

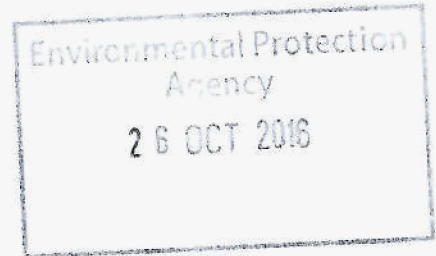


CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES

IRELAND UNITED KINGDOM POLAND SAUDI ARABIA

Our Ref: LW14/821/01/ConLet/DFM/CF

Mr. Brian Meaney
Environmental Protection Agency
PO Box 3000
Johnstown Castle Estate
County Wexford



25 October 2016

RE: Proposed development at Knockharley Landfill, Kentstown, Co. Meath

Dear Mr. Meaney ,

Knockharley Landfill Ltd. is applying to An Bord Pleanála (ABP), under the Strategic Infrastructure provisions of the 2000 Planning & Development Act, as amended, for permission to intensify waste acceptance at the existing landfill facility (ABP File ref: PL17.PC0223).

You may have received correspondence relating to previously proposed development at this facility in 2015 – these development applications did not proceed at the time.

Knockharley Landfill is located approximately 1.5 km north of Kentstown village, Co. Meath in the functional area of Meath County Council. The existing landfill facility operates under an Industrial Emission Licence (Ref. No. W0146-02) from the Environmental Protection Agency.

Knockharley Landfill Ltd. has appointed Fehily Timoney and Company to prepare an Environmental Impact Statement (EIS) for the proposed development. This letter is being issued to you as part of the scoping process for the EIS.

A scoping document describing the proposed development and the approach being taken to the preparation of the EIS is enclosed.

As part of the consultation process, we would be interested in receiving any comments you may have on the proposed development, relevant to your area of expertise, within two weeks of the date of this letter.

If you have no comments to make, we would be grateful if you would please acknowledge receipt of this letter.

Comments or acknowledgements can be sent via email to knockharleylandfillscoping@ftco.ie.

Yours sincerely,

Derek Milton
for and on behalf of **Fehily Timoney & Company**

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KNOCKHARLEY LANDFILL

ENVIRONMENTAL IMPACT STATEMENT - SCOPING REPORT FOR PROPOSED DEVELOPMENT

OCTOBER 2016



Environment (EIA) Section
Approved
26 OCT 2016

KNOCKHARLEY LANDFILL

ENVIRONMENTAL IMPACT STATEMENT - SCOPING REPORT FOR PROPOSED DEVELOPMENT

OCTOBER 2016

User is Responsible for Checking the Revision Status of This Document

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Client: Knockharley Landfill Ltd.

Keywords: Knockharley Landfill facility, disposal, recovery, municipal solid waste, bottom ash, environmental impact statement

Abstract: This is a scoping report prepared for a proposed intensification of waste acceptance at Knockharley Landfill facility for recovery and disposal. The purpose of the scoping report is to identify the content and extent of the information to be provided in the Environmental Impact Statement for the proposed development.

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1 INTRODUCTION

1.1 Applicant

The applicant is Knockharley Landfill Limited who is the owner and operator of the facility located in County Meath. The facility was developed and previously owned and operated by Greenstar North East Limited. The site was acquired by Knockharley Landfill Limited in March 2014.

1.2 The Development in Summary

Knockharley Landfill is located approximately 1.5 km north of Kentstown village, Co. Meath in the functional area of Meath County Council. The existing landfill operates under an Industrial Emissions Licence (Licence reference no. W0146-02) from the Environmental Protection Agency which permits the acceptance of up to 200,000 tonnes per annum (tpa) of waste, of which 175,000 tonnes is disposal capacity and 25,000 tonnes is recovery. Condition 3 of the planning consent (PL17.220331), restricted the disposal capacity at the facility to 132,000 tonnes per annum until December 2010, thereafter reducing to 88,000 tonnes per annum.

It is proposed to apply for consent to increase waste intake at Knockharley Landfill to up to 440,000 tpa for recovery and disposal. The development proposal includes the following recovery and disposal activities:

1. landfilling of residual non-hazardous municipal solid waste (rMSW) and non-hazardous soils
2. storage of incinerator bottom ash (IBA) to facilitate future recovery

The proposal will require the development of a dedicated storage area for IBA, in addition to the existing permitted landfill footprint. The proposed layout of the storage activity is shown on Figure 1: Drawing INFO-001. No changes are proposed to the current permitted landfill footprint. In order to increase the void capacity within the existing landfill footprint, it is proposed to raise the final profile of the landfill by up to 10-12 m.

In addition, the footprint of the existing leachate management area, which comprises a covered lagoon, will be increased to facilitate installation of a leachate treatment plant for pre-treatment of leachate generated from the landfill, prior to its removal offsite, as currently occurs.

To facilitate soils management onsite, as well as to mitigate potential impacts associated with noise and visual impact, it is also proposed to create a number of screening berms at a number of locations on the facility perimeter.

It is proposed to construct a 40 m² building on site to facilitate the short term storage of baled waste and/or the recovery of metals from ash.

1.3 Planning Process for the Proposed Development

1.3.1 Strategic Infrastructure

The Planning and Development Act 2000 was amended in 2006 to require applications for planning permission for major infrastructure projects to be made directly to An Bord Pleanála rather than to the local planning authority, as would have previously been the case.

In order to fall within the Strategic Infrastructure provisions of the 2000 Act, as amended, a proposed development must be, *inter alia*, of a class specified in the Seventh Schedule to the Act and satisfy one or more of the conditions of Section 37A (2) of the Act. The applicable class in this case is in Part 3 of the Seventh Schedule, as amended, which specifies, *inter alia*, the following class of development:

- "An installation for the disposal, treatment or recovery of waste with a capacity for an annual intake greater than 100,000 tonnes."

The conditions in Section 37A (2) are that:

37A (2) "following consultations under Section 37B, the Board serves on the prospective applicant a notice in writing under that section stating that, in the opinion of the Board, the proposed development would, if carried out, fall within one or more of the following paragraphs, namely—

(a) the development would be of strategic economic or social importance to the State or the region in which it would be situate,

(b) the development would contribute substantially to the fulfilment of any of the objectives in the National Spatial Strategy or in any regional spatial and economic strategy in force in respect of the area or areas in which it would be situate,

(c) the development would have a significant effect on the area of more than one planning authority."

