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STRATEGIC INFRASTRUCTURE DEVELOPMENT

APPLICATION TO

AN BORD PLEANÁLA

(REG NO. PL61.PA.0033)

ORAL HEARING

GALWAY HARBOUR EXTENSION

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Air Quality & Climatic Factors

EUGENE McKEOWN

RPS GROUP

QUALIFICATIONS AND EXPERIENCE

1.1. My name is Eugene McKeown. I hold a degree (B.E.) in mechanical engineering from University College Dublin), a degree in Law (LLB) from the National University of Ireland, Galway as well as a Master of Science Degree (M.Sc.), from the University of Derby. I hold Certificates in Industrial Emissions and Air Quality Monitoring and Industrial Ventilation.

1.2. I am a Senior Consultant with RPS Group PLC. I have over thirty years engineering experience including air quality and pollution control.

1.3. I have been involved in over 200 Environmental Impact Studies, including marine infrastructure, transport, waste management and power supply infrastructure. I have experience in impact assessment and monitoring in relation to large construction projects for over 30 years and marine projects specifically for 10 years.

ROLE IN THE PROJECT

2.1 My role in the preparation of the Environmental Impact Statement involved preparation of Chapter 9 Air Quality and Chapter 11 Climatic Factors, while employed by Biospheric Engineering Ltd. In preparing the environmental assessment I considered the proposed development and its general vicinity. The relevant chapters have been published in the EIS and provide the detail supporting the summary I am presenting today.

3. PRESENTATION TO THIS HEARING

In the interests of brevity I do not propose to repeat in detail any material already included in the EIS or in other material already submitted in evidence to this Oral Hearing but will summarise it as follows:

3.1. The project comprises the construction of an extension to Galway Harbour to facilitate the operation of the port on a round the clock basis rather than the current tidal mode of operation.

3.2. The approach adopted in the EIS is consistent with the approach applicable to infrastructure related air quality and climate generally which are based on:

Determining the existing background air quality levels by measurement at representative locations.

Determining the emissions during construction and operation of the project.

Recommending appropriate mitigation measures to ensure environmental impacts are minimised.

3.3. The nature of this project is such that construction will be carried out over approximately 8 years. The intensity of operations at any one time will be limited to specific activities such as lagoon construction, dredging, dewatering and consolidation, etc. The emissions associated with any particular phase are therefore specific to that phase of construction.

3.4. The operational phase will be ongoing.

3.5. As air quality and potential impacts on climate are related, I propose to deal with both in this witness statement.

AIR QUALITY

3.6. In chapter 9 of the EIS the potential impacts of emissions to atmosphere arising as a result of the construction and operation activities at the proposed development are considered. The potential air quality impacts on the surrounding area are:

- Dust emissions
- Odour Emissions
- Gaseous/Solvent emissions

Such emissions may arise during:

- The construction of the industrial park and deep water dock
- Operation of the industrial park
- Operation of the new port (deep water dock) area

AMBIENT AIR QUALITY

3.7. Galway City has historically had good air quality due to the low level of industrial activity close to the city and the prevailing westerly winds.

3.8. The Environmental Protection Agency and the Public Analyst Laboratory in Galway monitor air quality in Galway City. The results of this monitoring are outlined in section 9.3 of the EIS. The historical monitoring carried out on behalf of the Environmental Protection Agency indicates that air quality in Galway is consistently in compliance with the requirements of the Air Quality Framework Directive.

3.9. The existing Galway Harbour Board Enterprise Park (GHBEP) comprises some 25 hectares of industrial land that is bounded to the south by the sea, to the north by the main Galway-Dublin railway line, to the west by the sea and existing harbour and to the east by Ballyloughane beach. The nearest residential area is the army barracks and residential area in Renmore.

3.10. Nearby amenity areas include the Renmore saltmarsh, the army pitch & putt course and sports facilities, Ballyloughane Beach, the Lough Atalia area, South Park playing fields at the Claddagh and the inner section of Galway Bay, which is a designated site.

3.11. Dust Deposition measurements and odour surveys have been carried out on a regular basis at GHBEP and the results are on file in the Galway City Planning Office. The results of the monitoring are summarised in Table 9.5.1 and section 9.6 of the EIS and are in compliance with best international standards.

PREDICTION OF AIR QUALITY IMPACTS

3.12. In order to determine the quantum of potential impacts a four point scale ranging from Major to Negligible has been devised and is set out in section 9.7.1 of the EIS.

3.13. Four types of air emissions were assessed in detail in the EIS

3.14. Construction related dust emissions associated with the infill construction of the enterprise park which are addressed in section 9.7.3 and 9.7.4 of the EIS. A dust emission model is presented in section 9.7.4 of the EIS. The impact of construction related dust emissions is classified as negligible to minor. Monitoring will however be carried out for the duration of the construction to ensure emissions are controlled.

