Fingal County Council
Comhairle Contae Fhine Gall

Fingal Landfill Project

VOLUME 1
Environmental Impact Statement
Non Technical Summary

Waste Management Plan
Working for the Dublin Region

April 2006

RPS

ENVIRONMENTAL IMPACT STATEMENT

For The Proposed

Fingal Landfill

April 2006

VOLUME 1	**NON-TECHNICAL SUMMARY**
VOLUME 2	**MAIN REPORT**
VOLUME 3 - 5	**TECHNICAL APPENDICES**

VOLUME 1 – NON TECHNICAL SUMMARY

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1 INTRODUCTION

The proposed Fingal Landfill development will comprise of a new fully engineered landfill at a greenfield site in north County Dublin. The landfill disposal area will incorporate approximately 57 hectares which will be developed in lined cells, over approximately eleven construction phases and will include provision for leachate collection and treatment and gas collection and utilisation. The remaining site area comprising approximately 153 hectares will be used as a buffer area for screening/ landscaping of the landfill, for the provision of a new county road providing access to the landfill, and will also incorporate the landfill site infrastructure.

The Fingal landfill is a proposed development in respect of which an environmental impact statement (E.I.S.) requires to be prepared under Part 10 of the Planning & Development Act, 2000 (the 2000 Act) and the Planning & Development Regulations, 2001 made there under.

Where an E.I.S. has been prepared, the local authority must apply to An Bord Pleanala for approval, which is subject to statutory public consultation set out in Section 175 of the 2000 Act.

The E.I.S. contains certain specified information as provided for in Article 94 of and Schedule 6 to the Planning & Development Regulations, 2001.

The information on the likely effects/impacts on the environment of the proposed development contained in the E.I.S. considers and assesses the principal characteristics of the proposed development against the principal characteristics of the receiving environment.

The methods of assessment have regard, inter alia, to guidance documents published by the Environmental Protection Agency, namely, ‘Guidelines on the Information to be contained in Environmental Impact Statements’ and ‘Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)’.

2 STRUCTURE OF THE E.I.S.

This E.I.S. follows the structure outlined below:

- Volume 1 – Non Technical Summary
- Volume 2 – Main Report
- Volume 3 - 5 – Technical Appendices

Volume 1 - The Non Technical Summary outlines the main findings of the E.I.S. and summarises the main effects/impacts and mitigation measures for each environmental aspect.

Volume 2 - The Main Report follows the format outlined below;

- Chapter 1 contains information on the;
    - Need for the proposed landfill from both a national and regional level including waste policy;
    - Waste details for the proposed landfill; and
    - Outline of alternative sites considered.

- Chapter 2 describes the main design elements of the proposed development.
- Chapter 3 describes the main elements of the E.I.S. with regard to each of the environmental aspects. This chapter considers and assesses the existing environment; the potential effects/impacts of the proposed development and identifies measures to avoid reduce and, where possible, remedy significant adverse effects/impacts. **Table 3.1** shows the authors for the different environmental elements that were assessed as part of this E.I.S.

Table 3.1: Environmental Elements and Authors

Environmental Elements	Author
Public Health	Employment Health Advisers Ltd.
Social and Community	RPS Consulting Engineers
Disamenity Effects	McCarrick & Sons Real Estate Alliance
Air Quality	RPS Group/Odour Monitoring Ireland
Climate	RPS Group
Noise	RPS Group
Landscape and Visual	RPS Planning and Environment
Water – Surface	RPS Consulting Engineers
Water – Aquatic Ecology	Conservation Services Ltd
Bird Hazards	Central Science Laboratory
Terrestrial Ecology	Roger Goodwillie and Associates
Agriculture	RPS Consulting Engineers
Non-agricultural	RPS Consulting Engineers
Utilities/services	RPS Consulting Engineers
Architecture	Margaret Gowen and Co. Ltd
Archaeology	Margaret Gowen and Co Ltd
Traffic	RPS Consulting Engineers
Hydrogeology/Geology/Soils	RPS Group

- Chapter 4 is a summary of the significant effects/impacts and mitigation measures for each environmental aspect.
- Chapter 5 identifies the residual situation.
- Chapter 6 is the conclusion of the E.I.S.

Volume 3 – 5 – Technical Appendices, which contains reports and supporting documents for environmental elements considered in Volume 2.

3 NEED FOR THE LANDFILL

The Fingal Landfill is required as a fundamental and strategic element of the waste management infrastructure for the Dublin Region. Relevant planning and policy principles underlying the proposal include:-

Compliance with Regional Strategy and Plan – the proposed Fingal Landfill has been developed in a coherent and planned manner by the Dublin Local Authorities in-keeping with the planning and waste management policies of the region. Section 18.9 of the Waste Management Plan for the Dublin Region 2005 – 2010 includes the objective:- *"to provide a landfill (of up to 10 million tonne capacity) in accordance with the Dublin Landfill Siting Study 2004*". The proposed Fingal Landfill also conforms to Policy 18.10 of the Waste Management Plan, which seeks to ensure the Dublin Region can manage its own waste in a self-sufficient manner.

Minimisation of transportation impacts and costs– the proposed Fingal Landfill is closer to the centre of waste generation than any other landfill sites in the Greater Dublin Area (GDA). In the long term, reduced transportation distances will reduce environmental impacts and transportation costs, and represents a preferred option compared to more lengthy transfer distances.

Local Authority obligation to manage waste – the Dublin Local Authorities are responsible for managing waste from households, a small proportion of commercial outlets, and also wastes such as litter & street sweepings, residues from water and wastewater treatment plants etc. They currently manage c. 500,000 tonnes of waste annually and planning to develop appropriate waste management facilities to cater for this waste stream into the future either independently or in conjunction with the private sector via Public Private Partnership – is strategically important.

Need to guarantee landfill capacity - the authorised landfill capacity currently available in the Dublin Region is not sufficient to cater for future requirements: the capacity actually in place or authorised is limited. The proposed Fingal Landfill represents the coherent implementation of the forward planning policies expressed in the Greater Dublin Area's Regional Planning Guidelines, specifically the provision of adequate disposal capacity of a scale and standard to ensure regional competitiveness for waste disposal.