In July 2016, Knockharley Landfill Limited wrote to An Bord Pleanála to formally request a pre-application consultation meeting under Section 37B of the Planning and Development Act 2000, as amended, in respect of their existing development in County Meath. This pre-application consultation process is being undertaken under reference PL17.PC0223.

Under Section 37E of the Act, a planning application for a development which comes within the scope of Section 37A must be accompanied by an Environmental Impact Statement (EIS). Fehily Timoney & Company has been commissioned to prepare the EIS. This scoping document has been prepared to inform the preparation of the EIS.

Screening will be undertaken to determine if an Appropriate Assessment (AA) of the proposed development at Knockharley Landfill is required. If the screening assessment indicates that an AA is required, a Natura Impact Statement will be prepared and submitted to accompany the planning application and EIS.

1.4 Environmental Impact Assessment and the Function of the EIS

The European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, requires member states to ensure that a competent authority carries out an appraisal of the environmental impacts of certain types of project, as listed in the Directive, prior to development consent being given for the project. Knockharley Landfill is such a project. The environmental impact assessment of the proposed development at Knockharley Landfill will be undertaken by An Bord Pleanála, should the project be deemed as strategic infrastructure.

The EIS, to be submitted with the planning application for the development, will provide information on the possible environmental impacts of the project and propose mitigation measures to reduce the residual impacts. Thus the function of the EIS is to provide information for the environmental impact assessment.

1.5 Purpose of Scoping

The purpose of the EIS scoping process is to identify the issues which are likely to be important during the environmental impact assessment and to eliminate those that are not. The scoping process will identify the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors which are likely to be affected. The issues identified in the scoping process will be examined in the EIS, any potential impacts will be quantified, mitigation measures proposed as required, and residual impacts described. The scoping process will also identify the appropriate level of detail for the information to be provided in the EIS.

There is provision in the legislation for formal scoping of an EIS. The person preparing the EIS can request the competent authority, in this case An Bord Pleanála, to provide a written opinion on the information to be contained in the EIS. The applicant must provide sufficient information on the project to allow informed opinions to be given. The competent authority can request additional information from the applicant.

When sufficient information has been obtained, the competent authority seeks a written opinion from the statutory consultees. Upon receipt of these opinions, the competent authority issues its formal opinion to the applicant. Giving a formal scoping opinion does not preclude the competent authority from requiring further information at a later stage.

The alternative to formal scoping is informal scoping. This can be undertaken by the authors of the EIS by direct consultation with the relevant statutory and non-statutory consultees. Informal scoping is proposed for the EIS for Knockharley Landfill.

1.6 Consultation

A consultation process is being undertaken by Knockharley Landfill Limited and the EIS team. This will include liaising with relevant departments of the local planning authority, Meath County Council.

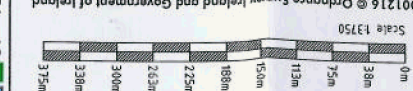
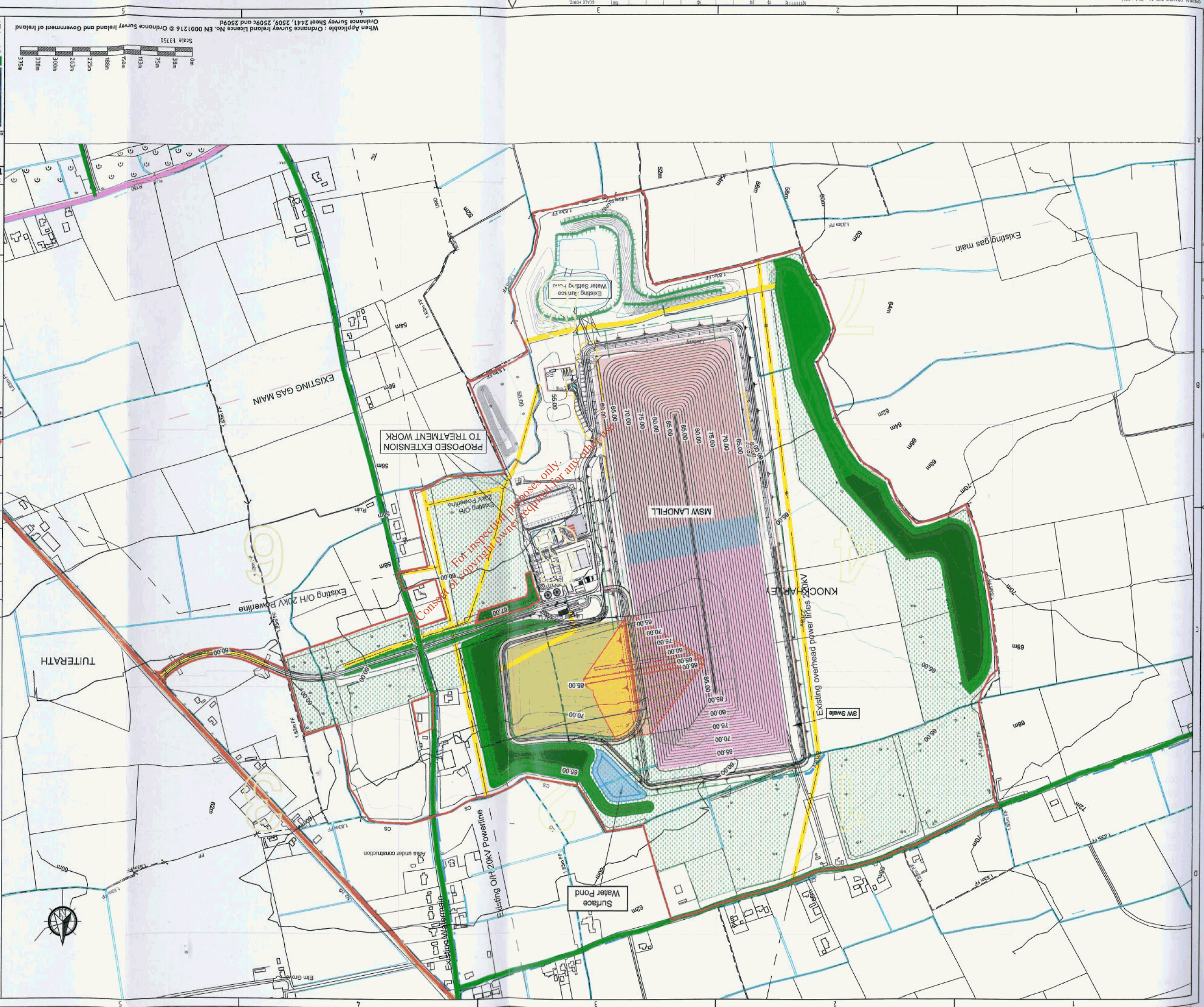
It is also the intention of the applicant to undertake public consultation and details of this consultation will be included in the EIS.

