ENVIRONMENTAL IMPACT STATEMENT

FOR INTENSIFICATION OF WASTE INTAKE AT KNOCKHARLEY LANDFILL, Co. MEATH

Main Report & Appendices Volume 2 & 3

greenstar

Prepared for:
Greenstar Holdings Limited
Ballyogan Business Park
Sandyford
Dublin 18

FEHILY TIMONEY & COMPANY

DECEMBER 2008

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VOLUMES 2 & 3 of 4

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0	Issue to client	DOS/ SMcA	DOS	DOS	11.11.08
1	Re-issue with inclusion of Figure 9.1	DOS/ SMcA			18.12.08

Client: Greenstar Ltd

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Abstract: Greenstar is applying to An Bord Pleanala under the Strategic Infrastructure Act for planning permission to increase waste intake at Knockharley Landfill to 400,000 tonnes per annum and to alter the landfill phasing sequence and all ancillary works including the installation of a second wheel wash. This EIS outlines the current situation, potential impact of the proposed changes to the landfill operation and outlines mitigation measures where necessary.

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1. INTRODUCTION

1.1. Background to the Current Application

The applicant company, Greenstar Holdings Limited (hereinafter 'Greenstar'), is a wholly owned subsidiary of National Toll Roads plc (NTR).

As part of its network of waste management facilities and services, Greenstar currently operates a residual waste landfill at this site at Knockharley near Kentstown, County Meath. The landfill opened in December 2004 and accepts residual household, commercial and industrial wastes together with construction and demolition wastes.

The residual waste landfill at Knockharley operates on foot of two permissions (Reg. Ref. Nos. 01/5006 & NA/60336) and in accordance with Waste Licence (Reg. No. W0146-01). The planning consents authorise the acceptance of up to 132,000 tonnes waste annually until end December 2010 with the permitted volume of waste reducing to 88,000 tonnes per annum after 2010. The waste facility is currently licensed to accept up to 200,000 tonnes waste per annum.

Figure 1.1 outlines the current extent and various components of the facility together with the planning permitted limit of the landfill footprint. The overall void capacity of the Greenstar Knockharley landfill is approximately three times greater than the capacity assumed in the Waste Management Plan for the Northeast Region. The site layout map shows the existing complex of buildings on the site comprising 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 permitted landfill footprint is aligned approximately north-south through the centre of the lands. The active area commencing at Cell 1 is located towards the south of the overall footprint and the landfill is currently being filled working northwards. The leachate storage lagoon is located to the south of the administrative buildings and the surface water pond is situated to the south of the landfill. Gas engines (for which statutory consent exists) are about to be installed for the purpose of utilising the landfill gas for electricity generation.

In August 2006 Greenstar applied for permission (Reg. Ref No. NA/60336; ABP Ref. No. PL.17.220331) to implement infrastructural and operational changes at the permitted landfill consisting of the following three elements: (1) an increased landfill footprint (c. 2 ha) to create an overall footprint of c. 25 ha, height 15 m; (2) an increase in the waste intake volume to 200,000 tonnes per annum (tpa); and (3) the removal of the regional restriction on the origin of the waste accepted at the facility by modifying Condition No. 2(a) of planning register reference number 01/5006 so the facility can accept waste from adjoining waste regions. Item (3) is intended to remove the obstacle to the applicant company's and its customers' efficient collection, transfer, treatment, recovery and disposal of waste.

Following first and third party appeals, An Bord Pleanála granted permission Reg. Ref. No. NA/60336 (ABP Ref. No. PL.17.220331) in March 2007 for the three elements with the following notable condition governing the rate of acceptance of waste at the facility.

> *Waste to be accepted at the facility shall be restricted to 132,000 tonnes per annum until December, 2010, thereafter tonnage for disposal at the facility shall be restricted to a maximum of 88,000 tonnes per annum.*
>
> ***Reason:*** *To meet short-term waste management capacity needs and to ensure compliance with the principles of waste management as set out in the North-East Region Waste Management Plan.*

In the meantime, circumstances have changed somewhat in that, on June 6th 2008, RPS consultants on behalf of Fingal County Council and the other local authorities in the Dublin Waste Management Region wrote to the applicant and to other landfill operators within easy reach of the Dublin Region with the purpose of securing commercial contracts for the supply of waste disposal capacity in the short to medium term. The correspondence states that *"waste disposal capacity will be required to cater for approximately 500,000 tonnes per annum in the short term potentially reducing to approximately 150,000 to 300,000 tonnes per annum in the medium term"*. This letter, which is presented in Appendix 1, confirms an imminent waste crisis whereby the licensed capacity in the Greater Dublin Area will be considerably short of the predicted demand for disposal capacity in the short and medium term. With its known volume of permitted and licensed disposal capacity the facility at Knockharley is immediately available and ideally positioned to meet some of the anticipated shortfall. Greenstar met with representatives of the Dublin Region Waste Steering Group on the 17th October 2008 to highlight the company's plans to increase the annual intake at Knockharley to 400,000 tonnes per annum of MSW and other non-hazardous waste streams, subject to receiving the necessary consents.

The landfill operates in accordance with Waste Licence (Reg. No. W0146-01) issued in March 2003 by the Environmental Protection Agency (EPA). The Licence permits the acceptance of 200,000 tpa of waste for disposal and recovery. However, Condition No. 3 of planning permission Reg. Ref. No. NA/60336 restricts the permitted tonnage of waste for disposal to 132,000 tonnes per annum until December 2010 with the tonnage accepted for disposal restricted to a maximum of 88,000 tpa thereafter. Waste accepted at the site to date complies fully with the ABP tonnage requirements. The EPA has conducted four

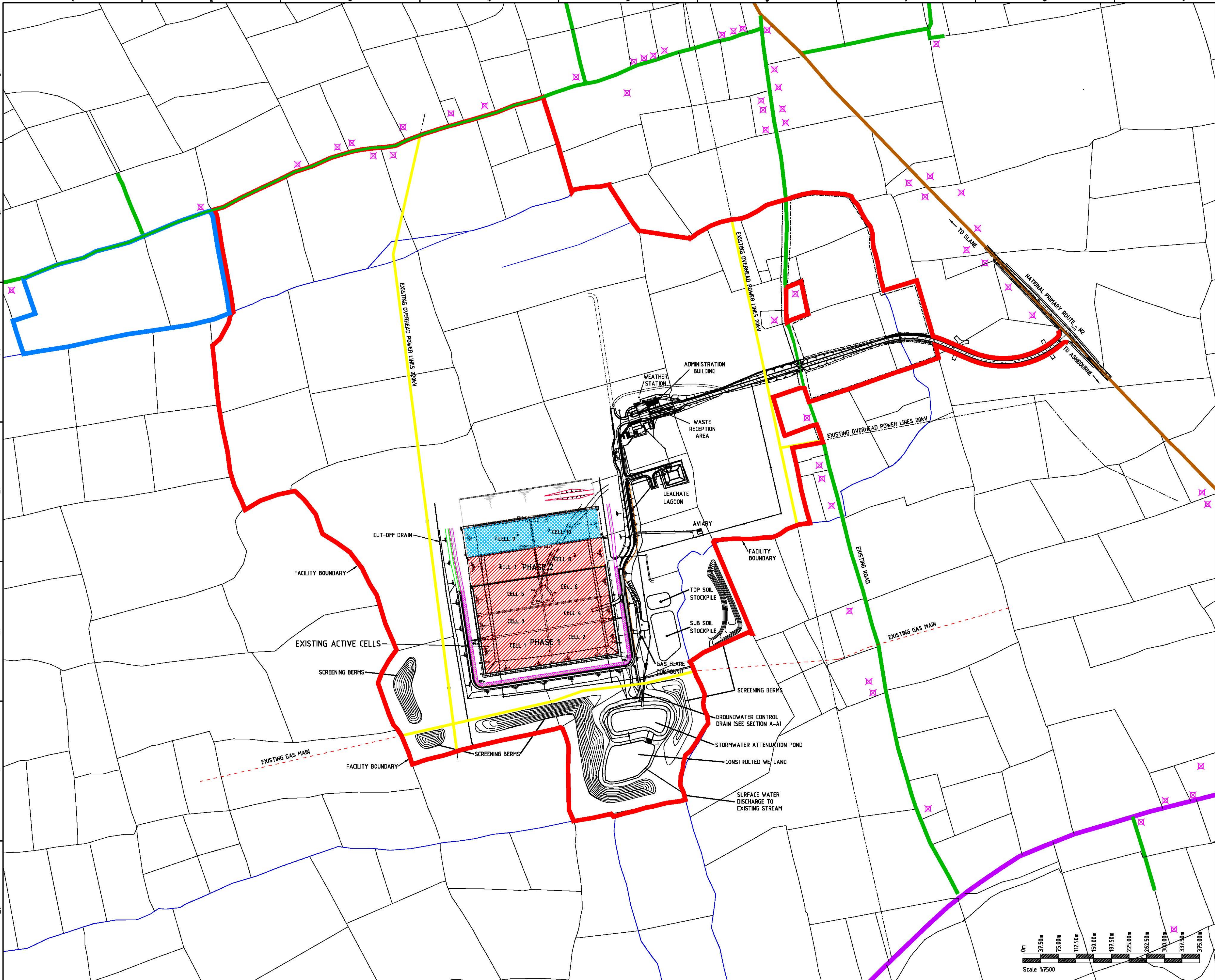
annual audits since the Knockharley Landfill began operating with no non-compliances noted during any of the audits making the facility the most compliant landfill in the country. A waste licence review application is being submitted concurrently with this planning application.

Copies of the current planning permissions and the EPA waste licence are attached in Appendix 2.

Planning permission (Reg. Ref No. NA/70015) was granted by Meath County Council in April 2007 for the installation and operation of a gas utilisation plant. The proposed plant will be phased and will generate up to 4.2 MW of electricity for input into the national grid. There will be three landfill gas engines generating approx 1.4 MW of power each with an enclosed flare ESB substation and switch room. Greenstar is awaiting connection to the national grid and it is envisaged that the first gas engine will be installed and operation in 2009 pending the grid connection. The Knockharley facility is therefore classed as a facility for residual disposal with energy recovery.

Chapter 2 of this EIS examines the waste management policy and planning context with particular emphasis upon the predicted demand for disposal capacity within the combined North East Region and County Dublin Area until 2016. Please note that this proposal seeks to accept waste streams other than MSW for disposal as described in Section 1.2. The analysis predicts a deficit in disposal capacity of at least 450,000 tonnes per annum for MSW alone in the short term, increasing to approximately 600,000 tonnes per annum from 2014. This predicted deficit is likely to continue beyond 2016 if planned waste infrastructure such as the Poolbeg Incinerator or the Fingal Landfill at Nevitt/Tooman is further delayed or abandoned. It is hoped that this proposed increase in the rate of acceptance of waste will contribute towards facilitating this need as the landfill is poised to accept much of this waste deficit using its current permitted infrastructure.

Sheet FTC-A1-2000 rev. K (template filed in O:\Acad\Templates\Autocad) (July 2006) - template externally referenced



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LEGEND

- CONSTRUCTED CELLS
- ACTIVE CELLS
- HOUSE LOCATION
- DENOTED NATIONAL PRIMARY ROAD
- DENOTES REGIONAL ROAD
- DENOTES COUNTY ROAD
- DENOTES RIVER / STREAM
- DENOTES APPLICATION SITE
- LAND UNDER APLPICANTS CONTROL
- Wayleave

Rev.	Drawn	Chk'd	App'd	Date	Description
B	JC	SMcA	D.O'S	11.11.08	ISSUE FOR PLANNING
A	CS	SMcA	D.O'S	14.02.08	For Information Only, Not For E.I.S or Construction Purposes

Name of Client

Name of Job

KNOCKHARLEY RESIDUAL LANDFILL SITE

Title of Drawing

EXISTING SITE LAYOUT

Scales Used
A3-1:7500

Dwg. No. 2007-172-02Fig 1.1

Rev. B

0m 37.50m 75.00m 112.50m 150.00m 187.50m 225.00m 262.50m 300.00m 337.50m 375.00m

Scale 1:7500

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ORIGINAL DRAWING SIZE A1 - (841 x 594)

NATURAL SCALE

Having regard to the closure of a number of existing waste disposal facilities and the lack of certainty over the future and timing of the replacement infrastructure, the needs analysis in Chapter 2 (Section 2.9) predicts an emerging waste crisis whereby licensed capacity within the study area is likely to be considerably less than the predicted demand for waste disposal capacity. Having regard to the decision of An Bord Pleanála to permit a temporary increase in the rate of waste acceptance at Knockharley, the applicant company considers its permitted and licensed facility is ideally located to address some of the need for additional landfill capacity in the region and it enjoys the following strategic advantages.

- Part of integrated network of Waste Management Services and Facilities in North Leinster.
- Location within North East Region and GDA.
- Excellent transport links.
- Dedicated junction at N2 with adequate traffic capacity.
- Facility ready to accept waste.
- Serves North East Region and Greater Dublin Area (ABP Ref. No. PL.17.220331)
- Facility can be a Regional Solution to Imminent Waste Crisis.

1.2. Description of the Proposal

This application seeks permission to increase the annual intake of residual waste. The proposed development comprises an increase in the rate of waste acceptance to 400,000 tonnes per annum of waste for disposal to include the following residual wastes (subject to a review of the waste licence);

i. Short to medium term disposal of stabilised biowaste from MBT (Mechanical Biological Treatment) processes

ii. Other stabilised secondary wastes from the processing of non-food bearing construction and industrial wastes

iii. Soils and rubble and other wastes from the construction industry

iv. Other residual wastes from the mechanical processing stages of municipal, commercial and industrial waste recycling

v. Non-hazardous residual wastes from other waste recovery processes.

It is not proposed to increase the permitted total quantity of waste to be deposited in the landfill or to extend the landfill footprint. Instead, this proposal involves a more efficient and more environmentally sustainable filling rate over a considerably reduced time period.

The proposed increased rate of waste intake will also reduce the potential for odour nuisance.

The proposed development at the Knockharley Landfill underpins the recycling industry and helps achieve key objectives in the waste management hierarchy by providing a sustainable disposal outlet for the residual wastes generated by the activities higher up the hierarchy. This is illustrated by the changing characteristics of the residual waste to be landfilled, which will comprise progressively less biodegradable waste and increasing volumes of MBT stabilised waste and other stabilised residual waste from recycling activities.

The proposed development acknowledges the rapidly evolving waste policy and legislative obligations which will focus efforts on reducing the amount of biodegradable waste to landfill in order to comply with Ireland's obligations set out in the EU Landfill Directive (1999/31/EC). For instance, the EPA recently circulated a consultation document on expected standards of municipal waste treatment prior to disposal, which is due to be published as a guidance document by the end of November 2008. The Government has also signalled its intention to alter the landfill tax levy to incentivise the stabilisation of biodegradable waste prior to landfilling.

The proposed development would increase the amount of waste accepted at the site to 400,000 tonnes per annum from 2009 until approximately 2016/17 with a further four years to restore the landfill in accordance with EPA restoration guidelines and international best practice. In practical terms, permission is sought to increase the rate of acceptance of waste from the current permitted levels of 132,000 tonnes per annum to 400,000 tpa in the years 2009 and 2010, and to increase from the permitted rate of 88,000 tonnes per annum to 400,000 tpa in the years 2011 to 2016/17 (approximately). The proposed increase rate of waste acceptance entails the filling of the landfill void more rapidly than the current permitted rates thereby enabling early closure and commencement of landfill aftercare.

Although the facility is permitted to accept waste from anywhere in the country the source of the waste will be the North Leinster Area comprising the North East Region and Dublin. It is envisaged the proposed increased capacity will help to meet existing and predicted demand in this catchment. Fingal County Council on behalf of the four Dublin local authorities are seeking proposals for additional short-term and medium term disposal capacity to serve the GDA and the applicant's landfill at Knockharley is ideally located to meet part of the expected shortfall. It should be noted the landfill at Knockharley is a private merchant facility and is not the long-term landfill for the North East Region. The applicant envisages that the landfill will serve the Greater Dublin Area in the same way as its recently permitted landfill at Usk, Co. Kildare (Condition No. 2 of ABP Ref. No. PL.09.131620).

The existing planning consents at Knockharley facilitate a short term increase in the disposal capacity and do not restrict the incoming waste stream to the North East Region. Greenstar requires the flexibility in relation to the volume of waste it can accept at Knockharley so that it can respond to such crises as demand arises and so that it is not operating at a competitive disadvantage in this industry.

Greenstar enters into long-term and short-term contracts with licensed collectors and local authorities based upon the prevailing conditions in the particular market. However, the actual proportion of the waste arising in Dublin or in any waste region and presented for residual disposal at Knockharley varies considerably so it is unrealistic to provide estimates of the exact quantity of waste from each source. We confirm that the residual waste deposited at Knockharley will be processed at permitted and/or licensed facilities located throughout the Dublin Region, the North East Region and elsewhere.

In operational terms, residual municipal waste will continue to be deposited at the south end of the active void working north. It is proposed to develop a second working face at the north end of the landfill void starting at Phase 7 for the deposition of stabilised waste and other wastes suited for disposal separately to biodegradable waste. Both ends of the active void will be worked towards the centre of the void with capping and screening occurring on a phased basis. The proposed site development is presented in Figure 1.2.

This second working face is consistent with the company's objective to have proper regard to the protection of the amenity of adjoining property including residential property. It is also consistent with contemporary scientific advice.

Construction waste often contains plaster. Conventional wisdom is that plaster wastes combined with leachate from putrescible waste can increase the odour potential in wastes. By isolating the construction and stabilised wastes in Phase 7, potential impacts from mixing them with putrescible wastes are mitigated, resulting in;

- Reduced potential for landfill gas odour nuisance
- Reduced odours from working waste faces (both north and south)

The proposed increased filling rate of 400,000 tpa is more efficient and more environmentally sustainable than the current permitted rate of filling (132,000 tonnes per annum reducing to 88,000 tonnes per annum at the end of 2010). The proposed increased rate is in keeping with Government Policy, which favours a network of fewer larger landfills (Changing Our Ways).

PROPOSED ACTIVE CELLS
ACTIVE CELLS
CONSTRUCTED CELLS
HOUSE LOCATION
LAND UNDER APPLICANTS CONTROL
APPLICATION SITE
DENOTED NATIONAL PRIMARY ROAD
DENOTES REGIONAL ROAD
DENOTES COUNTY ROAD
DENOTES RIVER / STREAM
DENOTES WAYLEAVE

N

PHASE 7
PHASE 6
PHASE 5
PHASE 4
PHASE 3
PHASE 2
PHASE 1
CELL 9
CELL 10
CELL 8
CELL 7
CELL 6
CELL 5
CELL 4
CELL 3
CELL 2
CELL 1

EXISTING OVERHEAD POWER LINES 20kV
EXISTING OVERHEAD POWER LINES 20kV
AREA RESERVED FOR FUTURE BIOLOGICAL WASTE TREATMENT SINCE 2001 EIS
PROPOSED WHEELWASH
ADMINISTRATION BUILDING
WEATHER STATION
WASTE RECEPTION AREA
EXISTING WHEELWASH
LEACHATE LAGOON
AVIARY
CUT-OFF DRAIN
TOP SOIL STOCKPILE
SUB SOIL STOCKPILE
GAS FLARE COMPOUND
AREA PERMITTED FOR GAS UTILISATION PLANT
SCREENING BERMS
SCREENING BERMS
SCREENING BERMS
GROUNDWATER CONTROL DRAIN
STORMWATER ATTENUATION POND
CONSTRUCTED WETLAND
SURFACE WATER DISCHARGE TO EXISTING STREAM
EXISTING GAS MAIN
EXISTING GAS MAIN
CR384
TO SLANE
NATIONAL PRIMARY ROUTE - N2
TO ASHBOURNE

Rev.	Drawn	Chk'd	App'd	Date	Description
B	JC	SMcA	D.O'SDO'S	11.11.08	ISSUE FOR PLANNING
A	CS	SMcA	D.O'SDO'S	14.02.08	For Information Only, Not For E.I.S. or Construction Purposes

Name of Client
greenstar

Name of Job
KNOCKHARLEY RESIDUAL LANDFILL SITE

Title of Drawing
PROPOSED SITE LAYOUT

Scales Used
A3 1:7500 / A4 1:15,000

Dwg. No. 2007-172-02-Fig 1.2 — **Rev.** B

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A tonnage-based community levy of €1.89 per tonne has been agreed with Meath County Council and approximately €500,000 has been lodged with the local authority in compliance with the planning permission to date with another c.€270,000 to be paid for 2008. This money has been used to fund projects in the locality of the landfill. It was accepted in the An Bord Pleanala report for the original planning application that such a levy would have a positive effect in the region (planning report July 2002, An Bord Plenala reference PL17.125891). Another benefit of the proposed increase in tonnage is that the community fund currently accruing at approximately €250,000 per annum would increase to approximately €750,000 per annum, thereby providing even more funding for local projects.

This application does not propose any significant change to the nature and extent of infrastructure already permitted on the site. However, operating the second face will require duplication of items such as operational plant, the wheel wash and litter-control netting.

1.3. Alternatives

It is a requirement of the EU Directive on Environmental Impact Assessment to consider the main alternatives studied and to indicate the main reasons for opting for the proposed development taking into account the effects on the environment. This statutory obligation is incorporated into Irish domestic legislation at Article 94(a) of the Planning and Development Regulations, 2001 (ref. item 1(d) of Schedule 6).

This application proposes an increased rate of filling at an existing permitted licensed waste facility, so the main alternatives to be considered relate to the rate of landfill disposal. Essentially, the applicant company considered options ranging from the continuation of landfilling of the void space at the maximum current permitted rates to the filling of the void at a number of different increased rates. An integral feature of the alternatives analysis is an assessment of the status of key planned waste management facilities in the Greater Dublin Area, i.e. the planned thermal treatment plants at Carranstown, Co. Meath and Poolbeg, Co. Dublin, the Fingal Landfill at Nevitt/Tooman and the need for biological stabilisation of waste to meet the 2010 Landfill Directive Target.

Alternative A : Do Nothing – Maintain Current Permitted Waste Input

Planning permission has been granted to accept up to 132,000 tonnes per annum until December 2010 reducing to 88,000 tonnes per annum thereafter. Assuming the maximum current permitted rate is achieved each year, the lifetime of the landfill facility will extend to 2033 at these filling rates to be followed by 30 years of post-filling aftercare.