4 DESCRIPTION OF PROPOSED DEVELOPMENT

4.1 INTRODUCTION

The landfill will be located in north County Dublin. The site is located to the west of the M1 motorway between Courtlough and Ballough. The nearest population centres to the site are the villages of Ballyboghil and the Naul and the towns of Lusk, Rush, Balbriggan and Skerries **(Figure 6.1).** The site is located approximately 20 km from the centre of Dublin City.

The proposed development of the landfill facility covers an area of approximately 210 hectares and comprises two distinct areas:

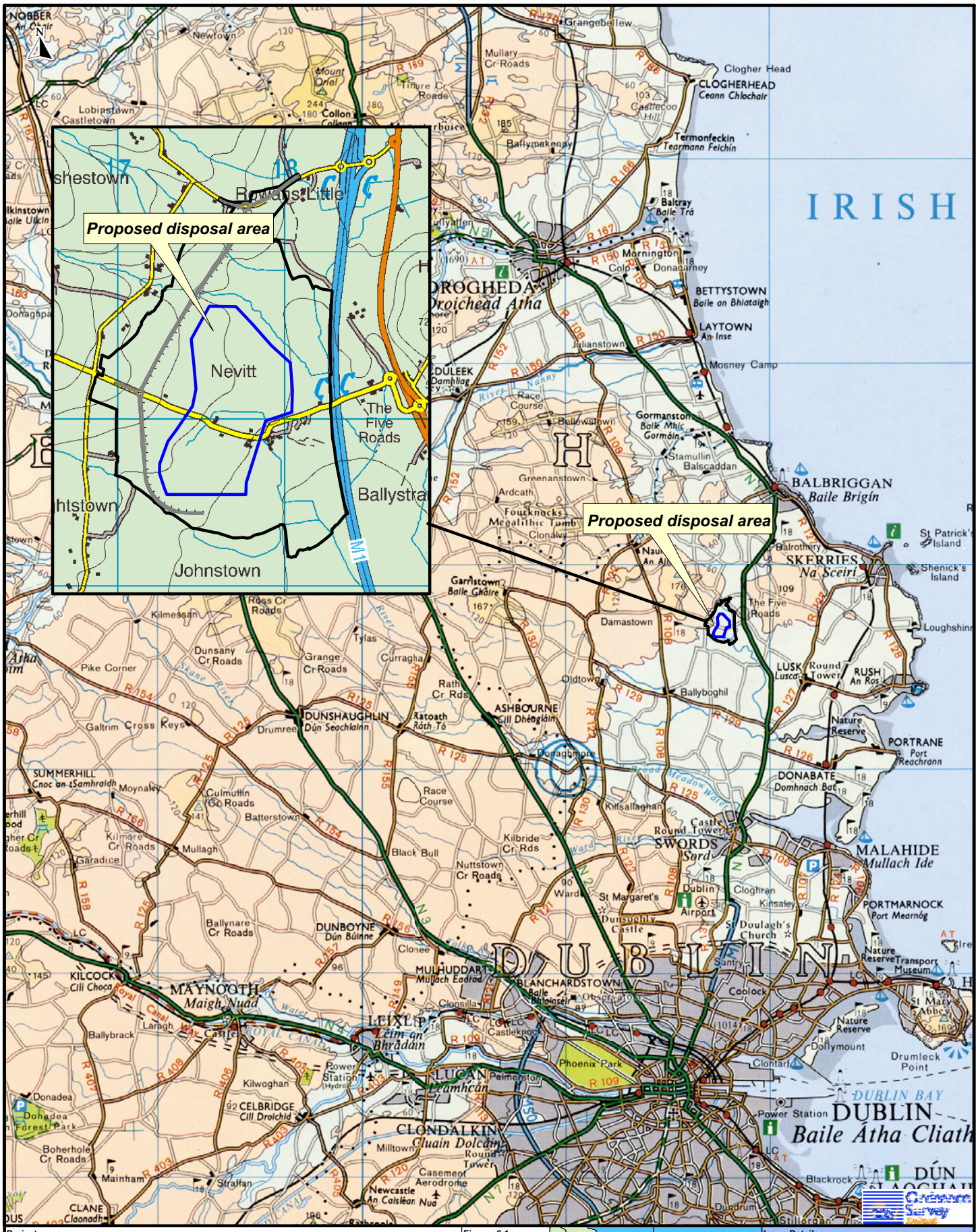
- Buffer zone consisting of landscape/screening/infrastructure areas; and
- Waste disposal area

The waste disposal area will cater for up to 9,400,000 tonnes of waste over its lifetime. The waste disposal area will consist of approximately 20-25 individual cells each with approximate areas of 2.5 ha or 25,000m^2.

4.2 FACILITIES

The landfill disposal area will incorporate approximately 57 hectares to be developed in discrete lined cells, over approximately eleven construction phases and to include the provision of leachate collection and treatment and gas collection and utilisation. A remaining area of approximately 153 hectares is to be used as a buffer area for screening/ landscaping of the landfill **(Figure 6.2).** This area will also incorporate the landfill site infrastructure including:

- New county road and landfill access road
- Public recycling centre



Project	*Fingal Landfill Project*	Figure 6.1	
Title	**Location Map**		

Issue Details

Drawn:	CW	Project No.	MDR0303
Checked:	EB	File Ref.	
Approved:	KW		MDR0303Mi0074
Scale:	1:250,000 @ A4	Drawing No.	Rev.
Date:	10/03/06	Mi0074	F01