Article 28 of the Planning and Development Regulations (as amended) requires that certain bodies are contacted depending on the nature of the potential impacts of a development. Consequently, consultation letters will be sent to the relevant prescribed bodies (as defined in Article 28 of the Planning and Development Regulations as amended) as well as non-governmental organisations (NGOs) and local stakeholders.

This scoping document will be sent to the organisations listed below:

- Meath County Council – Planning
- Meath County Council – Environment
- An Taisce
- Failte Ireland
- Teagasc
- The Heritage Council
- Dublin Airport Authority
- Development Application Unit, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
- Inland Fisheries Ireland – Eastern River Basin District
- Irish Wild Life Trust
- Transport Infrastructure Ireland
- Irish Geological Heritage Programme
- Environmental Health Department,
- Eastern & Midlands Regional Assembly
- Irish Water
- Office of Public Works (OPW)
- Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs –National Parks and Wildlife Service
- An Chomhairle Ealaíon
- Department of Communications, Climate Action and Environment
- Department of Agriculture, Food & Marine
- National Transport Authority
- Meath County Development Board
- Eastern-Midlands Region Waste Management Office
- Environmental Protection Agency
- Kentstown Village Project
- Knockharley and Districts Residents Association
- Knockharley Landfill Liaison Committee
- Department of Housing, Planning, Community and Local Government

Comments on the scope of the EIS can be submitted by email to knockharleylandfillscoping@ftco.ie



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 Rev. A

PROPOSED SITE LAYOUT PLAN
 Title of Drawing

PROPOSED DEVELOPMENT AT KNOCKHARLEY LANDFILL
 Name of Job

KNOCKHARLEY LANDFILL LTD.
 Name of Client

Issue For Planning Application
 Description: **PLANNING + EIS**

Rev.	Description	Issue For Planning Application
01	Issue For Planning Application	Issue For Planning Application
02	Issue For Planning Application	Issue For Planning Application
03	Issue For Planning Application	Issue For Planning Application
04	Issue For Planning Application	Issue For Planning Application
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20	Issue For Planning Application	Issue For Planning Application

LEGEND

- Planting Boundary
- Existing Wayleave
- Finished Ground Contour
- National Primary Route
- National Regional Route
- National County Route
- Landfill Cells currently being filled
- Constructed Landfill Cells
- Proposed Future Landfill Cells
- Proposed Screening Berms
- Existing Watercourse
- Existing Forested Areas

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2 PROJECT DESCRIPTION

2.1 Existing Development

The existing facility comprises a non-hazardous disposal site (landfill). It is located on a 135 hectare land holding with the existing landfill footprint positioned near its centre. The current planning permission (PL17.220331) permits the development of approximately 25 ha of landfill cells in seven phases. To date, four of the seven planned phases have been constructed. Phase 1 has been permanently capped. Phase 2 and 3 has part permanent and part intermediate capping (temporary). Phase 4 is partly filled and has both daily and intermediate capping. Permanent capping of the remainder of Phase 2 and part of Phase 3 has commenced and is due to be completed by year end.

The facility was designed, constructed and is being operated in accordance with the EU Landfill Directive 1999/31/EC, EPA Industrial Emissions Licence (W0146-02) and EPA manuals on landfill selection, design, operation and monitoring and its relevant planning permissions.

The landfill opened in December 2004 and accepts residual household, commercial and industrial wastes together with construction & demolition (C&D) wastes and incineration bottom ash (IBA). The site is licensed to operate from 07:30 to 18:30 Monday to Saturday inclusive and is licensed to accept waste between 08:00 and 18:00 (excluding public holidays).

The existing buildings on the site comprise an administration building, two weighbridges, inspection slab, quarantine slab, machinery/maintenance garage, car parking and other facilities. These are located within the buildings area to the east of the landfill cells.

The landfill is connected to the national primary route, the N2, by a private dedicated access road via an underpass under the regional road CR384. Waste arriving at the facility enters the site via this private dedicated access road.

The daily operation of the landfill facility is monitored as required under the Industrial Emissions Licence and consists of a number of monitoring programmes that address groundwater and surface water quality, leachate and landfill gas management, air emissions, VOG, noise, odour and dust deposition. The frequency of monitoring of the different environmental parameters is set out in the licence with a requirement to submit all the monitoring data from the facility to the EPA. Environmental monitoring data is reported to the EPA on a biannual and annual basis. Any non-compliances, incidents or complaints are reported by the next working day following occurrence.

Environmental management facilities on site include:

- Leachate management system
- Landfill gas management system
- Surface water management system

2.1.1 Leachate Management System

Leachate that gathers in the base of filled cells is collected via a system of pipework, laid in a 'herringbone' fashion within the granular material laid on the cell floors. Electricity-powered leachate pumps are located in the low points of the cells, and leachate is pumped from here to the on-site leachate storage lagoon. The lagoon itself is covered with a floating cover to minimise water ingress and odour emissions. Leachate is tankered from this lagoon to an off-site wastewater treatment facility.

2.1.2 Landfill Gas Management System

Landfill gas is extracted from all active and filled cells via vertical and horizontal gas wells and pipework. Gas extraction commences from each cell once sufficient waste has been placed to prevent air infiltration into the gas extraction system. In addition, temporary extraction pipes are installed at the landfill working face to further enhance gas collection. A slotted horizontal gas collection pipe is also installed at the top of the cell side-slopes to intercept any gas travelling up the cell embankments.

Landfill gas is fed from the cells to the utilisation compound just east of the landfill footprint and north of the surface water lagoon. This compound contains three enclosed flares and four landfill gas engines. The latter generate electricity for export to the Irish national grid. The landfill gas utilisation plant is operated by Bioverda Power Systems Ltd., under contract from Knockharley Landfill Ltd. There is a flare dedicated to the management of poor quality landfill gas generated in the active area.

2.1.3 Surface Water Management System

Drainage from adjoining lands onto the site is directed around the property and flows into the local drainage network at the southern boundary of the facility.

Surface water from the landfill is drained via the main landfill swale to a purpose-built storm water attenuation pond and constructed wetland. The storm water attenuation pond is lined with an engineered lining system, comprising a HDPE membrane (permeability 1×10^{-9} m/s) and a layer of engineered clay to the same specification as the landfill cells. The constructed wetland comprises a shallow clay-lined pond both naturally colonised and planted with appropriate species. The outflow from the constructed wetland flows into the Knockharley Stream local drainage network at the south-eastern corner of the site.

