

**Kealanine Landfill Site**  
**Proposed Remedial Solution**  
**Article 6 Appropriate Assessment**  
**Screening Report**

**DOCUMENT CONTROL SHEET**

<b>Client:</b>	Cork County Council					
<b>Project Title:</b>	Kealanine Landfill Site Proposed Remedial Solution					
<b>Document Title:</b>	Article 6 Appropriate Assessment Screening Report					
<b>Document No:</b>	RPS/MCE0761RP002AAF01					
<b>This Document Comprises:</b>	<b>DCS</b>	<b>TOC</b>	<b>Text</b>	<b>No. of Appendices</b>	<b>List of Figures</b>	<b>List of Tables</b>
	1	1	19	1	1	1

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A01	Client Approval	A. Fitzgerald	K. Banks	C. Doyle	Cork	01/07/2014
F01	Final issue	A. Fitzgerald	<i>K. Banks</i>	<i>C. Doyle</i>	Cork	15/07/2014

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# 1 INTRODUCTION

This report comprises information in support of screening for an Appropriate Assessment in line with the requirements of Article 6(3) of the EU Habitats Directive (Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora; the Planning and Development (Amendment) Act 2010; and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) as part of the proposed remedial solution for Kealanine Landfill site as determined by the Tier 3 Risk Assessment prepared for the site.

## 1.1 BACKGROUND

Under Section 22 of the Waste Management Act 1996 Cork County Council has an obligation to carry out an inventory and risk assessment of all closed landfill sites. To assist Local Authorities in complying with Section 22 of the Waste Management Act, the Environmental Protection Agency (the Agency) published a guidance document called 'Code of Practice- Environmental Risk Assessment for Unregulated Waste Disposal Sites' and Site Investigation Matrices (EPA, 2007).

The Code of Practice provides guidance to local authorities in relation to the investigation of old landfill sites that operated between 1977 and 1997 without the proper permitting and authorising system. As part of the process RPS undertook a review of the Tier 1, Draft Tier 2 and Draft Tier 3 Risk Assessments to confirm that the risk assessment was adequate and compliant with the Code of Practice. A remedial solution for the landfill site was put forward as part of the Tier 3 Risk Assessment.

The remedial solution put forward as a consequence of the Tier 3 Risk Assessment is the subject of this Appropriate Assessment Screening. Details of the proposed solution are provided in **Section 2.1** below.

## 1.2 LEGISLATIVE CONTEXT

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as "The Habitats Directive", provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/ECC) as codified by Directive 2009/147/EC.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):-

*Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public. Article 6(4) states:*

*If, in spite of a negative assessment of the implications for the [Natura 2000] site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*

### 1.3 STAGES OF THE APPROPRIATE ASSESSMENT

Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this AA screening has had regard to the following guidance:-

- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government. <http://www.npws.ie>
- Managing Natura 2000 Sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC, referred to as MN2000, European Commission 2000; <http://ec.europa.eu>
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, referred to as the "EC Article 6 Guidance Document (EC2000); <http://ec.europa.eu>
- Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. <http://ec.europa.eu>

In complying with the obligations under Article 6(3) and following the EC2000 and MN2000 Guidelines, this AA has been structured as a stage by stage approach as follows:-

#### 1) Screening Stage

- Description of the project;
- Identification of Natura 2000 sites potentially affected;
- Identification and description of individual and cumulative impacts likely to result;
- Assessment of the significance of the impacts identified above on site integrity;
- Exclusion of sites where it can be objectively concluded that there will be no significant effects;
- Screening conclusion.

## 2 SCREENING

### 2.1 DESCRIPTION OF THE PROJECT

#### 2.1.1 Location and Site Description

The landfill site is located at Kealanine (NGR 97620 55014) approximately 5km east south east of Glengarriff and 7km north northwest of Bantry. The site is located approximately 1.5km off the N71 (Bantry to Castletownbere road) via a local road. The landfill covers an area of approximately 1.6ha.

Detailed waste disposal records are unavailable for the landfilling operations as the facility operated unsupervised for a number of years. It is reported that most of the waste deposited was municipal but some wastewater sludge, end of life vehicles and oily waste was also deposited. An unknown quantity of oily waste originated from the oil spill that occurred after the Whiddy Island disaster in 1979. The oily waste was blended with municipal waste and deposited in the eastern section of the site. A small quantity of offal is also reported to have been deposited. It is estimated that the landfill contains in the region of 90,000m<sup>3</sup> of waste material. Based on a waste density of 1 tonne per m<sup>3</sup> it is likely that in the region of 90,000 tonnes of material is likely to have been deposited.

The historic maps for the area, the OSI 1:10,560 sheets and the 25" maps show that the stream along the southern boundary of the site predates the development of the landfill.