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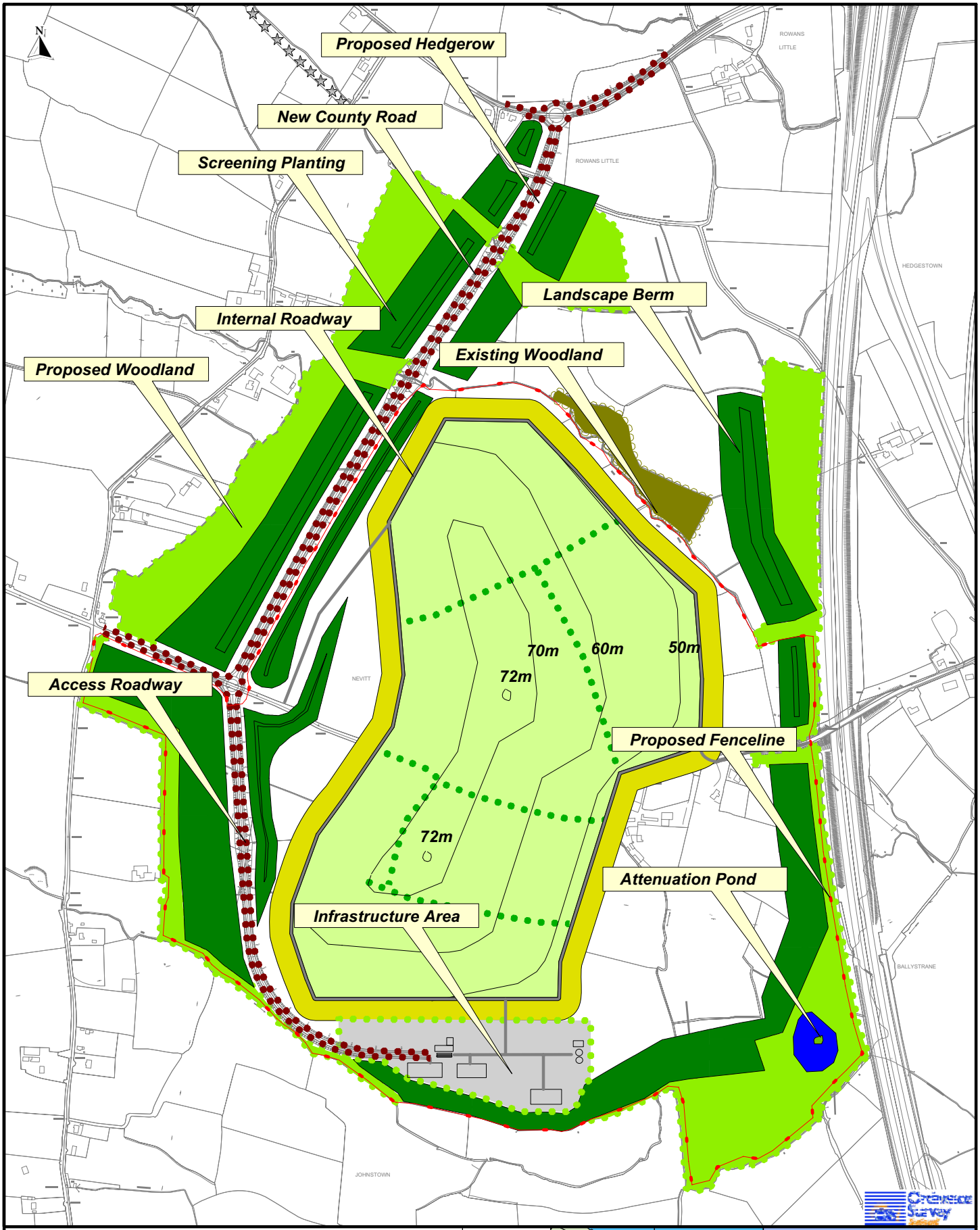

Project	*Fingal Landfill Project*	**Figure**	6.2
Title	**Proposed Development**		

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- Administration building & car parking
- Maintenance facilities
- Wheelwashing Facilities
- Weighbridges
- Waste Inspection and Quarantine Areas
- Gas Compound
- Leachate Treatment Facilities
- Surface Water Management Facilities

The landfill will cater for a maximum annual tonnage of approximately 500,000 tonnes of waste in the initial development period. Following the development of the proposed Waste-To-Energy (WTE) facility at Poolbeg this will reduce to approximately 300,000 tonnes. The landfill will have enough capacity to serve the Dublin Region as a non-hazardous landfill for up to 30 years depending on the progress of the implementation of other elements of the Dublin Waste Management Plan.

4.3 WASTE TYPES

The types of wastes to be received at the landfill for disposal include:

- Non-Hazardous Municipal Waste
- Industrial Non-Hazardous Waste
- Construction and Demolition Waste
- Biological sludge produced as a waste by-product of the on site leachate treatment system
- Residues from Water and Wastewater Treatment
- Bottom Ash from Non-hazardous Waste to Energy Plants

Waste will be accepted only from permitted waste hauliers. No hazardous waste will be accepted for landfill at the facility.

4.4 BUFFER ZONE AND EXCAVATED MATERIAL

The buffer zone surrounding the proposed waste disposal area serves three main functions. The first is to provide a physical separation between the landfill area and local residents; the second is to provide an area for the disposal of excavated material for screening and landscaping purposes and the third is to provide an area for associated site infrastructure.

Approximately 3,000,000 m^3 of soil and rock will be excavated from the site over the lifetime of the development. As the material is removed it will be deposited in the buffer zone and shaped, seeded and planted so that a natural landscape will be created to mitigate against negative views and operational and construction noise from the landfill.

The proposed screening/landscaping areas will have a maximum height of 7m and will cover a total area of approximately 60 ha.

4.5 WASTE DISPOSAL AREA AND PHASING OF CELL CONSTRUCTION

The waste disposal area comprises an area of approximately 57 hectares in size and will be developed in a number of construction phases, with construction phases typically occurring every 2-4 years depending on waste intake volumes. Between 20-25 individual cells in total will be constructed with a number of cells being constructed in each phase. The cells will have areas of up to 2.5 hectares and will on average hold 400,000 tonnes of waste and it is anticipated that it will take between 1 and 1½ years to fill each cell with the initial cells being filled in less than a year.

