

Art 16 info-  
(c).

Comhairle Chontae Dhun na nGall  
DONEGAL COUNTY COUNCIL



ENVIRONMENTAL PROTECTION  
AGENCY  
31 AUG 2005

**MEENABOLL LANDFILL SITE**  
**Non-Technical Summary Revision A**  
**August 2005**

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## BACKGROUND



Donegal County Council are proposing to develop a landfill facility at Meenabdl, approximately 17Km west of Letterkenny, in the mid Donegal area, at the location shown in Figure 1.

The proposed site has to be seen in the context of the Donegal Waste Management Plan, which was the subject of widespread public consultation, and adopted by the Council in 2000. This Plan identified the need for an additional 2 - 4 landfill facilities in Donegal, to provide secure long-term disposal for the County. It is also supported by a site selection study, undertaken by Donegal County Council, as to alternative sites, which is described further in Section 4 of the Environmental Impact Statement (EIS).

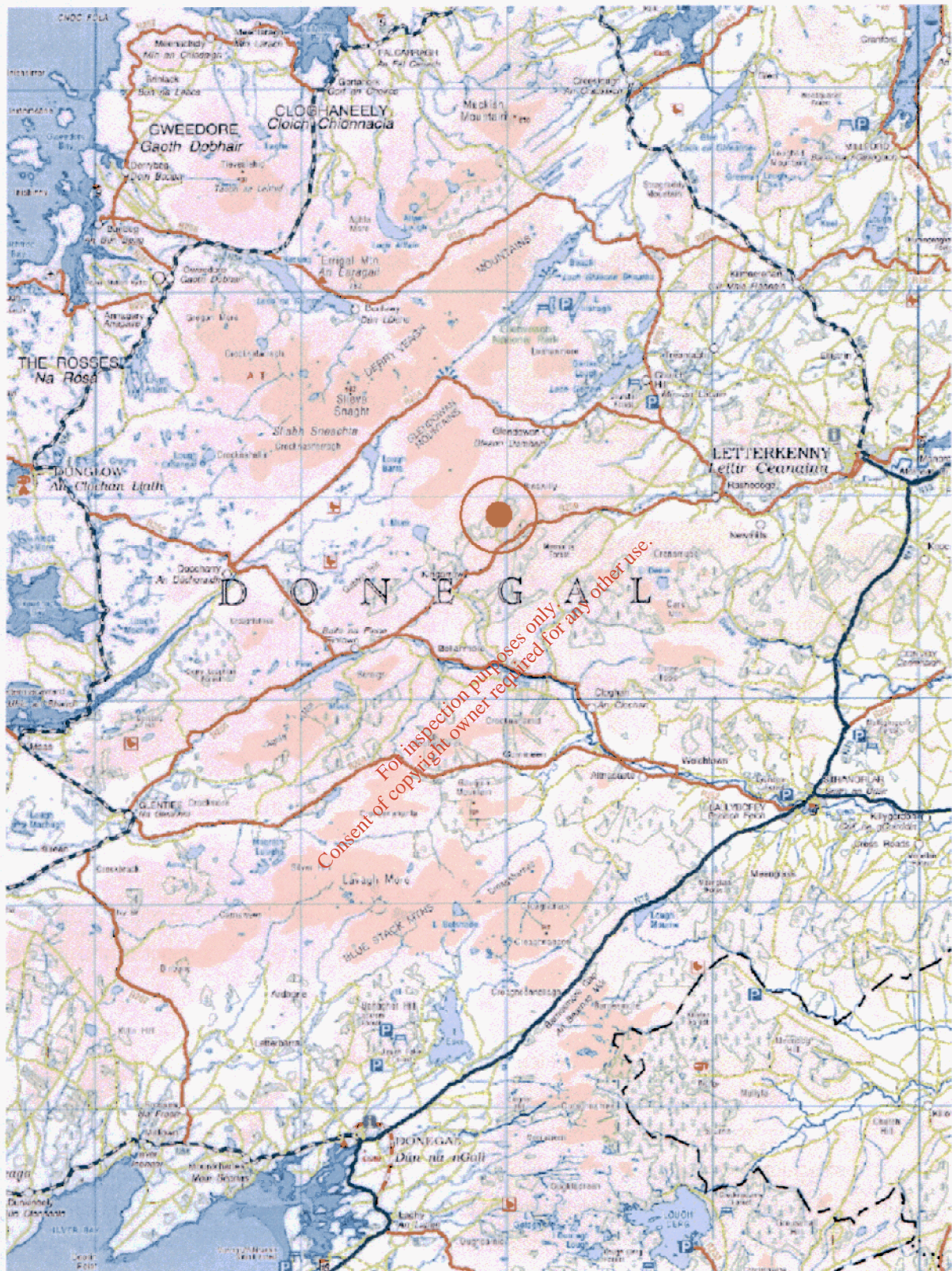
The proposed facility, which covers an area of 14.5 hectares, of which 4.5 hectares is for landfilling, would be developed and operated on a 'containment' basis, in accordance with the standards set out in Council Directive (1999/31/EC) on the Landfilling of Waste, otherwise known as the Landfill Directive. The remainder of the land will be utilised for site infrastructure, environmental monitoring and visual screening.

The site, which will accept up to 24,000 tonnes per annum for disposal at the landfill, will be classified as a non-hazardous landfill to accept household, commercial and industrial wastes from within the County. Waste will be accepted for recovery at the Civic Amenity Facility to be provided on site and will cater for household hazardous wastes.

The landfill would be operational for 20 years, and along with the extension to Ballynacarrick landfill Site in South Donegal, represents an important stage in meeting the targets set out in the Waste Management Plan.

The Council are also considering the development of recycling and recovery facilities within the County, in accordance with the Waste Management Plan. It is recognised that one option would be to provide an integrated waste management facility at the site, incorporating materials recovery and recycling infrastructure, with the disposal of residues to the landfill. Further consideration will be given to this during the review of the Waste Management Plan in 2005. Any such development at the site would be subject to further statutory applications for approval.

