Creagh House (Environmental) Ltd

Environmental Impact Assessment
Re: Waste Recovery Services (Fermoy) Ltd
Resource Recycling and Recovery Centre

Cullenagh, Fermoy, Co. Cork

Prepared by

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Non-Technical Summary

Waste Recovery Services (Fermoy) Ltd, Cullenagh, Fermoy, Co. Cork, propose to retain the existing use of their site as a waste transfer station and to carry out improvements and efficiencies in operation through the replacement of all the existing processing facilities with a single new enclosed Process Building. All the existing structures, with the exception of an on-site bungalow, would be demolished and the redundant land returned to agriculture.

There are no archaeological sites visible from the proposed development site. The most prominent archaeological site within the study area is the hillfort on Corrin Hill, located c. 1.5 km to the east. There is no visibility between this hillfort and the proposed development site, which is situated on reduced ground on the west-facing slope of a low ridge. It is screened by the top of the ridge and by the tree-lined embankment that forms the eastern site boundary. It is therefore concluded that the proposed development will have no visual impact on any archaeological sites.

The only large mammal confirmed on site is fox (*Vulpes vulpes*), and smaller mammals observed during the present survey included three species of bat, one of which was observed to be roosting within an on-site derelict cottage. Nine bird species or their signs were observed on site. No amphibians were noted. The proposed extension of the site is not expected to impact on local fauna and all species observed on site are expected to persist. The old cottage which is used as a roosting site by brown long-eared bats is not included in the present extension plans.

The nett benefit of the return of the area to the west of the site to agriculture, and its influence on the character of the road corridor of the Scenic Route, outweighs the slight additional loss of the disturbed landscape to the east of the site to form the extension to the plateau. The overall assessment would be a moderate positive impact on the landscape.

The overall magnitude of the visual impacts of the proposed development is a balance between the improvement in the views from the west including those from the Scenic Route, by the setting back of the proposed Processing Building, removal of the existing sheds and yards and the return of the area to the west of the hardstanding area to agriculture, and the initial increase in visual impact realised by the residential properties to the east and south. The overall assessment would be a moderate negative impact on the visual domain in the short term and a slight positive impact in the longer term, once the surrounding planting has become established and provided the mitigation measures described in the EIS are incorporated.

The additional traffic generated by the proposed extension to the waste facility to cater for 50,000 tonnes can easily be accommodated at the existing junction with the public road when combined with the predicted increased background flows on the public road to the year 2020 and beyond. It should be noted that the analysis contained in the EIS is based on an extremely onerous permutation of the maximum traffic flows as the anticipated daily flows are assumed to occur in each peak hour.

Provided the mitigation measures outlined in the EIS are fully implemented, it is anticipated that there will be no adverse impacts either on surface or groundwater quality. In particular, the principal mitigation will be good site management practise during the construction of the

new facility with a special emphasis on prevention of solids, cement and oil run-off during the construction phase.

The assessment of baseline air quality in the region of the proposed development has shown that current levels of key pollutants are significantly lower that their limit values.

Due to the size, nature and location of the development, which will lead to a small increase in road traffic emissions, the proposed development is expected to have an imperceptible impact on air quality parameters.

Timber waste shredding, sorting of construction and demolition waste and the sorting of cardboard, plastic, packaging and general waste may lead to some dust emissions. Under the existing Waste Licence (Licence Number 107-1) the facility monitors for dust deposition at three locations within or near the boundary of the site. Monitoring results, which are conducted three times per annum, are generally well within the limit value. It is expected that the operation of an expanded facility would also show compliance with such limits.

The only potential source of odorous emissions is from an estimated 200 tpa of canteen waste which may arise from customers indiscriminately placing this type of waste into skips. The use of jumbo skips will be maintained thus eliminating the potential for odour nuisance. Furthermore, as a condition of Waste Licence 107-1, putrescible waste stored overnight is required to be in covered containers within the transfer building and this waste is required to be removed off-site within forty-eight hours of its acceptance at the facility. Enforcement of these mitigation measures will mean odour impact is insignificant at nearby residential receptors.

As a condition of Waste Licence No. 107-1, noise measurements are taken at three locations on site.

Measurements show compliance with the EPA daytime noise limit at all three sites. It would be expected that the operation of an expanded facility would also show compliance with such daytime limits.

Chapter 1.0 – Introduction

Waste Recovery Services (Fermoy) Ltd propose to expand their inert waste handling facility at Cullenagh, Fermoy, Co. Cork. By virtue of its nature and scale, in accordance with the Planning & Development Regulations 2001, an environmental impact assessment of the proposal is required. This document is an environmental impact study (EIS) prepared on behalf of Waste Recovery Services (Fermoy) Ltd to support a planning application to Cork County Council in connection with the proposed expansion. The EIS was prepared using the *Advice Notes on Current Practice in the Preparation of EISs* (EPA, 2003) and *Guidelines on the Information to be Contained in EISs* (EPA, 2002).

This document is laid out in sections which consider the subject areas of environmental impact assessment, such as cultural heritage, ecology, landscape, water quality, traffic, air quality, and noise. Each of the subject sections (e.g. ecology, cultural heritage, etc) firstly reviews the existing situation (baseline), predicts the effects of the development on the particular aspect (impact) and outlines measures to reduce or remove any significant negative impacts (mitigation).

Baseline information was collected for each of the subject areas listed above from a combination of existing literature, consultations and site surveys. This information forms the basis on which the assessment of the environmental impact of the proposed development is carried out.

Where adverse effects were identified, appropriate mitigation has been put forward. Modifications were made to the layout of the development to accommodate environmental constraints. In addition, in areas where opportunities for environmental enhancement have been identified, suitable measures have been put forward.

Notwithstanding the presentation of information under individual headings, a number of aspects do interact closely with one another. Interactions between aspects are considered in a material way within the relevant section. A summary of interactions is also provided.

The reader is referred to the engineering drawings for the scheme which are separate to this document for a detailed inspection of dimensions. The reader is also advised not to scale from the reproduced drawings in the EIS.

Finally, there were no difficulties encountered in the assembly of the information in this environmental impact study which have precluded the ability to assess the potential significant impacts of the development.

Chapter 2.0 – Project Description and Human Environment

2.1 The Proposed Development

The proposal is to retain the existing use of the site as a waste transfer station and to carry out improvements and efficiencies in operation through the replacement of all the existing processing facilities with a single new enclosed Process Building. All the existing structures, with the exception of the bungalow, would be demolished and the redundant land returned to agriculture.

The location plan of the proposed development is shown on Figures 1 to 4. The proposed Process Building would be located to the southeast of the site, to the southern half of a new concrete hardstanding area. The new office building would be located to the northwest corner of the new hardstanding adjacent to the point where the realigned access road meets the hardstanding. This would also be the location of two new weighbridges with a small (3 x 4 x 3.5 m to ridge) control room between them (Figure 6 and Figures 8 to 12).

Located centrally along this northern edge would be a new workshop and garage building. This building would have a footprint of 15 x 20 m with a height to the ridge of just less than 7.6 m (Figure 12).

Skips would be located to the western edge of the hardstanding to the western elevation of the Process Building.

Surface water run-off from the development would be dispersed through a percolation area to the northwest on the sloping pasture-land and a bunded grass surfaced area to the west (Figures 15 and 16).

The new yard would be set to the same level as the existing hardstanding and would incorporate the easternmost section of the existing work area. To form the extended hardstanding as proposed, the existing bank would be excavated to form an enlarged plateau. The proposed yard would, therefore, be set approximately 9 m below grade in the northeastern corner. The excavation of the plateau to form the level area of hardstanding would require the removal of a large section of the recently established screen planting to the north, south and east of the proposed development; however, the existing mound and planting would be retained to the north, but lost to the east (Figure 23).

The works area, in common with the existing facility, would be illuminated in hours of darkness (06:00 to 21:00 hrs). Truck movements would remain much in keeping with the existing situation in terms of type and frequency of vehicular activity. All vehicles would be parked upon the proposed hardstanding area.

The footprint of the proposed Process Building would be 78.5 m by 50.5 m, the length of the building being almost the full width of the proposed hardstanding. The roof would be a shallow double pitch; with the height to the ridge just over 16.5 m above the hardstand and the height to eaves would be 12 m. The elevations of the building would be of rendered blockwork construction up to a height of 6 m and a matt olive green steel panel above this. The roof would be profiled steel to the same olive green colour (Figure 9).

2.2 Alternatives

A number of alternative layouts have been examined (see Figure 5). It is considered that the proposed development represents the optimum layout of the site (Figure 4).

2.3 Proposed Activity

It is proposed to increase the capacity of the waste transfer station to 50,000 T per annum. An indicative summary of the types of wastes to be accepted is shown in Table 1. A detailed listing of EWC codes for these wastes is included in Attachment 1A.

Table 1 Summary of Waste Accepted.

Waste	Annual Intake	Percentage
Timber	14,000	28
Mixed C&D	10,000	20
Dry Mixed Bulky Waste	10,000	20
Municipal Waste	3,500	7
Waste from other Waste Operators	3,500	7
Concrete/Bricks	2,500	5
Metal	2,000	4
Rubber/Plastic	1,500	3
Green Waste	1,500	3
WEEE	1,500	3

2.4 Re-Use and Disposal of Wastes

A summary of the quantities of wastes which would go to off-site re-use activities is shown in Table 2. The residual disposal to landfill is also shown.

Table 2

Waste	Tonnage	Disposal to Landfill (T)	Re-Use (T)
Timber	14,000	140	13,860
Mixed C&D	10,000	3,500	6,500
Dry Mixed Bulky Waste	10,000	3,500	6,500
Municipal Waste	3,500	3,150	350
Waste from other Waste Operators	3,500	2,975	525
Concrete/Bricks	2,500	125	2,375
Metal	2,000	50	1,950
Rubber/Plastic	1,500	150	1,350
Green Waste	1,500	75	1,425
WEEE	1,500	45	1,455

2.5 Human Environment

Waste Recovery Services (Fermoy) Ltd have operated a waste transfer station at this location since the 1980s and have maintained a good relationship with local residents over that time. Historically, there was a concern regarding the long-term storage of inert material, largely by non-resident interests, and the perception that the site may be operated as a landfill. It should be noted, however, that the activity of storage of inert material ceased in mid-1998. The prospect of toxic and dangerous material handling and storage of putrescible (organic) wastes was also a historic concern expressed by the public. For clarity and avoidance of doubt,

Waste Recovery Services (Fermoy) Ltd do not, and do not propose, to handle toxic and dangerous materials at this site.

The activity at this site handles commercial and industrial wastes for recycling (timber, metal, aggregates) and onward disposal to landfill of non-recyclable materials. Of the 50,000 tonnes of material proposed to be handled, approximately 73% would be recycled.

The evaluation provided in this environmental impact study demonstrates that the operation of this activity at this site has not had, and would not be expected to demonstrate, any material negative effect on the local environment or local residences to date.

While there would be an ongoing desire that the site be maintained clean and tidy and that further planting be provided on the boundaries, there is general acceptance by the local residents of the operation at its present location.

Chapter 3.0 – Construction and Material Assets

3.1 Introduction

This section comments on construction phase activities and the impacts which the proposed development may have on the existing services and utilities.

3.2 Construction

It is envisaged that construction activity would last for 12 months. Construction hours would be 06:00 to 21:00 Monday to Saturday.

3.2.1 Materials

Up to 8,400 tonnes of construction material in 450 loads over eight months would be utilised in the construction (see Table 3).

Table 3 Materials.

Material	Tonnes	Loads
Construction (metal, timber, etc)	650	30
Concrete	7,750	420

3.2.2 Excavation

Up to 105,000 tonnes of excavated shale would be removed from the site in c. 4,200 loads over six months. This material would be re-used as appropriate on site, recycled for alternate use, or disposed of in regulated fashion.

3.2.3 Transitional Arrangements

It is proposed to continue operation of the existing facility during the construction phase. Revised car park and operational areas would be adopted to allow both activities to operate in tandem (see Figure 7).

Upon completion of the new facility, the old facility buildings would be demolished. The anticipated materials arising would include c. 90 tonnes of metal and 1,500 tonnes of concrete and sub-base. These materials would be recycled.

3.3 Material Assets

3.3.1 Electricity Supply

The electrical demand for the proposed development will be supplied by a high tension line to the site. The ESB have indicated that the system has adequate capacity for the proposed development.

3.3.2 Water Supply

Average water use has been calculated to be c. 400 m^3 per day. Water supply for the development will be taken from the existing groundwater wells on site (BH1). The well has adequate capacity for the proposed development.

3.3.3 Surface Water

It is intended to restrict surface water discharge to the receiving water to green field run off rates. This will be achieved by the inclusion of an attenuation tank within the proposed development. See Attachment 2 for stormwater/surface water run-off calculations. See Figures 15 and 16 for run-off management proposals.

3.3.4 Wash Water

The anticipated wash water arising from washdown processes is outlined in Table 4 below. This will be removed from site at appropriate intervals to the Fermoy Wastewater Treatment Plant. A holding tank will be provided for temporary storage on site (see Figure 16).

Table 4 Washdown water.

	Per Week		Per Month		Per Year	
Water Required for	**Litres**	**Gallons**	**Litres**	**Gallons**	**Litres**	**Gallons**
Incoming Waste - Foul water from Skips						10,000
Skip Washing						20,000
Machinery Washing	1,807	397	7,830	1,722	93,964	20,669
Timber Floor Washing	350	77	1,516	333	18,190	4,001
Waste Area Floor Washing	350	77	1,516	333	18,190	4,001
Truck Washing	3,032	667	13,137	2,890	157,643	34,677
Annual Total						93,348

3.3.5 Foul Drainage

Domestic foul arising is estimated at c. 51,500 gallons per annum and a BOD of 156 kg. This will be dealt with by way of septic tank and soakaway (Figures 15 and 16).

3.3.6 Heating

Heating of office buildings and transfer building will be by way of woodchip boiler.

3.3.7 Telecommunications

Telecommunications services will be provided for the voice and data requirements of the proposed development. A connection will be provided to the local telecommunications network (Eircom or equivalent). It is not envisaged that the proposed development will have any significant impact on existing telecommunications infrastructure.

3.3.8 Rights of Way and Wayleaves

No right of way or wayleave would be interfered with by the realisation of this project.

3.3.9 Waste Management

Domestic waste arisings are estimated at c. 150 kg per week. Any waste recoverable will be treated on site and any residual waste be sent offsite to other waste management facilities.

3.3.10 Water Quality

This is addressed in Chapter 5.0 of this EIS.

3.3.11 Site Utilities and Residual Impacts

The proposed services will meet the projected needs of the development. Material assets will be upgraded as a result of the proposed development.

Chapter 4.0 – Cultural Heritage

4.1 Introduction

The proposed development will comprise the construction of a new building in an existing waste transfer facility in Cullenagh, Fermoy, Co. Cork. The purpose of the assessment is to evaluate the potential impact this proposed development would have on the cultural heritage of the proposed development site and surrounding area. It is based on a field inspection of the proposed development site and a desktop appraisal of the surrounding area.

There are no recorded archaeological sites within the proposed development site listed in the Record of Monuments and Places (RMP) for Co. Cork. There are 15 archaeological sites listed in the RMP within the 2 km radius study area surrounding the proposed development site. These monuments reflect the archaeological background of the area surrounding the proposed development site and possibly the archaeological potential of the development site itself (Figure 13).

Some terms used in this report are explained hereunder:

- **Cultural Heritage:** The term cultural heritage in this EIS encompasses the following topics: Archaeology, Folklore, Tradition, History and Monuments/Features.
- **Study Area:** The desk study examined documentary sources for the area (known as the study area) extending for a 2 km radius from the proposed development site.

4.2 Assessment Methodology

The care of archaeological monuments in Ireland has its beginnings in the nineteenth century with the establishment of the Ancient Monuments Protection Act of 1882. This was the first piece of legislation in the United Kingdom that sought to protect monuments of archaeological importance. This Act was upgraded in 1892 to provide legal protection to a wider range of monuments, including medieval structures. Various Acts followed (The Local Government Act, 1898; The Land Acts of 1903 and 1923) which sought to broaden the scope of what was considered to be of archaeological importance and to give more protection to these sites. The National Monuments Act 1930 repealed all previous Acts and is at present the principal statute which governs the care of monuments in the Irish Republic. Various amendments have been made to the Principal Act of 1930; 1954, 1987, 1994 and 2004. Archaeology and architectural heritage are protected under the National Monuments and National Monuments (Amendment) Acts 1930-2004, and the Planning and Development Acts 2000-2001.

This assessment is based on a field inspection of the proposed development site and a desktop appraisal of the surrounding area.

4.2.1 Field Inspection

An inspection of the development site was carried out on the 23rd October 2007. The primary purpose of the site inspection was to identify any possible features of archaeological or cultural heritage significance, which have not been previously recorded.

