

## Attachment I.1 – Assessment of Atmospheric Emissions

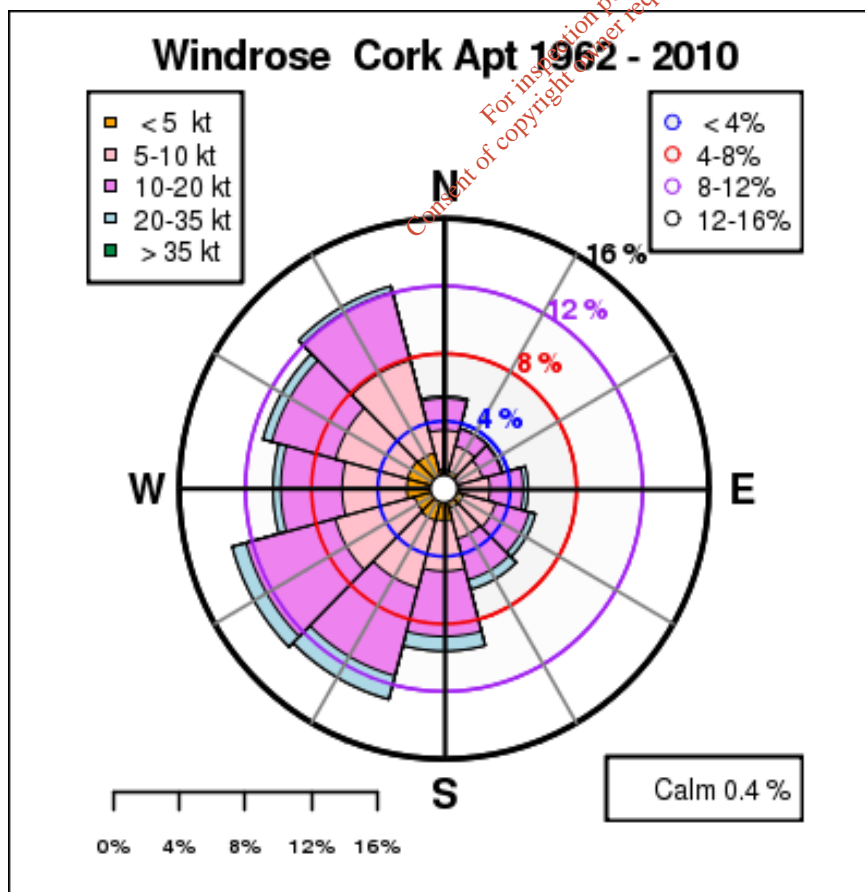
Chapter 3 of the EIS included in Attachment B.3(b).1, completed in 2002, contains an assessment of air quality and atmospheric emissions.

The sections below, prepared by Egan Environmental for KWD, provide an update on Air and Climate based on more recent data and the particulars of the current proposal to only process dry recyclables at the facility.

SLR Consulting prepared an odour assessment report that considers the impact of potential odour impacts from the facility and this is also included as an attachment to this section of the application.

### I.1.1. Air & Climate in the Existing Environment

The nearest synoptic meteorological station is located at Cork Airport (3 km) to the south of the site and gives a good approximation of the conditions which prevail in the area. The wind rose for the Cork Airport covering the period 1962 – 2010 is shown in Figure I.1.1 below. Although Cork Airport is relatively close to the facility at Forge Hill it is considered that the wind speeds would be slightly less at Forge Hill due to the fact that there is difference in height of about 100 metres. Wind directions however would be similar. The incidence of low wind conditions indicates that about 55% of hourly observations are less than 3.1 m/s with calm conditions occurring about 0.4 % of the year. Based on the wind speed and direction information from Cork Airport meteorological station, the dominant wind direction fluctuates between North Westerly to South Westerly



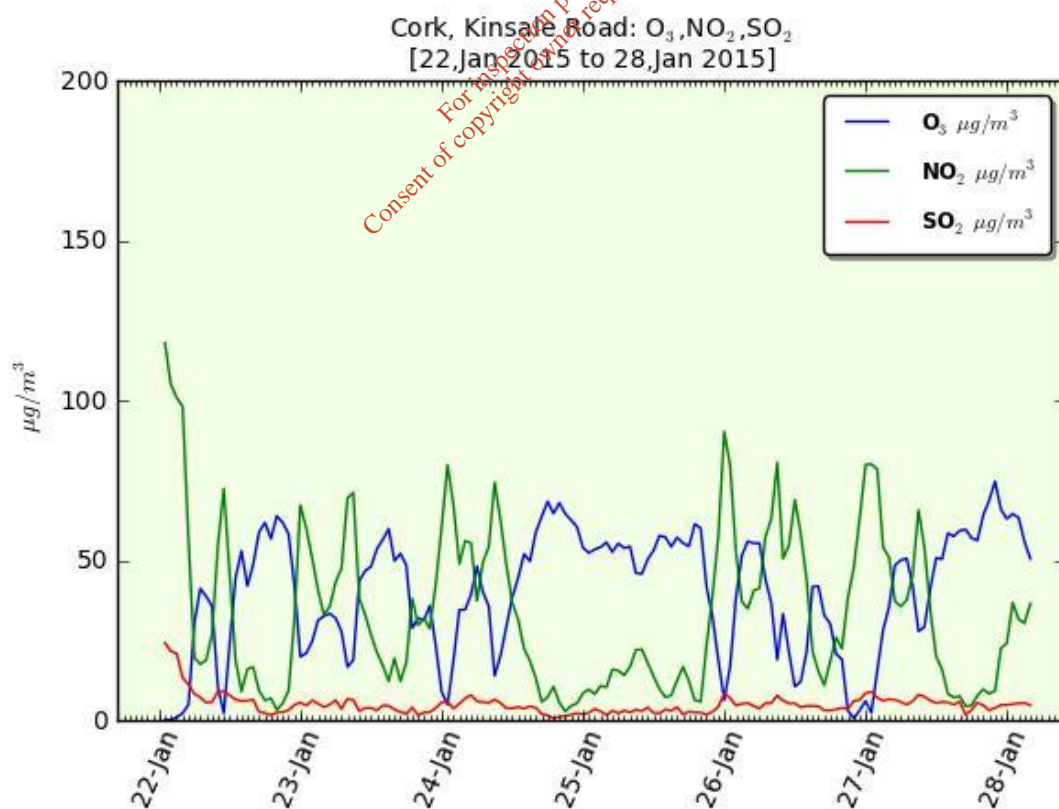
**Figure I.1.1** Windrose for Cork Airport 1962-2010

Annual rates of precipitation in the area have an average of approximately 1228 mm for the period 2012 – 2015. Table I.1.1 below illustrates that maximum rainfall amounts occur between October and March.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2015	110.2												110.2
2014	200.4	240.5	107.8	104.6	70.6	85.7	43.6	88.3	19.7	180.1	192.0	58.9	1392.2
2013	159.0	51.7	134.9	97.2	64.4	116.4	67.5	51.6	42.9	182.9	64.2	211.4	1244.1
2012	94.1	42.4	23.7	82.6	72.9	228.3	112.9	186.2	23.1	100.1	116.8	145.2	1228.3
Mean	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1	1228.0

**Table I.1.1** Mean Precipitation levels for 2012-2015

A requirement of the Clean Air for Europe (CAFÉ) Directive was that each Member State must designate ‘zones’ for the purposes of managing air quality. Cork City is zoned Zone B. The Environmental Protection Agency continuously monitors ambient air quality at a number of sites around Cork City. The site at Kinsale Road is the nearest ambient air monitoring station to the Forge Hill site and for the purposes of this EIS, the results are taken to be indicative of the surrounding area. Figure I.1.2 below illustrates the real-time data for nitrogen dioxide, sulphur dioxide and ozone at the monitoring station for January 2015.



