Addendum II to Environmental Impact Statement

Proposed Composting/Biogas Facility at Durnish, Foynes, County Limerick

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DOCUMENT DETAILS

Client:	Greenport Environmental Ltd.
Project title:	Greenport Foynes Composting/Biogas Facility EIS
Project Number:	080907
Document Title:	Addendum II to Environmental Impact Statement
Doc. File Name:	080907 – 2010.03.25 – F
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Document Issue:

Rev	Status	Issue Date	Document File Name	Author(s)	Approved By:
01	Final	2010.03.25	080907 – EIS Addendum II – 2010.03.25 - F	LM	BK

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1 INTRODUCTION

Greenport Environmental Ltd. proposes to construct a fully enclosed anaerobic digestion and in-vessel composting facility, capable of receiving up to 50,000 tonnes of organic waste per annum, at Durnish, Foynes, Co. Limerick. McCarthy Keville O'Sullivan Ltd. were appointed as Environmental Consultants on this project in 2008, and commissioned to complete an Environmental Impact Assessment (EIA) and prepare an Environmental Impact Statement (EIS). The planning application and accompanying EIS were submitted to Limerick County Council in 2009. Planning permission was granted by for the facility in late 2009 (Planning Reference No. 09/737). The application is currently at appeal stage and is due to be decided by An Bord Pleanála in April 2010.

A Waste Licence application for the proposed facility was submitted to the Environmental Protection Agency (EPA) by Greenport Environmental Ltd. in August 2009 (Licence Application No. W0271-01). A request for further information was subsequently issued by the EPA, with regards to information required under Article 12 and Article 13 of the Waste Management (Licensing) Regulations.

The information required for compliance with Article 12 of the Waste Management (Licensing) Regulations has been submitted to the EPA by Greenport Environmental. Fourteen points of information were required for compliance with Article 13 of the Regulations. Eleven of these 14 points have been addressed in Addendum I to the Environmental Impact Statement, which was submitted to the EPA in March 2010. Addendum I stated that the remaining three points of information, all of which relate to the Air Quality, Noise & Climate chapter of the EIS, would be set out in a second Addendum, also to be submitted to the EPA in March 2010. This report comprises the second Addendum to the EIS.

The further information request issued by the EPA also stated:

> *"Your reply to this notice should include a revised non-technical summary (Application Form and EIS) which reflects the information you supply in compliance with the notice, insofar as that information impinges on the non-technical summary."*

The revised non-technical summary of the EIS is submitted as part of this Addendum.

2 ARTICLE 13 COMPLIANCE REQUIREMENTS

2.1 Further Information Request

The 14 points of information required by the EPA under Article 13 Compliance as part of Waste Licence Application W0271-01 are set out below. All points, with the exception of Points No. 9, 12 and 14, were addressed in Addendum I to the EIS. Points No. 9, 12 and 14 are now addressed in this Addendum II to the EIS.

1. Quantify the amount of biogas to be stored and used per annum at the facility.

2. Give details of types and quantities of waste and compost product to be produced from the process per annum including hazardous classification.

3. Give details of waste storage facilities (if any) and final disposal/recovery locations for wastes.

4. Give details of the combined heat and power (CHP) plant including thermal input rating, combustion mechanism (i.e. turbine, generator), stack height and emission characteristics.

5. Give details of the flare and standby boiler.

6. Discuss the risks and preventative measures association with gas storage on-site and include the risks of a major accident from nearby Seveso site.

7. Give details of consideration of alternatives (location, process, scale, do nothing).

8. Give details of light/lux levels and their significance in relation to ecological disturbance.

9. Give details of impact on air quality from the combustion plant emissions.

10. Give details of foul sewer works to which the sanitary effluent from the proposed facility is to be discharged. Include Section 4 licence and comment on whether the discharge has agreement from the owner of the system and whether the discharge limits from the works will continue to be observed.

11. Give details of the number of air changes proposed for the facility.

12. Give details of the source of information for the 'odour emission levels' and reconcile the comments made with regard to odour emission levels derivation as described on 8-18, Table 8.17 and again on 8-19. Give details of the height at which emissions occur above ground level. Provide the full odour modelling study including model results in graphical format.

13. Provide plan identifying all emission points.

14. Predict the noise impact from operating the facility. Identify the main outdoor stationary noise sources and the measures taken to reduce their impact. Give

details in relation to building materials with regard to reducing noise emissions.

2.2 Further Information Response

The response to Points No. 9, 12 and 14 of the EPA request for further information is set out in this section of the Addendum. These points of information relate to the Air Quality, Noise & Climate chapter of the EIS, which was prepared by Byrne Environmental Consulting Ltd. Byrne Environmental has also prepared the response to these points of the further information request. The relevant appendices are referenced where required.

Point No. 9. Give details of the impact on air quality from the combustion plant emissions.

Combustion gas emissions shall be generated by the operation of the Guascor gas engine co-generation unit (Ref. A2-2), the CHP Unit (Ref. A2-3) and the CHP Bypass Unit (Ref. A2-5). The principal emissions to atmospheres from the operation of these units shall be NO_x, CO, SO_2 and NMHC (Non-methane Hydrocarbons) and TOC (Total Organic Carbons). Maximum emission limit values of these substances have been specified by the manufacturers of each item of plant.

In order to assess the impact of the operation of the individual items of plant, a computer based air dispersion modeling study was conducted to model and mathematically predict combustion gas emissions from the exhaust stacks based on the operating specifications of the three items of plant and to assess these emissions as ground level concentrations expressed as micrograms per cubic metre to allow for direct comparison with National Air Quality Standard Limit Values for the modeled parameters.

The model chosen for this study was the *Breeze Screen3 Version 2.04* which is an EPA-approved air dispersion model used to analyse single-source release scenarios in simple or complex terrain. *SCREEN3* enables users to prepare an initial screening analysis to establish a conservative or worst-case estimate of short-term air quality impacts from a specific source. If predicted screening concentrations are under the level of concern as specified in National Air Quality Standards, generally no further analysis is required. In general SCREEN models are used to predict maximum 1hour maximum ground level concentrations of modeled substances.

Tables 1 to 3 below summarise the results of the *SCREEN3* modelling study and the model outputs of which are presented in Appendices 1, 2 and 3 of this report. The predicted maximum 1-hour values of each substance modeled are compared against the limit values for each substance as specified in *Air Quality Standards Regulations 2002, S.I. No. 271 of 2002*.

The results of the *SCREEN3* Air Dispersion Modelling Study indicates that even under maximum emission scenarios, emissions from the subject plant's exhaust stacks will not exceed the specified and relevant *Air Quality Standards Regulations 2002, S.I. No. 271 of 2002* and that local ambient air quality will not be adversely impacted by the operation of the items of combustion plant.

Table 1 Results of SCREEN3 Air Dispersion Modelling Study: Point A2-2

Parameter	Maximum 1-hour Ground Level Concentration (μg/m³)	S.I. No. 271 of 2002 Limit Values (μg/m³)
Sulphur Dioxide	113	350 (99.7%ile, 1 hr)
Nitrogen Oxides	170	200 (99.8%ile, 1 hr)
Carbon Monoxide	113	1-hr limit Not specified
Non Methane Hydro Carbons	113	1-hr limit Not specified

Table 2 Results of SCREEN3 Air Dispersion Modelling Study: Point A2-3

Parameter	Maximum 1-hour Ground Level Concentration (μg/m³)	S.I. No. 271 of 2002 Limit Values (μg/m³)
Sulphur Dioxide	84	350 (99.7%ile, 1 hr)
Nitrogen Oxides	148	200 (99.8%ile, 1 hr)
Carbon Monoxide	176	1-hr limit Not specified
Non Methane Hydro Carbons	84	1-hr limit Not specified

Table 3 Results of SCREEN3 Air Dispersion Modelling Study: Point A2-5

Parameter	Maximum 1-hour Ground Level Concentration (μg/m³)	S.I. No. 271 of 2002 Limit Values (μg/m³)
TOC	2	1-hr limit Not specified
Nitrogen Oxides	165	200 (99.8%ile, 1 hr)
Carbon Monoxide	6	1-hr limit Not specified

Point No. 12. Give details of the source of information for the 'odour emission levels' and reconcile the comments made with regard to odour emission levels derivation as described on 8-18, Table 8.17 and again on 8-19. Give details of the height at which emissions occur above ground level. Provide the full odour modelling study including model results in graphical format.

Odour emission levels contained within Table 8.7 of the EIS were obtained from a typical operating scenario for a biofilter system operating within a composting facility. Predicted odour levels at the closest receptors were determined by reverse modeling to estimate the maximum odour emissions which can be permitted from a site in order to minimise the potential for odour complaints.

Up-to-date information has been provided by the biofilter supplier (Waste Treatment Technologies) on the odour emission concentration that the biofilter unit shall achieve. Waste Treatment Technologies state that Odour emissions of their biofilter shall achieve <500 OU/m^3 which is in compliance with Section 5.4.8.5(e) of TA Luft.

In summary, the maximum predicted Odour emission rate from the biofilter system shall be <500 OU/m^3 .

In order to verify the guaranteed performance of the biofilter system once operational, it is proposed that the performance of the Biofilter shall be assessed and verified by conducting an Odour monitoring survey at the biofilter and at a downwind location equivalent to the distance from the biofilter to the closest receptor (450m) to the site.

The height of the biofilter is specified as 1.8 metres above ground.

Based on revised data from Waste Treatment Technologies a SCREEN 3 air model has been conducted to determine the ground level impact of biofilter emissions expressed as OU/m^3 at the closest receptor to the site and at discrete 50m distances from the site between 50m and 1000m. The results of the model output data are presented in Table 4 below and in Appendix 4 of this report. Local ambient air quality will therefore not be adversely impacted by odour from the proposed facility.

Table 4a Results of SCREEN3 Air Dispersion Modelling Study: Biofilter

Closest Receptor	Maximum 1-hour Ground Level Concentration (OU/m^3)
450m from site	0.55

Table 4b SCREEN3 Air Dispersion Modelling Study: Biofilter Input Data

Closest Receptor	Maximum 1-hour Ground Level Concentration (OU/m^3)
Max Odour Emission	500 OU/m^3
Exit Fan Flow Velocity	55,000 m^3/hr x 2 fans = 30.6 m^3/sec
Release Height	1.8m above ground level
Exit Temp	70°C

Additional odour control will be ensured as a result of the exhaust air exiting the composting tunnels which will be conveyed initially to a sulphuric acid scrubber to neutralise any basic gases including Ammonia (NH3) prior to discharge to the humidifier.