4.2.2 Desktop Study

The desktop study includes the following components:

- Sites and Monuments Record (SMR) – This record was originally compiled by the OPW and is now maintained by the National Monuments Service of the Department of the Environment, Heritage and Local Government. It comprises a list of all known archaeological sites and monuments in the country and their location. The SMR also lists and locates possible archaeological sites and it lists sites known to occur in an area but with no exact location. It is accompanied by a set of constraint maps on which each site is marked.
- Record of Monuments and Places (RMP) – This record was compiled in accordance with The National Monuments Act 1994. It provides an updated list of all known archaeological monuments and places of archaeological interest, with an accompanying set of constraint maps. The numbering system consists of two parts: the first part is the county code (CO for Cork) followed by the Ordnance Survey map number (six-inch to the mile scale); the second part is the number of a circle surrounding the site on the RMP map, e.g. CO035-041 refers to circle 041 on OS sheet 35 for County Cork. The area within the circle is referred to as the Zone of Archaeological Potential (ZAP) for that site. Its diameter can vary depending on the size and shape of the site.
- The Archaeological Inventory of Co. Cork – The county inventories are a follow-up phase to the SMR where all the listed sites were visited and surveyed. Some of the SMR sites were found to be non-archaeological in nature and were not included in the Inventory. Sites discovered since the publication of the SMR are included and many of these are now listed in the RMP. The Inventory for Co. Cork is published in four volumes. Volume 4: North Cork (published in 2000) was used for this study. The descriptions of the recorded archaeological sites within the study area are included in Attachment 3A.
- The National Museum of Ireland Archives (NMI) – These files were consulted for all the townlands within the study area. The topographical files contain the reports, including correspondence, present location and occasionally, illustrations of archaeological material recovered throughout the country. There were no finds listed in the topographical files for any of the townlands in the study area.
- Database of Irish Excavation Reports (www.excavations.ie) – This web site provides a database of summary reports of all archaeological excavations and investigations in Ireland undertaken since 1970. The database was searched for any excavations that were undertaken in any of the townlands within the general environs of the proposed development site. The database contains no entries for any of the townlands within the study area. A number of previously unrecorded archaeological sites were uncovered and excavated prior to the construction of the N8 Rathcormac–Fermoy Bypass in the area outside the east end of the study area. These excavations have not been published to date.
- The County Cork Development Plan 2003 – The Record of Protected Structures (RPS) in the plan was consulted and there are no protected structures within the study area.
- National Inventory of Architectural Heritage (NIAH) – The work of the NIAH involves identifying and recording the architectural heritage of Ireland, from 1700 to the present day. The inventory for County Cork has not been published to date.

- Documentary Sources – The available literary sources were consulted, including local histories and journals.
- Cartographic Sources – The three editions of the Ordnance Survey six-inch maps were consulted for the study area. The first edition was published in 1845, the second edition was published in 1905 and the third edition was published in 1935.

4.3 Existing Site

The proposed development site is located in Cullenagh townland, County Cork, and comprises an existing waste transfer facility. It is proposed to construct a new waste transfer building in the east end of the existing facility. The area to be impacted by the proposed development is described below.

4.4 Archaeological and Historical Background

4.4.1 Overview of the Study Area: Receiving Environment

The following section provides an outline of the archaeological, historical and cartographic evidence record of the study area from the prehistoric to modern periods. The proposed development in Cullenagh townland is within the parish of Fermoy and the barony of Condons and Clangibbon. The town of Fermoy is located 3 km to the northwest of the proposed development site. There are no recorded archaeological monuments listed in the RMP for Co. Cork within the proposed development site (Figure 13). The closest recorded archaeological monuments to the proposed development site are a *fulacht fiadh* (CO-035-47-01) and a moated site (CO-035-47-02) both located c. 0.55 km to the northwest in Coolmucky townland.

The proposed development site is situated on elevated ground to the east of the Nagle Mountains, on the southern ridge of the Blackwater Valley. It is in an Old Red Sandstone geological region and the soil profiles in this area are dominated by well-draining brown podzolics. This region of north Cork has a wide land use capability and dairying and arable farming are the main agricultural activities (Aalen *et al.*, 1997, 18).

4.4.2 Archaeological and Historical Context

The proposed development site contains no archaeological sites listed in the RMP (Figure 13). The recorded archaeological sites within the 2 km radius study area are listed in the RMP for County Cork, as set out by the Department of the Environment, Heritage and Local Government (DoEHLG), and, as such, have statutory protection under the National Monuments Acts 1930-2004. The 2 km radius study area surrounding the proposed development site contains evidence for human settlement from the Bronze Age onwards but there is evidence for settlement in the wider River Blackwater catchment area from the Early Mesolithic onwards. The majority of the sites recorded within the study area generally date to the late prehistoric and early medieval periods. The *Archaeological Inventory of County Cork* has been published and Attachment 3A contains its descriptions of the RMPs within the study area. There are no archaeological investigations listed within the study area in the annual *Excavations Bulletins* publications.

The following section outlines the background to the study area and uses the dating framework for the Irish archaeological record as outlined in *Guidelines for authors of reports on Archaeological Excavations* (DoEHLG 2006):

- Prehistory (c. 7000 BC to 400 AD)
  - Mesolithic (c. 7000 to 4000 BC).
  - Neolithic (c. 4000 to 2400 BC).
  - Bronze Age (c. 2400 to 500 BC).
  - Iron Age (c. 500 BC to 400 AD).

- Historic Period
  - Early Medieval Period (fifth to twelfth century AD).
  - High Medieval Period (twelfth century to 1400 AD).
  - Late Medieval Period (1400 to sixteenth century).
  - Post Medieval Period (seventeenth century +).

Table 5 List of RMPs within the study area.

RMP	Site Type	Townland	Distance
CO-035-41---	Circular enclosure	Coolroe	c. 1.5 km NW
CO-035-46---	Circular enclosure	Knockananig	c. 1.9 km W
CO-035-47-01	Fulacht fiadh	Coolmucky	c. 0.55 km NW
CO-035-47-02	Moated site	Coolmucky	c. 0.55 km NW
CO-035-48---	Possible ringfort	Ballynahina	c. 0.6 km E
CO-035-49-01	Hillfort	Corrin/Coolcarron	c. 1.5 km E
CO-035-49-02	Cairn	Coolcarron	c. 1.5 km E
CO-035-49-03	Short cist	Coolcarron	c. 1.5 km E
CO-035-69---	Holy Well	Corrin	c. 1.9 km E
CO-035-75---	Fulacht fiadh	Coolcarron	c. 1.8 km NNE
CO-035-77---	Fulacht fiadh	Coolcarron	c. 2 km NNE
CO-035-79---	Possible souterrain	Coolmucky	c. 1.9 km N
CO-035-80---	Possible souterrain	Coolmucky	c. 1.9 km N
CO-035-81---	Fulacht fiadh	Ballynoe	c. 1.3 km NE
CO-035-99---	Bullaun stone	Ballynoe	c. 1.62 km NE
CO-035-100---	Early ecclesiastical enclosure	Ballynoe	c. 1.5 km NE

Prehistory

The study area does not contain any recorded sites dating to the Mesolithic and Neolithic periods. However, a number of prehistoric flint scatters, including Early Mesolithic examples, were noted during a field-walking project in the River Blackwater valley region, which was carried out by the Archaeology Department, UCC during the 1980s (Power & Lane 2000, 2). A scatter of late prehistoric flint artefacts was identified on the north side of the River Blackwater in Castlehyde East townland (CO035-063), c. 2.2 km to the north of the proposed development site.

The RMP lists four fulachta fiadh within the study area. These are the most numerous prehistoric sites in Ireland and, of the over 4,500 recorded examples, 3,000 are in County Cork (*ibid.*). Radiocarbon dating of excavated examples has generally produced Bronze Age dates and this includes a number of excavated examples in North Cork (Brindley *et al,* 1989-90; Power & Lane 2000, 43). Fulacht fiadh are typically found close to a water source and survive as horseshoe-shaped mounds surrounding a trough, which is often found to be stone or timber-lined. They functioned by filling the trough with water, which was then heated by

dropping hot stones into it. The water reached boiling point in a relatively short time and experiments have shown that this process could be used to cook meat (O'Kelly 1954, 105-55). The hot stones shattered on entering the cold water, and after use, the trough was cleaned out and the burnt stones were thrown behind and to the sides of the trough, which resulted in a distinctive horseshoe-shaped mound. Over time many of the mounds have been ploughed out and now survive as level spreads of black earth with burnt stones scattered through them. While these sites are widely interpreted to have functioned as cooking sites, a number of alternative interpretations have been forwarded, such as their potential uses as baths/saunas, dyeing, brewing and leather processing sites.

There are five recorded hillforts in County Cork and one of these is located c. 1.5 km to the east of the proposed development site on the summit of Corrin Hill (CO035-049-01). These large hilltop enclosures are typically assigned to the Late Bronze Age but their date is difficult to determine without excavation. It has been estimated that there are between 60-80 hillforts in Ireland and three classifications have been identified: univallate (single line of defence), multivallate (typically two to three lines of defence) and inland promontory forts (Raftery 1994, 38). The example to the east of the proposed development site is known as Carn Tigherna and has been classified as a univallate hillfort (*ibid.*). It comprises a large stone rampart (maximum height 1.6 m) enclosing an irregular oval area measuring c. 2 ha. The rampart and the interior of the site have been disturbed by a forestry plantation. A cairn (CO035-049-02) in the centre of the enclosed area survives to 22 m north-south by 42 m east-west and 2.7 m in height. This cairn was disturbed in the nineteenth century when 'several hundred tons of stone' were removed and a short cist burial (CO35-049-03), which contained an urn, was uncovered during this work in 1832 (Borlase 1897, 13). Windele recorded that a second urn, which contained ashes, was found in an adjoining chamber in 1837 and his description of the urn indicates that it was a vase food vessel (Doody 1986, Cork No. 16).

Early Medieval Period (Fifth to Twelfth Century)

There are a number of recorded sites dating to the early medieval period within the study area. The settlement patterns during this period were rural based and were characterised by the basic territorial unit known as a tuath. There is one possible ringfort (CO-035-46---) recorded within the study area, in Ballynahina townland. Ringforts are one of the most widespread and common monument types in the country and typically date to the early medieval period. The terms rath and lios are often used to denote ringforts, which are enclosed by earthen banks and ditches, while examples with enclosing stonewalls are referred to as caiseal or cathair. Ringforts comprise a circular area that is typically enclosed by a single circular earthen bank surrounded by a ditch but there are also multivallate ringforts that contain two or three enclosing banks and ditches. The diameter of the enclosed area ranges from between 15 m and 60 m. The evidence from excavated examples indicates that ringforts were farmsteads that contained dwellings and outbuildings and craft industrial areas within the enclosed area. The results of intensive agriculture and industrial development in recent centuries has significantly reduced the number of ringforts surviving in the landscape but many levelled examples retain below ground features that can be detected in aerial photographs or by geophysical surveying.

Some ringforts are associated with systems of artificial underground tunnels and chambers known as souterrains. These underground sites may also be found in isolation or in association with unenclosed settlements. The main theory relating to souterrains is that that

they were temporary hiding places at times of attack but they may also have functioned as storage cellars. The evidence from archaeological excavations carried out on these sites indicates that the majority date to the early medieval period. Due to the concealed nature of these underground sites many unrecorded examples are often only accidentally discovered following the collapse of their roofs (Clinton 2001). There are two possible souterrains (CO035-79--- and CO-035-80---) recorded within the study area, both in Coolmucky townland.

There are two sites listed in the RMP as circular enclosures (CO035-41--- and CO-035-46---) within the study area, in Coolroe and Knockananig townlands. The term enclosure is a general classification given to enclosed sites whose exact nature is unclear. It is possible that these sites may range in date from the prehistoric (ring-ditches/barrows) to the medieval (ringforts/churches/ringworks) periods. Enclosures may also be the remains of post-medieval demesne features, such as tree rings, but it is likely that most sites classified as circular enclosures in the RMP are the remains of ringforts.

Christianity was first introduced into Ireland during the late fourth century AD and had become widely established during the second half of the sixth century AD. The early Christians worshipped in small churches of stone or wood, which often formed the centre point for a settlement of monks or a monastery. These ecclesiastical settlements were usually enclosed by earthen banks and ranged between 40 m and 200 m in diameter. There is one early ecclesiastical enclosure (CO-035-100---) recorded within the study area, in Ballynoe townland. There is a bullaun stone (CO035-099---) incorporated into the wall of a farm building located 140 m to the northwest of the early ecclesiastical enclosure. The Irish word bullán means a round hollow in a stone and bullaun stones are associated with ecclesiastical sites (Power & Lane 2000, 448). Their function is unknown but there are surviving traditions that they had curative properties similar to those assigned to holy wells. The tradition of visiting wells dates to the very beginnings of Irish Christianity, but most probably has its origin in pre-Christian ritual activities. The majority of the 'wells' are springs or depressions in rocks where rainwater collects, some have more recently constructed stone or concrete surrounds. There is one holy well (CO-035-69---) recorded within the study area, in Corrin townland.

The High Medieval Period (Twelfth Century to 1400 AD)

The study area contains one recorded archaeological site dating to the high medieval period. This is a moated site (CO035-47-02) located 0.55 km to the northwest of the proposed development site in Coolmucky townland. These are square or rectangular enclosures constructed along frontier areas by Anglo-Norman settlers during the late thirteenth/early fourteenth-centuries (Barry 1987, 84-95). The defences were formed by a wide fosse, which was often waterlogged, and an internal bank. The internal buildings within moated sites were typically of timber construction and do not leave any surface trace.

The Late Medieval (1400–1600 AD) and Post-Medieval Periods (1600 AD+)

There are no recorded archaeological monuments dating to the late medieval and post-medieval periods within the study area surrounding the proposed development site. The first edition OS six-inch map of 1845 shows the area to be impacted by the proposed development as part of a large sub-rectangular field in rough pasture. The existing third class roads to the

west and east of this field are present on this map. The detail on the second edition OS map of 1905 and the third edition OS map of 1935 indicates that the proposed development site continued to be in use as undeveloped, rough pasture land into the twentieth century.

4.5 Site Inspection (including Visual Assessment)

The proposed development site was inspected on the 23rd October 2007 in dry, dull weather conditions. The primary purpose of this field inspection was to assess the cultural heritage environment in which the development is proposed. The waste transfer facility began operations in 1982 in an existing agricultural compound and has gradually expanded up to the present day. The facility contains a large galvanised metal shed, an office building and a concrete yard surface. The area to be impacted by the proposed new water transfer building comprises part of the concrete yard to the east of the existing buildings (Attachment 3B – Plate 1). The ground level in the yard area is lower than in the fields to the north, south and east and the concreted yard surface appears to have been created on previously reduced ground (Attachment 3B – Plates 2 and 3). The east end of the area to be impacted comprises an area of raised ground adjacent to the embankment bounding the east end of the facility. This area is partially obscured by stockpiles of earth and stones but it appears that the ground levels in this area have been reduced to the level of the underlying natural subsoil and bedrock. This ground reduction appears to have been the result of machine traffic in this area rather than deliberate topsoil stripping. There were no potential archaeological features or finds noted during an inspection of the area to be impacted by the proposed development.

The existing waste transfer facility is situated on the west side of a low ridge and is bounded by a tree-lined earthen embankment to the east, which was created to screen the facility. The level ground surface within the facility appears to have been created following the reduction of the ground surface on the side of the ridge. This has resulted in the facility being in a somewhat sunken setting and it is barely visible from outside the east, south and north site boundaries (Attachment 3B – Plate 4). The views towards the proposed development from the summit of the hillfort (CO-035-49-01) on Corrin Hill, c. 1.5 km to the east, were assessed as part of the site inspection (Attachment 3B – Plates 5 and 6). The setting of the existing facility on the west-facing slope of a ridge effectively removes any visual trace of the facility from the hillfort.

4.6 Potential Impacts

The proposed development site will have no impact on any archaeological sites recorded in the RMP for County Cork and it does not extend into the zone of archaeological potential for any recorded archaeological sites. The topographical files of the National Museum of Ireland do not list any archaeological objects in the townland containing the proposed development site (Cullenagh) or in the townlands in the surrounding study area. The consulted historical and cartographic sources do not record the presence of any archaeological sites in the vicinity of the proposed development site. There were no visible above ground features of archaeological potential identified during the field inspection of the proposed development site and the ground levels in the area to be impacted have been previously reduced. Therefore, there is no evidence for any recorded or potential archaeological sites within the proposed development site. The development of the existing waste transfer facility has resulted in the reduction of the ground levels in the area to be impacted down to subsoil and bedrock levels. This is likely to have removed any unrecorded archaeological features or

finds that may have existed on the site. It is therefore concluded that the proposed development will have no impact on any archaeological features or finds.

There are no archaeological sites visible from the proposed development site. The proposed new building will not extend above the rooflines of the existing buildings in the facility. The most prominent archaeological site within the study area is the hillfort on Corrin Hill (CO-035-049-01), located c. 1.5 km to the east. There is no inter-visibility between this hillfort and the proposed development site, which is situated on reduced ground on the west-facing slope of a low ridge. It is screened by the top of the ridge and by the tree-lined embankment that forms the eastern site boundary. It is therefore concluded that the proposed development will have no visual impact on any archaeological sites.

