



Cork County Council

Doherty Environmental

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Cork County Council.

Habitats Directive Screening Assessment

Clonakilty Landfill

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1 Introduction

The EU Birds and Habitat Directive oblige member states to establish a network of designated conservation areas known as the Natura 2000 (N2K) Network. The N2K network includes sites designated as Special Areas of Conservation (SACs), under the EU Habitats Directive and Special Protection Areas (SPAs) under the EU Birds Directive. Article 6 of the EU Habitats Directive imposes strict land-use control measures on SACs and SPAs, with Articles 6(3) and 6(4) establishing a prior authorisation process for any land-use plan or project likely to have a significant effect on an N2K site.

In the case of the Clonakilty Landfill it is has been considered necessary by Cork County Council and as part of the EPA methodology for the assessment of disused landfill sites to examine whether the landfill and/or any proposed remediation activity at the landfill will have the potential to significantly effect the integrity and conservation status of qualifying interests associated with European Sites occurring within the vicinity of the landfill site.

The approach for this Article 6 assessment broadly follows the guidelines outlined in the European Commission (2001) guidance document Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the EU Habitats Directive 92/43/EEC (to be referred to throughout this report as the "EC guidance"). The completion of an Article 6 Assessment may involve the completion of a number of assessment stages with Stage 1 Screening determining whether additional Stages in the Article 6 Assessment process are required. These stages, as outlined in the above EC guidance and in more recent guidance published by the DOEHLG¹, include:

- Stage 1 Screening for AA: This stage defines the project of activity to be assessed, establishes whether the project/activity is necessary for the conservation management of the European site and assesses the likelihood of the project having a significant effect, afone or in combination with other plans or projects, upon a European Site.
- Stage 2 AA: If a project is likely to have a significant effect, an Appropriate Assessment must be undertaken. In this stage the impact of the project to the Conservation Objectives of the European site is assessed and measures are proposed to avoid or reduce impacts so that they do not result in significant effects to the site. The outcome of this assessment will establish whether the project will have an adverse effect upon the integrity of the European site.
- Stage 3 Alternative Solutions: If it is concluded that, subsequent to the implementation of mitigation measures, a project has an adverse impact upon the integrity of a European site, it must be objectively concluded that no alternative solutions exist before the project can proceed to Stage 4.
- Stage 4 IROPI: Where no alternative solutions exist and where adverse impacts remain but imperative reasons of overriding public interest (IROPI) exist for the implementation of a project, an assessment of compensatory measures that will effectively offset the damage to the European Site will be necessary.

The remainder of this report outlines the results of a Stage 1 Screening Assessment.

2 Stage 1: Screening

The function of the Screening Assessment is to identify whether or not the project will have a likely significant effect on European Sites. In this context "likely" refers to the presence of doubt with regard to the absence of significant effects (ECJ case C-127/02) and "significant" means not trivial or inconsequential but an effect that

¹ Department of the Environment Heritage and Local Government (DEHLG) (2010). *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. Second Edition, February, 2010

has the potential to undermine the site's conservation objectives (English Nature, 1999; ECJ case C-127/02). In other words, any effect, which would compromise the functioning and viability of a site, and interfere with achieving the conservation objectives of the site, would constitute a significant effect.

The nature of the likely interactions between the landfill and the integrity of European Sites will depend upon the sensitivity of the European Site's qualifying features to potential impacts arising from the landfill; the current conservation status of the European Sites occurring within the sphere of influence of the landfill; and the likely changes to water quality that will result from activities associated with the landfill, in combination with other plans and projects.

The EC guidance outlines the steps involved in undertaking a Screening Assessment, which involves the following:

- 1. Describe the project and determine whether it is necessary for the conservation management of European Sites;
- 2. Identify and describe the European Sites likely to be influenced by the project;
- 3. Assessment of the likely effects of the project and whether they are (alone or in combination with other plans or projects) likely to adverse effect any European Sites; and
- 4. Screening Conclusions.