## Figure I.1.2 Background Ozone, Nitrogen Dioxide and Sulphur Dioxide levels

This graph demonstrates:

- The hourly NO<sub>2</sub> limits of 200 µg/m<sup>3</sup> is not exceeded
- The hourly SO<sub>2</sub> limit of 350 µg/m<sup>3</sup> is not exceeded
- The Ozone threshold of 180 µg/m<sup>3</sup> is not exceeded

Bergerhoff gauges were used to determine total dust deposition at the site during December 2014. The location of the dust monitors is shown on Drawing WL19. Monitoring was carried out in accordance with the Standard Method VDI 2119 (Part 2, 1996) - (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Engineering Institute). Dust deposition was measured for both organic and inorganic dust. The dust monitoring results are shown in Table I.1.2 below.

Monitoring Location	Organic Dust (mg/m <sup>2</sup> /d)	Inorganic Dust (mg/m <sup>2</sup> /d)	Total Dust (mg/m <sup>2</sup> /d)
ST1	440	202	642
ST2	42	66	108
ST3	78	37	115
ST4	296	31	327

**Table I.1.2. Dust Deposition Monitoring Results**

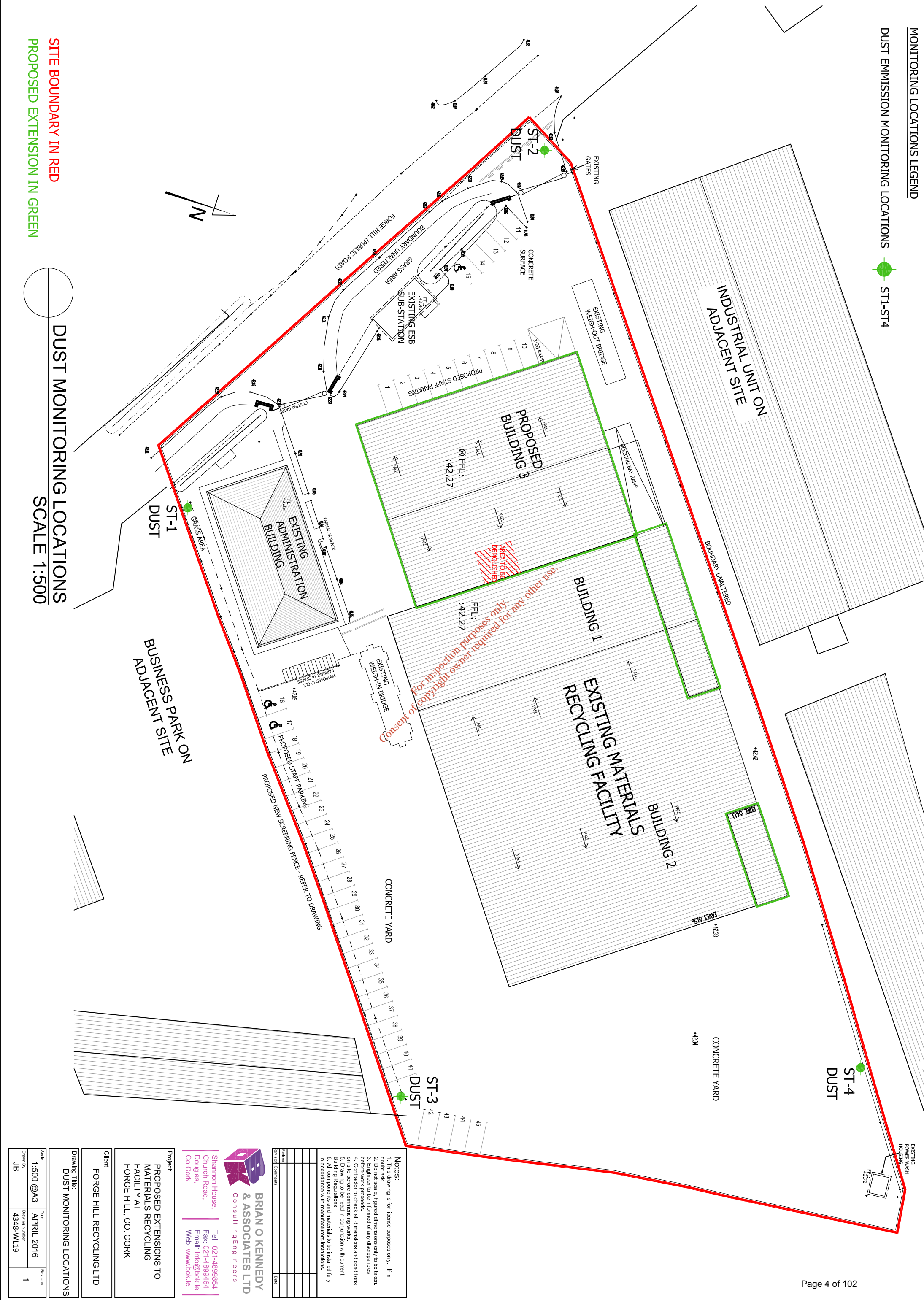
The results in the table above show that the dust deposition levels recorded at Location ST1 exceed the dust deposition limits of 350 mg/m<sup>2</sup>/d. The organic fraction of the total (440 mg/m<sup>2</sup>/d) is most likely applicable to dust generated by leaf fall from the nearby bushes.

All of the remaining results are less than the dust deposition limit of 350 mg/m<sup>2</sup>/d.

The Air Pollution Act 1987 recognises that dust in certain concentrations can cause nuisance and can be injurious to public health, impact on ecology and generally interfere with amenities or the environment. While there are no statutory limits for dust deposition, the Environmental Protection Agency and local authorities typically set a limit of 350 mg/m<sup>2</sup>/d as an allowable limit for dust deposition.

MONITORING LOCATIONS LEGEND

DUST EMISSION MONITORING LOCATIONS  ST1-ST4



SITE BOUNDARY IN RED  
 PROPOSED EXTENSION IN GREEN

DUST MONITORING LOCATIONS  
 SCALE 1:500

**Notes:**

1. This drawing is for license purposes only. - If in doubt ask.
2. Do not scale, figured dimensions only to be taken.
3. Engineer to be informed of any discrepancies before work proceeds.
4. Contractor to check all dimensions and conditions on site before commencing works.
5. All drawings to be read in conjunction with current drawings.
6. All components and materials to be installed fully in accordance with manufacturers instructions.

Revision	Number	Comments	Date

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**Client:**  
 FORGE HILL RECYCLING LTD

**Project:**  
 PROPOSED EXTENSIONS TO MATERIALS RECYCLING FACILITY AT FORGE HILL, CO. CORK

**Drawing Title:**  
 DUST MONITORING LOCATIONS

Scale	Date	Revision
1:500 @A3	APRIL 2016	1

Drawn By: JB  
 Drawing Number: 4348-W119

### **I.1.2. Potential Impacts of the Proposed Operations on Air Quality & Climate**

There are two main activities at the site that may have a potential impact on air quality. These are vehicular movements to and from the site and air emissions arising from the handling and recycling of the waste.

#### Traffic

Nitrogen oxides emissions will be generated from transportation of the waste to and from the site. Nitrogen oxides are greenhouse gases that contribute to global warming. The quantities of nitrogen oxides generated from transportation to the site are difficult to assess because the source for the waste is not known at this stage. The emissions of carbon from the vehicles servicing the site are relatively small.

