4.0 AIR

4.1 Methodology

This study will examine the ambient air quality and assess the impact the proposed development will have on the existing atmospheric environment. Potential impacts are identified and assessed with reference to existing standards and legislation. Mitigation measures are proposed to deal with any potential impacts.

A baseline survey was conducted at the site between the 11th and 19th May 2004 to monitor levels of nitrogen oxides, sulphur dioxide, Benzene, particulates and heavy metals.

Dispersion modelling was conducted by using (MAPMOS) the Advanced Gaussian Plume Model. The purpose of the dispersion model is to provide a means of calculating air pollution concentrations given information about the pollutant emissions and the nature of the atmosphere. Numerical data from the model were incorporated into a Geographic information system to produce air quality maps. The concentrations of pollutants at ground level are determined in order to calculate compliance with air quality standards. Maximum expected emission concentrations for the air emission point were utilised in the model. Since air quality objectives are expressed in a variety of averaging periods, it is important that dispersion models also calculate air pollutant concentrations in the same manner. Hourly average, daily average and annual average concentrations were calculated. Percentiles of hourly and daily averages were also calculated. Contour plots of maximum ground level concentrations occurring were plotted.

In this exercise, modelling for ground level concentrations for NOx, Dust, Carbon, CO and So2 from the Boiler Stack was undertaken for the following parameters:

- NOX annual mean concentrations
- NOX hourly averaged concentrations.
- PM10 annual mean concentrations.
- PM10 daily averaged concentrations.
- PM10 hourly averaged concentrations.
- Carbon annual mean concentrations.
- Carbon daily averaged concentrations.
- Carbon hourly averaged concentrations.
- SO2 daily averaged concentrations.
- SO2 hourly averaged concentrations.
- CO maximum 8 hour-averaged concentrations.

These emissions were compared with current and future air quality standards and guidelines.

The results of this baseline survey together with a full description of sampling and analysis methodologies including the air dispersion modelling results are presented in Appendix 5 Air Quality Data and Modelling Report.

4.2 Existing Conditions

Air quality in the vicinity of the site is influenced by industrial activities in the area including the adjacent Youghal Landfill, Youghal NCT centre and nearby Foxhole Industrial Estate and Business Park.

Much of the information on ambient air quality in Ireland has been compiled from continuous monitoring stations operated by local authorities and the EPA, as provided for under the terms of the Air Quality Framework Directive (1996/62/EC) and earlier legislation. Youghal is categorised under Zone D, Rural Ireland. However, Youghal area is suburban rural. Table 4.1 Comparison of Measurement and Reference Data shows the monitoring results.

Parameter	Concentration			
	Existing [1]	Typical Rural [2]	WHO data [3]	Annual Mean Limit Value [4]
SO_2, µg/m^3	2.6	< 9	3-20	20 (for the protection of ecosystems)
NO_x, µg/m^3	4.1	< 10	0.4 – 9.4	40 (NO_2 for protection of human health) 30 (NO & NO_2 for protection of vegetation)
a) PM_{10}, µg/m^3 b) T.S.P.*, µg/m^3	a) - b) 31.1	a) 15 - 18 b) < 60	a) < 50 stage 1 b) N/A	a) 40 b) N/A
Benzene, µg/m^3	1.19	< 2	1.5 **	5
Lead, µg/m^3	0.04	< 0.05	N/A	0.5

Table 4.1 Comparison of Measurement and Reference Data

NOTES:
[1] SWS baseline survey data.
[2] EPA Air Quality Monitoring, Annual Reports 2002 and SoE Irelands Environment 2004 Summary Report.
[3] Report data for rural areas, World Health Organisation (WHO) Air Quality Guidelines for Europe, 2nd Edition, 2000.
[4] Air Quality Standards Regulations 2002 (S.I. No. 271).
* T.S.P. = Total Suspended Particulates. Reference data refers to the former guideline level in the WHO Air Quality Guidelines 1987.
** Daily median rural air concentrations in the USA.

4.2.1 Dust

Results from the baseline survey conducted by SWS on site yielded a total suspended particulate baseline concentration of 31.1µg/m^3. Dust deposition rates from monitoring conducted at the neighbouring Youghal Landfill site on three separate occasions in 2002 yielded dust deposition rates between 33 mg/m^2/day to 251 mg/m^2/day for a number of locations around the site.