Figure 1 Site Location



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PROPOSED SITE LOCATION

0 2000 4000 6000 8000 10000

## PROJECT DESCRIPTION

**Statutory authorisations**, in the form of a **Planning Permission**, subject to a decision by An **Bord Pleanála**, and a **Waste Management Licence** issued by the EPA, are required before the **proposed landfill can be developed and operated**. The **Environmental Impact Statement (EIS)** therefore has been prepared in support of the applications for these statutory consents.

It is a requirement of current legislation that an **Environmental Impact Assessment (EIA)** and the **EIS produced as a result of this assessment, should consider the effects of a development on:** human beings, flora and fauna, soil, water, air, climatic factors, landscape, material assets and the interrelationships between the group. In addition to this, an integral part of the EIA process was **public consultation with the aim of this being to inform the public about the proposal under consideration and to seek views as to the Issues, concerns and the appropriateness of the proposed development**. The issues raised from this process have been addressed throughout the EIS and the **appropriate mitigation measures have been developed and set out**. This document provides a non-technical summary of the overall EIS.

The Waste Licence Application and Environmental Impact Statement will be available for public inspection and/or purchase at the EPA Headquarters in Wexford and Donegal County Council Offices in Lifford and Milford.

## REGIONAL WASTE MANAGEMENT POLICY AND PLANNING FRAMEWORK

The proposal to develop a landfill facility at Meenaboll has been reviewed against the background of European Union (EU), national and regional legislation, strategies and current waste management policies. The ongoing need for landfill is recognised by national legislation, as an integral component of the waste management infrastructure and is necessary to manage residual wastes in a more sustainable manner, albeit as the least preferred option. The quantities of waste landfilled should however reduce over time, as other policy initiatives promoting re-use, recycling and reduction are implemented. The proposal to develop landfill capacity within Donegal County Council also forms a key element of the Donegal County Council Waste Management Plan.

## THE CASE OF NEED

The development of waste management facilities are increasingly the subject of scrutiny as stakeholders seek to ensure that appropriate protection is afforded to human health and the environment, whilst ensuring that the necessary facilities are available to meet the needs of the community.

In addressing the question as to the requirement of this facility, the urgent need to develop new secure landfill disposal capacity within the County has been established, in accordance with the need identified within the Waste Management Plan.

Up to five years ago there were six landfill sites with County Donegal. Five have now closed with the only remaining licensed operational landfill site at Ballynacarrick in Ballintra. Only very limited capacity remains at this facility. However An Bord Pleanála approval has been granted for an extension to the Ballynacarrick facility, which will provide an additional 8½ years capacity based on an annual waste input of 24,000 tonnes. A Waste Management Licence (EPA License No. 24-2) is currently being considered by the Environmental Protection Agency.