It is significant to reiterate that the closest receptors to the site are located in an upwind direction relative the site and that the windrose for Shannon as presented in Figure 8.6 of the EIS indicates that the prevailing wind direction in the Shannon area is from the southwest and blows northeast across the proposed development site.

Point No. 14. Predict the noise impact from operating the facility. Identify the main outdoor stationary noise sources and the measures taken to reduce their impact. Give details in relation to the building materials with regard to reducing noise emissions.

The predicted maximum noise levels that will be experienced at the nearest residences as a result of the operation of the principal sources of outdoor noise at the site have been predicted using the activity L_{Aeq} method outlined in *BS 5228: Part 1: Noise and vibration control on construction and open sites*. The sound pressure levels measured at a reference distance of 10 metres for the individual items of plant to be used on-site are presented in Table 5 below together with the maximum predicted value at the closest receptor to the site. Details of noise prediction calculations are detailed in Appendix 5 of this report.

Table 5 Noise Levels Associated with Outdoor Plant

Plant Item	Reference	SPL @ 10m dB(A)	Predicted noise level at receptor 450m from site LAeq, 1hr dB(A)
Enclosed CHP Unit	A2-2	65	38
Enclosed CHP Unit	A2-3	65	
C-Deg HTC Unit	A2-5	66	
HGV Movement	na	77	

To assess the worst-case maximum noise impacts that the operation of the outdoor items of plant as detailed above in Table 5 may have on the closest receptors to the site, the closest distances between the site boundary and the noise sensitive locations have been used in the noise prediction calculations. The use of the closest distances from source to receptor ensures a worst-case scenario is considered.

The maximum predicted value at the closest receptor which is located approximately 450 metres from the site has been calculated to be 38 dB(A) $L_{Aeq, 1hr.}$

The existing baseline noise level previously measured at the receptor located approximately 450 metres to the south of the subject site is 63 dB(A) $L_{Aeq, 1hr.}$

It is concluded that the noise impact of the proposed development will not increase the existing ambient noise level at the closest receptors to the subject site.

Section 8.5.4 of the Environmental Impact Statement set out the mitigation measures that would be implemented at the proposed facility in order to ensure there would be no adverse impacts associated with noise. These measures included the following:

- Where practicable, principal external plant, including the Biofilter, with the potential to generate noise, shall be located on the northern façade of the facility building which shall result in the screening of the noise from the closest receptors to the facility which are located to the south of the facility at a distance of approximately 580 metres.

- All composting activities, from material delivery through to the production of the final compost product, shall occur within the facility building.
- The design of the facility will require that external doors remain closed when not in use.

- The use of vehicle horns will be discouraged during the daytime period and will be banned during the early morning periods before 09:00hrs.
- A ten-kilometre per hour speed limit will apply onsite.
- All site machinery will be shut down when not in use.
- A Noise Complaint Log will be maintained at the facility.
- Low noise level reverse warning alarms consistent with site safety requirements will be utilised.
- It is proposed that an annual noise monitoring survey is conducted at the site to assess compliance with recommended daytime and noise limit values and to assess the impact of the development according to *BS4142* to ensure that site operations do not cause nuisance at the closest Noise Sensitive Receptors. Noise monitoring will be conducted to the requirements of the EPA, as specified in any Waste Licence granted to the facility.

Further measures proposed to reduce noise from stationary external sources include:

- Both CHP units will be enclosed within dedicated containers to minimise noise emissions, and will be spring-mounted to minimise vibration.
- The HTC unit (flare) will be an enclosed unit.
- All three units (CHP and HTC) will be located within a compound with a six-metre high concrete wall, which will provide an additional noise barrier.
- The units will be located to the back of the site, in a location as far as possible from noise sensitive locations.

With regards to building materials, the main process area (in-vessel tunnels) will be cast in concrete with a central hall within a fully enclosed building, which will ensure noise emissions from these areas are minimal. The following measures are also proposed:

- The boiler unit will be located within a fully enclosed room within the building.
- The loading and unloading areas will be enclosed to minimise noise emissions during these operations.
- Where required, additional cladding can be provided if necessary to ensure that emission levels at noise sensitive locations are not exceeded. An example specification for this material is set out in the Kingspan 2005 Acoustic Performance Guide for Insulated Roof, Wall & Façade Systems. Based on the current and predicted background noise levels however, it is anticipated that this will not be required.

3 REVISED NON-TECHNICAL SUMMARY

The further information request issued to Greenport Environmental Ltd. by the EPA states:

> *"Your reply to this notice should include a revised non-technical summary (Application Form and EIS) which reflects the information you supply in compliance with the notice, insofar as that information impinges on the non-technical summary."*

The revised non-technical summary, which incorporates the further information that has been submitted to the EPA, is set out in this section of the Addendum to the EIS. Revisions have been made to Sections 3, 7 and 8 only of the non-technical summary. The remaining sections are unchanged from the original EIS.

1. Introduction

Greenport Environmental Ltd. proposes to construct a fully enclosed anaerobic digestion and in-vessel composting facility, capable of receiving up to 50,000 tonnes of organic waste per annum, at Durnish, Foynes, Co. Limerick. McCarthy Keville O'Sullivan Ltd. were appointed as Environmental Consultants on this project and commissioned to complete an Environmental Impact Assessment (EIA) and prepare an Environmental Impact Statement (EIS).

The site of the proposed development occupies 17.24 acres within the Shannon Foynes Port Area, on the southern side of the Shannon Estuary, Co. Limerick. Foynes town centre is located approximately one kilometre southwest of the site, while Limerick City lies approximately 30 kilometres to the east. The site of the proposed development currently comprises a vacant warehouse and external concrete surfaced yard. The proposed facility, which will be fully enclosed, will be constructed within the existing warehouse and in an extension to this building, to be constructed in the yard.

Given the anticipated efficiency of the proposed facility, which will incorporate the use of the Best Available Technology (BAT), it is envisaged that the plant may be capable of processing up to 50,000 tonnes of material per annum. Initially however, the facility will treat 40,000 tonnes of organic waste per annum. This material will comprise source-separated organic waste (household brown bin waste) and mechanically separated organic fines from mixed municipal solid waste. Each of the waste streams will be separately processed at all stages. As the source-separated collection of organic waste increases, the facility will dedicate more capacity to the separate treatment of this material.

The EU Landfill Directive (1999/31/EC), which was introduced in 1999, imposes restrictions on the consignment of certain waste materials to landfill, including a gradual reduction in the quantity of biodegradable municipal waste that may be deposited in landfill sites. Ireland is currently behind schedule on meeting these targets despite receiving a derogation from the EU for the initial targets. Failure to meet the target for 2010 and the subsequent targets will result in significant fines being imposed on the Irish Government. The most recently published Environmental Protection Agency (EPA) National Waste Report identifies as a priority action for 2009 the provision of adequate infrastructure to treat the very large amounts of organic (particularly food) waste that must be collected separately and diverted from landfill.

The purpose of this EIS is to document the current state of the environment in the vicinity of the proposed development site in an effort to quantify the possible effects, if any, of the proposed development on the environment. The assessment process that led to the compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from any negative impacts of the proposed development.

This EIS uses the grouped structure method to describe the existing environment, the potential impacts of the proposed development thereon and the proposed mitigation measures. Background information relating to the proposed development, scoping and consultation undertaken and a description of the proposed development are presented in separate sections. The grouped format sections describe the impacts of the proposed development in terms of human beings, flora and fauna, soils and geology, water, air, noise and climate, landscape, cultural heritage and material assets such as drainage, site services, traffic and transportation, along with the interaction of the foregoing.

2. Background to the Proposed Development

The site of the proposed development is accessed via the internal roadways of the Shannon Foynes Port Area, which is in turn accessed from two separate junctions with the N69 Limerick to Tralee National Secondary Route. Existing land-uses adjoining the site are industrial and commercial, including dusty coal/clinker storage (outdoors), engineering companies and other warehousing. Aughinish Alumina Refinery is located approximately 2.4 kilometres northeast of the proposed development site, on Aughinish Island. With regards to the wider landscape, agriculture is the dominant land-use within the Shannon estuary lowlands of Limerick and Clare.

The lands to the east of the proposed development site are generally flat, while more hilly topography is found to the west and the south. The River Shannon flows from east to west directly north of the site. The site of the proposed development lies in proximity to the Lower River Shannon Special Area of Conservation (SAC) and Natural Heritage Area (NHA) and the River Shannon and River Fergus Estuaries Special Protection Area (SPA).

A planning application was submitted by Greenport Environmental Ltd. to Limerick Co. Council in August 2008 for permission for change of use of the existing warehouse on the site of the proposed development to an in-vessel composting facility and the removal of an existing open-ended lean-to (Planning Reference No. 08/1633). Planning permission was granted for the change of use in March 2009.

This chapter of the EIS sets out the strategic and statutory planning context for the proposed composting facility at Foynes. It examines the regional and local planning policy context established by the Mid Western Regional Planning Guidelines 2004, the Limerick/Clare/Kerry Regional Waste Management Plan, and the Limerick County Development Plan 2005 – 2011. It also presents the national policies and targets established by the Department of the Environment, Heritage and Local Government with regards to biological treatment of municipal solid waste (MSW) and the diversion of biodegradable municipal waste (BMW) from landfill.

Scoping is the process of determining the content, depth and extent of topics to be covered in the information to be submitted to the competent authority for projects that are subject to an EIA. In carrying out this EIA, a scoping document was issued by McCarthy Keville O'Sullivan Ltd. to the relevant authorities and non-Governmental

Organisations (NGOs) with interest in the specific aspects of the environment likely to be affected by the proposal. Responses were received from the Department of the Environment, Heritage and Local Government, An Taisce, Limerick Co. Council and the National Roads Authority. The recommendations made by consultees have informed the EIA process and the contents of the EIS.