At these waste intake rates the duration of the production of leachate and landfill gas will occur over an extended time period beyond 2033. Consequently the time within which potential nuisances in terms of traffic, leachate, noise, dust and gas emissions are experienced and must be managed would be approx. 17 years longer than the original proposed active lifespan of the landfill based upon an intake of 200,000 tonnes per annum. Notwithstanding Greenstar's commitment to manage the active and aftercare periods to the most exacting standards, the permitted filling rates do not represent an optimum approach in sustainability terms and would be inefficient in terms of energy use, fuel consumption and the return on investment in the infrastructure compared with the proposed increased rates over shorter active filling periods. In addition, the efficiency with which landfill gas is harnessed for energy generation would be diminished. To fill Knockharley Landfill at the current permitted rate is not consistent with the filling rate and lifespans of other modern engineered landfills in Ireland. For example, the applicants KTK facility commenced operations in 1999 and closed for disposal during late October 2008, an operating period of less than 10 years. Similarly, Arthurstown Landfill, which is scheduled to close in late 2009, will have an operating life of approximately 12 years having opened for disposal in October 1997.

Alternative B: Accept waste at current EPA licensed rate.

Alternative A described the divergence between the current permitted landfilling rates under the planning permission and the corresponding licensed landfilling rate as per the Waste Licence.

Alternative B entails increasing the annual waste input for disposal to 200,000 tonnes per annum as per the waste licence. The licensed intake provides for the filling of the landfill void within a period of approximately 15 years, after which the licensee is obliged to restore the site and to continue to comply with the waste licence during the estimated 30 years after-care period. It is inferred from the waste licence that the EPA regards the approved rate of filling of the landfill under the waste licence (i.e. Alternative B) is an environmentally sustainable approach.

Alternative B does not involve a review of the waste licence but it requires an application for planning permission. Having regard to the original planned lifetime of the waste landfill (i.e. 45 years including post-filling aftercare) it follows that the filling rate under this alternative is more environmentally sustainable than the current rate under the existing planning consents. In terms of mitigation of environmental impact this alternative constitutes a significant improvement over Alternative A.

Alternative C: Increase the rate of waste acceptance in the Planning Permission and EPA Waste Licence.

A third alternative, which was examined involves the filling of the void space at a higher rate than the approved rate in the waste licence. Having regard to the demand for new landfill capacity (see Section 2.9) to meet the needs of North Leinster consisting of the North East Region and the Greater Dublin Area Alternative C involves an increased rate of landfilling to 400,000 tonnes per annum.

Alternative C requires planning permission and a review of the waste licence. It is not proposed to increase the permitted total quantity of waste to be deposited in the landfill or to extend the landfill footprint but this proposal involves a more efficient and more environmentally sustainable filling rate over a considerably reduced time period. If the proposed maximum proposed rate of filling (400,000 tonnes per annum) were achieved, the landfill would be complete approximately by the end of 2016/17 allowing the restoration phase to commence at an earlier date. Other key aspects of Alternative C are that the processes of leachate production and landfill gas generation would end earlier than under either of the other alternatives.

The EIS examines whether the existing infrastructure at Knockharley will support the increased filling rate without any significant increased adverse environmental impacts.

This EIS considers the likely significant environmental effects – positive, negative and neutral – of the revised proposal and predicts that there is an overall cumulative positive impact in terms of the environment and there are a number of definite environmental benefits associated with the increased disposal rate.

Greenstar therefore decided to apply for a review of its Waste Licence and for planning permission for the proposed increased filling rate at Alternative C.

Alternative D: Municipal Waste Infrastructure in the Greater Dublin Area.

Although these are not strictly environmental alternatives in their own right, the applicant's MSW needs analysis (Section 2.9) considers the implications of planned waste management facilities in the GDA, which are at different stages of the planning/licensing processes (Please note that this proposal seeks to accept waste streams other than MSW for disposal as described in Section 1.2.). These proposed facilities and their associated capacities include.

1. ***Fingal Landfill at Nevitt/Tooman, Co. Dublin***
   (500,000 tonnes per annum disposal and recovery)

2. ***Waste to Energy Plant at Poolbeg Peninsula, Co. Dublin***
   (600,000 tonnes per annum)

3. ***Waste to Energy Plant at Carranstown, Co. Meath***
   (200,000 tonnes per annum)

4. ***N7 Resource Recovery Project, Naas Road, Co. Dublin***

(365,000 tonnes per annum)

5. ***Drehid Waste Management Facility, Co. Kildare***
   (360,000 tonnes per annum until 2013)

Of these facilities only the Carranstown plant and the Drehid facility have completed their passage through the permission and licensing phases. An Bord Pleanala recently granted permission (dated 31st October 2008) to Bord na Mona to increase the rate of annual intake from 120,000 tonnes per annum to 360,000 tonnes per annum until the end of 2013. However, at the time of writing this EIS the EPA has not yet issued a Proposed Decision regarding an application submitted in June 2008 to review the waste licence in respect of this intensification of the annual intake at Drehid to 360,000 tonnes per annum.

At the time of writing An Bord Pleanála is preparing to reconvene the oral hearing in relation to the proposed Fingal Landfill so a planning decision is not expected until 2009. The EPA issued a Proposed Decision to grant a waste licence in September 2007. However, a final decision has not issued to date and the EPA has recently requested Fingal County Council to undertake a quantitative risk assessment in respect of the underlying groundwater. The EPA also indicated that the oral hearing in respect of the waste licence will be re-opened to discuss the findings of this assessment. The PD issued by the EPA includes a specified period of 8 years which suggests that the Agency recognises the possibility of significant delays in securing the necessary permissions for this facility.

Permission was granted in November 2007 for the development of a Waste to Energy Plant at Pigeon House Road, Poolbeg, Dublin 4. An EPA Licence has been sought and the Agency issued a Proposed Decision in November 2007, but as in the case of the Fingal Landfill, a final decision has not issued yet. The PD issued by the EPA for this facility also includes a specified period of 8 years.

Planning permission and an EPA Waste License were obtained for a thermal treatment plant at Carranstown, Co. Meath. Indaver Ireland has commenced the construction phase of the project and it is anticipated the first waste will be accepted in 2011. A waste licence was issued by the EPA in November 2005.

An Application by Energy Answers Ireland for the development of a Waste to Energy Plant at Behan's Quarry, Naas Road, Co. Dublin is currently being considered by An Bord Pleanála in accordance with the provisions of the Strategic Infrastructure Act. An oral hearing is scheduled for the second part of November 2008 so a decision on the planning application is due in 2009. From the EPA register of license applications no application for a waste license has been submitted in respect of this proposed facility.

Whether the facilities mentioned above are permitted and licensed and eventually become part of the waste management infrastructure serving the GDA will have a potentially significant bearing upon the availability of landfill disposal capacity and thermal treatment capacity in North Leinster (North East Region and Dublin).

The MSW needs analysis at Section 2.9 envisages thermal treatment in Co. Meath from 2011 (as stated in Indaver's press release dated 07 July 2008), an increase in the rate of

waste acceptance at Drehid from 2009, with the Fingal landfill accepting waste for disposal in 2015. The need analysis adopts realistic assumptions regarding extensions to existing facilities and the opening of approved facilities based upon up to date publicly available information.

1.4. Requirement for an Environmental Impact Statement

This EIS is prepared to accompany an application for permission, which is being submitted to An Bord Pleanala pursuant to Section 37E of the Planning and Development Act, 2000 as amended. This EIS also accompanies an application to the EPA for a review of the waste licence (Ref. No. W0146-01).

The planning application and EIS are in accordance with the requirements of the following statutory documents:

- ***The European Community Directive on Environmental Impact Assessment (No. 85/337/EEC).***
- ***The European Community Directive (97/11/EC) amending Directive 85/337/EEC "On the assessment of the effects of certain public and private projects on the environment".***
- ***Planning and Development Acts 2000-2007 and the Planning and Development Regulations made thereunder.***

Development projects requiring an environmental impact assessment are set out Schedule 5 of the Planning and Development Regulations, 2001. Part 2 of Schedule 5 establishes the threshold limits for projects requiring a mandatory EIS in Ireland. Clause 11(b) of Part 2 of Schedule 5 of the Planning and Development Regulations, 2001 indicates the threshold for landfilling is 25,000 tonnes per annum.

Class 13 of Part 2 of Schedule 5 of the Planning and Development Regulations 2001 states in respect of "changes, extensions, development and testing" as follows

> *(a) Any change or extension of development which would*
>
> *(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule, and*
>
> *(ii) result in an increase in size greater than*
>
> *25 per cent, or*
> *an amount equal to 50 per cent of the appropriate threshold,*
>
> *whichever is the greater.*

There is no proposed increase in *'size'* however, the proposed increase in annual waste

intake is 268,000 tpa (based upon current permitted 132,000 tpa). From 2011 and thereafter, based upon current permitted tonnage of 88,000 tpa, the proposed increase in the rate of waste acceptance is 312,000 tpa. The proposed increased waste tonnage exceeds the threshold of 12,500 tpa, i.e. (50% of 25,000 tonnes) so the proposed development therefore warrants the carrying out of an EIA and the preparation of an EIS.

Accordingly, this EIS has been prepared and is being submitted to An Bord Pleanala as part of the planning application for the proposed development.

The proposed amendments to the 2002 permission will result in changes to operation of the landfill facility. The main changes to the operation of the landfill will relate to:

1 the footprint development schedule
2 the capping & restoration programme
3 operational and construction traffic movements

This application for permission was prepared with reference to the previous permissions granted on this site, including the EIA prepared thereto.

The following sections of this EIS will:

i) outline the current environmental setting of the Knockharley landfill,

ii) describe the potential environmental impacts that might arise due to the proposed changes to the present operation of the landfill; and

iii) set out the mitigation measures proposed to limit any potential impact on the local human, natural and built environments associated with the proposed development.

The existing environment at the landfill and in its environs is described with reference to the comprehensive environmental monitoring programme required under the current operating waste licence. The monitoring programme commenced a year prior to the construction of the facility (i.e. 2003), it continued for the duration of the construction period and is now part of the routine operation of the landfill facility.

The scale and frequency of the environmental monitoring required under the licence directly relate to the extent and scale of the landfill facility permitted under the licence and therefore cover the extent of the proposed changes to the permitted facility.

1.5. Structure of the EIS

The EIS has been prepared using the Grouped Format Structure as recommended in the Guidelines on the Information to be contained in Environmental Impact Statements published by the Environmental Protection Agency.

The main EIS (Volume 2) is subdivided into the following sections:

- Section 1 is an introductory section which outlines the existing situation at the application, a description of the nature and extent of the development now proposed, the main alternatives considered, the statutory requirement for an environmental impact assessment, the structure of the EIS and project team.

- Section 2 sets out the waste management planning and policy context at national, regional and county level and considers the need for the proposed development having regard to the particular circumstances within the waste management sector in the region.

- Section 3 gives a description of the existing operation and proposed development.

- Sections 4 through 13 describe the various potential impacts of the proposed development on the existing environment and outlines the measures proposed to mitigate these potential impacts.

1.5.1. Scoping of EIS and Identification of Likely Significant Impacts

A scoping exercise was conducted during the initial stages of the EIA. The exercise established the terms of reference for the EIA and identified the concerns and issues that warranted particular attention during the assessment phases. The scoping process for this EIS was based on internal discussions and an initial workshop attended by all contributors referred to at 1.6 below to the study.

The scoping exercise determined that the following main issues were likely to be important with respect to potential impacts resulting from the proposed changes to the ABP permitted development.

- Human beings
- Traffic
- Noise
- Air quality
- Leachate & landfill gas production

1.5.2. Baseline Data

Baseline information for the proposed development site and its environs is readily available. The waste licence conditions that a number of environmental parameters be monitored at the site on a regular basis. The monitoring programme covers sampling of surface water, groundwater, noise and air emissions.

The results of this monitoring have been used as the baseline environmental conditions at the site as it currently operates and the predicted impacts of the development are based on this data.

Data from the previous EIS was used in establishing the environmental baseline prior to development of the site. This gives an accurate reflection of the current and historic status of the landfill.

1.5.3. Technical Difficulties

No technical difficulties were encountered during the evaluation of this project.

1.5.4. Impact Prediction

The predicted impacts of the proposed development have been determined through the observations made on site, an examination of the local surrounding receiving environment, examination of past monitoring data, review of previous EIS reports prepared for the site and through the use of appropriate predictive computer model software.

1.6. Contributors to the EIS

This EIS was prepared by a number of consulting firms. The members of the study team and their respective inputs are as follows:

Role	Team Member
Lead Team for EIS preparation	**Fehily Timoney and Company** **Core House** **Pouladuff Rd** **Cork**
Planning & Policy	**Kiaran O'Malley & Co. Ltd** **St Heliers** **Stillorgan Park** **Blackrock** **County Dublin**
Traffic	**Trafficwise** **Bracetown Business Park** **Clonee** **Co Dublin**

1.7. Strategic Infrastructure

In accordance with the provisions of the Planning and Development (Strategic Infrastructure) Act 2006, applications for certain key infrastructural projects shall be made directly to An Bord Pleanala. Three broad categories of project are listed in the Seventh Schedule of the 2000 Act as amended, namely Energy, Transport and Environmental Infrastructure.

A private developer (the prospective applicant) requests the commencement of pre-application consultations with An Bord Pleanála (ABP). Following those consultations, if the Board serves notice pursuant to Section 37B(4)(a) that the proposed development is strategic infrastructure, an application for permission shall be submitted directly to An Bord Pleanála in accordance with Section 37E.

On 7th December 2007, Greenstar formally requested ABP to commence pre-application consultations in respect of the proposed development. Greenstar and its project team met with officials of An Bord Pleanála on February 28th 2008, and made a presentation setting out the nature and extent of the proposed development together with the reasoning why the prospective applicant had formed the opinion that the proposal constitutes strategic infrastructure within the meaning of Section 37A(2).

Following this meeting An Bord Pleanála served a notice under Section 37B(4)(a) that the proposed development is strategic development (see letter dated May 8th 2008 from An Bord Pleanála to Kiaran O'Malley & Co. Ltd. in Appendix 3).

A further meeting between the prospective applicant and An Bord Pleanála was held at the Board's offices on May 29th 2008. The Inspector outlined the application procedures and protocols to be followed in the preparation of the application. He also advised in relation to the consultation phase prior to the compilation of the EIS and indicated the prescribed bodies to whom a copy of the application and EIS should be circulated for comment. An Bord Pleanála then wrote to the prospective applicant's agent on July 10th 2008 confirming its original opinion that the proposed development constitutes strategic infrastructure development pursuant to Section 37B(4)(a) of the Act (see letter dated July 10th 2008 from An Bord Pleanála to Kiaran O'Malley & Co. Ltd. in Appendix 3).

1.8. Pre-Application Consultation

In addition to the formal pre-application consultations with An Bord Pleanála referred to at Section 1.7 above, the applicant company contacted the following bodies/groups during the pre-application stage to inform them of the forthcoming planning application and to allow them an opportunity to highlight issues and concerns.

- Dublin Waste Region Steering Group
- North East Waste Region Steering Group
- Meath County Council
- Environmental Protection Agency
- Knockharley Landfill Liaison Committee

- Community Liaison Committee, Meath County Council
- An Taisce
- Commission for Energy Regulation
- The National Roads Authority

These consultees were invited to make submissions and/or comments in respect of the proposal to Fehily Timoney & Company Limited and/or Greenstar within four weeks.

Greenstar and its agents met with representatives of the North East Region Steering Group and Meath County Council on 27 August 2008 at Navan, Co. Meath.

The applicant company also met with the Dublin Waste Region Steering Group on 17 October 2008 and the Environmental Protection Agency on 9 September 2008.

Greenstar also hosted a two day information event at Knockharley Landfill at the end of October to provide interested parties with an opportunity to visit the site in order to learn more about the planning application and proposed development as well as to view Greenstar's operations and environmental performance first hand.

Prescribed Bodies

In accordance with Section 37E(3)(c) of the Planning and Development Acts, 2000-2006 a full copy of the planning application and Environmental Impact Statement will be sent to the following prescribed bodies as per Article 213 of the Planning and Development Regulations, 2001-2007.

The Minister for the Environment, Heritage and Local Government
The Minister for Communications, Marine and Natural Resources
The Minister for Agriculture, Fisheries and Food
Meath County Council
Fáilte Ireland
The Commissioner for Energy Regulation
An Táisce
National Roads Authority
Environmental Protection Agency
Health Service Executive
Dublin Transportation Office

Each prescribed body will be invited to make a submission in writing to An Bord Pleanála and any such submission must be received by the Board not later than 5:30pm on Friday, 9th January 2009. Meath County Council are required to report on the submission no later than 5.30pm on Friday 30 January 2009.

2. WASTE MANAGEMENT POLICY & PLANNING CONTEXT

2.1. Introduction

Chapter Two of this EIS is in two main parts. Sections 2.2 to 2.8 inclusive examine the general waste management planning and policy context at national, regional and local authority levels under the following sub-headings.

- National Review of Waste Plans (Taking Stock & Moving Forward)
- DOEHLG Section 60 Waste C ircular 04/05 (2005)
- The National Spatial Strategy 2002-2020
- Regional Planning Guidelines for the Greater Dublin Area (2004)
- North East Region Waste Management Plan 2005-2010
- Dublin Waste Management Plan 2005-2010
- Other Waste Management Reports

The second part of this chapter considers the need for the proposed increase in annual tonnage at the facility having regard to the remaining capacity and lifespan of existing and proposed facilities in the North East Region and the Greater Dublin Area under the following three sub-headings (Section 2.9 & 2.11).

- Need for the Proposed Development.
- Waste Management infrastructure in North Leinster and the GDA.
- Applicant's Integrated Waste Management Strategy.

2.2. National Review of Waste Plans (Taking Stock & Moving Forward)

National waste policy is implemented through waste management plans, which were prepared for each of the ten waste regions in Ireland. As the first generation of waste management plans approached the end of their plan periods, the Department of Environment Heritage and Local Government (DOEHLG) carried out a review to ensure the policy framework was taking account of developments in the sector. The results of the Review were published in '*Waste Management – Taking Stock and Moving Forward',(*April 2004) and the Review states that it is necessary to consider the following.

- *The implications of the more up to date waste data now available,*

- *Structural changes which have taken place within the waste sector, taking particular account of the growth and consolidation of the private sector's role in waste activities and the appropriate roles for the public and private sectors, and*

- *How to ensure we achieve more intensified and consistent enforcement of the law in relation to waste.*

Keypoint KP3 of the Review endorses the principle of an inter-regional solution to waste management and recommends that guidance is prepared to the local authorities as follows.

> *"KP3: An examination of the issues arising in terms of the interrelationship between regional boundaries and waste facilities will be completed with a view to providing guidance to the relevant authorities by end-Summer 2004."*

2.3. DOEHLG Section 60 Waste Circular 04/05 (2005).

Following the National Review, the DOEHLG published policy guidance Circular 04/05 pursuant to Section 60 of the Waste Management Act, 1996. This Circular restates the primacy of the proximity principle within the overall national approach to waste management and recommends that planning authorities do not adopt an unduly restrictive approach that would not be in keeping with the "rational use of waste management infrastructure".

2.4. National Spatial Strategy 2002-2020.

The National Spatial Strategy 2002-2020(NSS) is a long-term "*planning framework designed to deliver more balanced social, economic and physical development between regions*." Section 1.2 states that the NSS will "*set a national context for spatial planning to inform Regional Planning Guidelines*" and they will support the "*spatially balanced provision of key social and economic infrastructure*" to enable every region in Ireland achieve its potential.

As the capital city Dublin plays a vital national role but needs effective strategic planning and better management of the development pressures within it to secure and consolidate that role for the future. Section 3.3 notes the continuing health of Dublin is critically dependent on, amongst other things, efficient and cost effective water services and waste management infrastructure.

Section 3.7 refers to the waste sector as follows.

> *"Waste management is a particular current priority. Efficient, effective and cost competitive waste management facilities are essential if industrial and enterprise activity is to thrive and develop in a balanced way across Ireland."*

Based upon the present circumstances in the Greater Dublin Area waste management and in particular disposal is likely to remain a significant priority.

2.5. Regional Planning Guidelines for the Greater Dublin Area 2004-2016.

The Regional Planning Guidelines for the Greater Dublin Area (RPG) are intended to give effect to the National Spatial Strategy through regional and local development plans and to provide a strategic framework for the long-term sustainable development of the Greater Dublin Area up to 2016. Thus, the principles and recommendations in the Guidelines are an integral part of an on-going strategic planning process to ensure that key national and regional objectives are achieved and they should be accorded due weight.

Waste management is recognised at Section 6.6 of the Regional Planning Guidelines headed "General Policies for the Promotion of Economic Development" as this extract confirms.

> *"Planning authorities should in seeking to promote the economic development of the region, include policies in their development plans that:*
>
> *…Support the implementation of a coherent solid waste management strategy for the region as a whole."*

Section 8.6 of the Regional Planning Guidelines for the Greater Dublin Area headed "Services Infrastructure" notes the dramatic increase in pressure on existing infrastructure within the region and states that planning authorities should, inter alia:

> *"Liaise and cooperate with each other and other relevant bodies to facilitate an inter-regional solution to address the critical lack of waste disposal infrastructure. Provide integrated waste management facilities."*

Waste Disposal within the Greater Dublin Area is addressed at Section 8.6.3 of the Regional Planning Guidelines for the Greater Dublin Area as set out in the following extract.

> *"While progress has been made, particularly for recycling, it is clear that the targets identified in the plans were overly ambitious and that there is a serious lack of waste management infrastructure in the GDA, both for household and commercial waste, which will become critical beyond 2008…*
>
> *…Private sector proposals to develop landfill sites in Wicklow, Kildare and Meath are likely to be developed in the medium term. Should such proposals proceed, the transferring of waste between regions could be reconsidered so as to give flexibility in dealing with waste management at a regional level. New facilities should be allowed to perform their required function in one region and*

also form part of the wider strategy that includes waste management in another region."

In this context it is worth noting that Knockharley is the only landfill in both the North East Waste Management Region and in the Greater Dublin Area (as defined in the RPG). It is therefore ideally located to meet the predicted short to medium term disposal needs described in the letter dated June 6th 2008 issued by RPS Consultants on behalf of Fingal County Council on behalf of the four Dublin local authorities. In this letter the four local authorities in the Dublin Region are seeking proposals from Greenstar and other waste management stakeholders to provide additional MSW disposal capacity for approx. 500,000 tonnes per annum of non-hazardous household and commercial waste in the short term reducing to approx. 150,000 to 300,000 tonnes per annum in the medium term. This is independent confirmation of the urgent need for additional MSW disposal capacity to prevent a waste management crisis in the Greater Dublin Area. Greenstar considers its network of integrated waste management facilities including the landfill at Knockharley will meet some of the projected disposal shortfall.