2.1 Description of the Landfill and Relationship with European Sites

2.1.1 Site & Project Description

The disused landfill site is located on the southern outskirts of Clonakilty town (G.R. V12285 52345). The site is located at approximately <10m, OD Malin and is located immediately adjacent to Clonakilty Estuary. The estuary bounds the site to the north and east. Clonakilty town is located to the west of the site while agricultural pasture is the dominant landuse to the south of the site. The Feagle River feeds Clonakilty Estuary, which combines with Inchedony Estuary to form Clonakilty Bay.

The site operated as a waste disposal facility between the 1950's and 1999. The landfill site is separated into three distinct area (Areas A, B & C) based on previous disposal patterns within the site. These areas as well as the footprint of the landfill site are shown in Figure 2.1. Area A contains waste of over forty years old. The land cover in this area of the site is dominated by amenity grassland.

The Clonakilty Sewage Treatment plant occupied the footprint of Area B. Only minor amounts of waste remain within Area B as the majority of the waste from this Area was moved to Area C during the construction of the treatment plant.

The Model Railway Village building and car park occupy the footprint of Area C. The waste in this area of the site is characterised by typical mixed domestic and commercial waste to a maximum depth of 4.2m below ground.

The habitats occurring within and surrounding the Clonakilty Landfill site are described in the following sub-sections.

Terrestrial Habitats

The terrestrial habitats recorded within the survey area are outlined below. Four broad (Level 1) habitat groups were identified within the site area:

- 1. Grassland
- 2. Woodland & Scrub; and
- 3. Exposed Rock and Disturbed Ground
- 4. Cultivated and Built land.

Each of the broad habitats and the individual habitats (Level 3 habitats) making up these broad groups are described below. Habitats that represent a transition between two individual habitats will be described in the text below under the Level 3 habitat that they most resemble and details of such transitions will be outlined.

Grassland

The grassland habitats identified within the site have been classified as:

Amenity Grassland (GA2)

Amenity grassland is located within the site. This is an intensively managed artificial habitat supporting a low range of floral diversity. The low sward supports adimited number of grass and herb species.

Woodland and Scrub

The woodland and scrub habitats identified within the site have been classified as: ion

- Scrub (WS1)
- Treeline (WL2)

CORY Scrub is located towards the north of the site along the boundary between the site and the estuary. The scrub is dominated by gorse (*Ulex europaeus*) and bramble (*Rubus fruticosa* agg.).

A mature coniferous treeline is located along the western boundary of the site.

Exposed Rock and Bare Ground

The exposed rock and bare ground habitats identified within the site have been classified as:

Recolonsing bare ground (ED3) •

This habitat is assigned in areas of bare or disturbed ground where vegetation cover is greater than 50%. Vegetation associated with this habitat is generally dominated by ruderal (weed) species such as bramble, creeping buttercup (Ranunculus repens), ragwort (Senecio jacobaea) etc.

Cultivated and Built Land

The cultivated and built land habitats identified within the site have been classified as:

Buildings and artificial surfaces

This habitat is characterised by a control house and paved surfaces occurring within the site. few plant species can colonise this artificial habitat.

Coastal & Marine Habitats

The marine habitats recorded adjacent to the site are outlined below. Marine habitats were recorded in line with the Guide to Habitats in Ireland (Fossit, 2000). Reference is also made to corresponding JNCC classification system for marine habitats in Britain and Ireland (Connor et al., 2004). In addition to this the results of marine habitat surveys undertaken in 2005 (*Limosa Environmental, 2006*) are also presented in this section.

The following broad coastal and marine habitats, as outlined in the Guide to Habitats in Ireland (Fossit, 2000), have been identified adjacent to the site:

- Coastal Habitats;
- Littoral (intertidal) habitats; and
- Marine Water Body.

Coastal Habitats

The coastal habitats identified adjacent to the site were classified as:

- Tidal Rivers (CW2); and
- Sea walls, piers and jetties (CC1).