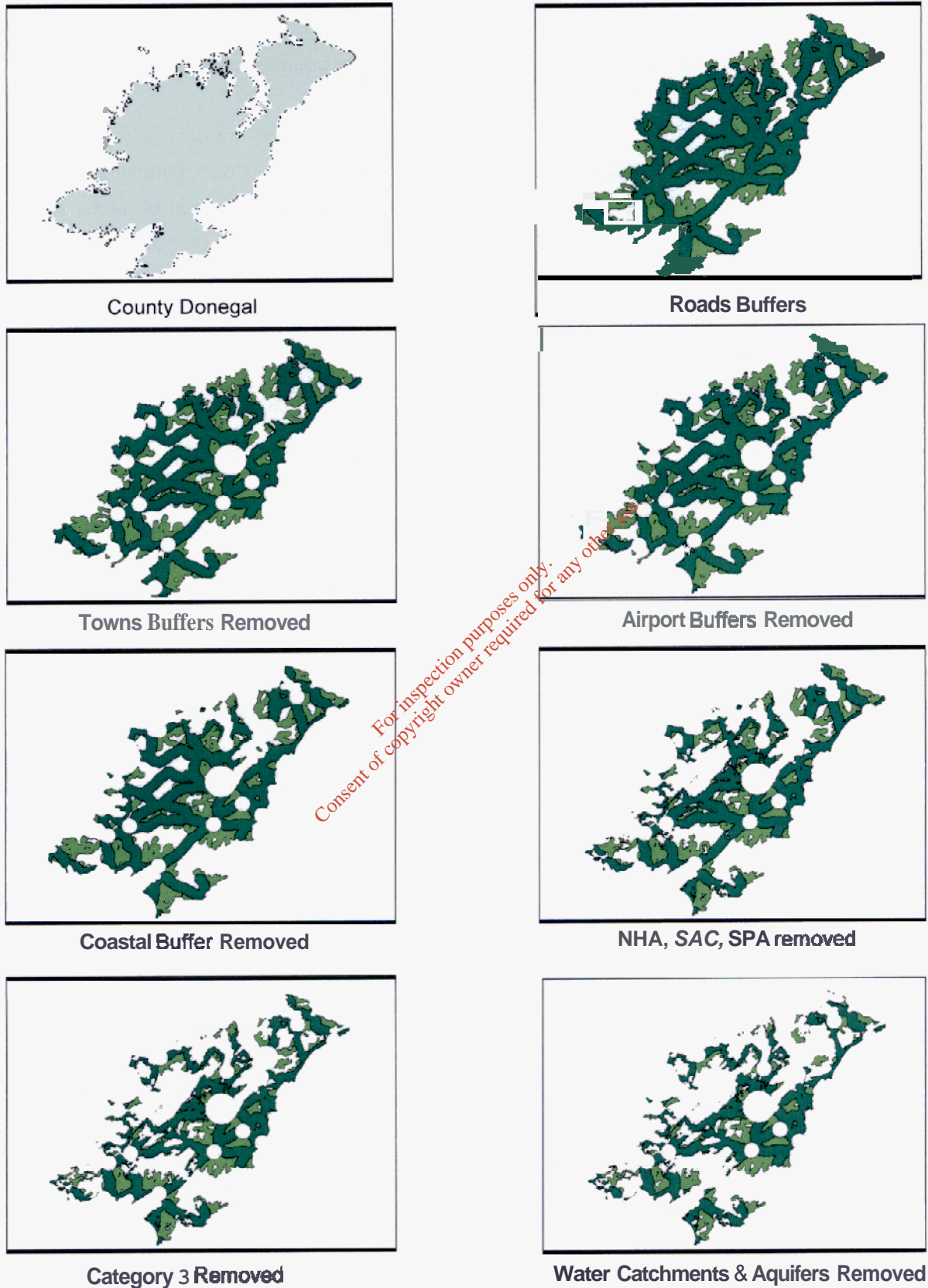
#### ASSESSMENT OF ALTERNATIVES

Prior to the selection of Meenaboll as the preferred location for a regional landfill, a county wide site selection study was undertaken to identify suitable areas for landfill development within the county. The process of site selection of new landfills commenced with establishing what criteria are to be used in the selection process. The EPA has produced guidelines on how the site selection process should be carried out and what criteria should be involved. The Guidelines set out a decision making pathway the first stage of which is the formation of a constraint study. A Constraint Study effectively sets out to establish areas of the County where the development of a landfill would be unsuitable. In order to relate the site selection criteria to County Donegal, a Geographical Information System (GIS) of the County was utilised. The GIS analysis confirmed that Meenaboll does not lie within an area classified as being unsuitable for landfill development (Figure 2).

Each waste catchment of the County was examined for possible sites that met the selection criteria. In the case of the Central and West Donegal a number of possible sites were examined. The decision making process to choose between sites was divided into three main categories:

- 4 Accessibility
- 4 Impact on local environment both human and natural.
- 4 Land Availability

**Figure 2** County Landfill Site Selection Process



It can be seen from the pictorial sequence in Figure 3 that the Western region of the County possess a range of undesirable factors from the constraints set out for the site selection study to such an extent that no suitable area for detailed investigation was identified. However in order to field proof this situation a number of sites were considered and visited by Donegal County Council technical staff.

The GIS based analysis was followed by a more detailed analysis of the areas indicated as being acceptable. This process led to the elected members of Donegal County Council granting approval for sites at Ballynacarrick in South Donegal and Meenaboll in Central Donegal to be taken to the design and planning stage and further investigation to be carried out on a site on scalp Mountain in Inishowen.

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**Figure 3 S / Selection in West Donegal**



**Western Catchment Area**



**Town Buffers Removed**



**Airport Buffer Removed**



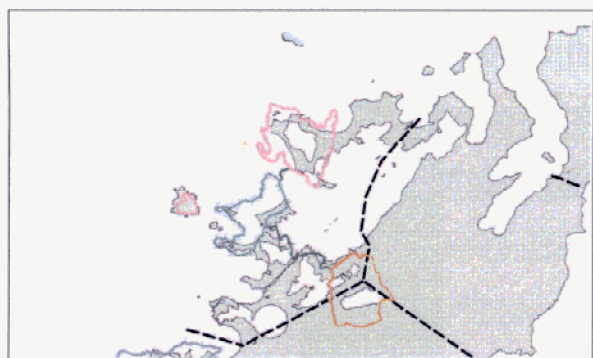
**Coastal Buffer Removed**



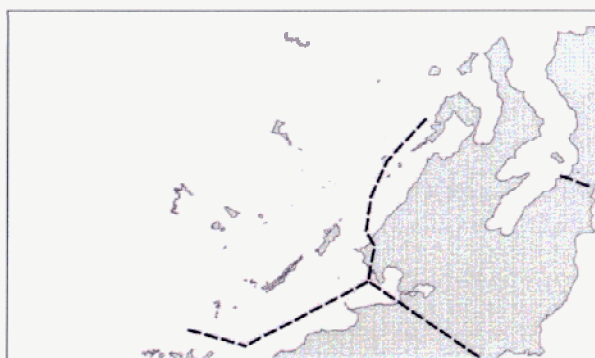
**NHA, SAC, SPA removed**



**Landscape Category 3 Removed**



**Bealach na Gaeltachta**



**Landscape Category 2 Removed**

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## SITE DESCRIPTION

The site is located in an area of recently felled coniferous forest owned by Coillte Teoranta, on the northwestern flank of Meenaboll Hill in the remote townlands of Meenaboll, Co. Donegal. The site is accessed by a county road which extends some 1.2km off the R250 Letterkenny to Glenties road at a junction situated approximately 17km to the southwest of Letterkenny. The nearest residential property to the site is located approximately 2Km from the proposed development.

The proposed facility covers an area of 14.5 hectares with the landfill area having an area of approximately 4.5 hectares, which will provide a capacity of approximately 500,000m<sup>3</sup> of landfill void space over an estimated lifespan of 20 years. It is envisaged the landfill operations, i.e. the deposition of waste at the facility, will commence during 2006 and cease by the end of 2025. The site layout is presented in Figure 4.

## SITE DEVELOPMENT

The landfill site will be developed on a containment basis to meet the requirements of the EU Landfill Directive (1999/31/EC). The site will be lined with a composite lining system to prevent the migration of leachate and landfill gas off-site. It is now accepted practice, particularly with the advent of containment sites, for landfills to be designed and operated in a series of discrete phases. The site at Meenaboll will be developed with 5 Phases. Phases 1 and 2 will be developed with one cell in each while Phases 3, 4 and 5 will consist of two cells which will be designed to allow for efficient management of the leachate. The site will be operated to standards set out by the Environmental Protection Agency. The cells will be capped, after being filled to the final permitted levels, with a low permeability capping layer thereby minimising the generation of leachate in the existing waste body. The key elements associated with the development of the site are summarised below.

### Earthworks

During the development of the proposed landfill all peat and boulder clay will be stripped from the surface to the *in situ* rock level or below to the proposed formation levels. The excavated material will be stored on undeveloped areas of the site. The boulder clay excavated will be utilised for the construction of the perimeter bunds while it is proposed to utilize the excavate rock for producing the construction material i.e. drainage layers thereby minimising the need to import material from external sources. The disposal area will be bounded by a minimum 30m wide buffer zone.