Surface water arising from all roads and hardstandings is diverted to the main surface water sewer. This surface water sewer discharges to the surface water pond via a full retention oil interceptor and stilling chamber.

2.1.4 Cell Lining System

The deposited waste is fully contained through the use of a 1m thick clay basal liner with a permeability of 1×10^{-9} m/s and a composite high-density polyethylene (HDPE) membrane, complying with both the EU Landfill Directive and with the licence conditions. Placed waste is compacted immediately and covered daily to limit wind-borne litter and other nuisances.

The clay component of the basal lining system is won from material excavated during the construction of the cells. The clay is screened and subsequently placed and compacted in layers, to achieve the required degree of permeability, in compliance with the licence. The cells are then lined with a 2 mm thick HDPE geomembrane. The liner is textured on the side slopes and smooth on the cell floors. The cell floors fall to low points equipped with leachate pumps. The composite barrier layer is protected against mechanical damage using a protective geotextile overlain by drainage stone on the floor and using a protective geotextile on the side slopes. The construction of the landfill liner system is subject to independent quality assurance testing and controls approved by the EPA.

2.1.5 Landfill Capping System

As part of ongoing operations at the site, the active area of the landfill is covered with daily cover. Near-horizontal areas of the working face are covered with soil and woodchip, the slope of the working face is covered with synthetic cover sheets at the end of each working day. Temporary low-permeability cover is installed as areas of the landfill reaches full height.

Phase 1 final capping at Knockharley Landfill consisted of 12,500m² of capping predominantly over Cells 1 and 2 and was undertaken in 2008/2009.

Phase 2 final capping consisted of 16,500m² of capping over the remaining areas above Cells 1, 2, 3 and 4. This work was undertaken during 2012.

Phase 3 capping at Knockharley Landfill consisted of final capping of 26,500m² over Cells 5 and 6. It also extended over part of Cells 7 and 8. This work was undertaken during 2013. Phase 4 capping is underway consisting of final capping over Cells 7 to 10.

The fully engineered final cap comprise a gas collection layer, a 1 mm fully welded linear low-density polyethylene (LLDPE) liner, sub-surface drainage layer, subsoil layer and topsoil layer. The overall thickness of the soil layers is 1 m in accordance with the requirements of the waste licence.

2.2 Proposed Development

It is proposed to increase the waste intake at the facility to up to 440,000 tpa for disposal and recovery, comprising the following waste management processes:

1. Landfilling of residual non-hazardous municipal solid waste (rMSW) and non-hazardous soils
2. Storage of incinerator bottom ash (IBA) to facilitate future recovery

2.2.1 Landfilling of residual non-hazardous MSW and non-hazardous soils

Landfilling of residual non-hazardous MSW and soils is currently undertaken at the facility and the proposed development will see an increase in tonnage of these materials to be accepted for disposal and recovery at the site. This increase will be accommodated within the current permitted landfill footprint, and proposed to raise the final profile by up to 10-12 m.

2.2.2 Storage of IBA

It is proposed to develop a dedicated area for the storage of incinerator bottom ash (IBA). This area will be developed as a 'land raise' concept and will comprise shallow cells constructed in accordance with the requirements of the Landfill Directive, as well as leachate collection and gas venting infrastructure, site access roads, covered leachate lagoon and all ancillary and associated works.

The indicative footprint of this area is shown in Figure 1.

2.2.3 Building

It is proposed to develop a 40 m² building to facilitate the following activities:

- temporary storage of baled MSW waste
- recovery of metals from IBA

The temporary storage of baled waste is proposed in response to a market identified requirement for capacity of this nature, as it provides contingency in terms of scheduling baled waste export shipments, as well as providing contingency during maintenance or unforeseen downtime experienced at energy from waste facilities.

2.2.4 Tonnages for acceptance

Up to 440,000 tonnes of material may be accepted at the facility per annum. Table 2.1 identifies potential tonnages of input materials and means of management of same.

Table 2.1: Potential Tonnages for acceptance

Waste Type	Input tonnage	Means of Management
Non-hazardous MSW and non-hazardous soils	up to 290,000 tpa	Disposal within existing footprint & recovery through approved means e.g. daily and intermediate cover etc., temporary baled waste storage
Incinerator Bottom Ash	up to 150,000 tpa	Recovery/disposal through storage within dedicated area

2.2.5 Leachate treatment infrastructure

It is also proposed to augment the existing leachate storage lagoon through the installation of leachate pre-treatment/conditioning plant in order to reduce the concentration and volume of leachate being consigned from site for treatment at offsite wastewater treatment facilities.

Specialised plant (likely to be membrane bioreactor or reverse osmosis technology) will be installed within housed, enclosed containerised systems on a concrete plinth, with 1-2 further covered lagoons installed to store the separated leachate fractions. Final detail of these systems will be presented in the EIS.

2.2.6 Screening Berm development & and Ancillary development

In order to facilitate the management of soils onsite, won from the development of the IBA storage area as well as the future development of the currently permitted landfill cells, it is proposed to develop a number of berms at certain locations along the facility perimeter. The installation of these berm will also serve a purpose in terms of mitigation of potential noise impacts and visual impacts. Indicative locations of these berms are shown on Figure 1.

In addition, a second surface water attenuation lagoon will be installed to the north of the IBA storage area, to facilitate surface water management from this area, which will discharge to the existing stream.

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3 STRUCTURE AND SCOPE OF THE EIS

3.1 Contents of the EIS - Statutory Requirements

The EIS must be prepared in accordance with the Planning and Development Regulations 2001, as amended, which set out the contents of an EIS.

Schedule 6 of the Regulations specifies the information to be contained in an EIS, including the following:

- "A description of the proposed development comprising information on the site, design and size of the proposed development
- A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects
- The data required to identify and assess the main effects which the proposed development is likely to have on the environment, and
- An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment."

Information is also required on the following matters:

- A description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operational phases
- A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used, and
- An estimate, by type and quantity, of expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development."

Aspects of the environment likely to be significantly affected by the proposed development are also to be described, including in particular:

- "Human beings, fauna and flora Soil, water, air, climatic factors and the landscape
- Material assets, including the architectural and archaeological heritage, and the cultural heritage, and
- The inter-relationship between the above factors."

A description is required of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:

- "The existence of the proposed development,
- The use of natural resources, and
- The emission of pollutants, the creation of nuisances and the elimination of waste"

A description is required of the methods used to assess the effects on the environment. A summary in non-technical language of this information is also to be included.