3. Description of Proposed Operations

Greenport Environmental Ltd. proposes to construct a fully enclosed in-vessel composting and biogas facility, capable of treating up to 50,000 tonnes of organic waste per annum. The incoming waste streams to be treated at the facility will comprise:

- Approximately 20,000 tonnes per annum of mechanically separated organic feedstock.
- Approximately 20,000 tonnes per annum of source-separated organic feedstock.

These quantities are estimates based on the successful rollout of source-separated brown bin collections to domestic and commercial customers in urban areas, in line with the *'National Strategy on Biodegradable Waste'*. Each of the waste streams will be separately processed at all stages. As source-separated collection of organic feedstock increases, the quantity of mechanically separated feedstock is expected to decline. The facility will then dedicate more capacity to the separate treatment of the source-separated material. It is anticipated that the facility will be capable of generating and using 3,500,000 to 5,256,000 m^3 of biogas per annum.

The biological treatment of organic waste encompasses two types of microbiological processes: composting and biogasing or anaerobic digestion. The main end-products of composting consist of a stabilised, odourless organic material (compost), carbon dioxide and water. During the process, the energy stored in biomass is converted to heat. This heat production causes the evaporation of the water that is present in the biomass and produced during the composting process. During anaerobic digestion the energy that is stored in the biomass is converted to methane. Methane can be harnessed for generation of energy that can be used elsewhere for electricity/heat generation.

The existing warehouse occupies 4,554.5 square metres (including two floors of office space). The proposed extension will measure 6,079.65 square metres. The proposed storage areas will measure 2,640.60 square metres. The overall site area occupies 3.424 hectares or 34,240 square metres.

Incoming material will be delivered to the reception area within the facility. It will be thoroughly homogenised, and then transferred immediately into one of the processing tunnels. There will be no long-term storage of waste on-site. All material will undergo an extensive screening process in order to separate the composted products from non-compostable residues.

The feedstock will first be treated in a Dry Anaerobic Digestion tunnel system in order to produce electric energy. The material will be removed from the first stage vessel, mixed with a fraction of incoming fresh material and processed through the aerobic vessel composting and drying system. Retention time will be in the range of two to three weeks. The composted product will be treated into a refining system where three fractions shall be separated:

- Compost product from source separated commercial and domestic biodegradable waste (brown bin waste).
- Stabilised biowaste from mechanically separated commercial and domestic biodegradable waste.
- Oversized residual materials of > 12mm in size separated from the compost products in the screening plant.

The composted products will therefore comprise of two different grades of material. Compost generated from source separated organic waste will be destined for the compost market and will be suitable primarily for agricultural and horticultural (e.g.gardening) uses as approved by the Department of Agriculture, Fisheries and Food. Composted material generated from the mechanically separated organic waste will meet the EPA requirements for stability and will be ABP approved. As verified by the EPA, this material will be suitable for engineering use in landfills and potentially for other land remediation. EPA approval for use of all locations will be sought in advance by Greenport Environmental.

Non-compostable residues screened from the compost material will be collected and disposed of at a pre-approved landfill by Greenport Envionrmental's parent company, Mr. Binman Ltd., a permitted waste management company.

The composting process will continue 24 hours per day, 365 days per year, but material will only be accepted at the facility during the hours of 7:30am – 6:00pm, six days a week. The majority of incoming waste will be sourced from the Mr. Binman Ltd. waste transfer station and recycling centre in Luddenmore, Grange, County Limerick.

Negative pressure will be created within the facility to ensure odorous and polluted air is treated in this system without escaping uncontrolled from the plant. All air within the building will also flow through the humidifier and biofilter abatement system prior to discharge. The air extraction system is designed with sufficient air changes to protect employees. Having considered best practice for waste facilities the number of air changes proposed for the facility will be at least three air changes per hour.

A site-specific Health and Safety Plan for the proposed composting facility is currently being prepared. All site staff will be made aware of and adhere to the company Health and Safety Plan. A Pest Control Plan for the site of the proposed development has been prepared by Curtin Pest Control.

The existing water supply to the site is via the Foynes Harbour Water Supply Scheme. The fire water supply is taken from the Foynes Harbour Fire Supply. The potable water supply is taken from the Limerick County Council Foynes water supply scheme, which is supplied from the Shannon Estuary Water Supply scheme whose source is the River Deel at Askeaton.

With regards to surface water run-off, external surface areas within the site will be limited to the perimeter of the building to allow access and egress for vehicles, thereby limiting the volume of run-off. Surface water run-off from external surfaced areas will discharge via a Class 1 hydrocarbon interceptor to the watercourse on the eastern boundary of the site. The Shannon Estuary will be the final receiving water for external surface water run-off from the site.

All process operations associated with the proposed composting and biogas facility will take place indoors on an impermeable surface. All process wastewater generated will be contained in bunded storage tanks and re-used within the process and additional water is required to optimise the process operation. There will therefore be no process wastewater discharges off-site to ground or surface water. If in the event that wastewater is required to be sent for off-site disposal, it will be collected and transported to a pre-approved wastewater treatment facility by Mr. Binman Ltd., a permitted waste management company.

Toilets are available onsite within the existing warehouse building, from which wastewater currently discharges to an onsite septic tank. A suitably sized 'Puraflow' or equivalent mechanical treatment unit will be installed onsite to replace this septic tank. The foul sewer to which the treated effluent from the facility will discharge is a 225 mm diameter sewer and currently takes treated effluent from other industrial development in the area. . It was verified that the sewer, as installed, has adequate capacity to cater for the additional flows to contribute from the Greenport facility, and agreement to discharge was received from the owner of the system subject to terms agreed including continuing to observe the discharge limits.

The proposed development site is supplied by the ESB network. The design, construction and installation of the electrical system equipment within the proposed facility will be in accordance with International Electro-technical Commission (IEC) regulations and shall comply to all applicable Community and national regulations. A lighting plan for the proposed development site has been prepared, and shows that there will be no light spill outside the proposed development site. It was concluded in the Appropriate Assessment of the proposed development that the lighting associated with the proposed development will be focused internally onto the site and away from areas of ecological sensitivity and will therefore not affect the adjacent designated sites.

Planning permission has been obtained by Greenport Environmental Ltd. from Limerick County Council for the change of use of the existing onsite warehouse from a timber frame construction facility to an in-vessel 10,000 tonne per annum composting facility and the removal of an open-ended lean-to (Planning Reference No. 08/1633). The demolition of the lean-to will take place prior to the construction of the proposed composting facility. All materials will be retained on site for future internal building works and repairs. It has been confirmed that this structure was not constructed using asbestos containing materials. The proposed composting and biogas facility will be constructed in one phase. It is anticipated that the duration of the construction phase will be approximately six months.

4. Human Beings

This section of the Environmental Impact Statement (EIS) discusses the key issues affecting human beings and the potential impacts of the proposed development on them. The key issues assessed in this section of the EIS include population, community and employment, health and safety, land-use, and tourism. Information regarding human beings and general socio-economic data were sourced from the Central Statistics Office, the Limerick County Development Plan 2005-2011 and the Limerick City Development Plan 2004-2010.

In order to make inferences about the population and other statistics in the vicinity of the proposed mixed development, the study area was defined in terms of the Electoral Divisions (EDs). The development lies within the Shanagolden Electoral Division area and is surrounded by four other EDs: Aughinish, Craggs, Loghill and

Shanid. These five EDs make up the Study Area for this section of the EIS. The dominant land use in the area is pastoral agriculture, with 82.8% of land within the Study Area being farmed, according to the 2000 Census of Agriculture.

The northwestern half of the Aughinish ED and the northeastern section of the Shanagolden ED are dominated by areas of industrial influence. While these particular areas of the EDs are under development pressure, the remainder of the study area is rural in nature, with agriculture being the predominant land-use. The vast majority of the study area is outside of settlement centres and is not subject to development pressure as would be expected on the urban fringe of Limerick City, although there has been a significant increase in the number of one-off houses being built in rural parts of the county in recent years.

Although land-use in the study area is primarily agricultural, the land-use in the immediate vicinity of the proposed development to the north, south and west is made up of heavy industry and indeed the site of the proposed development is an industrious site that is not currently in use. The area of land to the east of the site is owned by Irish Cement, but has not been developed for industrial purposes to date. The highly industrious area of Aughinish Alumina is located further to the east.

New developments help to sustain employment in the construction trade. The construction works for the construction of the extension and the refit of the existing warehouse will be put to tender, which will allow local firms to bid for the works. Concrete will be sourced locally, subject to price agreement. The proposed development will therefore have a direct positive impact on the local employment.

A site-specific Health and Safety Plan for the proposed composting facility is currently being prepared. All site staff will be made aware of and adhere to the company Health and Safety Plan. The proposed facility will incorporate the use of Best Available Technology and has been designed to ensure that there will be no negative impacts on human beings resulting from emissions to air, ground or water. These detailed design measures are described in Chapters 3 (Description of the Proposed Development), 7 (Hydrology and Hydrogeology) and 8 (Air Quality, Climate and Noise) of the EIS.

5. Flora and Fauna

This section of the EIS was compiled following a site visit carried out during November 2008 and a desk study of literature pertinent to the site. During fieldwork, flora and fauna were surveyed through direct observation and the recording of signs or calls of birds and mammal species. Habitat suitability was also assessed for the likely occurrence of other species, which would not be present due to seasonal factors. The literature review included the synopses of sites designated for their conservation importance, as compiled by the National Parks and Wildlife Service (NPWS), bird and plant distribution atlases and other research publications

The site of the proposed development is situated just over 100 metres south of the Lower River Shannon Special Area of Conservation (SAC), the River Shannon & River Fergus Estuaries SPA (Special Protection Area) and the Inner Shannon Estuary – South Shore proposed Natural Heritage Area (pNHA.)

The habitats recorded on or adjacent to the site of the proposed development include treelines, buildings and artificial surfaces, recolonising bare ground and flower beds and borders. None of the habitats are in their natural state, having been altered or created by industrial activity. The site has not been managed in some time and

coloniser plants have become established on areas that were formerly hard-standing. The treelines on site add little habitat diversity, since they are composed of non-native species or are in poor condition. Overall the character of the site is one of abandoned industry.