### Groundwater Drainage

The base and sides of each cell will be prepared by cutting or filling as necessary to achieve the desired profile. These will then be covered by a 300 mm deep layer of fines free crushed rock aggregate with a network of collection drains.

The base of each cell will have a minimum 1:25 gradient towards the collection sump and 1:100 in a transverse direction. The drainage blanket will intercept any groundwater seepage below the landfill, deliver it under gravity to the constructed wet lands prior to discharging to the existing watercourse i.e. Sruhanpollandoo stream to the northwest of the site.

#### Surface Water Drainage

In order to engineer the site it will be necessary to culvert the Sruhanpollandoo stream which runs along the north eastern boundary of the proposed site. In addition to this a surface water collection pipeline will be installed around the perimeter of the proposed landfill to collect surface water falling towards the landfill area. The surface water pipelines will join to the north of the proposed site and pass through a constructed wetland prior to discharging to the Sruhanpollandoo stream.

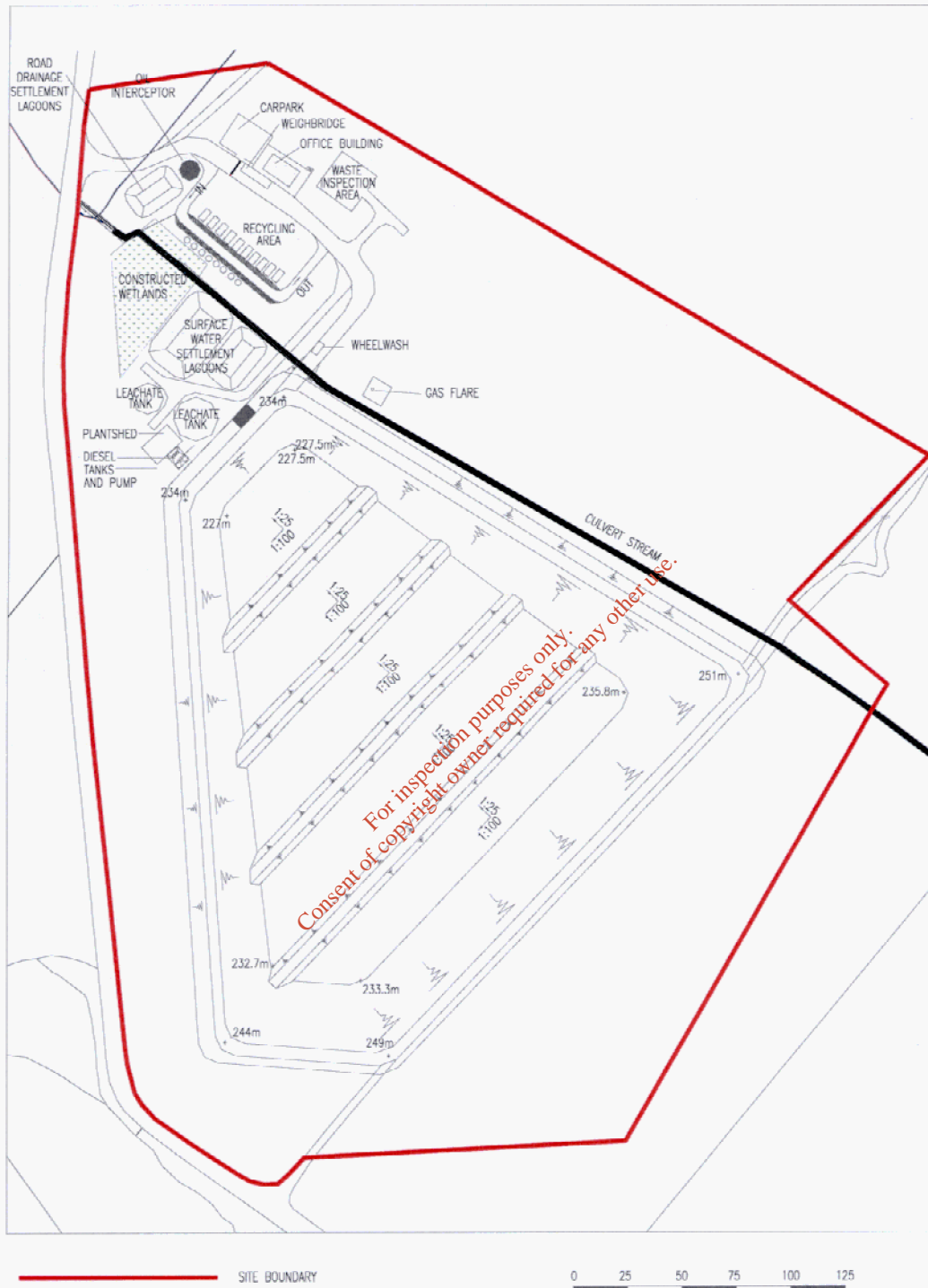
#### Containment System

The containment system is achieved by engineering the base and sides of the site using low permeability materials such as naturally occurring clays and/or synthetic geomembranes.

The containment system comprises a 2mm thick High Density Polyethylene (HDPE) geomembrane, welded to form a continuous membrane across the area of the landfill. This is underlain by a 500mm thick layer of low permeability Bentonite Enhanced Soil (BES) installed on top of a groundwater drainage blanket. The HDPE will then be covered by a protective geotextile layer and a leachate drainage blanket constructed of crushed aggregate. This blanket will provide an efficient system for the removal of any excess quantities of leachate, which may be generated.

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**Figure 4** Site Layout Plan



### Leachate Collection System

Leachate is produced as a result of the coupled action of the breakdown of waste material and rainfall percolating through the waste. The proposal includes the provision of a control system, designed to manage the quantities of leachate generated. A leachate collection system will be installed and this comprises a 500mm deep drainage blanket, as previously described, with 225mm diameter High Density Polyethylene (HDPE) collection pipes. The HDPE collection pipes will discharge leachate into a collection sump from where it will be pumped to a treatment tank, prior to disposal at a Waste Water Treatment Works.