4.2.2 Odour

Existing odour conditions in the vicinity of the site will be influenced by the adjacent Youghal Landfill site and other industrial activities in the nearby Foxhole Industrial Estate and Business Park. Odour data is limited and is subjective. It is been legislated for in terms of its "nuisance potential". Odour has not been an issue in the vicinity of the proposed development.

4.2.3 Gaseous Emissions

Combustion processes are the principal sources of classic primary air pollutants such as NO_x, SO_2, particulate matter and CO. Emissions from road traffic continue to have the most significant influence on air quality in Ireland.

Nitrogen oxides (NOx) are emitted from all combustion processes (such as a gas/oil fired boiler or a car engine). Site specific monitoring conducted by SWS Environmental Services indicates a baseline concentration of 4.1µg/m^3 of NO_x and SO_2 concentrations are in the range of 2.6µg/m^3.

Carbon Monoxide (CO) and Benzene are derived from the burning of carbon based fuels (petrol, diesel, coal, natural gas). Monitoring results throughout Ireland indicate background levels of less than 5µg/m^3 for CO and typically less than 2µg/m^3 for Benzene.

A summary of limit values specified in the Air Quality Standards Regulations, 2002 are contained in Table 4.2.

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m^3	Basis of Application of the Limit Value	Limit Value Attainment Date
SO_2	Protection of human health	1 hour	350	Not to be exceeded more than 24 times in a year	1/1/2005
SO_2	Protection of human health	24 hours	125	Not to be exceeded more than 3 times in a year.	1/1 /2005
SO_2	Protection of ecosystems	Year	20	Annual mean	19/7/2001
SO_2	Protection of ecosystems	1 October to 31 March	20	Winter mean	19/7/2001
NO_2	Protection of human health	1 hour	200	Not to be exceeded more than 18 times in a year.	1/1/2010
NO_2	Protection of human health	Year	40	Annual mean.	1/1/2010
NO & NO_2	Protection of vegetation	Year	30	Annual mean.	19/7/2001
PM_{10} stage 1	Protection of human health	24 hours	50	Not to be exceeded more than 35 times in a year.	1/1/2005
PM_{10} stage 2	Protection of human health	24 hours	50	Not to be exceeded more than 7 times in a year.	1/1/2010
Lead	Protection of human health	Calendar year	0.5	Annual mean.	1/1/2005
CO	Protection of human health	8 hours	10,000	8-hourly mean	1/1/2005
Benzene	Protection of human health	Year	5	Annual mean.	1/1/2010

Table 4.2 Limit Values from Air Quality Standards Regulations, 2002

4.3 Impacts Assessment

4.3.1 Construction Phase

It is expected that the construction phase will last a total of approximately 1 year and due to the scale of the development and short term earth moving activities, any impact on air quality will be minimal.

Dust

The major potential impact on air quality during the construction of the development will be dust, particularly in drier weather conditions. However, this will be limited at the proposed development as the quantity spoil to be excavated is small. Construction vehicles and plant have the potential to release particulate matter by generating windborne dust and from exhaust fumes. Impacts due to dust will be minimal if plant and equipment is kept in good working order. Therefore dust is not considered a significant impact.

Odour

No significant adverse odour impacts are anticipated during the construction phase as there are no odour generating activities.

Gaseous Emissions

During the construction phase the major gaseous emissions will be exhaust fumes from construction vehicles and plant (including generators, compressors etc.). Due to the size of the site (3.54 acres) and the short-term construction phase, the impacts are deemed negligible.

4.3.2 Operations Phase

Each air quality (Dust, Odour and Gaseous Emissions) parameter is evaluated and assigned a rating in terms of impact potential based on the design, waste to be managed and the proposed operational procedures. This evaluation is presented in matrix form in Table 4.3 Identification of Potential Emission Sources.

Type and Source of Emission	Rating: L=low, M=medium, H=high									
	Waste Recovery/Transfer Facility					Sludge Dryer and Ancillary Facilities				
Rating	L	L-M	M	M-H	H	L	L-M	M	M-H	H
Odours from Waste	X						X			
Odours from Activities	X						X			
Dust from Waste	X					X				
Dust from Activities		X					X			
Vehicle Emissions	X					X				
Gaseous Emissions from Boiler/Burner	N/A	N/A	N/A	N/A	N/A	X				

Table 4.3 Identification of Potential Emission Sources

Waste Recovery

Dust

Activities at the Waste Recovery and Transfer building have the potential to generate dust in the loading and treatment of waste. However, as operations will be conducted indoors, dust generation will be prevented at source and thus impacts are considered minimal.