None of the species that were recorded on the site visit are considered to be of conservation importance. The bird species recorded onsite were typical of the habitat types found on the site, built up areas, treelines and adjacent agricultural land. The only Mammal that was directly observed within the site during the visit was Irish Hare (*Lepus timidus hibernicus*). A group of four Leverets were observed on several occasions on the site. In addition an abundance of Hare droppings was recorded. Badger (*Meles meles*) faeces and scuffle marks were recorded in several locations in the eastern section of the site. There was, however, no evidence of Badger habitation, and indeed the ground conditions were very unsuitable for burrowing on the site. A single fox (*Vulpes vulpes*) dropping was recorded on the track between the two arable fields.

Given the nature of the site and its habitats, the associated fauna would be expected to be of low ecological significance. Although evidence of Badger and Irish Hare was recorded on site, the site itself is not expected to support these species during the breeding season and these mammals are thought to be occasional visitors to the site.

Areas of habitat within the footprint of the proposed development include buildings & artificial surfaces and recolonising bare ground. The proposed development will result in the permanent loss of these habitats within the construction footprint. These habitats are of low ecological significance and the resultant impact is considered to be slight.

The use of vehicles on the construction site gives the potential for the spillage of fuel and oil on the site either from leaks from vehicles or fuel tanks or spillages. These substances may leach down into the soil, subsoil and groundwater and eventually contaminate surface waters. In order to prevent such negative impacts, all machinery used during the construction works will be checked and maintained to avoid leaks of fuel, lubricants etc. Best practice for machinery management on construction sites will be adopted.

A concrete hard standing surrounds the entire building and the extension will be laid on existing hard standing area. Class 1 oil interceptors will be installed on the storm water lines servicing these hard standing areas in the initial stage of the project to ensure the construction phase does not impact on ground or surface water quality. All refueling activities will take place in a designated refueling area. All fuel on the site will be stored in double skinned (bunded) tanks in the designated fuel areas.

The proposed development will increase traffic and activity in the area, thus increasing disturbance of wildlife including birds (e.g. Curlew) and mammals (E.g. Irish Hare and Badger) using the site and adjacent areas. However as the site of the proposed development is within an industrial zone that is already subject to moderate volumes of traffic, this impact is considered to be slight to moderate.

No lighting will spill onto the estuary, as the development is over 100 metres inland. In addition the tree-line on the north side of the site and a building north of the site provides good screening which will prevent light from the facility from spilling on to the estuary. Thus there will be no visual impact on the estuary.

There will be no discharges of environmental significance from the facility. All process wastewater generated will be contained in wastewater tanks and reused in the process.

6. Geology and Soils

This section of the Environmental Impact Statement (EIS) relates to geology and soils at the site of the proposed development. Detailed descriptions of the existing soils and geology are provided along with information on potential significant environmental impacts due to the proposed development.

The sub-surface conditions at the site were identified through the study of existing maps and reports, aerial photography and detailed site investigation. Aerial photographs show the site is a Brownfield site adjacent to the River Shannon. Historically the site was used for coal storage. The topography of the site is lowland/estuarine floodplain. The site is 90 metres south of the river Shannon and 180 metres west of Robertstown River. Approximate ground level is 13 metres AOD.

The Geological Survey of Ireland (GSI) Sheet 17 published in 1999 indicates that the site may be underlain by the Carboniferous Durnish Formation (limestone). The GSI web mapping service indicates that the formation may be a locally important aquifer that is moderately productive. An interim assessment of the vulnerability for the formation had been carried out. There were no mapped karst features within the formation.

A geophysical survey of the site was carried out in March 2009 by Apex Geoservices. Their results show that rockhead varies from 0.3 metres to 7 metres below ground level (bgl). The rockhead is shallow in the central and western part of the site and getting deeper in the east. In the vicinity of the proposed development site rockhead is estimated to be 0.3 metres to 3.6 metres below ground level. The survey indicates that rock may comprise moderately weathered and fractured limestone with shale. No significant karstification was found in the limestone although two anomalous areas were identified in the Resistivity surveying – these require further investigation but are expected to be associated with saline intrusion based on experience from adjacent sites.

The made ground onsite was likely placed as part of the original site build up or reclamation on top of the soft alluvial soils then topped with hard standing or concrete. The hard standing comprises both concrete and hardcore. The levels on site were changed prior to 1991. Site build up comprises compacted fill. It is not laterally persistent over the site but where present varies in thickness from 0.2 metres to 2.45 metres.

Detailed site investigations were also carried out by Mouchel Ltd. The assessment concluded that the site is suitable for its current use and proposed use assuming that the proposed development is as stated and will comprise mainly buildings and hard standing. The site comprises mainly hard standing, thereby reducing the potential linkage between source and receptor. However, should the site be redeveloped to include areas of soft landscaping or for a more sensitive end use it is recommended that further assessment is carried out.
No significant impacts on the receiving soils or geology are anticipated. No elevated concentrations of ground gas were recorded during the monitoring. Where possible excavated soils will be reused on site to reduce spoil to land fill. The potential to contaminate groundwater will be prevented by channelling run-off to drainage ditches for discharge to surface waters after attenuation to remove hydrocarbons,

leachate and particulate contaminants. Drainage will be sealed to prevent interaction with the underlying aquifer. Dewatering will be limited and re-injected where possible. Site levels are to remain similar to the existing profile to limit potential settlement and disposal of unsuitable soils. Potential impacts on site soils and geology will be monitored and reassessed at regular intervals throughout the construction phase by means of site walkover and risk assessments. Also there will be continued monitoring of ground gas and leachate concentration in groundwater.

7. Hydrology & Hydrogeology

This section of the Environmental Impact Statement describes the watercourses and aquifers at the site of the proposed development. The impact of the development on the watercourses and aquifers is discussed and evaluated. Mitigation measures are proposed, and the residual effects are described.

The site is bounded to the north by a shallow open drain and to the east of the site there is an open drain which is routed through low-lying lands to a back drain which discharges to the Robertstown River and ultimately to the Shannon. The surface water from the site currently discharges via the open drain to the north and via a piped outfall through third party lands to the open drain to the east of the site.

The area immediatly east of the site is defined by the Office of Public Works (OPW) as "Benefiting Lands" i.e. lands identified by the OPW as those that might benefit from the implementation of Arterial (Major) Drainage Schemes (under the Arterial Drainage Act 1945) and indicating areas of land subject to flooding or poor drainage. There is protection to the lower lying land to the east of the site by embankments to the Robertstown Creek and Shannon Estuary.

In accordance with the requirements of the Planning System and Flood Risk Management Guidelines (Draft) of September 2008, zones are to be defined for development sites. The zoning is established based on flood probabilities. The extreme flood events are not fully defined for the Foynes area. As the site is located at 3.68 metres above the 1 in 40 year flood event, it is reasonable to conclude that the area proposed for development is significantly above the 1 in 1000 year flood event and accordingly within Flood Zone C (probability of flooding is low at less than 1 in 1000 year probability).

The Site Investigation undertaken by Priority Geotechnical in June 2008 and supervised by Mouchel identified groundwater levels at between one and three metres depth below existing ground level. The site investigation indicates that there were no exceedances in relation to Environmental Quality Standards for a marine, estuarine and coastal situation. The recommendation by Mouchel is that there is a low risk posed to the site by the contaminants currently present.

The existing water supply to the site is via the Foynes Harbour Water Supply Scheme. The fire water supply is taken from the Foynes Harbour Fire Supply. The potable water supply is taken from the Limerick County Council Foynes water supply scheme, which is supplied from the Shannon Estuary Water Supply scheme whose source is the River Deel at Askeaton. From a review of Limerick County Council supply sources and GSI data, there are no well sources identified in the vicinity of the subject site. The firewater supply is provided by a 2,000,000-gallon storage reservoir located in Leahys, Foynes. The proposed development will be connected to the Foynes Harbour Fire Water Main Supply, It is understood that plans are at an advanced stage for the upgrade of the fire water supply, which is scheduled for upgrade.

There are no proposed discharges to groundwater from the proposed development. All external areas on the site are to have impermeable surface with a surface water collection system. External surface areas will be limited to the perimeter of the building to allow access and egress for the vehicles, thereby limiting the volume of surface water run-off. The external surface water drainage system will be routed through a Class 1 hydrocarbon interceptor prior to discharge to an attenuation tank with controlled discharge to the adjacent drainage channel. This interceptor will be installed at the start of the project to prevent any impacts during the construction or the operational phase. During the construction phase all vehicles will be inspected for leaks prior to entering the site. Roof water will be partly directed to a storage tank for use in the composting process. It is proposed that the surface water run-off will be restricted to current development discharge rates.

All process operations will take place indoors on an impermeable surface and all process wastewater generated will be held in bunded storage for re-use in the process. There will be no process discharges off-site or to ground or surface water. If in the event that wastewater is required to be sent for off-site disposal, it will be collected and transported to a pre-approved wastewater treatment facility by Mr. Binman Ltd., a permitted waste management company.

A 'Puraflow' mechanical treatment unit or equivalent will be installed onsite to treat effluent from the office area facilities. This treatment unit will replace the use of the septic tank currently onsite. The treated effluent from the mechanical wastewater treatment unit will discharge to the Shannon via existing outfall provided as part of the contract for the adjacent facility. Emission limits will be assigned under the EPA licence for the facility for the discharge of this effluent.

The foul sewer to which the treated effluent will discharge is a 225 mm diameter sewer and currently takes treated effluent from the treatment plant associated with otherdevelopment to its discharge point on the estuary. This licenced discharge is limitedto BOD of 20 mg/l, suspended solids of 30 mg/l and pH of 6-9 and prohibits the discharge of mineral oil, diesel range organics and petrol range organics. It also limits the discharge to 5 m^3/day. It was verified that the sewer, as installed, has adequate capacity to cater for the additional flows to contribute from the Greenport facility.

Highest standards of site management will be maintained and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during the construction phase. A named person will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively.

The design and construction of the process waste water and waste water pipe networks and storage chambers will be such that the systems will be leak-proof.

8. Air and Climate

Byrne Environmental Consulting Ltd. was commissioned to prepare an Air Quality, Climate and Noise Impact Assessment on behalf of Greenport Environmental Ltd. for the proposed development. This impact assessment identifies and presents the potential air quality, climatic and noise impacts associated with the proposed development. It also presents the proposed mitigation measures that shall be implemented at the development site to ensure that all site activities are controlled and managed according to Industry Best Practices to minimise the impact on the

local receiving environment. Baseline dust and noise monitoring was carried out as part of the assessment, and the results are presented in this chapter of the EIS.