The proposed leachate collection and treatment system complies with the accepted and specified standards and practices and will provide a control mechanism to ensure that there is no build up of excess leachate at the landfill.

### Landfill Gas Collection System

Landfill gas is generated from the degradation of putrescible fractions within the waste. The major components of landfill gas are Methane (66%) and Carbon dioxide (33%) with a number of minor components in low concentrations. Methane is flammable and a landfill gas collection system will be installed to prevent the build up of gas. Uncontrolled gas migration off site will be prevented by the engineered containment system.

A series of gas wells will be installed following waste infilling on the proposed site. The wells will then be connected to a permanent gas flaring unit via a HDPE collection pipe.

### power Supply

The three phase power supply in closest proximity to the site is located over 4km away and to provide the site with a three phase supply would involve the erection of pylons to carry the cables onto site. This would not be considered appropriate for the location of the proposed site and as such electricity for the operation of site equipment and plant will be generated from an on site generator. This will be enclosed in a sound proofing container and buried into the embankment adjacent to the leachate holding tanks.

### Site Infrastructure

Modern landfills require a substantial amount of associated Infrastructure in order to operate to current guidelines and licence requirements. This includes Site Office, Weighbridge, Wheelwash, Haul Road, Security Fencing, Leachate holding tanks, Leachate treatment facility, Waste Inspection/Quarantine area, Surface water drainage, Car parking, Landfill Gas Flare, Recycling Area, Plant Maintenance Shed, fuel Storage Area, Electrical Generator, Settlement Folds and Constructed Wetlands. These facilities will allow for good operational practices to be applied in respect to waste acceptance, recording, control and emplacement as well as leachate and landfill gas management.

## SITE OPERATIONS

It is envisaged that the site will receive a maximum of 24,000 tonnes of non hazardous waste per annum. The waste will be delivered to the site by road in refuse freighters operated by private waste collection companies. All operations will be carried out in accordance with the Waste Management Licence, which would be issued by the EPA in accordance with the Waste Management (Licensing) Regulations, 2000.

Waste will be accepted for recovery at the Civic Amenity Facility to be provided on site and will cater for household hazardous wastes.

### Site Management

The site will be operational from 8.30 am to 5.00 pm Monday to Friday and 9.00 am to 1.00 pm on Saturday and will be manned by a minimum of 4 personnel. Operations may be undertaken outside these hours to facilitate emergency situations and the moving of the enclosed litter netting. Further personnel will be employed on an as required basis to deal with general maintenance of the site

The site management system procedures will be set out in the Environmental Management System, a document which defines responsibilities and site procedures. The management system will cover all operational activities of the waste acceptance and waste disposal on site, taking into account weighing of inputs, compaction and covering of wastes, control of vermin, litter, insects and birds, traffic control and the cleaning of roads. Odour control, noise control and fire prevention and control will also be incorporated into the management system.

Site personnel will be appropriately trained in health and safety matters generally and particularly on those areas that pertain to operation of a landfill facility.

### Phasing

The site will be progressively infilled and restored in phases. Each phase will be filled from the base to final levels sequentially. It will be necessary to commence filling in the subsequent cell before final levels may be reached in the preceding cell. However it is envisaged that no more than two cells will be open at any one time. The site will be filled in each phase to the proposed final profile making appropriate allowances for settlement of the waste mass to ensure that the predetermined profiles can be achieved. Permanent restoration will occur at the end of each phase and landscaping works will be undertaken.

### Leachate Management

The proposals for the development of the Meenaboll site allow for containment of all leachate generated at the site. This will require appropriate management throughout the life and aftercare period of the site to maintain leachate control and treatment.

Management of leachate will relate to generation, composition, control, treatment, disposal and monitoring.

### Landfill Gas Management

Management procedures at Meenaboll will ensure appropriate management of landfill gas during the life and aftercare of the site. This will accommodate the changes in quantity and composition of landfill gas, which occur with time. The management procedures will ensure that uncontrolled off-site migration will not occur. Monitoring will form an important part of this process and will follow the requirements of the Waste Management Licence.

### Community Liaison

A community liaison group will be established. Representatives of the local community will be invited to meet periodically with representatives of the site management to discuss progress with the development, operation and closure of the site.

## RESTORATION AND AFTERCARE

A key component of landfill design is the restoration and aftercare of the landfill after it has ceased receiving wastes. The purpose of the process is to cap the site to reduce leachate generation, to facilitate environmental management and to return the landscape to beneficial use.

Following completion of infilling and allowing time for settlement, groups of cells will be capped and progressively restored. Once any one phase has been capped, it will be restored in the first available soil moving season. The final contours will be designed to enable the implementation of the intended after use and to blend into the surrounding landscape.

The capping system will include a landfill gas collection layer with a geosynthetic clay liner, a surface water drainage layer and various sub-soil and topsoil finishing layers. Additional depths of soil will be provided in the areas where tree planting is proposed over the landfill cap.

In terms of landscaping, it is not proposed to carry out major areas of landscaping on the landfill site itself. This is consistent with good landfill practice, as root systems from trees and shrubs may adversely affect the capping system. However, it is recognised that the restoration of the site would benefit from the planting of hedgerows and trees both in terms of creating a visually acceptable landscape in the long term and help where possible to screen operations by advance works.

It is envisaged that an aftercare programme will be drawn up prior to the completion of each phase of the landfill. Each restored cell will be subject to an initial aftercare period. During this period, an annual inspection will take place and this will be over and above the environmental monitoring, which will continue whilst the waste management licence is maintained.

## IMPACT ASSESSMENT

Each potential impact is discussed and details of mitigating measures, designed to minimise any adverse effects, are presented.

### AIR AND CLIMATE

The Annual average rainfall for the site is approximately 1600mm. The mean monthly temperature ranges from 4.8°C to 15.0°C. The predominant winds measured are from the south and south westerly directions.