Littoral (intertidal) Habitats

The littoral (intertidal) habitats identified adjacent to the site were classified as:

• Littoral muds (LS4)

A detailed habitat assessment of the littoral mud habitats was undertaken within Clonakilty Bay during 2005 (Limosa Environmental, 2006), This assessment followed the JNCC classification system which divides habitats into biotopes based on the distribution and abundance of flora and fauna species and the distribution of sediment types. During this assessment the following biotopes associated with littoral mud habitats were identified:

LS.Lmu.UEst - Polychaete / oligochaete dominated upper estuarine mud shore

LS.Lmu.Uest.Hed.OI – Hediste divrsicolor and oligochaetes in littoral mud

LS.Lmu.MEst – Polychaete / bivalve dominated mid estuarine mud shores

LS.Lsa.MUSa – Polychaete / bivalve dominated muddy sand shores

LS.Lsa – Littoral sand

The area of the estuary immediately adjacent to the disused landfill site is characterised by Polychaete / oligochaete upper estuarine mod shores.

Marine Water Body Habitats

The marine water bodies identified adjacent to the site were classified as:

• Estuaries (MW4)

Clonakilty Estuary exhibits intertidal mud and sandflat habitats as outlined above. flowering plants are not abundant within the estuary. Remnants of macroalgae mats comprised of the filamentous green macroalga *Enteromorpha* spp. were recorded within the mudflat habitats of the estuary. *Ulva*

lactuca was also noted within this habitat adjacent to the site. Brown seaweed (*Fucus* spp.) were noted along the estuaries high-water shore line.

Proposed Activities at Clonakilty Landfill

No remedial land use activities are proposed for Clonakilty Landfill. Future activities to be undertaken or coordinated by Cork County Council at the landfill site will involve quaterly monitoring in services ducts and within the buildings now located within the footprint of the disused landfill to confirm the absence of landfill gas.

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2.2 Identification and Description of European Sites

2.2.1 Identification of European Sites

Current guidance on undertaking EU Habitats Directive Article 6 Assessments advises that all European Sites occurring within a 15km radius of a project site should be included within a Screening Assessment (Scott Wilson *et al.*, 2006; DOEHLG, 2010). Three SACs and three SPAs occur within the surrounding 15km radius of the site. These sites as shown in Figures 2.3 and 2.4 below.

The European Sites occurring within the landfill's sphere of influence and the projects potential to effect European Sites depends upon the location of European Sites with respect to the landfill and the sensitivity of European Site qualifying features to landfill-derived contamination. As no future land use is proposed at the landfill site the potential for likely significant effects will be restricted to landfill-derived contamination of qualifying habitats or species.

A Source-Pathway-Receptor (SPR) impact model is used to establish which European Sites occur within the sphere of influence of the landfill site. The Environmental Protection Agency (EPA) has published specific guidance for assessing the environmental risk of landfill sites in their guidance document *Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites* (2007). The risk assessment methodology outlined in this guidance document is based upon the SPR model for environmental management.

This guidance document identifies leachate and landfill gas as the principal sources of landfill-derived contamination. With regard to leachate the guidance document outlines five potentially sensitive receptors, one of which includes protected areas such as European Sites. The guidance document identifies human presence as the only significant and potentially sensitive receptor to landfill gas. Therefore this Screening Assessment focuses on the potential for leachate, migrating from the Clonakilty Landfill site to result in likely significant effects to European Sites.

The potential pathways for leachate migration to receptors such as European Sites include:

- vertical movement to the water table or aquifer where groundwater is the receptor to be considered;
- vertical movement to an aquifer and then horizontally in the aquifer to a receptor (i.e. a water body, or in the case of the Clonakilty Landfill the waterbodies of the Clonakilty Bay SAC and SPA); and
- Horizontally at the ground surface or at shallow depth to a surface receptor (i.e. Clonakilty Bay SAC and SPA).

Leachate migration from the Clonakilty Landfill site is likely to be a risk to receptors such as water-based habitats and species listed as qualifying features for European Sites occurring in the immediate vicinity of the landfill or downstream of an impact pathway.

