2-1). The boundary of Indaver Ireland Ltd. (IE Licence No. W0167-03) is located approximately 50m north-west of the site and the boundary for Irish Cement Ltd. (IE Licence No. P0030-06) is located approximately 200m north.

The nearest sensitive receptors regarding air emission from the site are illustrated in Figure 2-1.

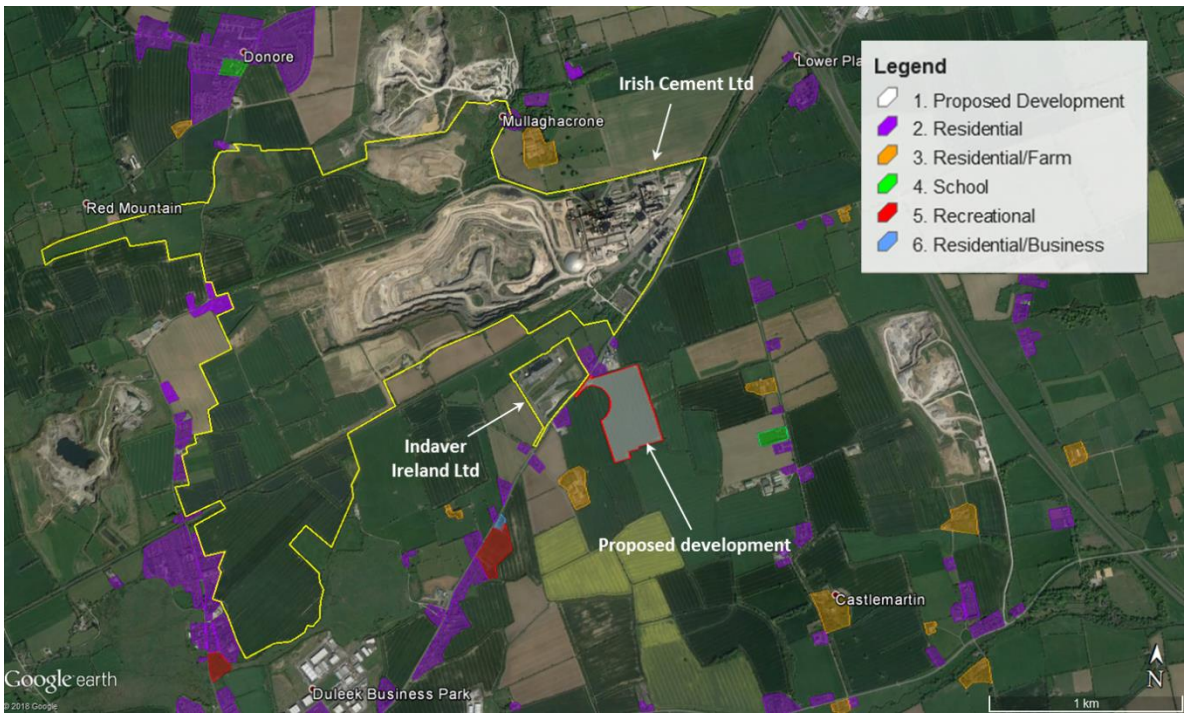

Figure 2-1: Sensitive receptors surrounding proposed development (Basemap: Google Earth, ownership boundary is outlined in red)

Special areas of conservation (SAC), special protection areas (SPA) and proposed natural heritage areas (pNHA) within a 15km radius of the proposed development are listed overleaf in Table 2-1. The SACs and SPAs are shown in Figure 2-2.

Table 2-1: SACs and SPAs within 15km and nearest pNHAs surrounding the site

Site	Site Code	Nearest Distance from site boundary	Nearest Co-ordinate point to site boundary (Irish National Grid)
Special Areas of Conservation (SAC) (within 15km)			
River Boyne and River BlackWater SAC	002299	3.5 km NW	(304113.99E, 273411.83N)
Boyne Coast and Estuary SAC	001957	7 km NE	(310425.15E, 275506.42N)
Special Protection Area (SPA) (within 15km)			
River Boyne and River BlackWater SPA	004232	3.7 km NW	(303708.62E, 273358.42N)
Boyne Estuary SPA	004080	6 km NE	(310753.40E, 275381.84N)
River Nanny and Shore SPA	004158	7.7 km E	(314637.14E, 270752.67N)
Proposed Natural Heritage Area (pNHA) (nearest surrounding site)			
Duleek Commons	001578	2.3 km WSW	(304590.18E, 269599.07N)
Rossnaree Riverbank	001589	6.6 km NW	(300054.41E, 271789.47N)
Dowth Wetland	001861	4 km NNW	(303830.16E, 273805.3N)
Boyne River Islands	001862	4.5 km N	(305872.6E, 275444.81N)
Boyne Coast and Estuary	001957	7km NE	(311908.74E, 275735.3N)
Laytown Dunes/Nanny Estuary	000554	6.6km E	(313491.93E, 270522.42N)
Cromwell's Bush Fen	001576	6.4 km SSE	(309932.09E, 264999.42N)

Figure 2-2: SACs and SPAs within 15km of the proposed development (Map Source: EPA GIS Map)

2.1 Ambient Air Quality Standards

Air Quality Standards (AQSs) for the protection of human health and the environment have been developed at European level and implemented into Irish legislation for a number of atmospheric pollutants. AQSs set limit values for Ground Level Concentrations (GLCs) of certain pollutants for both the short term (hourly, daily) and long term (annual averages). Limit values are often expressed as percentiles e.g. 98 percentile of mean hourly values which means that only 2% of the results obtained during the monitoring period can exceed the stated limit value.

The following ambient air quality legislation is currently implemented in Ireland:

- Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons In Ambient Air Regulations 2009 (S.I. No. 58/2009) which implement EU Directive 2004/107/EC. These regulations set target values in ambient air to be attained, from 31 December 2012, for concentrations of arsenic, cadmium, nickel and benzo(a)pyrene (a measurable indicator of the level of polycyclic aromatic hydrocarbons) and also specify monitoring requirements for mercury and other polycyclic aromatic hydrocarbons
- Air Quality Standards Regulations 2022 (S.I. No. 739/2022) replaces S.I. No. 180/2011 which implemented EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe. This Directive merges most of the existing directives (Directives 96/62/EC, 1999/30/EC, 2000/69/EC and 2002/3/EC) into a single directive. The regulations set ambient air quality limit values for sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and oxides of nitrogen (NO_x), benzene, lead and particulate matter (PM_{10}/ $PM_{2.5}$). S.I. No. 739/2022 sets the limit values and alert thresholds for air pollution for particular pollutants and also specifics the requirements for monitoring and reporting air quality data.

Emissions to the atmosphere from the proposed development include some of the pollutants addressed in the above air quality legislation. Therefore, the relevant air quality standards for this air quality assessment are detailed in Table 2-2 overleaf.

Table 2-2: **Relevant Air Quality Standard (AQS) Limit Values**

Pollutant	AQS ($\mu g/m^3$)	Source of AQS Value
Oxides of Nitrogen (NO_2 / NO_x)		
NO_2 99.8 Percentile Hourly	200	EU Directive 2008/50/EC / S.I. 739 of 2022
NO_2 Annual	40	EU Directive 2008/50/EC / S.I. 739 of 2022
NO_x + NO_2 Annual (Protection of Vegetation)	30	EU Directive 2008/50/EC / S.I. 739 of 2022
Sulphur Dioxide (SO_2)		
SO_2 99.7 Percentile Hourly	350	EU Directive 2008/50/EC / S.I. 739 of 2022
SO_2 99.2 Percentile Daily	125	EU Directive 2008/50/EC / S.I. 739 of 2022
SO_2 Annual & Winter (1st October – 31st Mar) (Protection of Vegetation)	20	EU Directive 2008/50/EC / S.I. 739 of 2022
Carbon Monoxide (CO)		
CO 8-hour	10,000	EU Directive 2008/50/EC / S.I. 739 of 2022
Particulate Matter less than 10 µm (PM_{10})		
PM_{10} 90.4 Percentile Daily	50	EU Directive 2008/50/EC / S.I. 739 of 2022
PM_{10} Annual	40	EU Directive 2008/50/EC / S.I. 739 of 2022
Particulate Matter less than 2.5 µm ($PM_{2.5}$)		
$PM_{2.5}$ Annual (up to end of 2019)	25	EU Directive 2008/50/EC / S.I. 739 of 2022
$PM_{2.5}$ Annual (from Jan 2020 onwards)	20	EU Directive 2008/50/EC / S.I. 739 of 2022
Ammonia (NH_3)		
NH_3 hourly	2,500	U.K. Department for Environment, Food & Rural Affairs (DEFRA) Environmental Assessment Level (EAL)
NH_3 Annual	180	U.K. Department for Environment, Food & Rural Affairs (DEFRA) Environmental Assessment Level (EAL)

3 Air Dispersion Modelling

3.1 Dispersion Model

The air dispersion modelling input data consists of meteorological data, detailed information on the physical environment (including building dimensions and terrain features) and design details from all emission points on site. Using this input data, the model predicts ground level concentrations of pollutants beyond the site boundary for each hour of the modelled meteorological years. The model post-processes the data to identify the location and concentration of the worst-case ground level concentrations.

Emissions from the proposed development have been modelled using AERMOD software (Version 19191), which has been developed by the U.S. Environmental Protection Agency (US EPA). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources. The model has been designated the regulatory model by the US EPA for modelling emissions from industrial sources in both flat and complex terrain. The modelling and reporting methodology was carried out based on the Irish Environmental Protection Agency (EPA) document *'Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (2020)'*.

3.2 Meteorological Data

The meteorological data required by the dispersion model is wind speed, wind direction, Pasquill-Gifford stability category, boundary layer height and ambient temperature. The stability category and boundary layer height are used to characterise the turbulence within, and the height of the lower levels of the atmosphere.

Extremely unstable conditions can cause plume looping and elevated concentrations close to the stack. Under stable conditions elevated concentrations can occur due to the emissions being trapped below the boundary layer. Neutral conditions, characterised by cloudy skies and strong winds, are most favourable for dispersion due to the mechanical mixing of the lower atmosphere. The wind direction determines the direction in which the plume is blown, and for a particular stability, higher wind speeds will result in reduced plume rise so causing the plume to reach ground level closer to the stack with elevated emission concentrations. The boundary layer height determines the total vertical distance over which the plume may spread.

The model has been run for each pollutant using five years of meteorological data (2017-2021) from Dublin Airport Meteorological Station. This is considered representative and appropriate data for use in the model and also satisfies the requirement of the Irish EPA AG4 Guidance Note. The meteorological windrose for the years 2017 to 2021 is presented in Figure 3-1.