4.7 Mitigation

Due to the absence of any evidence for the presence of any archaeological features or finds within the proposed development site and the disturbed nature of the area to be impacted, it is recommended that the proposed development proceed with no further archaeological intervention. In the event that there is any removal of the existing screening measures in place (embankment, tree lines, etc) it is recommended that they be replaced with new screening in order to mitigate any potential visual impact on the hillfort on Corrin Hill.

These recommendations are subject to the approval of the National Monuments Service (Department of Environment, Heritage & Local Government) and the Planning Authority (Cork County Council).

Chapter 5.0 – Surface and Ground Water

5.1 Introduction

This section considers the potential water quality, both surface and ground water, impacts of upscaling of operations at the Waste Recovery Services (Fermoy) Ltd operation at Cullenagh, Fermoy, Co. Cork (Figures 14 to 16 and Figure 24).

5.2 Monitoring Ground Water Quality

As part of the existing licence conditions Waste Recovery Services (Fermoy) Ltd monitor the groundwater on a quarterly basis in two monitoring wells (BH1 and BH3) as well as in four domestic wells: Dunlea's, Coughlan's, Riordan's and O'Leary's. A very wide range of parameters are analysed and have been since 2003. In addition, the Environmental Protection Agency (EPA) also monitor these wells each year independently. When the current site licence was being applied for the four domestic wells were also tested to establish a typical baseline (that was in 1999). Table 6 summarises the monitoring data available since 2003, including the EPA data, and presents them in the form of the median of all results. This is presented along with the 1999 snapshot 'baseline' data for comparison. These latter data are limited compared to the current monitoring data in terms of parameters, but do overlap for several key parameters. The 1999 data also lack details for monitoring boreholes (BH1 and BH3) that were not drilled at the time. Nevertheless, the data help to highlight continuities in the groundwater quality from before the current operation began up to the present time. For example a comparison of the 1999 data and the medians for the 2003-2007 period suggests that, with a few notable exceptions, there has been little if any change in several parameters including pH, conductivity, sodium, potassium, chloride, TON (nitrate + nitrite), and to a lesser extent for dissolved oxygen, ammonia and manganese (which can be quite variable parameters in any case).

The exceptions to these trends include: (i) the conductivity, pH, sodium and potassium at Riordan's, all of which were higher in the 1999 sample. This is because a potassium-based water treatment chemical is used intermittently by that well owner to neutralise the naturally slightly acidic water in the well. This has been used since 1999 also but only at a frequency that means it does not show up in the median results. Riordan's did not start treating their water until May 2006 approximately. The 1999 Dunlea result for chloride is higher. Ammonia is a variable parameter often in wells and in some wells it was higher in the 1999 samples, whereas at Dunlea's the median was higher. Given that the levels are not very high at any time and that this parameter is quite variable no particular significance can be read into these results. With regard to manganese, the 1999 results clearly show that this parameter is naturally high in some wells in the area and therefore the subsequent variable and high results cannot be linked to the operation of the facility.

Other parameters were not measured in the 1999 baseline so little can be said of these. However, with few exceptions these other parameters tend to be lower in concentration than the corresponding Drinking Water standard. This is the case for the following parameters: sulphate, TOC, barium, boron, calcium, magnesium, cadmium, copper, chromium, lead, mercury, nickel and zinc. This would suggest that in general these parameters do not indicate that the facility is adversely impacting groundwater in respect of these parameters.

Table 6 **Results for Annual and First Quarter (28-02-2008). Groundwater Monitoring at Waster Recovery Services (Fermoy) Ltd, Cullenagh. Table includes Long-Term Median values and Drinking Water Standards for Comparison. 1999 figures highlighted in blue show a significant divergence from the long-term median value for that site. Drinking Water Standards in red indicate that long-term median result does not comply. Note: TON = total oxidised nitrogen.**

			BHI	BH3	Dunlea	Riordan	Coughlan	O'Leary
Temperature	°C	1999	10.4	10.3	13.4	10.9	10.7	10.8
		Median	10.4	10.3	10.8	10.6	10.6	10.0
		Drinking Water	25	25	25	25	25	25
Conductivity	µS/cm	1999	523	253	535	754	141	114
		Median	523	253	615	121	121	110
		Drinking Water	1500	1500	1500	1500	1500	1500
pH		1999	5.6	5.8	5.4	8.27	4.9	5.2
		Median	5.6	5.8	5.9	5.3	5.3	5.7
		Drinking Water	>6.5-<9.5	>6.5-<9.5	>6.5-<9.5	>6.5-<9.5	>6.5-<9.5	>6.5-<9.5
Sodium	mg/l, Na	1999	26	14	30.3	15.1	8.1	8.4
		Median	26	14	35	9	9	9
		Median	22.6	23	7.1	0.7	0.7	0.9
Potassium	mg/l, K	1999	22.6	2.3	8.3	210	0.74	0.74
		Median	22.6	2.3	7.1	0.7	0.7	0.9
		Median	33	23	38	12	12	13
Chloride	mg/l, Cl	1999	33	23	51	16	15	13
		Median	33	23	38	12	12	13
		Drinking Water	250	250	250	250	250	250
Sulphate	mg/l, SO_4	1999	-	-	-	-	-	-
		Median	137	30	158	18	12	6
		Drinking Water	250	250	250	250	250	250
TON	mg/l, N	1999	-	-	4.4	5.4	4.6	4.2
		Median	5.8	8.8	4.2	4.1	3.6	4.3
		Drinking Water	11.3	11.3	11.3	11.3	11.3	11.3
Ammonia	mg/l, N	1999	-	-	0.006	0.092	0.003	0.023
		Median	0.223	0.030	0.041	<0.030	<0.030	<0.030
		Drinking Water	**0.3**	0.3	0.3	0.3	0.3	0.3
Total-P	µg/l, P	1999	-	-	36	8	6	34
		Median	9	34	54	54	9	43
		Drinking Water	30	30	30	30	30	30
TOC	µg/l, P	1999	-	-	-	-	-	-
		Median	6.0	2.9	5.71	3.2	2.43	2.30
			no abnormal change					

			BHI	BH3	Dunlea	Riordan	Coughlan	O'Leary
Manganese	µg/l, Mn	1999	-	-	1640	720	190	9
		Median	3869	206	1289	70	70	12
		Drinking Water	**50**	**50**	**50**	**50**	**50**	50
Iron	µg/l, Fe	1999	-	-	<100	<100	<100	450
		Median	60	50	56	50	50	55.0
		Drinking Water	200	200	200	200	200	200
DO	% sat	1999	-	-	6	30	59	58
		Median	37	68	33	33	51	74
		Drinking Water	no abnormal change					
TC	no./100ml	1999	-	-	300	<1	<1	3
		Median	4.5	2	33.5	2.5	2.5	1.0
		Drinking Water	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**
FC	no./100ml	1999	-	-	5	<1	<1	3
		Median	<1	<1	<1	<1	<1	<1
		Drinking Water	<1	<1	<1	<1	<1	<1
Barium	µg/l, Ba	1999	-	-	-	-	-	-
		Median	67	74	86	<50	<50	<50
		Drinking Water	1000	1000	1000	1000	1000	1000
Boron	µg/l, B	1999	-	-	-	-	-	-
		Median	104	50	91	82	82	<50
		Drinking Water						
Calcium	mg/l, Ca	1999	-	-	-	-	-	-
		Median	44	22	69	7	7	5
		Drinking Water	200	200	200	200	200	200
Magnesium	mg/l, Mg	1999		-	-	-	-	-
		Median	11	4	14	2	2	3
		Drinking Water	50	50	50	50	50	50
Cadmium	µg/l, Cd	1999	-	-	-	-	-	-
		Median	0.5	0.1	0.1	0.1	0.1	0.1
		Drinking Water	5	5	5	5	5	5
Copper	µg/l, Cu	1999	-	-	-	-	-	-
		Median	<5	<5	8	13.5	13.5	73
		Drinking Water	2000	2000	2000	2000	2000	2000
Chromium	µg/l, Cr	Median	-	-	-	-	-	-
		1999	6	5.5	5.5	<5	<5	5.0
		Median	<1	<1	<1	2.5	2.5	2.0
Lead	µg/l, Pb	1999	-	-	-	-	-	-

			BHI	BH3	Dunlea	Riordan	Coughlan	O'Leary
		Median	<1	<1	<1	2.5	2.5	2.0
		Drinking Water	10	10	10	10	10	10
Mercury	µg/l, Hg	1999	-	-	-	-	-	-
		Median	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		Drinking Water	1	1	1	1	1	1
Nickel	µg/l, Ni	1999	-	-	-	-	-	-
		Median	13	6	9	8	8	9
		Drinking Water	20	20	20	20	20	20
Zinc	µg/l, Zn	1999	-	-	-	-	-	-
		Median	30	15	45	35	35	91
		Drinking Water	5000	5000	5000	5000	5000	5000

Note: (i) The Total-Phosphorus median is in fact the dissolved reactive phosphorus median because the data for total phosphorus generally had very poor detection limits over the years compared to DRP.

In recent times there have been occasionally high levels of Total Coliform bacteria in a number of wells, particularly BH1 and BH3 but to a lesser extent at Dunlea and Coughlan's wells also. The reason for these elevated results is not know but it has been suggested that it may relate to soil conditions or perhaps to the rather exposed nature of the wellheads in question. This latter situation has been rectified and an improvement is expected going forward. Despite occasionally elevated Total Coliform levels Faecal Coliform levels (which are derived from human or animal sewage) were generally at or below acceptable levels or occasionally very marginally above.

In conclusion, it is believed that the current facility at Waste Recovery Services (Fermoy) Ltd is having little if any adverse impact on the quality of local groundwater sources and therefore that the proposed upgrading of the facility will continue this situation.

5.3 Foul Water and Surface Water

All foul water from the process shed and surface water from hardstand areas is currently collected in dedicated storage tanks and transported for treatment to the Fermoy Waste Water Treatment Plant (WWTP) and so has no adverse impacts on the quality of surface or groundwater in the area.

5.4 Relevant Characteristics of the Proposal

The upgraded facility will accept all the same non-hazardous waste as at present. The bulk of the waste, especially any thought likely to generate organic pollution, will be sorted and recovered in a roofed shed to avoid generating run-off from rain falling on the waste or leaching out of it. Other waste such as wood chip suitable for animal bedding, which would not give rise to organic run-off, may be temporarily handled or stored in an open concrete area. Rubble may also be stored externally.

5.4.1 Foul Water

The shed will have its own dedicated drainage system, which will direct any run-off derived from (i) the waste itself, (ii) washing down the floors, or (iii) spraying to reduce dust to a dedicated 'foul-water' storage tank. The waste from the latter will be tankered under licence to the Fermoy UDC Waste Water Treatment Plant for secondary treatment, which is a continuation of the current arrangement. This waste stream is occasionally high in BOD, suspended solids and ammonia and clearly needs to be handled in this manner.

5.4.2 Surface Water

There is limited water analysis data of surface run-off from non-roofed area from the existing operation. That which is available (Table 7) shows fluctuating and occasionally high BOD and ammonia figures but very low in oil, fats and grease as well as mineral oil and diesel oil. However, while these data are indicative, they are not exactly equivalent to the proposed upscaled facility because unlike the current situation where some waste that may give rise to organic run-off is handled in these open areas, at least temporarily, this will all be handled under roof in the new upscaled facility and therefore not contribute to run-off. Thus, in the new layout, surface run-off from this open hardstand area is expected to be much lower both in BOD and ammonia than in the existing set-up.

Table 7 Water quality results from the 2007 monitoring of surface water run-off holding tanks at Waste Recovery Services (Fermoy) Ltd (DRO=diesel range organics; OFG = oils, fats & grease).

		pH	BOD (mg/l)	SS (mg/l)	Amm (mg/l, N)	OFG (mg/l)	Mineral Oil (µg/l)	DRO (µg/l)
31-Jan-08	S1	7.52	12	30	8.3	<1	<10	-
25-Oct-07	S1	-	59	71	15.4	<1	<10	<10
25-Oct-07	S2	-	12	49	2.5	<1	<10	<10
29-Nov-07	S1	7.24	-	22	19.5	<1	<10	<10
29-Nov-07	S2	7.48	-	24	9.2	<1	<10	<10
13-Dec-07	S1	7.17	4	93	10.1	<1	<10	<10
13-Dec-07	S2	6.96	199	315	14.8	<1	<10	<10

5.5 Receiving Environment

The immediate area of the development has no surface water drainage channels. A small stream to the northwest would be used to drain any treated run-off from the site. The stream in question is the western branch of a small stream, which flows in a wooded glen eventually passing Glenabo Bridge and joining the River Blackwater upstream of Fermoy on the southern bank of the Blackwater at W7955 9800 (Irish National Grid). The stream was sampled immediately downstream of Glenabo Bridge (27-06-2008) where it was 2 m wide on average and 10 cm deep. The banks were low and eroding comprising gravel in particular. The instream substrate included scattered small boulders, frequent cobbles, pebble and coarse sand. The habitat was a shallow cascading flow over this substrate (Plate 1). Due to the heavy shade cast by overhanging trees, there was no in-channel vegetation. Bankside vegetation comprised sycamore, ash and alder with an understorey of bramble, nettle, ferns and a range of woodland herbs. The water quality as assessed by macroinvertebrate collections was Q4 using the EPA biotic index. Q4 indicates non-polluted, although not pristine quality. Table 8 presents the macroinvertebrates collected in a two-minute moving kick-sample taken with a pond net at this site. The habitats would be suitable for brown trout and possibly salmon in the very lower reaches. Brook lamprey might also be present in this stream.

Plate 1. Small stream at Glenabo Bridge (view upstream) – 27-6-2008.

Table 8 Macroinvertebrates collected in a 2-minute kick-sample at Glenabo Bridge (June 27th 2008).

Taxa	EPA Quality Category	Site 1
MAY FLIES (Ephemeroptera)		
Baetis sp.	C	+++/+
Ephemerella ignita	B	+++
CADDIS FLIES (Trichoptera)		
Rhyacophila sp.	C	++/+
Hydropsyche sp.	C	+
Polycentropidae	C	++
Sericostoma personatum	B	+
Goeridae	B	++/+
Glossosomatidae	C	++
Limnephilidae	C	+
TRUE FLIES (Diptera)		
Chironomidae	D	+/+
Dicranota	C	+
Tipulidae	C	+
Simuliidae	C	+++
BEETLES (Coleoptera)		
Haliplidae	C	
Elmidae	C	+/+
F/W SHRIMPS (Crustacea)		
Gammarus sp.	C	++++D
SNAILS (Mollusca)		
Sphaeriidae	D	+
SEGMENTED WORMS		
Oligochaets	E	+

+ = present, ++ = frequent, +++ = common ++++ = abundant, D = dominant.

5.6 Potential Impacts

5.6.1 Overview

The proposed development will potentially impact the environment during the construction phase and during the operation phase. During the operation phase there is the potential for suspended solids and bulk liquid cement to find their way to surface water drainage and from there to the small stream at Glenabo Bridge. During the operation phase there is a possibility for the contamination of groundwater and surface water. In reality, however, it is thought that both these eventualities are very low, the first because of the lack of nearby surface drainage and the second because the current operation appears not to have adversely impacted either surface or ground waters. Nevertheless, these matters will be examined in more detailed in the next sections and mitigation measures proposed in order to reduce or eliminate these eventualities.

5.6.2 Construction Phase

The proposed upgrade in the Waste Recovery Services (Fermoy) Ltd facility will involve significant earth works and the pouring of considerable amounts of bulk liquid cement. Earthworks sometimes require exposing or stockpiling considerable amounts of soil which, during wet weather, can generate solids laden run-off which can find its way to streams where they can damage fisheries habitats, at least in the short-term, and potentially have direct adverse impacts on fish by damaging gills or smothering spawning beds. At the site of the proposed development there are no obvious surface drainage channels and the nearest stream, which is very small, is about 650 m from the site. In these circumstances the risk is

low. However, even very small drainage ditches, e.g. in fields or along the local by-roads, can eventually end up in local streams so basic awareness must be exercised at all times (see Section 5.7 - Mitigation).

Bulk liquid cement used for laying hardstand areas could cause serious fish kills if it enters watercourses. Again, because of the remoteness of the work from watercourses the risk of this occurring is low, but as with solids, basic precautions must be taken to eliminate this risk (see Section 5.7 - Mitigation).

5.6.3 Operation Phase

Contaminated run-off from the operation will be retained on site in foul-water storage tanks which will be regularly emptied by tanker and the contents transported to Fermoy WWTP for treatment, i.e. a continuation of the current activity. However, this will be more thorough, because all waste likely to give rise to contaminated run-off will be handled entirely under roof, thus eliminating the possibility of run-off and pollution from this source.

In addition, run-off from the truck-steam washing area will be directed to an oil interceptor and from there to the foul-water storage tanks.