Clonakilty Bay SAC and SPA are the only European Sites occurring within the vicinity or downstream of a potential impact pathway. All other European Sites occurring within a 15km buffer of the landfill are not linked to the landfill or contaminant/hazard sources such as leachate by impact pathways. Thus the remainder of this Screening Assessment focuses on the potential for leachate migration from the Clonakilty Landfill to result in likely significant effects to the Clonakilty Bay SAC and SPA. All other European Sites are screened out at this stage of the assessment.





2.3 European Sites Baseline and Sensitivity

Table 3.1 provides information on the following elements associated with Clonakilty Bay SAC and SPA:

- Qualifying interests;
- Site sensitivity/vulnerability;
- Current Conservation Status; and
- Threats.

As noted above the qualifying interests are the features for which each site has been designated as a European Site under the Habitats Regulations.

At the time this assessment was undertaken, no Conservation Management Plan was available for this European Site. In the absence of these plans a list of generic conservation management objectives (CMOs) have been provided by the NPWS. These are:

• To maintain the bird species of special conservation interest, for which the SPA has been designated, at favourable conservation status.

Favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range is stable or increasing, and
- The ecological factors that are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable as defined below.

Favourable conservation status of a species is achieved when:

- Population data on the species concerned indicate that it is maintaining itself, and
- The natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Table 2-1: European Sites Qualifying Interests

EUROPEAN Site	Location	Qualifying Interests	Site Sensitivity	Conservation Status	Threats
000091 – Clonakilty Bay SAC	Adjacent to the Landfill Site	Mudflats and sandflats not covered by seawater at low tide	Surface and marine water dependent. Moderately sensitive to hydrological change. Moderate sensitivity to pollution. Changes to salinity and tidal regime. Coastal development	Poor	The most serious threats to this habitat arise from aquaculture, fishing, bait digging, removal of fauna, reclamation of land, coastal protection works and invasive species, particularly cord-grass. In addition, there is some concern over the potential impact that hard coastal defence structures may have, n combination with sea-level rise, for the long-term extent of this habitat.
		Annual vegetation of drift lines	Recreation and removal of parent material rot ret	ç [₽] oor	The main threats to this habitat arise from recreational uses, including trampling, horse riding, vehicle use and mechanised removal of tidal litter.
		Embryonic shifting dunes	Overgrazing, and erosion. Changes in management.	Poor	Threats to this habitat include both natural and man- made processes. These include natural erosion processes, which can be exacerbated by recreation and sand extraction. Construction of coastal protect can also cut off the supply of sand that is vital for the natural functioning of this habitat.
		Shifting dunes along the shoreline with	Recreational pressure. Overgrazing, and erosion. Changes in	Bad	Threats to this habitat include the removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction

			management.		caused by vehicles and trampling.
		Ammophila arenaria (white dunes)	Recreational pressure. Overgrazing, and erosion. Changes in management.	Bad	Threats to this habitat include the removal of beach material and interference with the supply of sand; construction of coastal defences; sand compaction caused by vehicles and trampling.
		Fixed coastal dunes with herbaceous vegetation (grey dunes)	Recreational pressure, inadequate grazing and invasive species.	Poor	Recreational impacts from pedestrian traffic and vehicle use, which can lead to the destruction of the vegetation cover, eventually leading to the exposure of bare sand, which becomes mobile.
		Atlantic decalcified fixed dunes (Calluno- Ulicetea)	Recreational, inadequate grazing and removalsed of material For Just	S Bat	The main pressures are agricultural improvement, overgrazing by cattle, undergrazing (leading to scrub encroachment), restructuring of agricultural land holdings, intensive stock feeding and the development of sand quarries.
004081 -	Adjacent	The listed qualifying	Loss of habitat or	Shelduck –	No information is currently available on the
Clonakilty Bay SPA	to the Landfill Site	features of interest for this SPA include: Shelduck (<i>Tadorna</i> <i>tadorna</i>) Dunlin (<i>Calidris</i>	fragmentation, Highly sensitive to hydrological changes	Amber listed. Dunlin – Amber listed Black-tailed	threats to the qualifying features of this site.
		aipina) Black-tailed Godwit (Limosa limosa)	Increased disturbance	Godwit – Amber listed	