The landfill site is located in an area of rugged topography with bedrock outcrops forming ridges separated by areas of blanket peat. The surrounding land is used for rough grazing of sheep and horses. The historic maps for the area are available to view on the OSI website and confirm the marshy/boggy nature of the ground and outcropping bedrock prior to the commencement of landfilling operations.

Temporary cover material was installed on top of the waste body in 1999. The site investigation indicates 0.20m to 0.30m of topsoil was placed on the waste body, compacted and reseeded. Vegetation is well established on site and includes rushes over the top and sides of the waste mound. The historic aerial photographs show that vegetation has been well established since at least 2005. The slopes of the site are covered by scrub in places and trees are well established on the base of the side slopes along the northern and southern boundaries of the site.

#### 2.1.2 Hydrology

The site is located within the surface water catchment of the Coomhola River. A tributary of the Coomhola River rises in the immediate vicinity of the site. The stream originates (rises) in the area of ground approximately 50m south west of the western site boundary. The stream flows in a north easterly direction at a minimum distance of 15m from the base of the waste mound. This stream is culverted under the access road to the site. The tributary joins the Coomhola River approximately 2km downstream of the landfill site at a location approximately 300m upstream of Coomhola Bridge. The Coomhola River discharges to the sea approximately 1.5km downstream of Coomhola Bridge. There is an EPA water quality monitoring station located at Coomhola Bridge with a high status (Q4-Q5) currently indicated.

The stream which is located south of the landfill is indicated on the historic ordnance survey maps for the area. There is also an additional surface water flow from the higher ground to the north of the site. This flows over the rock outcrop to the north of the site and skirts outside of the northern boundary of the site. The two streams join approximately 70m downstream of the landfill site.

There are a series of drains on the north western side of the site and the southern boundary of the site. These drains collect surface water runoff from the landfill site in addition to surface water runoff from the higher ground to the north west of the landfill. The drains do not directly connect to the southern stream but the water from the perimeter drains discharges to the boggy ground approximately 30m from the stream.

There is also ponding of surface water occurring in a localised low point along the eastern boundary of the site, north of the former site entrance gate. This surface water drains to the eastern tributary stream.

## 2.2 SUMMARY OF EXISTING SITUATION WITHOUT REMEDIATION

A generic quantitative risk assessment (QRA) has been completed on the landfill site based on the site investigation and environmental monitoring carried out in 2010, 2011 and 2014.

The results of the assessment indicate that the leachate is of low strength when compared to ranges quoted for typical leachate concentrations. The hydrocarbon concentrations in the east of the site are considered to be hotspot concentrations. The main contaminants of concern identified in the leachate were iron, manganese, ammonia and hydrocarbons. The main parameters of concern in relation to the potential impact on the surface water in the vicinity of the site are ammonia, iron and manganese. There is no evidence of metals or hydrocarbons presenting a risk to the surface water down gradient of the site. The February 2014 results indicate no issue in relation to the concentration of iron and manganese down gradient of the site. The landfill is having an impact on the ammonia concentration in the immediate vicinity of the site but the level returns to within background concentrations 400m down gradient of the site.

In relation to the groundwater quality the main parameters of concern are iron, manganese, ammonia and hydrocarbons. Based on the available monitoring data there is no evidence of significant groundwater contamination in the vicinity of the site.

The site investigation results indicate that there is a limited amount of material which could be classed as hazardous under the European Waste Catalogue and Hazardous Waste List. The environmental monitoring data indicates that the landfill is not having a significant effect on the groundwater or surface water down gradient of the site. The risk to human health based on the measured concentrations of contaminants in the soil / waste are considered to be low while the site remains in its current use and form. The seepage of leachate is occurring along the central area of the eastern boundary of the landfill site. The installation of a permanent capping system is recommended to reduce the leachate generation and leachate seepage.

In relation to gas; due to the distance of neighbouring properties from the landfill, the gas levels are not considered to pose a risk to neighbouring properties and were not included in the QRA. Methane is still being generated at the site and this would need to be taken into account in the detailed design of any capping layer.

The quantitative risk assessment indicates that the waste material does not pose a significant risk to the groundwater down gradient of the site. The main risk relates to the surface water quality in the immediate vicinity of the site. Based on the dilute nature of the leachate present at the site and the results of the surface water and groundwater quality monitoring a risk classification of moderate is deemed as being more appropriate to the site.

## 2.3 PROPOSED REMEDIAL SOLUTION

The Tier 3 Risk Assessment recommended that the preferred option to remediate any effects is the installation of a low permeability barrier which would limit the amount of water that could enter the landfill and therefore restrict the decay of the waste and the generation of contaminated leachate.

It is considered that this is a more appropriate, cost-effective and sustainable solution for the remediation of the site compared to the full excavation and removal of the waste which was also considered.

The recommended final capping solution will be composed of the following elements:-

- 0.50m of soil (100mm topsoil and 400mm subsoil).
- Drainage layer 0.5m thick with permeability of  $1 \times 10^{-4}$  m/s or equivalent geosynthetic material.
- Compacted mineral layer 0.6m thick with permeability  $< 1 \times 10^{-9}$  m/s or geosynthetic material (LLDPE or GCL) or similar that provides equivalent protection.