Surface water drainage, from hardstand areas, is expected to be very low in contamination, i.e. low BOD and ammonia but perhaps with occasionally elevated suspended solids. If this reaches surface water drainage areas untreated then there is a possibility that it would cause a low level of nutrient enrichment and add to the overall siltation levels in watercourses. However, this will receive basic treatment to prevent or very significantly reduce this risk (see Section 5.7 - Mitigation).

5.7 Mitigation

5.7.1 Construction Phase

The main mitigation here will be good site management practise during the construction of the new facility with a special emphasis on prevention of solids, cement and oil run-off during the construction phase.

- Main earthworks to be undertaken in the May to September period when the risk of run-off is normally lower.
- Soil will not be stockpiled within 20 m of surface drains.
- All generators and pumps etc will be placed on drip-trays to prevent soil and hence groundwater being contaminated with hydrocarbons
- On-site fuel storage will be in a locked and bunded area to prevent spillages reaching groundwater or vandalism which would result in the same.
- Bulk liquid cement will not be batched on site or, if so, the plant will be well removed from surface drainage and bunded.

- All shuttering will be well secured and bulk cement pouring exercises will be monitored at all times to prevent cement spillages.

Operation Phase

Surface water drainage will be directed to a vegetated infiltration, settlement pond facility, which will outlet to the nearest surface water drainage. This facility will consist of normal grassed soil bunded around the edges to form a settlement pond and infiltration basin that will allow any residual nutrients (mainly ammonia) to be absorbed by the grass and soil in the pond. When rainfall is within the infiltration capacity of the pond all of the run-off will percolate down through the pond surface (which will not be lined) and non-run-off will ensue. During intense run-off the infiltration capacity of the soil will be exceeded and the pond will begin to fill, which may or may not result in overflow from the outlet to surface water drainage channels. The pond will be designed to avoid internal bypassing and to facilitate a smooth laminar flow across the width of the pond. Measures to achieve this will be an engineered inlet and outlet weir and internal baffles. Every effort will be made to avoid compaction of the soil within the pond/infiltration area.

It is anticipated that this method will allow any low-level contamination, which might be present in the surface run-off from open hardstand areas, to be intercepted by the soil and vegetation before percolating to groundwater. It will also allow for the settlement of any suspended solids, which might be present in the run-off.

Based on the available data, it is clear that the surface water run-off from the current facility is not contaminated with hydrocarbons (Table 6). Nevertheless, all drainage from the hardstand areas will first be directed through a bypass oil interceptor.

Oil interceptors will be inspected regularly and de-sludged as required.

5.8 Residual Impacts

Provided the mitigation measures outlined above are fully implemented, it is anticipated that there will be no adverse impacts either on surface or groundwater quality.

Chapter 6.0 – Ecology

6.1 Introduction

An existing waste recovery facility at Cullenagh, Fermoy, Co. Cork, is proposed to be extended. Inert waste throughput is to be increased and a new transfer building is to be erected to the east of the existing on site structures (Attachment 4D – Plates 1 and 2) which are to be demolished.

A fauna survey of the site was carried out. The only large mammal confirmed on site is fox (*Vulpes vulpes*), and smaller mammals observed during the present survey included three species of bat, one of which was observed to be roosting within an on-site derelict cottage. Nine bird species or their signs were observed on site. No amphibians were noted.

6.2 Site Location and Access

The site is located approximately 4 km southwest of Fermoy town, in Co. Cork, within National Grid Reference square W7995 (Discovery Series Sheet No. 80). Access is from local minor roads.

6.3 Fauna Survey

This section presents the results of a site visit on the 10th of October 2007. The assessment included a bat detector survey at dusk. The terrestrial fauna occurring on the site are described along with other species likely to occur.

The general format of this section is in accordance with guidelines recommended by the EPA (2002) *Guidelines on the Information to be contained in Environmental Impact Statements*. Recommendations and evaluation techniques utilised are in general accordance with *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment, UK, 1995), *Wildlife Impact: the treatment of nature conservation in environmental assessment* (RSPB, 1995) and *Guidelines for Ecological Evaluation and Impact Assessment* (Regini, M. 2000).

6.3.1 Survey Methodology

Field survey was undertaken in favourable weather conditions.

Survey of fauna was carried out by means of a thorough search within the site including inspection of structures for bat use where necessary and accessible. Mammal presence is indicated principally by their signs; feeding signs or droppings - though direct observations are also occasionally made. Birds were observed with the aid of binoculars. The nature and type of habitats present are also indicative of the species likely to be present. The field survey was supplemented by evaluation of relevant literature and existing information. Potential bat roosting sites were surveyed in daytime and a night time survey was conducted with the use of a heterodyne bat detector (BATBOX Duet).

Survey Constraints

There were no seasonal or climatic constraints in regard to survey.

6.4 Site Description

The site was fully described within the Environmental Impact Statement (Parkman, 1999) (see Attachment 4E).

6.5 Results of Present Fauna Survey

The fox was the only large mammal noted on site – scats were observed in boundary areas. There was no evidence of badger (*Meles meles*) on site. Rabbit (*Oryctolagus cuniculus*) and hare (*Lepus timidus hibernicus*) were not observed. Signs of brown rat (*Rattus norvegicus*) were noted. Mice, bank vole (*Clethrionomys glareolus*) and shrew (*Sorex minutus*) are expected to be present.

Bat activity during the survey was high for the time of year but unseasonably high temperatures of 12° ensured many passes of three species being recorded on detector with species being recorded hunting or commuting on site and three species were noted as roosting within the structures.

Soprano pipistrelle (*Pipistrellus pygmaeus*) were widespread on site and detected feeding along hedgerows and tall treelines. Although not observed on this occasion, common pipistrelle (*P. Pipistrellus*) is also expected to be present.

Leisler's bat (*Nyctalus leisleri*) was heard flying high over the site soon after sundown.

Brown long-eared bats (*Plecotus auritus*) were noted to be roosting within the on site derelict cottage (Attachment 4D – Plates 6 and 7). Signs of this species presence included insect prey remains and old droppings (Attachment 4D – Plates 8 and 9). A single individual was seen to leave the structure at dusk.

Due to the absence of woodland and water bodies on site other bat species are not expected to occur on site; these include Natterer's (*Myotis nattereri*), Daubenton's (*M. daubentonii*), whiskered (*M. mystacinus*), Brandt's (*M. brandtii*) and Nathusius' pipistrelle (*P. nathusii*) (Richardson, 2000). The lesser horseshoe bat (*Rhinolophus hipposideros*) does not occur in the area.

No amphibians were observed on site.

Bird species noted on site during the present survey included: pied wagtail (*Motacilla alba yarrellii*), starling (*Sturnus vulgaris*), jackdaw (*Corvus monedula*), rook (*Corvus frugilegus*), robin (*Erithacus rubecula*), stonechat (*Saxicola torquata*) and song thrush (*Turdus philomelos*). Old nests of barn swallow (*Hirundo rustica*) and blackbird (*Turdus merula*) were noted in the derelict cottage.

Details of adjudged status of species on site are given in Attachment 4B.

6.6 Overall Assessment of Scientific Interest of Site

The main portion of the site is comprised of agricultural grassland and arable areas (Attachment 4D – Plates 11 and 13) of low ecological value but the presence of a small number of mature trees (Attachment 4D – Plates 10 and 12) enhances this habitat. The

working area is bare ground for vehicle access (Attachment 4D – Plate 3) with storage areas for piles of waste metal and timber (Attachment 4D – Plates 4 and 5) etc with no ecological value. The absence of woodland and water bodies adds to the paucity of wildlife on site.

Bats use the site for commuting along hedgerows and foraging along taller treelines, they are also roosting within one of the on-site buildings. The modern metal buildings due for demolition are not favourable as bat roosts as they are exposed, prone to heat loss and very much disturbed by both noise and vibration from works on site.

6.6.1 Species of Conservation Interest

Bats

Three species of bats were confirmed on site and at least one species uses the old derelict cottage as a roosting site.

LEGAL STATUS AND CONSERVATION ISSUES - BATS

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Act (2000). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

All bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat is further listed under Annex II. This species is absent from east Cork.

6.7 Potential Impacts of Proposed Development on Terrestrial Fauna

The proposed extension of the site is not expected to impact on local fauna and all species observed on site are expected to persist. The old cottage which is used as a roosting site by brown long-eared bats is not included in the present extension plans. It should be noted that destruction or evacuation of a known bat roost is a notifiable action under current legislation and a derogation licence has to be obtained from the National Parks and Wildlife Service before works can commence. Such a licence is required for any future works to the derelict cottage where a bat roost was confirmed and no works should be undertaken on this structure before the licence is granted by the NPWS.

Chapter 7.0 – Landscape

7.1 Introduction

Cullenagh is a small settlement located towards the top of a pronounced ridge to the south of the town of Fermoy in County Cork. The proposal under assessment is for the upgrading of an existing waste transfer facility that has been in operation since the early 1980s.

This section of the EIS considers the landscape and visual implications of the proposed facility and throughout the assessment the appraisal has sought to distinguish between the direct effects upon the physical landscape and the visual implications of the development upon the observer. The methodology adopted follows the EPA *Guidance on Environmental Impact Assessment* and the *Guidelines for Information to be Contained in EIS*.

Within this section, the landscape and visual assessments are set against an understanding of the existing landscape character and context. The impact of the development on this existing context is appraised and where significant impacts occur to either the landscape character or visual amenity, then appropriate forms of mitigation to alleviate these impacts are proposed and described.

That the site is already an operational waste transfer station and the proposal is for the provision of a new building to replace the existing development within the existing curtilage, is an important consideration within the assessment, as the impacts of the new building and operations would be set against a baseline that incorporates the existing waste transfer uses.

7.2 Methodology

This aspect of the overall assessment focuses on the potential impacts on both the physical and visual environment and seeks to differentiate between the two. The assessment is based on the methodology provided by the EPA in their document *Guidelines for Environmental Impact Assessment*, supplemented by the document produced by the Landscape Institute and Institute of Environmental Assessment, *Guidelines for Landscape and Visual Impact Assessment* and the *Design Manual for Road and Bridge Works*.

7.2.1 The Baseline Landscape Condition

The assessment firstly seeks to establish the significance and sensitivity of the existing landscape through a description of the existing landscape condition along the proposed route options alignments. This description involves an appraisal of the context, character, significance and sensitivity of the landscape of the study area.

7.2.2 Impact Assessment

It is against this understanding of the existing baseline landscape condition that the significance of any impacts arising from the proposed redevelopment of the transfer station could be assessed. These potential impacts are described by their character, magnitude and duration (whether they would be short, medium, long term or permanent impacts). The nature and significance of the impacts would also differ from the relatively short period during construction and the long term effects of the facility in operation.

The impacts of redevelopment of the site upon the landscape can broadly be defined as physical changes in the fabric, character and quality of the landscape resulting from the development and operation of the transfer station. The existing landscape character has been described according to its aesthetic and cultural characteristics.

Assessment of the impact on the landscape was determined by assessing the magnitude of change which the scheme makes to the landscape and how sensitive the landscape is to change. Sensitivity of the landscape takes into account the quality, character and importance, and the ability of that particular landscape to accommodate change. The magnitude of change deals with the size, extent and duration of the impact. Impacts can be beneficial or adverse. Information on the ecological, historical and cultural components of the landscape contained within this assessment have been taken into account when considering the character and quality of the landscape.

The *sensitivity* of change is defined as:

- Very High: Important landscapes of particularly distinctive character and highest quality, which are susceptible to any changes. Areas designated for their Regional and National Landscape Value.
- High: Important components or landscapes of distinctive character and County designated landscapes, which are susceptible to relatively small changes.
- Medium: Landscapes of moderately valued characteristics reasonably tolerant of changes.
- Low: Unimportant landscapes, the nature of which is potentially tolerant of substantial change.

The visual impact relates to changes in available views of the landscape and the effects of those changes on people. Assessment of the visual impact involves identifying individual visual receptors such as residents and users of the landscape within the public domain (local roads and footpaths). The effect on visual receptors is assessed without mitigation during the daytime. Lighting could be a cause of significant impact at night and it has been assumed that the facility would be lit at night. As with landscape impacts the visual impact can be assessed according to the visibility or magnitude of the impact from a given viewpoint as combined with the sensitivity of the receptors. The impact on certain receptors may be beneficial or detrimental.

The overall *impact significance* on both landscape and visual receptors is then categorised as follows:

- Profound Impact: An impact which obliterates sensitive characteristics.
- Significant Impact: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
- Moderate Impact: An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.

- Slight Impact: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.

- Imperceptible Impact: An impact capable of measurement, but without noticeable consequence.

7.2.3 Mitigation

Finally, any possible mitigation measures are explored; to determine whether the potentially adverse impact could be avoided, reduced or remedied.

7.3 The Baseline Landscape Condition

7.3.1 The Wider Landscape Context

The site is located to the south of the town of Fermoy, which straddles the River Blackwater in County Cork. The site sits on elevated ground to the east of the Nagle Mountains, on the southern ridge of the river valley (Figure 21 – Photograph 9).

The site is accessed from the third-class road that runs northeastwards into Fermoy, by two gravel tracks that feed the northern and southern end of the facility. A second third-class road runs to the south of the transfer station eastwards towards Ballynahina. South of this road is the Fermoy Golf Club on land falling away to the south. There are a number of bungalows to the east of the road junction and the north of this road, whose rear elevations face the transfer station.

To the northwest of the transfer station a bungalow sits to the east of the road to Fermoy (Figure 20 – Photograph 8). Beyond this road the land continues to fall towards a tributary stream that flows northwards into the River Blackwater. The land around the upper reaches of this side valley, immediately west of the station, has been recently planted with conifers. This woodland turns to more mature deciduous species as the valley descends. On the high ground to the west of the side valley, a mature coniferous wood forms the horizon (Figure 19 – Photograph 6). A number of isolated farms look back from the western slopes of the stream valley towards the site. The high point on the ridge is immediately to the northeast of the site and is marked by a transmitter station within a fenced enclosure.

The strong form of the ridge is evident from around the transfer station as the land falls sharply away to both north and south. The monument to the east of the site sits on the point of the ridge before the land falls to the pass through the ridgeline to the south of Fermoy (Figure 17 – Photograph 2). The N8 from Cork to Fermoy runs through this pass and from the road the monument is a striking landmark.

7.3.2 The Existing Site

The site consists of two plateaux cut into the sloping ground, with the first plateau set some 7 m above the road and approximately 70 m back from the road. This first plateau contains the skip storage (Figure 19 – Photograph 5). Set behind this and a further 3 m higher is the main site yard. Separating the two plateaux is a mound rising to 7 m above the lower storage yard and therefore 4 m above the main yard. The west facing face of this mound has been recently planted and effectively screens activity within the main yard to views from the west.

The lower plateau contains a collection of bright yellow skips and an enclosure for the tanks. The main yard consists of a level concrete surface and contains a collection of connected buildings, the lowest of which is the single storey office building to the northwest adjacent to the weighbridge and the road that runs to the north of the site, which links the facility with the local road.

A monopitch, corrugated steel roof covers the offices and rises to cover a workshop building to the south. Contiguous with the workshop and again rising in height are two corrugated, barrel vaulted metal sheds that contain the waste baler and excavator with sorting grab (Figure 17 – Photograph 1).

To the east of the sheds a sorting machine stands amidst heaps of ungraded and graded recycled material and to the south are groups of prefab buildings and a mobile home around the remains of a derelict cottage that stands against the southern boundary.

Broad areas of mounding and recently established belts of screen planting surround the facility to the north, south and east. To the south, the mounds extend as far west as the skip storage area, where a belt of mature conifers continues the screen. Between this conifer screen and the skip storage area a bungalow has been constructed, screened from the skip storage area by a further line of conifers.

7.3.3 Landscape and Visual Significance

The County Cork Development Plan 2003 (Second Edition) contains a Landscape Character Assessment subdividing the county into 76 different landscape character areas (LCAs), amalgamated into 16 generic landscape types. The character of the landscape is determined by a combination of the underlying topography, geology and ecology, overlaid by the components of the landscape dictated by the historic land-uses, for example, the woods, hedgerows and settlement patterns.

The site lies within Character Area 30, Kilworth (Moorland Ridge and Undulating Patchwork Lower Valley) close to the boundary with The Golden Vale Character Area 62, which shares the same description. Both these Landscape Character Areas fall within landscape Type 5 – Fertile Plain with Moorland Ridge. The County Development Plan does not go into detail on the significance and sensitivity of these particular character areas or landscape types, stating that this will be picked up and developed in the Local Plans. However, it is clear to see that the site would conform to the overall description of the landscape type, in that the facility is located on the crest of the moorland ridge, to the south of the River Blackwater plain.

In Section 7.7.11. of the Fermoy Local Area Plan the value of the Type 5 landscape, "Fertile Plain with Moorland Ridge", is described as follows: 'The "Golden Vale" is renowned nationally as an important agriculture area. In addition to this, the natural heritage of the area, particularly given the range, quality and diversity of habitats, is also of national importance. Within Cork County the area is highly valued for its recreational (i.e. mainly fishing and walking) and scenic amenities, particularly within the broad fertile valley of the River Blackwater, which is characterised by demesnes, broadleaf woodland and a high quality built heritage, as found in such settlements as Castletownroche and Mitchelstown. Some upland areas are valued locally for commercial forestry.'