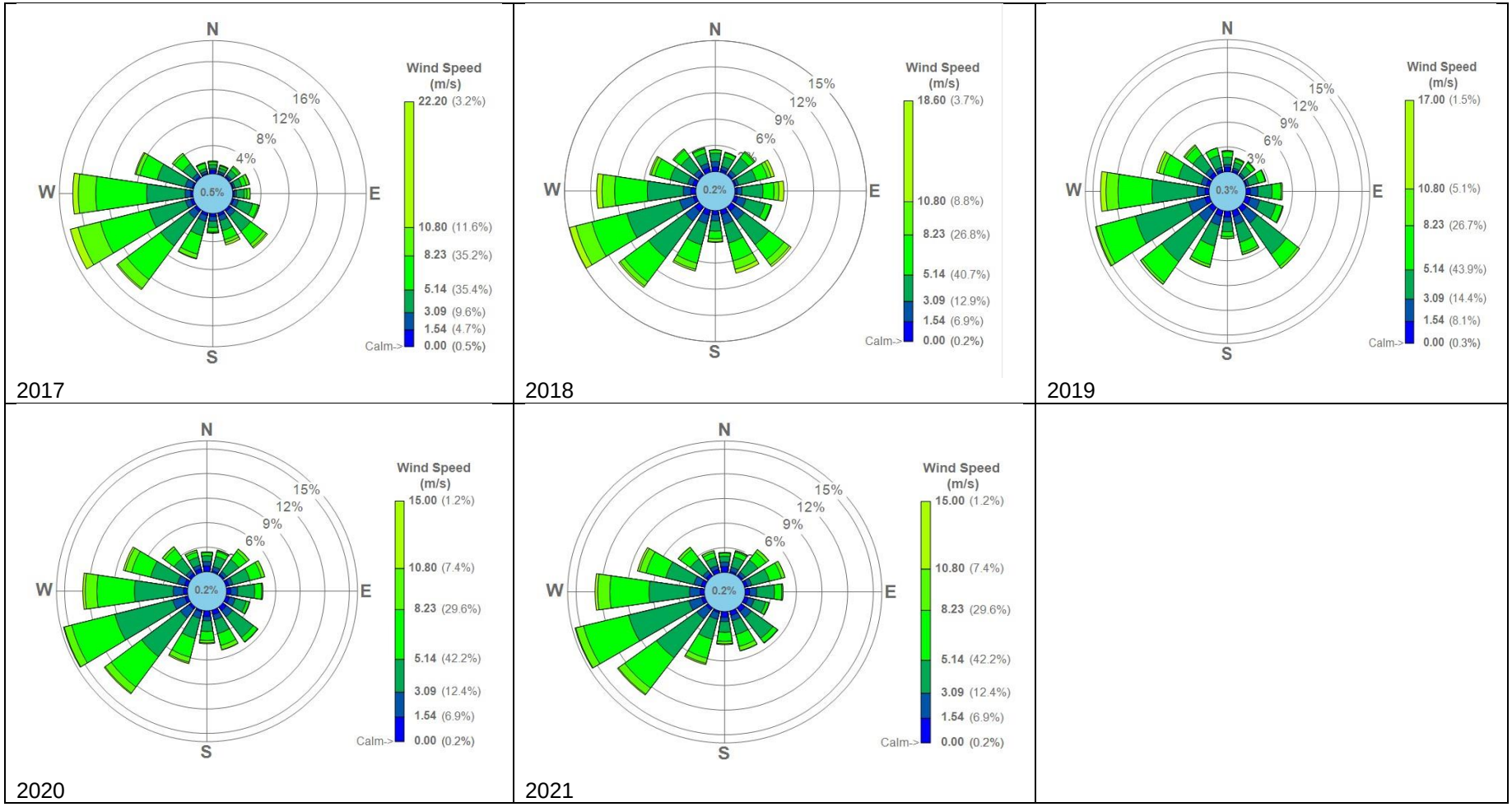

Figure 3-1: Meteorological Windrose for Dublin Airport Station 2017 to 2021

3.3 Building Downwash

Air streams blowing across buildings can become disrupted, with turbulent eddies occurring downwind in the building wake. If an emission point is sufficiently close to a building, then the plume may become entrained in the turbulent eddies of the building wake.

This entrainment can cause plume downwash resulting in elevated emission concentrations close to the emission point. The stacks modelled are subject to downwash and, as a result, direction specific building dimensions were calculated.

The AERMOD model interprets the influence zone of each building for a given wind direction using the Building Profile Input Program (BPIP). The dimensions of the buildings and tanks included in the modelling analysis are outlined in Table 3-1.

Table 3-1: Buildings and tanks included in the model to account for Building Downwash

Structure Description	Structure Height (m)	Elevation (m)
Switchgear building	5	34.5
GT3 Lube Oil Cooler 1	3.719	34.5
GT3 Lube Oil Cooler 2	3.719	34.5
GT2 Lube Oil Cooler 1	3.719	34.5
GT2 Lube Oil Cooler 2	3.719	34.5
GT1 Lube Oil Cooler 1	3.719	34.5
GT1 Lube Oil Cooler 2	3.719	34.5
GT1 Exhaust and Scrubber	18	34.5
GT2 Exhaust and Scrubber	18	34.5
GT3 Exhaust and Scrubber	18	34.5
Services Building	5	34.5
Denionising Building	6	34.5
Fire Fighting Water tank	2	34.5
Sodium HydroxideTank	2.8	34.5
Water Treatment Chemicals tank	2.8	34.5
Denionised water tank	15.4	34.5
Raw water tank	12.8	34.5
Processed water tank	9	34.5
HVO tank	13	34.5
HVO tank	13	34.5
Ammonia Tank	1.8	34.5
OCGT Enclosure 1	16.9	34.5
OCGT Enclosure 2	16.9	34.5
OCGT Enclosure 3	16.9	34.5
Fuel Polishing System	3	34.5
Firewater Module	4	34.5

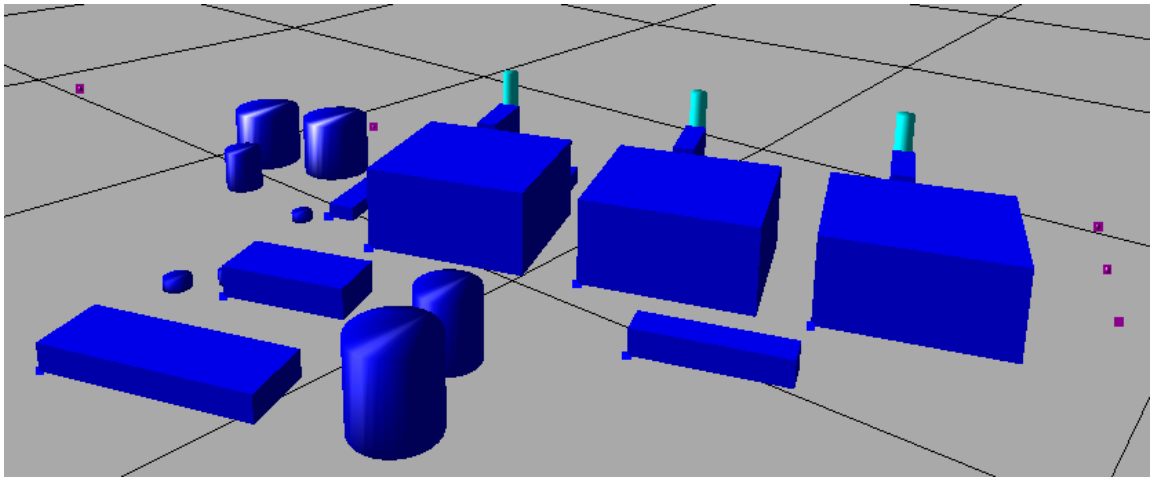

Figure 3-2: Image showing buildings and tanks included in the air dispersion model (also shown in turquoise are the emission stacks)

3.4 Model Receptor Points

The model was set up to examine the impact of emissions on the area surrounding the proposed development using a series of receptors. A receptor is a location at which the model will calculate maximum process contributions (PCs). A Cartesian co-ordinate receptor grid system was established centred on the area of the emission stacks. Grid convergence was performed to determine the optimum configuration, which was a nested grid consisting of:

- **Coarse grid**: Area of 20 km by 20 km with 500 m grid spacing
- **Fine grid**: Area of 4 km by 4 km with 100 m grid spacing

Receptors points were also established around the site boundary (spaced every 100m) and at the sensitive receptors, discussed in Section 2 of this report (NOTE: The ownership boundary was used in the model as opposed to the planning application boundary). Figure 3-3 shows a screenshot of the build model and receptor grids.

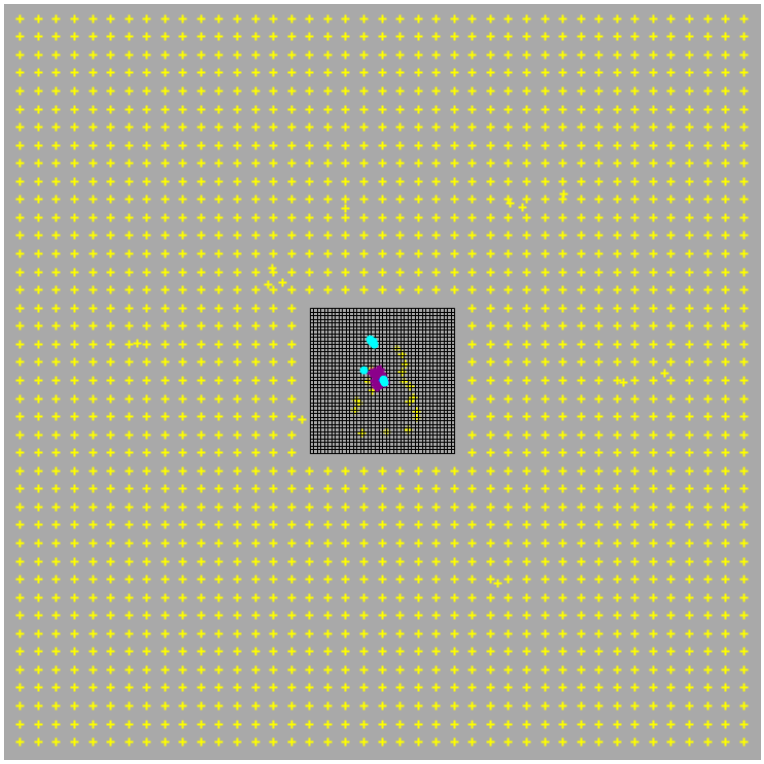

Figure 3-3: **Built Model including Receptor Grids**

3.5 Terrain Data

A terrain height for each of the receptors on the grid was input to the model in order to accurately represent the changing elevations of the surrounding landscape. Digitised terrain data was incorporated into the model using a Digital Elevation Model (DEM) file and the AERMAP function of the AERMOD software. It is noted that the facility objects, i.e. the buildings and the stacks were set at the floor levels indicated on the planning drawings, i.e. the DEM file was only used to give the elevations of the off-site receptors.

3.6 Stack Discharge Parameters and Emissions Data

The characteristics and emissions data are outlined in Table 3-2 for the proposed development. Figure 3-4 show the locations of the stacks within the model.