3.15. Potential odours during the construction phase associated with the infill/construction of the enterprise park are addressed in section 9.7.5 of the EIS. The surface layer of seabed material recovered during dredging has the potential to generate Hydrogen Sulphide (rotten egg type) odours. A worst case odour dispersion model is presented in section 9.7.5 of the EIS. The model indicates that odours will not be detectable beyond a range of 650 metres, which is greater than the distance from the closest lagoon to any sensitive residential location. It is unlikely that odours due to the dredging operations will cause any difficulty at locations outside the harbour site boundary. The potential impact from odours is classified as Minor to Moderate and justifies the requirement for ongoing monitoring and control measures during the dredging phase.

3.16. Emissions resulting from traffic using the industrial park are addressed in section 9.7.1 in the EIS. Road transport contributes the major part of carbon monoxide (CO) emissions over Ireland as a whole and is the largest single source of oxides of nitrogen (NOx) and black smoke emissions. Road transport emissions of hydrocarbons (HC), from both exhaust and evaporative emissions, are also a significant factor of the total. The contribution of road transport to national emissions of sulphur dioxide, in contrast, is very small due to reductions in sulphur content of transport fuel.

3.17. From the analysis carried out in the Traffic (Chapter 13) it is clear that traffic volumes associate with the development both on and off site will amount to small incremental changes over the Do Nothing scenario. This small incremental change is also reflected in relation to air quality and is classified as negligible to minor in section 9.7.7.1 of the EIS.

3.18. Emissions arising from the port activity which can be broken down into three categories: Emissions from cargo handling which is addressed in section 9.7.7.2.1 of the EIS, Cargo vapour emissions which are addressed in section 9.7.7.2.2 of the EIS and Emissions from ships which is addressed in section 9.7.7.2.3 and Appendix 9.1 of the EIS.

3.19. During cargo handling operations in ports and harbours, discharges and emissions can and do occur. Handling of dry bulk cargo including coal or crushed limestone may cause the production of dust. Handling of liquid bulks may require discharge through pipelines, which provides the potential for leaks, emissions and spillages. Sources of atmospheric pollution can also stem from cargo vapour emissions.

3.20. Although discharges and emissions from dust and fumes may occur from everyday operational activities in ports and harbours, research has indicated they are unlikely to be present in sufficient concentrations to cause ecological harm if Health & Safety regulations are complied with and good operational practice adopted. This is addressed in section 9.7.2.1 and 9.7.2.2 of the EIS. From an air quality perspective the impact of dust emissions is classified as negligible to minor.

3.21. Emissions for ships using the port are addressed in section 9.7.7.3 of the EIS. A European wide study of emissions from ships engines was carried out by ENTEC consultants under the EMEP (European Monitoring and Evaluation Programme). This study included data from over 600,000 ship movements within the EU shipping area. Data from 46,000 vessels calling to 6,000 ports were included in the data set.

3.22. The ENTEC report dates from 2002, more recent data has been published by the International Transport Forum of the Organisation for Economic Co-operation and Development (OECD). This new data more accurately reflects the current shipping fleet and provides a standardised methodology for calculating emissions from ships in port. The emissions have been recalculated using this methodology and have been found to be less than those presented in the EIS. An addendum to the EIS with updated calculations has been presented to the Board.

3.23. Moving liquid and dry goods in larger vessels and reducing the time spent in port has the effect of a 30% reduction in CO_2 emissions per Tonne of goods moved.

3.24. Figure 9.7.3 (which is based on data in Appendix 9.1) provides a comparison of predicted CO_2 emissions from shipping using the port in the 'Do-nothing' and 'Do-something' scenarios.

3.25. Figure 9.7.3 also indicates the significantly greater emissions that would arise if materials were to be transported by road from Foynes, Cork or Dublin.

3.26. The provision of shoreside electricity reduces in-port emissions due to eliminating the requirement for the ship to run its engines when in port for power. This effectively eliminates emissions of NO_x, CO_2, SO_2, HC and PM at the harbour. It is not possible to implement this option until international standards are agreed on physical infrastructure. Provision is being made at the proposed development by the installation of ductwork during the construction phase to implement this service once standards are agreed.

MITIGATION MEASURES

3.27. The approach taken to mitigation on this project is based on the best practice hierarchical approach. Where possible the final design has engineered low impact solutions into the final design. The dredging operation has been designed so that discharge from the TSHD is located in a confined area and the overall lagoon construction methodology compartmentalises the emission sources. The design also incorporates lagoon covering at the earliest possible stages.

3.28. Where residual impacts remain, that cannot be prevented or reduced, remedial action is taken and these are outlined in section 9.9 of the EIS. The principal measures are outlined as follows:

Construction Site Monitoring

3.29. As outlined in Appendix 4.2 of the EIS a site dust monitoring programme will be put in place during the construction phase with secure monitoring locations to ensure compliance with dust deposition limits. There are already two monitoring points near the site, which are monitored twice yearly.