Gas collection layer is to comprise of 0.3m minimum of natural material or alternatively be composed of a geosynthetic layer. The final capping will be installed after an initial vegetation scrape of the site and minor re-profiling to facilitate surface water runoff from the site. A 0.50m layer of topsoil (100mm) and subsoil (400mm) is proposed as part of the final capping detail. The installation of the final capping will slightly increase site levels but this would not be out of character with the surrounding hummocky topography of the area. A cross section detail of the proposed capping layer is provided as **Figure 2.1**.

Some re-grading of the side slopes will be required particularly along the northern, western and eastern boundaries to provide more appropriate side slopes on which to place the capping system. The stability of the lining system should be considered at the detailed design stage.

The lining system will be anchored appropriately and some backfilling of the adjoining ditches (preferably with low permeability material) may be required to provide a toe or key within which the capping layers can be tied in or anchored into and to limit direct discharge of seepage into the streams.

A low permeability clay (or other) plug will also be formed or constructed where the capping encounters the edge of the rock outcrop to seal off any localised seepages. It is not considered necessary or practicable at this stage to line the outer face of the rock outcrop as the volumes of leachate should reduce after capping, however the sides and base of the outcrop should be monitored over time to check whether seepages are occurring.

The results of the February 2014 round of monitoring indicate that methane is still being generated at the site. On this basis it was also recommended that a perimeter gas collection trench will be constructed around the full perimeter of the site with passive gas vents. The gas collection system from the capping should preferably tie in to this trench or be vented separately.



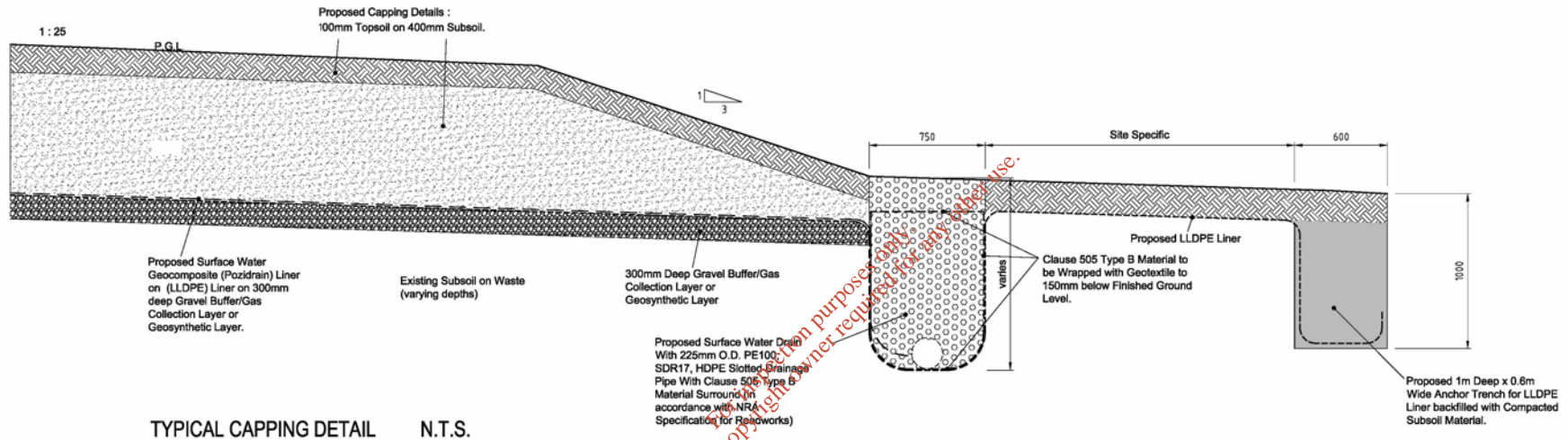


Figure 2.1: Typical Capping Detail



It was recommended that stock proof fencing be installed on the full perimeter of the site to prevent livestock gaining access to the site to prevent damage to the cover material. This stock proof fencing would need to be installed prior to the commencement of the capping works to prevent livestock from the surrounding area accessing the site. Following the establishment of the grass sward it may be possible for livestock grazing to take place at a later date.

## 2.4 BRIEF DESCRIPTION OF THE NATURA 2000 SITES

This section of the screening process describes the Natura 2000 sites within a 15km radius of the Kealanine Landfill site. A 15km buffer zone has been chosen as a precautionary measure, to ensure that all potentially affected Natura 2000 sites are included in the screening process, which is in line with *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities* produced by the Department of the Environment, Heritage and Local Government.

**Table 2.1** lists the Special Areas of Conservation (SACs) that are within 15km of the project area, and **Figure 2.1** shows their locations in relation to the landfill site. There are no Special Protection Areas (SPAs) within 15km of the site.