The plant design will allow for flexible operation so the plant can cater for high demand and respond quickly to fluctuations on the electricity grid. Operation over extended periods is not foreseen. The running regime, in terms of load and runtime, will depend on the size of the peak load experienced. It is anticipated that the plant will operate a maximum of 1,800 hours per year with the highest expected demand during winter months. The air dispersion modelling has conservatively considered the proposed development to be operational 24 hours a day, 7 days a week.

Table 3-2: Turbine Stacks Discharge Parameters and Emissions Data

Item	Value
Stack height	25 m
Stack internal diameter	3.541 m
Exit gas temperature @ 100% load	454 °C
Discharge volumetric flowrate @ 100% full load	459,549 Nm^3/hr
Exit gas velocity @ 100% load	34.52 m/s
Nitrogen oxides (NO_x) max. emission concentration	50 mg/Nm^3
NO_x max. emission rate	6.38 g/s
Sulphur dioxide (SO_2) max. emission concentration	5 mg/Nm^3
SO_2 max. emission rate	0.64 g/s
Carbon monoxide (CO) max. emission concentration	100 mg/Nm^3
CO max. emission rate	12.77 g/s
Particulates max. emission concentration	5 mg/Nm^3
Particulates max. emission rate	0.64 g/s
Ammonia max. emission concentration	10 mg/Nm^3
Ammonia max. emission rate	1.28 g/s

NO_x/NO_2 Chemistry

During combustion a mixture of both nitric oxide (NO) and nitrogen dioxide (NO_2) is released. Once released, a series of complex chemical reactions take place during which a portion of the NO is converted into NO_2.

In accordance with the EPA's AG4 Guidance, the following default factors were used to covert the NO_x modelled to NO_2 for comparison with the relevant Air Quality Standard Limits:

- Annual NO_2/NO_x ratio of 1.00;
- 1-hour NO_2/NO_x ratio of 0.50.

3.6.1 Best Available Techniques-Associated Emission Levels (BAT-AELs)

The proposed development will be designed to the highest specification in line with Best Available Technologies (BAT) thus ensuring that atmospheric emissions from the facility will not result in an impact to human health or the environment. The proposed OCGT units have been specified so that the pollutant maximum emissions levels as set out in Table 3-2 will not be exceeded.

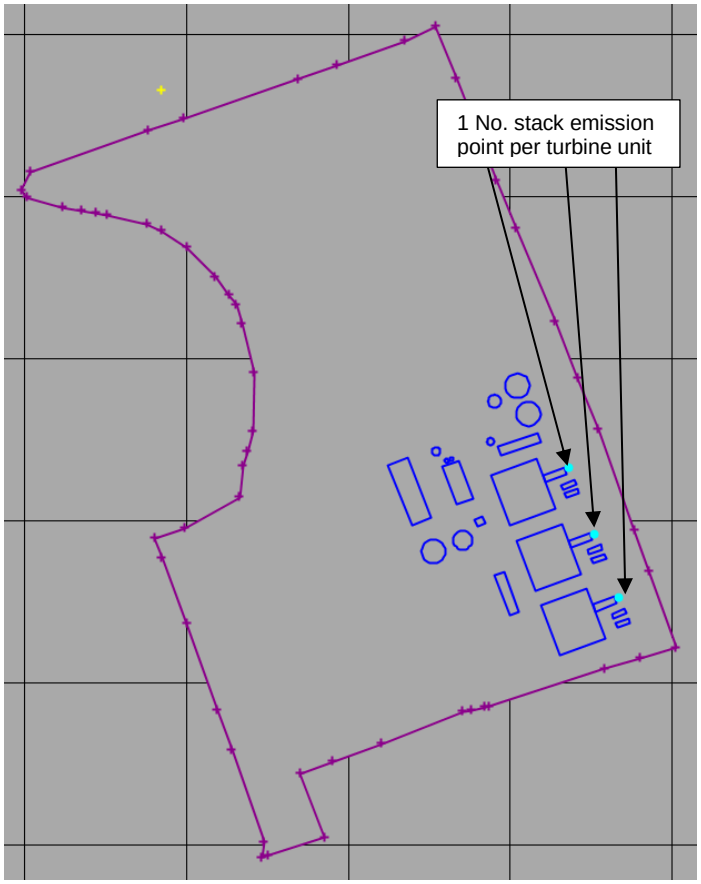

Figure 3-4 Stack Locations (turquoise dots represent each emission point) (NOTE: The ownership boundary was used in the model as opposed to the planning application boundary)

3.7 Cumulative Assessment and Off-site Stack Emissions Data

As discussed in Section 2 of this report, there are two IE Licenced sites, namely Irish Cement Ltd. and Indaver Ireland Ltd., near the proposed development. Both of these sites have the potential to emit more than 100 tonnes per annum of some (in the case of Indaver) or all (in the case of Irish Cement) of the pollutants being assessed as part of this air dispersion model. Hence the relevant stack emissions for both these sites were included as part of the air dispersion model. The stack discharge parameters and emissions data used are outlined in **Appendix C**.

3.8 Sensitivity Analysis and Modelling Scenarios

To determine the worst case modelling scenarios for the air dispersion modelling, sensitivity analysis was performed on the operational load and associated varying discharge parameters.

The emission flowrate, temperature and velocity vary depending upon the load. Table 3-3 details the varying emission discharge parameters with operational load.

Table 3-3: Discharge parameters for varying operational load

Item	100% Load	70% Load	35% Load
Exit Gas Temperature (°C)	454	454	454
Volumetric Flow rate Nm^3/hr	459,549	384,950	297,573
NO_x conc. (mg/Nm^3)	50	50	50
SO_x conc. (mg/Nm^3)	5	5	5
CO conc. (mg/Nm^3)	100	100	100
Dust conc. (mg/Nm^3)	5	5	10
Ammonia conc. (mg/Nm^3)	10	10	10
NO_x emission rate (g/s)	6.38	5.35	4.13
SO_x emission rate (g/s)	0.64	0.53	0.41
CO emission rate (g/s)	12.77	10.69	8.27
Dust emission rate g/s	0.64	0.53	0.83
Ammonia emission rate g/s	1.28	1.07	0.83
Exit Gas Velocity m/s	34.52	28.92	22.35

4 Modelling Results

Tables 4-3 and 4-4 outline the results of the modelling exercise. The predicted maximum process contributions (PCs) outlined in Tables 4-3 to 4-4 are the cumulative effect of the proposed development and nearby facilities (Irish Cement Ltd. and Indaver Ireland Ltd.). Reported are the annual values and the relevant percentiles of hourly or daily values. Contour plots have also been produced for each scenario using the BREEZE 3D Analyst software tool and Google Earth Pro and are included in **Appendix A**.

4.1 Predicted Environmental Concentrations

Predicted Environmental Concentrations (PECs) (i.e. background concentrations plus modelled process contributions) were also calculated for each parameter and averaging time, for comparison to AQS limit values. This assessment ensures that both the modelled emission and the existing background concentrations are taken into account when determining the possible overall ambient air quality once the proposed facility is operational.

The site is located within Air Quality Zone D: Rural Ireland, however it is very close to Air Quality Zone C: Other Cities and Large Towns (Figure 4-1). Adopting a conservative approach, the monitoring results for Zone C will be used as they will give a higher background concentration than those for Zone D monitoring stations.

Figure 4-1: Air Quality Zones around the Proposed Development Site (Map Source: EPA GIS Map

The EPA produces an annual report on air quality[2], which details the results from monitoring stations throughout the various Air Quality Zones within Ireland. Outlined in **Appendix B** is the Zone C monitoring stations results for the relevant study pollutants covering the five year period 2017-2021.

Table 4-1 summarises the background concentrations for these Zone C stations selected.

The background concentrations for Ammonia were gathered from the EPA[3] which collected data from various monitoring stations located around the island of Ireland in the years 2013 and 2014. This is the most recent data available for ambient ammonia in the study area.

[2] The latest issued EPA report is *Air Quality in Ireland 2021 Key Indicators of Ambient Air Quality (2022)*

[3] EPA Research report *Ambient Atmospheric Ammonia in Ireland 2013-2014* (2017)

Table 4-2 summarises the background concentrations for ammonia for the area surrounding the proposed development.

Table 4-1: **EPA Quality Zone C Monitoring Stations: Background Pollutant concentrations (µg/m^3) for period 2017 to 2021**

Pollutant Parameter	Resultant Estimated Background Concentration
Nitrogen Dioxide (NO_2) Hourly - Annual Mean	**12.05 µg/m^3**
Nitrogen Dioxide (NO_2) Hourly - 99.8th Percentile	**24.10 µg/m^3**
Sulphur Dioxide (SO_2) Hourly – Annual Mean	**2.85 µg/m^3**
Sulphur Dioxide (SO_2) Hourly – 99.7th Percentile	**5.7 µg/m^3**
Sulphur Dioxide (SO_2) Daily – 99.2th Percentile	**5.7 µg/m^3**
Carbon Monoxide (CO) 8-Hour – Annual Mean	**0.22 mg/m^3**
Particulate Matter (PM_{10}) Daily – Annual Mean	**13.8 µg/m^3**
Particulate Matter ($PM_{2.5}$) Daily – Annual Mean	**8.4 µg/m^3**

Table 4-2: **Background Ammonia (NH_3) concentrations (µg/m^3) for period 2013 to 2014**

Pollutant Parameter	Resultant Estimated Background Concentration
Ammonia (NH_3) Hourly mean	**3.2 µg/m^3**
Ammonia (NH_3) Hourly – Annual mean	**1.6 µg/m^3**

In relation to annual mean values the background concentrations were added directly to the maximum annual predicted concentrations for human health. This is also the case for the daily PM_{10} values and the 8 hour CO. In relation to combining the short term (relevant to hourly NO_2, SO_2 and daily SO_2) peak contributions with background concentrations, guidance from the Appendix E of the 'EPA AG4 Guidance Note' advises that the background concentration should be twice the annual mean value added to the short term process contribution.

These background concentrations have been combined with the predicted ground level concentrations (GLCs) in order to determine the PECs, as summarised in the dispersion modelling results tables (Tables 4-3 and 4-4).