Finally, any difficulties encountered by the developer in compiling the required information should be indicated.

3.2 EIS Methodology

3.2.1 General

The EPA published guidelines on the preparation of environmental impact statements. These are contained in 'Advice Notes on Current Practice (in the preparation of Environmental Impact Statements)', published in 2003 and 'Guidelines on the Information to be contained in Environmental Impact Statements' published in 2002. The EIS team will have regard to these guidelines in the preparation of the EIS, as well as the draft revised versions of these guidelines, published for consultation in 2015. The team will also have regard to best practice guidance for individual environmental topics and available Best Available Technique (BAT) conclusion notes.

3.2.2 Mitigation Measures

The central purpose of the EIS is to identify potentially significant adverse impacts at the pre-application stage and to propose measures to mitigate these impacts. The primary mitigation will be by avoidance. Where potential adverse impacts are identified, the element of the proposed development giving rise to the adverse impact will be modified if feasible, to avoid the impact. If impacts cannot be avoided, measures will be incorporated into the project to reduce the adverse impacts to as low as is practicable. Where adverse impacts cannot be prevented, measures will be taken to restore the environment to an approximation of its previous condition or to a new equilibrium.

3.2.3 EIS Structure

There are two different EIS structures which are commonly used and which the EPA guidelines accept as equally valid. The structure, which the EIS team proposes to use for the EIS for the proposed development, is the grouped format structure.

Using this structure there is a separate chapter for each topic, e.g. air and climate, ecology, hydrology. The description of the existing environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in the chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

Each of the environmental topics will generally be presented under the following headings:

- Introduction
- Methodology
- Receiving Environment
- Potential Impacts
 - Construction
 - Operation
 - Decommissioning
- Mitigation Measures
 - Construction
 - Operation
 - Decommissioning
- Residual Impacts
- References

The structure proposed for the EIS is as follows:

Volume 1 – Non-Technical Summary (including figures)
Volume 2 – Main EIS
Volume 3 – Appendices for the EIS

4 ENVIRONMENTAL ISSUES TO BE ADDRESSED IN THE EIS

4.1 Background to the Project

The EIS will summarise the nature of the existing development, the planning history associated with the development site, the consultation processes undertaken and the format and structure being followed in the EIS preparation.

4.2 The Need for the Development

The specific need for the proposed development will be outlined identifying the legislative and policy aspects relevant to the wastes proposed for acceptance, the current and likely future generation and capacity demand profiles, as well as alternative management options.

Based on this assessment, the need for the proposed development will be established.

4.3 Alternatives Considered

The alternatives in relation to the proposed development will be considered under the following headings:

- Alternative site layout
- Alternative treatment technologies
- 'Do-nothing' alternative

The reasons, including environmental considerations, for choosing the proposed alternatives will be explained.

4.4 Technical Difficulties

Any technical difficulties encountered during the preparation of the EIS will be outlined.

4.5 Scheme Description

A description of all elements of the proposed development will be provided including:

- Construction methods and programmes of work
- Operations
- Restoration and aftercare
- Monitoring, maintenance and reporting.

4.6 Planning and Policy Context

The European, national, regional and local planning and policy context for the project will be addressed with reference to relevant county development and other plans or policies, regional planning guidelines and Government and waste management policy statements including (but not limited to):

- Council Directive 1999/31/EC on the Landfilling of Waste
- Council Directive 2008/98/EC on waste (and repealing certain Directives)
- European Communities (Waste Directive) Regulations 2011
- Waste Management: Changing Our Ways – 1998
- Preventing and Recycling Waste – Delivering Change – a Policy Statement – 2002

- A Resource Opportunity – Waste Management Policy in Ireland – 2012
- Eastern Midlands Region Waste Management Plan 2015 – 2021
- Southern Region Waste Management Plan 2015 – 2021
- Connacht Ulster Region Waste Management Plan 2015 - 2021
- National Spatial Strategy 2020-2020
- The National Development Plan 2007-2013 (revised in 2010 to 2016)
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022
- Meath County Development Plan 2013 – 2019.

The relevant objectives within each of these documents will be summarised and put in context in relation to the proposed development.

4.7 Consultation Programme

Stakeholders, including national and local regulatory bodies, Government agencies, environmental non-governmental organisations (NGOs) and the general public will be provided with information on the project and asked for their comments and concerns. A list will be provided in the EIS of the bodies consulted and a summary will be provided of the queries and concerns expressed.

4.8 Human Environment – Socio Economic, Land Use and Amenity

The main areas that will be examined in this section with respect to the potential effects of the proposed development on the human environment in the area are:

- Settlements & population
- Land use
- Local employment and economic activity
- Transportation network
- Utilities
- Amenity
- Tourism

4.8.1 Assessment Methodology

Data from the Central Statistics Office will be used to define the socio-economic baseline of the surrounding environment. The potential positive and negative impacts of the project on population, tourism and recreation, employment and economic activity both directly and indirectly, will be assessed. This includes a review of the economic benefits to the surrounding community arising from the community contribution fund.

4.8.2 Existing Environment

The facility is located in a rural area approximately 1.5 km north of Kentstown village. The village of Slane is located 7 km north of the site, the town of Duleek 7 km to the east and the town of Navan 10 km to the west. There are a number of farmsteads and residences located along the local road network surrounding the site with a number of these situated within 1 km of the existing facility.

Community facilities in the immediate area, are primarily focused in Kentstown Village and include schools, a community hall, pubs and shops. The Kentstown Local Area Plan promotes tourism by encouraging and facilitating the development of sustainable tourism in through the conservation, protection and enhancement of the built and natural heritage, in order to maximise upon the economic benefits arising from the industry.

4.8.3 Potential Impacts

The continued operation of the Knockharley has significant economic benefits for the local community through the continued contributions from the community contribution fund.

4.9 Noise and Vibration

4.9.1 Aspects to be Addressed

The chapter will address noise and vibration impacts arising from the development and operation of the IBA storage area, the operation of the existing landfill, the installation of the leachate conditioning plant, screening berms installation and the impact of traffic associated with increased waste acceptance activities at the site.

4.9.2 Assessment Methodology

A noise assessment will be carried out for the construction and operational phases of the proposed development. This will include characterising the existing background noise environment through the review of monitoring data conducted as part of licence compliance.

A site specific noise prediction assessment will be conducted using prediction modelling software which will assess the cumulative impacts from operations within the existing landfill footprint, the construction and operation of the proposed IBA storage area, the installation of screening berms and increased traffic movements on sensitive receptors in the vicinity of the site.