3.30. An odour management plan will also be implemented during the construction phase, using geographical data, meteorological data and site operator knowledge to mitigate potential odour issues and implement remedial action using a developed strategy. The management plan includes odour monitoring proposals, odour control mechanisms and odour complaint procedures.

Operation phase

3.31. Ship unloading will be carried out in a manner that minimises cargo spillage. To this effect all loading/unloading will be subject to appropriate operation specific control and containment protocols. Operatives will undergo training on spillage reduction measures and emergency spill containment and clean-up measures. Such training will be documented and updated on a regular basis.

3.32. The port will be equipped with infrastructure to support the installation of shore-side electricity for vessels using the port. When international service standards are finalised this will provide essential services for the vessels and eliminate the requirement for ships engines to run continuously while in port.

3.33. Many of the industries proposed for the enterprise park will require licences from the Environmental Protection Agency to operate. Where a licence is not required, the Harbour Company will require site leases to include environmental protection conditions equivalent to those required in Environmental Protection Agency licences.

3.34. Monitoring proposals for dust and odour emissions are set out in section 5.4 of the Environmental Management Framework submitted with the EIS and include a continuous monitoring programme during construction for dust and odours.

CLIMATE

3.35. The climate in the Galway area is described in section 11.2.1.1 of the EIS and can be described as mild, wet and reasonably windy due to the influence of maritime air masses sweeping in from the Atlantic.

CONSTRUCTION PHASE IMPACTS

Construction Materials

3.36. The use of concrete, aggregates and steel materials in the project will result in significant 'embedded' greenhouse gas emissions. This is a consequence of any significant construction project. The design of the development, including the passive re-use of all of the dredged material and the use of rock breakwaters as opposed to pre-fabricated concrete units minimises the use of high embedded energy materials. Alternative construction methods using virgin materials would result in a far more significant environmental footprint.

Construction Machinery and Traffic

3.3. The quantities of construction machinery are set out in Chapter 4 of the EIS, Description of the Proposed Development. As is evidenced from there, the quantity of machinery proposed is of a modest scale for an infrastructural development such as this. The construction methods outlined in Chapter 4 are phased and designed to minimise the use of heavy machinery and consequently minimise greenhouse gas emissions during the construction phase.

Dredging activities

3.4. With regard to greenhouse gas emissions the dredging activity will result in CO_2 emissions from the equipment used for dredging and a limited release of CH_4 from the dredged material. With regard to the dredging equipment, such equipment is subject to several EU Directives on fuel use and emissions to minimise environmental impact. The European Dredgers Association, to which the majority of contractors are affiliated have a position paper on reduction of greenhouse gasses by introduction of fuel efficient vessels and methods to their operations.

Operational Phase Impacts

3.6. As outlined in Chapter 9, the transport of freight by sea has a significantly lower carbon footprint than other means. When aligned with the rail proposal at the new port, the overall proposal will significantly reduce CO_2 emissions from current levels. In line with CO_2 emissions other airborne pollutants will also reduce and the overall climatic impact of the proposed development is positive.

Carbon Dioxide Emissions

3.7. The quantity of CO_2 emitted from port operations has been outlined in Chapter 9 Air Quality. By utilising a regional port and transporting goods by sea to the region, the carbon footprint of those goods is considerably reduced. As outlined in Chapter 9, in the Do-Nothing Scenario, the alternative transportation of goods by road from Foynes, Cork or Dublin would result in significantly higher CO_2 emissions. Figure 9.7.3 clearly illustrates the difference in transporting goods by road from an alternative port and the shipping scenarios.

3.8. Putting the CO_2 emissions from Galway Port extension into context, Ireland's total CO2 emissions are in the region of 55,000,000 to 60,000,000 Tonnes/annum. The projected emissions from ships in Galway port is 3,000 to 4,000 Tonnes per annum. The use of larger vessels with 24 hour access has the effect of reducing CO_2 emissions by 30% per Tonne of goods through the port.

Microclimate

3.9. The development is not of a scale to influence the global climate. Due to the design, scale and location of the development there is however an opportunity to create a significantly positive microclimate close to the heart of the city. Details of the landscaping and amenity features are described in Chapter 12.

Microclimate Impacts

3.10. The introduction of the development at the mouth of the River Corrib has the potential to create a small microclimate in the immediate area of the development. The most significant change will be the replacement of a section of the water body with a developed area. This area has the potential to develop local heat changes. The land area reclaimed from the sea will result in the generation of wind thermals and updrafts, similar to those occurring along the north shore of Galway Bay, along the promenade at Salthill and the causeway to Mutton Island. These updrafts are a useful benefit to seabirds using the area.