The integrity of a Natura 2000 site (referred to in Article 6.3 of the EU Habitats Directive) is determined based on the conservation status of the Qualifying Interests of the SAC or SPA. The Qualifying Interests for each site have been obtained through a review of the Conservation Objectives available from the NPWS.

**Table 2.1: SACs Located within the Zone of Influence from the Kealanine Landfill Site**

Site Code	Site Name	Qualifying Habitats	Qualifying Species	Distance from Kealanine
001873	Derryclogher (Knockboy) Bog SAC	Blanket bog (*active only) (1730)	-	3.7km
000090	Glengarriff Harbour and Woodland SAC	Old sessile oak woods with Ilex and Blechnum in British Isles, Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) and Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	<i>Rhinolophus hipposideros</i> (1303), <i>Lutra lutra</i> (1355), <i>Geomalacus maculosus</i> (1024) and <i>Phoca vitulina</i> (1365)	2km

Site Code	Site Name	Qualifying Habitats	Qualifying Species	Distance from Kealanine
001342	Clonee and Inchiquin Loughs, Uragh Wood SAC	Old sessile oak woods with Ilex and Blechnum in British Isles (91A0) and Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)(3110)	<i>Geomalacus maculosus</i> (1024), <i>Rhinolophus hipposideros</i> (1303), <i>Trichomanes speciosum</i> (1421) and <i>Najas flexilis</i> (1833)	12.9km
001881	Maulagowna Bog SAC	Blanket bog (*active only) (7130)		11.8km
000102	Sheeps Head SAC	European dry heaths (4030) and Northern Atlantic wet heaths with <i>Erica tetralix</i> (4010)	<i>Geomalacus maculosus</i> (1024)	
002315	Glanlough Wood SAC		<i>Rhinolophus hipposideros</i> (1303)	14.6km
000093	Caha Mountains SAC	Blanket bog (*active only) (7130), Siliceous rocky slopes with chasmophytic vegetation (8220), Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea (3130), Natural dystrophic lakes and ponds (3160), Northern Atlantic wet heaths with <i>Erica tetralix</i> (4010) and Alpine and Boreal heaths (4060)	<i>Geomalacus maculosus</i> (1024) and <i>Trichomanes speciosum</i> (1421)	4.7km

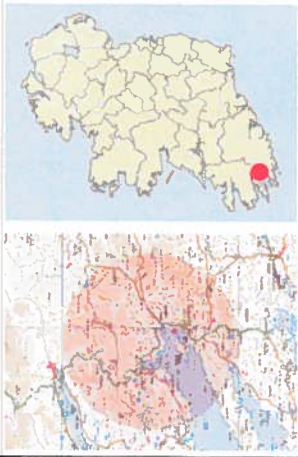


# Legend

## Kealanine Landfill Site

- Landfill Location
- Landfill 15km Buffer
- SAC
- SPA

Note: No SPA within 15km of site location.