Currently, a large quantity of dry recyclables that is collected by Country Clean in Cork City and by KWD in West Cork is transported to KWD's MRF in Killarney for processing. Much of the baled product generated at the Killarney facility is then transported to Cork Harbour for export as there are no paper or steel mills in Ireland. Development of this infrastructure at the Forge Hill site will reduce the transport distances of these materials and will have a positive impact in terms of Greenhouse Gas emissions and Climate Change.

#### Dust

A qualitative assessment for dust emissions during the handling of the waste has been undertaken. This assessment considered:

- the nature of potentially released dust
- Prevailing winds; and
- distances between sources and receptors

During the operation at the facility potential dust emissions may arise from:

- Waste delivery, processing and movement of vehicles in and out of the site
- Storage of waste material
- Traffic generated emissions

All waste arriving at the site will be covered so litter nuisance and dust emissions will not arise.

As the predominant wind direction at the site is South Westerly and North Westerly, properties to the North East and South East will have the highest potential of an impact from dust. Although Cork Airport is relatively close to the facility at Forge Hill it is considered that the wind speeds would be slightly less in Forge Hill due to the fact that there is difference in height of about 100 metres. Wind directions however would be similar.

The recycling plant will be optimised in design and process flow to minimise dust emissions. The particulates that could potentially be generated by the proposed activities will mainly be made up of the coarse fraction and >PM10 fractions. Because all of the waste tipping, handling, sorting and storage will be undertaken indoors it is anticipated that dust levels generated from the recycling process will be minimal and will not cause a nuisance to nearby sensitive receptors. The dust levels generated will not have any impact on the nearby ecology. Consequently the impacts of air emissions from the plant will be **long-term neutral**.

### **I.1.3. Mitigation Measures to reduce the impacts on Air Quality**

The proposal includes the following mitigation measures to control emissions of dust:

- All waste handling operations will be undertaken inside the material recycling plant
- All wastes tipped onto the tipping floor will be loaded onto the conveyors with minimum delay
- Drop heights for the transfer of material will be kept to a minimum
- Any putrescible waste delivered to the site will be removed with minimum delay
- Any source of waste that contains putrescible waste will be removed and the source of the material will be contacted regarding same
- The suppliers of waste to the site will be given strict instructions to ensure that waste does not contain putrescible fraction. Suppliers who breach this requirement will be refused entry to the site
- No materials will be stored outside of the site
- All truck movements will take place on the hard standing areas
- Operations at the site will be carried out under strict Standard Operating Procedures. These procedures will form part of the Environmental Management System that will be installed at the site. The EMS will follow the heading used in the ISO 14001:2004 EMS Standard.
- Dust monitoring will be conducted at the locations outlined in Attachment F.2 (and Drawing WL17) on a quarterly basis. Method VDI 2119 – Measurement of Dustfall using Bergerhoff Gauges will be employed.
- Any complaints about dust will be immediately investigated and remedied.

### **Greenhouse Gases**

The materials that will be recycled on site will be used in place of virgin material. This operation will reduce both the greenhouse gas emissions generated from the disposal of the material and the manufacture of new material. The recycling of paper and cardboard products in particular results in forest sequestration. Even when the greenhouse gas emissions from the transportation, recycling and energy usage are applied there will be a net reduction in the greenhouse gas emissions from the manufacture of virgin products.

Currently recyclable waste generated in the Cork Region is been transported to Kerry and Tipperary for further processing. These operations are placing an increased environmental burden on air quality from the greenhouse gas emissions generated during transportation. The use of this site will reduce these transport related greenhouse gas emissions and will overall provide a net benefit to the reduction in greenhouse gas emissions.

### **I.1.4. Residual Impacts**

There will be no residual impacts on air and climate.

### **I.1.5. 'Do Nothing' Scenario**

The 'do nothing' scenario would allow for the status quo to continue i.e. Recyclables generated in the Cork Region would be transported to Kerry and Tipperary for further processing. The greenhouse gas burdens associated with the transportation would continue.

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global environmental solutions

Forge Hill Materials Recycling Facility

Forge Hill Recycling Limited

Odour Impact Assessment

501.00271.00004

April 2016

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DRAWING AQ1: Odour Sensitive Receptors

## APPENDICES

APPENDIX AQ1: IAQM Odour Assessment Methodology

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## 1.0 INTRODUCTION

This report presents an assessment of potential odour impact from the Materials Recycling Facility (MRF) in Forge Hill, Cork.

The MRF has not been operational since 2011; the license application proposes the re-commencement of operations at the facility to receive and sort Dry Mixed Recycling (DMR) waste.

The focus of the assessment is to determine the potential odour emissions from the recommencement of operations at the Site, the magnitude of any emissions and their potential impact on local sensitive receptors. Any change in odour as a result of the proposed development would be assessed against the baseline scenario.

### 1.1 Scope

The scope of the assessment involves the assessment of odour impact which has been requested verbally by the Environment Protection Agency (EPA). The assessment of dust emissions from the proposed development has been undertaken separately and can be found in Attachments E.6 and I.1.

Where development proposals are described, or this assessment touches on other technical issues covered in greater detail within the associated licence application for the proposed re-development, descriptions will refer to those aspects critical to the assessment of odour only.

### 1.2 Overview of Historic Operations

The Forge Hill MRF commenced operations as a waste facility in the late 1970s. In September 2003, a waste licence (ref. no. W0173-01) was obtained for the facility by its operator at the time, IPODEC Ireland Limited.

Up until the time of its recent temporary closure (2011), the facility was licensed to accept and process up to 82,000 tonnes per annum (tpa) of mixed non-hazardous, municipal, commercial, industrial and construction / demolition waste.

The facility was licensed to operate between 0600 and 2200 hours from Monday to Saturday and between 0900 and 1800 hours on public holidays. No waste intake or other operations were permitted on Sundays. Waste was brought onto the Site by both Greenstar and approved third party waste collectors.

### 1.3 Overview of Proposed Operations

The proposed development comprises the resumption of the MRF operations at the Forge Hill Site. The existing building, following some improvements, would continue to house the separation plant as well as all storage and loading / unloading areas. Waste accepted by the MRF would be restricted to DMR waste, of which paper and cardboard would make up the majority of the waste received.

The capacity of the development would continue to be a maximum of 82,000 tpa. A Waste Facility Permit for the Site was issued by Cork County Council in December 2015 (WFP-CK-15-0148-01).

## 1.4 Structure of Report

The remainder of this report is structured as follows:

- section 2 describes the relevant legislation and guidance used in the assessment;
- section 3 describes the assessment methodology used to identify sources and receptors and describes the assessment approach;
- section 4 characterises the baseline environment in the vicinity of the Site from an air quality perspective with regard to site location, local meteorology and nearby receptors;
- section 5 details the odour emission sources and the significance of impacts;
- section 6 presents the recommended mitigation measures and the resulting residual impacts; and
- section 7 concludes the assessment.

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## 2.0 LEGISLATION FRAMEWORK, GUIDANCE & PLANNING POLICY

### 2.1 Odour Legislation

There are no specific European or Irish regulatory numerical standards for the assessment of the impact of odours. However, it can be reasonably argued that complaints are likely to occur only when odours become detectable and recognisable on a routine basis. The longer and more frequently the odour detection persists for an individual, the greater the level of complaints may be expected, particularly if the odours are unpleasant.

Facilities which are licensed to operate under the Environmental Protection Agency Act (1992) and its subsequent amendments are required to operate in such a way where:

*“[...] environmental protection includes [...] the prevention, limitation, elimination, abatement or reduction of environmental pollution”.*

Where ‘environmental pollution’ is defined as:

- “(i) the disposal of waste in a manner which would endanger human health or harm the environment and, in particular*
- (ii) cause a nuisance through [...] odours.”*

Odour is therefore defined as pollution as it may cause offence to human senses and consequently must be controlled to the satisfaction of the EPA.