4.9.3 Potential Impacts

The main potential construction phase impacts may arise during the construction of the IBA storage area, which could coincide with the development of future cells within the main landfill footprint, as well as screening berm installation. Construction related impacts related to the use of plant and machinery in the development of these area will be considered.

Operational noise impacts may arise from the acceptance and placement of IBA, residual MSW and soils within their respective locations, as well as potential future winnowing of IBA from the storage area and its movement offsite.

4.10 Traffic and Transportation

4.10.1 Aspects to be Addressed

The traffic impact assessment will address the traffic impacts on the local road network from the construction of IBA storage area and operation of the overall facility at the maximum input of 440,000 tpa.

4.10.2 Assessment Methodology

A traffic impact assessment will be conducted in accordance with the National Roads Authority (NRA) Traffic and Transport Assessment (TTA) Guidelines, May 2014. Data collected from road traffic surveys at the junction to the facility from the N2 will be used in the assessment.

The methodology for the traffic impact assessment will include a review of the traffic volumes and impacts which will be generated by the construction and operation of the facility. The type and nature of waste loads will be characterised to calculate vehicle trips to and from the facility. Baseline traffic volumes will be established for the receiving environment and an assessment of the increases in traffic volumes undertaken. Recommendations will be made to mitigate any potential traffic impacts where required.

4.10.3 Existing Environment

The site is approximately 7 km south of Slane on the west side of the N2 National Primary Road. Navan is located approximately 10 km to the west of the site via the R153 Regional Road.

To the north, the site is bounded by the County Road CR384 running east-west. To the east the site is bounded by the CR384 running north-south between the N2 and R150. To the south, the site is bounded by farmland, which in general is located adjacent to the R150 over the section between the N2 National Primary Road and Kentstown.

The site has direct vehicular access to the national road network with access facilitated at a ghost island priority junction on the N2. The ghost island provides easy access for right-turning vehicles travelling from the north. This is complimented with an auxiliary left turn deceleration lane to facilitate access for vehicles coming from the south. The junction has been designed and constructed in accordance with the NRA: Design Manual for Roads and Bridges (DMRB).

The private access road to the site runs due west through arable lands, thereafter running under the CR384 County Road. The primary controlled site entrance (a security gate with closed circuit television) is located approximately 80 to 100 m west of the underpass of the CR384. Vehicles arriving at the facility enter the site via this private dedicated access road, through the site entrance to the weighbridge facility.

4.10.4 Potential Impacts

It is anticipated that the traffic volumes arising from the construction of any new infrastructure will be minor when considered in context with traffic volumes associated with the operation of the facility. The increase in waste acceptance activities at the facility has the potential to give rise to traffic congestion and capacity issues, such as queuing, in the event of there being inadequate access infrastructure. However, given that works have taken place to upgrade the junction with the N2 along a dedicated private road, the impact arising from increase traffic volumes will be reduced. Nonetheless these potential impacts will be assessed as part of the traffic impact assessment.

4.11 Air and Climate Change

4.11.1 Aspects to be Addressed

The assessment will address the potential impacts on air quality due to construction activities and emissions from traffic and material placement activities associated with the operation of the overall facility.

The climate in the immediate local area of a proposed development is known as the micro-climate whereas the climate of a large geographical area (global) is the macro-climate. The potential impacts of Knockharley Landfill on micro-climate and macro-climate will be addressed.

Odour modelling will be undertaken, which will be informed by baseline field assessment and other information sources, to determine the potential impact of increased waste acceptance at the facility.

4.11.2 Assessment Methodology

Air quality monitoring conducted by the EPA at a number of locations in the vicinity of the site, as well as dust and volatile organic compound (VOC) monitoring conducted on-site, will be reviewed and levels compared with the air quality standards.

To assess the impacts of construction dust emissions, the approach and assessment criteria outline in the *National Roads Authority (NRA) Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (2011) and the *Institute of Air Quality Management (IAQM) publications, Guidance on the assessment of dust from demolition and construction & Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance* will be used.

Potential vehicle emissions arising from the operation of the facility at 440,000 tpa will be assessed using the NRA Guidelines. For the purposes of assessing the impact on air quality of emissions generated by operation traffic, the methodology described in the Design Manual for Roads (DMRB) (Volume 11, Section 3 Air Quality, May 2007) and published by the UK Highways Agency will be used. The DMRB model predicts vehicle emissions for NO_x, NO₂ and PM₁₀, carbon monoxide, benzene and 1,3-butadiene.

The potential for the generation of operational dust, odour and other emissions will be evaluated and mitigation measures proposed, where necessary.

The potential micro-climatic impacts of the Knockharley facility will be assessed in relation to the micro-climatic baseline, the scale of the elements of the project and the nature of use of the surrounding environment.

The data collected during baseline assessments will be used to construct a baseline odour dispersion model of the site. The model will define estimates of the current emissions generated from the site, and the odour exposure levels that are predicted to occur around the site under the range of meteorological conditions that occur over a typical meteorological year. Modelling will be conducted using the AERMOD dispersion model in accordance with relevant guidance issued by the US EPA and Irish EPA. The potential levels of exposure experienced around the site will be presented in the form of concentration isopleths. This model will then be used as a foundation from which to investigate the effect of the proposed development at various points in time during its development.

4.11.3 Existing Environment

Knockharley landfill is located in a rural area, corresponding to air quality zone D under the Air Quality Regulations, SI 180 of 2011, as amended. The air quality is expected to be good.

Existing air emissions from the site include landfill gas which is actively managed and utilised to generate electricity for export to the national grid. There have been odour issues associated with the operation of the landfill and the operators have been actively engaged with the EPA in relation to the implementation of processes and regimes to significantly mitigate these issues.

4.11.4 Potential Impacts

The construction phase of the IBA storage area has the potential to generate dust emissions, which could give rise to nuisance for local residents. Construction plant and equipment, and the traffic generated by the construction process, have the potential to give rise to emissions of oxides of nitrogen, benzene and particulates, which could impact on local air quality in the short term.

Potential air quality impacts arising from the operation of the IBA storage area include dust emissions arising from the placement and/or winning of IBA, while potential emissions from increased MSW landfilling rates includes odour and landfill gas.

4.12 Ecology

4.12.1 Aspects to be Addressed

This chapter of the EIS will address the habitats and species, including those of conservation concern in and in close proximity to the facility.

