

# Waterford County Council



## **Environmental Risk Assessment for Unregulated Waste Disposal Site**

### **Non-Technical Summary Document**

**Townspark East, Lismore Landfill**

### **Attachment A.1**

Waterford County Council  
Civic Offices  
Dungarvan  
Co Waterford

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## 1.0 Introduction

Waterford County Council has undertaken an inventory and preliminary risk assessment of all unregulated waste disposal sites within the county (as per the COP). A number of Tier 1 desk studies and reports have been completed. Waterford County Council has proceeded to the next phase (Tier 2 & Tier 3) for one particular site located at Townspark East, Lismore, Co. Waterford.

Waterford County Council has completed an exploratory and main Tier 2 site investigation on this particular site located at Townspark East, Lismore, Co. Waterford. The exploratory field investigation was performed in September 2010 incorporating Waterford County Council technical staff. Waterford County Council commissioned URS Ireland Ltd to carry out the main Tier 2 intrusive ground investigation on the historic landfill in November 2010. The purpose of this geotechnical ground investigation was to obtain information on the extent and nature of the historic landfill for completion of the Tier 2 Risk Assessment (as per the COP). In 2012, Waterford County Council compiled the Tier 3 Risk Assessment for the historic landfill. This Tier 3 document includes the following, non-technical summary document, quantitative risk assessment, refined conceptual site model, appropriate assessment & remediation proposal.

## 2.0 Site Location

This closed landfill is located in the Townland of Townspark East, approximately 1km from Lismore town outside the town boundary. The site was previously operated as civic amenity site by Waterford County Council, Environment Section. This civic amenity has been in operation since 1991 & ceased in November 2009. The GPS co-ordinates of the site are 204,520 (x) & 96,400 (y). The lands on which the site is located are zoned for agricultural use/development (White Lands – to provide for the development of agriculture, to protect and improve rural amenity, and to distinguish general agricultural landuse). Residential zoning extends to 1.2km from the northern boundary of the site.

The lands adjoining the site appear to be primarily used for agriculture purposes and mainly grassland. There are a number of residential dwellings in close proximity to the site. To the south, one dwelling is present and approximately 20m from the site and the River Owbeg is approximately 120m. To the north, three dwellings are present and approximately 50m from the site. To the east, one dwelling is present and approximately 50m from the site. To the west, two dwellings are present and approximately 150m & 200m from the site.



**Figure 2.1: Site Location**

### 3.0 History of Site

The Lismore site was used as a municipal landfill site, and from local knowledge it was determined that the site operated as a landfill from circa 1972 and closed in 1991. The site is owned and was operated by Waterford County Council. The total size of the site is less than 1 hectare (2.47 acres). Before Waterford County Council owned and operated the site, it was previously used as a limestone quarry which had been exhausted and then purchased by the council.

The Lismore landfill accepted domestic and commercial and possibly a small quantity of industrial waste, although sources of industrial waste are unknown. The site is reported to be 5 – 10m deep. At closure, the landfill was capped with approximately 0.3m of topsoil and the rear of the site was planted with native trees.

## 4.0 Geology, Hydrogeology & Ecology of the Site

### 4.1 Geology:

The geology characteristics of the site were obtained using the Environmental Protection Agency (EPA) website and also information provided by the geophysical survey. The EPA website identified that the site location and adjacent lands soil characteristics consisted of Acid Brown Earths/Brown Podzolics.

Minerex Geophysics Ltd. (MGX) carried out a geophysical survey including EM31 ground conductivity and 2D-Resistivity. The bedrock geological map of East Cork – Waterford indicates that the site is underlain by Carboniferous lithologies of Waulsortian Limestone. The survey identified that limestone bedrock was present at depth of 9.0 – 23.0m below the site.

### 4.2 Hydrogeology:

The historic landfill on lands at Townspark East, Lismore, Co. Waterford is located within an area which consists of a Regionally Important and Karstified Aquifer and is classed by the GSI as extremely vulnerable. The limestone beneath the site is understood to be underlain by Devonian Kiltorcan-type Sandstone, which is considered by the GSI to be a considerable groundwater bearing body. This aquifer is expected to contribute a relatively high baseflow to rivers and streams directly.