Construction of the first phase of development is estimated to take between 12 and 18 months and will include:

- Landfill cell development to allow for 1.6 million tonne capacity.
- New County Road and Access road for landfill
- Public Recycling Centre
- Leachate Management Infrastructure
- Landfill Gas Management Infrastructure
- Surface Water Management Infrastructure
- Foul Water Management Infrastructure
- Administration Building
- Plant Workshop and Equipment Compound
- Site Security (including CCTV and fencing)
- Paved areas around the site infrastructure
- Weighbridges
- Wheelwash Systems
- Fuel Storage Bund
- Waste Quarantine Area
- Waste Inspection Area
- Traffic Control
- Services
- Emission Monitoring Infrastructure
- Mechanical, Electrical, Instrumentation, Control and Automation

Approximately two years after completion of the first phase of construction, and depending on waste intakes at that stage, a second construction phase is likely to commence which will incorporate both capping of previous filled cells and the development of additional cells. This will be the model for the development of the site where cell developments and capping will be carried out on a phased basis throughout the life of the landfill.

4.6 COMPOSITE LINING SYSTEM

A composite lining system will be installed at the Fingal Landfill in accordance with the EPA Landfill Site Design manual. The liner system will consist of the following components at a minimum:

- A minimum 0.5m thick leachate collection layer;
- Geotextile protection layer;
- A minimum 2mm thick HDPE liner or equivalent; and
- 1m thick, compacted clay liner.

The composite liner system will be designed to act as the primary barrier to leachate migration. However the lining system will be supported by a minimum depth of 10m of low permeability clay, which will act as a further extensive barrier in the unlikely event of any leachate migration through the composite lining system.

4.7 LEACHATE COLLECTION

Leachate is generated as a result of rainfall on the landfill, which percolates through the solid waste thereby becoming contaminated by various chemical and biological processes within the waste and also includes moisture which leaches directly from the waste.

Leachate will be collected from each individual cell and either recirculated back into filled cells or pre-treated on site. A leachate management system will be installed which will include monitoring, collection and recirculation infrastructure, removal of leachate from each discrete cell, 7 day storage capacity of raw leachate in a covered fully engineered lined tank, primary treatment system to allow for discharge of treated leachate to sewer for final treatment at a municipal wastewater treatment facility off site. The detailed design, installation and commissioning of the leachate management system will be in accordance with the EPA Landfill Site Design Manual.

4.8 EXTRACTION AND UTILISATION OF LANDFILL GAS

The biodegradation processes in a landfill produce gas, which is primarily composed of methane, carbon dioxide and water vapour. Typically gas will continue to be generated for between 20 and 50 years after placement, (depending on the aforementioned site conditions), with a peak in production after 2 to 5 years.

A gas management system including gas collection, extraction and flaring system will be installed at the site from the outset and extended during progressive capping of the cells. Gas will be utilised as an energy source with the gas being burned in a gas engine to produce electricity.

4.9 CLOSURE AND AFTERCARE

Closure and restoration of the landfill will be carried out in accordance with the EPA Manual “Landfill Restoration and Aftercare” (1999) or with any conditions set down by the EPA. The final capping

system will be progressively installed and sown/planted after the landfill cells/construction phases reach full capacity. The capping system at a minimum will consist of:

- Gas collection layer;
- Compacted mineral layer of minimum 0.6m thickness;
- Drainage layer of 0.5m thickness;
- Subsoil; and
- Topsoil – such that the subsoil and topsoil have a total thickness of 1m.

After the landfill facility has ceased accepting waste, the monitoring and management systems will continue to operate as normal until such time as the EPA determines that the landfill no longer poses an environmental risk and the Waste Licence has been surrendered.

4.10 OPERATIONAL PRINCIPLES

The site will be operated in accordance with best international practices for similar facilities and having regard to the Waste Management Act, 1996 as amended; Waste Management Licensing Regulations 2002; EPA Landfill *"Operational Practices"* manual (1997); the EU Directive on Landfill of Waste 1999; such Waste Licence as may be issued by the EPA; and any subsequent legislation and licences.

A comprehensive Environmental Management Plan (EMP) will be prepared for the site pursuant to these objectives. The purpose of the EMP is to set out the measures, procedures and guidance *"to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, as well as the resulting risk to human and animal health, from landfilling of waste"* (from Article 1 of the EU Directive on the Landfill of Waste (99/31/EC)). This Environmental Management Plan will be updated as part of the requirements of any licence that may be issued for the development by the EPA.

The proposed facility is a municipal waste facility and as such is required to accept waste during normal working hours. In order to facilitate the volume of waste traffic expected and to ensure as little queuing of waste trucks occurs as possible permission is being sought for the following opening hours:

Landfill and Associated Activities:

- Waste acceptance at the facility, for disposal to the landfill, between the hours of 8.00am and 4.30pm Monday to Saturday inclusive.

- Landfill operations between the hours of 7.30am to 8.00pm Monday to Friday inclusive, 7.30am - 6:30pm on Saturdays and 8:00am to 4:30pm on Sundays and Bank Holidays (Operations on Sundays and Bank Holidays to be limited to essential maintenance only)

- Construction activities at the facility between the hours of 7:30am to 8:00pm Monday to Friday inclusive, 7:30am to 6:30pm on Saturdays. No construction on Sundays or Bank Holidays

Public Recycling Centre Activities:

- The Public Recycling Centre will accept waste between the hours of 8:00am to 4:30pm Monday to Friday, 8.00am to 4.00pm Saturdays and Sundays.

- The Public Recycling Centre operations will be carried out between the hours of 7.30am to 6.30pm seven days a week and 8:00am to 4:30pm on Bank Holidays.

5 WRITTEN SUBMISSIONS

Any persons wishing to make a written submission or observation in relation to the implications of the proposed development for proper planning and sustainable development in the area concerned and/or the likely effects on the environment of the proposed development, if carried out, may do so within the specified period by sending same to:

An Bord Pleanála
64 Marlborough Street,
Dublin 1

6 ENVIRONMENTAL ASSESSMENT

6.1 HUMAN BEINGS - PUBLIC HEALTH

It is estimated that somewhere between 1,000 and 1,500 persons live within 3 km of the proposed landfill site. One school and two juvenile remand centres are within 2 km of the site. There are no hospitals, or other care institutions within 3 km of the proposed site. The site is therefore in a rural environment with moderately dense housing in the 3km buffer.