Air Guidance Note (AG5) Odour Impact Assessment Guidance for EPA Licensed Sites has been issued by the EPA to address the impact of odorous emissions from processes authorised under the EPA Acts 1992 and subsequent amendments. AG5 provides a consistent and systematic approach to the assessment of odours on and in the local area of facilities and installations licensed by the EPA. The principles of AG5 have been applied to the qualitative assessment of odour impacts relating to the proposed development.

### 2.2 Planning Policy Guidance

#### 2.2.1 Cork County Development Plan

The Cork County Development Plan<sup>1</sup> 2014 came into effect on 15<sup>th</sup> January 2015 and is expected to remain in force until 2020. It is a six year development plan for the County that attempts to set out Cork County Council’s current thinking on planning policy looking towards the horizon year of 2022.

There are no specific policies within the County Development Plan relating to odour or amenity issues at proposed waste facilities.

#### 2.2.2 Southern Region Waste Management Plan 2015-2021

The waste management plan<sup>2</sup> is a statutory document prepared by the local authorities of the region; it provides a framework for the prevention and management of wastes in a safe and sustainable manner. This waste plan covers the period 2015 to 2021 and is required to be revised or replaced every 6 years.

<sup>1</sup> Cork County Council, 2014. Cork County Development Plan 2014 [WWW] <http://corkcocodevplan.com>

<sup>2</sup> Southern Waste Region, 2015. Southern Region Waste Management Plan 2015-2012. [WWW] <http://southernregion.ie/publications>

Policy E19 of the plan states that *“The waste plan supports the development of indigenous reprocessing and recycling capacity for the treatment of non-hazardous and hazardous wastes where technically, economically and environmentally practicable. The relevant environmental protection criteria for the planning and development of such activities needs to be applied.”*

The environmental criteria set out in the plan must be applied in order to ensure that the impact on communities, human health, ecology and the wider environment can be avoided where possible and minimised, managed and mitigated, where necessary.

Policy G3 states: *“Ensure there is a consistent approach to the protection of the environment and communities through the authorisation of locations for the treatment of wastes.”*

### **2.3 Institute of Air Quality Management**

The Institute of Air Quality Management (IAQM) is a UK professional body for air quality professionals. The IAQM produces useful guidance on matters affecting air quality professionals, the document considered relevant to this assessment being the *Guidance on the Assessment of Odour for Planning*<sup>3</sup>.

This document was prepared in order to assist in the assessment of odour for planning purposes, describing what the IAQM considers to be best practice. The document is peer reviewed and is considered to provide a transparent piece of guidance in the assessment of odour at both proposed and existing developments.

Although primarily aimed for use within the UK, it recognises that due to the international memberships of the IAQM guidance published may be applied elsewhere.

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<sup>3</sup> Bull *et al* (2014) IAQM Guidance on the assessment of odour for planning, Institute of Air Quality Management, London, 2014.

### 3.0 ASSESSMENT METHODOLOGY

This chapter provides information relating to methods used in this assessment. The methodologies used are consistent with the source literature and regulations detailed in chapter 2 of this assessment.

Wherever bulk quantities of waste are handled and disposed of there is potential for the generation of odours. Potential odour sources associated with the proposed development have been identified by consideration of the nature of wastes received, current operations at the Site and how the development of the Site may change the existing potential odour sources onsite.

EPA Guidance Note AG5 proposes the systematic approach of field observations to undertake an assessment of odour. Given that the facility is not currently operational; a desk top based assessment approach has been undertaken as an alternative.

Potential odour impacts during the operational phase have been assessed qualitatively using the approach defined in the Guidance on the Assessment of Odour for Planning by the IAQM<sup>8</sup>.

Fugitive releases of odour have been assessed using a qualitative approach by consideration of the following:

- additional potential for odour release as a result of the redevelopment;
- the nature, scale and duration of activities undertaken on site to determine the potential magnitude of releases;
- the land uses and location of receptors in the surrounding area;
- the local climate and meteorology; and
- existing odour control measures and their effectiveness.

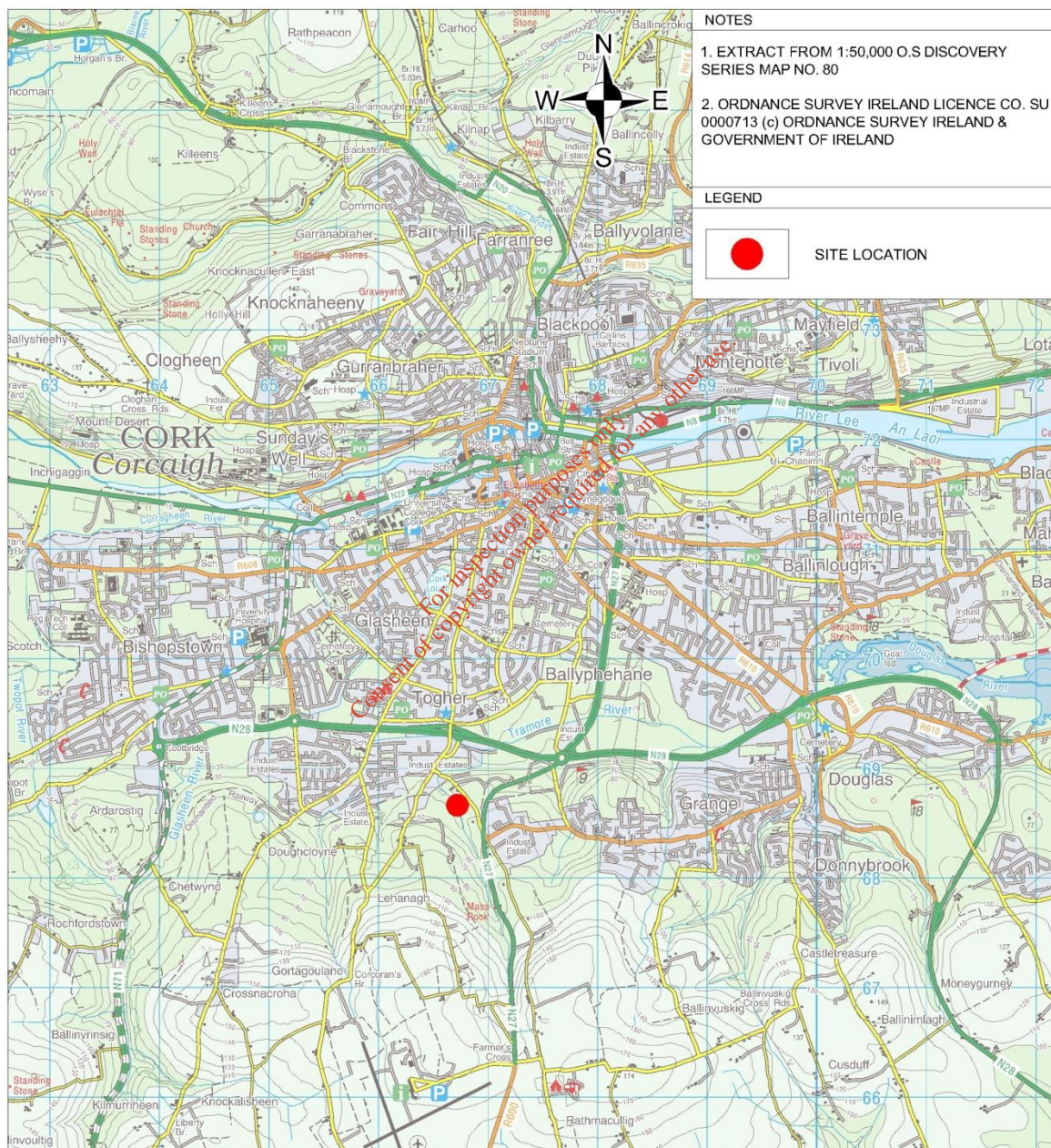
Subsequently, recommendations for any further mitigation measures as and where necessary on site will be undertaken and the residual impacts following the implementation of such measures re-assessed. The IAQM assessment methodology is presented in Appendix AQ1.