2.6. North East Region Waste Management Plan 2005-2010.

This plan was adopted on 16th May 2006 and supersedes the 1999 Waste Management Plan for the North East Region. The plan summarises the status of the landfills in the North East Region as follows.

Landfill	Operator	Lifespan	Capacity	Regional Restriction
Scotch Corner	Monaghan CC	2018	39,500 tpa	No
White River	Louth CC	2022	96,000 tpa	No
Corranure	Cavan CC	2010/11	90,000 tpa	No
Knockharley	Greenstar	2033	132,000 tpa /88,000tpa	Yes

It should be noted that the overall void capacity of the Greenstar Knockharley landfill is approximately three times greater than the capacity assumed in the Waste Management Plan for the Northeast Region.

Section 3.9 refers to rationalisation of landfills in the long term. Section 3.10 sets out the policy in relation to the inter-regional movement of waste.

"The Waste Plan recognises that there should be flexibility in respect of the movement of waste across regional boundaries. In broad terms the capacity of waste facilities in the Region should primarily satisfy the needs of the Region whilst not precluding inter regional movement of waste and allowing flexibility to cater for the development of required national infrastructure."

Table 5.4 of the Waste Plan confirms *"the current municipal landfill capacity within the region is deemed adequate for the lifetime of the plan".* Section 14.2 of the Waste Plan states the following:

> *"As landfill disposal rates decrease, the lifespan of the current landfills will be extended considerably and could meet the disposal needs of the Region for the next 30-40 years. In addition to meeting the long-term disposal needs of the region the available over capacity could be used to landfill waste from outside the region if required."*

It seems from the Inspector's Report in relation to the previous appeal (ABP Ref. No. PL. 17.220331) there is adequate capacity within the local authority landfills in the North East Region to meet the current needs of the Region without a single tonne of waste being sent for disposal at Knockharley. Having regard to the location of the landfill, the provisions of waste plans, national waste management policy and the Board's decision to increase the rate of waste accepted at the landfill to meet the recognised disposal capacity shortfall in the catchment area, it seems to follow that the proposed increased disposal capacity is justified on objective planning grounds.

2.7. Dublin Waste Management Plan 2005-2010 (November 2005).

Section 18.9 of the Waste Management Plan for the Dublin Region 2005-2010 sets out the landfill requirements for the Region as follows:

> "A *critical shortage of municipal landfill capacity is imminent with the closure of Ballyogan Landfill in 2005, Arthurstown Landfill at the end of 2007, and Balleally landfill in 2008 approximately. Urgent delivery of the proposed Fingal landfill is required to replace these facilities and provide adequate safe disposal capacity for residual waste in accordance with this Plan. Even with the diversion of waste from landfill to the Dublin WTE facility there will remain a significant requirement for residual landfill disposal.*
>
> *It is an objective of the current Waste Management Plan to provide a landfill (of up to 10 million tonne capacity) in accordance with the Dublin Landfill Siting Study 2004.*
>
> *Fingal County Council has recently lodged a Planning Application including a detailed EIS with An Bord Pleanala and a Waste Licence Application and EIS with the EPA for the proposed site in Nevitt.*
>
> *It is an objective to provide for the use of other available landfills within the greater Dublin Region in the event of lack of capacity within the Dublin Region.*
>
> *There may be a short term requirement for additional disposal capacity in the Greater Dublin Area after 2007, in particular to accommodate household and commercial/industrial waste, at least*

until such time as the Dublin Waste To Energy plant and the proposed Fingal Landfill are in operation.

The preferred approach to manage this short-term waste disposal requirement is by:

- *Developing an additional short term extension to the Arthurstown Landfill in County Kildare subject to appropriate approvals.*
- *Maximising the use of available disposal (or energy recovery) facilities in the Greater Dublin Area, i.e. counties Kildare, Meath and Wicklow if feasible*
- *Seek options for disposal capacity in other Regions if necessary."*

If the proposed landfill were operational within 18 months of the date of commencement of the planning process in June 2006 (it is not), Table 18.4 of the Dublin Waste Plan predicts a potential demand for up to 400,000 tpa of additional private sector landfill capacity from 2008 onwards.

If the Fingal landfill were refused or delayed beyond 2008, Table 18.4 of the WMP predicts that up to 950,000 tpa of waste will need to be land filled outside of the region from 2008. Table 13.1 of the 2007 Annual Report for the Dublin Waste Plan revises the forecast opening date for the Fingal Landfill to 2010. As noted at Chapter 1 above An Bord Pleanála is about to re-open the oral hearing so it is unlikely a decision order will issue until early 2009 at best. The EPA has indicated its intention to re-open the licensing hearing to discuss the findings of a quantitative risk assessment that Fingal County Council has been requested to provide. The PD issued by the EPA in September 2007 allows a specified period of 8 years.

In addition to the delay associated with the Fingal Landfill project, the predicted landfill demands in Table 18.4 of the Waste Plan are proven to be conservative for a number of reasons, including the following.

- Table 18.4 of the Dublin Waste Plan assumes all necessary biological treatment capacity will be in place in County Dublin by 2008 to meet the requirements of the 2006 National Biodegradable Waste Strategy. The 2007 Annual Progress Report for the Waste Plan revises this forecast to the third quarter of 2009. However, the tendering process for both biological plants has not yet been completed.
- Waste tonnages in the Dublin Waste Plan are based upon waste arising data, which is shown by the more recent population statistics and growth rates published by the Central Statistics Office and up to date economic growth rates published by the Economic and Social Research Unit to underestimate the waste volumes.
- Delays in the planning, licensing and legal administrative processes can significantly slow down the roll out of new waste management

infrastructure. The Dublin Waste Plan anticipates the Dublin Waste to Energy (WTE) Plant will open in 2010. This date is revised to mid-2012 in Table 13.1 of the 2007 Annual Report for the Dublin Waste Plan. Based on experience of the development of similar facilities here and elsewhere, it is not unrealistic to expect the likely commencement date for the operation of the WTE plant may be delayed by a number of years beyond 2012. This is recognised by the EPA who included a specified period of 8 years in the Proposed Decision issued in November 2007.

Section 11.6 of the 2007 Annual Report recognises that there will remain a requirement for landfill in the long-term regardless of diversion rates and it states that *"the provision of additional landfill void space to serve the Region is therefore critical to avoid potential environmental impacts and substantial costs if Dublin's waste has to be exported for disposal to other Regions or countries".* Section 11.6.3 states that a *"critical shortage of municipal landfill capacity is imminent"* and indicates that the Dublin Local Authorities will *"seek options"* for the short disposal of municipal types in other regions, hence the letter from its agent, RPS Consultants, seeking short and medium term disposal capacity (Appendix 1).

In the event of delays to planned waste infrastructure in the Dublin Region, which are discussed in Section 2.10, South Dublin County Council's landfill at Arthurstown near Kill, Co. Kildare is the first stated alternative destination for Dublin's residual waste. Arthurstown Landfill is scheduled to close in 2009.

Section 18.11 of the Dublin Waste Management Plan acknowledges the importance of the regional dimension to existing waste management in the Greater Dublin Area (as defined in the Regional Planning Guidelines) and it states, inter alia, as follows.

> "*Regional co-operation is already in place by means of waste movement and transfer between Dublin and other Regions. For example, household waste from Kildare, Meath and Wicklow is currently baled in Dublin for disposal at Arthurstown landfill while other waste streams such as construction and demolition waste and green waste arising in Dublin are managed in these counties….*
>
> *"where infrastructure deficits arise in the Dublin Region, facilities in other Regions with spare capacity should be employed until this deficit is corrected and if required in accordance with this plan"*

The Dublin Waste Management Plan 2005-2010 states that *"it is an objective to provide for the use of other available landfills within the greater Dublin Area in the event of lack of capacity within the Dublin Region".* This is reiterated at Section 11.6.3 of the 2007 Annual Report for the Dublin Waste Plan which states that *"In keeping with the objectives in Section 18.9 of the Waste Plan, the Dublin Local Authorities will "seek options" for the short term disposal of municipal types in other regions as required".* The Waste Plan embraces a waste management approach, which is based upon *"maximising the use of*

available disposal (or energy recovery) facilities in the Greater Dublin Area, i.e. counties Kildare, Meath and Wicklow if feasible".

The predicted waste crisis is likely to be exacerbated if there are additional delays in the commissioning of planned facilities in the Greater Dublin Area (Section 2.10). Having regard to the lengthy planning and licensing processes and notwithstanding the new 'fast track' strategic infrastructure legislation additional capacity such as at Knockharley cannot be delivered "at the flick of a switch". Accordingly, it would be contrary to the principles of the proper planning of the necessary regional waste management infrastructure that the capacity in place at Knockharley cannot be made available to meet short and medium term disposal needs such as are now apparent in the Greater Dublin Area.

Based upon the needs analysis below, the proposed increased rate of filling of the existing licensed landfill with material from the catchment area within which it is located comes within the scope of the waste management plans for the North East Region and the Dublin Region. It is further supported at Section 11.6 of the most recent review of the Dublin Waste Plan. It is inferred from the Board's decision at permission Reg. Ref. No. NA/60336 and the reasons underpinning its decision that the inter-regional movement of waste between the North East Region and the Dublin Region is a vital part of the overall waste management approach "on the ground".

2.8. Other Waste Management Reports

Employers group IBEC recognises the impending waste crisis in Dublin in its recently published 21st century vision for Dublin. IBEC predicts that *"waste will pile up on the city's streets by 2009 when the region runs out of landfill capacity".* This is corroborated by the Economic and Social Research Institute (ESRI) in its Report entitled Ex-ante Evaluation of the Investment Priorities for the National Development Plan 2007-2013, (ESRI Policy Research Series Number 59 October 2006), which notes that a priority of the National Development Plan is the delivery of adequate national landfill capacity. Section 15.3 of the ESRI report entitled 'Priorities for the Next Plan', states:

> *"Landfill will remain the single most important type of waste management infrastructure in the short-medium term. Notwithstanding increasing diversion of waste to other routes (including incineration) over time, there will remain a residue that need to be landfilled. Landfill will also act as the fall back where other routes are for whatever reason unavailable (for example, a breakdown in an incinerator or difficulties in recycling markets). Ensuring adequate landfill capacity is thus the highest single priority".*

Under section 15.1 it states that *"remaining capacity in landfills in 2004 was eight years, still too tight for comfort, given the tortuous planning process that new facilities must go through".*

Two Forfas Reports entitled *Key Waste Management Issues in Ireland (2001)* and *Key Waste Management Issues in Ireland – Update Report (2003),* highlighted the growing

concerns of industry over the lack of adequate waste infrastructure available in the country to cope with the demands from industrial, commercial and household production. Forfas published a study in June 2006 entitled "Waste Management Benchmarking Report – A Baseline Assessment", and a further study in May 2008, both of which indicate that the delivery of adequate capacity to treat all types of waste is essential to meet the needs of a growing economy and attract Foreign Direct Investment (FDI).

The reader is invited to consider the findings in the recently published report (April 2007) entitled "Waste Policy, Planning and Regulation in Ireland" by Eunomia Research & Consulting in association with TOBIN Consulting Engineers (known as 'the Hogg Report'). Amongst its main conclusions, the Hogg Report questions whether the current waste management approach in Ireland can achieve the targets for reducing waste disposed to landfill in accordance with the EU Landfill Directive.

Specifically, this Report notes the substantial capital costs and considerable delays associated with the development of thermal treatment plants, yet points out that these facilities are central to the overall waste management approach in each waste region. Despite waste to energy plants being at the core of most waste management strategies for over ten years, progress towards implementation has been slow. Construction has commenced on only one incinerator in the country.

The Hogg Report also questions the emphasis on incineration in the waste plans. If recent progress in terms of recycling and other diversion measures is sustained and if Ireland reaches the same levels of recycling as the Flemish region of Belgium, Hogg estimates that the proposed incinerator at Poolbeg would have sufficient capacity to deal with residual household waste from the whole of Ireland. In other words, the Hogg Report casts doubt upon the commercial viability of an incinerator in every waste region.

The Hogg Report recommends alternatives to thermal treatment to facilitate compliance with the Landfill Directive. Mechanical and biological treatment (MBT) processes are identified as a proven flexible solution involving low capital costs and shorter lead in times than incinerators. These technologies include sorting and composting processes, which are applied to the segregated waste stream. An advantage of MBT is that the treated waste contains a lower proportion of bio-degradable material and is less problematic when landfilled. The Hogg Report endorses the potential of MBT facilities to help achieve the targets in the EU Directive in a relatively short period of time and it urges a policy shift towards the introduction of MBT as an effective waste management approach. A second Hogg Report published in 2008 further emphasises the role of MBT in reducing the volumes of residual waste in Ireland and in helping to achieve the targets in the National Strategy on Biodegradeable Waste.

Waste Management is considered in the Progress Report for the Department of the Environment, Heritage and Local Government on the Programme for Government 2007-2012. The Government reiterates its commitment to the internationally recognised waste management hierarchy and to meeting the targets under the EU Landfill Directive. In this regard, the Report emphasises the role of MBT facilities as the following extract confirms.

The move away from mass burn incineration towards alternative technologies is a process which will be assisted by the major review of waste policy, also provided for in the Programme, which is now underway and which will address how best to implement waste prevention and minimisation, and the emergence of new technologies in waste management, particularly those for the mechanical and biological treatment of waste, which can reduce the need for incineration or landfill.

In this particular regard, the Department appointed Eunomia & Partners to undertake a review of the waste management plans, practices and procedures and to examine how best to promote alternative technologies such as MBT. Following an extensive consultation phase, it is expected the Review will be available in Mid-2009.

Greenstar has licensed biological treatment capacity for 50,000 tonnes per annum at its Millenium Park centre. This facility will form part of Greenstar's integrated waste management network and will work in association with the residual landfill at Knockharley in accordance with the proximity principle.

2.9. Need for the Proposed Development

It is proposed to increase the rate of waste acceptance for disposal at Knockharley to 400,000 tonnes per annum of non-hazardous residual waste, as described in Section 1.2.1. There are two aspects to the assessment of need in relation to this proposed development.

1. First the need for municipal waste (MSW) disposal capacity including the short-term disposal of stabilised bio-waste from MBT and other recovery residuals is assessed.

2. Second, the need for disposal capacity for other inert or non-putrescible waste streams including construction waste and soils and recycling fines is determined.

This analysis estimates the demand for residual landfill disposal capacity in the combined North East and Dublin Waste Management Regions, collectively referred to as the North Leinster Area, using the most up-to-date information available from a variety of public sources.

Need for Municipal Waste Disposal Capacity

Municipal waste (MSW) is defined by Section 5 of the Waste Management Act, 1996 as 'household waste as well as commercial waste and other waste which, because of its nature or composition is similar to household waste'. Process industrial waste that is similar in nature to commercial waste collected from offices and administration buildings is therefore counted as part of the MSW stream.

There are two elements to calculating the need for residual landfill disposal capacity for MSW, namely the estimate of the likely residual municipal waste that will be generated and the estimated available licence capacity to accept this residual waste.

Residual Municipal Waste Generation

The model estimates the likely national residual municipal waste requiring disposal in the coming years based on best available objective independent information from public sources and assumes that all targeted recycling and recovery will be met, as well as achievement of the Landfill Directive Targets with respect to diverting biodegradable waste away from landfill.

The model is founded on the EPA Waste Database for 2006 published in January 2008 and latest CSO population statistics as well as Local Authority estimates of commercial and industrial waste arisings. To project forward, realistic growth rates are applied to obtain estimates of waste that will arise each year up to 2016. Year on year growth rates are calculated using methods published in the "National Overview of Waste Management Plans" (DoE 2004) and utilising more up-to-date information where available. Such published information includes population growth rates in the 2006 population census (CSO), predicted economic growth rates as published by the Economic and Social Research Institute (ESRI) and taking account of the National Waste Preventative Programme as described in the National Biodegradable Waste Strategy.

The waste arisings forecast in the model are in line with the projections in the waste plans for the Northeast and Dublin Regions.

To predict the residual portion of the municipal waste stream for disposal, diversion targets through recycling and biological treatment as defined in the National Biodegradable Waste Strategy published in 2006 are applied.

However, quantities of waste diverted by materials recycling and biological treatment are not sufficient to entirely bridge the gap between biodegradable waste generation and the Landfill Diversion Targets for the years 2010, 2013 and 2016. Residual treatment in the form of MBT and thermal treatment is applied in the model so that the Diversion Targets for biodegradable waste to landfill are achieved. The model assumes all stabilised residue from MBT processes is disposed of to landfill.

The model assumes the permitted thermal treatment plant at Carranstown will commence operation at the start of 2011 and that all municipal waste inputs to the facility (up to 200,000 tonnes per annum of municipal waste) will be from sources in the North Leinster

Area. Indaver Ireland announced that construction work would commence in August 2008 and that the plant will be operational three years after the commencement of construction.

The model assumes that neither of the proposed incinerators at Poolbeg or at Behans Quarry (N7 Resource Recovery Project) will become operational before 2016 (see Section 2.10).

Using this methodology, the model predicts the tonnage of residual municipal waste requiring disposal to landfill in the North Leinster Area each year until 2016. It is estimated that up to 44% of municipal waste generated in North Leinster in 2010 will be recycled. This compares favourably with the estimated national municipal diversion rate of 36.1% in 2006 and the target rate of 35% recovery by 2013. The model estimates that 50% of municipal waste will be diverted from landfill in 2013.

Landfill Capacity for Residual Municipal Waste

The model estimates the available landfill capacity to cater for the residual municipal waste until 2016, and takes the following into account;

- the life expectancy of existing facilities in the North East Region and Greater Dublin Area (serving North Leinster) as outlined in the current suite of waste management plans and the most recent AERs available for these facilities for 2007
- the permitted annual intake as specified in the waste licences for each facility
- and the current annual intake into each facility as outlined in the facility AERs.

The model also considers the capacity of planned facilities expected to be developed within the period covered in the model. The model incorporates the following changes and assumptions, which have the potential to affect available landfill capacity;

- Permitted capacity at Knockharley Residual Landfill reduces from 132,000 to 88,000 tonnes per annum after 2010
- Corranure Landfill (in Co. Cavan) closes at the end of 2011 in accordance with the waste plan for the Northeast Region
- White River Landfill (in Co. Louth) continues to accept waste until 2022 in accordance with the Northeast Waste Management Plan
- Scotch Corner Landfill (in Co. Monaghan) closes in 2018 in accordance with the waste plan for the Northeast Region
- Arthurstown Landfill (in Co. Kildare) closes in 2009

- Ballealy Landfill (in Co. Dublin) continues to accept waste until the end of 2010

- KTK Landfill (in Co. Kildare) closes for waste acceptance at the end of 2008

- Neiphin Trading at Kerdiffstown Landfill (in Co. Kildare) starts to accept waste for disposal from 2009

- Bord na Mona intensifies annual intake to Drehid Landfill (in Co. Kildare) between the years 2009 and end of 2013 (in line with recent permission granted by An Bord Pleanala dated 31st October 2008).

- Usk Landfill (in Co. Kildare) becomes operational from 2010

- Rampere Landfill (in Co. Wicklow) closes in 2010

Monaghan County Council applied to the EPA for a waste licence review in respect of a proposed intensification of the annual intake from 39,500 tonnes per annum to 59,000 tonnes per annum at Scotch Corner. This application is not considered in the model because the EPA has not yet issued a Proposed Decision (PD) in this case. If granted, this additional capacity would not have a significant impact on the model, however the lifespan of Scotch Corner Landfill would be shortened by as much as 3 years.

Oxigen has applied to the EPA for a waste licence in respect of an integrated waste management facility at Corranure Landfill. The proposed facility will consist of a biological treatment plant and materials recovery facility. The application also includes for continued operation of the active and planned cells at the current landfill but does not seek to extend the landfill beyond its scheduled closure date, or to increase the intake to it. Therefore, if permission were granted, it would not affect the forecast of available MSW disposal capacity in the need model. The EPA has not yet issued a Proposed Decision (PD) in this case. Oxigen has also applied to An Bord Pleanala to commence pre-application consultations under the provisions of the Strategic Infrastructure Act in respect of this proposal.

The model assumes the proposed Fingal Landfill at Nevitt in north County Dublin does become operational until 2015 as discussed in Section 2.9.

Residual Municipal Waste versus Available MSW Landfill Capacity

The need model for MSW disposal capacity in North Leinster is presented in Figure 2.1

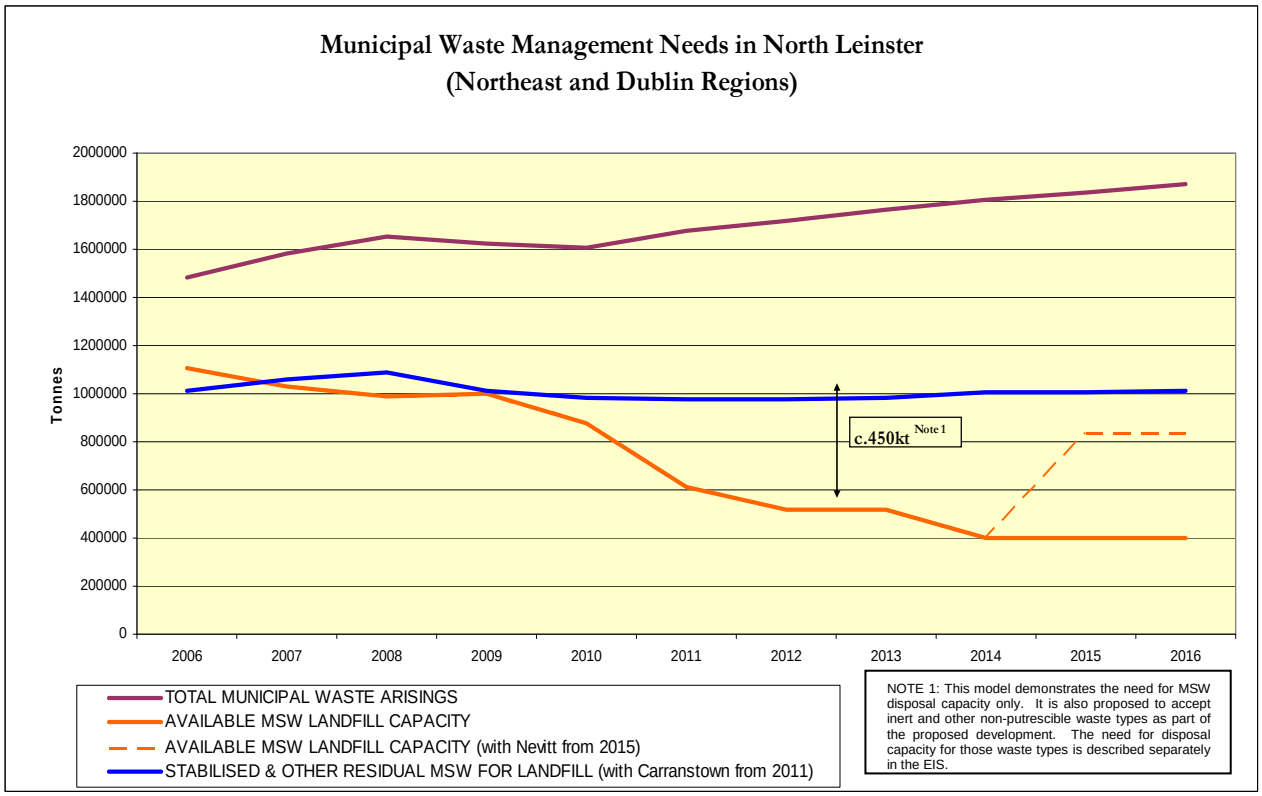

Figure 2.1: Residual municipal waste available for landfill (up to 2016) v anticipated available MSW landfill capacity in North Leinster.