Curlew (Numenius		Curlew – Red	
arquata)		listed	
Waterbirds			
Waterbirds			
Aside from			
supporting			
internationally			
important			
populations of the			
above listed species		øj .	
this SPA also		not We	
supports the		N. A	
following species		es Official	
listed on Annex 1 of	3	at Postine	
the EU Habitats	ion P	St tor	
Directive: Golden	SPectown	\$	
Plover, Bar-tailed	FOLINISH		
Godwit, Little Egret	fcop,		
and Short-eared	sento		
Owl.	Con		

3 Assessment of Effects

Describe the individual elements of the project that could give rise to impacts (either alone or in combination with other plans or projects) on the European Site.

As outlined above in Section 2.2 the emission of leachate from the landfill to the Clonakilty Bay SAC and SPA adjacent to the site represents the only element of the project that may have the potential to give rise to likely significant effects.

A detailed assessment of effects has been undertaken using the Assessment Criteria outlined in the European Commissions guidance document *Assessment of Plans and Projects Significantly Effecting European Sites* (2001) and the National Appropriate Assessment Guidelines (2010 as updated).

Table 3.1 outlines the Assessment Criteria against which the project is examined for its potential to result in likely significant effects to the Clonakilty Bay SAC and SPA.

The assessment outlined in Table 3.1 below should be read in conjunction with the Clonakilty Tier II Site Investigation Report, prepared by Cork County Council (2011) and Quantitative Risk Assessment (QRA) prepared by O'Callaghan Moran Consultants (2010).

ontor

Table 3-1: Assessment of Likely Significant Effects to European Sites

Assessment Criteria	

Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the European Site by virtue of

Size and Scale	The project site occupies an area of land approximately 4 Ha in size. Area A is 0.68 Ha, Area B is 1.82 HA and Area C is 1.58 Ha.
Land-take	The project will not involve any land take from European Sites.
Distance from	The project site is located immediately adjacent to Clonakilty Bay SAC and
European Sites	SPA.
or key features	
of the site	
Resource	No resources associated with European Sites (e.g. water or mud/sand for
requirements	abstraction etc.) will be required for, or utilized by the project.
Emissions	Leachate emissions from the landfill to the adjacent SAC and SPA is
	considered to represent the only process by which the landfill could have the

potential to result in likely significant effects.

A detailed assessment of leachate emissions from the landfill site has been undertaken by Cork County Council.

These assessments were undertaken following the guidance outlined in the EPA's guidance document *A Code of Practice: Environmental Risk Assessments of Unregulated Waste Disposal Sites* and included a Tier I, Tier II Site Investigation and Tier III Quantitative Risk Assessment.

As part of these assessments sampling was undertaken throughout the site to characterise the waste material at the landfill. Sampling of surface water and sediments adjacent to the site was also undertaken to investigate whether leachate-derived contamination was occurring within the estuary. (See the Clonakilty Tier II Site Investigation Report for maps detailing the location of all sampling points).

The results of the Tier I, Tier II and Quantitative Risk Assessments characterizing the waste material and investigating whether leachate was migrating from the landfill and effecting the status of the estuary adjacent to the landfill are outlined below.

Characterisation of the Waste Material & Leachate

With regard to the characterization of the waste material the Tier I and Tier II Exploratory investigations resulted in the following assumptions concerning the waste material at the landfill site:

- 1. the majority of the waste in Area B was moved to Area C during the construction of the Sewage Treatment Plant; and
- 2. Waste in Area A is over 40 years old and is composed of mainly inorganic waste.