## 4.0 BASELINE ENVIRONMENT

### 4.1 Location

The Site is located on the southern fringe of Cork City, within the townland of Ballycurreen. The facility covers an area of approximately 1.03 hectares (2.48 acres) and is accessed from the Forge Hill Road via a junction on the N27 National Primary Road (Kinsale Road) leading from the N40 Southern Ring Road to Cork Airport.

The location of the proposed development is shown in Figure 4-1 below.



**Figure 4-1  
 Site Location**



The proposed development is bounded to the north and south by other industrial and commercial premises. It is bounded to the west by a public road (Forge Hill) with other industrial premises on the opposite side of the road. To the east of the Site is an area of undeveloped Greenfield land and beyond that is the N27 Kinsale Road. Figure 4-2 shows an aerial view of the Site and the surrounding area.



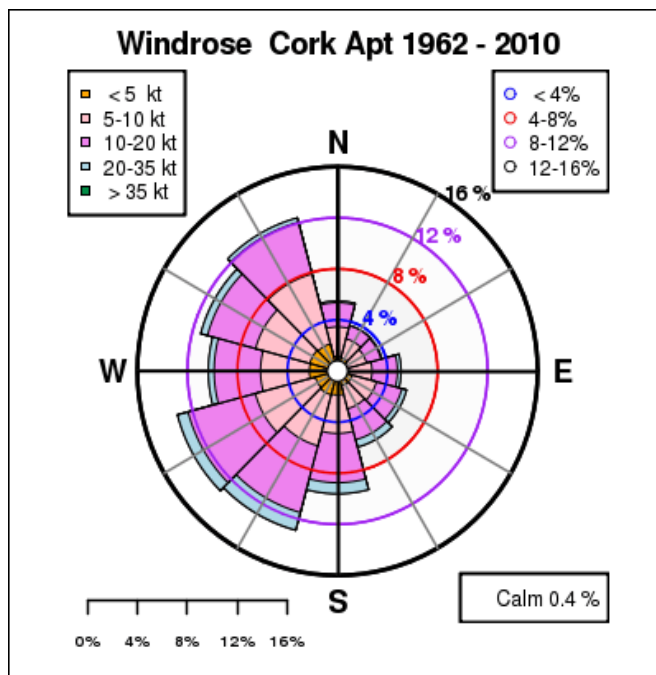
**Figure 4-2**  
**Aerial View of Site and Surrounding Area (from Microsoft Bing Maps)**

## 4.2 Meteorology

The generation, release and dispersion of fugitive odours are particularly dependent upon weather conditions. The prevailing meteorological conditions at any site would be dependent upon many factors including its location in relation to macroclimatic conditions as well as more site specific, microclimatic conditions. The most important climatic parameters governing the emission and the magnitude of impact and odour are:

- wind direction which determines the broad transport of the emission and the direction in which it is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of pollutants in the emission.

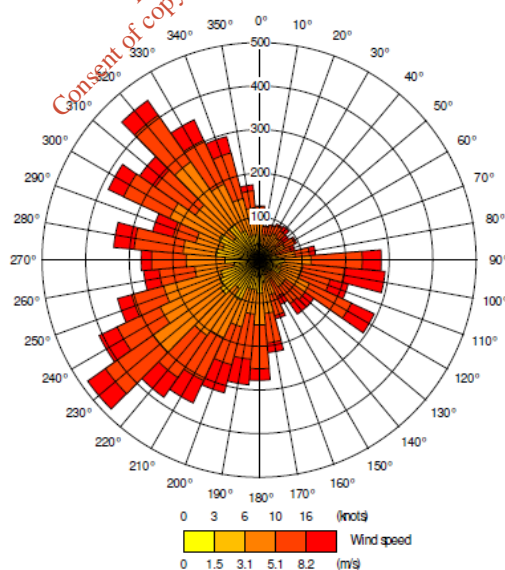
The closest meteorological station considered to be representative of local site conditions is located at Cork Airport, approximately 3km south of the Site. A wind rose for the Cork Airport Observation Station covering the period 1962 to 2010 is shown in Figure 4-3. Although Cork Airport is relatively close to the proposed facility, it is considered the wind speeds would be slightly less at Forge Hill due to the fact that there is a height difference of approximately 100m. Wind directions however would be considered to be similar.



**Figure 4-3**  
**Windrose for Cork Airport Observation Station 1962 - 2010**

Based on the wind speed and direction information from Cork Airport meteorological station, the dominant wind direction fluctuates between South Westerly to North Westerly.

An additional wind-rose for the year 2012 is provided in Figure 4-4, confirming the prevailing wind directions from western sectors. Winds from the north-easterly sectors occur least frequently.



**Figure 4-4**  
**Windrose for Cork Airport Observation Station (2012)**

### 4.3 Sensitive Receptors

Sensitive receptor locations are those where the public may be exposed to odour emissions potentially arising from the Site. The sensitivity of receptors with regard to odour is presented in more detail in Appendix AQ1.

The surrounding area mainly comprises of commercial / industrial activities within the adjacent business parks. The closest residential properties are approximately 80m to the northwest and 120m to the east. The location of the odour sensitive receptors considered within this assessment are summarised in Table 4-1 and presented in Drawing AQ1 'Odour Sensitive Receptors'.

**Table 4-1  
 Odour Discrete Receptor Locations**

Receptor	Sensitivity	Location	Distance & Direction from Site Boundary
R1 City Link Park west	Medium	51°52'14.13" 8°28'57.35"	<20m, North
R2 City Link Park east	Medium	51°52'15.74" 8°28'50.01"	<20m, North
R3 John S & Son Business Park	Medium	51°52'19.36" 8°28'38.08"	245m, Northeast
R4 Residential Property, N27	High	51°52'13.28" 8°28'43.92"	120m, East
R5 Kinsale Rd Accommodation Centre	High	51°52'07.94" 8°28'48.24"	165m, South
R6 Forge Hill Business Park	Medium	51°52'11.37" 8°28'52.70"	30m, South
R7 Manor Road Residences	High	51°52'07.47" 8°29'03.88"	215m, Southwest
R8 Offices / Industrial Premises	Medium	51°52'12.51" 8°28'58.66"	30m, West
R9 Dan Seaman Car Garage	Medium	51°52'13.83" 8°28'59.62"	30m, West
R10 Residence fronting Forge Hill	High	51°52'15.40" 8°29'01.54"	80m, Northwest

### 4.4 Baseline Odour

The previous MRF at the Site accepted, amongst other wastes, residual municipal waste and relatively small quantities of food waste. These wastes are both considered to have potential to generate odours. The Annual Environmental Reviews (AER's) for the final 4 years of operation (2008 to 2011) indicated that no odour complaints were received during that period<sup>4</sup>. There have been no operations at the Site since 2011.

The surrounding area is dominated by industrial and commercial uses, with limited potential to produce significant odour emissions.

<sup>4</sup> SLR Consulting Ltd, 2013. Forge Hill Environmental Liabilities Risk Assessment, April 2013. Report Ref: 501.00303.00001.011.