The aim of this assessment is to estimate the extent of gas emissions that may arise during the operation of the waste management facility and their potential impact on the surrounding environment in terms of lateral migration, atmospheric dispersion and global warming; and to propose appropriate mitigation measures.

The proposed landfill site is located in a rural area with the nearest residential property over 2 Km from the site, therefore no long term sensitive receptors were identified in close proximity of the site. In addition to this, the site will only accept household, commercial, construction and demolition wastes, thereby minimising any potential toxic or hazardous emissions from the site.

In terms of mitigating measures, the impact from gas emissions will be minimised by implementation of measures such as gas venting and flaring while odour will be controlled by rapid deposition and covering of waste, and installation of a capping system and a Raring system. Dust will be minimised by immediate disposal of dusty wastes, damping down materials during very dry weather and a careful choice of daily cover.

Monitoring will be undertaken throughout the life of the landfill site. The following environmental factors (amongst others) will be included in the monitoring programme.

- 4 Landfill gas
- ✦ Meteorological conditions
- ✦ Odours
- ✦ Dust

In addition, regular site inspections will be carried out, which will note any problems arising from the landfill operations, including the above. The Impact Assessment demonstrated that the development should not have a significant impact on the existing air quality in the surrounding environment.



## FLORA AND FAUNA

The habitat in the proposed development site is characterised by conifer plantation forestry, which is highly modified, non-native woodland. Most of the area was clear-felled and replanted with a 2<sup>nd</sup> rotation within the last ten years. The existing vegetation is transitional and reflects the response of ecological processes to this type of land-use and the changes which have taken place.

Field survey work to collect data on the fauna of the existing environment of the site and surrounding habitats was carried out from September 2002 to July 2003. The field surveys were structured to attain information on wintering birds and other fauna, as well as summer breeding birds and other fauna. The survey area was extended well beyond the proposed development site, to encompass adjacent areas of ecologically important habitat hosting important, sensitive species, which could be considered in the baseline information and the assessment of impacts.

In spite of the fact that the site and adjoining afforested habitats are highly modified, the composition of plant communities and specks still bears a strong resemblance to natural upland habitats, especially within the 2<sup>nd</sup> rotation forestry where the vegetation has recovered to form a semi-natural groundcover, containing as yet quite a high diversity of species. Plant species diversity would be expected to decrease again within much of the 2<sup>nd</sup> rotation plantation as the conifer matures to closed-canopy forest. Diversity of fauna species was also found to be moderately high with 27 out of 34 recorded breeding bird species occurring in the four 1km squares dominated by forestry habitats, while 19 of the total were recorded in the four squares dominated by moorland habitats. A total of 49 species were recorded in both winter and summer bird surveys. Mammal species were also quite diverse with Red Deer, Irish Hare and Otter recorded in the survey area.

Given sufficient scope, it is possible that a range of habitat management measures, targeted particularly at the more important and vulnerable bird species recorded in the surveys, could support and conserve these species at a favourable conservation status.

### Farm and Animal Health

The site is situated in an area of hill bog land and forestry development and, other than the extensive grazing of small numbers of hill sheep, there is no significant farming activity in the area.

As mentioned previously, the site will be for the acceptance of low risk waste and therefore will contain no high risk condemned, diseased or high-risk biodegradable.

Wind blown debris will be kept to a minimum on site by using netting systems and by placing cover material on the working face of the landfill at the end of each working day. Dust will be controlled by the immediate burial and disposal of dusty wastes. All embankments and stockpiles will be vegetated immediately to reduce the surface area of soil open to the environment

Roads in the vicinity of the site will be swept on a regular basis and wheelwash facilities will be in place to ensure dust emission on site is not caused from the tyres of vehicles using the landfill site.

The lack of significant farming activity in the area, and the 'extensive' nature of hill sheep grazing reduce the likelihood of any individual animal's health being compromised by activities at the landfill to an extremely low level.

## GEOLOGY AND SOILS

The geological setting of Meenaboll Landfill site was examined by means of a desk study, walkover survey and an exploratory ground investigation.

The proposed landfill is entirely underlain by metamorphic rocks assigned to the Upper Falcarragh Pelite Formation, a sub-division of the Dalradian Supergroup. The bedrock is completely mantled by a variable thickness drift deposits comprising a lower horizon of boulder clay and an upper peat layer.

No regional faults or slides are shown to pass through the study area. The Knackateen slide as a northeast to southwest trending thrust fault, represents the nearest structural feature to the site. The fault plane is inclined to the southwest beneath the summit of Meenaboll Hill and does not extend beneath the site.

Peaty topsoils mantle the entire site area which is associated with very poor drainage conditions, where the soils are waterlogged for most of the year. These soil conditions are only suitable for rough grazing purposes, or in the case of the study area coniferous plantation. The textural limitations of the peaty soils also inhibit attempts to improve the drainage of the material.

The development of the landfill site will inevitably lead to the disturbance and/or loss of the peaty topsoils over an area of 4.5 hectares. However, the loss of these soils would not represent a significant environmental impact as they are of limited agricultural amenity and occur extensively throughout the region.

The construction of the landfill also has the potential to destroy any features of geological interest that may exist within the site. However, no bedrock exposures, drift deposits or landforms of special geological or scientific interest exist within the study area. The construction of the landfill and resultant loss of prevailing geological features at the site would not therefore represent a significant environmental impact as high quality exposures occur extensively throughout the region.

To mitigate the construction impacts of the proposed landfill, all mechanically suitable topsoil, subsoil and rock materials will be stockpiled onsite for reuse in earthwork and landscaping operations in each phase of the sites development. The materials will be either reused directly or as soon as possible after their excavation. Proper material handling and storage practices will be adopted to minimise the potential effects of wetting and weathering on the workability and the mechanical properties of the materials. Material stockpiles will be constructed with graded banks to promote surface runoff.