The top line on the graph represents the forecast total municipal waste generation up to 2016. The blue line represents the residual portion of the municipal waste stream for disposal including stabilised bio-waste from MBT and other recovery residuals. The bottom red line illustrates the forecast MSW landfill capacity available in the region to 2016. The broken red line shows the effect of the proposed Fingal Landfill (Nevitt) coming on line in 2015.

Even allowing for 'best case scenario' assumptions in respect of residual waste generation and available landfill capacity the model predicts a landfill capacity deficit from 2009 onwards. Figure 2.1 illustrates that additional licensed MSW landfill capacity is required from 2009 onwards increasing up to at least 450,000 tonnes per annum in the short term and increasing further to approximately 600,000 tonnes per annum from 2014. This is despite the recycling targets in the Biodegradable Waste Strategy and the Regional Waste Management Plans being achieved in the model, and after meeting the Landfill Diversion Targets with the introduction of MBT, and the commissioning of the proposed Incinerator at Carranstown from 2011. It should be noted that the model presented in Figure 2.1 demonstrates the need for MSW disposal capacity only. In addition to this there is also a need for disposal capacity for the inert and other non-putrescible wastes including construction waste that it is proposed to accept at Knockharley as part of this application. This need is described below.

Figure 2.1 predicts a turning point in 2009 after the closure of the applicant company's KTK landfill at Kilcullen and the closure of South Dublin County Council's Landfill at Arthurstown near Kill.

Available disposal capacity is predicted to decrease further following the closure of landfills at Balleally (2010) and Corranure (2011), taken together with the reduced annual intake at Knockharley post 2010. Some lost capacity will be replaced by the commencement of landfills at Kerdiffstown and Usk in Kildare, as well as the intensification at Drehid. These landfills are not restricted to accepting waste from the Kildare Region only.

If planned waste infrastructure such as the Fingal Landfill at Nevitt is further delayed or abandoned altogether the forecast deficit of c.600,000 tonnes per annum from 2014 is likely to continue beyond 2016.

This model predicts an impending waste disposal crisis in North Leinster. In such circumstances, having regard to the inevitable planning and licensing delays and uncertainties associated with large scale projects, it is prudent and in accordance with proper planning to grant permission for the proposed increased tonnage at Knockharley so its licensed void space is available to meet the predicted wider regional requirements outlined above. In addition to the predicted landfill disposal deficit, sound waste management planning should provide reserve capacity to meet short and medium term demand particularly where planned facilities are not delivered in accordance with the objectives in regional waste plans.

Notwithstanding the significant progress towards increased diversion from landfill including recycling, re-use and other measures such as mechanical and biological treatment (MBT), landfill will continue to play a significant role in the disposal of treated waste. The Regional Authorities, the planning authorities, An Bord Pleanála and independent agencies such as Forfas, IBEC and ESRI recognise the need to provide adequate landfill capacity to serve the Northeast Region and the Greater Dublin Area. Adequate waste management infrastructure including disposal facilities fulfil an essential role helping to achieve objectives in the waste plans and in the wider economy.

Need for disposal capacity for inert and other non-putrescible waste

The inert and other non-putrescible waste category that forms part of this proposal includes the following;

- mildly contaminated non-hazardous soils and rubble and other wastes from the construction industry

- stabilised waste from the processing of non-putrescible construction and commercial/industrial wastes. These are essentially non-inert fines generated from various waste recovery activities that are not suitable for disposal in inert landfills.

Construction wastes

Construction waste includes fractions such as soil and stones, concrete and rubble, wood, glass, metal and plastic. Large volumes of C&D waste are generated from road construction, excavation and land-clearing works. According to the waste management plans for the North East and Dublin Regions, there was approximately 8.2 million tonnes of C&D waste arisings in North Leinster in 2006. The soil and stone fraction comprised 83% of total C&D waste collected nationally in 2006.

According to EPA data 330,000 tonnes of C&D waste/rubble were deposited in EPA licensed waste facilities in North Leinster during 2006. This is likely to increase under the provisions of the new Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007) which will reduce permitted capacity for inert waste from C&D activity. Sites currently permitted to accept inert waste arising from C&D activity will be required to apply for an EPA waste licence if the permitted annual intake exceeds 50,000 tonnes per annum. This will result in an increase in the volume of this waste stream to licensed engineered non-hazardous residual landfills, thereby intensifying the need for additional licensed deposition capacity for this waste stream.

Non-hazardous contaminated soils

It is also proposed to accept non-hazardous contaminated soils that comply with the leaching limit values for landfills for non-hazardous waste that are set out in Section 2.2.2 of the Annex to the Council Decision of 19th December 2002 that establishes criteria and procedures for the acceptance of waste at landfills (2003/33/EC).

Contaminated soil is generated from once-off construction projects and not on a continuous basis like other waste streams. The volume of contaminated soil generated is determined primarily by the development of brownfield sites. It is therefore very difficult to predict a trend or the quantities that will arise in the future but there is still a considerable landbank of brownfield sites remaining in the country.

EPA data indicates that more than 400,000 tonnes of contaminated soil arose nationally in 2006, the majority of which is exported for treatment/disposal. It is likely that most of this contaminated soil was generated in Dublin alone.

Greenstar has obtained expert advice from consultants O'Callaghan Moran, which states that the majority of contaminated soils currently being exported from Ireland for overseas treatment/disposal are suitable for disposal to non-hazardous landfill. Thus, the proposal to accept non-hazardous contaminated soils for disposal at Knockharley will provide an outlet for these materials closer to source thereby avoiding long haul transportation of soils.

Generation of non-inert fines from processing of construction and commercial/industrial waste

The C&D waste stream is very significant in terms of meeting national and regional targets due to its high recycling potential. In 2003, 21% of C&D waste generated in the North-east region was recycled. This compares to 14% recycling of C&D waste in the Dublin region in 2003. These recycling rates do not include soil and subsoil recovered at waste

permitted facilities. Under national and European waste policies, Ireland is obliged to recycle 85% of construction and demolition waste by 2013.

There has been a steady increase in mixed C&D materials received at MRFs in the GDA in recent years. This may be due to increased construction activity and an increased awareness of recycling in the C&D industry and the economic benefits of wastes segregation.

Recycling of C&D and C&I waste streams will always generate a residual fines waste stream. As the quantity of C&D and C&I waste being processed at MRFs increases going forward in order to comply with National and European waste policies, so too will the growth of secondary wastes or residual fines increase. This is recognised in the 2001 Forfas report on waste Management in Ireland that states *"European experience has shown that even with efficient waste prevention, minimisation and recycling programmes, it is inevitable that wastes of a recalcitrant nature will be generated".*

It is estimated that more than 300,000 tonnes per annum of construction and commercial/industrial non-inert fines are generated from various waste recovery activities at facilities managed by the leading private sector waste companies operating in the North Leinster area. The majority of fines generated at these MRFs will be more suited to disposal in a non-hazardous landfill facility rather than an inert facility due to the potential for elevated sulphate concentrations given that C&D waste often contains a significant proportion of gypsum (arising from plasterboard and similar material).

The Council Decision of 19th December 2002 establishes criteria and procedures for the acceptance of waste at landfills (2003/33/EC). Section 2.1.2.2 of the Annex to this Decision defines leaching limit values which include a limit of 1,000mg/kg dry substance for sulphate (L/S = 10 l/kg) for inert landfill facilities. This compares with a corresponding limit value of 20,000 mg/kg dry substance defined for non-hazardous landfills in Section 2.2.2.

The establishment of leaching limit values for inert wastes has resulted in the failure of waste acceptance criteria in relation to C&D waste during compliance testing on a number of occasions at the Murphy Environmental Inert Waste Facility at Hollywood, Co. Dublin. The Hollywood facility accepts mixed C&D fines for disposal from various waste transfer stations. This waste type arises from mixed sources and is not part of a well-characterised waste stream, and hence may contain plasterboard and gypsum wastes giving rise to elevated sulphate concentrations in the fines.

The available disposal capacity for residual fines generated from the processing of construction and commercial/industrial waste is further reduced by the recent closure of the applicants KTK Landfill Facility which ceased taking waste for disposal at the end of October 2008. The available disposal capacity will be reduced further again in the very near future with the imminent closure of facilities such as Arthurstown which is due to close by the end of 2009, followed closely by Balleally landfill which is due to close in 2010.

Need Conclusion

It is evident from the needs analysis there is an imminent waste disposal crisis in the North Leinster Area, with a deficit of at least 450,000 tonnes per annum disposal capacity for MSW alone developing from 2009, and increasing to approximately 600,000 tonnes per annum from 2014. Knockharley is well positioned to provide short to medium term capacity for residual MSW arising in the Dublin Region. It is not envisaged that the proposed additional tonnage (i.e. up to 400,000 tonnes per annum) at Knockharley will address the predicted deficit in its entirety. Nonetheless, there is a compelling planning logic in increasing the permitted rate of waste acceptance so this landfill has the flexibility to form part of a GDA region-wide response to the waste crisis. The landfill at Knockharley is a private merchant facility and the applicant envisages that the landfill shall serve the Greater Dublin Area in the same way as its recently permitted landfill at Usk, Co. Kildare.

The above demonstrates a wider industry based need for a dedicated non-hazardous landfill deposition resource for inert and other non-putrescible wastes. This is in addition to the demonstrated need for additional residual MSW landfill disposal capacity in the short-term.

2.10. Proposed Waste Management Infrastructure in North Leinster and the Greater Dublin Area.

It is important to assess the effectiveness of the policy implementation in respect of the waste management regions in North Leinster and the Greater Dublin Area. In particular, this section considers the development of new facilities and extensions at existing facilities in the main catchment area.

It is clear from the extracts at Section 2.7 above the waste management strategy in the Dublin Region hinges upon the outcome of two current proposals, namely the Fingal Landfill at Nevitt/Tooman and the Dublin Waste to Energy Plant at Poolbeg. Even in a best case scenario, it is not inconceivable that the development of either facility will encounter more delay. Neither facility has a waste licence although the Poolbeg WTE plant does have planning permission. Each facility and proposals relating to three other waste management facilities in the North Leinster and GDA catchment are described below.

Fingal Landfill at Nevitt/Tooman.

Applications for permission and for a waste licence are being considered by An Bord Pleanála and the EPA respectively. While these are matters to be determined by the Board and the Agency having regard to all of the relevant information available, substantive questions have been raised regarding the suitability of the site relative to archaeology and groundwater. This proposed development is also located at the site of a very significant illegal dump.

The Dublin Landfill Site Selection Process that identified the proposed site at Nevitt/Tooman started in 1997. A planning application to develop the proposed Fingal

landfill was lodged in June 2006 and a waste licence application was submitted to the EPA in July 2006. The EPA issued a Proposed Decision to grant a waste licence in September 2007 but a final decision has not yet issued. At the time of writing An Bord Pleanala is preparing to reconvene the planning oral hearing and the EPA has also indicated its intention to reconvene the licensing hearing to discuss the findings of a quantitative risk assessment that it has requested from Fingal County Council. Even modest landfill proposals may take from 5 to 10 years from the date of the commencement of planning applications through oral hearings and legal challenges to opening. This is recognised in the Proposed Decision issued by the EPA which includes a specified period of 8 years to allow for the possibility of significant delays in securing the necessary permissions for this facility.

In that context, and given its controversial scale, its prominent location and environmental uncertainties, delays in the public tendering process, inevitable construction and other delays, if permission were granted and a waste licence issued, it is not unreasonable to expect that the proposed Landfill at Nevitt/Tooman will be unlikely to accept waste before 2015.

In the event the Fingal landfill were refused permission or a waste licence, and assuming the refusal reasons were incapable of being addressed in a subsequent application, the process of identifying an alternative suitable site for a regional landfill to serve the Dublin Region would have to commence. This entails a site selection study and a lengthy site investigation process leading to the preparation of applications for permission and a waste licence. In this scenario, it seems highly unlikely a new Dublin regional landfill would be commissioned before 2015 at the earliest.

Waste to Energy Plant at Poolbeg Peninsula, Dublin 4.

Another key element of the waste management strategy in the Dublin Region is the planned WTE incinerator at Poolbeg, which is expected to accept up to 600,000 tonnes residual municipal waste per annum. An Bord Pleanála has granted approval for the proposed WTE facility (ABP Ref. No. ES.2022). The EPA has not licensed the facility but issued a Proposed Decision in November 2007 which includes a specified period of 8 years.

The current Programme for Government provides for a move away from mass burn incineration towards alternative technologies, particularly MBT. The Programme considers that undue emphasis of incineration as the cornerstone of waste management policy is detrimental to the development of alternative solutions. The Department of the Environment has commissioned an international review of waste management in Ireland which is currently underway and due to be reported by middle of 2009. The scope of this review will include issues such as how to best promote alternative technologies such as MBT. The Programme for Government also states that the landfill levy will not be altered to give a competitive advantage to thermal treatment, which other incineration companies have described as necessary to ensure the commercial viability of waste to energy thermal plants.

Earlier this year the proposed Dublin WTE Plant received a further setback after a site visit by a delegation from the EU Petitions Committee. Following meetings with the Minister,

Dublin City Council officials and local residents, it is understood that members of the Committee expressed concerns regarding the suitability of the site and adherence to EU environmental legislation.

The lengthy specified period of 8 years included in the Proposed Decision issued by the EPA reflects the uncertainty regarding the future of the WTE plant, which is a cornerstone of the waste management strategy in the Dublin Region, and acknowledges that if a waste licence is issued, it could be 2016 or later before the proposed Poolbeg facility is operational.. The site selection process that identified the proposed Poolbeg site commenced in 1999.

N7RRP Waste to Energy Plant at Behans Quarry, Co. Dublin.

An Bord Pleanála is considering an application by Energy Answers Ireland for a Waste to Energy Plant at Behan's Quarry, Naas Road, Co. Dublin pursuant to the provisions of the Planning and Development (Strategic Infrastructure) Act, 2006. The planned capacity of the proposed facility is 365,000 tonnes per annum and it will accept waste from the Greater Dublin Area and other waste regions. An oral hearing is scheduled for mid November 2008 and a decision is not expected until 2009. No waste license application has been submitted to the EPA in respect of this proposed facility at the time of writing. Based on experience of the timespan for the development of similar facilities, it is not unrealistic to expect the likely commencement date for the operation of this proposed facility could be delayed by a number of years, maybe beyond 2012.

Extension and Intensification of Landfill at Drehid, Co. Kildare.

Bord Na Mona is seeking to extend and increase the rate of acceptance of waste at its existing landfill at Drehid so it can accept up to 360,000 tonnes per annum for disposal. An Bord Pleanala has recently granted permission for this proposal allowing an increase in the rate of waste acceptance to 360,000 tonnes per annum until the end of 2013. As regards the waste license Bord Na Mona applied for a waste license review in June 2008 but the Agency has not made a Proposed Decision at the time of writing of the EIS.

Waste to Energy Plant at Carranstown.

Planning permission and an EPA Waste License were obtained for a thermal treatment plant at Carranstown, Co. Meath. Indaver Ireland commenced construction of the facility recently with the first waste due to be accepted in 2011. A waste license was issued by the EPA in November 2005.

Summary Waste Management in North Leinster and the Greater Dublin Area.

It is useful to recap the key points in relation to other proposed waste management facilities in the Greater Dublin Area incorporating Kildare, Meath and Wicklow and the North East Region.

Existing local authority facilities at Arthurstown (2009), Balleally (2010) and Corranure (2011) are scheduled to close during the period of the current Waste Management Plans. Greenstar's commercial and industrial facility at KTK closed for waste acceptance last

month (October 2008). New private facilities have become operational at Coolbeg/Ballynagran, Co. Wicklow and at Drehid, Co. Kildare in 2007/2008. New disposal facilities are due to become operational at Usk in Co. Kildare and Kerdiffstown in Co. Kildare.

An application has been made by Monaghan County Council to the EPA to increase the rate of waste acceptance at Scotch Corner Landfill from 39,000 to 59,000 tonnes per annum. Oxigen applied to the EPA for an integrated waste management facility at Corranure Landfill but this application does not seek to extend the current landfill. The EPA has not yet issued Proposed Decisions (PD) on either of these applications.

However, the largest planned disposal/energy recovery capacity to serve the GDA is at Poolbeg and Nevitt/Tooman, which account for a combined waste volume of more than 1,000,000 tonnes per annum, so the future of waste management in the Region is critically dependent on the implementation of both facilities. Failure to deliver either facility, or a protracted delay in the coming on-stream of either would create a significant waste disposal crisis.

Bord na Mona has been granted permission by An Bord Pleanala for an extra 240,000 tonnes per annum at Drehid, Co. Kildare until the end of 2013 but has not yet received a revised waste licence from the EPA in respect of this. Energy Answers Ireland proposes a WTE Plant to accept 365,000 tonnes per annum residual waste at Behan's Quarry, Naas Road, Co. Dublin. At the time of writing the proposed WTE Plant has not been permitted or licensed.

It seems the available permitted capacity at Knockharley Residual Landfill can become an important part of the solution to the emerging MSW disposal deficit crisis in the region. If the permitted capacity were increased to 400,000 tonnes per annum of residual waste as now proposed, this landfill can meet some of the deficit in MSW waste disposal capacity in the Dublin Region. This approach is envisaged in the Ministerial Directive WIR 04/05, in the current suite of waste management plans and it is endorsed in the reasoning cited by An Bord Pleanála to grant an increase in the landfill capacity at Knockharley (Reg. Ref. No. NA/60336).

2.11. Applicant's Integrated Waste Management Strategy

The applicant company is involved in every aspect of waste management in the Greater Dublin Area (GDA) and it intends to develop its collection network for commercial, industrial and household waste throughout North Leinster. Greenstar considers the Knockharley waste facility to be a vital component of the company's integrated waste management business in North Leinster.

Greenstar collects wastes from its customers so it is in an important position in terms of influencing and supporting waste segregation and other collection based initiatives at source. Greenstar transfers its waste and waste collected by other licensed contractors for processing through its modern materials recovery facilities (MRF) at Fassaroe, Co. Wicklow and at Millenium Park, North County Dublin. These facilities operate in conjunction with the company's disposal sites at KTK, Co. Kildare (closed in October 2008 to be succeeded by Usk, Co. Kildare) and at Knockharley, Co. Meath. Greenstar's approved (and award winning) waste disposal facility at Ballynagran in Co. Wicklow operates closely with the MRF at Fassaroe.

The landfill at Knockharley is a private facility and is intended to serve the GDA in the same way as the recently permitted landfill at Usk, Co. Kildare (Condition No. 2 of ABP Ref. No. PL.09.131620).

Waste facilities are designed to fit in with the efficient and cost effective collection, handling and treatment of wastes in natural catchment areas irrespective of administrative boundaries. Greenstar envisages its landfill at Knockharley will continue to facilitate residual waste disposal for waste processed at a number of private EPA licensed and permitted treatment facilities and at other permitted facilities servicing the North East Region, Dublin, Kildare and Wicklow.

The above analysis (Section 2.10) of the waste management situation in North Leinster seems to support the findings of the Hogg Report with regard to the emphasis on incineration in the waste plans. Although waste to energy plants are at the core of waste management strategies for over ten years, progress towards implementation has been extremely slow. In Dublin, there have been considerable delays in the delivery of new infrastructure such as the Fingal Landfill and the Poolbeg WTE Plant. With the closure of existing facilities notably at Arthurstown, this has resulted in the request from the four Dublin authorities to stakeholders for proposals to provide additional short term (500,000 tpa) and medium term (150,000 to 300,000 tpa) MSW disposal capacity to meet anticipated requirements.

The Hogg Report also questions whether the current waste management approach in Ireland can achieve the targets for reducing waste disposed to landfill in accordance with the EU Landfill Directive. If progress in terms of recycling and other diversion measures is sustained and if Ireland reaches the same levels of recycling as the Flemish region of Belgium, Hogg estimates the proposed incinerator at Poolbeg would have sufficient capacity to deal with residual household waste from the whole of Ireland. In other words, the Hogg Report raises fundamental questions about the viability of an incinerator in every waste region.

The North East Waste Plan envisages that the waste stream in the North East Region will be dealt with as follows: 36% recycled; 36% thermal treatment and 28% landfill. Thermal treatment will not be commissioned in the Region before 2011, i.e. during the period of the current Waste Plan, so a greater proportion of the residual waste will require disposal to landfill. Thus, the alternatives to thermal treatment recommended in the Hogg Report to facilitate compliance with the EU Landfill Directive will become increasingly relevant and the proposed development should be examined in this context.

Mechanical and biological treatment (MBT) is a proven solution involving significantly lower capital costs and shorter lead times than incineration. The Hogg Report endorses this approach because it can help to achieve targets in the EU Directive by availing of existing infrastructure, minimal additional investment and it can be achieved in a relatively short period of time. It also has the potential to be part of any future thermal solutions. Pending the commissioning of the incinerators and other facilities envisaged in the waste plans for the North East and Dublin Regions, the combination of MBT together with the landfilling of stabilised waste (with energy recovery) is a sustainable alternative way to achieve the objectives in the regional waste plans in the short to medium term, i.e. from 2009 to 2015.