## 5.0 ASSESSMENT OF EFFECTS AND SIGNIFICANCE

Wherever bulk quantities of waste are handled there is potential for the generation of offensive odours. Typically, odour may be generated as a result of the receipt and handling of wastes with a biodegradable fraction. Wastes handled at the proposed development will be solely DMR waste and therefore of negligible risk of odour generation. No food wastes or residual municipal wastes are to be received onsite.

### 5.1.1 Source Odour Potential

The expected throughput of the MRF will be a maximum of 82,000 tpa. The DMR waste would comprise mainly of paper, plastic and metals, with a potential for other recyclables such as glass, wood and textiles. A full breakdown of the permitted wastes to be accepted onsite can be found in Attachment B.3.2 (Condition 5 of the Site's Permit).

All waste material would be delivered, processed and stored inside the fully contained buildings. Waste would arrive onsite in bulk loads and infrequently by Refuse Collection Vehicles; both of which would ensure the waste is enclosed during transport. All unloading, loading, storage and operation of plant would be undertaken within the enclosed MRF buildings. Full details of the proposed operations and plant can be found in Attachment D.2.1, with associated drawings in Attachment D.2.2.

There is not anticipated to be any putrescible waste within the incoming waste source that would have the potential to generate malodours during storage and processing. However should a delivery be contaminated with putrescible waste this scenario would allow potential for the generation of odour.

The design of the MRF incorporates a number of 'designed-in' mitigation measures that require consideration when assessing the source odour potential during the operation of the facility. These include the following:

- all waste handling operations will be conducted indoors with full containment of the buildings;
- roller shutter doors installed;
- no materials will be stored outside;
- concrete floors in buildings and yards with drainage of trade effluent to the sewer; and
- all baled wastes will be stored indoors so no leachate will be generated.

Based upon the nature of the material received and the enclosed nature of all aspects of the operations, the odour source is considered to present a 'small' odour potential.

### 5.1.2 Effectiveness of the Pollutant Pathway

The descriptors for the effectiveness of dispersion are set out in Appendix AQ1. Factors that are considered include distance from source, location of receptors with regard to the prevailing wind direction, and frequency of low winds / calm periods.

High wind speeds tend to lead to odour emissions being more rapidly dispersed and diluted due to turbulence, and low wind speeds inhibit the dilution of odours. Therefore the incidence of low wind speed conditions of less than 3m/s have been used to inform the odour risk assessment as presented.

The incidence of low wind conditions at Cork Airport Observation Station indicates that about 55% of hourly observations are less than 3.1m/s with calm conditions (being less than 0.5m/s) occurring about 0.4 % of the year. As previously discussed, given the height

difference between the Site and the airport, the proportion of low wind conditions could be greater than those indicated from the observation station dataset.

From Figure 4-3 it can be seen that the prevailing wind directions are from the south-western and north-western quadrants. Receptors to the north east and southeast are therefore considered to be at a higher risk of odour impact, should odour generation occur, during periods of low wind speeds.

Taking the distance and direction of the receptor locations from the source, the effectiveness of the pathway for odour is presented in Table 5-1.

**Table 5-1  
 Summary of Pathway Effectiveness**

Receptor Location	Distance from Source (approx.)	Downwind / Upwind	Pathway Effectiveness
R1 City Link Park west	<20m	Downwind	Highly Effective
R2 City Link Park east	<20m	Downwind	Highly Effective
R3 John S & Son Business Park	245m	Downwind	Ineffective
R4 Residential Property, N27	120m	Downwind	Moderately Effective
R5 Kinsdale Rd Accommodation Centre	165m	Downwind	Ineffective
R6 Forge Hill Business Park	30m	Downwind	Highly Effective
R7 Manor Road Residences	215m	Upwind	Ineffective
R8 Offices / Industrial Premises	30m	Upwind	Moderately Effective
R9 Dan Seaman Car Garage	<20m	Upwind	Moderately Effective
R10 Residence fronting Forge Hill	80m	Upwind	Moderately Effective

**5.1.3 Risk of Odour Exposure (Impact)**

Based on the ‘small’ odour source potential and the pathway effectiveness at each identified receptor (see Table 5-1), the risk of odour exposure (impact) at each receptor is determined using the matrix provided in Appendix AQ1. The risk of exposure for each receptor is presented in Table 5-2.

**Table 5-2  
 Summary of Risk of Odour Exposure at Sensitive Receptors**

Receptor Location	Odour Source Potential	Pathway Effectiveness	Risk of Exposure (Impact)
R1 City Link Park west	Small	Highly Effective	Low Risk
R2 City Link Park east	Small	Highly Effective	Low Risk
R3 John S & Son Business Park	Small	Ineffective	Negligible
R4 Residential Property, N27	Small	Moderately Effective	Negligible
R5 Kinsdale Rd Accommodation Centre	Small	Ineffective	Negligible
R6 Forge Hill Business Park	Small	Highly Effective	Low Risk
R7 Manor Road Residences	Small	Ineffective	Negligible
R8 Offices / Industrial Premises	Small	Moderately Effective	Negligible
R9 Dan Seaman Car Garage	Small	Moderately Effective	Negligible
R10 Residence fronting Forge Hill	Small	Moderately Effective	Negligible

### 5.1.4 Effect of Odour Impact

The effect of odour at the receptor locations was determined using the matrix provided in Appendix AQ1. This uses the risk of exposure of each receptor (Table 5-2) and the sensitivity of the receptors (see Table 4-1). A summary of the likely odour effect at each sensitive receptor is presented in Table 5-3.

**Table 5-3  
 Summary of Likely Impacts at Sensitive Receptors**

	<b>Receptor Location</b>	<b>Risk of Exposure (Impact)</b>	<b>Receptor Sensitivity</b>	<b>Likely Odour Effect</b>
R1	City Link Park west	Low Risk	Medium	Negligible
R2	City Link Park east	Low Risk	Medium	Negligible
R3	John S & Son Business Park	Negligible	Medium	Negligible
R4	Residential Property, N27	Negligible	High	Negligible
R5	Kinsale Rd Accommodation Centre	Negligible	High	Negligible
R6	Forge Hill Business Park	Low Risk	Medium	Negligible
R7	Manor Road Residences	Negligible	High	Negligible
R8	Offices / Industrial Premises	Negligible	Medium	Negligible
R9	Dan Seaman Car Garage	Negligible	Medium	Negligible
R10	Residence fronting Forge Hill	Negligible	High	Negligible

The likely effect of odour is predicted to be negligible for all receptors. The potential for odour impact on the surrounding receptors is therefore considered not to be significant.

The outcome of the assessment is consistent with the fact that no odour complaints were received in the last 4 years of operations of the previous MRF at the Site (2008 to 2011); during which putrescible wastes with a high potential for odour generation were received as opposed to the proposed future DMR waste with very low odour potential.

## 6.0 MITIGATION MEASURES & RESIDUAL IMPACTS

The potential risk of odour impact is considered to be low or negligible with a consequential negligible risk of effect on nearby receptors. Waste is not anticipated to be odorous given that the waste stream is entirely DMR material; however as discussed previously there is a small risk of contamination of residual waste within the waste stream.

### 6.1 Existing Permit Conditions

The operation of the facility would be under the strict conditions of the existing permit (WFP-CK-15-0148-01) issued by Cork County Council (see Attachment B.3.2). Controls relating to odour within the existing permit include the following taken from Condition 6 of the permit document:

*“The permit holder shall, in advance of the commencement of waste activities, install and provide adequate measures for the control of odours and dust emissions, including fugitive dust emissions, from the facility. Such measures at a minimum should include [...]: maintenance of integrity throughout the building to ensure no significant escape of odours.”*

*“The permit holder shall ensure that all waste for disposal stored overnight at the facility shall be stored in suitably covered and enclosed containers, and shall be removed from the facility within forty eight hours of its arrival at the facility except at Bank Holiday Weekends. At Bank Holiday Weekends, waste for disposal shall be removed from the site within seventy-two hours of its arrival on site.”*

Given the daily throughput of circa 300 tonnes and the 100 tonnes storage limit, material would typically be removed from the facility within 24 hours.