Although a great number of studies have been carried out of different potentially adverse effects, evidence of a causal relationship between specific health outcomes and landfill exposures is inconclusive. The health effects associated with living close to a non-hazardous landfill site appear to be very small, if any. Any effects that do exist can only occur as a result of physical, chemical, biological or psychological exposures that might occur as a result of living in proximity. If all possible emissions from a landfill site are kept as low as possible the possibility of any health effect is minimised. There is minimal risk associated with the proposed site when operated in accordance with EPA guidance and conditions of such Licence as may be issued by the EPA.

Overall any additional health risk of living close to the proposed non-hazardous landfill site is assessed as extremely low. On the information available the proposed landfill, constructed and operated as intended will not pose a material threat to human health.

6.2 HUMAN BEINGS - COMMUNITY IMPACT

The proposed site is situated in a relatively rural setting in North County Dublin, west of the M1 motorway, with Lusk, Balbriggan and Skerries being the closest “large” centres of population. There are approximately 118 residences within 1km of the proposed site, 259 within 2 km and 497 within 3 km. With the exception of the cluster of 8 houses at the Nevitt Road, which crosses the proposed development site, the settlement pattern in the vicinity of the site is generally linear with residences fronting onto the local road network.

There is no specific community focus within the proposed site or its immediate vicinity. The national school at Hedgestown does provide a social focus for families with children of primary school going age. The Nevitt road gives the most direct access to the school from the west.

Agriculture, light industry, rural housing and quarrying have been the traditional land uses in the surrounding area. However, in more recent years, 2 waste facilities for managing inert material have been established to the north and west of the proposed site and a business park is being developed around the Courtlough Interchange on the M1 to the north-east of the site.

The perceived potential impact of the presence and operation of the development may initially have a significant impact on the community in the vicinity of the site in terms of concerns regarding property values, health security and general enjoyment of the environment. The proposed development will result in the acquisition of the cluster of 8 houses located at the Nevitt Road. This will have a direct impact on a small proportion of the local community.

During the construction phase of the proposed landfill there will be a temporary positive impact on local employment and local businesses and services. With the exception of the closure of the section of the Nevitt Road, no social or community infrastructure will be directly impacted by the development of the facility.

The impact of the proposed alteration to traffic flows in the vicinity of the Hedgestown school due to the closure of the Nevitt road will have a positive effect on traffic volumes as these will be considerably reduced, particularly the number of heavy goods vehicles.

The perceived impact of the development on the overall well being of the community and environment in the vicinity of the development will be mitigated by involving the community in the management of the facility through the creation of a local liaison committee and through the creation of a community fund to be spent on community projects/facilities and environmental initiatives/improvements that will benefit the local community.

With the exception of the landowners and residents currently located within the proposed development site; appropriate design, licensing and operation of the landfill will ensure that the development does not have a significant impact on the community living and working in its vicinity. However, the presence of such a facility in the community will initially have a moderate impact on the well being of the community in terms of the perceived impacts of the development.

6.3 HUMAN BEINGS - DISAMENITY EFFECT

The lands in the immediate vicinity of the proposed development are primarily rural, with agriculture the principal land use. There are 2,869 residential properties within 5km of the proposed landfill boundary and 183 commercial properties. The number of houses and commercial properties within 250 metres of the study area is 36. The disamenity assessment found that there was an initial drop in prices of property within a 1 mile radius of the landfill boundary though there is no depreciation of value on properties outside the 1-mile radius.

The effect on property value is an effect on the disamenity of the area. The mitigation should therefore be to enhance the amenity value of the affected/local area i.e. setting up a community fund as outlined in the previous section, and hence negate the disamenity effect of the proposed landfill.

6.4 AIR QUALITY

The potential impact of the landfill has been assessed in terms of its impact on air quality and odour. A baseline air quality assessment has been carried out in the area around the site of the proposed development to identify the existing pollutant trends in the area.

The existing air quality is considered generally good within the surrounding area. The M1 motorway runs parallel to the western boundary of the site and the volume of traffic using the M1 may have an impact on air quality as a result of vehicular emissions. However, as the traffic is relatively free flowing the potential for traffic gridlock and elevated levels of pollution is not considered high.

There are no other major sources of potential air pollution in the area. There is one large quarry to the west, which may generate dust, and other small industries in the area but a large proportion of the land use is agricultural, which may have odour implications.

The main potential impacts from the proposed development were modelled and it is predicted that there would be little or no impact on air quality or odour within the vicinity of the proposed landfill.

In order to ensure that no dust or odour nuisances occur during the operational phase of the landfill a series of mitigation measures will be implemented which will include wheel-wash systems, construction of paved internal roads, spraying road surfaces with water during dry weather, all trucks delivering waste to the facility will be covered, all waste will be incorporated into the active face as soon as possible, the deposited waste material will be covered on a daily basis and a landfill gas collection, utilisation/flaring system will be installed.

6.5 CLIMATE

The potential impact of the proposed landfill has been assessed in terms of greenhouses gases and long term impact to climate change. The assessment has included both the impact of the degradation of waste to methane levels and impact of traffic alterations to carbon dioxide emissions.

The landfill gas generation model predicts the potential volume of greenhouse gas that will be emitted from the proposed landfill. The model predicts that the maximum flow of gas from the landfill is likely to occur in 2011. Gas generation decreases thereafter due to the reduction in the waste volume and biodegradable content of the waste. However, it is proposed to utilise as much as possible of this gas to produce electricity using gas engines. This will reduce the net effect of the proposed landfill to greenhouse gases and the impact is predicted to be low in the long term.

The traffic impact to climate change as a result of the proposed landfill has been assessed quantitatively. The results of this prediction indicate that with the proposed landfill in operation, the increased carbon dioxide generated by traffic will increase by 3.6% in 2009 and 0.5% in 2024. The results show that the generation of greenhouse gases as a result of traffic associated with the proposed landfill is considered low in the long term.

6.6 NOISE

Noise was monitored at a number of noise sensitive locations, including residential properties, at the boundary of the proposed landfill site. The existing acoustic environment of the site is dominated by traffic along local roads. In the absence of passing traffic, noise from the M1 motorway makes up the background noise.