Odour

The Waste Recovery and Transfer building will treat waste from commercial and industrial sources. The absence of any significant quantities of putrescible organic waste due to segregation by the producer will ensure that odour impacts any minimal.

Gaseous Emissions

Vehicles and plant associated with materials handling and the incoming waste material provide the only source of gaseous emissions at the Waste Recovery and Transfer building. However, as the maximum truck movements per day at full operational capacity are estimated at 39, the gaseous emissions levels are negligible.

4.3.3 Sludge Drying

Dust

Sludge will be transported to site in closed vehicles. The wet sludge is then tipped into sludge reception bins (covered with hydraulic lids and gratings) in the fully enclosed Sludge Reception building. Dust potential from wet sludge is considered non-existent.

The sludge is dried using an indirect method. After the drying process the dried sludge is received onto a discharge conveyor and transferred to a product cooling conveyor, and indirectly cooled. The product with a moisture content of less that 10% is then screened to separate the fines, which are returned by the fines conveyer to the front of the dryer. The end-product is a sterilised granulate is collected in enclosed silos and containers. The system is designed to prevent fugitive emissions. All these processes are undertaken in a closed system which is housed in a building.

Odour

Odorous air pollutants are important primarily for their nuisance value and the number of complaints they generate rather than associated adverse health effects. The factors that influence odour complaints are the frequency of occurrence, intensity, duration of exposure, offensiveness and location of the odour.

Purge stream off-gas from the drying process, volatile organics evaporating from the hooded waste water plant and odours from the sludge reception bin will be treated by a standalone odour abatement technology such as a biofilter or thermal oxidiser.

The dried granulated sludge product is a sterilised material with a low odour emission rate due to the fact that the moisture content has been reduced to less than 10%. The granulate will be stored in sealed silos/containers so it can be directly transferred to trucks for removal. The dried sludge with a high solids content (circa 90-95%) can be stored on site for relatively long periods of time without causing problems.

Therefore the potential for any odour is considered negligible due to the controls and preventions.

Gaseous Emissions

Any potential gaseous emissions from the drying of the sludge will be trapped in the condensate and therefore treated by the odour abatement technology such as a biofilter or thermal oxidiser. Therefore the potential for any odour is considered negligible due to the controls and preventions.

4.3.4 Ancillary Facilities

The ancillary facilities that may have an impact on air quality include:

- Standby Generator,
- Truck Parking and Bulk Storage Area,
- Boiler and Woodchip Storage Building,
- Mobile Dewatering Plant,
- Waste Water Treatment Plant and Balancing Tank.

Dust

There will be negligible dust generated by the operating activities of the ancillary facilities. The Standby Generator will only be operated when there are electrical power outages. The Truck Parking and Bulk Storage area will be keep litter free and regularly swept. Poorly operated boilers and burners have the capacity to generate dust.

Odour

The wastewater treatment plant and mobile sludge dewatering unit have the potential to create odour problems. The wastewater treatment plant will be hooded and the gaseous emissions collected and treated by the standalone odour abatement technology (eg. biofilter or thermal oxidiser). Fuels stored on site have the potential to release volatile components to the environment; these will be stored in sealed containers in a covered bunded area thus eliminating fugitive emissions.

The proposed site control measures will ensure that all odour sources are controlled and contained at source as a priority together with final treatment.

Gaseous Emissions

Gaseous emissions of concern are primarily those from combustion sources to include boilers and generators. Gaseous emissions include NO_X, SO_2, CO, Carbon and Particulates (treated as aerosols). These emissions from the proposed combustion sources were examined using the (MAPMOS) Advanced Gaussian Plume Model to investigate the impacts on the surrounding environment. The complete air pollution modelling report is contained in Appendix 5.

Emission points will be from the boiler stack, treated off-gas from the pollution abatement system, vehicular movements and the standby generator.

All plant will be operated in accordance with Best Available Technology (BAT) principles and provided that correct operation, control and monitoring procedures are followed, the emissions are not expected to have any significant adverse impact on the local air quality.