It is evident from the needs model there is an imminent waste crisis in the North Leinster Area with a deficit of at least 450,000 tonnes per annum of MSW disposal capacity developing from 2009 onwards, and increasing to approximately 600,000 tonnes per annum from 2014. Greenstar has licensed biological treatment capacity for 50,000 tonnes per annum at its Millenium Park centre. This capacity will form an integral part of the company's integrated waste infrastructure and given its location on the N2 near the Meath/ Dublin county boundary it is expected to work in association with the residual landfill at Knockharley. Thus, the proposed increase in the rate of waste acceptance to 400,000 tonnes per annum at Knockharley together with biological treatment processes is an effective approach, which is consistent with national waste management policy and the National Biodegradable Waste Strategy.

The overall landfill capacity within the North East Region will not change. Assuming Greenstar is permitted to accept an increased volume of waste at Knockharley it will result in a short-term ramping up of deposition at the landfill at Knockharley. Following closure it is likely the existing and other planned waste infrastructure in the North East Region and on its periphery will be available to replace Knockharley as a residual landfill. Contrary to the statement in the Inspector's Report (Reg. Ref. No. NA/60336) the landfill at Knockharley is not the regional landfill for the North East Region. It is a merchant facility and it is a privately owned and privately operated landfill. Unlike local authority facilities such as the proposed Fingal landfill at Tooman/Nevitt, Greenstar is not contractually required to facilitate the deposition of any waste by any party, public or private, at this location. The landfill's continuance depends upon its commercial viability within the context of the company's waste management business and strategy.

2.12. Waste Management Planning & Policy Summary.

Waste management is identified as a priority in the National Spatial Strategy and the Regional Planning Guidelines for the Greater Dublin Area. Ministerial Direction WIR 04/05

confirms, and the waste plans ensure that the inter-regional dimension plays an essential role in effective waste management practices with extensive established cross-boundary functional relationships within North Leinster.

Having regard to the closure of a number of existing disposal facilities and the lack of certainty over the future and the timing of the replacement waste infrastructure, the needs analysis predicts an emerging waste crisis whereby the licensed MSW capacity within the study area would be considerably short of the predicted demand for disposal capacity in the period to 2016.

The analysis predicts a deficit of at least 450,000 tonnes per annum of licensed MSW disposal capacity in the short term in North Leinster, increasing to approximately 600,000 tonnes per annum from 2014. If planned waste infrastructure is further delayed or abandoned this deficit is likely to continue beyond 2016. These findings are corroborated by the request from the four Dublin local authorities for proposals for additional MSW disposal capacity for non-hazardous waste in the Dublin Region. This letter confirms an imminent waste crisis whereby the licensed capacity in the Greater Dublin Area will be considerably short of the predicted demand for MSW disposal capacity within the short-term.

The landfill at Knockharley is a private merchant facility and it is envisaged that the landfill shall serve the Greater Dublin Area in the same way as the applicant's recently permitted landfill at Usk, Co. Kildare. A known volume of permitted and licensed disposal capacity is immediately available at Knockharley and it is ideally located to meet some of the anticipated shortfall. The Board's decision to grant permission for an increased rate of waste acceptance at Knockharley, and more importantly, its rationale for allowing the increase to meet the short-term capacity needs of North East Region and the Greater Dublin Area, confirms that the subject landfill is a crucial facility in terms of the wider North Leinster Area within which it is located.

The proposed increase in the rate of waste acceptance at Knockharley to 400,000 tonnes per annum together with the stabilisation of biodegradable waste using MBT processes is an effective alternative approach, which is consistent with national waste management policy and the National Biodegradable Waste Strategy. This approach based upon the mechanical and biological treatment of waste together with landfill plus energy recovery represents a sustainable form of waste management, which supports the other higher in the waste hierarchy measures to reduce the volume of waste being disposed to landfill.

No land-use purpose is served by not allowing the increased rate of waste acceptance. On the contrary, in circumstances where the Planning Authority and An Bord Pleanála consider there is adequate capacity to meet the needs of the North East Region, it is prudent and in accordance with proper planning and sustainable development to provide a viable solution to the waste crisis in the Greater Dublin Area by ensuring there is permission at this established licensed facility to cater for demands arising in the North East Region and other regions.

All that is sought in this application is the opportunity to meet some of that demand should it arise, and in the event the waste crisis is averted within the Dublin Region it follows that the demand will be satisfied elsewhere in accordance with the interest of the efficient

provision of waste management facilities. Greenstar is prepared to take a commercial risk that its landfill at Knockharley can be an important part of the solution to the anticipated waste crisis in the Dublin Region. Unlike the proposed waste facilities at Poolbeg, Nevitt/Tooman, Behan's Quarry in Dublin and at Carranstown in Meath, there is an existing licensed operational landfill at Knockharley, which can accept residual waste.

Having regard to the prevailing circumstances there is an imminent risk of a deficit in waste management infrastructure. An inevitable consequence of this deficit is increased costs and unauthorised activities, which will be ultimately borne by consumers and businesses. Proper planning with respect to the provision of infrastructure requires not just meeting needs but providing an element of redundancy to cope with the unexpected and you are invited to give some weight to such considerations.

3. DESCRIPTION OF KNOCKHARLEY LANDFILL

3.1. Ownership and Location

Greenstar operates the Knockharley Residual Landfill since its opening in December 2004. The landfill accepts residual household, commercial and industrial wastes together with construction and demolition wastes. The boundary of the permitted waste facility is shown on Figure 1.1 which is reproduced from Section 1 overleaf. Greenstar owns the entire development site.

The site is located 7 km south of Slane, 7 km west of Duleek, 10 km east of Navan and 17 km north of Ashbourne in the townlands of Knockharley, Flemingstown and Tuiterath, Co. Meath. The location of the Knockharley landfill is shown in Figure 3.1 and has a National Grid Reference of 2975E, 2670N.

The property is bounded to the east by the National Primary Road (N2) and is generally enclosed to the north and west by county road CR384 and to the south by regional road R150. The landfill is connected by a dedicated access road to the N2 via an underpass under the regional road CR384 as shown on Figure 1.1.

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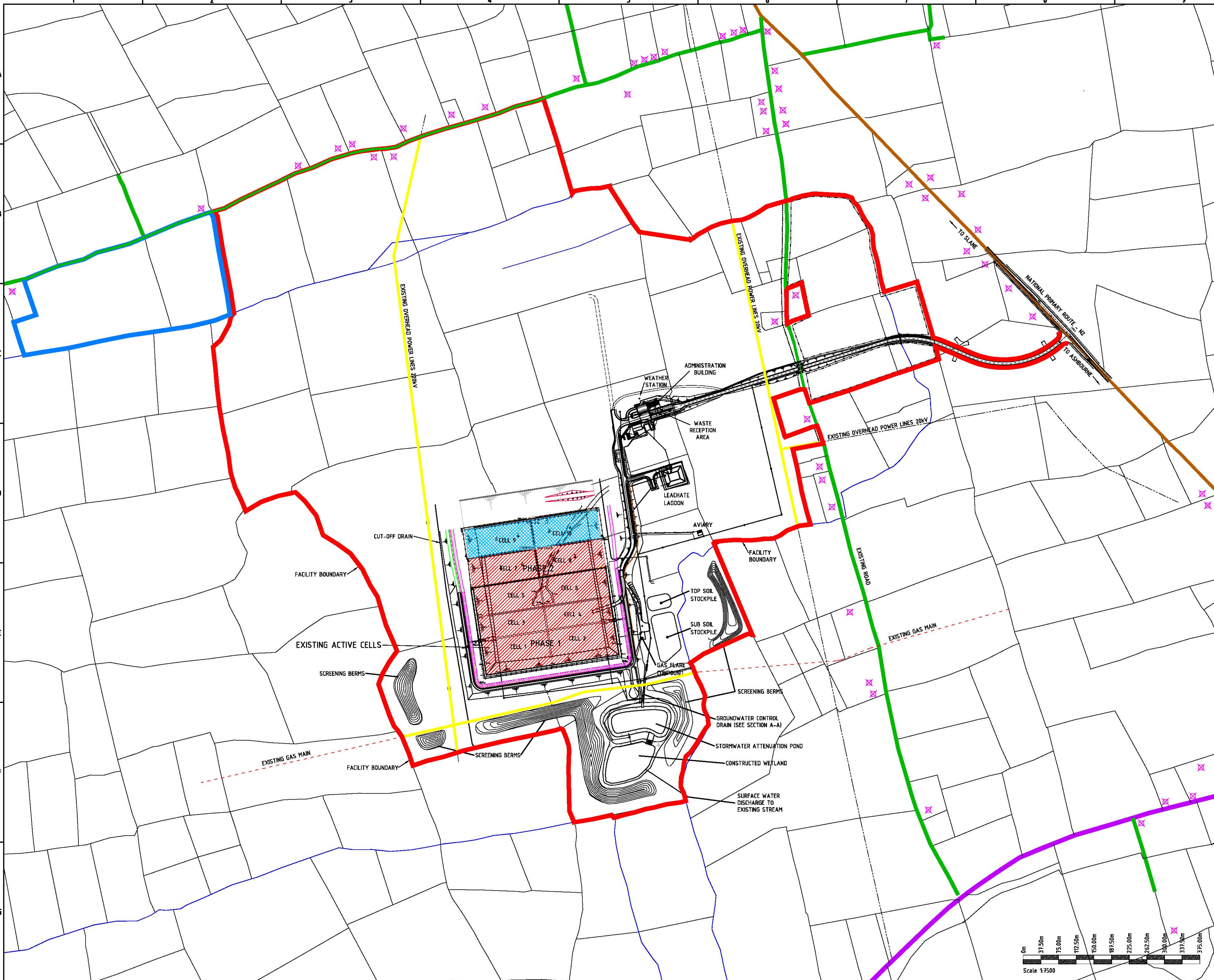

NOT FOR CONSTRUCTION UNLESS SPECIFICALLY STATED OTHERWISE

Printing/Copying distortion should be checked against scale bar, when scaling distances from this drawing.
Use figured dimensions only. If in doubt - Ask!

N

LEGEND

- CONSTRUCTED CELLS
- ACTIVE CELLS
- HOUSE LOCATION
- DENOTED NATIONAL PRIMARY ROAD
- DENOTES REGIONAL ROAD
- DENOTES COUNTY ROAD
- DENOTES RIVER / STREAM
- DENOTES APPLICATION SITE
- LAND UNDER APLPICANTS CONTROL
- Wayleave

Rev.	Drawn	Chk'd	App'd	Date	Description
B	JC	SMcA	DO'S	11.11.08	ISSUE FOR PLANNING
A	CS	SMcA	D.O'S	14.02.08	For Information Only, Not For E.I.S or Construction Purposes

Name of Client

Name of Job

KNOCKHARLEY RESIDUAL LANDFILL SITE

Title of Drawing

EXISTING SITE LAYOUT

Scales Used
A3-1:7500

Dwg. No.
2007-172-02Fig 1.1

Rev.
B

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0m 37.50m 75.00m 112.50m 150.00m 187.50m 225.00m 262.50m 300.00m 337.50m 375.00m
Scale 1:7500

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ORIGINAL DRAWING SIZE A1 - (841 x 594)


0 5 10 15
SCALE 1:250,000 KILOMETRES
N
Dundalk
MONAGHAN
Castlebellingham
Irish Sea
Ardee
LOUTH
Dunleer
Nobber
Collon
Drogheda
Slane
Navan
Knockharley Site
Duleek
MEATH
Kentstown
Balbriggan
Skerries
Garristown
FINGAL
Trim
Lusk
Dunshaughlin
Ashbourne
Swords
Malahide
Dublin Airport
River Boyne
River Nanny
Fane River
River Glyde
River Dee
Broad Meadow River
Ward River
Tolka River
N2 Ashbourne by-pass
LEGEND
Motorway
National Road
Regional Road
Railway Line
County Boundary
Knockharley Residual Landfill Project
Site Location Plan
Figure No. 3.1
Job No. CE04480
Date. Aug. 2008
Finalised By - D McD
White Young Green
For Illustrative purposes only.
JF(8)

3.2. Description of Existing Operation

The facility is located on a 135.2 hectare (333 acre site) as presented in Figure 1.1 under the present planning permission NA/60336. The landfill footprint is positioned approximately in the centre of the landholding and the current planning permission permits the development of approximately 25 ha of landfill cells.

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).

Waste arriving at the facility enters the site via a private dedicated access road that connects the landfill with the National Primary N2 road. It is firstly weighed and inspected at the weighbridge and reception before proceeding to the waste disposal area.

Plate 3.1 Knockharley Landfill Administration Buildings

Generally, waste delivered to the Knockharley facility arrives in covered vehicles with ca. 20 tonne capacity. HGVs leaving the site pass through a wheel wash before exiting onto the N2 via the private site access road.

The deposited waste is fully contained through the use of a 1 m thick composite HDPE membrane and clay basal liner complying with both EU regulation and with the licence conditions. Waste is compacted immediately and covered daily to limit wind-borne litter and other nuisances. Vermin control is achieved through the use of trained birds of prey controlled by a specialist handler, combined by other deterrents such as kites and balloons. In addition to the use of daily cover, supplementary odour control technology comprising fine-moist deodorising spray has been installed at the facility.

Plate 3.2 Lined cells at Knockharley Landfill

Leachate that gathers in the base of the footprint is pumped to the leachate lagoon and is ultimately tankered from the site for treatment and disposal.

Drainage from adjoining lands onto the Knockharley 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 directed to a purpose built storm water attenuation pond and constructed wetland. The outflow from the constructed wetland flows into the local drainage network as indicated in Figure 1.1, reproduced in this section.

Plate 3.3 Storm Water Attenuation Pond

The development of the landfill to date has included the construction of berms and the planting of trees as shown on Figure 1.1, that are designed to limit the visual intrusion of the landfill within the local landscape.

The site is licensed by the Environmental Protection Agency (EPA) under the Waste Management Acts 1996 and 2003. Licence reference W0146-01 was granted in March 2003 for operating a landfill whose principal class of activity is "*Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment*". Environmental emissions from the site are limited by a set of emission limit values contained in the waste licence and these relate to noise, leachate, landfill gas, dust deposition, PM_{10} (particulates of less than 10 microns in size capable of being inhaled through nose and throat into lungs), surface water and ground water.

The daily operation of the landfill facility is monitored as required under the waste licence and consists of a number of monitoring programmes that address groundwater, surface water and leachate quality, landfill gas, noise and dust deposition.

The frequency of monitoring of the different environmental parameters is set in the waste licence with a requirement to submit all the monitoring data from the facility in an annual environmental report to the EPA.

The EPA has audited the Knockharley landfill site on four separate occasions (07 March 2005, 11 April 2006, 16 May 2007 and 03 April 2008) with no non-compliances noted.

Cells 1 to 4 (Phase 1) were constructed in 2004 and landfilling commenced in December 2004. Phase 2 works included the construction of Cells 5 & 6 in 2006. Phase 3 works consisted of the construction of Cells 7 to 10 in 2007.

Preliminary capping works have commenced on Cells 1 to 6. That comprises welding a flap of cap-liner to the base-liner to effect a seal at the landfill perimeter

At its current stage the development comprises:

- road works;
- ancillary facilities;
- environmental monitoring and control infrastructure;
- fencing and security;
- Waste cells
    - Cells 1 to 4 (Landfill phase 1): 85% filled and temporarily capped on all flanked areas
    - Cells 5 and 6 (Landfill phase 2): 65% filled and temporarily capped on all flanked areas
    - Cells 7 and 8 (Landfill phase 2): Actively filling with no temporary capping
    - Cells 9 and 10 (Landfill phase 3): two landfill cells constructed in 2007 and ready to accept waste.

An enclosed landfill gas flare was commissioned and taken into operation in December 2006 to operate on a 24 hour basis, 365 days a year.

Plate 3.4 Gas Flare

The facility was designed, constructed and is being operated in accordance with the EU Landfill Directive 1999/31/EC, EPA Waste Licence (W0146-01) and EPA manuals on landfill selection, design, operation and monitoring.

3.3. Description of Proposed Operation

The proposed development would increase the amount of waste accepted at the subject site to 400,000 tonnes per annum from 2009 until 2016/2017 (approx.) with a further four years to restore the landfill in accordance with EPA restoration guidelines and international best practice.

In practical terms, permission is being sought to increase the rate of acceptance of waste from the current permitted levels of 132,000 tonnes per annum to 400,000 tpa in the years 2009 and 2010 and to increase from the permitted rate of 88,000 tonnes per annum to 400,000 tpa in the years 2011 to 2016/2017 approximately.

It is not proposed to increase the permitted total quantity of waste to be deposited in the landfill or to extend the landfill footprint. The proposed increase rate of landfilling entails the consumption of the landfill void more rapidly than the current permitted rates thereby enabling early closure and commencement of landfill aftercare. This proposed increased rate of waste intake will be a more efficient and more environmentally sustainable filing rate over a considerably reduced time period and will also reduce the potential for odour nuisance.

The proposed operation will continue to deposit waste in the southern cells working north and to develop a second working face commencing at the north end of the landfill void at Phase 7 (cells 25, 26, 27 and 28). Both ends of the active void will be worked towards the centre of the void. The proposed waste types comprising the 400,000 tpa include the following;

- Short to medium term disposal of stabilised biowaste from MBT (mechanical biological treatment) processes
- Other stabilised secondary wastes from the processing of non-food-bearing construction, commercial and industrial wastes.
- Soils and rubble and other wastes from the construction industry
- Other residual wastes from the mechanical processing stages of municipal, commercial and industrial waste
- Non-hazardous residual wastes from other waste recovery processes.

It is proposed that stabilised wastes and wastes suited for disposal separately to biodegradable waste are deposited at the northern end of the landfill, Phase 7.

The proposed development at the Knockharley Landfill underpins the recycling industry and helps achieve key objectives in the waste management hierarchy by providing a sustainable disposal outlet for the residual wastes generated by the activities higher up the hierarchy. This is illustrated by the changing characteristics of the residual waste to be landfilled, which will comprise progressively less biodegradable waste and increasing volumes of MBT stabilised waste and other stabilised residual waste from recycling activities.

The hours for waste acceptance are currently licensed at 08:00 to 18:00 Monday to Saturday. The proposed increase in waste intake does not require a change in the operational hours.

The hours for operation are currently licensed at 07:30 to 18:30, Monday to Saturday. The proposed increase in waste intake does not require a change in the operational hours.

The waste licence does not distinguish hours for construction and maintenance. The current proposal is to allow for industry standard construction working hours and also to allow routine maintenance of machinery to be done on Sundays.

The proposed hours for construction/ maintenance operations are:

- 07:00 to 20:00, Monday to Friday
- 07:30 to 18:00, Saturday
- 07:30 to 16:00, Sunday (maintenance only).

In summary, the proposed amendments to the 2007 An Bord Pleanála planning permission are

- an intensification of waste intake to 400,000 tpa and
- concurrent filling in the south cells (Phases 2, 3, 4, etc) and in the northern cells (phases 7, 6, 5, etc).

3.4. Main Changes from Proposal

3.4.1. Main Operational Changes from Proposal

The main changes to the existing operation of the landfill will relate to:

(i) the landfilling development schedule;
(ii) the capping & restoration programme;
(iii) operational and construction traffic movements.

In operational terms, residual municipal waste will continue to be deposited at the south end of the active void working north. It is proposed to develop a second working face at the north end of the landfill void starting at Phase 7 for the deposition of stabilised waste and other wastes suited for disposal separately to biodegradable waste. Both ends of the active void will be worked towards the centre of the void with capping and screening occurring on a phased basis.

This second working face is consistent with the company's objective to have proper regard to the protection of the amenity of adjoining property including residential property. It is also consistent with contemporary scientific advice.

Construction waste often contains plaster. Conventional wisdom is that plaster wastes combined with leachate from putrescible waste can increase the odour potential in wastes. By isolating the construction and stabilised wastes in Phase 7, potential impacts from mixing them with putrescible wastes are mitigated, resulting in;

- Reduced potential for landfill gas odour nuisance
- Reduced odours from working waste faces (both north and south)

The intensification of waste intake will not alter the final-land form when compared with the current permitted development. Clearly, with this proposal, the final land-form will be achieved sooner and this is seen as a positive impact. In addition, there will be a reduced visual impact from the north because the northern working cells will face south (i.e. towards the southern working cells).

In any case, the considerable hedgerows along the northern boundary of the Greenstar property already have a strong mitigating effect on landfill visibility, the dual-filling proposal will mean that at an early stage, the only visual impact from the north will be the 'back' of an advancing landscaped mound. The proposed change to dual-filling is seen as a positive impact.

The intensification of use will primarily result in an increase in the number of traffic movements entering and leaving the site associated with waste deliveries, leachate removal and the construction and restoration programmes. Otherwise, the proposed intensification of use will have a minimal impact on the existing daily operation of the landfill.

The planned intensification of use will result in an improved use of both human and mechanical resources at the landfill and which are currently available to handle the existing permitted disposal rate. Clearly, operating two 'faces' will require extra machinery and manpower however all ancillary infrastructure will be shared and therefore used more efficiently.

3.4.2. Main Environmental Changes from Proposal

Leachate Production

The planned increase in the waste disposal rate will impact on the leachate production profile. (summarised in Table 3.1). These volumes are derived from the calculations provided in Appendix 4. The leachate prediction calculation has been adjusted to reflect actual experience since the site opened.

Table 3.1: Annual Leachate Generation (Based on waste acceptance increase to 400,000 tpa in year 4)

Year	Annual Leachate Generation (m^3)
1	8,016
2	16,033
3	25,652
4	33,668
5	34,873
6	33,672
7	40,687
8	34,677
9	37,883

Year	Annual Leachate Generation (m^3)
10	36,382
11	28,467
12	29,669
13*	18,548
14	12,937
15	8,430

* Approximate date when landfill closed to waste acceptance

The cumulative leachate production up to installation of the final cap is predicted to be approximately 133,000 m^3. This is substantially less than the predicted volume based on the current licensed waste input (276,000 m^3 predicted in the EIS on which the licence and planning applications were based). The current model takes evaporation from the intermediate cap into account and seems to reflect quite accurately the experience on site to date. However the absorptive capacity of the more intense waste input has the most profound effect on the leachate production calculation.