The GSI database identifies a number of groundwater wells within 1km of the site, with two wells noted as having agricultural and domestic uses. A dwelling with a groundwater abstraction well is located within 250m of the site, however, this particular well is not being used by the householder. The public water supply runs past the site serving adjacent dwellings. Tobar na Glóire is a spring fed ‘Holy Well’ located approximately 500m southwest of the site.

### 4.3 Ecology:

The River Blackwater which is located approximately 2.5km north of the site is a designated Special Area of Conservation (SAC), Special Protection Area (SPA) and Proposed Natural Heritage Area (pNHA). The River Bride is located approximately 3km south of the site and is a designated SAC and pNHA.

The River Balckwater and lower part of the Owbeg River are listed in the Water Framework Directive (WFD) Register of Protected Areas as being nutrient sensitive.

There are no designated Groundwater Dependant Terrestrial Ecosystems (GWDTE) within 1km of the site.

A screening exercise was carried out under the Habitats Directive by Waterford County Councils’ heritage Officer. No adverse impacts were noted on the SAC, SPA or pNHA and so a full Appropriate Assessment was not required.

## 5.0 Risk Category of the Site

The conceptual site model (CSM) compiled in the Tier 1 Desk Study identified leachate and landfill gas as the potential sources and surface water, groundwater and human presence as the potential receptors. However, following the calculation of the source-pathway-receptor linkages, the overall site classification was Class C – ‘low risk’.

In November 2010, Waterford County Council commissioned URS Ireland Ltd to carry out an intrusive ground investigation at the unregulated landfill situated at Townspark East, Lismore, Co. Waterford. The Tier 2 intrusive Risk Assessment identified that a Quantitative Risk Assessment was required to assess the potential source of landfill gas present and the potential source of leachate migration risk to groundwater and surface waters. An initial QRA was undertaken by URS. This QRA was finalised by Waterford County Council after further monitoring.

## 6.0 Potential Environment Impacts

### 6.1 Potential Pathways:

With regard to the historic landfill located on lands at Townspark East, Lismore, Co. Waterford, the potential pathways for the said lands are identified below in table 6.1.

Potential Pathway	Route
Groundwater	Contamination to the water table via the LIMESTONE bedrock.
Surface Water/Protected area	Leachate migration from the landfill discharging into the River Owbeg and River Blackwater. The River Blackwater is a designated SAC, SPA & pNHA.
Air/Soil	Landfill gas migration to human presence residential dwellings along the subsurface or surface pathway.

**Table 6.1 Potential Pathways**

## 6.2 Potential Receptors:

With regard to the historic landfill located on lands at Townspark East, Lismore, Co. Waterford, the potential receptors for the said lands are identified below in table 6.2.

Potential Receptor	Type
<b>Groundwater</b>	Regionally important and karstified aquifer beneath the site.
<b>Surface Water/Protected area</b>	River Owbeg and River Blackwater. River Owbeg regarded as being nutrient sensitive. River Blackwater is a designated SAC, SPA & pNHA.
<b>Human Beings/Animals</b>	Agricultural Activity and Residential Dwellings in close proximity to the site

**Table 6.2 Potential Receptors**

## 7.0 Conclusions and Recommendations

### 7.1 Conclusions:

The Tier 1 risk screening exercise indicated that the overall risk classification for the site was 'low risk', however, following the Tier 2 Exploratory and Intrusive Investigations which provided further information found that the overall risk classification for the site is 'moderate risk' based on 2 SPR linkages. The two SPR linkages identified below were highlighted as posing a risk to identified receptors:

- *SPR 5 – Leachate migration to bedrock via groundwater*
- *SPR 10 – Gas migration to human receptors via subsoil – lateral*

The Tier 2 Exploratory and Intrusive Investigations found the extent of the waste body to be 5,500m<sup>2</sup> with a maximum thickness of approximately 18m. The estimated volume of the waste body was 100,000m<sup>3</sup>.

The surface water monitoring data and findings indicate that the historic landfill is not having an impact on the River Owbeg or River Blackwater which is a designated SAC, SPA & pNHA.