**Client**  
Cork County Council

**Project**  
Kealanine Landfill, Bantry.

**Title**  
Designated Sites (SPA & SAC) within 15km of Landfill site  
Figure: 2.2

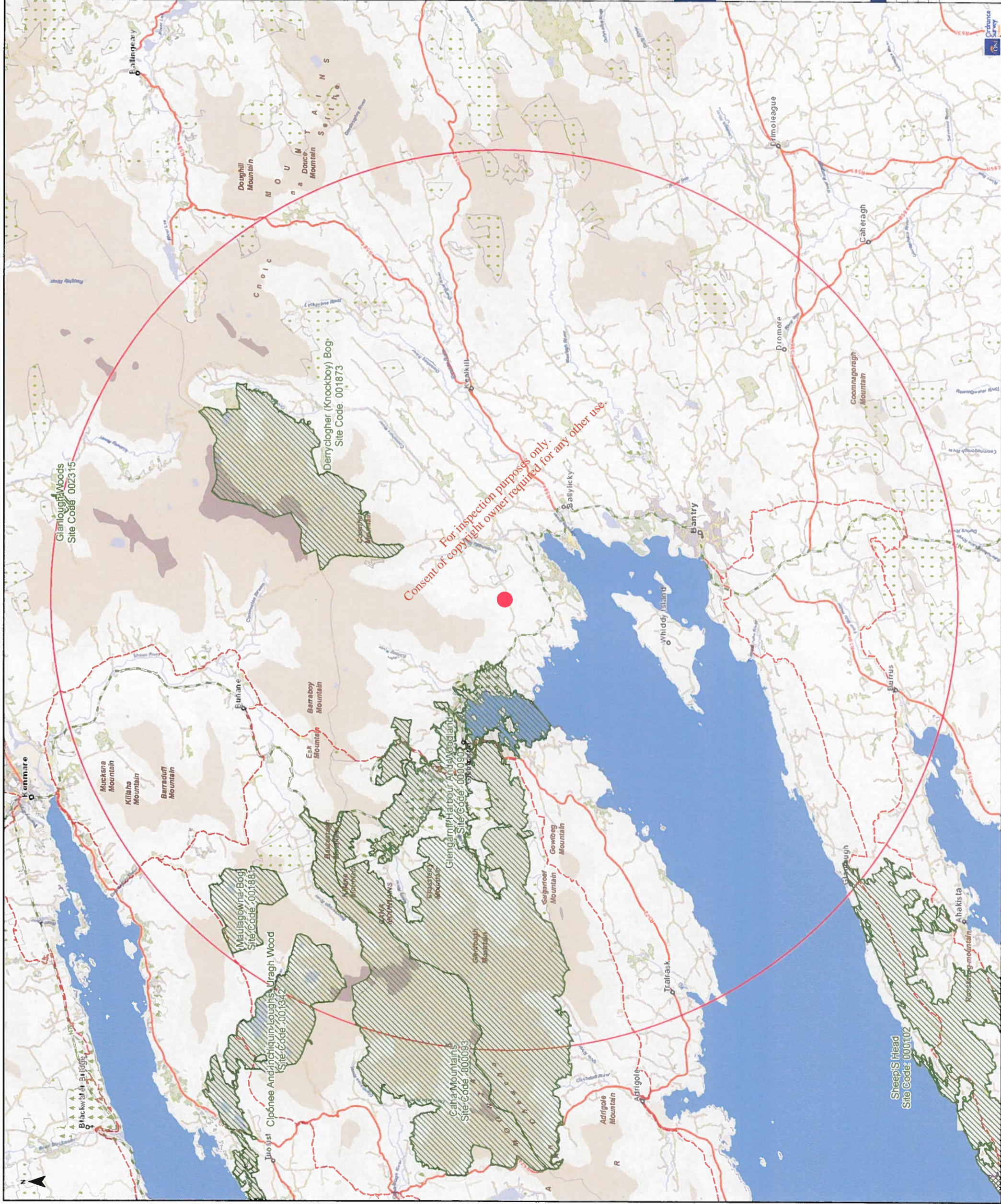
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**Issue Details**

Drawn By:	JPM	Project No.:	MC 0781
Checked By:	AP	File Ref:	MCE0781Ac002A01
Approved By:	CD	Scale:	NTS
Date:	03/07/2014	Drawing No.:	MCE0781Ac002
		Rev.:	A01

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Sheep's Head Site Code: 000102



## 2.5 POSSIBLE EFFECTS OF THE REMEDIAL SOLUTION ON THE NATURA 2000 SITES

The purpose of this Section of the Screening is to examine the possibility that the proposed remedial solution, either individually or in combination with other plans and projects, may result in significant negative effects on the Conservation Objectives and the integrity of the Natura 2000 sites discussed in **Section 2.4**.

### 2.5.1 Direct, Indirect or Secondary Impacts

#### 2.5.1.1 Direct

The landfill site is not within the boundaries of any SAC or SPA, therefore, no direct impacts will occur through landtake or fragmentation of habitats. Secondary or Indirect

The quantitative risk assessment indicates that the waste material does not pose a significant risk to the groundwater down gradient of the site. The main risk relates to the surface water quality in the immediate vicinity of the site. Based on the dilute nature of the leachate present at the site and the results of the surface water and groundwater quality monitoring a risk classification of moderate is deemed as being more appropriate to the site. **Table 2.1** lists the Natura 2000 sites within 15km of the landfill site. There are seven sites in all, all of which are SAC's. The closest designated site is located at Glengarriff Harbour and Woodland SAC which is located at a distance of 2km from the landfill site. This designated site is not located down gradient of the landfill and is not hydraulically connected to the designated site, therefore it is not anticipated that there will be any significant negative impacts upon its conservation objectives as a result of the current leachate.

Likewise, the remaining SACs (Derryclogher (Knockboy) Bog SAC, Clonee and Inchiquin Loughs, Uragh Wood SAC, Maulagowna Bog SAC, Sheeps Head SAC, Glanlough Wood SAC and Cahal Mountains SAC) within the 15km boundary are considered to be a sufficient distance from the proposed development site, with no connecting pathways (e.g. rivers or streams) for indirect effects to occur. It is therefore not anticipated that there will be any likely significant impacts on these sites from the current leachate. The installation of a permanent capping system was recommended by the Tier 3 assessment to reduce the leachate generation and leachate seepage. Therefore the proposed remedial solution will have an overall positive effect on water quality. It is not anticipated that there will be any significant negative impacts on the the conservation objectives of Natura 2000 sites in the vicinity of Kealanine Landfill as a result of the proposed remedial solution.

## 2.6 SCREENING ASSESSMENT

**Table 2.2** provides a summary of the likely significant impact of the proposed remedial solution on the conservation objectives of the Natura 2000 sites within the study area as identified in **Table 2.1** above.