Table 4-3: **Air Dispersion Modelling Results**

Pollutant	Averaging Period	Predicted Max. Process Contribution (PC) (µg/m^3)	Predicted Max Occurred at Location (UTM Coords.)	Predicted Max Occurred in Year	Background Conc.[1] (µg/m^3)	PEC: Background + Process Contribution (µg/m^3)	Air Quality Standards/ Limit Value (µg/m^3)	Predicted PC as Percentage of Limit	PEC as Percentage of Limit
Nitrogen Dioxide (NO_2)	99.8th Percentile of 1 hr means	42.93	671863, 5951938	2021	24.1	67.03	200	21.47%	33.52%
	Annual Mean (Human Health Protection)	4.03	673663, 5952337	2017	12.05	16.1	40	10.07%	40.20%
	Annual Mean (Protection of Vegetation)						30	13.43%	53.59%
Sulphur Dioxide (SO_2)	99.7th Percentile of 1 hr means	22.60	669763, 5951538	2021	5.69	28.30	350	6.46%	8.08%
	99.2th Percentile of Daily Means	7.04	672263, 5951938	2021	5.69	12.74	125	5.63%	10.19%
	Annual Mean (Protection of Vegetation)	0.998	673163, 5952037	2017	2.85	3.84	20	4.99%	19.22%
Carbon Monoxide (CO)	8 hr Mean	234.91	671863,5952337	2018	220	454.9	10,000	0.563%	4.55%

Pollutant	Averaging Period	Predicted Max. Process Contribution (PC) (µg/m^3)	Predicted Max Occurred at Location (UTM Coords.)	Predicted Max Occurred in Year	Background Conc.[1] (µg/m^3)	PEC: Background + Process Contribution (µg/m^3)	Air Quality Standards/ Limit Value (µg/m^3)	Predicted PC as Percentage of Limit	PEC as Percentage of Limit
Particulate Matter less than 10 µm (PM_{10})	90.4th Percentile of Daily Means	0.63	671763, 5952238	2019	13.8	14.4	50	1.26%	28.86%
	Annual Mean	0.196	673263, 5950837	2017	13.8	14.0	40	0.49%	34.99%
Particulate Matter less than 2.5 µm ($PM_{2.5}$)	Annual Mean	0.196	673263,5950837	2017	8.4	8.6	20	0.98%	42.98%
Ammonia (NH_3)	Hourly mean	13.63	672763,5950337	2019	3.2	16.8	2,500	0.55%	0.67%
	Annual Mean	0.28	673663,5952437	2017	1.6	1.9	180	0.16%	1.04%

NOTES

1. From EPA Guidance document AG4:
   - the 99.8th percentile NO_2 PEC is equal to 99.8th percentile concentration plus twice the annual mean background NO_2;
   - the 99.7th percentile of 1-hr SO_2 PEC is equal to 99.7th percentile concentration plus twice the annual mean background SO_2;
   - the 99.2th percentile of daily SO_2 PEC is equal to 99.2th percentile concentration plus twice the annual mean background SO_2;
   - the 90.4th percentile PM_{10} daily PEC is equal to 90.4th percentile concentration plus the annual mean background PM_{10}

Table 4-4 Air Dispersion Modelling Results – Maximum Annual NO_2 concentration for nearest SACs

Sensitive Receptor		UTM Coordinates (Zone 29N)		Year of Max Predicted Results	Max Annual NO_2 Process Contributions (PC) conc. (µg/m^3)	Background Concentration (µg/m3)	Max Annual NO_2 PEC conc. (µg/m^3)	Air Quality Standards/ Limit Value (µg/m^3)	Predicted Result as Percentage of Limit
No	Description	Easting	Northing						
21	River Boyne and River Blackwater SAC	670026	5953246	2019	1.63	12.05	13.68	30	45.6%
22	Boyne Coast and Estuary SAC	676306	5955429	2017	1.28		13.33		44.4%
23	River Boyne and River BlackWater SPA	669622	5953187	2019	1.28		13.33		44.4%
24	Boyne Estuary SPA	676636	5955309	2017	1.35		13.40		44.7%
25	River Nanny and Shore SPA	680583	5950736	2017	0.90		12.95		43.2%

The results in Table 4-3 are those for the worst case modelling scenarios, as determined from the sensitivity assessment, the results of which are outlined in **Appendix D**.

The process contributions for each pollutant parameter indicated in Table 4-3 are the sum of contributions from both the proposed development and offsite emission stacks. The breakdown of these process contributions between on-site and off-site emissions is shown in Tables 4-5.

Table 4-5: Breakdown of Total Process Contribution between Proposed Development and Off-Site Emissions

Pollutant	Averaging Period	Predicted Max. Process Contribution (PC) ($\mu g/m^3$)	Proposed Development PC as % of Total PC	Off-Site PC as % of Total PC
Nitrogen Dioxide (NO_2)	99.8th Percentile of 1 hr means	42.93	25%	75%
	Annual Mean (Human Health Protection)	4.03	15%	85%
	Annual Mean (Protection of Vegetation)			
Sulphur Dioxide (SO_2)	99.7th Percentile of 1 hr means	22.60	6.3%	93.7%
	99.2th Percentile of Daily Means	7.04	5.9%	94.1%
	Annual Mean (Protection of Vegetation)	0.998	6%	94%
Carbon Monoxide (CO)	8 hr Mean	234.91	24.0%	76.0%
Particulate Matter less than 10 µm (PM_{10})	90.4th Percentile of Daily Means	0.63	51%	49%
	Annual Mean	0.196	67%	33%
Particulate Matter less than 2.5 µm ($PM_{2.5}$)	Annual Mean	0.196	67%	33%
Ammonia (NH_3)	Hourly Mean	13.63	99.97%	0.03%
	Annual Mean	0.28	44%	56%

4.2 Environmental Loading at Ecological Sites

4.2.1 Critical Level NO_2

Sensitive receptors surrounding the site were discussed in Section 2 of this report. As mentioned, the nearest SAC to the site is the River Boyne and River Blackwater SAC (site code 002299), at approximately 3.5 km northwest from the boundary of the site. A critical level for ambient annual NO_2 concentration is specified in the Air Quality Standards Regulations 2011 (S.I. No. 739 of 2022) as 30 µg/m^3. The intent of this critical level for vegetation was to assess the impact at distances greater than 20 km from the source of NO_2 emissions. It is also appropriate to use this limit value in assessing any impacts on local rivers and small sites of ecological importance.

The predicted PC NO_2 value generated by the proposed development and neighboring facilities is at the nearest point of the River Boyne and River Blackwater SAC is 1.63 µg/m^3. Using a background NO_2 concentration of 12.05 µg/m^3 (refer to Section 4.1 of this report) the maximum annual average PEC at the River Boyne and River Blackwater SAC is equivalent to 45.6% of the AQS.

5 Discussion and Conclusions

As can been seen from Table 4-3, the cumulative maximum predicted ground level concentrations (GLCs) of NO_2, SO_2, CO, $PM_{10/2.5}$ and NH_3 arising from the operation of the proposed development and neighbouring facilities are well below the relevant Air Quality Standards (AQSs) and Environmental Assessment Levels (EALs). Furthermore, the PECs are also below the relevant AQSs and EALs.

It is noted that the air dispersion modelling has conservatively considered the proposed development to be operational 24 hours a day, 7 days a week. As stated in this report, it is intended that the plant will operate for no more than 1,800 hours annually, therefore the air emissions generated by the operation of the facility will be less than stated in Table 4-3.

It is therefore concluded that atmospheric emissions from the proposed development will not have a significant impact on ambient air quality.

Appendix A
Dispersion Modelling Contour

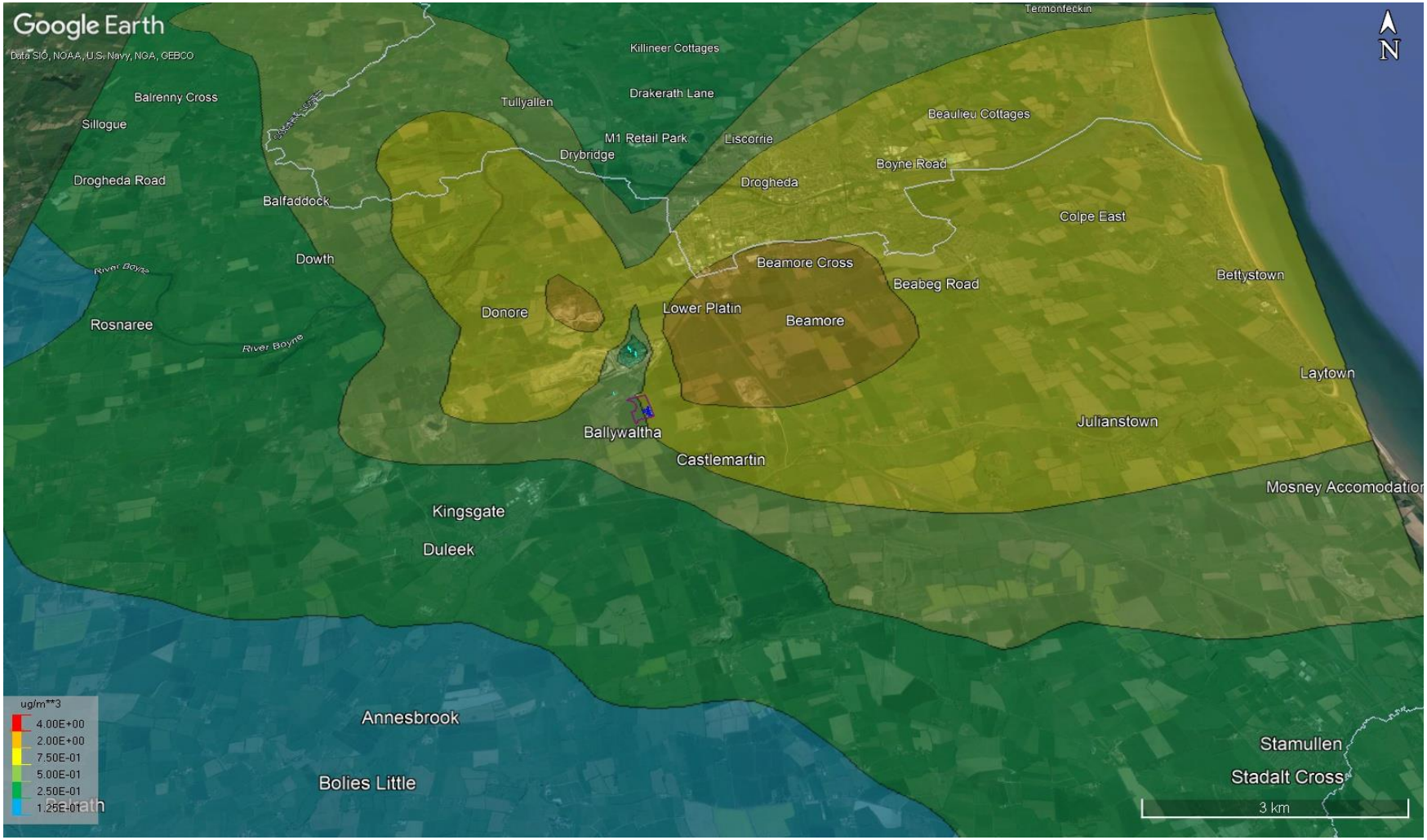

Figure 1: 99.8%ile of Hourly Mean Ground Level Concentrations for NO_2 at 100% Load (2021 Met Year) (Base Image from Google Earth)