The proposed facility has been designed to include state of the art air quality abatement technologies including an air scrubbing system, humidifier and biofilter system, and enclosure of all processes within the plant building. In order to ensure that the potential for odour nuisance is minimised, the facility has been designed to operate under negative pressure whereby all air within the facility building and processing areas shall be vented through the scrubber, humidifier and biofilter system. A negative pressure building is kept at a lower air pressure than the outside atmosphere. This ensures that air does not escape the building, except through the scrubbers, humidifiers and biofilter systems.

In order to assess the impact of the operation of the individual items of plant at the proposed facility, a computer based air dispersion modeling study was conducted to model and mathematically predict combustion gas emissions from the exhaust stacks based on the operating specifications of the items of plant and to assess these emissions as ground level concentrations expressed as micrograms per cubic metre to allow for direct comparison with National Air Quality Standard Limit Values for the modeled parameters. The model chosen for this study was the *Breeze Screen3 Version 2.04* which is an EPA-approved air dispersion model used to analyse single-source release scenarios in simple or complex terrain. The results of the *SCREEN3* Air Dispersion Modelling Study indicate that even under maximum emission scenarios, emissions from the subject plant's exhaust stacks will not exceed the specified and relevant *Air Quality Standards Regulations 2002, S.I. No. 271 of 2002* and that local ambient air quality will not be adversely impacted by the operation of the items of combustion plant.

The SCREEN3 Air Model was run in order to assess the odour impact from the proposed development. The results of the odour model show that the maximum one-hour ground level concentration at the closest sensitive receptor to the site will be 0.55 Odour Units per cubic metre. There will therefore be no adverse impact on local ambient air quality due to odour.

Guidelines from the UK Environment Agency and Cré - The Composting Association of Ireland specify that the minimum distance that composting facilities should be situated relative to receptors to ensure the potential impacts of bioaerosols such as *Aspergillus fumigatus* are minimised is 250 metres. This minimum distance is significantly exceeded at the proposed facility, with the closest receptors located approximately 450 metres upwind of the facility.

Noise generated by the operation of the facility will be attenuated as all processing activities will occur within the plant building, and any external plant including fans and duct shall be enclosed and include silencer systems. Relevant external plant will be enclosed and will be located within a compound with a six-metre high concrete wall, which will provide an additional noise barrier. The units will be located to the back of the site, in a location as far as possible from noise sensitive locations. The predicted maximum noise levels that will be experienced at the nearest residences as a result of the operation of the principal sources of outdoor noise at the site have been predicted using the activity L_{Aeq} method outlined in *BS 5228: Part 1: Noise and vibration control on construction and open sites.* The maximum predicted value at the closest receptor which is located approximately 450 metres from the site has been calculated to be 38dB(A) $L_{Aeq,\ 1hr.}$ The existing baseline noise level previously measured at the receptor located approximately 450 metres to the south of the

subject site is 63dB(A) $L_{Aeq, 1hr.}$ It is concluded that the noise impact of the proposed development will not increase the existing ambient noise level at the closest receptors to the subject site.

A programme of routine air quality monitoring including bioaerosol sampling for *Aspergillus fumigatus* using the Anderson Sampling Technique, dust monitoring using *German Standard Method for determination of dust deposition rate (VDI 2129),* odour monitoring utilising olfactometric analysis and environmental noise monitoring at baseline monitoring locations has been designed to verify that the proposed air quality and noise mitigation measures are effective in ensuring that the potential impacts on the receiving environment and local residential receptors in the Foynes area are minimised.

9. Landscape

This section of the EIS addresses the landscape and visual impacts of the proposed development. It includes a description of Limerick County Council landscape policy, with specific reference to the area within which the proposed development site is located. Landscape values and sensitivity are also examined. The landscape of the area is described in terms of its character, which includes a description of the physical, visual and image units.

The Landscape Character Assessment of County Limerick divides the county into ten distinct Landscape Character Areas (LCAs). The proposed development site is located within Landscape Character Area 2, referred to as the Shannon Integrated Coastal Management Zone (ICMZ), which comprises a large area of northern County Limerick. The Shannon Estuary is the defining characteristic of this region. The landscape itself is generally that of an enclosed farm type, essentially that of a hedgerow-dominant landscape.

In general, the lands to the east of the site are relatively flat, while more hilly topography is found to the west and the south. The site itself is flat. Land-cover to the south of Foynes is primarily agricultural, although areas of broad-leaf and coniferous forest are also a common element. Pockets of peat bog are found further southwest, particularly around the Ballyhahill area. Land-use in the vicinity of the proposed development site is industrial and commercial. The site of the proposed development currently comprises a vacant warehouse and external surfaced yard.

Aughinish Alumina Refinery, which is located on Aughinish Island to the northeast of Foynes, is one of the largest refineries in Europe. The waste ore or bauxite residue produced by the refinery is a reddish-brown colour and is spread on the western part of Aughinish Island, on an area of approximately 200 acres. The low hill on Aughinish Island, on which the reddish-brown waste ore from the refinery is spread, forms the most distinctive feature in the local landscape.

The availability of views to the west of the proposed development site is limited by the industrial buildings of the Shannon Foynes Port Area. To the south and southwest, the range of visibility extends to the hilly topography of Ballynacragga, and to the east to Aughinish Island. Looking towards the southeast, the hilly topography of the Barrigone and Craggs area is visible. The Shannon Estuary is not visible from within the site.
There is one National and two Regional Routes located within a five-kilometre radius of the proposed development site. However, the proposed development site is located in the northeastern corner of the Shannon Foynes Port Area and as such is visible only from the internal roadways of the Port Area. These roadways are used by

There is one National and two Regional Routes located within a five-kilometre radius of the proposed development site. However, the proposed development site is located in the northeastern corner of the Shannon Foynes Port Area and as such is visible only from the internal roadways of the Port Area. These roadways are used by port employees and commercial traffic operating within the Port Area and are not open to members of the general public.

There are no houses located in the immediate vicinity of the proposed development site. Many houses within Foynes town face towards the port, and thus the occupants have a view or partial view of the industrialised Port Area. The proposed development site is screened from the view of the occupants of these houses by the industrial and commercial buildings that lie in the intervening lands between these houses and the site. There are no views of the proposed development site available from any hotels or other amenities in the Foynes area such as golf courses, walking routes, parks, nature areas or sports fields.

The construction phase of the proposed development will encompass the movement of construction vehicles into and out of the site, and the storage of machinery, other equipment, temporary site buildings and building materials onsite. These activities will have no visual impact on the surrounding area. The Shannon Foynes Port Area is a busy industrial premises and construction works are currently taking place on a site located directly west of the proposed development site. The activities associated with the construction phase of the proposed development will therefore assimilate well into their receiving environment.

The proposed composting facility will be constructed within the existing warehouse and in part of the external yard. The change in land-cover will have no impact on the industrial character of the surrounding landscape. The site is screened to the north, south and west by warehouses and other industrial buildings. Visibility of the site within the surrounding landscape will not increase as a result of the proposed development. The proposed development will have no impact on the designated Scenic Views of the Shannon Estuary, which are available from the N69 National Secondary Route between Foynes and Glin. The site is not currently visible from any part of this road, and this will not change with the construction of the proposed composting facility.

10. Cultural Heritage

Cultural Heritage (Physical) in respect of a project is assumed to include all humanly created features on the landscape, including portable artefacts, which might reflect the prehistoric, historic, architectural, engineering and/or social history of the area. The Cultural Heritage of the subject development area and environs was examined through an Archaeological, Architectural and Historical study. The Archaeological and Architectural studies involved a documentary/cartographic search and field inspection of the area, while the Historical study involved documentary research. Such research and inspections were undertaken in the manner recommended by the Heritage and Planning Division of the Department of the Environment, Heritage and Local Government, who were consulted as part of the wider scoping exercise undertaken by McCarthy Keville O'Sullivan Ltd.

The subject development site is located in the townland of Durnish, in the civil parish of Robertstown and in the barony of Shanid. Historic Ordnance Survey maps of the site and immediate environs indicate the presence of a probable residential farm – Durnish Cottage – located in the general area of the subject development site. This complex of buildings, together with associated agricultural field systems, is at least

of early nineteenth century date and was removed when the port lands were extended eastwards. In addition, there is evidence from the maps that the bay to the immediate east of Durnish Point, to the north of the subject development area, were subjected to reclamation works in the late nineteenth century. Additional reclamation works were undertaken to the estuary edge to the west of the subject lands in more recent times.

Research undertaken as part of the project indicates that there are no historical events associated with the subject development lands. In addition, there are no previously Recorded Monuments located within, or in the immediate environs of, the subject development lands – the nearest monument is an Enclosure (SMR: LI010:009), situated approximately 450 metres to the south. Likewise, the site inspection/surface reconnaissance survey did not reveal any surface traces of archaeological potential within, or in the immediate environs of, the subject development lands and it is suggested that the raising of the levels across the site has probably resulted in extensive ground disturbance/reductions to the original site surface.

There are no Protected Structures, within the meaning of the Planning and Development Act 2000, situated either within the boundaries of the subject development lands or within the defined study area of approximately 500 metres surrounding such lands. There is a modern office/warehouse structure contained within the subject site boundaries and a number of modern warehouses located to the south, north and west of the subject site. Field inspections of the site and environs indicate that none of these structures are of architectural heritage potential/interest.

The development, as proposed, will cause any direct or indirect/visual impacts on any features or structures of historical, archaeological or architectural heritage interest. Consequently, it is not envisaged that any mitigation measures are required.

11. Material Assets

This section of the EIS considers economic assets of human origin, including major utilities such as transportation infrastructure, water supply, sewage and power systems. Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are dealt with in other sections of the EIS such as Chapter 6 Soils & Geology, Chapter 7 Hydrology and Hydrogeology, and Chapter 8 Air, Climate and Noise. Cultural assets are discussed in Chapter 10.

Traffic and Transportation

The traffic and transportation assessment for the proposed development has been carried out in accordance with the National Road Authority (NRA)'s *'Traffic and Transportation Assessment Guidelines'* (2007) and makes reference to the *'Guidelines for Traffic Impact Assessment'* published by the Institution of Highways and Transportation (1994). The purpose of this assessment is to assess the potential impact of the proposed development on the existing junction with the National Road network, and to ensure that the site access will have adequate capacity to carry the development traffic and the future growth in existing road traffic to the design year and beyond.