**Table 2.2: Potential Significant Impacts on Natura 2000 Sites from the Proposed Remedial Solution**

Site Name	Direct Impacts	Indirect/ Secondary	Resource Requirements (Drinking Water Abstraction, etc.)	Emissions (Disposal to Land, Water or Air)	Excavation Requirements	Transportation Requirements	Duration of Construction, Operation, Decommissioning
Derryclogher (Knockboy) Bog SAC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest
Glengarriff Harbour and Woodland SAC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest
Clonee and Inchiquin Loughs, Uragh Wood SAC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest
Maulagowna Bog SAC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest
Sheeps Head AC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest
Glanlough Wood SAC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest
Caha Mountains SAC	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest	No impact on qualifying interest

### 2.6.1 Likely Changes to the Natura 2000 Site(s)

The likely changes that will arise from the proposed remedial solution for Kealanine Landfill site have been examined in the context of a number of factors that could potentially affect the integrity of the identified Natura 2000 sites. Overall, it has been found that the proposed remedial solution will not affect the integrity of the identified Natura 2000 sites (see Table 2.3).

**Table 2.3: Likely Affect on Natura 2000 Sites**

Site Name	Reduction of Habitat Area	Disturbance to Key Species	Habitat or Species Fragmentation	Reduction in Species Density	Changes in Key Indicators of Conservation Value (Water Quality Etc.)	Climate Change
Derryclogher (Knockboy) Bog SAC	None	None	None	None	None	None
Glengarriff Harbour and Woodland SAC	None	None	None	None	None	None
Clonee and Inchiquin Loughs, Uragh Wood SAC	None	None	None	None	None	None
Maulagowna Bog SAC	None	None	None	None	None	None
Sheeps Head SAC	None	None	None	None	None	None
Glanlough Wood SAC	None	None	None	None	None	None
Caha Mountains SAC	None	None	None	None	None	None

### 2.6.2 Elements of the Project where the Impacts are Likely to be Significant

No elements of the proposed remedial solution for Kealanine Landfill Site are likely to cause significant impacts on Natura 2000 sites.

### 3 SCREENING CONCLUSIONS AND STATEMENT

The likely impacts that will arise from the proposed remedial solution for Kealanine Landfill site have been examined in the context of a number of factors that could potentially affect the integrity of the Natura 2000 network. None of the sites within 15km of the remedial solution area will be adversely affected. A finding of No Significant Effects Matrix has been completed and is presented in Section 4 of this Screening Statement.

On the basis of the findings of this Screening for Appropriate Assessment of Natura 2000 Sites, it is concluded that the proposed remedial solution for Kealanine Landfill site will not have a significant effect on the Natura 2000 network and a Stage 2 Appropriate Assessment is not required.

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## 4 FINDING OF NO SIGNIFICANT EFFECTS REPORT MATRIX

Name of Project or Plan	Kealanine Landfill Proposed Remedial Solution.
Name and Location of Natura 2000 Site	Derryclogher (Knockboy) Bog SAC Glengarriff Harbour and Woodland SAC Clonee and Inchiquin Loughs, Uragh Wood SAC Maulagowna Bog SAC Sheeps Head SAC Glanlough Wood SAC Caha Mountains SAC
Description of the Project or Plan	<p><b>Location and Site Description</b></p> <p>The landfill site is located at Kealanine (NGR 97620 55014) approximately 5km east south east of Glengarriff and 7km north northwest of Bantry. The site is located approximately 1.5km off the N71 (Bantry to Castletownbere road) via a local road. The landfill covers an area of approximately 1.6ha.</p> <p>Detailed waste disposal records are unavailable for the landfilling operations as the facility operated unsupervised for a number of years. It is reported that most of the waste deposited was municipal but some wastewater sludge, end of life vehicles and oily waste was also deposited. An unknown quantity of oily waste originated from the oil spill that occurred after the Whiddy Island disaster in 1979. The oily waste was blended with municipal waste and deposited in the eastern section of the site. A small quantity of offal is also reported to have been deposited. It is estimated that the landfill contains in the region of 90,000 m<sup>3</sup> of waste material. Based on a waste density of 1 tonne per m<sup>3</sup> it is likely that in the region of 90,000 tonnes of material is likely to have been deposited.</p> <p>The historic maps for the area, the OSI 1:10,560 sheets and the 25" maps show that the stream along the southern boundary of the site predates the development of the landfill.</p> <p>The landfill site is located in an area of rugged topography with bedrock outcrops forming ridges separated by areas of blanket peat. The surrounding land is used for rough grazing of sheep and horses. The historic maps for the area are available to view on the OSI website and confirm the marshy/boggy nature of the ground and outcropping bedrock prior to the commencement of landfilling operations.</p> <p>Temporary cover material was installed on top of the waste body in 1999. The site investigation indicates 0.20m to 0.30m of topsoil was placed on the waste body, compacted and reseeded. Vegetation is well established on site and includes rushes over the top and sides of the waste mound. The historic aerial photographs show that vegetation has been well established since at least 2005. The slopes of the site are covered by scrub in places and trees are well established on the base of the side slopes along the northern and southern boundaries of the site.</p>