During the Tier II Investigations leachate samples were taken from three locations (Leachate 1, 4 & 7) within Area C, where the majority of the waste material is contained within the landfill site. Analysis of the leachate samples showed that 90% of the values for parameters analysed were below the median values for landfills that are in Stage III and Stage IV of the degradation process. The Tier II Investigation report also noted that 70% of the values that are under the Median values are an order of 10 below those median values. These values coupled with a reported low BOD to COD ratio less than 0.1 led to a conclusion that the waste material at Clonakilty Landfill is likely to be in late Stage IV or Stage V (aerobic Stage) of the biodegradation process. It is noted that the BOD to COD ratio of less than 0.25, which is typical of methanogenic phase leachate (EPA, 2000). The relatively low levels of ammonia recorded from the leachate samples also supports the conclusion that the waste material is representative of Stage IV or Stage V degradation.

Ammonia levels were particularly low in samples taken at Leachate 4 (1.01
mg/l N) and Leachate 7 (16.47 mg/l N). A higher level was recorded at
Leachate 1 (138.67 mg/l N) but this was still considerably lower than typical
ammonia levels associated with acetogenic (i.e. Stage III) and methanogenic
(i.e. Stage IV) landfills which are 194mg/l N and 283mg/l N respectively.
Considering the late stage of the degradation process at the landfill site it is
likely that the ammonia levels associated with landfill leachate are naturally
decreasing with time as the waste material continues through Stage V of the
degradation process.

On foot of the recommendations of the Exploratory Tier II investigations the Tier II Main Investigation undertook additional analysis to further characterise the waste material at the landfill site. Two waste samples were taken within Area C, the portion of the site containing the majority of the landfill waste material. The results of this analysis indicated that the waste material at the landfill site is representative of inert waste material (see Section 4.2.3 of the Tier II Site Investigation Report).

Surface Water Quality Adjacent to the Landfill Site

The Tier I and Exploratory Tier II Investigations resulted in an assumption that lateral migration of leachate from the landfill is minimal due to the installation of an impermeable geo membrane surrounding all areas of the landfill.

The Tier II Investigation undertook surface water sampling to further investigation the potential for lateral migration of leachate from the landfill to the estuary.

Three surface water samples (SW1, SW2, SW3) were collected from Clonakilty Bay adjacent to the landfill site. One groundwater sample (GW1) was taken immediately adjacent to the southeastern boundary of the landfill. The Tier II report lists the parameters analysed from these samples and noted exceedances of Environmental Quality Standards for a number parameters. The parameters and sampling points at which exceedances were noted are outlined below.

- Iron at SW2 and GW1;
- Lead at GW1; and
- Ammonia at all sampling points.

High conductivity, magnesium, sulphate and chloride were also recorded but the elevated levels are considered to be due to the saline conditions at Clonakilty Bay.

The exploratory Tier II investigations stated that the elevated ammonia, iron

and lead recorded in surface water samples may be arising from the landfill and that the landfill could be having a minor impact on surface water quality and thus presenting a risk to the Clonakilty Bay SAC and SPA.

The elevated levels of ammonia outlined in the Tier II Report are based upon Environmental Quality Standard (EQS) of 0.02mg/l for total ammonia. However it is noted that the EQS's from a number of statutory regulations and other guidelines specify a higher EQS for total ammonia. For instance the Salmonid Water Regulations (SI No. 293 of 1988) EQS for total ammonia is less than 1mg/l N (subject to conforming with the standard for non-ionized ammonia which is 0.02mg/l NH₃). More recently the Surface Water Regulations of 2009 set standards for high and good ecological status of <0.04 mg/l N and <0.065 mg/l N respectively for total ammonia in freshwater bodies. No standards for coastal waters are outlined in these regulations.

The Marine Institute established water quality guidelines for the classification of Irish coastal waters as part of their Quality Standard Report (Marine Institute, 1999). These guidelines established a lower and upper limit of <0.2mg/l N and >1mg/l N for total ammonia. The lower limits set for non-ionized ammonia were <0.02mg/l NH₃ (reflecting the EQS outlined in the Tier II report), while the upper limits were set at >0.05mg/l NH₃.