Manual classified traffic turning count surveys were carried out by Michael Punch & Partners during November 2008 at the junction between the N69 and the Foynes Port Area. The AM peak hour was 9.00am to 10.00am and the PM peak 4.30pm to 5.30pm. The traffic count was converted to Passenger Car Units (PCUs) for use in the

modelling software. The Foynes Port access junction has been modelled using the TRL junction analysis software package PICADY version 5.

Over a five-day week, there will be nine loads of material delivered to the facility a day. These trailers will leave the facility empty. There will be three articulated vehicles drawing this material, each doing three loads. In addition to this there will be approximately five to six loads of material going out of the facility on a daily basis. These will be removed by a further two articulated vehicles. This is a maximum of 15 trucks in/out per day. In order to model an onerous condition the analysis assumes that all of the trucks enter and leave the site during the AM peak hour and also during the PM peak hour in order to robustly test the two peak periods.

As a worst-case scenario it is also assumed that the additional traffic generated at the junction with the National Road due to the facility will turn right off the National Road (in fact most of it will) and turn right onto the National Road (in fact little of it will). If under these worst case assumptions the access is found to have sufficient capacity in the PICADY model it can safely be assumed that the access will have sufficient operating capacity at all times of the day.

The PICADY analysis shows that the Foynes Port access junction would be well within practical reserve capacity by the design year 2025 even under the onerous assumptions made throughout the analysis in relation to existing traffic flows and future traffic generation. The volumes of traffic that will be generated during the construction phase of the development will be small in comparison to the traffic volumes *modelled* for the operation of the development during the peak periods. A quantitative analysis for the construction stage would yield lower ratio of flow to capacity results than the worst-case scenario analysed in the report, which is the 2025 peak hour. The construction stage therefore did not require traffic analysis.

The additional traffic generated by the proposed composting/biogas facility can easily be accommodated at the existing junction with the National Road when combined with the predicted increased background flows on the National Road to the year 2025 and beyond.

Services

The existing water supply to the site is via the Foynes Harbour Water Supply Scheme. The fire water supply is taken from the Foynes Harbour Fire Supply. The potable water supply is taken from the Limerick County Council Foynes water supply scheme, which is supplied from the Shannon Estuary Water Supply scheme whose source is the River Deel at Askeaton. Significant quantities of additional water will not be required during the operational phase of the proposed development, as a roof water storage tank will be installed, which will provide supplementary process water, when required.

A drainage model was prepared to establish the surface water drainage volumes generated from the proposed development. In addition, an assessment of the existing run-off from the facility was calculated. It is proposed to limit the surface water run-off from the facility to the current discharge rate of 209 litres per second. Surface water run-off from external surfaced areas within the site will discharge via a Class 1 hydrocarbon interceptor to the watercourse on the eastern boundary of the site.

All process operations associated with the proposed composting and biogas facility will take place indoors on an impermeable surface. All process wastewater

generated will be contained in bunded storage tanks and re-used within the process. There will therefore be no process discharges off-site to ground or surface water.

Toilets are available onsite within the existing warehouse building, from which wastewater currently discharges to an onsite septic tank. A 'Puraflow' mechanical treatment unit or equivalent will be installed onsite to replace this septic tank. This upgrade will be completed at the beginning of the construction works to ensure there is no impact on emissions to the sewer during the construction phase. Following discussions between Greenport Environmental Ltd. and the Shannon Foynes Port Authority, the connection from the onsite treatment unit will be made to a sewer that is currently under construction on the Port Road.

The proposed development site is supplied by the ESB network. The design, construction and installation of the electrical system equipment within the proposed facility will be in accordance with International Electro-technical Commission (IEC) regulations and shall comply with all applicable Community and national regulations.

A lighting plan for the proposed development site has been prepared. 19 No. AKTRA 600w High Pressure Sodium (HPS) floodlights will light the interior of the site. The lux levels shown on the lighting plan show that there will be no light spill outside the proposed development site.

12. Interaction of the Foregoing

All of the reasonably predictable significant impacts of the proposed development and the measures proposed to mitigate them have been outlined in this report. However, for any development with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of these interactions may either exacerbate the magnitude of the impact or ameliorate it. The interaction of impacts on the surrounding environment needs to be addressed as part of the Environmental Impact Assessment process.

While the work for all parts of the EIA were not carried out by McCarthy Keville O'Sullivan Associates Ltd., this Environmental Impact Statement was edited and collated by McCarthy Keville O'Sullivan Ltd. as an integrated document, rather than a collection of separate reports. The impacts that arise as a result of the interaction between several aspects of the development have therefore been addressed in Sections 4 to 11 of this report.

Appendix 1

SCREEN3 Air Model Output Data: Combustion Plant Emissions

A2-2

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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-2 NMHC ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.280000
   STACK HEIGHT (M)         =        5.0000
   STK INSIDE DIAM (M)      =        0.2000
   STK EXIT VELOCITY (M/S)=         15.0242
   STK GAS EXIT TEMP (K)    =      768.0000
   AMBIENT AIR TEMP (K)     =      293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M) =          0.0000
   MAX HORIZ BLDG DIM (M) =          0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.47200000     (M**3/S)

BUOY. FLUX =     0.911 M**4/S**3;  MOM. FLUX =     0.861 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                 U10M   USTK   MIX HT    PLUME    SIGMA    SIGMA
   (M)   (UG/M**3)   STAB      (M/S)  (M/S)     (M)     HT (M)    Y (M)    Z (M)  DWASH
-------  ----------  ----  ---------  -----  -------  --------  -------  -------  -----
   100.    113.3        4        1.5    1.5    480.0     18.32    16.14    14.31    NO
   200.    68.37        4        1.0    1.0    320.0     24.98    31.32    27.79    NO
   300.    51.69        6        1.0    1.0  10000.0     28.91    31.92    21.07    NO
   400.    44.68        6        1.0    1.0  10000.0     28.91    41.42    26.20    NO
   500.    36.73        6        1.0    1.0  10000.0     28.91    50.67    31.00    NO
   600.    30.21        6        1.0    1.0  10000.0     28.91    59.66    35.49    NO
   700.    25.17        6        1.0    1.0  10000.0     28.91    68.40    39.70    NO
   800.    21.31        6        1.0    1.0  10000.0     28.91    76.90    43.69    NO
   900.    18.32        6        1.0    1.0  10000.0     28.91    85.17    47.46    NO
  1000.    15.95        6        1.0    1.0  10000.0     28.91    93.22    51.06    NO

 DWASH=    MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO  MEANS NO BUILDING DOWNWASH USED
 DWASH=HS  MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS  MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA  MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------    -------    -------
SIMPLE TERRAIN       113.3          100.         0.

****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****************************************************
```

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

A2-2 NOx ** 0

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.420000
STACK HEIGHT (M)	=	5.0000
STK INSIDE DIAM (M)	=	0.2000
STK EXIT VELOCITY (M/S)	=	15.0242
STK GAS EXIT TEMP (K)	=	768.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 0.47200000 (M**3/S)

BUOY. FLUX = 0.911 M**4/S**3; MOM. FLUX = 0.861 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	170.0	4	1.5	1.0	480.0	18.32	16.14	14.31	NO
200.	102.6	4	1.0	1.0	320.0	24.98	31.32	27.79	NO
300.	77.53	6	1.0	1.0	10000.0	28.91	31.92	21.07	NO
400.	67.02	6	1.0	1.0	10000.0	28.91	41.42	26.20	NO
500.	55.09	6	1.0	1.0	10000.0	28.91	50.67	31.00	NO
600.	45.31	6	1.0	1.0	10000.0	28.91	59.66	35.49	NO
700.	37.76	6	1.0	1.0	10000.0	28.91	68.40	39.70	NO
800.	31.97	6	1.0	1.0	10000.0	28.91	76.90	43.69	NO
900.	27.47	6	1.0	1.0	10000.0	28.91	85.17	47.46	NO
1000.	23.93	6	1.0	1.0	10000.0	28.91	93.22	51.06	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	170.0	100.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-2 SO2 ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.280000
   STACK HEIGHT (M)         =        5.0000
   STK INSIDE DIAM (M)      =        0.2000
   STK EXIT VELOCITY (M/S)=         15.0242
   STK GAS EXIT TEMP (K)    =      768.0000
   AMBIENT AIR TEMP (K)     =      293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M)   =        0.0000
   MAX HORIZ BLDG DIM (M)   =        0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.47200000     (M**3/S)

BUOY. FLUX =     0.911 M**4/S**3;  MOM. FLUX =     0.861 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	113.3	4	1.5	1.8	480.0	18.32	16.14	14.31	NO
200.	68.37	4	1.0	1.0	320.0	24.98	31.32	27.79	NO
300.	51.69	6	1.0	1.0	10000.0	28.91	31.92	21.07	NO
400.	44.68	6	1.0	1.0	10000.0	28.91	41.42	26.20	NO
500.	36.73	6	1.0	1.0	10000.0	28.91	50.67	31.00	NO
600.	30.21	6	1.0	1.0	10000.0	28.91	59.66	35.49	NO
700.	25.17	6	1.0	1.0	10000.0	28.91	68.40	39.70	NO
800.	21.31	6	1.0	1.0	10000.0	28.91	76.90	43.69	NO
900.	18.32	6	1.0	1.0	10000.0	28.91	85.17	47.46	NO
1000.	15.95	6	1.0	1.0	10000.0	28.91	93.22	51.06	NO

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************
```

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	113.3	100.	0.

```
****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****************************************************
```

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-2 CO ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.280000
   STACK HEIGHT (M)         =        5.0000
   STK INSIDE DIAM (M)      =        0.2000
   STK EXIT VELOCITY (M/S)=         15.0242
   STK GAS EXIT TEMP (K)    =      768.0000
   AMBIENT AIR TEMP (K)     =      293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M) =          0.0000
   MAX HORIZ BLDG DIM (M) =          0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.47200000      (M**3/S)

BUOY. FLUX =     0.911 M**4/S**3;  MOM. FLUX =     0.861 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                 U10M   USTK   MIX HT    PLUME    SIGMA    SIGMA
   (M)   (UG/M**3)   STAB     (M/S)  (M/S)     (M)     HT (M)   Y (M)    Z (M)  DWASH
-------  ----------  ----  ---------  -----  -------  --------  -------  -------  -----
   100.    113.3        4        1.5    1.0    480.0     18.32    16.14    14.31    NO
   200.    68.37        4        1.0    1.0    320.0     24.98    31.32    27.79    NO
   300.    51.69        6        1.0    1.0  10000.0     28.91    31.92    21.07    NO
   400.    44.68        6        1.0    1.0  10000.0     28.91    41.42    26.20    NO
   500.    36.73        6        1.0    1.0  10000.0     28.91    50.67    31.00    NO
   600.    30.21        6        1.0    1.0  10000.0     28.91    59.66    35.49    NO
   700.    25.17        6        1.0    1.0  10000.0     28.91    68.40    39.70    NO
   800.    21.31        6        1.0    1.0  10000.0     28.91    76.90    43.69    NO
   900.    18.32        6        1.0    1.0  10000.0     28.91    85.17    47.46    NO
  1000.    15.95        6        1.0    1.0  10000.0     28.91    93.22    51.06    NO

 DWASH=    MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO  MEANS NO BUILDING DOWNWASH USED
 DWASH=HS  MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS  MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA  MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------   -------    -------
SIMPLE TERRAIN       113.3          100.         0.