### 6.2 Recommended Odour Control Measures

Mitigation measures to prevent the contamination of the waste with putrescible waste include the following:

- waste profiling and characterisation to ensure that only dry recyclables are delivered to the facility (see attachment F.1);
- waste acceptance procedures to ensure that only dry recyclables are accepted at the facility (see attachment F.1);
- a dedicated waste inspection area to identify non-DMR waste on receipt (see attachment D.1(i));
- a dedicated waste quarantine area for non-recyclable non-hazardous wastes (see attachment D.1(h));
- rejected material store in an enclosed compactor prior to removal off site to an appropriate disposal or recovery facility;
- spill kits provided in vehicles and at appropriate locations to quickly contain any spills of potentially polluting liquids (see attachment F.1);
- any putrescible waste delivered to the Site removed with minimum delay (see attachment I.1.3);
- any source of waste that contains putrescible waste removed and the source of the material contacted regarding same (see attachment I.1.3);
- the suppliers of waste to the Site given strict instructions to ensure that waste does not contain putrescible fraction. Suppliers who breach this requirement refused entry to the Site (see attachment I.1.3);

- no materials stored outside of buildings (see attachment I.1.3);
- operations at the Site carried out under strict Standard Operating Procedures. These procedures will form part of the Environmental Management System that will be installed at the Site (see attachment I.1.3); and
- a high standard of cleaning and general good housekeeping;

### 6.3 Odour Monitoring & Complaints Management

In addition to the implementation of the recommended mitigation measures, daily patrols will monitor odour around the Site (see attachment F.2).

In accordance with the conditions of the Sites permit (see Attachment B.3.2) a register of all complaints relating the operation of the facility shall be kept. Each record shall give details of the following:

- time and date of the complaint;
- name of the complainant;
- details and nature of the complaint;
- actions taken to deal with the complaint, and the results of such actions; and
- the response made to each complainant.

The Local Authority or the EPA (as appropriate) shall be made aware of each complaint and receive full details of the complaints register.

### 6.4 Residual Effects

In the absence of mitigation measures, there is considered to be a 'negligible' risk of effect at surrounding receptors from onsite odour. Taking into account the conditions of the existing permit, and the control measures recommended, there continues to be a 'negligible' risk of effect on the surrounding receptors. The residual effect on surrounding receptors is therefore considered to be not significant.

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## 7.0 CONCLUSIONS

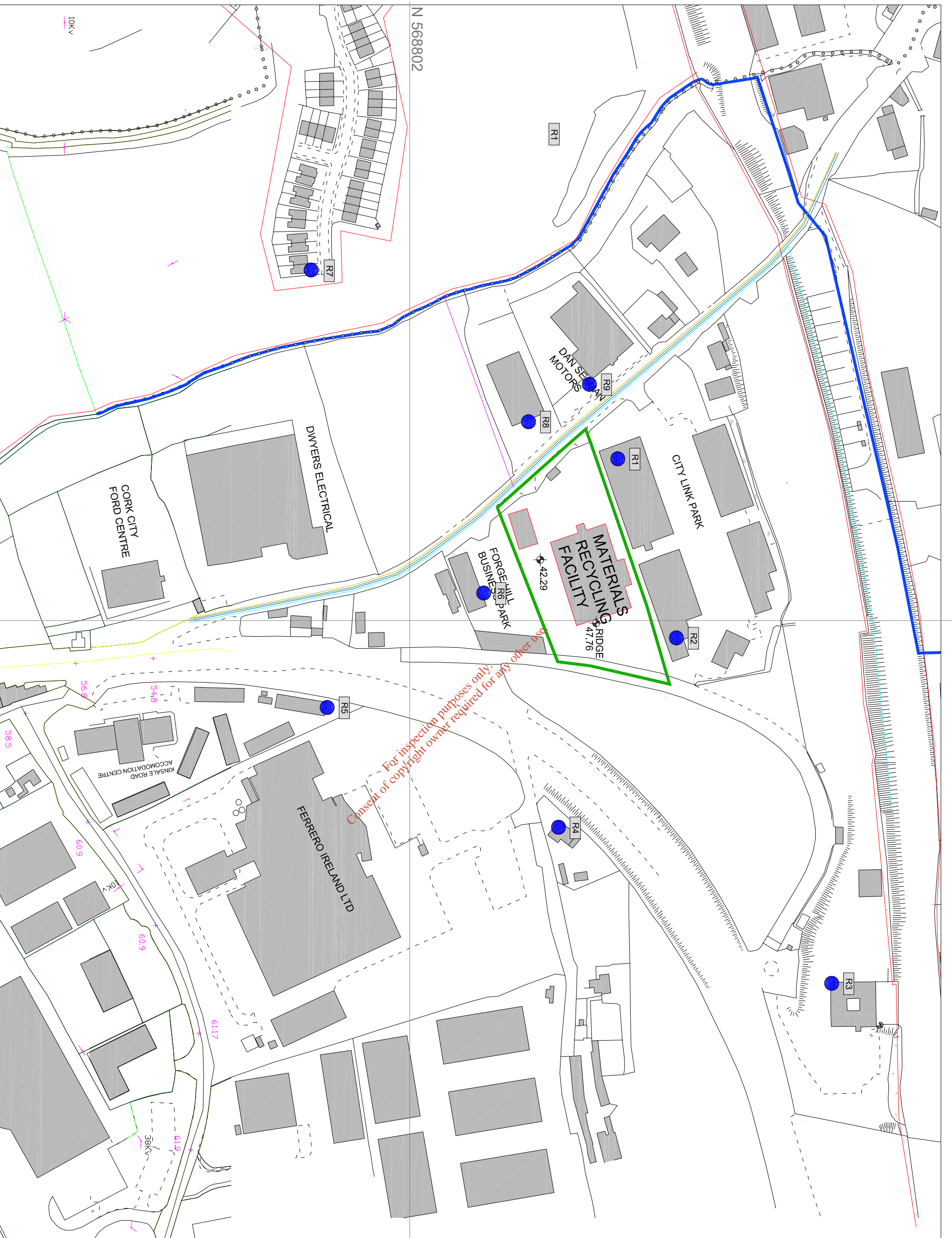
This assessment has considered the potential odour impacts of the proposed MRF located on the Site of the previous MRF at Forge Hill, Cork. Operations ceased at the Site in 2011, during which time mixed non-hazardous and municipal waste was received. The proposed development is for a MRF to receive solely Dry Mixed Recycling waste.

The report describes the assessment methodology, the baseline conditions currently existing at the Site, the likely sources of emissions, the mitigation measures and the likely residual effects after these mitigation measures have been implemented.

Potential odour impacts from the facility were assessed using the IAQM assessment methodology. The potential risk of effect is considered to be negligible at all assessed receptor locations; this is primarily due to the nature of waste received and the enclosed nature of the building.

The regulation of the facility with regard to odour by the Environment Protection Agency will ensure that standards of control are maintained.

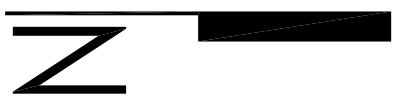
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ORDINANCE SURVEY MAP  
SCALE 1:2500

E 566843

N 568802



LEGEND:  
SITE BOUNDARY

Notes:  
1. This drawing is for permit application purposes only.  
2. Do not scale from drawing.  
3. Direct any queries to the engineer.