The historic landfill is located over a Regionally Important karstified aquifer of extreme groundwater vulnerability. Groundwater analysis undertaken during the Tier 2 Assessment indicates that the waste body is not impacting on groundwater quality

downgradient of the site and there is no pollutant linkage between the leachate source and the groundwater aquifer beneath the site. Although groundwater analysis yielded some exceedances for ammonia, nitrate, nitrite, potassium and coliforms in up-gradient monitoring wells, these exceedances were attributed to agricultural practices. The field in which these up-gradient wells sit is used for agricultural activities. Given that these wells are located hydraulically up-gradient of the waste body, it is considered that agricultural practices (such as fertilizer application and spreading organic waste) could act as potential sources of these contaminants. Overall, the findings from the groundwater analysis indicate that leachate from the historic landfill is not impacting on the groundwater aquifer beneath the site.

The Tier 2 Exploratory and Intrusive Investigations found that, while there is a potential source of landfill gas present, it is not likely to be significant. No human presence is located directly above the historic landfill. Landfill gas exceedances were not detected in the borewells outside the site. It is proposed that further monitoring works will be carried out by Waterford County Council given the proximity of residential houses to the site.

In conclusion, the Tier 2 Exploratory and Intrusive Investigations and subsequent Quantitative Risk Assessment (QRA) identified no major risk of contamination with the historic landfill located on lands at Townspark East, Lismore, Co. Waterford. There were no links identified between groundwater sampling and leachate from the site, indicating that leachate is not having a negative impact on groundwater sources in the vicinity of the site. Landfill gas exceedances were not detected in wells outside the landfill site and so there is no direct link identified between the landfill gas within the site migrating outside the site. As the site is not occupied, the low landfill gas levels detected within the site boundary are not of a concern.

## 7.2 Recommendations:

The selection of suitable remediation options is dependent on the results of the quantitative risk assessment (QRA) process. The QRA indicates that there is no significant Source-Pathway-Receptor linkage existing from the historic landfill located on lands at Townspark East, Lismore, Co. Waterford.

Tier 1 & 2 Risk Assessment showed potential links between leachate and groundwater and gas movements outside the site and calculated the site to be a moderate risk (Class B). These SPR linkages were calculated on perceived risks taking on board existing geological conditions, proximity of residences, proximity of ground and surface water sources etc. The highest calculated links identified were:



- *SPR 5 – Leachate migration to bedrock via groundwater*
- *SPR 10 – Gas migration to human receptors via subsoil – lateral*

Subsequent monitoring showed that leachate breakout is not occurring from the site and gas monitoring indicates that landfill gas migration outside the site is not a potential concern. Waterford County Council considers these original links to be broken and as a result consider the site to be of **low risk**.

The following measures are proposed by Waterford County Council to manage the site in the future :

- Routine monitoring on a quarterly basis of surface water and groundwater sources for year 1 & 2. Ongoing monitoring of both groundwater and surface water is recommended to assess for seasonal variations in water quality in the vicinity of the site. All parameters tested during the Tier 2 & Exploratory Investigation will be re-tested as part of the monitoring regime and in accordance with the EPA 'Landfill Monitoring Manual (2003).
- No landfill gas was detected in monitoring undertaken outside the site. Notwithstanding this, it is proposed to perform routine monitoring on a quarterly basis for presence of gas both within and outside the site.
- If negative changes or impacts are noted during the monitoring regime, Waterford County Council will proceed to notify the EPA and undertake a Detailed Quantitative Risk Assessment for the site.
- If no changes or impacts are noted in year 1 & 2, it is proposed to reduce monitoring requirement to bi-annually in years 3 and thereafter.
- Annual monitoring results will be presented to the EPA and a validation report submitted after 1 full year of monitoring.
- It is also proposed to create a GIS layer marking the site and monitoring wells. This can be incorporated into the Planning system to assist in planning assessments in the future and in order for applications to comply with the requirements of *Protection of new Buildings and Occupants from Landfill Gas' (1994)*.

Waterford County Council considers following the findings and information provided within the Tier 1, Tier 2 & Tier 3 risk assessment reports, that these recommendations as outlined above will lead to the protection of the environment within the surrounding lands of the historic landfill.

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