A worst-case construction scenario was modelled, with all construction machinery running simultaneously at a minimum distance to the nearest noise sensitive location. The results indicated that noise levels during this phase of the development will be similar to existing baseline levels, therefore resulting in a moderate short term impact.

The potential noise impacts from the proposed landfill during its operational phase will primarily be as a result of increased traffic flows along existing routes within and surrounding the development coupled with the operation of both mobile and stationary site plant and machinery.

Based on recommendations from the EPA, noise levels during the operation of the landfill will be limited to 55dB L_{Aeq} during day time hours. Predicted noise levels from site plant and machinery during the operational phase of the landfill are below this recommended limit and therefore will not be significant.

An earthen berm will be erected between properties along the western boundary of the site and the proposed county road, which will reduce noise levels from this source. This will be extended as far as the site entrance.

6.7 LANDSCAPE AND VISUAL

The proposed site is located on the gentle east facing side slopes of Knockbrack Hill. Knockbrack and its associated rounded hills dominate the surrounding lowlands of North Fingal and are significant visual components of this landscape. Elevated views across the site are available to Dublin Bay and mountains. Below the Nevitt Road, the side slopes give way to level lowland which contains an almost flat landscape crossed by the M1. There are protected views in the vicinity of the site and one area of Sensitive Landscape surrounds Knockbrack and Nags Head hills and crosses the western side of the proposed site.

The landscape of the study area incorporates elevated agricultural hills and lowland agricultural landscape. The proposed landfill lies completely within the lowland agricultural landscape area. The construction and operational phases will alter the overall landscape character resulting in the loss of existing field patterns and loss of arable and pastoral characters and this will have a moderate negative effect on the landscape. There will be no significant landscape impacts as a result of the proposed development.

The negative visual impact of the proposal on residential properties and road users will range from slight to substantial. A number of properties will have significant visual impacts.

The impact on sensitive landscapes is slight, while the impact on protected views is moderate. Neither of these impacts will be significant.

Landscape planting will take place to reduce the level of visual impact caused by the proposed development and to assist in blending the development with its surroundings. Mitigation measures will be put in place to protect any trees and hedgerows to be retained on site.

6.8 SURFACE WATER

An assessment was carried out to determine the likely and significant impacts associated with the surface water environment from the proposed landfill, particularly relating to quantity, physical and chemical quality of surface waters. There are a number of streams crossing the proposed landfill site, which form part of the Corduff River Catchment. Monitoring of local watercourses identified local flooding as an issue in low-lying areas south of the proposed landfill. Results from water quality monitoring in some of the local watercourses indicated that there are potential pollution issues.

Impacts on adjacent watercourses and ultimately the Corduff River could occur during the construction phase of the proposed development from the accidental discharge of suspended solids and other

pollutants. During the operation of the landfill there is a potential impact from the quality and quantity of surface water runoff from paved surfaces and buildings entering the storm water drainage system.

Therefore during construction, there will be strict control of erosion, sediment generation and other pollutants associated with construction processes. A sustainable drainage system will be implemented at the site to mitigate the adverse impacts of storm water from the site and ensure the effective reduction in pollutants. Any leachate generated from the landfill will be contained and undergo preliminary treatment on site for discharge to sewer for final treatment at a municipal wastewater treatment plant before discharge to receiving waters. No leachate treated or otherwise will be discharged to local surface waters.

6.9 AQUATIC ECOLOGY

The proposed Fingal landfill site is drained by four small streams, all of which converge adjacent to the eastern boundary of the site to form a tributary of the Corduff (Ballough) River. Habitat assessment carried out on the local watercourses found that although some of the streams on site were found to have significant potential salmonid nursery habitat quality, a significant proportion of the stream/river downstream of the site was found to have degraded habitat. Biological assessment indicated moderately polluted conditions throughout the system. Fish assessment indicated significant populations of brown trout in sections of the Corduff river where habitat and water quality are suitable.

The proposed landfill will result in the loss of c. 1km of watercourse within the area that it is proposed to landfill. The habitat lost does not constitute suitable habitat for salmonid fish.

If adverse impacts from the proposed landfill on the ecology and fish populations of the Corduff river are to be avoided, it will be necessary to prevent leachate and other pollutants from reaching the river.

All leachate will be collected, treated and discharged to sewer. Detailed measures are also included in the E.I.S. to minimise or prevent pollution of surface waters by suspended solids and other pollutants during the construction and operation of the landfill.

The proposed Nevitt road realignment will cross two streams on the site. This realignment will be designed and constructed in such a way as to ensure that the streams remain passable for fish. The two crossings will be by way of bridge or open bottomed culvert retaining the existing stream substrate and flow regime. To facilitate the construction of the new road it is proposed to straighten a section of stream at the southern crossing. The stream in this section constitutes good potential salmonid nursery habitat. Detailed recommendations are included in the E.I.S. to maximise the habitat value of the replacement channel.

In order to compensate for the moderate impact, which may be caused due to stream habitat loss on the proposed landfill site, habitat improvement works will be carried out on the man-made channel of the Corduff River. This will result in a net moderate positive impact from the total development on salmonid habitat quality and fish passage conditions.

Providing that compensation and mitigation measures are implemented in full, and that leachate is fully contained and disposed of to sewer, the residual net impact of the proposed Fingal landfill development on the Corduff River system will be a positive impact of minor or moderate significance.

6.10 BIRD HAZARDS

The proposed new landfill facility for Dublin is located approximately 12.5km north of Dublin Airport and therefore might attract birds that could create a birdstrike risk to aircraft. The existing facility at

Balleally, which is only 10km from the airport, already attracts large numbers of gulls and crows. The proposed new site would be likely to draw these birds further from the airport and could therefore reduce the birdstrike risk as aircraft operating further from the runways are operating at higher altitudes. They are therefore less likely to come into contact with birds from the landfill. Studies in the area have shown, however, that birds such as gulls would commute to feed at the site from coastal areas and, in some rare instances, could come into conflict with aircraft flying through the same airspace on departure from the airport.