Clearly the more intensified waste input significantly reduces the cumulative leachate generation. Intensifying waste input positively impacts on the landfill's environmental impact by reducing the aqueous pollutant load generated by the landfill, reducing leachate disposal requirements and reducing the traffic movements associated with leachate transport.

The figures given in Table 3.1 can be further reduced by re-circulating leachate into the capped cells. That will lead to the 'peak' production level being reduced and distributed into subsequent years.

The prediction is conservative in that there is an assumed long-term 10% leakage through the final cap and 60% through the intermediate cap. Good quality assurance (QA) should reduce the leakage.

Landfill Gas Production

The predicted quantities of gas likely to be produced at Knockharley based on an intensified waste intake are given in Table 3.2. These predictions are made using LandGem Landfill Gas Emissions Model version 3.02 and the model outputs are presented in Appendix 5.

The gas model was prepared assuming that 250,000 tonnes of the proposed 400,000 tpa intake is putrescible municipal solid waste. This assumption is considered conservative since stabilised wastes and other recovery residuals will be present in the 250,000 tpa modelled.

Table 3.2: Landfill Gas Prediction

END OF YEAR	WASTE ACCEPTED TONNES	WASTE IN PLACE TONNES	METHANE M^3X10^6/YR	LANDFILL GAS M^3X10^6/YR	END OF YEAR	WASTE ACCEPTED TONNES	WASTE IN PLACE TONNES	METHANE M^3X10^6/YR	LANDFILL GAS M^3X10^6/YR
2004	-	-	0	0	2030	-	2,683,000	9.4	18.8
2005	132,000	-	0	0	2031	-	2,683,000	9.0	17.9
2006	132,000	132,000	1.1	2.2	2032	-	2,683,000	8.5	17.1
2007	132,000	264,000	2.1	4.3	2033	-	2,683,000	8.1	16.2
2008	132,000	396,000	3.1	6.3	2034	-	2,683,000	7.7	15.4
2009	250,000	528,000	4.1	8.2	2035	-	2,683,000	7.3	14.7
2010	250,000	808,000	6.2	12.4	2036	-	2,683,000	7.0	14.0
2011	250,000	1,058,000	8.0	16.0	2037	-	2,683,000	6.6	13.3
2012	250,000	1,308,000	9.7	19.3	2038	-	2,683,000	6.3	12.6
2013	250,000	1,558,000	11.3	22.6	2039	-	2,683,000	6.0	12.0
2014	250,000	1,808,000	12.8	25.6	2040	-	2,683,000	5.7	11.4
2015	250,000	2,058,000	14.3	28.5	2041	-	2,683,000	5.4	10.9
2016	250,000	2,308,000	15.6	31.3	2042	-	2,683,000	5.2	10.3
2017	125,000	2,683,000	17.0	33.9	2043	-	2,683,000	4.9	9.8
2018	-	2,683,000	17.2	34.3	2044	-	2,683,000	4.7	9.4
2019	-	2,683,000	16.3	32.7	2045	-	2,683,000	4.5	8.9
2020	-	2,683,000	15.5	31.1	2046	-	2,683,000	4.2	8.5
2021	-	2,683,000	14.8	29.6	2047	-	2,683,000	4.0	8.1
2022	-	2,683,000	14.1	28.1	2048	-	2,683,000	3.8	7.7
2023	-	2,683,000	13.4	26.7	2049	-	2,683,000	3.6	7.3
2024	-	2,683,000	12.7	25.4	2050	-	2,683,000	3.5	6.9
2025	-	2,683,000	12.1	24.2	2051	-	2,683,000	3.3	6.6
2026	-	2,683,000	11.5	23.0	2052	-	2,683,000	3.1	6.3
2027	-	2,683,000	11.0	21.9	2053	-	2,683,000	3.0	6.0
2028	-	2,683,000	10.4	20.8	2054	-	2,683,000	2.8	5.7
2029	-	2,683,000	9.9	19.8	2055	-	2,683,000	2.7	5.4

The cessation of waste deposition in 2017 is an approximation that depends on when the permission to increase deposition is given.

A temporary open gas flare was installed and has been operational at the facility since the end of December 2005. Following agreement by the Agency an enclosed landfill gas flare commenced operation in December 2006.

Planning permission was granted in April 2007 for installation and operation of a gas utilisation plant (planning reference NA70015). The proposed plant will be phased and will generate up to 4.2 MW of electricity for input into the national grid. There will be three landfill gas engines generating approx 1.4 MW of power each with an enclosed flare ESB substation and switch room. Greenstar is awaiting connection to the national grid and it is envisaged that the first gas engine will be installed and operation in 2009 pending the grid connection. Knockharley Landfill is therefore classed as disposal with energy recovery.

The landfill gas prediction model results are presented in Appendix 5 together with the landfill gas production records for 2006 to quarter 3 2008. Landfill gas monitoring is conducted as per the schedule and conditions of the waste licence.

3.5. Compliance with EPA Waste Licence

The EPA has audited the Knockharley landfill site on four separate occasions with no non-compliances noted making it the most compliant landfill in the country.

- 07 March 2005
- 11 April 2006
- 16 May 2007 and
- 03 April 2008.

It was noted in the 2007 audit that many of the corrective actions suggested by the EPA were closed out satisfactorily and in general a good standard of compliance with the waste licence was observed during the audit. The 2008 audit commented that the site was tidy and well organised.

Some priority issues (highlighted in the audit report) include the installation of a landfill gas combustion plant and the installation of backup landfill gas flaring. (see above)

3.6. Environmental Controls

The facility was designed and is being operated in accordance with the EU Landfill Directive 1999/31/EC and the EPA Manuals on landfill selection, design, operation and monitoring.

It is not proposed, nor is it deemed necessary, to implement changes to the comprehensive environmental controls and monitoring that are presently in operation for the purpose of this proposal. Although full nuisance controls will be implemented at the Phase 7 cells, the stabilised wastes and wastes suited for disposal separately to biodegradable waste will not generate visual (litter, birds) or odour nuisance to nearby properties.

3.6.1. Bird Control

The number of scavenging birds such as gulls and crows attracted to the landfill site are minimised by the following measures:

- Daily cover material comprising soil-like material covered by woodchip is placed on the active area of the landfill to deny access for scavenging birds to the waste.
- The surface area of exposed waste is minimised during operations.
- Trained falconers are employed to use birds of prey to deter scavenging birds. A purpose built aviary has been constructed on site. Falconry has proved a very effective control measure at other landfill sites.
- Falconry is being augmented by visual and acoustic deterrents such as stress callers and signal flares.

In almost three years of operation, there has been no significant increase in the number of birds at the site. During the period of proposed waste intake intensification, current procedures will be maintained.

3.6.2. Dust Control

Dust is controlled at the site by the following means:

- A wheelwash consisting of a wet shakeout is provided. All waste haulage and landfill construction vehicles are required to utilise this facility before exiting the site.
- After passing through the wheelwash, all vehicles travel along approximately 900 m of paved road before reaching the public road network. This road is cleansed daily of mud and dust.
- The landfill will be temporarily or finally capped and seeded with grass as soon as practicable after completion of filling operations.
- A water bowser and road sweeper is used daily to control dust nuisance.
- All waste disposed of in the landfill is covered daily. During periods of dry weather the cover material is kept moist to prevent dust nuisance.
- Following completion of a cell it will be capped and seeded with grass.

There is a buffer of 250 m from the waste disposal area to the nearest residential property. This allows for attenuation of dust if any should arise.

A second wheelwash will be employed when the filling of the northern phases is commenced.

3.6.3. Litter Control

Measures used to control litter at the site include the following:

- The active tipping area is kept to the minimum area required to efficiently operate the site.
- The active tipping area is covered on a daily basis with soil-like material covered by woodchip.
- All waste in non-active areas of the landfill is at all times covered with soil or an alternative mineral layer.
- Netting systems are employed around active areas of the site.
- Mobile litter cages are used as necessary close to unloading vehicles.
- A minimum buffer of approximately 100 m exists between the landfill footprint and the site boundary. This ensures that in the event of a failure in the netting system the primary receptor of any litter will be on land owned by the site operator and a clean-up can be instigated immediately.
- All waste is delivered to the site in covered vehicles by hauliers under contract to Greenstar. Any contractor delivering uncovered waste is deemed to be in breach of contract and appropriate action is taken by Greenstar. This action is designed to ensure that this practice will not recur.
- Waste contractors are prohibited from using minor roads on their approach to and departure from the site and all access is directly from the N2.
- Staff at the site patrol the nearby roads regularly to ensure that there is no litter emanating from vehicles using the facility. The nature of the waste to be deposited on the north face will be less prone to litter nuisance.
- The site is closed in the event of severe wind conditions.

3.6.4. Odour Control

The mitigation measures include careful scrutiny and screening of waste intake to prevent particularly odourous material being accepted at the landfill for disposal. Regular patrols of the site are undertaken to examine for any odour problems and any complaints received are promptly investigated.

The primary odour control is the use of daily cover in accordance with the provisions of the waste licence. Daily cover comprises a minimum of 150 mm soil-like material covered with a 100 mm deep layer of woodchip, the latter being a well documented medium used to treat odourous compounds in bio-filters. Before being covered the waste is compacted. The immediate compaction of the waste within a small controlled area serves to minimise the available area for odours to escape from the daily tipping area.

The progressive development of the landfill gas collection and treatment infrastructure enhances odour control as landfill gas combustion effectively destroys its odourous compounds. A high density of landfill gas extraction points have been installed at the landfill that are connected to modern state-of-the-art gas flares. A gas-engine and generator will be installed at the site in the near future to utilise the gas.

The tertiary odour control system employed on site comprises a fog spray system. This system is installed along the litter fence, along the aviary hedgerow and as multi nozzle stands at the working face. The system releases a fog of odour neutraliser ('Clean-Air') comprising natural oils. The system is not used continuously but is always used when the prevailing wind threatens off-site odour migration. Predominantly the installation along the litter fence is used but depending on the wind speed and direction, the two other locations are treated.

There is minimum distance buffer of 250 m from the waste disposal area to the nearest residential property. This provides for significant attenuation of any potentially odorous gases.

Leachate is removed regularly by a licensed waste contractor thus minimising the potential for odours which can form as a result of leachate stagnating and becoming anaerobic. The leachate lagoon is covered.

This proposal together with the implementation of national waste policy will reduce the potential of landfilled waste being odiferous.

3.6.5. Vermin Control

Strict management and mitigation measures are in place and have been successful in the control of populations of vermin in the vicinity of the landfill. These measures include the following:

- Monitoring of vermin and controlling population numbers so that no significant increase is allowed to occur. Professional vermin control experts are employed to control vermin levels using standard humane methods. Measures used as part of this programme include internal and external bait boxes, rodenticides and insect control measures. Vermin control commenced before the onset of landfilling.
- The specialist contractor visits the site at regular intervals throughout the year to inspect the control measures and assess their effectiveness. These control measures have found to be successful.
- Baiting is undertaken on a monthly basis, or more frequently as required.
- Precautions are taken to avoid non-target species from coming in contact with vermin bait e.g. rodenticides. This includes the following: laying bait in areas not accessible to non-target species; strict control of vermin population levels; and where possible, the removal of any dead or dying vermin which may act as a food source for non-target species. However, it should be noted that poisoned vermin, such as rats, will ordinarily return to their nests and burrows to die. The success of the programme is manifest by the diversity of fauna that has colonised the site since farming has ceased and landfilling has commenced.
- Daily cover material comprising soil-like material covered with a layer of woodchip is placed on the active area of the landfill to deny access for scavenging birds and vermin to the waste.

- The surface area of exposed waste is minimised during operations and good housekeeping practices are employed to minimise the potential for scavenging.
- Birds of prey are employed to control any increase in the local bird population. This form of control relies on the natural instincts of gulls and crows in recognising that the landfill is located in the territory of a predator. As part of the site construction, an aviary was constructed which houses birds of prey, including Falcons and Harris Hawks, which are used by the contractor in the control of birds. A seven day dawn to dusk programme is established at the facility and a contractor is based full time on the site. Both visible and audible deterrents are used as part of the bird control programme.
- The number of birds at the surface water attenuation pond is monitored regularly by site personnel confirming the success of the bird control measures.

3.7. Environmental Monitoring and Reporting

3.7.1. Leachate

Waste cells have been constructed in accordance with the waste licence and are lined with an EU-standard composite lining system comprising a leachate collection network which drains to sumps. Leachate levels are continuously recorded in the sumps.

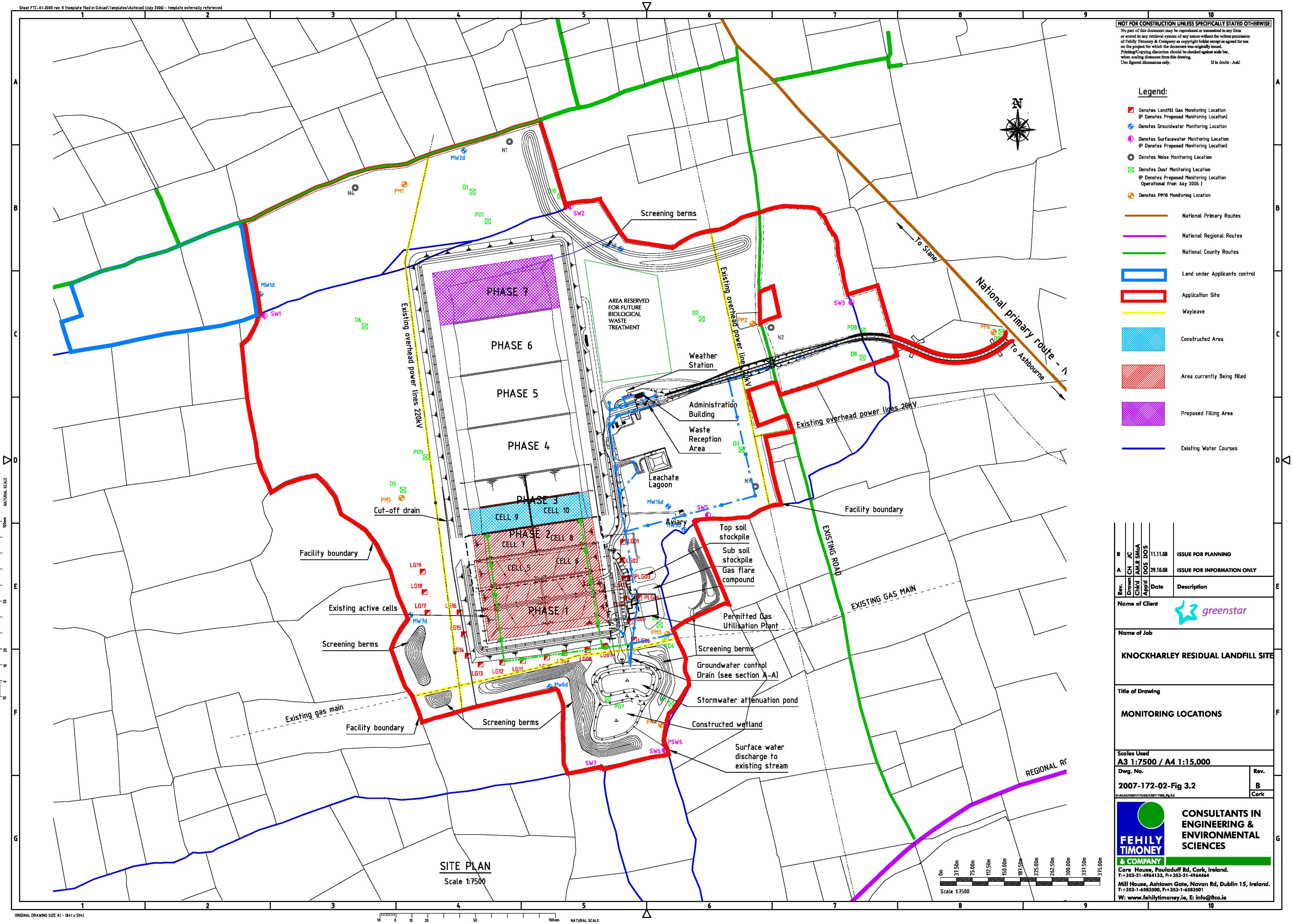
Leachate samples are collected from each of these sumps on a quarterly basis in accordance with Condition 3 and Schedule D of the waste licence and analysed for the specified suite of parameters. A composite sample of the leachate pumped from the leachate lagoon is also analysed on a quarterly basis. See Figure 3.2 Environmental Monitoring Locations.

The results of 2006, 2007 and 2008 leachate monitoring are summarised in Appendix 4.

3.7.2. Landfill Gas

Landfill gas comprises a mixture of methane (CH_4), carbon dioxide (CO_2), oxygen (O_2) and trace (odorous) compounds. Landfill gas migration monitoring points have been installed into the boulder clay at 50 m intervals outside the landfill footprint. The locations of the wells were agreed in advance with the Agency and comprised 19 no. gas wells (LG01 - LG19). All of these gas wells are located outside the waste body. These locations are presented in Figure 3.2 Environmental Monitoring Locations.

There are also six wells located in the waste body available for monitoring throughout cells 1 to 4. Wells 1E and 1W are located in Cell 1, wells 2E and 2W are in Cell 2, wells 3E and 3W are in Cell 3 and wells 4E and 4W are located in Cell 4.



Sheet FTC-A1-2000 rev. K (template filed in O:\Acad\Templates\Autocad) (July 2006) - template externally referenced
NOT FOR CONSTRUCTION UNLESS SPECIFICALLY STATED OTHERWISE
Legend:
Denotes Landfill Gas Monitoring Location (P Denotes Proposed Monitoring Location)
Denotes Groundwater Monitoring Location
Denotes Surfacewater Monitoring Location (P Denotes Proposed Monitoring Location)
Denotes Noise Monitoring Location
Denotes Dust Monitoring Location (P Denotes Proposed Monitoring Location Operational from July 2006)
Denotes PM10 Monitoring Location
National Primary Routes
National Regional Routes
National County Routes
Land under Applicants control
Application Site
Wayleave
Constructed Area
Area currently Being filled
Proposed Filling Area
Existing Water Courses
PHASE 7
PHASE 6
PHASE 5
PHASE 4
PHASE 3
PHASE 2
PHASE 1
AREA RESERVED FOR FUTURE BIOLOGICAL WASTE TREATMENT
Screening berms
Weather Station
Administration Building
Waste Reception Area
Leachate Lagoon
Facility boundary
Cut-off drain
Aviary
Top soil stockpile
Sub soil stockpile
Gas flare compound
Existing active cells
Permitted Gas Utilisation Plant
Groundwater control Drain (see section A-A)
Stormwater attenuation pond
Constructed wetland
Surface water discharge to existing stream
Existing gas main
EXISTING GAS MAIN
EXISTING ROAD
Existing overhead power lines 220kV
Existing overhead power lines 20kV
National primary route
To Slane
To Ashbourne
SITE PLAN
Scale 1:7500
B | JC | CH | SMcA | DOS | 11.11.08 | ISSUE FOR PLANNING
A | CH | AM.R | DOS | DOS | 29.10.08 | ISSUE FOR INFORMATION ONLY
Rev. | Drawn | Chk'd | App'd | Date | Description
Name of Client
greenstar
Name of Job
KNOCKHARLEY RESIDUAL LANDFILL SITE
Title of Drawing
MONITORING LOCATIONS
Scales Used
A3 1:7500 / A4 1:15,000
Dwg. No.
2007-172-02-Fig 3.2
Rev.
B
Cork
FEHILY TIMONEY & COMPANY
CONSULTANTS IN ENGINEERING & ENVIRONMENTAL SCIENCES
Core House, Pouladuff Rd, Cork, Ireland.
Mill House, Ashtown Gate, Navan Rd, Dublin 15, Ireland.
W: www.fehilytimoney.ie, E: info@ftco.ie
ORIGINAL DRAWING SIZE A1 - (841 x 594)

Landfill gas monitoring is conducted in accordance with Condition 6 and Schedules C and D of the waste licence. The 2006, 2007 and 2008 landfill gas monitoring results are presented in Appendix 5.

To gain an understanding of the baseline conditions at the site, an initial round of monitoring was conducted in November 2004 prior to filling of waste.

Site buildings are monitored continuously for landfill gas by means of a continuous gas detection system. A gas analyser is permanently available on site and is used for spot checks should the need arise.

Monitoring has confirmed that there is no migration of landfill gas.

3.7.3. Ecological Monitoring

A biological assessment of the Knockharley stream is undertaken annually, in compliance with the waste licence at locations upstream and downstream of the site. The appropriate water quality values are assigned using the EPA scheme of Biotic Indices or Quality (Q) Values and their relationship to water quality (EPA, 2005[1].), These water quality values are presented in Table 3.3 'EPA Q Index'.

Table 3.3: EPA Q Index

Q VALUE	COMMUNITY DIVERSITY	WATER QUALITY	QUALITY STATUS
Q1	Very low	Bad	Seriously polluted
Q2	Low	Poor	Seriously polluted
Q3	Much reduced	Doubtful	Moderately Polluted
Q4	Reduced	Fair	Unpolluted
Q5	High	Good	Unpolluted

There are five upstream monitoring locations and two downstream monitoring locations relative to the landfill surface water outfall. These locations are presented in Table 3.4.

[1] EPA. (2005). *Water Quality in Ireland 2001-2003. Appendix 1.* PO Box 3000, Johnston Castle Estate, Co. Wexford.

Table 3.4: Biological Assessment Locations

SAMPLE LOCATION	WATERCOURSE	LOCATION RELATIVE TO SURFACE WATER OUTFALL
SW 1	Kentstown Stream	Upstream
SW 2	Kentstown Stream	Upstream
SW 3	Kentstown Stream	Upstream
SW 5	Kentstown Stream	Upstream
SW 6	Kentstown Stream	Downstream
SW 7	Nanny River	Upstream
SW 8	Nanny River	Downstream

Macroinvertebrate surveys have been carried out from 2005 to 2008. The assessments identified the water quality upstream from the site as Q1 to Q3-Q4, moderately to seriously polluted. The water quality downstream of the site is generally rated as Q2 to Q3, moderately to seriously polluted.

This confirms that the biological water quality does not degrade on passing the landfill surface water outflow and the site is not having a detrimental impact on water quality downstream of the site. An improvement in water quality is noted at downstream locations.