Although no quantitative statement of value or sensitivity is defined, it is clear that the River Blackwater valley is an environmentally and culturally rich and important landscape. This is reflected in the designation of the Blackwater Valley as a Scenic Landscape within the County Development Plan. The Local Plan makes no mention of the quality, sensitivity and significance of the moorland ridges that define the plain, but as these are an integral component of the quality of the landscape of the river corridor, then significant weight must be attached to their value.

The site is not covered or affected by any landscape designation. It would not be visible from the sensitive landscape of the designated scenic landscape of the immediate river corridor. However, the overall planning policies for visual amenity for the county are set out in Chapter 7 (Environment & Heritage) of Volume 1 of the County Development Plan. These policies cover visual and scenic amenity and views and prospects and the key objectives for views and prospects are stated as follows:

- ENV 3-4: It is a general objective to preserve the character of all important views and prospects, particularly sea views, river or lake views, views of unspoilt mountain, upland or coastal landscapes, views of historical or cultural significance (including buildings and townscapes) and views of natural beauty.

- ENV 3-5: It is a particular objective to preserve the character of those views and prospects obtainable from scenic routes identified in this plan. These routes are shown on the scenic amenity maps in volume 4 and listed in volume 2 of this plan - 4.1 Scenic Routes.

The third class road that provides access from Fermoy to the facility and runs along the western perimeter of the site has been identified as Scenic Route A9, Road over Hollymount. As described in the County Development Plan, views from Scenic Routes should be preserved or, where possible, improved.

The site is located on the ridgeline overlooking the protected Scenic Landscape of the Blackwater Valley. Potentially visual impacts are, therefore, wide-ranging and significant. Although the site does not fall within a protected landscape area, due to the proximity of and potential impact on the Scenic Route and the Scenic Landscape of the River Blackwater, the site is of **High Landscape Sensitivity.**

7.4 Impact Assessment

7.4.1 Likely Impacts

The main elements of the development have the potential for the following landscape and visual impact during the construction stage:

- Tree and scrub removal;
- Removal of the existing buildings and hardstanding areas;
- General construction disturbance, traffic, plant, working lights, services installation, etc;
- Cut and fill operations to create the development platform;
- Construction of elevated structures and buildings;
- Construction of the soakaway area;

- Storage of materials.

The features of the operational stage of the proposed scheme which have potential for landscape and visual impact include the following main elements:

- Buildings and infrastructure;
- The presence of significant changes to the landform, both embankments and cuttings;
- Illumination;
- Traffic during operation, both within the site and on the local road leading to and from the site.

The significance criteria used for the landscape and visual impact assessment are based on the impact levels suggested in the EPA Guidelines on the *Information to be Contained in Environmental Impact Statements (March 2002)* as follows:

- Imperceptible Impact: an impact capable of measurement but without noticeable consequences;
- Slight Impact: an impact which causes noticeable changes in the character of the environment without affecting its sensitivities;
- Moderate Impact: an impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends;
- Significant Impact: an impact which, by its character, magnitude, duration or intensity alters sensitive aspects of the environment;
- Profound Impact: an impact, which obliterates sensitive characteristics.

Impacts may be rated as positive, neutral or negative and be of a temporary; short term; medium term; long term or permanent nature as described in the EPA Guidelines.

7.4.2 Landscape Impacts

The landscape impacts are those effects upon the physical landscape that alter the character, structure or elements of the landscape. In this regard, the major cause of potential landscape impact within the site would be the extension of the plateau to accommodate the new building and hardstanding and the removal of the existing buildings and hardstandings. The extension of the hardstanding area would entail cutting the plateau further back into the slope. The construction of the plateau would necessitate the removal of recently established screen planting.

Although the site sits to the top of a defined ridgeline, the area is undulating, dividing the large-scale landscape up into smaller compartments, through the intervention of the cross valleys, tree-belts and wooded hedgerows. The nature of the plateau extension would be, therefore, consistent with the character of the existing terrain and within a short period of time the localised slight negative impact would be softened as the cut slopes revegetate, to result in an imperceptible impact.

The mature trees to the south of proposed building and the coniferous tree belts would be retained.

The return to agriculture of the existing plateau and hardstandings to the west of the proposed facility would continue the character and quality of the landscape along the corridor of the scenic route. This would result in a significant improvement to the local landscape and constitute a significant localised positive impact.

The localised, minor realignment of the access track and the widening and resurfacing of the track would have an imperceptible, short term impact on the landscape, countered by the return to agriculture of the existing route.

In terms of the overall magnitude of the impacts on the landscape and character of the site, the nett benefits of the return to agriculture of the area to the west of the site and its influence on the character of the road corridor of the Scenic Route, outweighs the slight additional loss of the disturbed landscape to the east of the site to form the extension to the plateau. The overall assessment would be a **moderate positive impact** on the landscape.

7.4.3 Visual Impacts

As described by the ZVI drawing (Figure 22), the nature of visual impact of the new facility would be much as existing. The location within the site of the proposed process building towards the eastern boundary and its increased height compared to the existing sheds, would increase initial adverse impacts to the properties to the south and east and west. From the west, and with mitigation measures as described below this would include improving or completely concealing views of the proposed building from the Scenic Route, which is of a lower elevation compared to the building (Figure 23). Without mitigation and as shown on the section, the setting back of the proposed building would result in a similar degree of visual intrusion to the existing process building. Due to the shoulder of the ridgeline to the north of the site and the relocation of the building to the southeast, it is likely that the site would be completely screened from the bungalows along the local road (Figure 23).

Provided the mounding to the west was incorporated early in the construction period, the above impacts would be the same for the construction period, where the screening would provide similar beneficial mitigation to views into the site. The construction of the soakaway area would be visible from the local road and the adjacent properties along the route. These impacts would be slight to moderate adverse and short term, as the reseeding of the soakaway area and return to pasture would result in an imperceptible impact within a few years.

The return of the area of the existing site to agriculture and the removal of the existing buildings, skip storage area and the timber storage would result in significant positive visual impact to views from the west.

The proposed process building would be located close to the southeastern boundary and therefore in closer proximity to the properties to the south and east of the site across the fields. On this corner, the hardstanding would only be 4 m below the existing grade, whilst the height of the building would be, therefore, 12.5 m above the existing grade. Landform alone would not screen the building and the level of adverse visual impact would be significantly increased until the planting and potential landform becomes further established. Although a large building, the form is not incongruous as it resembles the agricultural buildings prevalent in the area.

The overall magnitude of the visual impacts of the proposed development is, therefore, a balance between the improvement in the views from the west including those from the Scenic Route, by the setting back of the proposed Processing Building, removal of the existing sheds and yards and the return to agriculture of the area to the west of the hardstanding area, and the initial increase in visual impact realised by the residential properties to the east and south. The overall assessment would be a moderate negative impact on the visual domain in the short term and a slight positive impact in the longer term, once the surrounding planting has become established and provided the mitigation measures described below are incorporated.

7.5 Mitigation

As described above, the visual and landscape impacts of the proposed development are generally neutral to beneficial. The scheme as submitted for appraisal does not describe any extensive mitigation proposals but it is understood that the following has been proposed:

- The return to agriculture of the area to the west of the facility down to the Scenic Route.
- The careful selection of materials and their colour for the built elements of the scheme to respond to the position on the ridgeline, to minimise reflection and acknowledge that the cladded areas of the buildings, where visible from beyond the site boundary, would be read against the sky.
- Retention of the mounding and planting to the boundaries to the north, south and west of the site.

The following represents further recommendations that could be incorporated in the scheme to improve its landscape and visual credentials:

- Select neutral colours and texture of the construction materials to reduce reflection and integrate into the landscape of the ridgeline.
- Incorporation of indigenous mixed deciduous woodland planting to existing screen planting areas and the phased removal of the eucalyptus and a percentage of the conifer content of the mix to achieve a more visually and ecologically appropriate scheme.
- Extend the height of the bund to the west of the hardstanding area to approximately 4 m to improve the immediate screening effect on the building and skip storage area and incorporate the mound into the general slope of the landform to the west of the facility.
- Ensure all lighting is flat glass and angled away from adjacent residential properties to prevent direct glare and minimise night glow.

Chapter 8.0 – Traffic

8.1 Introduction

This section considers the traffic and transportation assessment for an extension to an existing Waste Recovery Facility in Fermoy, Co. Cork. The assessment has been carried out in accordance with the NRA's *Traffic and Transportation Assessment Guidelines* (2007) and makes reference to the *Guidelines for Traffic Impact Assessment* published by the Institution of Highways and Transportation (UK) (1994).

The purpose of this section is to assess the potential impact of the proposed development on the existing junction with the local transport network and to ensure that the site access will have adequate capacity to carry the development traffic and the future growth in existing road traffic to the design year and beyond.

8.2 Existing Road Network and Traffic

8.2.1 Fermoy Town, Existing Road Network and Site Location

Fermoy Town is located 34 km northeast of Cork City. The town has a population of approximately 5,800 persons and an additional 230 acres of land has been zoned for residential development under the current Fermoy Local Area Plan which could accommodate a population increase of approximately 6,900 persons. Fermoy is located on the intersection of the N72 National Secondary Route and the N8 National Primary Route linking Ireland's two main cities (Dublin and Cork). Until recently Fermoy suffered from serious traffic congestion due to N8 traffic travelling through the town centre. In October 2006 the N8 bypass of Fermoy and Rathcormac was completed by Direct Route (Fermoy) Ltd as part of a design, build, finance and operate project. The scheme comprised 17.5 km of motorway standard roadway together with associated interchanges and local road realignments. A map of the road network in the vicinity of Fermoy detailing the alignment of the N8 bypass has been reproduced in Figure 1.

The proposed site is located on lands to the southwest of Fermoy Town as indicated on Figure 1. Access to the site is via an existing T-junction onto the county roadway which leads onto Duntaheen Road. The county roadway runs in a north/south direction past the site access falling at a downgrade towards Fermoy. The roadway has an approximate width of 5.5 m and has a surfaced dressed carriageway finish. Photograph 1 and Photograph 1 detail the alignment of the county roadway north and south from the proposed access while Photograph 3 details the site access minor arm.

Visibility to the left and right along the county roadway is at present inadequate when measured from a 3 m setback. In order to achieve sufficient visibility for an 80 km/h roadway (i.e. 3.0 x 160 m) minor works will be required in order to remove existing vegetation and an existing earth bank which currently impedes sightlines.

Photograph 1. View Along County Roadway to Fermoy (North).

Photograph 2. View Along County Roadway to South.

Photograph 3. View into Site Access from County Roadway.

8.2.2 Existing Traffic Flows

Manual classified traffic turning count surveys were carried out on Wednesday, 10th October 2007 at the junction between the site entrance and the county roadway. The survey was conducted between the hours of 7.00 am to 10.00 am. A further count was carried out on 12th February 2008 for the pm, 4.00 pm to 7.00 pm. The results of the survey have been reproduced in full as Attachment 5A. A worst case 2007 AM and 2008 PM peak hour flow regime was established for the junction by combining the largest peak hour values for each turning movement over the survey period. Text Figure 1 and Text Figure 2 detail the worst case AM and PM peak hour flows on which the following PICADY analysis is based.

8.3 Proposed Development

The applicant is seeking permission to extend operations at an existing Waste Recovery Facility. The layout of the existing facility and the proposed extension are detailed on Figures 3, 4 and 24. Access to the development will be via a new 6 m wide concrete roadway which will link to the existing junction and the new concrete yard and Process Building at the eastern extent of the site.

8.4 Generation of Development Traffic and Trip Distribution

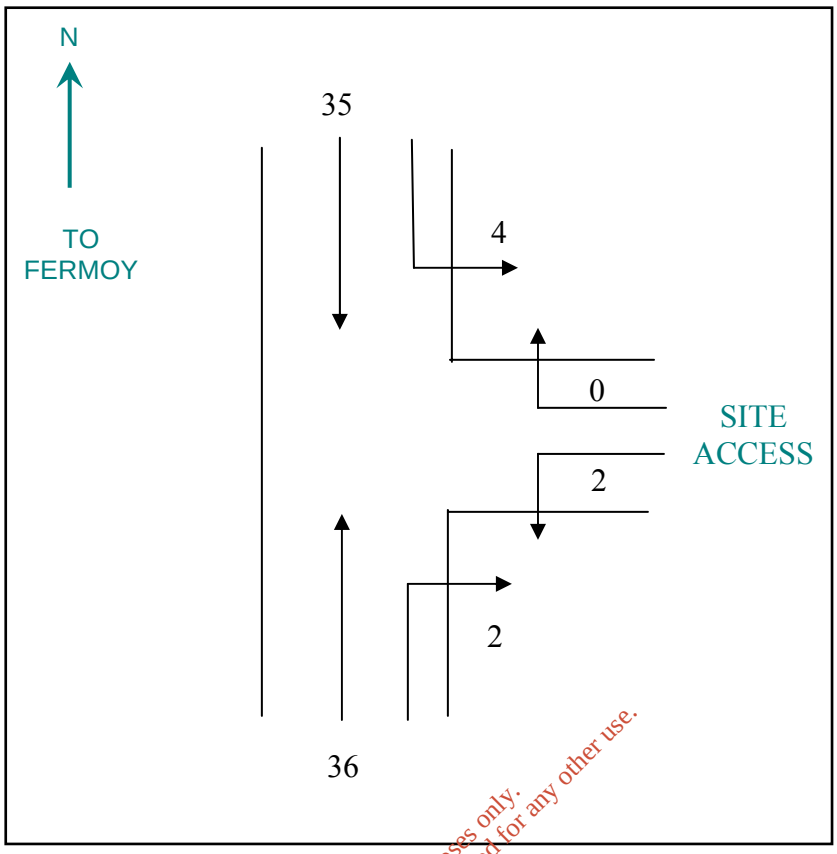
8.4.1 Future Baseline Traffic Growth

In the absence of any specific local traffic growth information it was assumed that baseline traffic will continue to grow at the levels recommended by the NRA in their *Future Traffic Forecasts 2002-2040* document. The year of opening of the scheme was assumed to be 2010. A 10-year analysis period for the scheme would give a design year of 2020. The growth factor used in the analysis is detailed below:

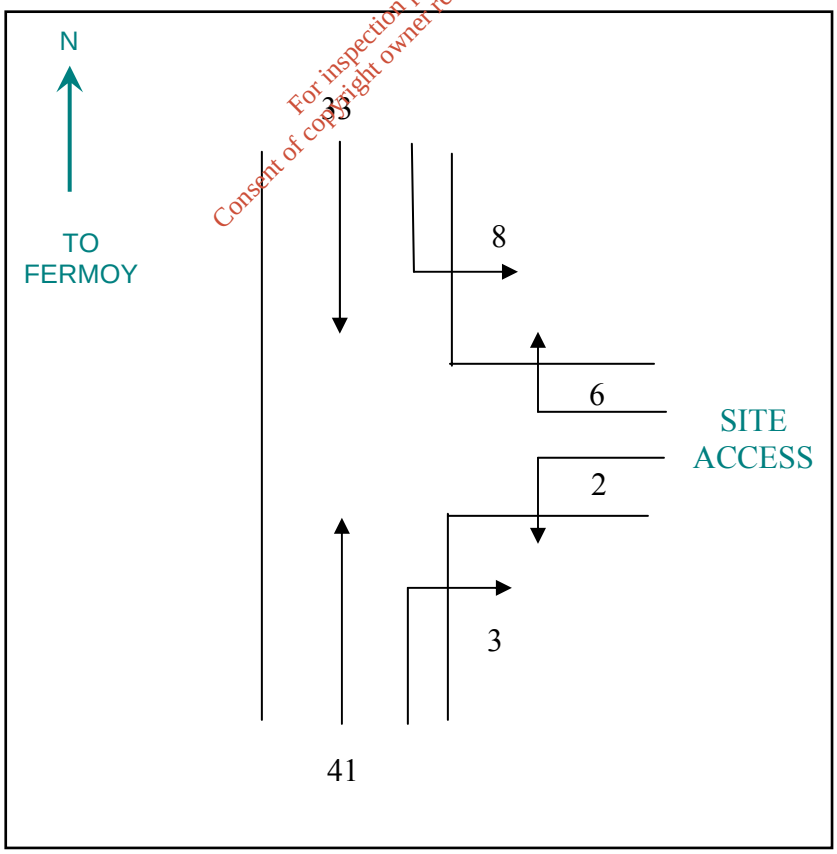
- NRA Non-National Route Growth Factor for 2007-2020 = 1.17

In order to simplify the junction analysis the highest growth factors for non-national roads (for either cars or heavy goods vehicles) were applied to surveyed values of total vehicles and a 10% HGV content applied globally to the vehicle flows in the PICADY model. This simplified analysis will be slightly more conservative than the application of two separate growth factors for cars and LGVs and HGVs. The application of an HGV content of 10% will simplify the analysis in PICADY and will ensure a more robust analysis than the application of the surveyed HGV percentages for each turning movement.