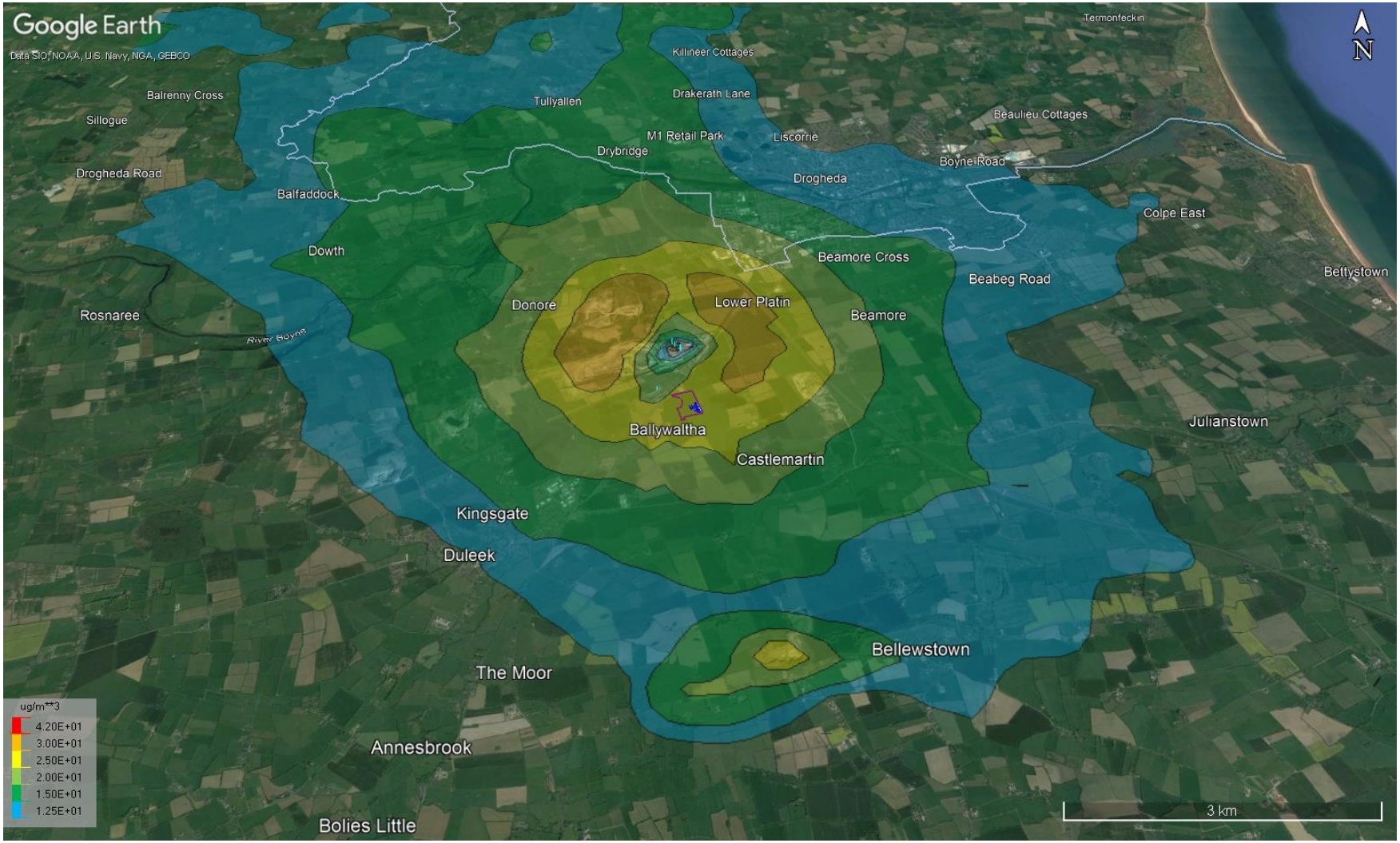

Figure 2: Annual Mean Ground Level Concentrations for NO_2 at 100% Load (2017 Met Year) (Base Image from Google Earth)

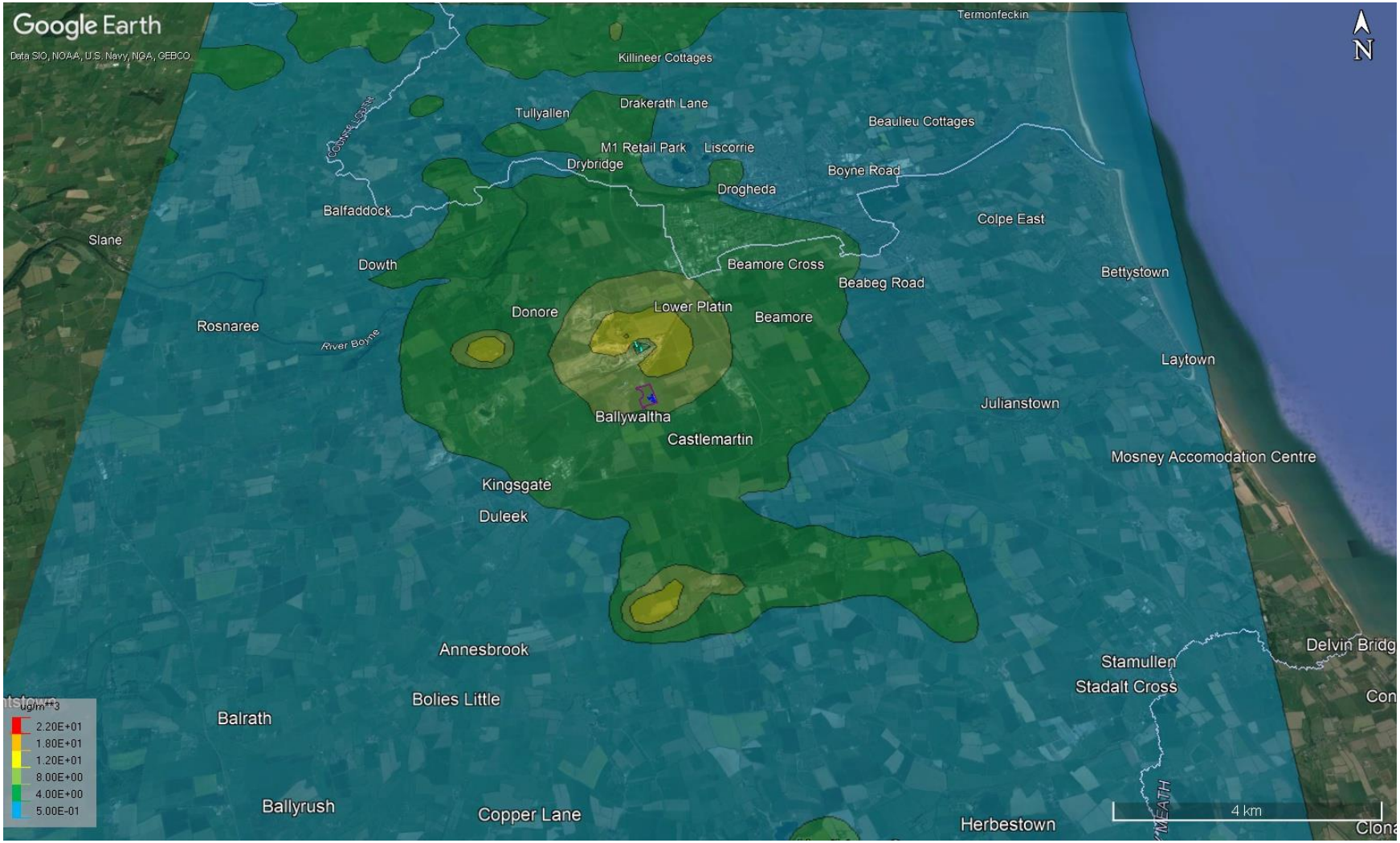

Figure 3: 99.7%ile of Hourly Mean Ground Level Concentrations for SO_2 at 35% Load (2021 Met Year) (Base Image from Google Earth)

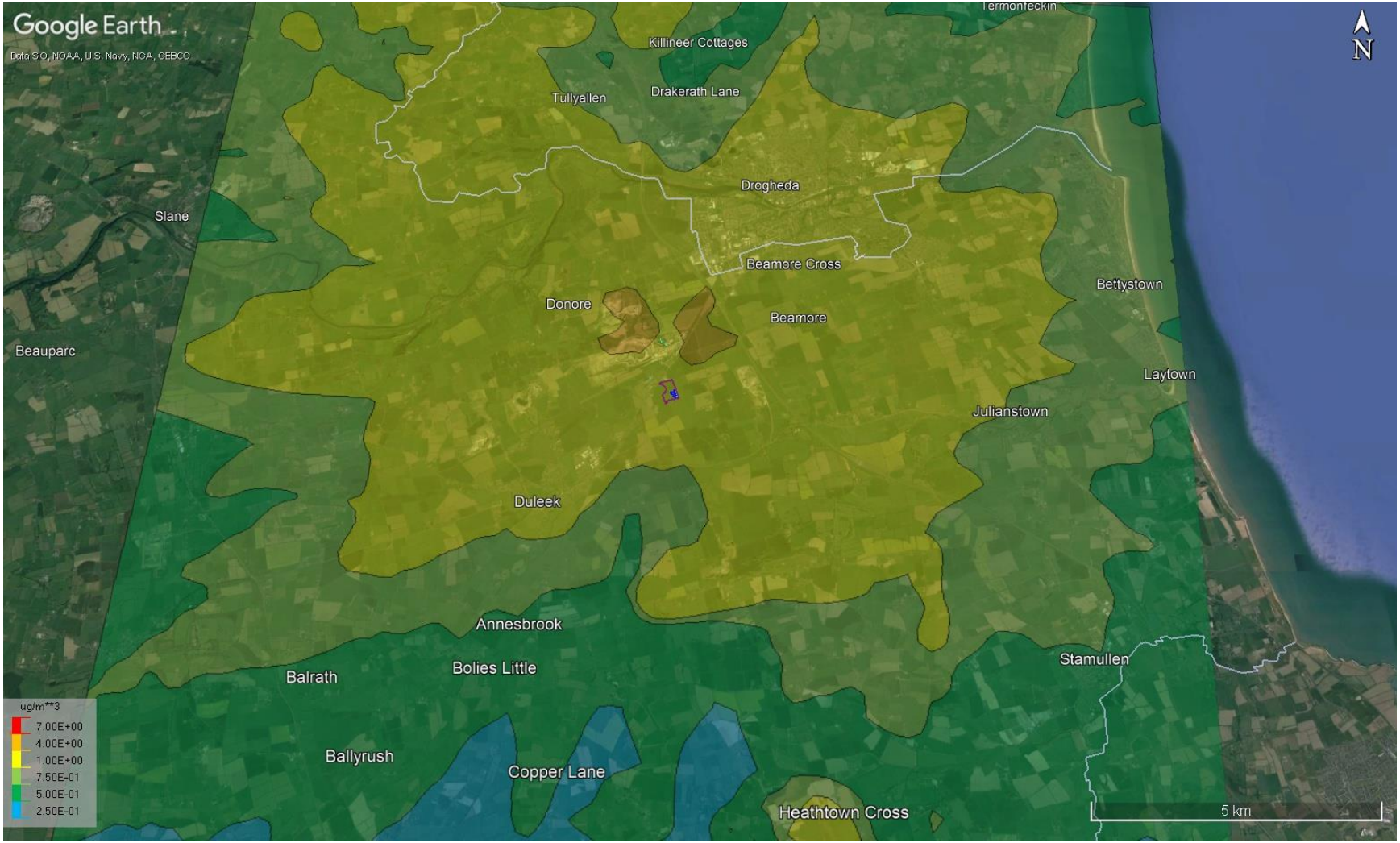

Figure 4: 99.2%ile of Daily Mean Ground Level Concentrations for SO_2 at 100% Load (2021 Met Year) (Base Image from Google Earth)