4.12.2 Assessment Methodology

The assessment will focus on:

- Natura 2000 sites i.e. Special Areas of Conservation designated under the EU Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EU Birds Directive (Directive 2009/147 EC), within 15 km of the proposed sites and routes

- Other designated sites such as Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora
- Habitats listed in Annex I of the Habitats Directive
- Birds listed in Annex I of the Birds Directive
- Species protected under the Wildlife Acts including protected flora
- Habitats that can be considered as corridors for the purposes of Article 10 of the Habitats Directive
- Red data book species
- and biodiversity in general.

Desk studies will be undertaken in which ecological databases, such as those of the NPWS and EPA will be consulted. The NPWS (including the local conservation ranger), Inland Fisheries Ireland and the main environmental non-governmental organisations will be consulted.

A flora and fauna assessment for the proposed development will be conducted in accordance with Fossitt (2000) "A Guide to Habitats in Ireland", following best practice guidelines in Smith *et al.* (2011) "Best Practice Guidance for Habitat Survey and Mapping". The aquatic habitats in the Knockharley Stream and the River Nanny are evaluated based on biological monitoring conducted as part of licence compliance. The results of this assessment will be presented in the EIS using GIS mapping.

Some vegetation and tree removal will be required for the development of the IBA storage area and the screening berms installation and relevant assessments for these areas will be included in the EIS.

4.12.3 Existing Environment

To the north and the east of the existing landfill footprint and within the site boundary is agricultural land which is predominantly managed forestry. The site itself, while relatively flat, rises gradually northwards and westward from approximately 50 mOD at the south-east corner to almost 70 mOD at the western boundary.

There are a number of designated sites located in the vicinity of Knockharley landfill. These include:

- Balrath Woods pNHA (001579)
- Thomastown Bog pNHA (001593)
- Rossnaree Riverbank pNHA (001589)
- River Boyne and River Blackwater SAC (002299)
- Duleek Commons pNHA (001578)

While there will be no direct impact on any of these sites, indirect impacts may occur. These include the potential impacts from a discharge of contaminated run-off from the Knockharley site. The local Knockharley Stream, to which surface water discharges from the site, is within the River Nanny catchment, which discharges to the River Nanny Estuary and Shore SPA, which is located c. 20 km from the site.

Screening will be undertaken to determine if an Appropriate Assessment (AA) of the proposed development at Knockharley Landfill is required. If the screening assessment indicates that an AA is required, a Natura Impact Statement will be prepared and submitted to accompany the planning application and EIS.

4.12.4 Potential Impacts

Potential impacts from the construction and operation of the proposed development on flora and fauna include:

- Direct loss of habitat
- Damage to adjacent habitats during construction
- Impacts on water quality due to polluted run-off emanating from the site
- Disturbance to local wildlife, including loss of habitat for, or displacement from, known foraging or breeding areas of mammals, birds, bats etc.
- The introduction of alien invasive species during construction
- Impact on water quality or aquatic habitats resulting from the stream diversion
- Cumulative impacts which may affect the conservation status of any given species, in particular Annex species
- Impacts on the conservation status of Natura 2000 sites.

4.13 Soils, Geology & Hydrogeology

4.13.1 Aspects to be Addressed

The assessment will address soils, bedrock and aquifer underlying the site.

4.13.2 Assessment Methodology

The methodology for the soils and geology assessment will be in accordance with the guidelines published by the Institute of Geologists of Ireland (2013) *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*.

The existing geology will be described in terms of the bedrock geology, overburden geology and hydrogeology. It will be prepared using available published literature for the site area which includes:

1. Groundwater Protection Scheme for County Meath (on GSI website)
2. Geology of Meath - Sheet 13 (McConnell, B et al., 2001)
3. General Soil Map of Ireland - Second Edition 1980 (Gardiner, M.J and Radford, T, 1980)

As part of the assessment the following will be conducted:

- A review of the characteristics of the entire site (ground conditions, topography, vegetation cover/condition)
- Identification of past and present land use on the site (grazing, forestry etc.) and their current impact on the existing ground conditions
- Review and interpretation of data collected during site investigations carried out in July and August 2016

4.13.3 Existing Environment

Site investigations previously undertaken at the site during the phased development of the landfill to-date indicate that the overburden at the site is glacial till which varies in thickness from 12 to 21.5 m, from east to west across the site. The till comprises cobbles and boulders in a silty clay matrix with minor sand content. The till has a low permeability in the range of 1×10^{-9} m/sec to 4.6×10^{-11} m/sec.

Bedrock recovered from boreholes on-site indicate fine grained light coloured sandstone and darker coloured siltstone /mudstone. The elevation of the bedrock surface varies from 40 to 50 mOD, falling away towards the south, following the slope of the topography. The GSI website classifies this bedrock (Namurian rocks) in County Meath as a Poor Aquifer (PI) which would generally be unproductive except in localised zones. The vulnerability of the aquifer is also classified as low.

4.13.4 Potential Impacts

The impact on soils/geology of the site is limited to any excavations required for the development of the proposed IBA storage area, the expanded leachate storage lagoons and the development of screening berms, in terms of slope stability.

Excavated material will be used in screening berm development and/or as temporary landfill cap. Once operational, the management of clean surface water run-off and/or leachate from the site will be integrated into the existing management systems on-site, through installation of newly required infrastructure. As no alterations are required to the consented landfill footprint to accommodate the proposed intensification of landfilling, it is anticipated that there will be no impacts from increased landfilling activities on the soil/ geology or groundwater. A hydrogeological risk assessment will be prepared in relation to the development of the landfill cells associated with the IBA storage.

Groundwater monitoring conducted as part of licence compliance to date indicates no impact on water quality. Therefore, it is anticipated that the continued employment of the groundwater protection measures in accordance with the Landfill Directive and site operations will result in no degradation of groundwater quality at the site.

4.14 Hydrology & Water Quality

4.14.1 Aspects to be Addressed

The assessment will address water quality impacts on surface water. The impact of the project on the hydrological regime of the receiving environment, including flood risk, will be addressed.

4.14.2 Assessment Methodology

The objectives of the relevant River Basin Management Plan in relation to water quality will be considered. The review will include the County Development Plans for Meath and will consider the policies and objectives of the Plan in relation to surface water and flooding. The assessment will be prepared in accordance with the EPA and Office Public Works (OPW) guidance. Any concerns expressed by consultees relating to hydrology, drainage and/or flooding will be addressed, where appropriate.