3.7.4. Surface Water Monitoring

Surface water monitoring is carried out at seven locations (SW1, SW2, SW3, SW5, SW6, SW7 and SW8) upstream and downstream of the site since 2001. These locations and monitoring requirements are prescribed by Schedules C and D of the waste licence. The monitoring locations are shown on Figure 3.2. The 2006, 2007 and 2008 analysis is presented in Appendix 6.

A new surface water monitoring location, PSW6, was proposed in the outlet from the wetland prior to discharge to the stream. This was agreed with the EPA, implemented on site and has been monitored since October 2006.

Greenstar site staff conduct weekly visual inspections of surface waters at the site. The inspections involve walking along the stream banks and checking for any signs of pollution such as littering, iridescence or odour.

The monitoring results indicate surface water quality is of a good standard and activities on-site are not affecting local water quality. The baseline surface water quality is characterised by naturally elevated hardness and iron concentrations. The analytical results indicate that the baseline quality is impacted upon by the surrounding land-use and agricultural activities as well as effluent disposal from septic tanks in this un-sewered area. These impacts are reflected in the elevated and variable BOD, COD, nitrate and nitrite levels quantified along the Knockharley Stream.

To date there is no evidence of surface water contamination associated with the site activities.

3.7.5. Groundwater Monitoring

Groundwater monitoring is carried out at seven groundwater boreholes as defined in Schedule D of the waste licence. Locations MW1d, MW2d, MW3d and MW7d are all up-gradient of the landfill footprint whereas MW5d, MW6d and MW16d are down-gradient. The direction of groundwater flow on the site is from northwest to southeast. The monitoring locations are shown on Figure 3.2.

A comprehensive groundwater monitoring programme is carried out at the landfill and the results to date are presented in Appendix 7. The monitoring was completed as per the waste licence. Schedule D.5. Surface Water, Groundwater and Leachate.

The groundwater monitoring results show that samples from up-gradient and down-gradient wells are similar in terms of parameter concentrations and that the site is not negatively impacting on groundwater quality.

3.7.6. Dust Monitoring

Monthly dust monitoring is carried out in accordance with Schedule C and D of the waste licence at locations shown on Figure 3.2. Dust monitoring locations, D5 and D8, were relocated in March 2004, with the approval of the Agency, to accommodate development works in these areas. The Agency further agreed to removal of dust monitoring locations D9 and D10 from the monitoring programme in October 2006. The dust gauges were located within developing woodland surrounded by vegetation and results would not present accurate results for dust deposition.

The dust monitoring locations are presented in Figure 3.2 Environmental Monitoring Locations. A summary of the 2006, 2007 and 2008 dust monitoring results to date is presented in Appendix 8. Monitoring was conducted in accordance with the waste licence schedule D.3.

Typically dust deposition results are within the waste licence dust deposition limit of 350 mg/m^3/day. This limit was exceeded in June and December 2006 but these were found to be caused by natural pollen and seed dispersion in June and algae inhibitors in December. These exceedences are not attributed to site operations. The latest results are fully compliant with the limit and confirm that the site is not impacting on ambient dust levels.

3.7.7. PM_{10} Monitoring

PM_{10} represents the fraction of dust particles of 10 micron diameter or lower. The significance of PM_{10} is that particles of this size (or lower) are respirable. Levels are monitored at six locations every quarter for a period of 24 hours as per the waste licence conditions (Condition 6 and Schedule D). These locations are shown on Figure 3.2 'Environmental Monitoring Locations'.

A summary of the 2006, 2007 and 2008 PM_{10} monitoring results is presented in Appendix 9. Monitoring is conducted in accordance with the waste licence (W0146-01) conditions and schedules.

The monitoring results show that all measurements are below the trigger level of 50 $\mu g/m^3$ set in the licence with the exception of an exceedance in March 2007 at PM1 located away from the landfill footprint, at the site boundary. All the PM_{10} locations located closer to the landfill had significantly lower results. The recorded exceedance was caused by traffic on adjacent roads and not by landfill activities.

3.7.8. Noise Monitoring

Quarterly noise monitoring is conducted at four locations (N1 to N4) in compliance with Condition 6 and Schedules C and D of the waste licence. These locations are presented in Figure 3.2 'Environmental Monitoring Locations'. A summary of 2006, 2007 and 2008 noise monitoring results are presented in Appendix 10.

The site is fully compliant at all locations except N2. Exceedances of the L_{Aeq} limit of 55 dB(A) were recorded for the latter half of 2007 and first quarter of 2008 but these exceedances were shown to be caused by extraneous off-site noise and not by on-site activity. The LA_{90} measurements are thought to more accurately represent the continuous emissions from the landfill. These LA_{90} measurements are within the licence limits as stated on Schedule C of the waste licence for daytime noise levels of 55 dB(A).

3.7.9. Meteorological Monitoring

A meteorological monitoring station was installed in 2004 in accordance with the waste licence (Condition 3 and Schedule D).

3.7.10. Archaeological Monitoring

Archaeological monitoring and excavation work was conducted by a qualified archaeologist prior to and during landfill construction in accordance with Condition 8 of the waste licence. Archaeological investigations will precede each development phase. In the event of any archaeological material being uncovered, steps will be taken, in consultation with the National Monuments Division, Department of the Environment, Heritage and Local Government to ensure that the site is recorded and excavated appropriately.

Details of archaeological monitoring and excavation conducted to date are presented in Appendix 11.

3.7.11. Stability and Settlement

A survey of the site is carried out once per year in accordance with Condition 8 of the waste licence. If settlement is found to be interfering with the integrity of the cap or interfering with run-off from the landform, measures will be taken to reinforce the cap or reshape the landform as required. No issues have arisen to date.

3.7.12. Contingency Arrangements

Contingency arrangements for the current landfill operation as conditioned in the waste licence will apply to the proposed waste intensification and dual-phase filling.

3.7.13. Closure and Restoration

On closure, the waste disposal area will be capped and the area returned to vegetation in compliance with Closure, Restoration and Aftercare plans agreed with the Agency.

3.7.14. Reporting

Quarterly, bi-annual and annual environmental reports are submitted to the Agency in compliance with Schedule E of the waste licence for the facility. All records of monitoring are also kept in the information room. The general public can request viewing of all monitoring data associated with the landfill.

4. CLIMATE

4.1. Climate in the Existing Environment

The climate of the Knockharley area is described by meteorological measurements collected by the national Meteorological Service at their network of synoptic stations in the region and from rainfall observations recorded at nearby population centres. Site specific data has been recorded at the facility since 2005. At present it is not possible to establish long-term averages or trends. Meteorological data is presented from the synoptic station at Dublin airport together with rainfall data from this part of Meath.

4.1.1. Temperature

The mean daily air temperature for the winter months ranged from 8.3 ^{0}C to 5.9 ^{0}C for 2007. The mean air temperatures recorded on site for the summer months ranged from 13.0 ^{0}C to 14.6 ^{0}C for 2007. Similar temperatures have been recorded for 2008 to date.

4.1.2. Rainfall

The rainfall stations at Slane, Duleek Nobber, Dunshaughlin and Navan give annual rainfall amounts for the 1961-1990 period in the range 846, 792, 860, 853 and 823 mm respectively. This is presented in Figure 4.1. The annual average rainfall at Dublin Airport is approximately 733 mm per year with 761 mm in 2007.

Table 4.1: Precipitation Figures for Dublin Airport

MONTH	2007	2008
January	73.2	97.4
February	77.8	14.7
March	38.8	101.8
April	14.7	27.6
May	35.0	32.7
June	126.4	76.4
July	127.1	111.5
August	95.5	157.3
September	39.2	
October	15.7	
November	53.8	
December	63.8	

4.1.3. Evapotranspiration

The annual average potential evapotranspiration (PE) is approximately 560 mm as calculated from data collected at Dublin airport. Annual actual evapotranspiration (AE) is less than the PE due to the development of a soil moisture deficit (SMD) in the drier summer months. In the east of Ireland AE averages about 77% of the PE over the April to September period. The calculated AE provides an approximation of the moisture losses to the atmosphere and it varies depending on the nature of the surface from fill to grassed cover.

4.1.4. Effective Rainfall

Effective rainfall is the difference between the incident rainfall and the moisture losses to the atmosphere and to vegetation through AE. It is estimated that the effective rainfall at the site is 0.338 m/year.

4.1.5. Wind

A wind rose is a graphical representation of wind at a particular location. It displays both the strength and predominant direction that the wind blows from. The wind-rose for Dublin Airport shown in Figure 4.1 shows that the main wind direction is from the west-southwest with the average monthly wind speed varying from 8 to 10 knots (4 to 8 m/s) from summer to winter.

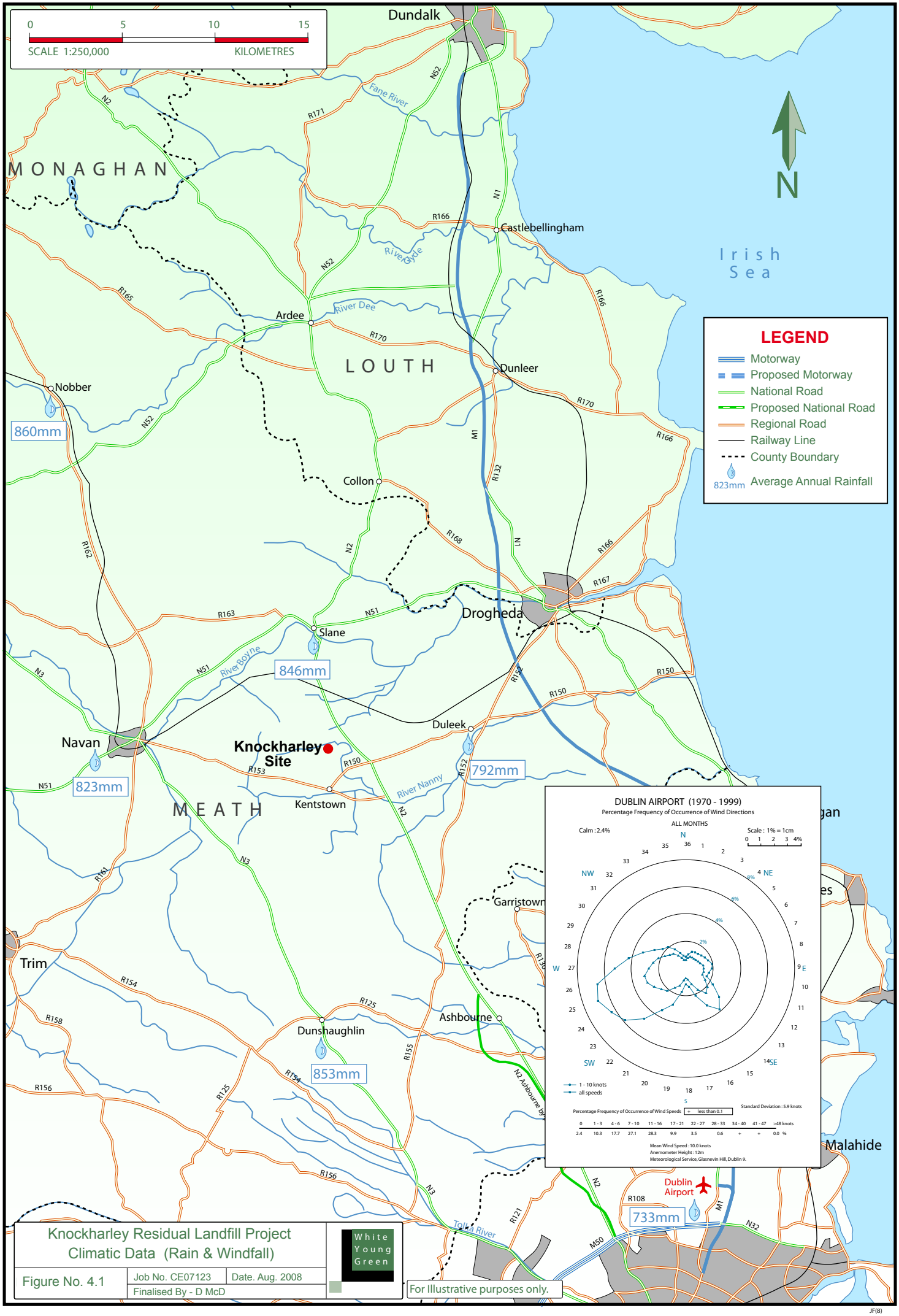
4.2. Potential Impacts on Climate

There are no expected adverse impacts from the development on the local climate in the area. Landfill facilities generate landfill gas as the waste decomposes over time mainly comprising methane and carbon dioxide. Although there will be a faster production rate of landfill gas and the peak generation will occur sooner for an intensified waste intake (see Section 3.4.2), it will be actively abstracted and directed for flaring and utilisation. The overall quantity will not be altered by the accelerated filling but the effectiveness of extraction, the efficiency of destruction of methane and the economics of utilisation (energy recovery) will be increased.

Landfill gas comprises of methane, CO_2, O_2 and other trace compounds. Its combustion eliminates methane which is approximately 23 times more harmful to the environment (contribution to global warming) than CO_2.

4.3. Mitigation Measures

No additional mitigation measures are required.


0 5 10 15
SCALE 1:250,000 KILOMETRES
N
Dundalk
MONAGHAN
LOUTH
MEATH
Castlebellingham
Irish Sea
Ardee
Dunleer
Nobber
Collon
Drogheda
Slane
Navan
Knockharley Site
Kentstown
Duleek
Garristown
Trim
Dunshaughlin
Ashbourne
Malahide
Dublin Airport
River Boyne
River Nanny
Fane River
River Glyde
River Dee
Tolka River
860mm
846mm
823mm
792mm
853mm
733mm
LEGEND
Motorway
Proposed Motorway
National Road
Proposed National Road
Regional Road
Railway Line
County Boundary
823mm Average Annual Rainfall
DUBLIN AIRPORT (1970 - 1999)
Percentage Frequency of Occurrence of Wind Directions
ALL MONTHS
Calm : 2.4%
Scale : 1% = 1cm
Mean Wind Speed : 10.0 knots
Anemometer Height : 12m
Meteorological Service, Glasnevin Hill, Dublin 9.
Knockharley Residual Landfill Project
Climatic Data (Rain & Windfall)
Figure No. 4.1
Job No. CE07123
Date. Aug. 2008
Finalised By - D McD
White Young Green
For Illustrative purposes only.
JF(8)

5. TRAFFIC

5.1. Overview of Existing Grant of Permission

An Bord Pleanála, in 2002, granted permission for the existing landfill which accepts 132,000 tonnes of waste material per annum. In 2002 there was no legislation in place requiring that waste be treated before transport to landfill. Based on relevant weighbridge data form landfill sites which operated at that time, one third of untreated waste was forecast to arrive in 8.5 tonne loads with the remaining two thirds forecast to arrive in 14.5 tonne loads. Traffic generation at the permitted development was forecast to be approximately 37 HGV per day. This level of traffic was not considered to have an adverse impact on the road network.

The Traffic Impact Assessment (TIA) which accompanied the original application presented an analysis of traffic impact based upon the proposed acceptance of 180,000. A further 'sensitivity' assessment was based upon 250,000 tonnes per annum. For the proposed 180,000 tonnes per annum the original development was forecast to generate an average of 51 HGV trips per day; whilst under the sensitivity analysis this figure was 67 HGV trips per day.

Under both the 180,000 and 250,000 tonnes per annum scenarios, the development impact upon the operation of the roads network was shown through detailed analysis as not significant. The robustness of the original traffic analysis was commented upon in the report of the ABP Inspector (An Bord Pleanála Ref. No. PL17.125891).

It is current EU policy, national policy and indeed an EPA requirement that all waste received at residual landfill sites must be treated. The traffic implication of this policy has been that the average payload arriving at the landfill site has increased considerably from the above estimates in the EIS submitted as part of the original landfill application in 2001. The resultant average vehicle payload to landfill sites is now generally 20+ tonnes where prior to the introduction of the current policy, waste was typically transported in smaller payloads.

5.2. Existing Conditions (See Figure 5.1 Road Network)

The landfill is currently provided with a high quality direct vehicular access to the N2 National Primary Road. The existing 'access' is designed to the NRA standard for a 'junction' on the national primary road network and is provided with a ghost island right turn lane and a nearside auxiliary lane (left turn). The geometry of the access was designed to Design Manual for Roads and Bridges (DMRB):TD42 'Geometric Design of Major/Minor Priority Junctions' and constructed in accordance with the requirements of the NRA: DMRB for a 100kph speed limit. The ghost island right turn lane facilitates site traffic approaching the development from the north to wait in the mainline carriageway without impeding the free flow of southbound N2 traffic, similarly the nearside auxiliary lane reduces the level of impedance which might otherwise arise from site traffic slowing down

to turn left from the N2. These facilities were implemented in the interest of road safety and to preserve the carrying capacity of the N2 National Primary Road; not for capacity of the access itself. The ultimate capacity of the existing access is many times the traffic generation of the landfill. Preliminary junction modelling calculations based upon current N2 flows suggest that the access could reasonably accommodate 20-30 times the current traffic generation of the site (equivalent to receiving a forecast full days waste in less than an hour).

From factored traffic count survey data (2008), the N2 was estimated to have an AADT (Annual Average Daily Traffic: Average Daily Two Way Traffic Flow for any given year) of 8,000-10,000 vehicles per day in the vicinity of the site. Of these, 21% or 1,680-2,100 were recorded as HGV. The N2 has a posted speed limit of 100kph.

As suggested by Greenstar at the original planning consultation, waste related traffic is currently banned from using the R150 Regional Road, between its junction with the R153 to the west and the N2 to the east. The ban is successfully enforced by condition of contract with hauliers.

The road infrastructure in the vicinity of the site is of a relatively good standard in terms of alignment, visibility, surfacing and cross section. Recent new road schemes and upgrades which have improved accessibility for landfill generated traffic include the N2 Realignment scheme/Ashbourne Bypass; Slane Traffic Calming; R153 Kentstown Road Resurfacing; and an upgrade of the Rathdrinagh Cross Roads. Future schemes which will afford additional benefit are the M3 Clonee to Kells Motorway and the N2 Slane Bypass.

5.3. Existing Traffic Generation

Traffic generation is usually quantified using two scales of assessment: average traffic generation; and upper value traffic generation. Average traffic generation quantifies typical day to day expectations; whilst upper value or 85th percentile is a value greater than the average generally used to reflect busier than normal times. The upper value is used in traffic analyses to guard against under-sizing infrastructure; which is unlikely in this case given the standard of access from a National Primary Road.

Weighbridge records for the site have been reviewed for the period from March 2006 to February 2007. The records show a total of 198,000 tonnes of material was registered by the weighbridge in this 12-month period. Of the total 198,000 tonnes, approximately 132,000 tonnes is made up of waste for disposal, and 66,000 tonnes is made up of materials used for daily cover and other engineering purposes. Another source of HGV generation is tankers exporting leachate from the site...

Analysis of weighbridge records shows the following traffic generating characteristics:

- an average traffic generation of 36 HGV trips[2] per day and;
- an upper value (assessment figure) traffic generation of 43 HGV trips per day.

[2] Movement = vehicle either entering or leaving the site.
Trip = vehicle entering the site and leaving on the return journey

These figures represent the total HGV currently generated by the site on a daily basis.

A breakdown of these figures is provided in the following paragraphs to quantify the number of trucks associated with importing waste for disposal and for daily cover and other engineering purposes, as well as exporting leachate, in the period reviewed.

Relating to the transportation of waste, the landfill accepts 132,000 tonnes per annum for disposal over 300 days per year. From the weighbridge data, HGV arriving at the site have an average payload of 19 tonnes and an upper value payload of 14.5[3] tonnes. It follows that the landfill generates an average of 23 HGV waste for disposal transportation trips per day; and an upper value of 30 HGV per day.

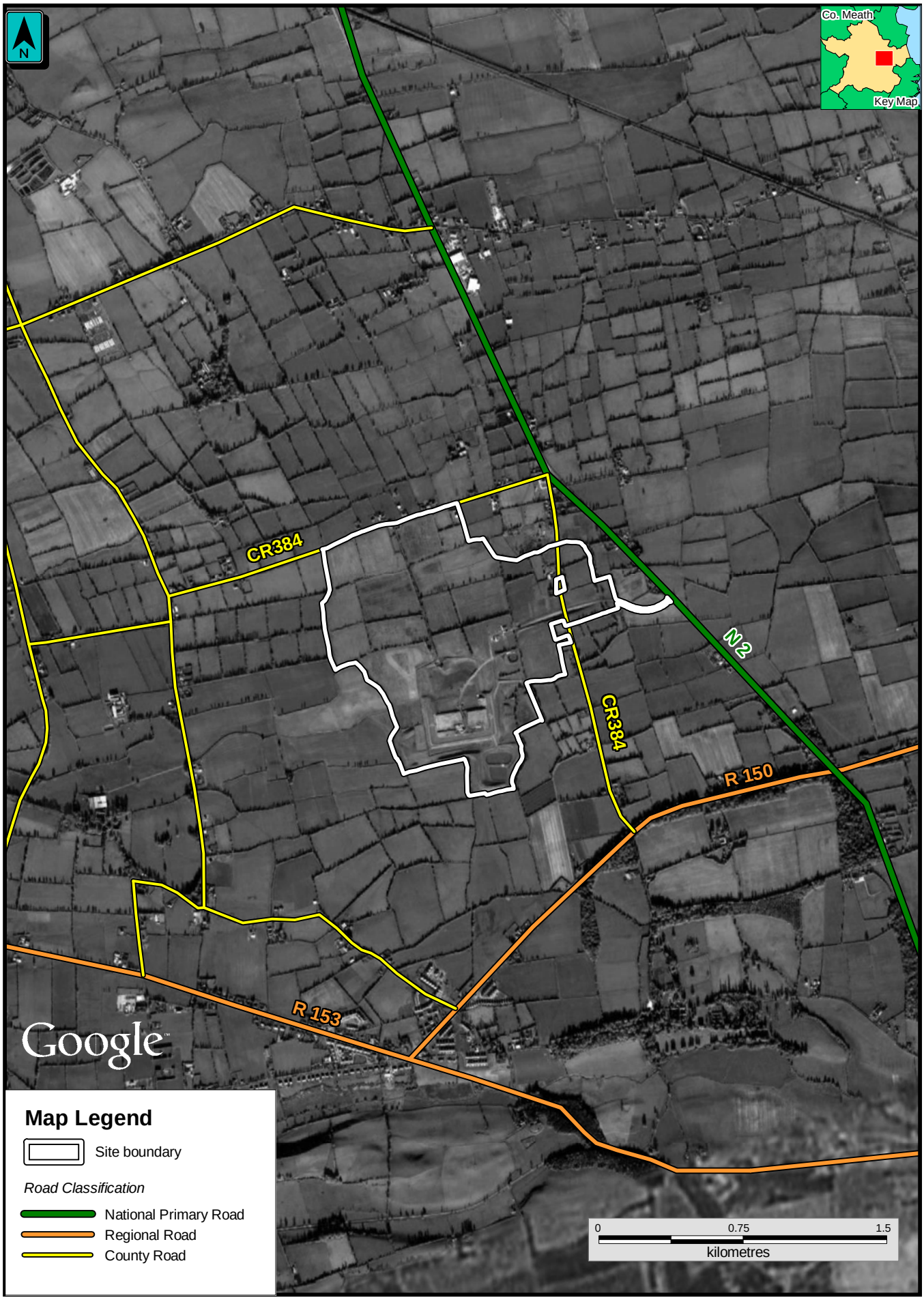
Relating to the importation of materials used for daily cover and other engineering purposes, the landfill accepted a total of 66,000 tonnes in the period reviewed. This material arrives at the site in articulated tipper trucks, typically in loads of 20 tonnes. Given 300 days per year, on average the landfill generates 11No. HGV trips per day arising from this activity.