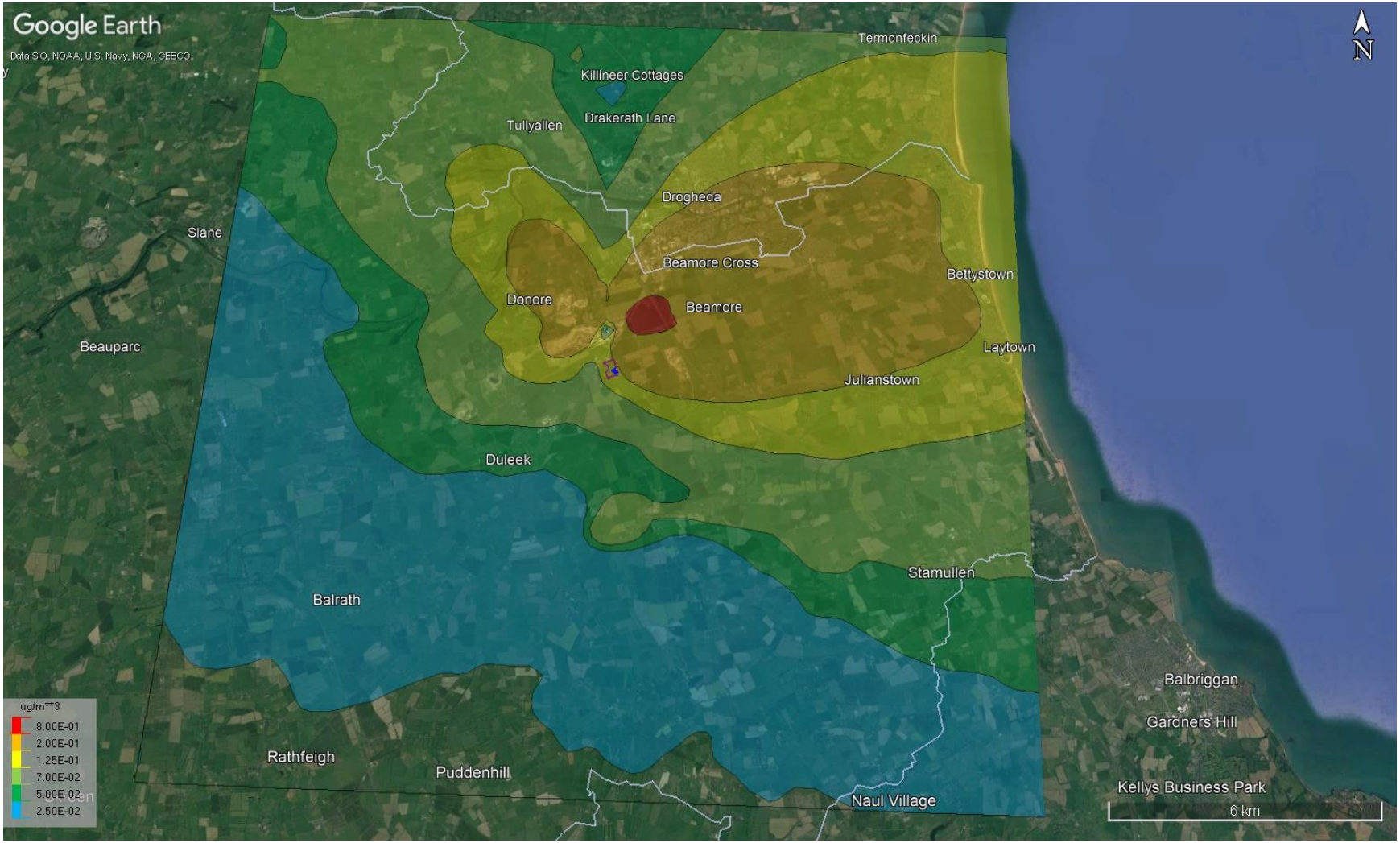

Figure 5: Annual Mean Ground Level Concentrations for SO_2 at 100% Load (2017 Met Year) (Base Image from Google Earth)

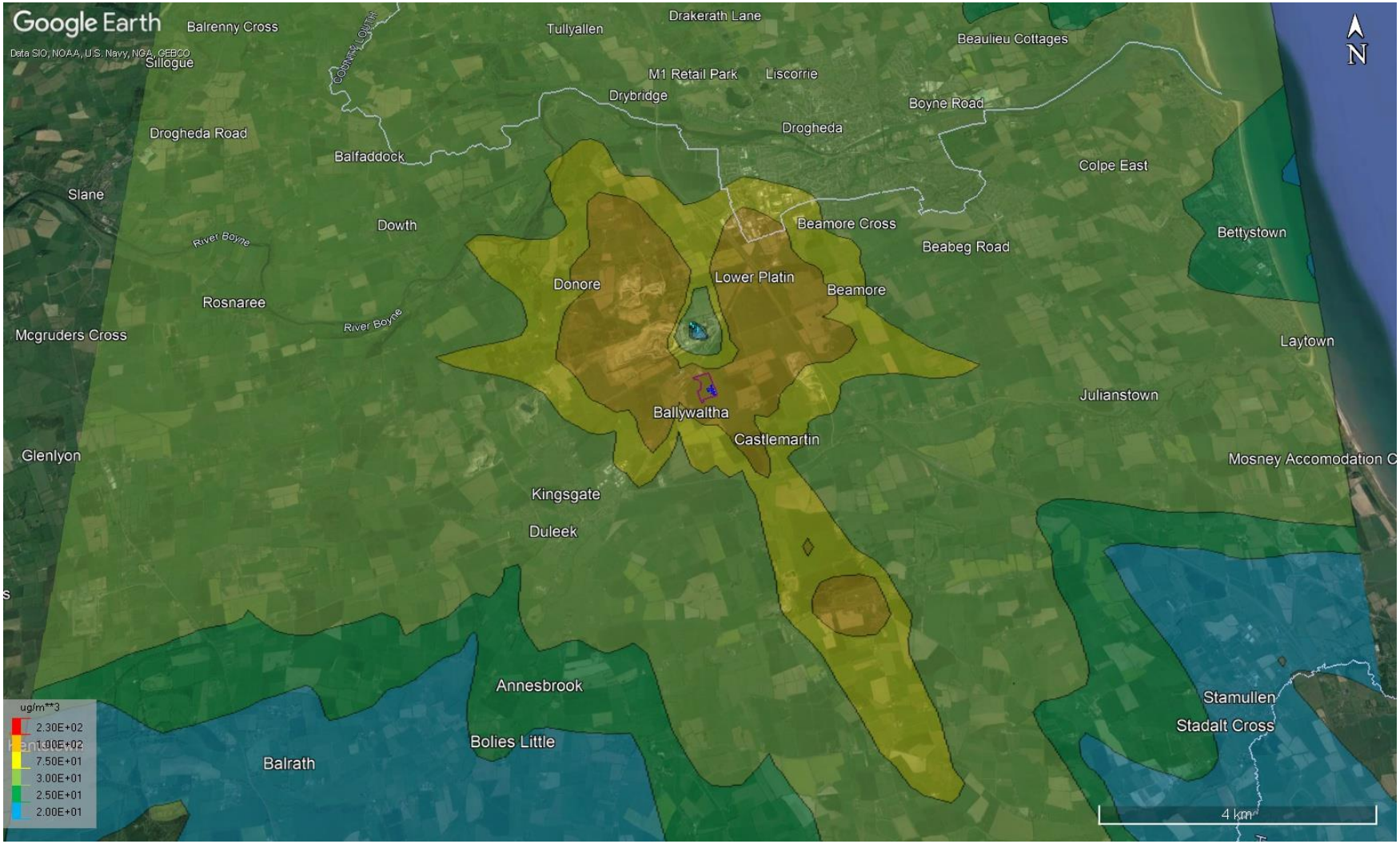

Figure 6: 8 hour Mean Ground Level Concentrations for CO at 100% Load (2018 Met Year) (Base Image from Google Earth)