## HYDROLOGY

The study area is drained by the Sruhanpollandoo stream, which flows in a north-westerly direction through the site. The stream is a tributary of the Cummirk River and is consequently within the Finn Catchment. The Sruhanpollandoo rises to the east of the site and flows through coniferous forest, hill land and a wooded glen at the downstream section.

Two detailed topographical surveys of the area were undertaken on the site in conjunction with existing maps and a visual inspection of the surface water flows at the site. Based on this information, no surface water originating within the boundary would naturally drain to the Gartan catchment. Indeed the proposed site has been strategically located to ensure that the landfill is not located within Gartan catchment.

An improved surface water management system will be established in the vicinity of the site to minimise the impacts on water quality and quantity in the adjacent watercourses and downstream in the River Finn.

Prior to any construction work commencing on site settlement lagoons and Constructed Wetlands will be developed at the facility. This will assist with ensuring sediment transport off site is minimised. The Sruhanpollandoo stream, which runs adjacent to the landfill area will be culverted through the site to prevent the possibility of sediment entering the stream.

The ongoing monitoring of surface water quality at the landfill site will be continued, ensuring the effective management of the drainage system.

## HYDROGEOLOGY

The protection of surface water and groundwater resources is a determining factor in the assessment of the acceptability of a site for landfill development. The potential impact on surface water and groundwater resources generally depends on the prevailing geological and hydrogeological setting of the landfill and the nature and volume of any leachate leakage from the site.

The potential environmental impacts on groundwater and surface waters that may arise from landfilling of wastes principally relate to the generation of leachate within the landfill and its leakage into the environment. Under current legislation, the primary objective of landfill design is to provide effective control measures to prevent, or reduce as far as possible, leachate emissions from a site. This is necessary in order to ensure potential impacts on the environment are reduced to an acceptable level.

The hydrogeological risk assessment considered the potential impact of the landfill on the groundwater resources. This was based on a conceptual model of the prevailing ground conditions and groundwater flow regime, which were determined by the exploratory investigations and groundwater-monitoring programme.

A principal consideration that controlled the siting of the proposed landfill within the study area was that it should lie outside the Lough Gartan catchment area, which is used as a public water supply. Investigation and modelling of the surface water and groundwater regimes in the area have established that watershed that divides the Finn catchment from the Lough Gartan catchment is located across the slope some 300m beyond the proposed landfill boundary. The investigations demonstrated that the groundwater and surface water that drains through the study area is directed toward the Finn catchment. Therefore there will be no impact on surface water and groundwater abstractions with the Lough Gartan catchment.

Groundwater protection policy for the development of landfills in Ireland is referenced against a Groundwater Protection Matrix that has been developed by the Geological Survey of Ireland (GSI). This provides a determination of the acceptability of the proposed site for development as a landfill, based on the groundwater resource potential of the bedrock and the protection afforded by any overburden deposits.

The Geological Survey of Ireland classifies the metamorphic rock that underlies the site as a poor and generally unproductive aquifer. This rock will directly underlie the landfill as any overburden cover will be removed during the construction of the landfill cells. These conditions place the proposed landfill site at Meenaboll in the R2<sup>1</sup> response category of the groundwater protection matrix.

In accordance with the groundwater protection matrix response category the proposed landfill development is indicated to be 'Acceptable Subject to Guidance in the EPA Landfill Design Manual or conditions of a waste licence'.

Following the above to assess the significance of the landfills impact on the groundwater resources and examine the effectiveness of the engineered containment system a probabilistic risk assessment was undertaken using LandSim software. This was based on a conceptual model of the site.

The model was developed using parameters representative of the prevailing ground conditions, which were recorded by the exploratory ground investigations. It also simulated the engineered barrier and leachate control systems incorporated in the design of the proposed facility.

The LandSim model calculated that the volume of leachate leakage from the proposed landfill will be minimal following its development as an engineered containment landfill, operated in accordance with current best practices with phased capping and restoration.

The LandSim model also examined the impact key leachate pollution indicators (ammonia, chloride, mercury and potassium) at a groundwater compliance point located 60m downgradient of the proposed Phase I landfill boundary. The results of the analysis determined that no significant contaminant loading on groundwater quality would arise from the leakage from the engineered containment phases.

On the basis of the above the proposed development of the Meenaboll site as a fully engineered containment landfill site would meet the requirements of the EC Landfill Directive and Groundwater Directive with respect to off site compliance.

## HUMAN BEINGS

Human beings form one of the most important aspects of the environment to be considered. This section of the EIS is split into three parts: socio-economic aspects, tourism aspects and human health. The first two parts consider the human environment in the vicinity of the application site in terms of its population profile and trends, labour force profile, socio-economic profile and an assessment of the tourist impacts. The final part considers current available literature for Health Research Board on the health effects of landfills.

The proposed development of a modern landfill has inherent benefits to the socio-economic fabric of the catchment area. It also has a number of beneficial impacts on local sectors of the economy. The tourism sector is an important part of the economy of the northwest. The future development, and indeed expansion of the sector relies on the provision of essential services such as waste disposal. The proposed development is a critical factor in the sustainability of the local tourism sector, as well as other local employment generating industries.

### Impact on the Socio-Economic Fabric of the Region

The proposed development of a landfill site in the Meenaboll area of Donegal will impact on the inhabitants of the area. The majority of these impacts will be positive and are detailed below.

During the construction phase of the development employment will be created and sourced from the surrounding area. This will have a positive impact on employment levels in the short term. The proposed landfill will require operatives to collect refuse, transport, compress and oversee the process. The proposed development will therefore sustain current employment levels in the refuse collection/disposal sector but will potentially create additional employment for inhabitants of the area.

The remote nature of the site will ensure that disturbance to inhabitants of the general area is effectively eliminated. The impact on current land uses in the area will be negligible.

### Impact on the Tourist Industry

The development of this proposed landfill site will have an imperceptible impact on the number of tourists travelling to the County. The site is not on any recognised tourism routes and therefore its presence will be unknown to visitors unless happened upon by chance. Hence the proposed development will not adversely impact on the established tourism centres of Glenveagh National Park, Letterkenny or Fintown. Indeed the development of the facility is an important factor in ensuring the required waste management infrastructure is available in the Mid and West Donegal to allow the tourism industry to develop.