Another day to day activity which generates HGV is the removal of leachate from the landfill in tankers. The landfill currently generates an average of 2No. HGV per day associated with this activity.

The following distribution patterns were identified in the survey: 79% of inbound HGV traffic came from the north (direction of existing Rathdrinagh MRF facility); 7% came from the Drogheda direction (R150); 7% came from Navan (R153); and 7% came from Ashbourne (N2). Outbound traffic was distributed into similar proportions.

The traffic count surveys recorded the landfill peak hour (in terms of HGV) as: 10-11am and 3-4pm. During these periods, a total of 8 HGV movements were recorded at the site access. This accounts for 14% of the total HGV generated by the landfill on the day of the survey.

[3] The lower the value the greater the traffic generation



Roads Network

Fehily Timoney & Company

Figure 5.1

5.4. Proposed Traffic Generation

The volume of waste to be accepted at the landfill is projected to increase by c.300% from 132,000 to 400,000 tonnes per annum. The proposed waste types to be received at the site for disposal will comprise progressively less biodegradable waste and increasing volumes of MBT stabilised waste together with other stabilised residual waste from recycling activities as well as construction wastes. Accordingly, the volume of material required for landfill cover and engineering activities is not expected to rise proportionally. For the purposes of modelling forecast traffic generation it is conservatively assumed that the volume of this material will approximately double from 66,000 to 125,000 tonnes per annum. This is considered to represent the worse case scenario as the increasingly stabilised nature of the wastes that will be accepted for disposal will not require the same level of daily cover as is the current situation. The amount of engineering materials used in any particular year will be related to activities at the site and will be in accordance with EPA guidance.

In total the landfill is forecast to generate the following:

- an average traffic generation of 92 HGV trips[4] per day and;
- an upper value (assessment figure) traffic generation of 113 HGV trips per day.

The following section provides a breakdown of these figures into the number of HGV transporting waste for disposal; the number of HGV importing materials for daily cover and other engineering purposes; and the number of HGV exporting leachate from the landfill..

With regard to the future transportation of waste to the landfill, a pro-rata c.300% increase is assumed. It follows that the proposed development has the potential to generate an average of 69No. HGV per day and an upper value of 90 No. HGV per day associated with the import of waste material.

It is conservatively assumed that 125,000 tonnes of materials for engineering purposes will arrive at the landfill site each year. For 300 days per year and an assumed 20 tonne payload this translates into 21No. HGV trips per day. The number of HGV exporting leachate from the landfill is not likely to increase from the existing average value of 2No. HGV trips per day. These estimates of HGV activity are considered robust, since the volume of cover material is actually expected to decrease over time in line with more refined guidelines relating to the pre-treatment of materials for landfilling; together with the expected composition of the material that will be transported to the landfill for disposal.

Based on existing traffic profiles at the site (as determined from traffic surveys); in the peak hour, the proposed development is forecast to have the potential to generate an average of 13 HGV trips and an upper value of 16 HGV trips. In terms of HGV movements, this translates into an average of 26No. HGV movements and an upper value of 32No. HGV movements.

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[4] Movement = vehicle either entering or leaving the site.
Trip = vehicle entering the site and leaving on the return journey

It is assumed that HGV will distribute on the National Primary Road network in different proportions than recorded in the traffic survey. At the time of the surveys a large proportion of waste arrived from the Rathdrinagh MRF, however this is not envisaged to be the case under the current application. For the purposes of the traffic assessments it is assumed that HGV travelling from MRFs to the landfill will have a greater propensity to approach the site from the south. The traffic assessments are based upon a future traffic scenario where HGV traffic is distributed in the following proportions: 56% coming from the south via Ashbourne; 7% come from the south via the R153 (from Navan); 7% come from the south via the R150 (from Duleek); and 30% come from the north.

5.5. Traffic Impact on Existing Road Infrastructure

The forecast traffic increases are not likely to adversely affect the performance of the existing ghost island right turn lane junction or any other junctions in the vicinity of the site. It is estimated that the existing site access on the N2 has 20 to 30 times the capacity required to serve the landfill site.

The forecast traffic generation during the peak hour is estimated to be 13 (average) and 16 (upper value) HGV trips. The resultant traffic increases will be virtually imperceptible to existing N2 road users.

The forecast trebling of waste related HGV from 23-30 HGV trips per day to 69-90 HGV trips per day; represents a modest increase with regard to the average 67 trips per day which were considered (in determining the original application) not to have a significant impact on the roads network; as confirmed by the traffic assessments in the original EIS.

The N2 is the main corridor upon which new development traffic will have an impact. The site currently generates an average of 36 HGV trips and 20 car trips per day. This represents approximately 1.1 – 1.4% of total N2 traffic. In terms of HGV only, the site currently generates 3.4 – 4.3% of all HGV on the N2 in the vicinity of the site.

The proposed development could increase the percentage of landfill traffic (cars and HGV) on the N2 to 2.5 – 3.1%. This represents a 1.1 – 2.0% increase. In terms of HGV only the proposed development could increase the percentage of landfill HGV traffic on the N2 to 8.4 – 10.6% i.e. an increase of 4.1 – 7.2%. These incremental increases are not likely to compromise the carrying capacity or the level of service afforded by the existing local road network.

There will be a negligible increase in the number of HGV using the R153. The number of waste related HGVs noted during the survey was two, and this is forecast to increase to seven following the proposed development. The ban on HGV using the R150 for traffic accessing the site from the direction of Kentstown School will remain in place.

Given that the greatest traffic increases will occur on the N2; and considering this is classified as a strategic national route, any negative impact arising from the development is likely to be negligible

A traffic and transport assessment report prepared by **Traffic*wise*** Ltd. Is presented in Appendix 12 and provides detailed analysis and assessment of the effect the proposal is likely to have on traffic patterns and volumes on the receiving roads network.

5.6. Mitigation Measures

No mitigation measures are required to facilitate the proposal; save for a commitment to adhere to the existing routing arrangements.

Significant roads infrastructure both within and serving the site was provided as part of the Phase 1 development. The existing infrastructure serving the site is provided with features (auxiliary turning lanes) designed to increase road safety and to preserve the mainline flow of traffic. These features also increase junction capacity. The roads and traffic section of this EIS demonstrates that the existing infrastructure is satisfactory for the intensified use. From detailed modelling assessments it is estimated that there will be a reserve capacity in the region of 90% at the existing site access at the design year.

The recent N2 Realignment/Ashbourne Bypass further reduces traffic impact and the need for mitigation measures; since it provides a high standard connection, from the landfill to the M50 motorway and the Dublin Region. This new road is relatively free of vulnerable road users and does not pass through any villages or towns.

5.7. NRA Consultation

The Applicant has sent a copy of this submission to the NRA for comment. The NRA had requested that a Traffic Impact Statement be prepared together with a Road Safety Audit.

This section summarises the traffic impact likely to arise form the development and is considered to constitute a Traffic Impact Statement. The document attached as Appendix 12 is a Traffic and Transport Assessment as defined by the NRA.[5]

The current access is designed to NRA:DMRB:TD42 '*Geometric Design of Major/ Minor Priority Junctions'* which applies to the national primary road network. With respect to safety and capacity the junction is provided with both left and right turn lanes. As was confirmed by the NRA in determining the original application, the existing access is fully compliant with the NRA:DMRB.

There are no proposals to alter the existing geometry, only proposals to increase the volume of traffic entering and leaving the site. In this regard the proposed traffic generation at the site is many multiples below the ultimate capacity of the existing junction (right turn lane not warranted on capacity grounds until flow reaches 500 AADT[6] where mainline AADT is above 10,000 AADT).

[5] Traffic and Transport Assessment Guidelines – Sept. 2007 NRA

[6] Annual Average Daily Traffic: Average daily Two Way Traffic Flow for any given year

The remit of a Road Safety Audit as defined by the NRA in HD19 covers permanent physical alteration to the road network and does not cover intensification of use; accordingly a Road Safety Audit is not required.

A Road Safety Audit is defined in para 1.2 of HD19 as follows: "*The evaluation of road schemes[7] during design and construction to identify potential safety hazards which may affect any type of road user, before the scheme is opened to traffic, and to suggest measures to eliminate or mitigate those problems."*

[7] NRA Defines a Road Scheme as *"All works that involve permanent change to the existing road layout"*

6. NOISE

6.1. Noise in the Existing Environment

The landfill is located in a rural environment and the existing noise environment around the site can be determined by reference to the noise monitoring data presented in Appendix 10. Noise monitoring was undertaken as per Schedule D.4. 'Noise' of the waste licence. Daytime activities on site are regulated by a noise emission limit value (ELV) of 55 dB(A) $L_{Aeq\ 30\ min}$ at noise sensitive locations. The noise monitoring locations are indicated on Figure 3.2 'Environmental Monitoring Locations'.

Noise monitoring carried out in Quarter 3 and 4 2007 and Quarter 1 and 2 2008 noise location, N2, resulted in L_{Aeq} levels greater than the daytime L_{Aeq} licence emission limit of 55dB(A). The noise monitoring report states that extraneous off-site sources were audible and in such circumstances, the continuous emissions audible from the study site are more accurately represented by the L_{A90} parameter, which describes the noise level exceeded for 90% of the measurement interval. The L_{A90} readings for this location were compliant with ELV of 55dB (A).

The EPA has audited the Knockharley landfill site on four separate occasions (07 March 2005, 11 April 2006, 16 May 2007 and 03 April 2008) with no non-compliances noted.

6.2. Potential Noise Impacts

6.2.1. Potential Vehicular Noise Impacts

One of the main changes to the existing noise environment associated with the proposed development will be the increase in traffic to the facility and dual filling of northern and southern cells.

A noise prediction model was undertaken for the original and EPA-approved application. This was based on untreated waste arriving at the site in the following payloads: one third of waste in 8.5 t loads, and two thirds in 14.5 t loads (conservative when compared with actual truck movements to-date). Noise levels from typical waste haulage vehicles were used in the model. The model demonstrated that noise levels at the closest noise sensitive locations were as a worst case 53 dB when waste haulage traffic only were using the purpose built road to the landfill and 55 dB during the construction phase.

Realisation of the proposed development will result an upper value of 90 HGVs associated with waste and additional HGVS as detailed in Chapter 5 .

All of the additional traffic associated with the proposed development will pass along the N2. The N2 had a reduction in traffic over the period 2000-2005 due to the opening of the M1 and M1 Ardee link. Consequently impact of noise from the increased traffic to the facility will be negligible along the N2.

The impact of noise on the nearest residents where traffic leaves the N2 will be minimal to imperceptible as the traffic will not be concentrated over any particular hour but will average out over the course of operational hours of the landfill.

6.2.2. Potential Operational noise Impacts

A temporary open gas flare was installed and has been operational at the facility since the end of December 2005. Following agreement by the Agency an enclosed landfill gas flare was commissioned and taken into operation in December 2006 to operate on a 24 hour basis, 365 days a year.

Planning permission was granted in April 2007 for installation and operation of a gas utilisation plant (planning reference NA70015). The proposed plant will be phased and will generate up to 4.2 MW of electricity for input into the national grid. There will be three landfill gas engines generating approx. 1.4 MW of power each with an enclosed flare ESB substation and switch room. Greenstar is awaiting connection to the national grid and it is envisaged that the first gas engine will be installed and operation in 2009 pending the grid connection.

A noise prediction model was run in January 2006 by Golder & Associates to assess predicted noise levels from the proposed gas utilisation plant at two noise sensitive locations, 440 m and 480 m to the east of the gas compound. Assuming the noise level from the gas flare unit was 75 to 78 dB(A) and the noise levels from each of the three gas utilisation engine units were 70 dB(A), then the noise levels at the modelled noise sensitive locations were below 35 dB(A) and would not present a noise nuisance . This detail was inputted to a noise model prepared for this report below.

Operational noise is currently monitored at four locations on site. Noise monitoring results are discussed in Section 3.7.8 and presented in Appendix 10.

6.3. Noise Prediction Model

6.3.1. Noise Model Inputs

Noise prediction models undertaken for this EIS evaluate the impact of traffic (as described in Chapter 5), dual filling both at the south and at the northern ends of the site and the proposed gas engines and flare on surrounding noise sensitive locations. The models are based on ISO 9613-2:1996 *Acoustics – Attenuation of sound outdoors- Part 2: General Method of Calculation* were undertaken using Brüel and Kjaer Predictor Type 7810 Version V5.0 – Revision 4 software. The ground type was set at 0.8, representing typically soft ground.

Sound power data on the noise sources used in the models were obtained from BS 5228: Part 1: 1997 “Noise and Vibration Control on Construction and Open Sites – Part 1 Code of Practice for basic information and procedures for noise and vibration control”. Greenstar supplied the vehicle types and numbers for landfilling operations.

It was assumed the landfill plant would be operating 100% of the time generating a worst-case scenario model and these are inputted as line noise sources to represent industrial traffic with low speed. The traffic figures were obtained from the TrafficWise report prepared for this EIS and these were inputted as moving sources. It is assumed of the 400,000 tpa, 150,000 tonnes would be deposited in the northern cells with the remaining 250,000 tonnes in the southern cells. The gas flare and gas engines are modelled as static, point sources at their highest stack point.

Noise models were run for operations in Phase 1-2 and Phase 7 cells and for operations in Phase 5 and 6 cells.

Table 6.1: Noise Model Inputs

PLANT TYPE	NO. OF PLANT	ON-TIME
LINE SOURCE		
47 tonne compactor	2	100%
20 tonne excavator	2	100%
Tractor	2	100%
MOVING SOURCE		
HGVs associated with southern cells	138 movements per day	
HGVs associated with northern cells	84 movements per day	
HGVs associated with leachate removal	4 movements per day	
POINT SOURCE		
Gas Flare	10 m high stack	
landfill gas engine	6 m high stack	

The distribution of dwellings around the landfill is focused to the north and east of the site. Estimation of predicted noise levels from the proposed intensification of waste intake and on these dwellings was determined by placing noise receptors at some of the dwelling locations at a standard height of 1.5 m.

6.3.2. Noise Model Results

The predicted noise levels associated with on-site activities are 37 to 41 dB(A) at receptors placed on the northern boundary of the site. The predicted noise levels at receptors placed on the eastern boundary and at selected locations of dwellings range from 28 to 38 dB(A). The closest location on the eastern boundary of the site is N3 at 38 dB(A) for both models. Noise levels greater than the EPA daytime noise limit of 55 dB(A) are contained well within the site boundary.

Table 6.2: Predicted Noise Levels for Operation at Phases 1-2 and 7

LOCATION	PREDICTED NOISE LEVEL DB(A)	COMPLIANT WITH DAYTIME ELV OF 55 DB(A)
LICENSED NOISE MONITORING LOCATION		
N1	41	Compliant
N2	38	Compliant
N3	38	Compliant
N4	40	Compliant
NOISE SENSITIVE RECEIVERS		
Rec1	37	Compliant
Rec2	40	Compliant
Rec3	40	Compliant
Rec4	36	Compliant
Rec5	32	Compliant
Rec6	38	Compliant
Rec7	37	Compliant
Rec8	37	Compliant
Rec9	36	Compliant
Rec10	34	Compliant
Rec11	31	Compliant

Noise contours were generated and these are presented in Figure 6.1.

Table 6.3: Predicted Noise Levels for Operation at Phases 5 and 6

LOCATION	PREDICTED NOISE LEVEL DB(A)	COMPLIANT WITH DAYTIME ELV OF 55 DB(A)
LICENSED NOISE MONITORING LOCATION		
N1	40	Compliant
N2	39	Compliant
N3	38	Compliant
N4	39	Compliant
NOISE SENSITIVE RECEIVERS		
Rec1	37	Compliant
Rec2	39	Compliant
Rec3	38	Compliant
Rec4	36	Compliant
Rec5	32	Compliant
Rec6	38	Compliant
Rec7	37	Compliant
Rec8	36	Compliant
Rec9	33	Compliant
Rec10	31	Compliant
Rec11	28	Compliant

Noise contours were generated and these are presented in Figure 6.2.

Based on the models, noise levels from the site will remain in compliance with the EPA waste licence daytime limit of 55 dB(A) from activities associated with dual filling and intensification of waste intake.

There are no waste activities conducted during night-time hours and the noise prediction model run in January 2006 by Golder & Associates to assess noise from the proposed gas utilisation plant showed predicted noise levels at noise sensitive locations were below 35 dB(A) and would not present a night-time noise nuisance .

6.4. Mitigation Measures

No additional noise mitigation measures are required.

Discovery Series Sheet No. 43

Noise Prediction Contours Phases 1, 2 and 7

> 70.0 dB(A)	
65.0 - 70.0 dB(A)	
60.0 - 65.0 dB(A)	
55.0 - 60.0 dB(A)	
50.0 - 55.0 dB(A)	
45.0 - 50.0 dB(A)	
< 45.0 dB(A)	

Nx Denotes Noise Monitoring Location

Rec x Denotes Noise Level Prediction Location

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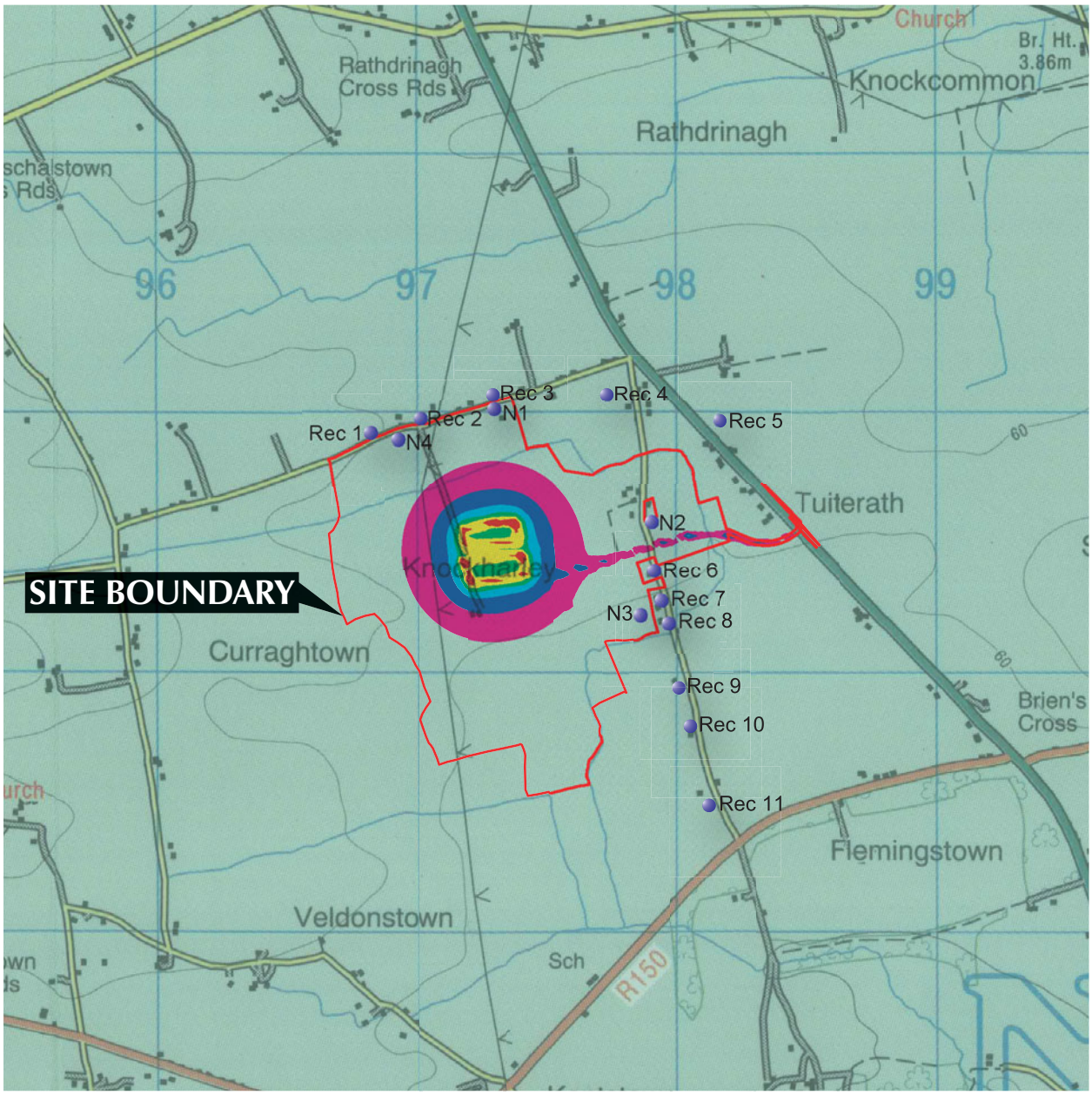
Figure 6.1

Discovery Series Sheet No. 43



Noise Prediction Contours Phases 5 and 6

> 70.0 dB(A)	Nx Denotes Noise Monitoring Location
65.0 - 70.0 dB(A)	Rec x Denotes Noise Level Prediction Location
60.0 - 65.0 dB(A)	
55.0 - 60.0 dB(A)	
50.0 - 55.0 dB(A)	
45.0 - 50.0 dB(A)	
< 45.0 dB(A)	

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Figure 6.2