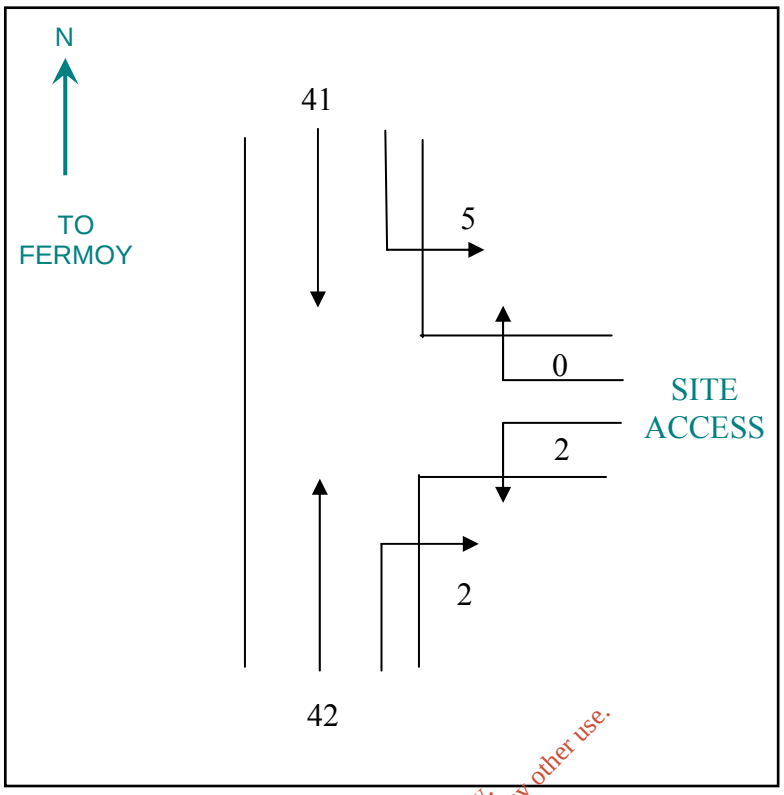
Estimated future baseline traffic flows on the county road in the vicinity of the proposed Waste Facility access were calculated by applying these factors to the 2007 and 2008 surveyed flows. The forecast 2020 AM and PM Peak Hour Flows at the access are detailed in Text Figure 3 and Text Figure 4.



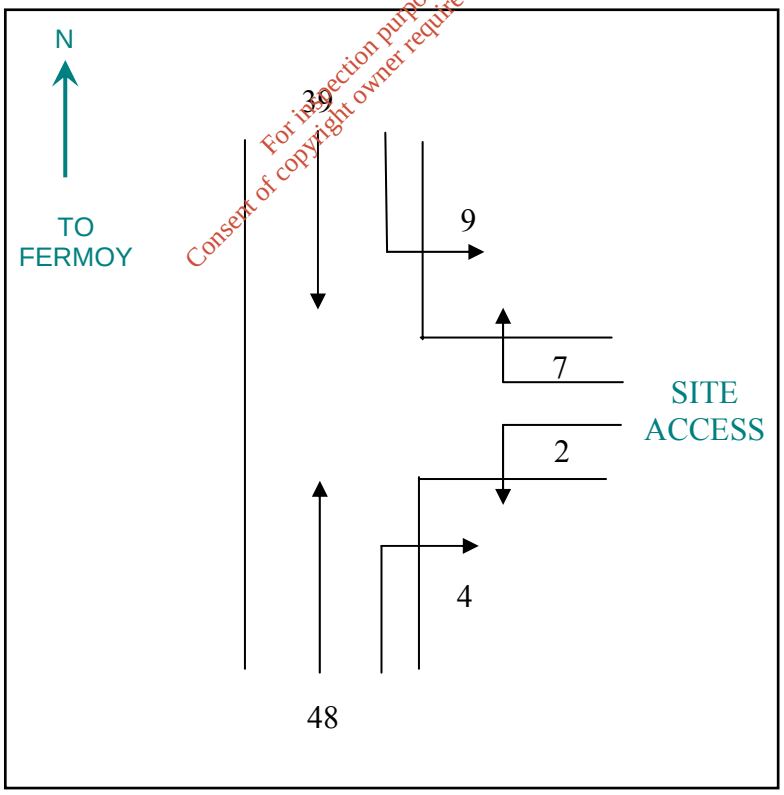
Text Figure 1. 2007 AM Peak Hour Survey Flows (in pcu).



Text Figure 2. 2007 PM Peak Hour Survey Flows (in pcu).



Text Figure 3. Forecast 2020 AM Peak Hour Baseflows (pcu).



Text Figure 4. Forecast 2020 AM Peak Hour Baseflows (pcu).

8.4.2 Traffic Generated by the Proposed Development

It is estimated that approximately 127 trucks will enter and leave the site on a typical working day. For the purposes of this analysis it has been assumed that 1 truck is equivalent to 2 pcu (passenger car units). In order to model an onerous condition the analysis assumes that all of the trucks enter and leave the site during the AM peak hour and also during the PM peak hour in order to robustly test the two peak periods. In addition to the generated HGV traffic it has been assumed that 60 staff cars enter the site during the AM peak hour and depart the site during the PM peak period. If under these worst case assumptions the access is found to have sufficient capacity in the PICADY model it can safely be assumed that the access will have sufficient operating capacity at all other times of the day.

8.4.3 Construction Stage Traffic

The volumes of traffic that will be generated during the construction phase of the development will be small in comparison to the traffic volumes generated by the operation of the development during the peak periods. A quantitative analysis for the construction stage would yield lower ratio of flow to capacity results than the worst case scenario analysed in the report which is the 2020 peak hour. The construction stage therefore does not require traffic analysis, however in order to minimise disruption due to construction, wheel washing facilities will be installed at the site access to reduce the amount of dirt and debris carried on to the public roadway during the excavation operation, etc.

8.4.4 Distribution of Generated Traffic

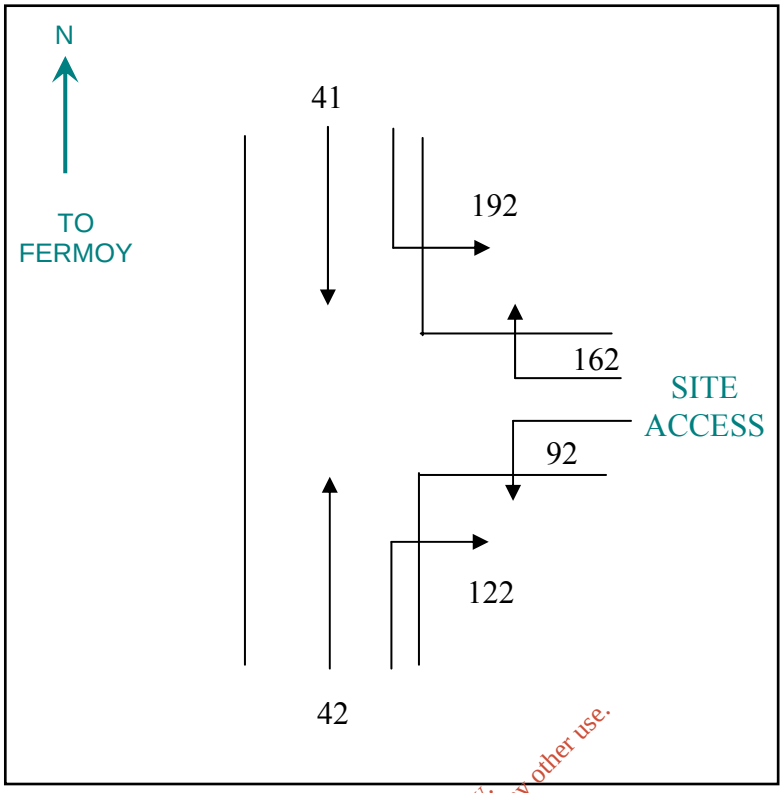
In accordance with the information supplied, the traffic that will be generated by the development has been distributed at the waste facility access in accordance with Table Option (A) (Attachment 5B) which assumes that 50,000 tonnes of waste is processed at the site per year. (It is not necessary to analyse the possible smaller throughput of 35,000 tonnes as the junction will cater for the larger number.) The staff trips to and from the site have been evenly distributed at the site access. The information on which the traffic distribution and traffic generation calculations was based has been presented in Attachment 5B.

8.5 Junction Analysis

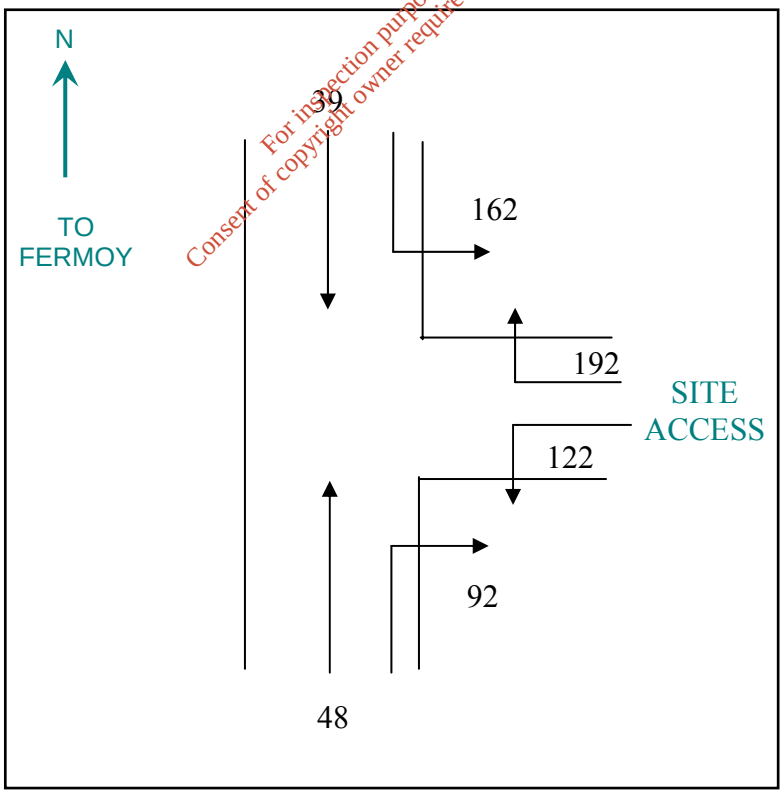
8.5.1 PICADY Analysis of Proposed Development Access onto Limerick Road

The waste facility access junction has been modelled using the TRL junction analysis software package PICADY version 5. The following scenario has been analysed: 2020 Design Year AM and PM Peak Hour Flows with waste facility fully operational.

Estimated turning movements for the 2020 AM and PM peak hour scenario with the development fully operational were calculated by summing the predicted generated flows and the forecast baseflows. The peak total traffic turning movements are detailed in Text Figure 5 and Text Figure 6.



Text Figure 5. 2020 AM Peak Hour Turning Movements – Development Operational.



Text Figure 6. 2020 PM Peak Hour Turning Movements – Development Operational.

The PICADY analysis shows that the waste facility access junction would be within practical reserve capacity by the design year 2020 even under the onerous assumptions made throughout the analysis in relation to existing traffic flows and future traffic generation. PICADY predicts that the junction would be at 67.1% capacity during the 2020 AM peak hour and 80.0% capacity during the PM peak hour for vehicles exiting the development. The results of the PICADY analysis have been reproduced in full as Attachment 5C.

8.6 Conclusion

The additional traffic generated by the proposed extension to the waste facility to cater for 50,000 tonnes can easily be accommodated at the existing junction with the public road when combined with the predicted increased background flows on the public road to the year 2020 and beyond. It should be noted that the analysis contained in the EIS is based on an extremely onerous permutation of the maximum traffic flows as the anticipated daily flows are assumed to occur in each peak hour.

The junction visibility is restricted and some vegetation/earth banks should be removed to provide a minimum of 160 m visibility in each direction from a setback of 3 m.

Chapter 9.0 – Air Quality and Climate

9.1 Introduction

This section considers the air quality and climate impact assessment for the proposed extension of waste handling activities at Cullenagh, Fermoy, Co. Cork. The site is located on an elevated site in an agricultural area with seven domestic dwellings within 250 m of the facility.

9.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health- or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 9 to Table 11 and Attachment 6A).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2002, which incorporate EU Directives 1999/30/EC and 2000/69/EC (see Table 9 and Table 10). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Attachment 6A).

The European Commission sponsored report "Second Position Paper on Particulate Matter - Final" (2004) recommended that the principal metric for assessing exposure to particulates should be $PM_{2.5}$ rather than PM_{10} after 2010. The report also suggested that the annual average should be in the range 12-20 $\mu g/m^3$ which should be compared with the PM_{10} annual limit value, to be complied with in 2005, of 40 $\mu g/m^3$. In relation to the maximum 24-hour limit value, a starting point for discussion was set at 35 $\mu g/m^3$ as a 90th%ile. These indicative limit values were to be reviewed in the light of further information on health and environmental effects, technical feasibility etc.

Following on from this report, proposed Directive COM(2005) 447 on Ambient Air Quality and Cleaner Air for Europe (21/09/2005) has recently outlined proposals to revise and combine several existing Ambient Air Quality Standards including Council Directives 96/62/EC, 1999/30/EC and 2000/69/EC. A recent Common Position has been adopted by the EU Council (COM(2007) 320, dated 29/06/07) with a view to adoption of this Directive. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, it is proposed to set new ambient standards for $PM_{2.5}$.

The proposed approach for $PM_{2.5}$ is to establish a target value of 25 $\mu g/m^3$, as an annual average (to be attained by 2010), coupled with a non-binding target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target is currently proposed to be on a sliding scale of 7-13 $\mu g/m^3$ based on the average exposure indicator (AEI). The AEI is based on measurements taken in urban background locations averaged over a three year period.

Table 9 Air Quality Standards Regulations 2002 (based on EU Council Directive 1999/30/EC).

Pollutant	Regulation	Limit Type	Margin of Tolerance	Value
Nitrogen Dioxide	1999/30/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	40% until 2003 reducing linearly to 0% by 2010.	200 µg/m^3 NO_2
		Annual limit for protection of human health	40% until 2003 reducing linearly to 0% by 2010.	40 µg/m^3 NO_2
		Annual limit for protection of vegetation	None.	30 µg/m^3 NO + NO_2
Lead	1999/30/EC	Annual limit for protection of human health	60% until 2003 reducing linearly to 0% by 2005.	0.5 µg/m^3
Sulphur dioxide	1999/30/EC	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	90 µg/m^3 until 2003, reducing linearly to 0 µg/m^3 by 2005.	350 µg/m^3
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	None.	125 µg/m^3
		Annual & winter limit for the protection of ecosystems	None.	20 µg/m^3
Particulate Matter (as PM_{10}) Stage 1	1999/30/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	30% until 2003 reducing linearly to 0% by 2005.	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	12% until 2003 reducing linearly to 0% by 2005.	40 µg/m^3 PM_{10}
Particulate Matter (as PM_{10}) Stage 2[Note1]	1999/30/EC	24-hour limit for protection of human health - not to be exceeded more than 7 times/year	Not to be exceeded more than 28 times until 2006, 21 times until 2007, 14 times until 2008, 7 times until 2009 and zero times by 2010.	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	50% from 2005 reducing linearly to 0% by 2010.	20 µg/m^3 PM_{10}
$PM_{2.5}$	COM (2005) 447	Annual concentration cap designed to limit unduly high risks to the population	None. Limit value applicable in 2010.	25 µg/m^3 $PM_{2.5}$

Note 1 EU 1999/30/EC states "Indicative limit values to be reviewed in the light of further information on health and environmental effects, technical feasibility and experience in the application of Stage 1 limit values in the Member States". Proposed EU Directive COM (2005) 447 will "replace the indicative limit values for PM_{10} for the year 2010 by a legally binding "cap" for the annual average concentrations of $PM_{2.5}$ of 25 µg/m^3 to be attained by 2010".

Table 10 Air Quality Standards Regulations 2002 (based on EU Council Directive 2000/69/EC).

Pollutant	Regulation	Limit Type	Margin of Tolerance	Value
Benzene	2000/69/EC	Annual limit for protection of human health	100% until 2006 reducing linearly to 0% by 2010	5 µg/m^3
Carbon Monoxide	2000/69/EC	8-hour limit (on a rolling basis) for protection of human health	60% until 2003 reducing linearly to 0% by 2005	10 mg/m^3 (8.6 ppm)

Table 11 WHO Guidelines for Air Quality Europe 2000.

Substances	Time-weighted Average	Averaging Time
Lead	0.5 µg/m^3	1 year
Nitrogen dioxide	200 µg/m^3 40-50 µg/m^3	1 hour annual
Carbon monoxide	100 µg/m^3 60 µg/m^3 30 µg/m^3 10 µg/m^3	15 minutes 30 minutes 1 hour 8 hour
Benzene	Note 1	
Particulate Matter (PM_{10})	Note 2	

Note 1: No safe level recommended owing to carcinogenicity.
Note 2: No specific guideline recommended because no obvious exposure concentration and duration that could be judged a threshold and decreased by uncertainty factors to avoid risk.