When assessed against the Marine Institute water quality guidelines, the total ammonia (mg/l as N) recorded at two of the surface water samples (SW1 & SW2) are within the low levels while the third at SW3 is representative of a moderate level.

The location of SW3 is upstream of Area B and Area C where the majority of the waste material is located. Conversely SW 1 which recorded low levels of total ammonia is located downstream of Area C. When considering the location and results of the surface water quality analysis the Quantitative Risk Assessment (QRA) concluded that, while the water quality of the River Feagle is impacted, the source of the impact (within the estuary) appears to originate upstream from the landfill site.

The Quantitative Risk Assessment goes on to state that "during the Tier II Site Investigations no direct drainage was observed between the landfill and the Estuary. A substantial portion of the land area where waste is present i.e. Areas B and C is covered by hardstanding therefore rainfall infiltration is limited and the pathway from the landfill to the estuary is greatly inhibited".

The QRA also noted that no significant groundwater pathway links the landfill to the surrounding estuary.

The results of the water quality sampling, with low levels of typical leachate contaminant recorded downstream of the landfill site supports the

contention that no pathway links landfill leachate to the surrounding estuary.

Considering the QRA assessment; the results of the surface water analysis which did not display any significant perturbations to water quality at SW1 downstream of the landfill; the presence of impermeable surfaces overlaying the waste material; and a geo-membrane surrounding the landfill it is considered that no impact pathway facilitates the emission of leachate to surrounding surface waters in the Clonakilty Bay SAC and SPA.

In light of the above it is also considered that the elevated levels of iron and lead recorded in surface water samples are associated with other source such as riverine inputs and are not derived from the landfill leachate.

Sediment Quality Adjacent to the Landfill Site

Sediment samples in the estuary adjacent to the landfill site were analysed as part of an Ecology Study undertaken during the Tier II Main Investigation. The sediment samples were analysed for a suite of metal parameters typically associated with landfill leachate. The recorded levels of all metal parameters were very low and within sediment quality standards established in the UK, Netherlands and Norway. The Ecology Report referred to previous analysis of sediments taken near the landfill site in 2005 as part of the Ecological Impact Assessment of the Clonakilty Waste Water Treatment Plant upgrade. Levels of chromium, nickel and zinc above the UK (MAFF) in-house sediment quality standards were recorded for these samples. However the 2005 Ecological Report (Limosas Environmental, 2005) noted that the slightly elevated levels of metals recorded within this sample were likely to be derived from the Clonakilty Waste Water Treatment Plant and riverine inputs.

Leaching tests carried out on the 2009 sediment samples recorded very low leachable levels for the metal parameters analysed.

The 2009 sediment samples were also analysed for concentrations of ammonia leachate. The levels recorded at Sample 1 was 60.98mg/l N and Sample 2 was 39.45mg/l N. Considering the lack of impact pathways facilitating the migration of leachate from the landfill to the estuary, as outlined in the QRA, it is likely that the source of nutrients within the sediment samples are derived from other processes such as a riverine inputs. The very low levels of metals typically associated with leachate contamination in the sediments further suggests the lack of interaction between landfill leachate and the areas of the estuary from where samples were taken.

Summary of Leachate Emissions

In light of the finding of the Tier II Investigations and QRA it is considered that leachate generated at the landfill site is not interacting with the Clonakilty Bay SAC and SPA and is not posing a threat to the conservation status of qualifying