Mitigation measures will be implemented at the proposed site because of the risk of birdstrike. These will be deployed for the life of the site to stringent standards based on zero tolerance towards gulls and crows. Combinations of active deterrence including falconry, distress calls and other measures will be used from dawn to dusk, seven days a week. Failures of the system will result in cessation of waste acceptance at the facility until the failure is resolved. Consistent failures will require the erection of a bird exclusion netting system in addition to existing measures. Airport staff or their representatives will be allowed to inspect the site to assess the effectiveness of deterrence measures and ensure that the site does not create a risk to flight safety.

6.11 TERRESTRIAL ECOLOGY

The landfill is planned on agricultural land in north Dublin in a mixed area of intensive grassland and tillage farming. Two stream valleys provide the main features of habitat interest though these are only of local value. There is one unusual native plant - a St John's wort - while badgers and five species of bats occur in the overall site. The bird fauna includes the yellowhammer. No parts of the site are protected by an ecological designation though much of the wildlife (except for pest species) is protected under the Wildlife Acts 1976 and 2000.

The proposals involve the excavation of soil and its permanent storage in peripheral banks or berms, the diversion of the central road to the north so that it runs across the north-west corner of the area, and the later disposal of refuse. There will also be an access road to the southern end. Landscaping of the berms will take place as well as a significant amount of woodland planting outside them to conceal their height.

The position of the development within the site means that none of the above features of ecological note will be directly affected. However it will reduce the feeding habitat for many mammals, including bats, which will decline slightly. New plantings on the berms that surround the landfill and along the new roadway in the northwest corner will eventually replace and augment the existing complement of trees and hedgerows and will be of net benefit to most of the wildlife. The impact should be thought of as minor and temporary. Waste disposal itself will not have significant impacts on ecology though there will be changes in the local bird fauna.

Demolition of buildings and felling of trees will be carried out under the guidance of a bat specialist. Bat boxes will be installed in suitable locations around the site. Measures will be carried out to protect and replace any badger setts that are impacted by construction. All landscaping measures will concentrate on native species of tree and shrub to maximise the habitat value for fauna.

6.12 MATERIAL ASSETS – AGRICULTURE

Land within the proposed landfill site has three principal uses: tillage, grassland, and woodland; and four principal agricultural enterprises, tillage, dairying, drystock (horses sheep and cattle) and commercial woodland. Farming enterprises within the site will be affected by land take, severance and loss of farm buildings or facilities.

The proposed development will not have a significant impact on a national or regional scale. It will have a minor impact on a local scale due to loss of agricultural land. The proposed development will have a significant impact on landowners within the proposed site. This will range from a “major” impact on those landowners that are losing a considerable area of land, to a “severe” impact on those that are losing all their lands at this location and their associated farm buildings. Mitigation for landtake will be dealt with through compensation under the statutory code. Mitigation for other sources of environmental nuisance is detailed in the relevant chapters of the E.I.S.

6.13 MATERIAL ASSETS - NON-AGRICULTURE

There is a cluster of eight dwelling houses on the Nevitt Road crossing the proposed site and three houses to the north that will be impacted by the proposed development. If the proposed development proceeds then the eight dwelling houses will be acquired and demolished. The effect will be profound, as these buildings will cease to exist. A landtake will also be required for the “tie-in” of the new County Road with the Rowans Road. This landtake consists of the road in front of three houses to the west of the new County Road.

Where buildings are acquired for the proposed development then the mitigation will be compensation through the statutory code. For the three houses to the north of the development, the landtake for the new road will not affect the boundaries of the properties, only the road, and therefore the impact will be imperceptible. Disturbance during construction of the new road will be minimised.

6.14 MATERIAL ASSETS - SERVICES AND UTILITIES

There are a number of utilities in the location of the proposed development including gas pipelines, overhead power lines, water mains and telecommunications. The gas pipeline will not be affected by the proposed development. All other utilities that will be affected will be replaced and/or re-routed with minimum disturbance to end-users.

6.15 CULTURAL ASSETS – ARCHITECTURAL

A total of 27 properties/structures were identified during the field assessment – 13 close to or within the footprint of the proposed disposal area and 14 on the periphery of the study area. None of these properties/structures have protected status.

Of the 13 properties/structures close to or within the footprint of the proposed disposal area, 6 are of architectural heritage merit. These properties/structures will be removed by the proposed landfill and as such will be adversely impacted. The remaining 7 properties close to or within the disposal area are of no architectural heritage merit and their removal will not result in an adverse impact.

Of the 14 properties/structures located on the periphery of the study area, 6 are of architectural heritage merit and the remaining 8 are of no architectural heritage merit.

None of the properties/structures scheduled for removal have protected status. Properties/structures of architectural heritage merit that are to be removed by the proposed landfill, do not warrant avoidance as part of the mitigation strategy and will be recorded prior to removal ‘as a record of the past’. The removal of modern properties does not adversely affect the architectural heritage of the study area and therefore requires no mitigation measures. Furthermore, the properties/structures of architectural heritage merit located on the periphery of the study area will not be adversely impacted by the proposed landfill or access road and do not require mitigation.

6.16 CULTURAL ASSETS – ARCHAEOLOGICAL

Archaeological investigations combined with geophysical surveys have identified eight areas of below ground remains indicating individual sites, and four areas of archaeological potential were revealed. The proposed design for the landfill has ensured that two of these sites, the largest and most complex, will be preserved in situ and protected by an exclusion zone in which no development will be allowed take place. At the extreme north of the development, outside the study area an enclosure with internal divisions was detected at the proposed location for the roundabout. The road design has now been altered to allow preservation in situ to take place and the site has therefore been avoided.

A circular cropmark detected by aerial photography in Walshestown townland to the north of the disposal area was subject to investigation and geophysical survey and was revealed to be archaeological in nature. The proposed access road has been redesigned to avoid this feature however earthen berms will be placed over the site. If preservation in situ is not a viable option the site will be excavated ensuring preservation by record well in advance of the construction stage of the development.