In relation to dust deposition, the criteria to be met by this development are the immission levels laid out in the TA-Luft, for dust deposition (non-hazardous dust)[(1)]. The maximum permissible immission level for dust deposition is 350 mg/m^2/day averaged over a one year period at any receptors outside the site boundary (see Table 9).

9.1.2 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002[(1,2)]. For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2007 to 2012[(3,4)]. The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emissions Trading and burden sharing. The most recent Conference of the Parties (COP13) to the agreement was convened in Bali in December 2007.

9.1.3 Methodology

The assessment of air quality has been carried out using a phased approach as recommended by the UK DEFRA[(5,6)]. The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standards. In the current assessment, an initial scoping of possible key pollutants was carried out. An examination of recent EPA and Local Authority data in Ireland[(7-9)] (see below under "Available Background Data") has indicated that SO_2, smoke and CO are unlikely to be exceeded at a location such as the current one.

The scoping assessment also indicated that the pollutants NO_2, PM_{10}, $PM_{2.5}$ and benzene are also unlikely to be exceeded thus the current assessment focused on identifying the existing baseline levels of these pollutants in the region of the proposed development by analysis of suitable EPA monitoring data. Thereafter, a qualitative assessment on air quality and climate was carried out based on the nature, size and location of the proposed development.

9.2 Description of the Existing Environment

9.2.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels)[10]. Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Cork Airport, which is located approximately 35 km southwest of the site. Data from Cork Airport meteorological station has been examined to identify the prevailing wind direction and average wind speeds over a five-year period. For data collated during five representative years (1998-2002), the predominant wind direction is southwesterly with an average wind speed of approximately 4-6 m/s.

9.2.2 Baseline Air Quality

An assessment of the baseline air quality in the region of the proposed development has been carried out by reference to suitable EPA long-term monitoring data. Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality entitled "Air Quality Monitoring Annual Report 2006" (EPA, 2007)[7], details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes[7,9]. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 15 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, Cullenagh is categorised as Zone D[7,9].

EPA monitoring is carried out at the rural Zone D locations, Askeaton, Glashaboy and Kilkitt using continuous monitors[7]. In addition, the EPA carried out long-term monitoring at Ferbane, at a site outside Drogheda and Castlebar in 2005/06, which is also an urban Zone D location[7].

Long-term NO_2 monitoring is carried out at the two rural Zone D locations, Glashaboy and Kilkitt[7]. The NO_2 annual average in 2006 for both sites was 10 and 3 $\mu g/m^3$, respectively. The results of NO_2 monitoring carried out at the urban Zone D location in Ferbane in 2006 indicated an average NO_2 concentration of 4 $\mu g/m^3$[7], with no exceedences of the 1-hour limit value. Hence long-term average concentrations measured at these locations were significantly lower than the annual average limit value of 40 $\mu g/m^3$. Based on the above

information, a conservative estimate of the background NO_2 concentration for Cullenagh in 2007 is 10 µg/m^3.

The results of CO monitoring carried out in Ferbane in 2006 (urban Zone D) showed no exceedences of the 8-hour limit value[7], with an average level of 0.2 mg/m^3. Data for the Zone C station in Wexford and Bray in 2006 indicated a long-term average of 0.5 and 0.3 mg/m^3 respectively[7]. Based on the above information, a conservative estimate of the background CO concentration for Cullenagh in 2007 is 0.3 mg/m^3.

With regard to benzene, continuous monitoring was carried out at Mountrath in 2004/05[7], with a long-term average of 0.3 µg/m^3 respectively. The results of monitoring carried out in the Zone C locations of Ennis and Bray in 2006 indicated a long-term average of 0.6 and 0.3 µg/m^3 respectively[7]. Based on the above information, a conservative estimate of the background benzene concentration for Cullenagh in 2007 is 0.3 µg/m^3.

Long-term PM_{10} measurements carried out at Ferbane and Drogheda in 2006, gave an average level of 17 and 18 µg/m^3[7]. In addition, the results of Zone D measurements in Castlebar and Kilkitt in 2006 gave averages of 16 and 10 µg/m^3 respectively[7]. Data from the Phoenix Park provides a good indication of urban background levels, with an annual average in 2006 of 14 µg/m^3[7]. Based on the above information, a conservative estimate of the background PM_{10} concentration for Cullenagh in 2007 of 12 µg/m^3 has been used.

The results of $PM_{2.5}$ monitoring in Mountrath, Carlow, Clonmel and Tralee in 2004/05[7] indicated average $PM_{2.5}/PM_{10}$ ratios ranging from 0.34 to 0.50. Based on this information, a conservative ratio of 0.60 was used to generate a background $PM_{2.5}$ concentration in 2007 of 7.2 µg/m^3.

9.3 Characteristics of the Proposed Development

9.3.1 Air Quality

As stated above, road traffic would be expected to be the dominant source of emissions of NO_X, benzene and CO in the region of the development (with the possible exception of PM_{10}) and thus is the focus of the current assessment.

Particulate emissions may arise from road traffic with on-site movement and treatment of waste an additional source of particulate emissions. Due to the treatment of a small quantity of canteen waste, odour emissions can potentially arise.

9.3.2 Climate

Road traffic would be expected to be the dominant source of greenhouse gas emissions as a result of the development. Vehicles will give rise to CO_2 and N_2O emissions near the proposed development.

9.4 Predicted Impact of the Proposal

9.4.1 Air Quality

The assessment of baseline air quality in the region of the proposed development has shown that current levels of key pollutants are significantly lower that their limit values.

Due to the size, nature and location of the development, which will lead to a small increase in road traffic emissions of the order of 187 two-way vehicle movements per day, the proposed development is expected to have an imperceptible impact on air quality in terms of NO_2, benzene and CO.

Particulate emissions from road traffic will also be insignificant due to the existing low levels of site traffic and with a small increase in road traffic emissions envisaged as a result of this development. Particulate emissions due to the on-site activity of timber waste shredding (1,700 tpa), sorting of construction and demolition waste (1,800 tpa) and the sorting of 3,000 tpa of cardboard, plastic, packaging and canteen waste may lead to some particulate emissions. Under Schedule D of Waste Licence Number 107-1 the facility monitors for dust deposition at three locations within or near the boundary of the site (Figure 25). Monitoring results, which are conducted three times per annum, are generally well within the TA Luft Limit value of 350 $mg/m^2/day$.

The only potential source of odorous emissions is from the 300 tpa of commercial canteen waste which is loaded directly into jumbo skips within the transfer building for onward disposal to landfill. In the current application, the use of jumbo skips will be maintained thus eliminating the potential for odour nuisance. Furthermore, as a condition of Waste Licence 107-1, putrescible waste stored overnight is required to be in covered containers within the transfer building and this waste is required to be removed off-site within forty-eight hours of its acceptance at the facility (Conditions 5.2.3 and 7.4.1). Enforcement of these mitigation measures will mean odour impact is insignificant at nearby residential receptors.

9.4.2 Climate

Greenhouse gas emissions, as a result of this development, will be imperceptible in terms of Ireland's obligations under the Kyoto Protocol[1,2].

9.5 Mitigation Measures to Reduce Adverse Effects

9.5.1 Air Quality

Mitigation measures in relation to traffic-derived pollutants have focused generally on improvements in both engine technology and fuel quality. Recent EU legislation, based on the EU sponsored Auto-Oil programmes, has imposed stringent emission standards for key pollutants (Euro IV (98/69/EC) for passenger cars to be complied with in 2006 and Euro IV and V for diesel HGVs introduced in 2006 and 2007). In relation to fuel quality, a recent EU Fuel Directive (98/70/EC) has introduced significant reductions in both sulphur and benzene content of fuels.

Waste Licence 107-1 has a range of conditions which will ensure that dust and odour emissions will be control such that a nuisance should not arise:

- In dry weather, site roads and any other areas used by vehicles shall be sprayed with water as and when required to minimise airborne dust nuisance (Condition 7.4.1).
- Following construction, all waste vehicles shall use the vehicle cleaning facilities prior to exiting the facility (Condition 7.5).

- Timber stockpiles at the facility shall not be of a height greater than five metres (Condition 7.6).

- All stockpiles shall be maintained so as to minimise dust generation (Condition 5.4.4.2).

- The floor of the waste transfer building shall be washed down and cleared of all waste at the end of the working day. The floor of the storage bays for recovered wastes shall be washed down and cleaned on each occasion such bays are emptied (Condition 5.3.1).

- Putrescible waste stored overnight is required to be in covered containers within the Waste Transfer Building and this waste is required to be removed off-site within forty-eight hours of its acceptance at the facility (Condition 7.4.1).

9.5.2 Climate

CO_2 emissions will be reduced to 120 g/km by 2012 through EU legislation. This measure will reduce CO_2 emissions from new cars by an average of 25% in the period 1995 to 2007/2009 whilst 15% of the necessary effort towards the overall climate change target of the EU will be met by this measure alone[11]. Additional fuel efficiency measures include VRT and Motor Tax rebalancing to favour the purchases of more fuel-efficient vehicles, the National Car Test and Fuel Economy Labelling[11,12].

9.6 Construction Impacts and Mitigation Measures

9.6.1 Local Construction Impacts

Air Quality

There is the potential for a number of emissions to the atmosphere during the construction of the development. In particular, the construction activities may generate quantities of dust. Construction vehicles, generators etc, will also give rise to some exhaust emissions.

A dust minimisation plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. Site roads shall be regularly cleaned and maintained as appropriate. Hard surface roads shall be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only. Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.

Vehicles using site roads shall have their speed restricted, and this speed restriction must be enforced rigidly. Indeed, on any unsurfaced site road, this shall be 20 km per hour, and on

hard surfaced roads as site management dictates. Vehicles delivering material with dust potential shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust.

All vehicles exiting the site shall make use of a wheel wash facility, preferably automatic, prior to entering onto public roads, to ensure mud and other wastes are not tracked onto public roads. Public roads outside the site shall be regularly inspected for cleanliness, and cleaned as necessary.

Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

Furthermore, during movement of the soil both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, the procedures put in place will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, satisfactory procedures will be implemented to rectify the problem.

The dust minimisation plan shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practise and procedures.

Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions.

9.6.2 Predicted Impacts

If a satisfactory dust minimisation plan is implemented, the effect of construction on air quality will be slight.

9.7 Forecasting Methods

Not applicable.

Chapter 10.0 – Noise and Vibration

10.1 Introduction

The site is located to on an elevated site in an agricultural area with seven domestic dwellings within 250 m of the facility.

It is understood that the facility operates between 08:00 and 20:00 hrs, Monday to Saturday and it is proposed to operate between 06:00 and 21:00 in the future.

10.2 Study Methodology

The receiving environment for the proposed development will be quantified through a review of environmental noise surveys previously conducted in the vicinity of the site in support of planning applications and in light of the requirements of relevant Environmental Protection Agency (EPA) waste licence. The potential impact of the construction and operational phases of the development will be assessed through the preparation of various noise predictions with reference to appropriate criteria, standards and guidance documents.

10.2.1 Forecasting Methods

Prediction calculations for building services plant, car parking, service yards and traffic movements on site have been conducted generally in accordance with ISO 9613: *Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation, 1996.*

Prediction calculations for vehicles on public roads have been conducted in accordance with the British *Calculation of Road Traffic Noise,* Department of Transport Welsh Office, HMSO, 1988 (hereafter referred to as CRTN).

Prediction calculations for construction noise have been conducted in accordance with BS5228: *Noise and vibration control on construction and open sites, Part 1: Code of practice for basic information and procedures for noise and vibration control*, 1997.

10.3 The Receiving Environment – Noise

A series of environmental noise surveys have been conducted previously in relation to the site and have been reviewed in order to quantify the existing noise environment. These surveys were typically conducted in accordance with ISO 1996: *1982: Acoustics – Description and measurement of environmental noise*. Details are set out below.

10.3.1 Measurement Locations

As part of this survey work carried out in the vicinity of the site monitoring work has previously been carried out at three locations as detailed in Figure 25 (MP1, MP2 and MP3). These locations are as detailed in the 1999 EIS Drawing No. 21802/0B/03 referenced in the noise condition of the facilities waste licence.

10.3.2 Discussion of Baseline Noise Surveys

Noise monitoring has been conducted on an annual basis in order to demonstrate compliance with Condition 6.4 and Schedules C1, D1 and D3 of the EPA waste licence No. 107-1. Details of the requirements of this licence are provided in Section 10.5.1 .

A review of the noise data collected during the annual noise monitoring from the years 2003 to 2006 was conducted.

The annual noise survey results are presented in terms of the following three parameters:

- L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2 x 10^{-5} Pa.

10.3.3 Noise Measurement Results

A discussion of the noise measurement results at nearby noise sensitive locations is provided below.

- Location 1 (MP1): Daytime noise measurements at this location were dominated by road traffic movements on local roads and occasional distant noise from site activities. Measurements show compliance with the EPA daytime noise limit of 55 dB $L_{Aeq\ (30\ minutes)}$.
- Location 2 (MP2): Daytime noise measurements at this location were dominated by road traffic noise on local roads and noise from N8 (Cork-Dublin national route). Occasional distant noise from site activities were audible during lulls in traffic movements. Measurements show compliance with the EPA daytime noise limit of 55 dB $L_{Aeq\ (30\ minutes)}$.
- Location 3 (MP3): Daytime noise measurements at this location were dominated by road traffic movements on local roads wind generated noise. Noise from site activities was just audible at this location. Measurements show compliance with the EPA daytime noise limit of 55 dB $L_{Aeq\ (30\ minutes)}$.

10.3.4 Discussion

It has been demonstrated within the annual noise reports that the site is operating within the daytime noise limits detailed within the EPA waste licence.

There are no activities within the proposed development during the night-time, although there may be some building services plant operating. Building services noise is commented on in the appropriate section of this report.

10.4 Characteristics of the Proposed Development

When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages: the short term impact of the construction phase and the longer term impact of the operational phase.

The construction phase will involve the preparation of the site, excavation and removal of on site material, construction of proposed site roads and erection of the proposed structures.

There are five primary sources of noise in the operational context as follows:

- building services plant;
- internal building activities;
- truck movements along site access road;
- concrete yard activities; and
- additional vehicular traffic on public roads.

10.5 The Potential Impact of the Proposed Development

10.5.1 Noise Criteria

Construction Noise

There is no published Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider at their discretion noise limits.

In the absence of specific noise limits and appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the National Roads Authority (NRA) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[1]. The following criteria and hours of operation have been extracted from this document. The majority of the construction activity is expected to occur during normal working hours.

Table 12 indicates the maximum permissible noise levels at the façade of dwellings during the construction period as recommended by the NRA.

Table 12 Maximum Permissible Noise Levels at the Façade of Dwellings during Construction.

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00 hrs	70	80
Monday to Friday 19:00 to 22:00 hrs	60*	65*
Saturdays 08:00 to 16:30 hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30 hrs	60*	65*

*Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

[1] *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004* , National Roads Authority.

Operational Noise

Due consideration must be given to the nature of the primary noise sources when setting criteria. In this instance, there are five primary sources of noise associated with the development once operational as outlined above. Criteria for noise from all sources with the exception of traffic movements on local roads will be set in terms of $L_{Aeq,T}$, the equivalent continuous sound level. Given that vehicle movements on public roads are assessed using a different parameter (the ten percentile noise level; L_{A10}), it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development on public roads in terms of the L_{A10} parameter.

The existing site is subject to a waste licence agreement issued by the EPA; this licence (No. 107-1) details noise limits at nearby noise sensitive locations. The relevant sections of the waste licence are reproduced below:

CONDITION 6.4

There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity at the noise sensitive locations.

C.1 NOISE EMISSIONS: (MEASURED AT THE MONITORING POINTS INDICATED IN TABLE D.1.1).

Day dB(A) $L_{Aeq\ (30\ minutes)}$	Night dB(A) $L_{Aeq\ (30\ minutes)}$
55	45

D.1 MONITORING LOCATIONS

Monitoring locations shall be those as set out in Table D.1.1 and Drawing No.21802/0B/03, Borehole and Noise Monitor Sites of EIS submitted 18/05/00.

TABLE D.1.1 NOISE MONITORING LOCATIONS

Noise Stations
MP1 Note 1
MP2 Note 1

Note 1: Location to be agreed with the Agency.

D.3 NOISE

TABLE D.3.1 NOISE MONITORING FREQUENCY AND TECHNIQUE

Parameter	**Monitoring Frequency**	**Analysis Method/Technique**
$L_{(A)EQ\ [30\ minutes]}$	Annual	Standard Note 1
$L_{(A)EQ\ [30\ minutes]}$	Annual	Standard Note 1
$L_{(A)EQ\ [30\ minutes]}$	Annual	Standard Note 1
Frequency Analysis (1/3 Octave band analysis)	Annual	Standard Note 1

Note 1: International Standards Organisation. ISO 1996. Acoustics description and Measurement of Environmental noise. Parts 1, 2 and 3.