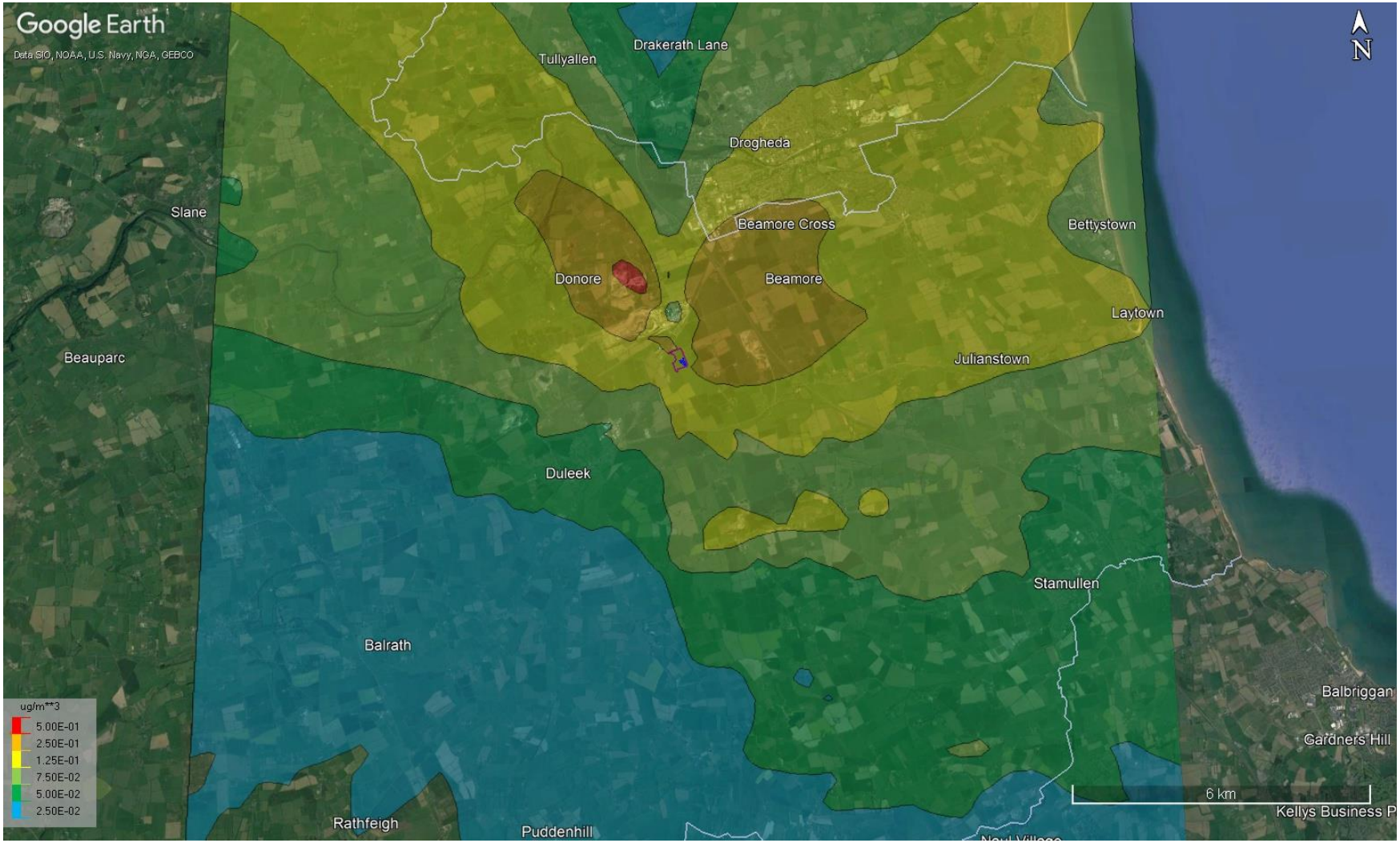

Figure 7: 90.4%ile of Daily Mean Ground Level Concentrations for PM_{10} at 35% Load (2019 Met Year) (Base Image from Google Earth)

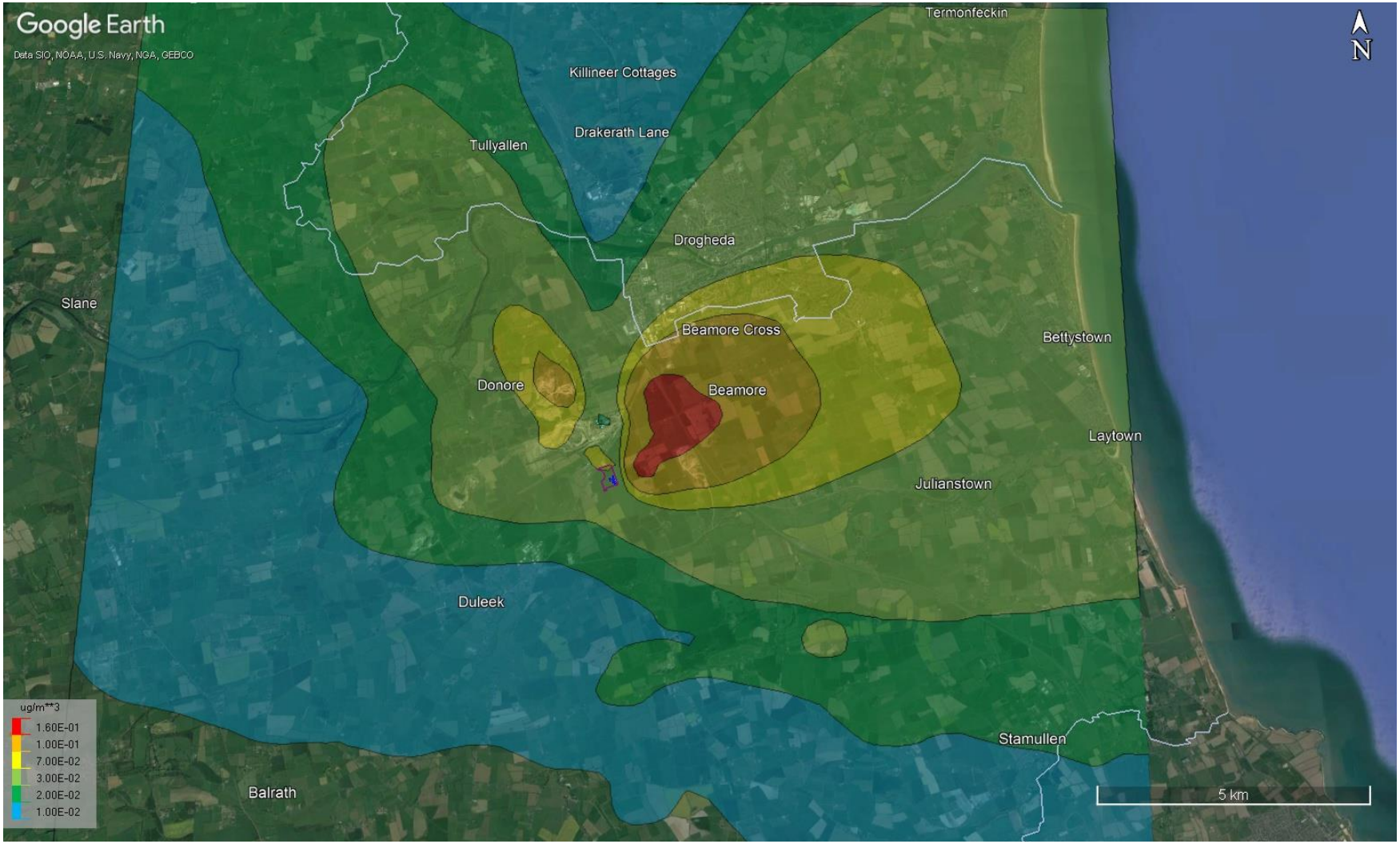

Figure 8: Annual Mean Ground Level Concentrations for PM_{10}/ $PM_{2.5}$ at 35% Load (2017 Met Year) (Base Image from Google Earth)

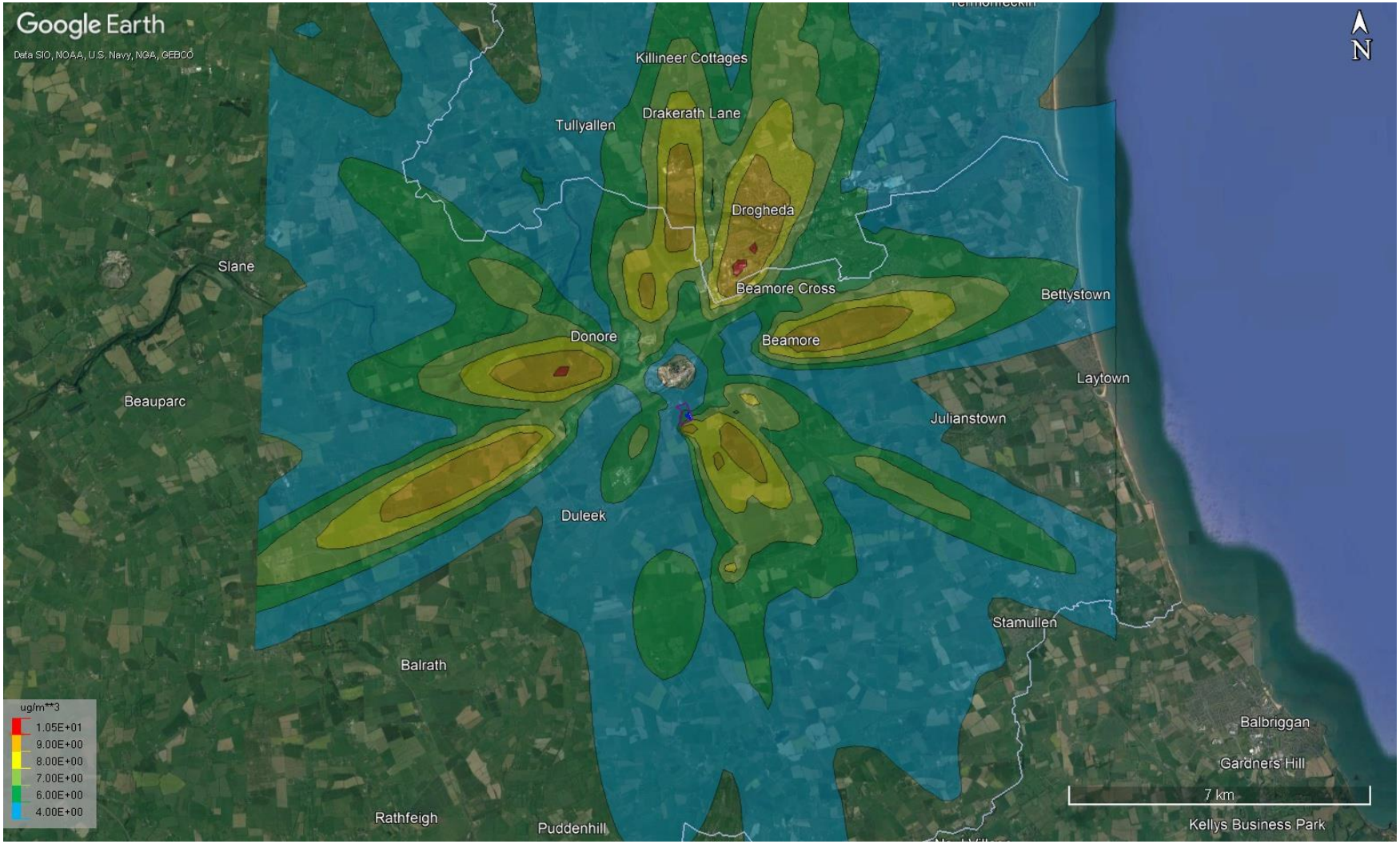

Figure 9: Hourly Mean Ground Level Concentrations for NH_3 at 35% Load (2019 Met Year) (Base Image from Google Earth)