****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****************************************************
```

Appendix 2

SCREEN3 Air Model Output Data: Combustion Plant Emissions

A2-3

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-3 NOx ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.417000
   STACK HEIGHT (M)         =        3.0000
   STK INSIDE DIAM (M)      =        0.3000
   STK EXIT VELOCITY (M/S)=         10.1718
   STK GAS EXIT TEMP (K)    =       747.0000
   AMBIENT AIR TEMP (K)     =       293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M)   =        0.0000
   MAX HORIZ BLDG DIM (M)   =        0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.71899998     (M**3/S)

BUOY. FLUX =     1.364 M**4/S**3;  MOM. FLUX =     0.913 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	147.5	4	2.0	3.0	640.0	16.52	16.16	14.33	NO
200.	84.09	4	1.0	1.0	320.0	30.04	31.75	28.27	NO
300.	70.59	6	1.0	1.0	10000.0	30.35	32.15	21.41	NO
400.	62.48	6	1.0	1.0	10000.0	30.35	41.59	26.48	NO
500.	52.16	6	1.0	1.0	10000.0	30.35	50.81	31.23	NO
600.	43.33	6	1.0	1.0	10000.0	30.35	59.78	35.69	NO
700.	36.36	6	1.0	1.0	10000.0	30.35	68.51	39.89	NO
800.	30.94	6	1.0	1.0	10000.0	30.35	76.99	43.85	NO
900.	26.69	6	1.0	1.0	10000.0	30.35	85.25	47.61	NO
1000.	23.31	6	1.0	1.0	10000.0	30.35	93.29	51.20	NO

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************
```

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	147.5	100.	0.

```
*****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
*****************************************************
```

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-3 SO2 ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.278000
   STACK HEIGHT (M)         =        5.0000
   STK INSIDE DIAM (M)      =        0.3000
   STK EXIT VELOCITY (M/S)=         10.1718
   STK GAS EXIT TEMP (K)    =       747.0000
   AMBIENT AIR TEMP (K)     =       293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M)   =        0.0000
   MAX HORIZ BLDG DIM (M)   =        0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.71899998     (M**3/S)

BUOY. FLUX =     1.364 M**4/S**3;  MOM. FLUX =     0.913 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	83.74	4	2.5	2.5	800.0	15.82	15.99	14.14	NO
200.	51.87	4	1.0	1.0	320.0	32.04	31.75	28.27	NO
300.	41.04	6	1.0	1.0	10000.0	32.35	32.15	21.41	NO
400.	38.09	6	1.0	1.0	10000.0	32.35	41.59	26.48	NO
500.	32.61	6	1.0	1.0	10000.0	32.35	50.81	31.23	NO
600.	27.50	6	1.0	1.0	10000.0	32.35	59.78	35.69	NO
700.	23.31	6	1.0	1.0	10000.0	32.35	68.51	39.89	NO
800.	19.96	6	1.0	1.0	10000.0	32.35	76.99	43.85	NO
900.	17.31	6	1.0	1.0	10000.0	32.35	85.25	47.61	NO
1000.	15.17	6	1.0	1.0	10000.0	32.35	93.29	51.20	NO

```
 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************
```

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	83.74	100.	0.

```
**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-3 CO ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.583000
   STACK HEIGHT (M)         =        5.0000
   STK INSIDE DIAM (M)      =        0.3000
   STK EXIT VELOCITY (M/S)=         10.1718
   STK GAS EXIT TEMP (K)    =       747.0000
   AMBIENT AIR TEMP (K)     =       293.0000
   RECEPTOR HEIGHT (M)      =         0.0000
   URBAN/RURAL OPTION       =          URBAN
   BUILDING HEIGHT (M)      =         0.0000
   MIN HORIZ BLDG DIM (M)   =         0.0000
   MAX HORIZ BLDG DIM (M)   =         0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.71899998     (M**3/S)

BUOY. FLUX =     1.364 M**4/S**3;  MOM. FLUX =     0.913 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                  U10M   USTK   MIX HT    PLUME    SIGMA    SIGMA
   (M)   (UG/M**3)   STAB   (M/S)  (M/S)    (M)    HT (M)   Y (M)   Z (M)  DWASH
-------  ----------  ----  -----  -----  -------  ------  ------  ------  -----
   100.    175.6       4    2.5     2.5    800.0   15.82   15.99   14.14    NO
   200.    108.8       4    1.0     1.0    320.0   32.04   31.75   28.27    NO
   300.     86.07      6    1.0     1.0  10000.0   32.35   32.15   21.41    NO
   400.     79.87      6    1.0     1.0  10000.0   32.35   41.59   26.48    NO
   500.     68.38      6    1.0     1.0  10000.0   32.35   50.81   31.23    NO
   600.     57.67      6    1.0     1.0  10000.0   32.35   59.78   35.69    NO
   700.     48.88      6    1.0     1.0  10000.0   32.35   68.51   39.89    NO
   800.     41.87      6    1.0     1.0  10000.0   32.35   76.99   43.85    NO
   900.     36.29      6    1.0     1.0  10000.0   32.35   85.25   47.61    NO
  1000.     31.82      6    1.0     1.0  10000.0   32.35   93.29   51.20    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       175.6          100.        0.

****************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****************************************************
```

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-3 NMHC ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =      0.278000
   STACK HEIGHT (M)         =        5.0000
   STK INSIDE DIAM (M)      =        0.3000
   STK EXIT VELOCITY (M/S)=         10.1718
   STK GAS EXIT TEMP (K)    =      747.0000
   AMBIENT AIR TEMP (K)     =      293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M)   =        0.0000
   MAX HORIZ BLDG DIM (M)   =        0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.71899998     (M**3/S)

BUOY. FLUX =     1.364 M**4/S**3;  MOM. FLUX =     0.913 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                  U10M   USTK   MIX HT    PLUME    SIGMA    SIGMA
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)    HT (M)   Y (M)    Z (M)  DWASH
-------  ----------  ----  -----  -----  -------  ------  ------  ------  -----
   100.    83.74        4    2.5    2.5    800.0   15.82   15.99   14.14    NO
   200.    51.87        4    1.0    1.0    320.0   32.04   31.75   28.27    NO
   300.    41.04        6    1.0    1.0  10000.0   32.35   32.15   21.41    NO
   400.    38.09        6    1.0    1.0  10000.0   32.35   41.59   26.48    NO
   500.    32.61        6    1.0    1.0  10000.0   32.35   50.81   31.23    NO
   600.    27.50        6    1.0    1.0  10000.0   32.35   59.78   35.69    NO
   700.    23.31        6    1.0    1.0  10000.0   32.35   68.51   39.89    NO
   800.    19.96        6    1.0    1.0  10000.0   32.35   76.99   43.85    NO
   900.    17.31        6    1.0    1.0  10000.0   32.35   85.25   47.61    NO
  1000.    15.17        6    1.0    1.0  10000.0   32.35   93.29   51.20    NO

 DWASH=    MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO  MEANS NO BUILDING DOWNWASH USED
 DWASH=HS  MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS  MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA  MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------    -------    -------
SIMPLE TERRAIN       83.74          100.         0.

**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

Appendix 3

SCREEN3 Air Model Output Data: Combustion Plant Emissions

A2-5

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-5 TOC ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =     0.300000E-02
   STACK HEIGHT (M)         =        9.0000
   STK INSIDE DIAM (M)      =        1.3000
   STK EXIT VELOCITY (M/S)=          0.1047
   STK GAS EXIT TEMP (K)    =     1573.0000
   AMBIENT AIR TEMP (K)     =      293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M)   =        0.0000
   MAX HORIZ BLDG DIM (M)   =        0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.13900000     (M**3/S)

BUOY. FLUX =     0.353 M**4/S**3;  MOM. FLUX =     0.001 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                  U10M   USTK   MIX HT    PLUME    SIGMA    SIGMA
   (M)   (UG/M**3)    STAB      (M/S)  (M/S)     (M)    HT (M)   Y (M)    Z (M)  DWASH
-------  ----------   ----     -------  -----  ------    ------   ------   ------  -----
   100.    2.379        4         1.0    1.0   320.0     15.19    15.94    14.08    NO
   200.   0.9682        4         1.0    1.0   320.0     15.19    30.92    27.34    NO
   300.   0.7950        6         1.0    1.0 10000.0     22.80    31.58    20.54    NO
   400.   0.6086        6         1.0    1.0 10000.0     22.80    41.16    25.78    NO
   500.   0.4682        6         1.0    1.0 10000.0     22.80    50.45    30.64    NO
   600.   0.3699        6         1.0    1.0 10000.0     22.80    59.48    35.18    NO
   700.   0.3002        6         1.0    1.0 10000.0     22.80    68.24    39.43    NO
   800.   0.2496        6         1.0    1.0 10000.0     22.80    76.76    43.44    NO
   900.   0.2116        6         1.0    1.0 10000.0     22.80    85.04    47.23    NO
  1000.   0.1824        6         1.0    1.0 10000.0     22.80    93.10    50.84    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------    -------    -------
SIMPLE TERRAIN       2.379          100.         0.