It should be noted that noise monitoring location MP3 is not shown in Table D.1.1; it is however detailed on drawing No. 21802/0B/03 as referenced in Section D1 of the waste licence. It should also be noted that Location 4 (as shown on Figure 25) is not included in Table D.1.1. This location is, however, included as a noise sensitive receptor for the purposes of this assessment.

The criteria set out above relate to noise from building services plant, internal building activities, truck movements along site access road and concrete yard activities in relation to the proposed development.

In order to assist with interpretation of increased traffic noise on public roads, Table 13 offers guidance as to the likely impact associated with any particular change in traffic noise level.

Table 13 Likely impact associated with change in traffic noise level.

Change in Sound Level (dB L_{A10})	Subjective Reaction	Impact
<3	Inaudible	Imperceptible
3–5	Perceptible	Slight
6–10	Up to a doubling of loudness	Moderate
11–15	Over a doubling of loudness	Significant
>15		Profound

In summary, the following criteria apply at the façades of those residential properties closest to the proposed development:

- Daytime (07:00 to 23:00 hours) 55 dB $L_{Aeq,(30\ minute)}$
- Night-time (23:00 to 07:00 hours) 45 dB $L_{Aeq,(30\ minute)}$

10.5.2 Vibration Guidelines

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. For example, blasting and piling, two of the primary sources of vibration during construction, are typically tolerated at vibration levels up to 12 mm/s and 5 mm/s respectively. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385 (1993): *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*, and;

- British Standard BS 5228 (1992): *Noise control on construction and open sites* Part 4 *Code of practice for noise and vibration control during piling*.

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 10 mm/s for intermittent vibration and 5 mm/s for continuous vibration. Below these vibration magnitudes minor damage is unlikely, although where there is existing damage these limits may be reduced by up to 50%. For light and flexible industrial and commercial structures threshold limits of 20 mm/s for intermittent and 10 mm/s for continuous are recommended, whilst for heavy and stiff buildings higher thresholds of 30 mm/s for intermittent and 15 mm/s for continuous are recommended.

10.5.3 Predicted Impact of Construction

A variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. There will be vehicular movements to and from the site that will make use of existing roads.

Due to the nature of the activities undertaken on a construction site, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels. The potential for vibration at neighbouring sensitive locations during construction is typically limited to excavation works and lorry movements on uneven road surfaces. Due to the proximity of sensitive locations to potential site access points, the more significant of these is likely to be uneven road surfaces. However, there is little likelihood of structural or even cosmetic damage to existing neighbouring dwellings.

Due to the fact that the construction programme has been established in outline form only, it is difficult to calculate the actual magnitude of noise emissions to the local environment. However, Table 14 indicates typical noise levels that would be expected from the proposed construction site during the various phases of the construction project.

For the purposes of the calculation, it is assumed that equipment will be operating at the southern boundary at a distance of 75 m from the nearest residential dwelling (i.e. Location 4). It must be stated that for most of the time, plant and equipment will be a greater distance from the nearest residential dwelling than that used for the calculations in Table 14 and consequently will have lesser impact. Our assessment is therefore representative of a "worst-case" scenario.

The following assumptions have been made in the preparation of these construction noise predictions:

- a utilisation of equipment of 66% over a working day;
- construction site will be screened by 2.4 m high hoarding.

There are no items of plant that would be expected to give rise to noise levels that would be considered out of the ordinary or in exceedance of the levels outlined in Table 12.

Table 14 Typical Noise Levels at nearest Residential Property during various Construction Phases.

Phase	Item of Plant *(BS5228 Ref)*	L_{Aeq} at 10 m[2] (dB)	L_{Aeq} at NSL (dB)
Site clearance/ excavation	Wheeled Loader Lorry *(C3 51)* Track Excavator *(C2 25)* Breaking Ground *(C2 2)*	84 85 81	67
Foundations	Compressor *(C6 43)* Poker Vibrator *(C6 29)* Concrete Mixer *(C6 5)*	77 86 74	65
Steel Erection	Tracked Crane *(C6 26)* Wheeled Loader Lorry *(C3 51)*	86 84	70
General Construction	Surfacing *(C8 26)* Steel panel fixing (possible riveting) Internal fit–out	80 90 70	69
Road works/ landscaping	Surfacing *(C8 26)*	80	58

10.5.4 Predicted Impact of Operation

There are five primary sources of noise in the operational context.

- building services plant;
- internal building activities;
- truck movements along site access road;
- concrete yard activities; and
- additional vehicular traffic on public roads.

Each of these primary noise sources is addressed in turn.

Note that there are no significant sources of vibration associated with the operational phase of the proposed development.

Building Services Plant

The closest off-site noise-sensitive locations are the residential properties to the northwest, south, southeast and west of the site boundaries (i.e. MP1, 2, 3 and Location 4).

The cumulative effect of noise from building services plant will be controlled such that it does not exceed a level of 40 dB $L_{Aeq,T}$ during the daytime and 35 dB $L_{Aeq,T}$ during the night-time at the façade of any nearby noise sensitive locations. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements.

These levels have been determined in order to ensure the impact of the proposed development buildings on nearby noise sensitive locations are within acceptable levels.

The proposed building services plant criteria are below the adopted operational daytime and night-time noise criteria (detailed in Section 10.5.1) based on the EPA waste licence limit values. These criteria have been derived with due consideration to measured background noise levels in the area and guidance contained BS 4142: 1997: *Method for rating industrial noise affecting mixed residential and industrial areas*.

[2] Sound Pressure Level data from *BS5228 – 1: 1997*

Taking into account the cumulative effect of building services noise from development buildings based on the above building services noise criteria, the predicted maximum noise levels at the nearest residence are 40 dB $L_{Aeq,T}$ during the daytime and 35 dB $L_{Aeq,T}$ during the night-time.

In summary, careful selection of plant items and appropriate noise and vibration control measures will be required to ensure that the impact of building services plant on the local environment will not be significant.

Internal Building Activities

Activities within the proposed new process building have the potential to generate significant levels of noise. It would be expected that the building envelope will offer the level of attenuation required to ensure that noise breakout does not exceed the adopted daytime noise limits at the façades of the nearest noise sensitive properties. This is however subject to confirmation of the proposed activities, their noise levels and detailed information in relation to the construction of the building envelope. It is recommended that a review of the building envelope be conducted as part of the detailed design of the scheme.

Truck Movements Along Site Access Road

The potential noise impact of HGVs accessing the concrete yard is assessed through consideration of the cumulative noise level associated with a series of individual events. The noise level associated with an event of short duration, such as a vehicle drive-by, may be expressed in terms of its Sound Exposure Level[3] (SEL or L_{Ax}). The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is as follows:

$$L_{Aeq,\,T} = L_{Ax} + 10\log_{10}(N) - 10\log_{10}(T) - 20\log_{10}(r_2/r_1)\ \text{dB}$$

Where:

$L_{Aeq,\,T}$ is the equivalent continuous sound level over the time period T (s);

L_{Ax} is the "A-weighted" Sound Exposure Level of the event under consideration (dB);

N is the number of events over the course of time period T.

r_2 is the distance from the edge of the entrance road to the façade of nearest property

r_1 is the distance from vehicle to the point of original measurement

The mean value of SEL for a delivery truck at low speeds is of the order of 78 dB L_{Ax} at a distance of 5 m from the edge of the road. This figure is based on a series of measurements conducted under controlled conditions.

[3] Defined as being the "A-weighted" equivalent continuous sound level which, when maintained for one second, contains the same quantity of sound energy as the actual time varying level of one event.

The site is accessed from the road to the west of the site, the nearest residential properties are located to the south (i.e. Location 4) and north (i.e. Location MP2) of the new concrete roadway, at distances of approximately 80 and 150 m respectively.

Details of truck movements have been provided by the scheme traffic consultant. From this information the 'worst case' peak HGV movements along the site access road have been calculated. The traffic report states: 'It is estimated that approximately 127 trucks will enter and leave the site on a typical working day…..In order to model an onerous condition the analysis assumes that all of the trucks enter and leave the site during the AM peak hour and also during the PM peak hour in order to robustly test the two peak periods'.

Based on the above traffic data, 127 truck movements in any 30-minute period during the daytime have been included in the calculation. This is considered an extreme 'worst-case' scenario, actual peak movements are likely to be below this figure. Taking all these factors into account, the predicted daytime noise level at the nearest residential property is:

$L_{Aeq\ (30\ minutes)} = 78 + 10\log_{10}(127) - 10\log_{10}(1{,}800) - 20\log_{10}(80/5) = 42dB$

The predicted noise level is within the daytime criterion of 55 dB $L_{Aeq\ (30\ minutes)}$

As detailed above, operations are not proposed during night-time hours; therefore the resultant impact of vehicles accessing the site during night-time hours is not significant.

Concrete Yard Activities

Goods will be delivered to and transported from the development site using a variety of vehicles that will conduct their loading/unloading activity at purpose built process building located to the southeast of the site.

The noise level at a distance of 10 m from a typical delivery yard is of the order of 62 dB $L_{Aeq,1hr}$. This noise level includes the effects of reflections from building façades and service yard boundaries and contributions from all sources of noise, i.e. vehicles manoeuvring, air brakes and trolleys.

The nearest noise sensitive location to the boundary of the proposed new concrete yard is the residential dwelling to the west of the site at a distance of approximately 105 m.

Taking into account the cumulative effect of loading/unloading activity from vehicles located on the site, attenuation due to distance, attenuation due to the screening, air and ground absorption, the predicted noise level at the nearest residence is of the order of 39 dB $L_{Aeq,1hr}$ during the daytime period.

This level is within the daytime criterion of 55 dB $L_{Aeq\ (30\ minutes)}$. Therefore, the likely noise impact of the new concrete yards is not significant. It is not envisaged that the concrete yard will be in operation during night time periods.

Additional Vehicular Traffic on Public Roads

A detailed assessment on roads and traffic has been prepared by the scheme traffic consultant. Information from this assessment has been used to determine the predicted noise levels in the vicinity of nearby roads in the area surrounding the proposed development.

When considering traffic noise, the acoustical parameters considered here is the $L_{A10(1hour)}$ expressed in terms of decibels (dB) relative to 2 x 10^{-5} Pa. The value of $L_{A10(1hour)}$ is the noise level exceeded for just 10% of the time over the period of one hour. $L_{A10(1hour)}$ is a parameter typically used in Ireland for the purposes of measuring traffic noise.

AM and PM peak hour traffic volumes with and without the proposed development for the Year 2020 are detailed in Table 15 and Table 16. The predicted increase in traffic noise level is also detailed.

Table 15 Summary of AM Peak Hour traffic flows Year 2020 and calculated relative change in traffic noise levels.

Route	Year 2020 AM Peak Hour		Relative Change in Traffic Noise (dB(A))
	Do Minimum	Do Something	
Local Road North of Site Access Road	88	437	+7.0
Local Road South of Site Access Road	87	297	+5.3

Table 16 Summary of PM Peak Hour traffic flows Year 2020 and calculated relative change in traffic noise levels.

Route	Year 2020 PM Peak Hour		Relative Change in Traffic Noise (dB(A))
	Do Minimum	Do Something	
Local Road North of Site Access Road	103	441	+6.3
Local Road South of Site Access Road	93	301	+5.1

The predicted increase in peak hour noise levels due to additional vehicular traffic is approximately 6 to 7 dB along the local road to the north of the site entrance. Reference to Table 13 confirms that such an increase will have a moderate noise impact.

The predicted increase in peak hour noise levels due to additional vehicular traffic is approximately 5 dB along the local road to the south of the site entrance. Reference to Table 13 confirms that such an increase will have a slight noise impact.

As previously discussed, the traffic report assumes that all daily vehicle movements enter and leave the site during the AM and PM peak hour periods. This is considered an extreme 'worst-case' scenario, actual peak movements are likely to be below this figure and the resultant noise impacts are expected to be less than those stated above.

10.6 Do Nothing Scenario

The existing noise environment in the vicinity of the site would remain unchanged.

10.7 Remedial and Mitigation Measures

In order to sufficiently ameliorate the likely noise impacts, a schedule of noise control measures has been formulated for both construction and operational phases.

10.7.1 Construction Phase

With regard to construction activities, reference will be made to BS5228: *Noise control on construction and open sites*, which offers detailed guidance on the control of noise and vibration from demolition and construction activities. In particular, it is proposed that various practices be adopted during construction, including:

- limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- establishing channels of communication between the contractor/developer, Local Authority and residents;
- appointing a site representative responsible for matters relating to noise and vibration;
- monitoring typical levels of noise and vibration during critical periods and at sensitive locations;
- all site access roads will be kept even so as to mitigate the potential for vibration from lorries.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- selection of plant with low inherent potential for generation of noise and/or vibration;
- erection of barriers as necessary around items such as generators or high duty compressors;
- siting of noisy/vibratory plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

It is recommended that vibration from construction activities be limited to the values set out in Table 17 below.

Table 17 Allowable Vibration During Construction Phase

Allowable vibration (in terms of peak particle velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10 Hz 3 mm/s	10 to 50 Hz 3 to 8 mm/s	50 to 100 Hz (and above) 8 to 10 mm/s

10.7.2 Operational Phase

Building Services Plant

Plant will be sited as far away from noise sensitive locations as is practicable. Proven noise control techniques will be employed to ensure that emissions from plant comply with the daytime and night-time criteria.

With regard to building services plant it is envisaged that the following may be employed:

- duct mounted attenuators on the atmosphere side of all air moving plant;
- splitter attenuators or acoustic louvres providing free ventilation to internal plant areas;
- solid barriers screening any external plant;
- anti-vibration mounts on all reciprocating plant.

Internal Building Activities

Once appropriate consideration is given to the design of building envelope as part of the detailed design phase of the project it would be considered that no further mitigation measures are required.

Truck Movements along Site Access Road

The noise impact assessment outlined above has demonstrated that mitigation measures are not required.

Concrete Yard Activities

While predicted noise levels are within the adopted criteria for daytime periods the following 'good practice' issues would be advised for the site.

It is critical that drivers making regular deliveries to site behave in a way that noise disturbance is minimised.

- vehicle engines shall not be left idling unnecessarily once on site;
- drivers should minimise impact sounds whilst working about their vehicle. This includes dropping tailgates and moving cages and pallets;
- all radios and amplified music in the truck cab shall be turned off prior to the doors being opened;
- there should be no unnecessary sounding of horns whilst on site;
- reversing alarms should be carefully selected so as to reduce the likelihood of tonal noise elements at nearby noise sensitive locations.

In addition to the above truck noise management practices, it is proposed that the following practices are adopted to minimise potential noise disturbance for neighbours.

- All mechanical plant items, e.g. motors, pumps etc, shall be regularly maintained to ensure that excessive noise generated any worn or rattling components is minimised.
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document.
- An appointed Noise Liaison Officer shall ensure that all truck drivers have been briefed and understand the requirements of the site practice. It will be the Noise Liaison Officer's responsibility to ensure that drivers are adhering to the requirements of site practice.
- The surface of the concrete yard should be smooth and continuous with no holes or ridges that would cause trolleys to vibrate unnecessarily.

Additional Vehicular Traffic on Public Roads

The noise impact assessment outlined above has demonstrated that mitigation measures are not required.

10.8 Monitoring

A review of annual noise monitoring at various locations surrounding the proposed site boundary has been conducted.

10.9 Reinstatement

Not applicable.

Chapter 11.0 – Environmental Interactions and Significance of Impacts

11.1 Introduction

This section provides an overview of environmental interactions and the significance of the impacts identified for each environmental aspect considered in this EIS. For detail of the predicted impacts the reader is referred to the individual sections.

11.2 Environmental Interactions

The interaction of environmental elements is considered within the context of each section of the EIS which considers an environmental aspect (e.g. air, noise, water, etc).

A summary table of interactions of environmental effects as considered for the proposed development is presented below for general assessment.

		Human Environment	Material Assets	Cultural Heritage	Landscape	Ecology	Surface Water and Groundwater	Traffic	Noise/Vibration	Air/Climate
1.	Human Environment				■			■	■	■
2.	Material Assets						■			
4.	Cultural Heritage				■					
5.	Landscape			■		■				
6.	Ecology				■		■			
7.	Surface Water & Groundwater		■			■				
8.	Traffic	■							■	■
9.	Noise/Vibration							■		
10.	Air/Climate							■		

11.3 Significance

The EIS has found that the negative impacts of the development on aspects such as ecology, air and climate are not significant.

The negative impacts upon aspects such as cultural heritage, traffic, water quality, groundwater, and noise, with mitigation, are not significant.

There are however, positive and long-term impacts anticipated in terms of townscape, and material assets. There is also a positive opportunity to recycle and recover wastes arising from the operation of the development.

The effect upon the human environment, while temporarily negative during construction, would be largely permanent and positive overall.

Finally, it is considered that, based on the data available in the impact study, a significant impact based on the sum of the predicted non-significant impacts does not arise in this instance.

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