The review will have regard to the baseline data and the studies undertaken for the assessment of impacts on terrestrial and fresh water ecology, geology and hydrogeology in relation to environmentally protected areas, receiving waters and soil conditions. Baseline monitoring data collected on a quarterly basis as part of licence compliance will be reviewed and used to characterise the impact, if any, on receiving waterbodies.

Preliminary drainage design, using Sustainable Drainage Systems (SuDs), for the proposed development will be conducted to ensure that additional surface water run-off is incorporated into the existing drainage system design, where possible.

The impact of the proposed stream diversion will be assessed to determine any potential impact on flooding as part of a standalone Flood Risk Assessment report. The design of the second standalone surface water attenuation facility will ensure sufficient capacity for the flows resulting from the IBA storage area development.

4.14.3 Existing Environment

The site is drained by Knockharley Stream which lies in the Veldonstown waterbody (EA_Nanny160_NannyTRIB_Veldonstown) within the Eastern River Basin District (ERBD). The stream enters to the site from the west and flows eastwards towards the eastern boundary of the site before travelling southwards to Veldonstown Stream, which in turn drains to the River Nanny. The outlet from the existing onsite surface water management system discharges into tributaries of the River Nanny.

4.14.4 Potential Impacts

The main impact from the construction phase of the proposed development will be rainfall run-off containing silt that could potentially lead to siltation and consequently physical effects on flora and fauna in aquatic habitats.

Sediment has the potential to arise from:

- Vegetation removal could lead to an increase in sediment in the surface water run-off
- Temporary spoil heaps from the excavation of foundations of the proposed facilities
- Silt carried on the wheels of vehicles leaving the site could be carried onto the public road.

In addition, potential impacts on water quality and flooding may result from the diversion of the Knockharley Stream.

The potential impacts on hydrology and drainage that may arise from the operation of the facility includes impacts on localised flooding patterns and downstream structures arising from increase run-off/discharge rates as well as cumulative hydrological impacts with neighbouring developments.

4.15 Archaeology, Architecture and Cultural Heritage

4.15.1 Aspects to be Addressed

The assessment will address features and sites of archaeological, architectural and cultural heritage significance.

4.15.2 Assessment Methodology

Archaeological, architectural and cultural heritage assessments of the Knockharley site were conducted for previous applications. In addition, archaeological monitoring was conducted at the site during the previous excavation for the various phases of the landfill footprint. These records will be reviewed and presented in the EIS. Subsequently a walkover of the site, with particular focus on the previously undisturbed area proposed for the development of the IBA storage area, and screening berms will be conducted by an archaeologist.

An impact assessment and mitigation strategy will be prepared. This will outline potential adverse impacts that the proposed development may have on the archaeological, architectural or cultural heritage resource, while the mitigation strategy is designed to avoid, reduce or offset such impacts.

Consultation will take place with a number of bodies including the Heritage Officer and/or Conservation Officer in Meath County Council.

4.15.3 Existing Environment

A number of archaeological features have been recorded within the Knockharley site. Geophysical surveying of targeted areas undertaken in 2003 (Licence Number 03R010) identified potential areas which were subject to pre-development testing. This testing resulted in the identification of a possible well and a posthole feature which were archaeologically resolved. In 2004, nine archaeological features were encountered in the course of pre-development testing and archaeological monitoring. Two of these sites, a deer trap and a well, were excavated and preserved by record.

In 2006, further monitoring was conducted (Licence 04E0788 extension) resulting in five separate areas/features of archaeological significance were uncovered in the course of monitoring.

In 2009, monitoring of the removal of topsoil for the development of the on-site gas utilisation compound in the south eastern portion of the landfill site was conducted. The archaeological monitoring found no evidence of archaeological layers or features. The stratigraphy consisted of topsoil overlying natural layers. Occasional modern debris indicated the area had been disturbed in the recent past.

4.15.4 Potential Impacts

The potential impacts of the proposed development will be the loss or interference with a previously unrecorded site or features of archaeological, architectural and cultural heritage significance caused by excavations. Once construction of the proposed development has been completed, the potential for a negative impact on archaeological, architectural and cultural heritage from the development will be minimal.

4.16 Landscape and Visual Impact

4.16.1 Aspects to be Addressed

The potential impacts from the proposed development within the context of the existing waste management facility will be assessed.

4.16.2 Assessment Methodology

A desktop study will be undertaken to determine the existing landscape of the area and visual envelope of the Knockharley development within that area. Landscape values such as amenity areas, designated views and prospects, and historical archaeological and architectural heritage will be identified from the Meath County Development Plan.

A number of viewpoints illustrating the existing views of the facility and in particular the landfill body itself will be included. An assessment of the impacts of the IBA storage area and in particular the proposed increased landfill height will be conducted with representations of the dimensions and scale of these elements of the development produced and included in the assessment.

4.16.3 Existing Environment

The landscape of the existing facility and the surrounding area is characterised by extensive hedgerow bound fields interspersed with areas of woodland cover and mature trees. Relatively gentle undulations in landform combine with vegetation to generally constrain views across the landscape with the exception of localised vantage points or clearances in vegetation. The existing facility and in particular, the landfill body, is a visible feature in the surrounding landscape.

4.16.4 Potential Impacts

It is anticipated that the potential impacts arising from the IBA storage area development and the increased landfill height will be mitigated by the installation of the screening berms such that impacts will be related to the scale and form of overall development with respect to the visual character of the surrounding area.

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5 CUMULATIVE IMPACTS, INDIRECT IMPACTS AND INTERACTION OF EFFECTS

5.1.1 Aspects to be Addressed

The cumulative impacts of the proposed development at Knockharley Landfill with other projects, existing or which have received planning permission but have not yet been built, or for which there is information in the public domain, at a sufficient level of detail to allow assessment, will be addressed. Indirect effects and effects in different environmental media will be addressed.

5.1.2 Assessment Methodology

The assessment methodology will be based on the EPA guidance and the EU guidelines, 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions', published by the Office for Official Publications of the European Communities in May 1999.

As part of scoping the studies required to assess the impacts of the development in the different environmental media, the potential for significant cumulative and indirect impacts and interactions will be examined and any such potential impacts will be identified. Where the potential for significant cumulative and indirect impacts and interactions is identified, such impacts and interaction of impacts will be included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental media and aspects of the project. The cumulative and indirect impacts and interaction of impacts will be presented in the chapters of the EIS which address the most relevant environmental media.

The matrix and expert opinion approaches, as outlined in the EU Guidelines, will be used in the identification of the potential for significant cumulative and indirect impacts and interactions. A matrix of potential interactions will be prepared. Modelling and carrying out of capacity analyses will be used to evaluate impacts.

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