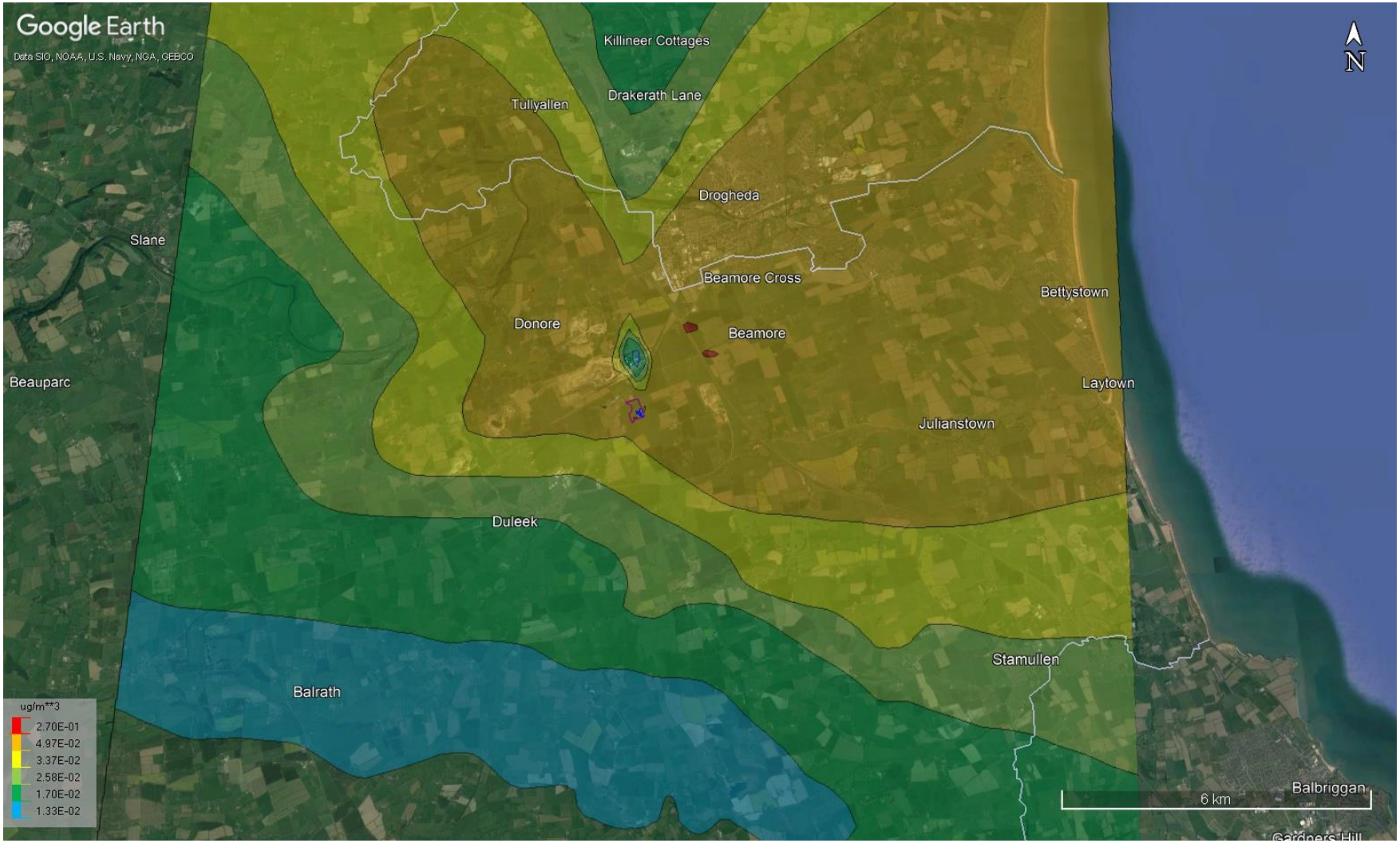

Figure 10: Annual Mean Ground Level Concentrations for NH_3 at 100% Load (2017 Met Year) (Base Image from Google Earth)

Appendix B
EPA Zone C - Ambient Air Quality Monitoring Results

The following tables outline ambient air quality monitoring results for EPA Zone C Monitoring stations (Other Cities and Large Towns). The results were obtained from the EPA Air Quality in Ireland Reports available at http://www.epa.ie/pubs/reports/air/quality/.

Table B.1 – EPA Air Quality Zone C Monitoring Stations: **NO_2 Annual Mean concentrations** (µg/m^3) for period 2017-2021

Year	Meath Navan	Kilkenny Seville Lodge	Portlaoise	Dundalk	Total Average
2017	-	5.2	10.8	-	
2018	-	6	11	14	
2019	23	5	11	12	
2020	19	4	11	10	
2021	21.90	4.20	7.90	10.73	**12.05**
	21.3	**4.9**	**10.3**	**10.4**	

Table B.2 – EPA Air Quality Zone C Monitoring Stations: **SO_2 Annual Mean concentrations** (µg/m^3) for period 2017-2021

Year	Ennis	Dundalk	Portlaoise	Total Average
2017	3.4		2.4	
2018	3.2	3.8	3	
2019	3.6	1.5	1.3	
2020	4.4	2	1.6	
2021	5.90	2.30	1.90	**2.85**
	4.1	**2.4**	**2.0**	

Table B.3 – EPA Air Quality Zone C Monitoring Stations: **CO 8-hour Annual Mean concentrations** (mg/m^3) for period 2017-2021

Year	Dundalk	Portlaoise	Total Average
2017	-	0.15	
2018	0.5	0.2	
2019	0.1	0.1	
2020	0.3	0.1	
2021	0.1	0.4	**0.220**
	0.25	**0.19**	

Table B.4 – EPA Air Quality Zone C Monitoring Stations: **PM_{10} Annual Mean concentrations** ($\mu g/m^3$) for period 2017-2021

Year	Meath Navan	Ennis	Portlaoise	Dundalk	Drogheda	Total Average
2017	-	15.8	9.5	-	-	
2018	-	16	11	15	-	
2019	-	18	15	14	-	
2020	14	20	12	13	-	
2021	13.5	19	19	11.7	10.7	**13.79**
	13.75	**17.76**	**13.43**	**13.75**	**10.7**	

Table B.5 – EPA Air Quality Zone C Monitoring Stations: **$PM_{2.5}$ Annual Mean concentrations** ($\mu g/m^3$) for period 2017-2021

Year	Navan	Ennis	Bray	Drogheda	Total Average
2017	-	10.6	5.2	-	
2018	-	10	6	-	
2019	11	7	14	-	
2020	8	14	5	-	
2021	8.2	14.7	5.6	6.1	**8.40**
	9.07	**11.26**	**7.16**	**6.10**	

Appendix C
Cumulative Assessment Emissions Data

Indaver Ireland Ltd. Emission Stack

The information outlined in Table C.1 was obtained from either Indaver's IE License (Licence No. W0167-03) or licence application form data, available from the EPA's website (http://www.epa.ie) .

Table C.1: Indaver Ireland Ltd. Emission Stack Data

Information	STACK A1-1
Emission point location (UTM Zone 29 Coordinates)	672276.8E, 5950829.4N
Minimum discharge height (m)	95.5
Height of stack above ground (m)	65
Diameter (m)	2
Normalised Volume to be emitted - max rate (Nm^3/hr)	183,700
Sulphur dioxide conc. - daily avg (mg/Nm^3)	50
Oxides of Nitrogen conc. - daily avg (mg/Nm^3)	200
Carbon monoxide conc. - daily avg (mg/Nm^3)	100
Dust/Particulates conc. - daily avg (mg/Nm^3)	10
Emissions rate: NOx (g/s)	10.21
Emissions rate: SO_2 (g/s)	2.55
Emissions rate: CO (g/s)	5.10
Emissions rate: Particulates (g/s)	0.51
Temperature: Avg (°C)	140
Periods of emission:	Continuous
CALCULATED DATA:	
Max discharge velocity (m/s)	24.6

Irish Cement Ltd. Emission Stacks

The information outlined in Table C.2 was obtained from either Irish Cement's IE License (Licence No P0030-06) or licence application form data, available from the EPA's website.

Table C.2: Irish Cement Ltd. Stack's Emissions Data

Information	STACK A2-01	STACK A2-02	STACK A2-03	STACK A2-08
Emission point coordinates (UTM Zone 29N)	672454.6E, 5951622.8N	672424E, 5951669.4N	672533.8E, 5951606.9N	672537.7E, 5951545N
Minimum discharge height (m)	145.2	153.37	95.03	168.2
Height of stack above ground (m)	98.01	103.04	48.09	123
Diameter (m)	2.38	3.7	1	3.75
Normalised Volume to be emitted max rate (Nm^3/hr)	49,000	650,000	31,000	650,000
Sulphur dioxide conc. - daily avg (mg/Nm^3)	50	390	390	50
Oxides of Nitrogen conc. - daily avg (mg/Nm^3)	500	500	500	500
Carbon monoxide conc. (daily avg) (mg/Nm^3)	1500	1500	1500	1500
Dust/Particulates - daily avg (mg/Nm^3)	20	20	20	20
Ammonia – daily average (mg/Nm^3)	N/A	50	N/A	50
Emissions rate: NO_x g/s	6.81	90.28	4.31	90.28
Emissions rate: SO_x g/s	0.68	9.03	3.36	9.03
Emissions rate: CO g/s	20.42	270.83	12.92	270.83
Emissions rate: Particulates g/s	0.27	3.61	0.17	3.61
Emissions rate: Ammonia g/s	N/A	9.03	N/A	9.03
Temperature - Avg (°C)	87	121	81	108
Periods of emission	Continuous	Continuous	Continuous	Continuous
CALCULATED DATA:				
Max discharge velocity (m/s)	4.03	24.235	14.22	22.815

Appendix D
Sensitivity Analysis Modelling Results

Operational Load Sensitivity Assessment Results

Nitrogen Dioxide Results – Process Contribution:

Pollutant	Parameter	Worst Case Year for Pollutant Parameter	100% Load	70% Load	35% Load
			Max conc. (µg/m3)	Max conc. (µg/m3)	Max conc. (µg/m3)
NO_x/NO_2	Max 99.8th Percentile of 1-hr concentrations	2021	42.9327	42.9277	39.62975
NO_x/NO_2	Max Annual concentration	2017	4.02846	4.0257	4.02087

Sulphur Dioxide Results –Process Contribution:

Pollutant	Parameter	Worst Case Year for Pollutant Parameter	100% Load	70% Load	35% Load
			Max conc. (µg/m3)	Max conc. (µg/m3)	Max conc. (µg/m3)
SO_2	Max 99.7th Percentile of 1-hr concentrations	2021	22.60252	22.602530	22.602550
SO_2	Max 99.2 Percentile Daily concentrations	2021	7.043589	7.04165	7.0393
SO_2	Max Annual concentration	2017	0.997520	0.99730	0.99708

Carbon Monoxide Results – Process Contribution:

Pollutant	Parameter	Worst Case Year for Pollutant Parameter	100% Load	70% Load	35% Load
			Max conc. (µg/m3)	Max conc. (µg/m3)	Max conc. (µg/m3)
CO	Max 8-hour rolling average concentration	2018	234.909	234.63414	234.25014

Particulate Results – Process Contribution:

Pollutant	Parameter	Worst Case Year for Pollutant Parameter	100% Load	70% Load	35% Load
			Max conc. (µg/m3)	Max conc. (µg/m3)	Max conc. (µg/m3)
PM_{10}	Max annual average concentration	2017	0.16997	0.16956	0.19599
PM_{10}	Max 90.4 Percentile of Daily concentrations	2019	0.590094	0.589	0.62845
$PM_{2.5}$	Max annual average concentration	2017	0.16997	0.16956	0.19599

Ammonia Results – Process Contribution:

Pollutant	Parameter	Worst Case Year for Pollutant Parameter	100% Load	70% Load	35% Load
			Max conc. (µg/m3)	Max conc. (µg/m3)	Max conc. (µg/m3)
NH_3	Max 1-hour average concentration	2019	12.8106	12.670	13.627
NH_3	Max annual average concentration	2017	0.27963	0.27903	0.27821