### Impact on Human Health

The potential risk to human health from landfill is from the migration of landfill gas and the contamination of surface and groundwater by leachate. A study on the health effects of landfilling was undertaken by Health Research Board (HRB), 2003 at the request of the Department of the Environment Heritage and Local Government. The summary of this report states that studies show an increased risk of the adverse health effects linked to residence near certain specific sites. However, when with a great number of studies, evidence of a causal relationship between specific health outcomes and landfill exposure is still inconclusive.

### **LANDSCAPE AND VISUAL**

The site of the proposed landfill facility is located in the Glendowan Mountains, to the north west of Meenaboll Hill and close to the head waters of the Owenbeg and Sruhanpoldoo Rivers. The site is 11.6km south of Glenveagh Castle, 14km from the Glenveagh National Park Visitor Centre, and 0.5km east of the SAC site Clogheragoare Bog.

Extensive areas of poor quality blanket bog cover much of the area and severely limit agricultural activity, which is more evident in the lower sheltered valleys in the form of dairying and beef production. Open grazing is the main agricultural activity on the bogland.

Extensive areas of conifer forests cover much of the lower slopes and valley sides in the area. These break up the visual character of the area with their dark form and regular outline at variance with the surrounding landscape. There is also evidence of domestic peat cutting in the local area.

Views of the site from the surrounding landscape would be limited to farmers using the hills, forestry workers and occasional hill walkers. The degrees of visual intrusion experienced by these people would depend on the sensitivity of the receptor and a range of factors, including distance from the site, direction of view, local weather conditions etc. For example in the case of hill walkers, their expectation of views may be considered to be higher and so they may be more sensitive to changes in the visual quality of the area. Effective screening measures and progressive site restoration would be the most effective means of limiting visual intrusion.

## MATERIAL ASSETS

A two phased study took place to ascertain the impact of the proposed development on material assets. The first phase comprised a desk study of all available archaeological, historical and cartographic sources. The second phase involved a field inspection of the proposed development area to determine the impact on the market value of the site.

### Archaeological Impact

The study found there are no known archaeological sites within the townland of Meenaboll. However due to the size of the proposed development, it is envisaged that deep and extensive machine excavation would be required. This may have a negative impact on any archaeological features and deposits which may remain in the area. In addition to this, the passage of machinery and vehicles may have a negative impact on any previously unrecorded sub-surface remains that may survive within the proposed development.

In order to mitigate against these effects, it is proposed that all groundworks be monitored by an archaeologist to assess the scale of the impact.

### Impact on Market Development

Development of a landfill site can potentially result in a perceived negative impact on commercial investment and property values in the area of the site. There are no residential properties on the county road between the R250 and the site. However it is proposed to carry out remedial works along the access route to the site to reduce the impact for local road users.

Studies in relation to the impact of landfills on property prices are not available for the Republic of Ireland or Northern Ireland. However a study to identify and estimate the disamenity costs of landfill in Great Britain was produced by Cambridge Econometrics.

Disamenity costs are the local nuisance impacts caused by landfill activity and experienced by households living close to landfill. The local nuisance impacts include dour, dust, litter, noise, vermin and visual intrusion. The report indicates the property values reductions vary dependent upon distance from the landfill but no evidence of reduction was reported at distances greater than ½ mile from the sites.

## NOISE

The site is surrounded by hills and therefore hidden from view from road traffic and is located more than 2Km from the nearest residential property. The land is currently in use by the forestry service.

The potential for noise from the proposed development can be split into a number of sections, which are subject to separate noise impact assessment. These sections are landfill operation, vehicle noise and construction noise.

### Landfill Operation

The noise assessment has shown that the potential noise impact from activities, at the most proximate residential properties, is below daytime target levels while the operation of the leachate treatment system and the flare unit together will not exceed night time limits.

As part of the site preparation works including removal of overfill, it is proposed to use the surplus material to create earth bunds. These have the dual benefit of acting as visual screening barriers and acoustic barriers.

### Vehicle Noise

This assesses the impact of traffic movement on roads approaching and within the boundaries of the site including the impact of service vehicles.

It is predicted that the potential noise impact from 'worst case' HGV activity on the site roads will be within the day target level at the most proximate residential property. Based in the information provided in the TIA, worst case increase noise levels due to transportation on the local supply roads will be imperceptible.

### Construction Noise

This assessment is based on guidelines and recommendations from the relevant British Standard dealing with construction noise as presently there are no fixed noise levels for construction noise in Ireland and the control of such sources is outside the remit of the EPA.



In order to mitigate the impact from construction noise, it is recommended that contractors apply appropriate measures where practicable, including temporary screening or enclosure of noisy plant, control of on times for noisy plant and positioning of plant.

## TRANSPORTATION

The existing road leading to the site is currently unused apart from Gbnveagh Nation Park and logging traffic. The Connecting R250 links traffic from Letterkenny to Fintown and other local towns and villages in north west Donegal.

Traffic generations from the proposed development of Meenaboll Landfill have been calculated by counting and analysing the daily flow of existing traffic at Ballynacarrick Landfill, including development traffic to the site to predict peak hour traffic flows. This has included a classified traffic count at the existing access and the adjacent priority junction to the south of the site access.

The proposal includes resurfacing access roads and generally improving road conditions. This will include the provision of lay-bys at identified points to ensure there is no conflict between vehicles entering and leaving the site.

Overall it can be concluded that the impact of the traffic to and from the site will not have a significant impact on the surrounding road network, and with minor improvements, there will be no net detriment on the surrounding road network as a result of this proposal.

## CONCLUSION

The findings of the EIS conclude that there should be no significant adverse environmental effects of the proposed development. The proposed development will bring a number of important benefits to County Donegal, including the provision of landfill capacity to meet the requirement of people and business in Donegal.

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