**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

A2-5 NOx ** 0

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.208000
STACK HEIGHT (M)	=	9.0000
STK INSIDE DIAM (M)	=	1.3000
STK EXIT VELOCITY (M/S)	=	0.1047
STK GAS EXIT TEMP (K)	=	1573.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 0.13900000 (M**3/S)

BUOY. FLUX = 0.353 M**4/S**3; MOM. FLUX = 0.001 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	164.9	4	1.0	1.0	320.0	15.19	15.94	14.08	NO
200.	67.13	4	1.0	1.0	320.0	15.19	30.92	27.34	NO
300.	55.12	6	1.0	1.0	10000.0	22.80	31.58	20.54	NO
400.	42.20	6	1.0	1.0	10000.0	22.80	41.16	25.78	NO
500.	32.46	6	1.0	1.0	10000.0	22.80	50.45	30.64	NO
600.	25.65	6	1.0	1.0	10000.0	22.80	59.48	35.18	NO
700.	20.82	6	1.0	1.0	10000.0	22.80	68.24	39.43	NO
800.	17.30	6	1.0	1.0	10000.0	22.80	76.76	43.44	NO
900.	14.67	6	1.0	1.0	10000.0	22.80	85.04	47.23	NO
1000.	12.65	6	1.0	1.0	10000.0	22.80	93.10	50.84	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	164.9	100.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

A2-5 CO ** 0

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE              =         POINT
   EMISSION RATE (G/S)      =     0.700000E-02
   STACK HEIGHT (M)         =        9.0000
   STK INSIDE DIAM (M)      =        1.3000
   STK EXIT VELOCITY (M/S)=          0.1047
   STK GAS EXIT TEMP (K)    =     1573.0000
   AMBIENT AIR TEMP (K)     =      293.0000
   RECEPTOR HEIGHT (M)      =        0.0000
   URBAN/RURAL OPTION       =         URBAN
   BUILDING HEIGHT (M)      =        0.0000
   MIN HORIZ BLDG DIM (M)   =        0.0000
   MAX HORIZ BLDG DIM (M)   =        0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =  0.13900000     (M**3/S)

BUOY. FLUX =     0.353 M**4/S**3;  MOM. FLUX =     0.001 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN DISCRETE DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF     0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC                 U10M   USTK   MIX HT    PLUME    SIGMA    SIGMA
   (M)   (UG/M**3)   STAB     (M/S)  (M/S)     (M)     HT (M)   Y (M)    Z (M)  DWASH
-------  ----------  ----     -----  -----  ------    ------   ------   ------  -----
   100.    5.550       4       1.0    1.0   320.0     15.19    15.94    14.08    NO
   200.    2.259       4       1.0    1.0   320.0     15.19    30.92    27.34    NO
   300.    1.855       6       1.0    1.0 10000.0     22.80    31.58    20.54    NO
   400.    1.420       6       1.0    1.0 10000.0     22.80    41.16    25.78    NO
   500.    1.093       6       1.0    1.0 10000.0     22.80    50.45    30.64    NO
   600.   0.8631       6       1.0    1.0 10000.0     22.80    59.48    35.18    NO
   700.   0.7006       6       1.0    1.0 10000.0     22.80    68.24    39.43    NO
   800.   0.5823       6       1.0    1.0 10000.0     22.80    76.76    43.44    NO
   900.   0.4937       6       1.0    1.0 10000.0     22.80    85.04    47.23    NO
  1000.   0.4257       6       1.0    1.0 10000.0     22.80    93.10    50.84    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

      ****************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ****************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       5.550          100.        0.

**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
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Appendix 4

SCREEN3 Air Odour Model Output Data: Odour Emissions

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

FOYNES ODOUR ** 0

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	16.0000
STACK HEIGHT (M)	=	1.8000
STK INSIDE DIAM (M)	=	1.0000
STK EXIT VELOCITY (M/S)	=	38.9611
STK GAS EXIT TEMP (K)	=	343.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

STACK EXIT VELOCITY WAS CALCULATED FROM
VOLUME FLOW RATE = 30.600000 (M**3/S)

BUOY. FLUX = 13.923 M**4/S**3; MOM. FLUX = 324.173 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	1812. = 1.8 OU/m3	4	20.0	20.0	6400.0	29.24	8.08	7.13	NO
100.	1070.	4	10.0	10.0	3200.0	29.24	16.01	14.15	NO
150.	773.8	4	8.0	8.0	2560.0	32.10	23.64	20.92	NO
200.	582.2	4	5.0	5.0	1600.0	32.69	31.70	28.22	NO
250.	482.6	4	4.5	4.5	1440.0	36.12	39.35	35.12	NO
300.	409.0	4	4.0	4.0	1280.0	40.41	46.68	41.71	NO
350.	452.5	6	1.5	1.5	10000.0	53.64	38.98	27.08	NO
400.	504.0	6	1.0	1.0	10000.0	61.14	44.23	30.45	NO
RECEPTOR 450.	552.6 = 0.55 OU/m3	6	1.0	1.0	10000.0	61.14	48.62	32.58	NO
500.	585.4	6	1.0	1.0	10000.0	61.14	52.99	34.67	NO
550.	604.9	6	1.0	1.0	10000.0	61.14	57.34	36.72	NO
600.	613.7	6	1.0	1.0	10000.0	61.14	61.65	38.73	NO
650.	614.4	6	1.0	1.0	10000.0	61.14	65.91	40.70	NO
700.	609.1	6	1.0	1.0	10000.0	61.14	70.14	42.63	NO
750.	599.5	6	1.0	1.0	10000.0	61.14	74.32	44.51	NO
800.	587.0	6	1.0	1.0	10000.0	61.14	78.45	46.36	NO
850.	572.5	6	1.0	1.0	10000.0	61.14	82.53	48.17	NO
900.	556.8	6	1.0	1.0	10000.0	61.14	86.57	49.93	NO
950.	540.5	6	1.0	1.0	10000.0	61.14	90.56	51.66	NO
1000.	523.9	6	1.0	1.0	10000.0	61.14	94.50	53.36	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

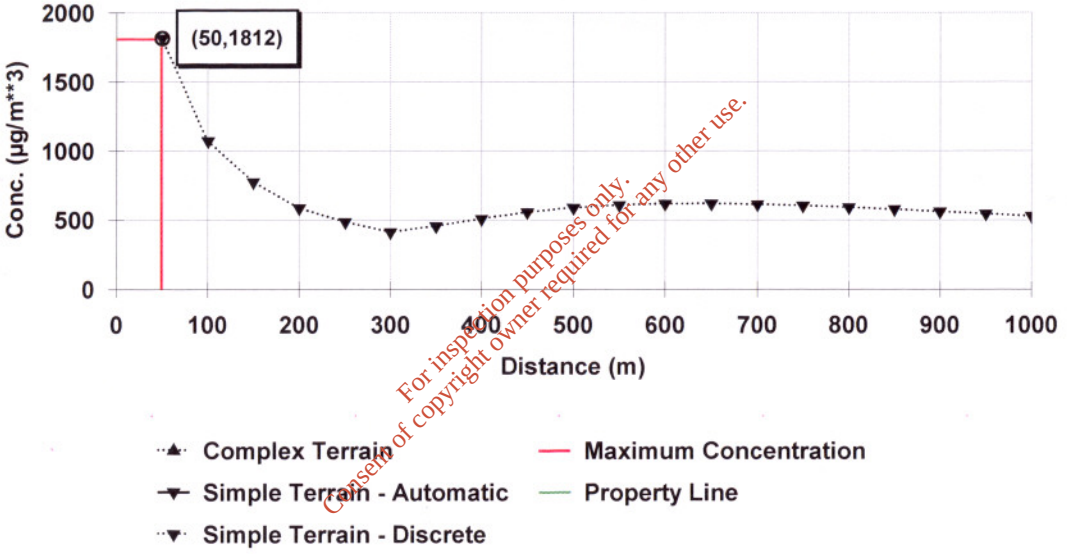
CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	1812 / 10^3 = 1.8 OU/m3	50.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

NOTE MODEL OUTPUT IN mg/m3. TO CONVERT TO OU/m3 DIVIDE BY 10^3.

$\Rightarrow \frac{1812}{10^3} = 1.8$ OU/m3

FOYNES ODOUR



Appendix 5

Noise Prediction Calculations

Greenport Environmental Foynes

Noise prediction at closest receptors located 450m south of site

PREDICTION OF NOISE FROM STATIONARY PLANT [ACTIVITY LAEQ METHOD]

PLANT TYPE / NOISE SOURCE	L_{Aeq}, AT 1m, dB	L_{Aeq}, AT 10m, dB	DISTANCE, m	ADJUSTMENTS (dB)				RESULTANT $L_{Aeq, dB}$	FRACTION ON TIME	CORRECTIONS TO $L_{Aeq, 1 HR}$		ACTIVITY $L_{Aeq, 1 HR}$
				DISTANCE		SCREENING	REFLECTION					
Noise Source	*Noise Level*		*Closest distance to receptor, m*	$K_h = 20\log_{10}(R/10)$	$K_s = (25\log_{10}(R/10) - 2$	*0, 5, 10, calculate*	*0, 3*	L_{WA} *- adjustments*	*(Activity duration / working period)*	$t_c = T_t \times F$	$(t_c)(10^{0.1Li})$	$L_{Aeq,1hr} = 10\log_{10}[1/1S(t_c)(10^{0.1Li})$
Enclosed CHP Unit A2-2	na	65	450		39.3	0	0	25.7	1	1	369.0	
Enclosed CHP Unit A2-3	na	65	450		39.3	0	0	25.7	1	1	369.0	
C-Deg HTC Unit A2-5	na	66	450		39.3	0	0	26.7	1	1	464.5	
HGV Truck movement	na	77	450		39.3	0	0	37.7	1	1	5847.5	

NOTE

This assessment is based on a worst case scenario in which all items of plant are operating simultaneously, on a continual basis

	RESULT $L_{Aeq, 1 HR dB(A)}$
SIGMA $(t_c)(10^{0.1Li})$	$L_{Aeq,1hr} = 10\log_{10}[1/1S(t_c)(10^{0.1Li})$
7049.9	**38**