4.4 Mitigation Measures

4.4.1 Construction Phase

Dust is not considered a significant impact during the construction phase. However, site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Exposed surfaces will be wetted as required to prevent airborne dusts.

Proper maintenance of vehicles and machinery will ensure that gaseous emissions are negligible.

4.4.2 Operation Phase

Waste Recovery

Dust

To prevent dusts at source, waste operations will be conducted indoors. Storage areas will be appropriately designed to accommodate the various incoming and outgoing waste streams. Compaction and baling of the recyclable wastes will ensure the containment of dusts that may be present. The implementation of good housekeeping, maintenance and training programmes on site will ensure that dust generation is kept to a minimum.

Odour

Due to the fact that only commercial/enterprise and industrial waste will be accepted at the waste recovery and transfer facility the odour potential is minimal. Any arriving material deemed unsuitable will be stored in a quarantine area and as soon as is practicable possible. Proper house-keeping is essential to ensure that holding times are kept to a minimum. The facility will be regularly cleaned and maintained to prevent odours associated with storage and handling of waste. Regular inspections will be conducted to prevent odour emissions as part of proposed operational plan.

Gaseous

Gaseous emissions at the Material Recovery and Transfer building will negligible. Proper maintenance of vehicles, plant and machinery will ensure that gaseous emissions are kept negligible.

Sludge Drying

Dust

The Sludge Drying building will be operated as a closed housed system to contain any generated dust. Dust potential from wet sludge is considered non-existent. The system is designed to prevent fugitive emissions. Proper housekeeping, maintenance and management of the sludge drying building will ensure that dust generating activities are limited.

Odour

Best Available Technology (BAT) measures were implemented during the design stage to prevent process and fugitive emissions.

Incoming sludge will generally be the product of secondary treatment and will thus have much of its odour potential removed (as opposed to primary sludge). This will be pumped directly into the enclosed system and a fan will be placed at the door to maintain a negative pressure in order to prevent fugitive odour emissions escaping.

The sludge will be dried using an indirect heating process, minimising air-sludge contact and thus reducing the pollution potential. The dried granular sludge has a very low odour potential and will be stored in closed silos and containers.

Process water and gas purge streams from the Sludge Drying Facility will be sent directed to the hooded wastewater treatment plant. Gaseous emissions from the hooded Waste Water Treatment plant will be treated by the standalone odour abatement technology.

Gaseous Emissions

Gaseous emissions like odour will be treated by the standalone pollution abatement technology.

Gaseous fugitive emissions will be avoided due to the fact that a closed system will be installed. Operating at negative pressure will ensure that there are no fugitive emissions at the inlet and outlet points.

Ancillary Facilities - Mitigation

Best Available Technology (BAT) measures were implemented during the design stage to prevent process and fugitive emissions.

Dust

The wastewater treatment plant will be covered and will not have any significant dust impacts. All ancillary plant and equipment will be maintained and cleaned.

Any dusts generated from combustion plant and vehicles on site will be minimised by regularly following effective maintenance and operation procedures. Staff operation and awareness training is proposed to ensure procedures are correctly followed. Regular cleaning and inspection of the site is essential to control dust levels.

A 2m buffer zone around the site together with a 1.85 - 2m high palisade fence will minimise the transfer of generated dust to neighbouring sites.

Any dust generated by boiler equipment and standby generator will be well within proposed ground level concentrations as directed by the draft TA Luft 2002 guidelines and SI 271 of 2002 Air Quality Standards (Refer to Air Quality Data and Modelling Report). Therefore no mitigation measures are required.

Odour

Odour will be prevented at source by controls in the composition of incoming wastes, proper handling procedures and maintaining practicable storage times. Odour from the various processes will be vented together and treated via the appropriate abatement technologies. It is proposed to undertake regular inspections so that odorous material is not accepted on site. Fuels and chemicals will be contained in sealed containers to prevent the escape of odorous compounds to the environment.

Gaseous

During the design stage, consideration has been given to selecting fuel efficient and low emission plant and machinery. Operational control to include regular inspection and servicing of vehicles, minimising on-site vehicle movements and monitoring of boiler equipment and other potential gaseous emission sources will ensure that the impact to air quality from the development is minimal.