	features associated with these European Sites.
Excavation requirements	The project will not involve any excavations from European Sites.
Transportation requirements	No transportation requirements are associated with the landfill.
Duration of the project	The landfill is assessed as being in the latter stages of degradation. As the degradation process continues through Stage V the concentration of contaminating parameters such as ammonia will decrease. However the time required for the establishment of benign conditions within the leachate cannot be estimated.
Other	See Below
Describe any likel	y changes to the European site arising as a result of:
Reduction of habitat area	No changes of land-use are associated with the project and the landfill will not result in a reduction in habitat extent.
Disturbance of key species	The key species associated with the Clonakilty Bay SAC and SPA include the invertebrate assemblages of estuarmer habitats such as mudflats and the qualifying bird species for which the site is designated an SPA. The landfill is not considered to be disturbing key species due to the lack of direct pathways via lateration vertical migration of leachate between the land fill site and the estuary of the site is designed.
Habitat or species fragmentation	The landfill does not pose a threat of habitat or species fragmentation within or adjacent to the Clonakilty Bay SAC and SPA.
Reduction in species density	As no impact pathway links the landfill and leachate generated within the landfill to the Clonakilty Bay SAC and SPA, there will be no potential for the landfill to result in reductions of species densities within the surrounding estuary.

Changes in key indicators of conservation status	The European Commission (2006) Explanatory Notes and Guidelines for the Assessment, Monitoring and Reporting under Article 17 of the Habitats Directive outlines key indicators for assessing the conservation status of designated sites. The key indicators for assessing the conservation status of key species i.e. species listed on Annex 1 of the EU Birds Directive and Annex 2 of the EU Habitats Directive are:		
	<i>Range:</i> as outlined above the elements of the landfill will not result in direct or indirect impacts to European Sites. Therefore the distribution of qualifying species associated with European Sites will not be altered by the project.		
	<i>Population:</i> As the leachate generated within the landfill will not result in direct or indirect impacts to European Sites the populations of qualifying species will not be affected;		
	Habitat for the species: As direct or indirect impacts to European Sites are not predicted to occur, habitats which support foraging qualifying species will not be affected by the project; and		
	Future Prospects: As the landfill will not result in direct or indirect affects to European Sites the future prospect of the qualifying interests of this site will not be affected.		
Climate change	There is currently insufficient information to predict the effects of climate change on the site. It is predicted that on a national level winters will become wetter and summers driver but the effect on local precipitation is unknown.		
Describe any likel	y impacts on the Boropean Site as a whole in terms of:		
Interference with key relationships that define the structure and function of the site	Clonakilty Bay functions as a key over-wintering area and breeding ground for a number of bird species. The invertebrate assemblages and flora associated with estuarine habitats ensure that this site functions as a key foraging resource for qualifying bird species. Marine and freshwater processes underpin the structure of the Clonakilty Bay. As no linkages occur between the landfill site and the bay there is no risk of impact affecting this European Site.		
Describe from th where the above is not known.	Describe from the above the elements of the project or plan or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known.		
Detailed investiga or not an SPR link Clonakilty Bay SAC	tions have been undertaken at the Clonakilty Landfill site to establish whether cage exists between the landfill and the surrounding estuary which forms the C and SPA.		

As part of this assessment it has been established that the waste material at the landfill site is representative of inert waste in the latter stages of degradation. These characteristics of the waste material are likely to limit the levels of contaminants associated with any leachate generated within the landfill.

The potential for leachate generation at the landfill is inhibited as a substantial portion of where the waste is located (i.e. within Areas B and particularly C) is covered by impermeable hardstanding that limits rainfall infiltration.

A silt/clay layer is located beneath the waste material. This layer is of low permeability and greatly inhibits the vertical migration of leachate from the landfill site.

An impermeable geo-membrane surrounds all areas of the landfill site.

Due to these factors is has been concluded that no direct pathway exists to facilitate the migration of leachate to the surrounding estuary. As such the landfill does not pose a threat of contamination to the Clonakilty Bay SAC and SPA adjacent to it.

4 Screening Conclusions

This Stage 1 Screening Assessment has resulted in a Finding of No Significant Effects to the Clonakilty Bay SAC and SPA, which represent the only European Site occurring within the potential sphere of influence of the project site.

As the implementation of the proposed project will not result in likely significant effects to European Sites a Stage 2 Appropriate Assessment is not required.

For instruction

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