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	<p><b>Hydrology</b></p> <p>The site is located within the surface water catchment of the Coomhola River. A tributary of the Coomhola River rises in the immediate vicinity of the site. The stream originates (rises) in the area of ground approximately 50m south west of the western site boundary. The stream flows in a north easterly direction at a minimum distance of 15m from the base of the waste mound. This stream is culverted under the access road to the site. The tributary joins the Coomhola River approximately 2km downstream of the landfill site at a location approximately 300m upstream of Coomhola Bridge. The Coomhola River discharges to the sea approximately 1.5km downstream of Coomhola Bridge. There is an EPA water quality monitoring station located at Coomhola Bridge with a high status (Q4-Q5) currently indicated.</p> <p>The stream which is located south of the landfill is indicated on the historic ordnance survey maps for the area. There is also an additional surface water flow from the higher ground to the north of the site which flows over the rock outcrop to the north of the site and skirts outside of the northern boundary of the site. The two streams join approximately 70m downstream of the landfill site.</p> <p>There are a series of drains on the north western side of the site and the southern boundary of the site. These drains collect surface water runoff from the landfill site in addition to surface water runoff from the higher ground to the north west of the landfill. The drains do not directly connect to the southern stream but the water from the perimeter drains discharges to the boggy ground approximately 30m from the stream.</p> <p>There is also ponding of surface water occurring in a localised low point along the eastern boundary of the site north of the former site entrance gate. This surface water drains to the eastern tributary stream.</p> <p><b>Summary of Existing Situation Without Remediation</b></p> <p>A generic quantitative risk assessment (QRA) has been completed on the landfill site based on the site investigation and environmental monitoring carried out in 2010, 2011 and 2014.</p> <p>The results of the assessment indicate that the leachate is of low strength when compared to ranges quoted for typical leachate concentrations. The hydrocarbon concentrations in the east of the site are considered to be hotspot concentrations. The main contaminants of concern identified in the leachate were iron, manganese, ammonia and hydrocarbons. The main parameters of concern in relation to the potential impact on the surface water in the vicinity of the site are ammonia, iron and manganese. There is no evidence of metals or hydrocarbons presenting a risk to the surface water down gradient of the site.</p>

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	<p>The February 2014 results indicate no issue in relation to the concentration of iron and manganese down gradient of the site. The landfill is having an impact on the ammonia concentration in the immediate vicinity of the site but the level returns to within background concentrations 400m down gradient of the site.</p> <p>In relation to the groundwater quality, the main parameters of concern are iron, manganese, ammonia and hydrocarbons. Based on the available monitoring data, there is no evidence of significant groundwater contamination in the vicinity of the site.</p> <p>The site investigation results indicate that there is a limited amount of material which could be classed as hazardous under the European Waste Catalogue and Hazardous Waste List. The environmental monitoring data indicates that the landfill is not having a significant effect on the groundwater or surface water down gradient of the site. The risk to human health based on the measured concentrations of contaminants in the soil/waste are considered to be low while the site remains in its current use and form. The seepage of leachate is occurring along the central area of the eastern boundary of the landfill site. The installation of a permanent capping system is recommended to reduce the leachate generation and leachate seepage.</p> <p>In relation to gas, due to the distance of neighbouring properties from the landfill, the gas levels are not considered to pose a risk to neighbouring properties and were not included in the QRA. Methane is still being generated at the site and this would need to be taken into account in the design of any capping layer.</p> <p>The quantitative risk assessment indicates that the waste material does not pose a significant risk to the groundwater down gradient of the site. The main risk relates to the surface water quality in the immediate vicinity of the site. Based on the dilute nature of the leachate present at the site and the results of the surface water and groundwater quality monitoring a risk classification of moderate is deemed as being more appropriate to the site.</p> <p><b>Proposed Remedial Solution</b></p> <p>The Tier 3 Risk Assessment recommended that the preferred option to remediate any effects is the installation of a low permeability barrier which would limit the amount of water that could enter the landfill and therefore restrict the decay of the waste and the generation of contaminated leachate.</p> <p>It is considered that this is a more appropriate, cost-effective and sustainable solution for the remediation of the site compared to the full excavation and removal of the waste which was also considered.</p>