Four other sites, located within the proposed disposal area were confirmed to be archaeological in nature by the testing regime employed throughout the development area. These sites while disturbed in places by deep ploughing or truncated due to ongoing agricultural practices will be preserved by record and will require full excavation in advance of construction of the development. A further archaeological site was detected by geophysical survey in the southeast corner of the proposed development. As this site is located just north of an area proposed for the construction of a berm, archaeological excavation is proposed as the most appropriate mitigation strategy to be employed in order to accurately record this below ground site in advance of construction.

Three other areas proved to be archaeological in nature although no site type could be assigned given the disturbed nature of the remains. These areas will be fully excavated and recorded in advance of any construction taking place for the proposed development.

Monitoring by a licensed archaeologist of the topsoil stripping process will take place at the site preparation stage of the development through out the site so archaeological material is recognised, reported to the authorities and appropriately preserved. Provision will be made to allow for and fund the archaeological works required to resolve any remains that are noted during the site preparation phase of development.

6.17 TRAFFIC

Traffic surveys were undertaken in the vicinity of the proposed development in order to establish existing traffic patterns. The information was collected and collated to determine if there were specific differences in daily trends in traffic movements within the vicinity of the proposed landfill.

The potential impact of the proposed development on the surrounding road network was also assessed in terms of operational difficulties such as queuing or delay. Mitigation measures have been proposed in order to alleviate any significant negative impacts that may arise from the proposed development.

The Nevitt Road will be closed to traffic with the opening of the proposed Fingal Landfill in 2009. The provision of the new ““County” Road” between Rowans’ Road and Nevitt Road will provide a suitable alternative and a high degree of accessibility to Fingal Landfill. Utilising the existing Nevitt Overbridge

as an entrance point to the proposed landfill was considered in the Traffic assessment and was found to be less suitable.

Fingal Landfill will not result in traffic congestion or operational problems on the road network. All junctions have been proven to operate satisfactorily in the Opening Year 2009 and the Design Year 2024. If the Courtlough Interchange is not upgraded, the existing road network has capacity to accommodate the proposed Fingal Landfill traffic satisfactorily.

The proposed Fingal Landfill has been tested with the recommended mitigation measures detailed in the E.I.S. and the results showed that no operational difficulties are expected. It is anticipated, therefore, that the residual impact on traffic will be imperceptible.

6.18 HYDROGEOLOGY/GEOLOGY/SOILS

The bedrock geology of the North Fingal area is varied. Apart from Lower Palaeozoic Rocks which lie to the north of Bog of the Ring, the geological succession is Carboniferous aged.

The bedrock geology of the study area was established by ground investigations which encountered limestones, siltstones and mudstones inferred to be of the Balrickard, Loughshinny, Lucan, Naul and Walshestown Formations. In general, depth to bedrock ranged from approximately 5m to 34m below ground level (mbGL) within the study area.

The overburden within the study area typically consists of glacial till deposits overlying bedrock and in some places sand and gravel deposits. The depth of overburden was found to vary considerably with typical thicknesses range from 15m to 25m, thinning to the east and southeast.

The deepest clay deposits were found within the centre of the study area (where the proposed landfill footprint has been located) with thicknesses up to 27.25m encountered. Sand and gravel deposits vary across the study area with thicknesses ranging from absent to 10m. These areas lie outside of the landfill footprint.

The landfill footprint has been specifically located such that it is in an area where groundwater has a low vulnerability to pollution due to the presence of thick (at least 10m) low permeability (clay) subsoils and where a minimum of 10m of low permeability clay will be retained below the footprint when excavation occurs. The site has the lowest risk response of ‘R1’ in the DoEHLG/ EPA / GSI Response Matrix for landfills, contained within the Groundwater Protection Scheme Guidance Document 1999.

Mitigation measures have been proposed for construction, operation and aftercare phases to further minimise potential impacts associated with the proposed development such as:

A minimum of 10m of low permeability clay will be retained to mitigate the impact on groundwater vulnerability; a groundwater monitoring network will be used to determine any changes in groundwater levels; leachate levels within the landfill will be controlled at the site and monitoring boreholes will be installed to monitor levels; the network of groundwater monitoring wells will be sampled and analysed to establish any changes in water quality; capping will be progressively placed, sown and planted as the landfill cells are filled.

The hydrogeology, geology and soils assessment concluded that there will be no significant residual impact.

7 INTERACTIONS/INTER-RELATIONSHIPS IN THE RECEIVING ENVIRONMENT

The interactions/inter-relationship between the various environmental factors was also taken into account as part of the assessment. Where a potential exists for interaction between two or more environmental topics, the relevant specialists have taken the potential interactions into account when making their assessment and where possible complementary mitigation measures have been proposed.

Table 7.1 shows a matrix of significant interactions likely to occur from the proposed development. The boxes marked with a dot in **Table 7.1** indicate that a potential relationship exists between the two environmental factors. The level of interaction between the various topics will greatly vary but the table allows the interactions to be recognised and further developed where necessary. The table is constructed on the basis that an environmental subject has a potential inter-relationship both during the construction and operational phases of the proposed development.

Table7.1: **Inter-Relationship Matrix - Potential Significant Interaction in the Receiving Environment**

	HUMAN BEINGS	AIR	NOISE	LANDSCAPE	FLORA AND FAUNA	WATER	BIRD HAZARDS	GEOLOGY/SOILS/ /HYDROGEOLOGY	CLIMATE	MATERIAL/CULTURAL ASSETS
HUMAN BEINGS		●	●	●	●	●	●	●	●	●
AIR	●				●	●		●	●	●
NOISE	●			●	●		●			●
LANDSCAPE	●		●		●			●		●
FLORA AND FAUNA	●	●	●	●		●	●	●	●	●
WATER	●	●			●			●		●
BIRD HAZARDS	●		●		●					●
GEOLOGY/SOILS/ HYDROGEOLOGY	●	●		●	●	●				●
CLIMATE	●	●			●					
MATERIAL/CULTURAL ASSETS	●	●	●	●	●	●	●	●		

8 CONCLUSION

The overall assessment of the proposed Fingal landfill has concluded that, if approved, it will not have a significant impact on the environment.