SUBMISSIONS AND RESPONSES

3.11. I now wish to deal with the issues raised in observations submitted to An Bord Pleanála by various parties in relation to the potential impact of the project. I have considered all submissions. I note in particular the submissions of the Statutory Consultees and where specific climate and air quality related issues were raised in submissions, I address these in the context of the relevant submission.

SUBMISSIONS RELATING TO CLIMATE CHANGE

Response:

3.12. The issue of sea level rises due to Global Warming has been addressed by my colleage Dr. Tony Cawley in Chapter 8 of the EIS. The scale of the proposed development is such that no direct impact on the climate is likely to occur. A regional port with 24 hour marine access and both rail and road links to the region has the potential to significantly reduce national CO_2 emissions in the longer term.

SUBMISSION FROM: THE HEALTH SERVICE EXECUTIVE

3.13. The Health Service Executive state: '**Air Quality and Dust** – *In light of complaints received in relation to the scrap metal operation, the possible impacts to moving this operation to the new development has not been fully considered as of yet e.g. will wind blow dust adversly affect new populations. It is stated however that 'Many of the industries proposed for the* *enterprise park will require licences from the Environmental Protection Agency to operate. Where a licence is not required the Harbour Company will require site leases to include environmental protection conditions equivalent to those required in Environmental Protection Agency licences' These environmental protection conditions must be assessed independently by the local authority and the HSE'*

Response:

3.14. The relocation of the shipping activity to the Harbour Extension will eliminate any issues arising from carrying out this activity in the current Dock area. This bulk cargo loading takes place approximately 80m from the Cé na Mara apartments and 100m Dún Aengus apartments.

3.15. As outlined in section 9.7.3 of the EIS (in relation to construction dust) large dust particles settle out of the atmosphere relatively quickly (within 100m). With prevailing winds this dust will fall on the proposed development. The majority of the dust arising from bulk loading cargos is large heavy particulate. The separation distances to 'new population' sensitive areas is set out in Table 9.4.1 of the EIS, the closest property is over 1 kilometre from the proposed dock area. The potential impact of fugitive dust from bulk cargo activity at any sensitive location is therefore Negligable.

3.16. In the event that the Bórd decides to grant planning permission for this development, it is anticipated that any such grant will be subject to overall site environmental control conditions. Recent decisions by an Bórd Pleanála tend to include environmental protection conditions equivalent to those required in Environmental Protection Agency. Any such conditions will be included in leases on the Enterprise Park leases.

SUBMISSION FROM: AN TAISCE

3.17. An Taisce state: '*Chapter 11 of the EIS purports to deal with climate. It fails, entirely to do so and does not address the increased trade and shipping tonnages the project would generate'*

Response:

3.18. Chapter 11 deals with the potential climatic impacts arising from the proposed development. In the chapter we clearly set out that the scale of the proposed development is such that no significant impact on the climate is likely to occur. Any potential impact of the project on the climate is most likely to arise in the context of CO_2 emissions and these are quantified in Chapter 9 – Air Quality.

3.19. Figure 9.7.2 shows the relative CO_2 emission from various forms of goods transport. The use of larger vessels will reduce the CO_2/Tonne by 30% for all goods going through the port. As stated in section 9.7.7.3.2 of the EIS – To move an equivalent quantity of materials by road would generate a multiple of the emissions generated by moving the same quantity by sea. Figure 9.7.3 illustrates the difference in emissions using alternative transport modes.

3.20. A regional port with 24 hour marine access and both rail and road links to the region has the potential to significantly reduce national CO_2 emissions in the longer term.

3.21. The calculations used in Appendix 9.1 and Figure 9.7.3 of the EIS show the emissions likely to arise from the 'Low', 'Medium' and 'High' growth scenarios set out in Chapter 2 of the EIS. The calculations are based on the latest OECD dataset and and take into consideration the increased shipping tonnages in the event of the proposed development being granted permission.

CONCLUSIONS

3.22. The overall impact of the proposal will be to retain the Good air quality status in the Galway Bay area. There will be a decrease in air emissions per Tonne of goods transported at the new harbour area due to the use of larger more efficient vessels and reduced turnaround capability. Future shipping traffic will be of shorter duration as docking, entering and leaving the port will be quicker and fewer vessels will be required for the same throughput of cargo.

3.23. Air pollutants from the proposed development are within the levels set by European air quality guidelines as transposed into Irish law and no deterioration in air quality is anticipated, even in the long term high growth scenario. Significant mitigation measures will be employed during the construction phase to avoid potential impacts to air quality.

3.24. The scale of the proposed development is such that no significant impact on the climate is likely to occur. There are however activities in the construction and operational phases that will give rise to limited quantities of greenhouse gas emissions.

3.25. The option of having a regional port with 24 hour marine access and both rail and road links to the region has the potential to significantly reduce national CO_2 emissions in the longer term.