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	<p>The recommended final capping solution will be composed of the following elements:-</p> <ul style="list-style-type: none"> <li>• 0.50m of soil (100mm topsoil and 400mm subsoil).</li> <li>• Drainage layer 0.5m thick with permeability of <math>1 \times 10^{-4}</math> m/s or equivalent geosynthetic material.</li> <li>• Compacted mineral layer 0.6m thick with permeability <math>&lt; 1 \times 10^{-9}</math> m/s or geosynthetic material (LLDPE or GCL) or similar that provides equivalent protection.</li> </ul> <p>Gas collection layer 0.3m minimum of natural material or geosynthetic layer. The final capping will be installed after an initial vegetation scrape and site re-profiling to facilitate surface water runoff from the site. A 0.50m layer of topsoil (100mm) and subsoil (400mm) is proposed as part of the final capping detail. The installation of the final capping will slightly increase site levels but this would not be out of character with the surrounding hummocky topography of the area. A cross section detail of the proposed capping layer is provided as <b>Figure 2.1</b>.</p> <p>Some re-grading of the side slopes will be required particularly along the northern, western and eastern boundaries to provide more appropriate side slopes on which to place the capping system. The stability of the lining system should be considered in the detailed design.</p> <p>The lining system will be anchored appropriately and some backfilling of the adjoining ditches (preferably with low permeability material) may be required to provide a toe or key within which the capping layers can be tied in or anchored into and to limit direct discharge of seepage into the streams.</p> <p>A low permeability clay (or other) plug will also be formed or constructed where the capping encounters the edge of the rock outcrop to seal off any localised seepages. It is not considered necessary or practicable at this stage to line the outer face of the rock outcrop as the volumes of leachate should reduce after capping, however the sides and base of the outcrop should be monitored over time to check whether seepages are occurring.</p> <p>The results of the February 2014 round of monitoring indicate that methane is still being generated at the site. On this basis it was also recommended that a perimeter gas collection trench will be constructed around the full perimeter of the site with passive gas vents. The gas collection system from the capping should preferably tie in to this trench or be vented separately.</p> <p>It was recommended that stock proof fencing be installed on the full perimeter of the site to prevent livestock gaining access to the site to prevent damage to the cover material. This stock proof fencing would need to be installed prior to the commencement of the capping works to prevent livestock from the surrounding area accessing the site. Following the establishment of the grass sward it may be possible for livestock grazing to take place at a later date.</p>

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Is the project or plan directly connected with or necessary to the management of the site?	No.
Are there other projects or plans that together with the project or plan being assessed could affect the site?	No.
<b>The Assessment of Significance of Effects</b>	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.	The proposed remediation is not likely to affect any site that makes up the Natura 2000 network.
Explain why these effects are not considered significant.	<p><b>Direct</b></p> <p>The landfill site is not within the boundaries of any SAC or SPA, therefore, no direct impacts will occur through landtake or fragmentation of habitats.</p> <p><b>Secondary or Indirect</b></p> <p>The quantitative risk assessment indicates that the waste material does not pose a significant risk to the groundwater down gradient of the site. The main risk relates to the surface water quality in the immediate vicinity of the site. Based on the dilute nature of the leachate present at the site and the results of the surface water and groundwater quality monitoring a risk classification of moderate is deemed as being more appropriate to the site. <b>Table 2.1</b> lists the Natura 2000 sites within 15km of the landfill site. There are seven sites in all, all of which are SAC's. The closest designated site is located at Glengarriff Harbour and Woodland SAC which is located at a distance of 2km from the landfill site. This designated site is not located down gradient of the landfill and is not hydraulically connected to the designated site, therefore it is not anticipated that there will be any significant negative impacts upon its conservation objectives as a result of the current leachate.</p> <p>Likewise, the remaining SACs (Derryclogher (Knockboy) Bog SAC, Clonee and Inchiquin Loughs, Uragh Wood SAC, Maulagowna Bog SAC, Sheeps Head SAC, Glanlough Wood SAC and Caha Mountains SAC) within the 15km boundary are considered to be a sufficient distance from the proposed development site, with no connecting pathways (e.g. rivers or streams) for indirect effects to occur. It is therefore not anticipated that there will be any likely significant impacts on these sites from the current leachate. The installation of a permanent capping system was recommended by the Tier 3 assessment to reduce the leachate generation and leachate seepage. Therefore the proposed remedial solution will have an overall positive effect on water quality. It is not anticipated that there will be any significant negative impacts on the conservation objectives of Natura 2000 sites in the vicinity of Kealanine Landfill as a result of the proposed remedial solution.</p>

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List of agencies consulted: provide contact name and telephone or e-mail address.	-
Response to Consultation.	-
Data Collected to Carry Out the Assessment	
Who Carried out the Assessment?	Aileen Fitzgerald, RPS. BSc (Hons) Ecology, MSC Environmental Science
Sources of Data	NPWS database. Information from RPS.
Level of Assessment Completed	Desktop
Where can the full results of the assessment be accessed and viewed?	Cork County Council
Overall Conclusion	Stage 1 Screening indicates that the Kealanine Landfill Remedial Solution will not have a significant negative impact on the Natura 2000 network. Therefore, a Stage 2 'Appropriate Assessment' under Article 6(3) of the Habitats Directive 92/43/EEC is not required.

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