Map file:  
Discover Series 87, Scale 1:50,000  
All levels are related to Mean Head Datum and dimensioned in meters.

Number	Comments	Date

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FOR FORGE HILL RECYCLING  
AT FORGE HILL, CO. CORK**

Client:  
**FORGE HILL RECYCLING**

Drawing Title:  
**ODOUR SENSITIVE  
RECEPTORS**

Scale: 1:2500 @A3	Date: 20/04/2016	Revision: 1
Drawn By: RM	Drawing Number: xxxx_xxxx	

## Appendix AQ1 – Odour Assessment Methodology

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## ODOUR ASSESSMENT METHODOLOGY

### Overview

The assessment of impact is determined by considering the magnitude of source release, the effectiveness of the pathway and the sensitivity of the receptor

The assessment of odour follows the qualitative odour assessment framework provided within IAQM: Guidance on the Assessment of Odour for Planning.

### Source Odour Potential

The first step in the assessment is to estimate the odour-generating potential of the site activities, terms the “Source Odour Potential”. This takes into account the following factors:

- the magnitude of release (taking into account odour-control measures);
- how inherently odorous the compounds are; and
- the unpleasantness of the odour.

An example of risk ranking of source odour potential is presented within Table AQ1-1.

**Table AQ1-1  
 Source Odour Potential Examples**

Odour Potential	Description of Examples
<b>Large</b>	Magnitude – larger permitted processes of odorous nature or large STWs; materials of thousands of tonnes/m <sup>3</sup> per year; area sources of thousands of m <sup>2</sup> ; Compounds are very odorous (i.e. mercaptans) with low ODT where known; Unpleasantness: process classed as ‘most offensive’ or having an unpleasant to very unpleasant score; Mitigation / control – open air operation with no containment, reliance solely on good management techniques and best practice.
<b>Medium</b>	Magnitude – smaller permitted processes of small STWs; materials usage thousands of tonnes/m <sup>3</sup> per year; area sources of hundreds or m <sup>2</sup> ; Compounds involved are moderately odorous; Unpleasantness – process classed as ‘moderately offensive’ or odours to have a score of neutral to unpleasant; Mitigation / control – some mitigation measures in place, but significant residual odour remains.
<b>Small</b>	Magnitude – falls below Part B threshold; materials usage hundreds of tonnes/m <sup>3</sup> per year; area sources of tens m <sup>2</sup> ; Compounds involved are mildly odorous, having a relatively high ODT where known; Unpleasantness – processes classed as ‘less offensive’ or compounds having a neutral to very pleasant score; Mitigation / control – effective, tangible mitigation measures in place leading to little or no residual odour.

### Effectiveness of the Pollutant Pathway

The effectiveness of the pollutant pathway as the transport mechanism for odour through the air to the receptor needs to be estimated by considering any factor that increases dilution / dispersion into the atmosphere. Factors affecting the odour flux to the receptor are:

- distance from source to receptor;
- frequency of winds from the source to receptor (or qualitatively, the direction of receptors from source with respect to prevailing wind);
- the effectiveness of dispersion / dilution in reducing the odour flux to the receptor; and
- topography and terrain.

An example of risk ranking of source odour potential is presented within Table AQ1-2.

**Table AQ1-2  
 Effective Pathway Examples**

Effectiveness of Pathway	Description of Examples
<b>Highly Effective</b>	Distance – receptor is adjacent to the source / sit; distance will be below any official set-back distances; Direction – high frequency (%) of winds from source to receptor (or qualitatively, receptors downwind of source with respect to prevailing wind); Effectiveness of dispersion / dilution – open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.
<b>Moderately Effective</b>	Distance – receptor is local to the source; Where mitigation relies on dispersion / dilution – releases are elevated, but compromised by building effects.
<b>Ineffective</b>	Distance – receptor is remote from the source; distance exceeds any official set-back distances; Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind); Where mitigation relies on dispersion / dilution – releases are from a high level (e.g. stacks) and are not compromised by surrounding buildings.

**Risk of Odour Exposure (Impact)**

The estimates of source potential and the pathway effectiveness are considered together to predict the risk of odour exposure (impact) at the specific receptor locations, as shown in Table AQ1-3.

**Table AQ1-3  
 Risk of Odour Exposure (Impact) at the Specific Receptor Location**

Pathway Effectiveness		Source Odour Potential		
		Small	Medium	Large
Pathway Effectiveness	Highly Effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

The estimate of odour impact is then combined with the sensitivity of the receptor to estimate the effect of that odour impact, as shown in Table AQ1-4 and Table AQ1-5.

**Table AQ1-4  
 Receptor Sensitivities**

Receptor Description	
<b>High</b>	Surrounding land where: <ul style="list-style-type: none"> <li>• users' can reasonably expect enjoyment of a high level of amenity; and</li> <li>• the people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.</li> </ul> Examples may include residential dwellings, hospitals, schools/education and tourist/cultural
<b>Medium</b>	surrounding land where: <ul style="list-style-type: none"> <li>• users' would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or</li> <li>• people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.</li> </ul> Examples may include places of work, commercial/retail premises and playing/recreation fields.
<b>Low</b>	Surrounding land where: <ul style="list-style-type: none"> <li>• the enjoyment of amenity would not reasonably be expected; or</li> <li>• there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.</li> </ul> Examples may include industrial, farms, footpaths and roads.

**Table AQ1-5  
 Likely Magnitude of Odour Effect at the Specific Receptor Location**

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
<b>High</b>	Slight Adverse	Moderate Adverse	Moderate Adverse
<b>Medium</b>	Negligible	Slight Adverse	Moderate Adverse
<b>Low</b>	Negligible	Negligible	Slight Adverse
<b>Negligible</b>	Negligible	Negligible	Negligible

## 8.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

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## Attachment I.2 – Assessment of Impact on Receiving Surface Water

Chapter 5 of the EIS included in Attachment B.3(b).1, completed in 2002, contains a baseline assessment of hydrology in the area and an impact assessment of a waste facility on the receiving surface water.

The sections below, prepared by Egan Environmental and SLR Consulting, provide an update on the potential impact on surface water from the current proposal to only process dry recyclables at the facility.

The risk of surface water contamination from the current proposal is significantly less than the risk posed from previous operations at the site, for the following reasons:

- Dry Recyclables, by their nature, pose a low risk of surface water contamination, compared to residual MSW and C&D wastes.
- All waste materials will be handled inside buildings that are designed for full containment of liquids.
- Additional fire-water containment will be provided in the current proposal to address a longer lasting fire than previously anticipated.
- There will be no diesel tanks on site or other bulk storage of hazardous materials, such as hydrocarbons.

### I.2.1. Introduction

This section addresses hydrology, water quality and surface water runoff in the existing environment, identifies potential impacts of the proposed development and outlines measures to avoid, reduce and mitigate potential impacts. Residual impacts that cannot be avoided are also identified and discussed.

The Water Framework Directive (2000/60/EC) was established by the European Community in 2000. This Directive was transposed into Irish legislation in December 2003 as the European Communities (Water Policy) Regulations 2003, (S.I. No 722 of 2003). The overriding purpose of the Water Framework Directive is to achieve at least 'good status' in all European waters by 2015 and ensure that no further deterioration occurs in these waters. European waters are classified as groundwaters, rivers, lakes, transitional and coastal waters. The Water Framework Directive has been implemented in Ireland by dividing the island of Ireland into eight river basin districts. The proposed facility is located in the South-western River Basin District (SWRBD).

### I.2.2. Site Drainage

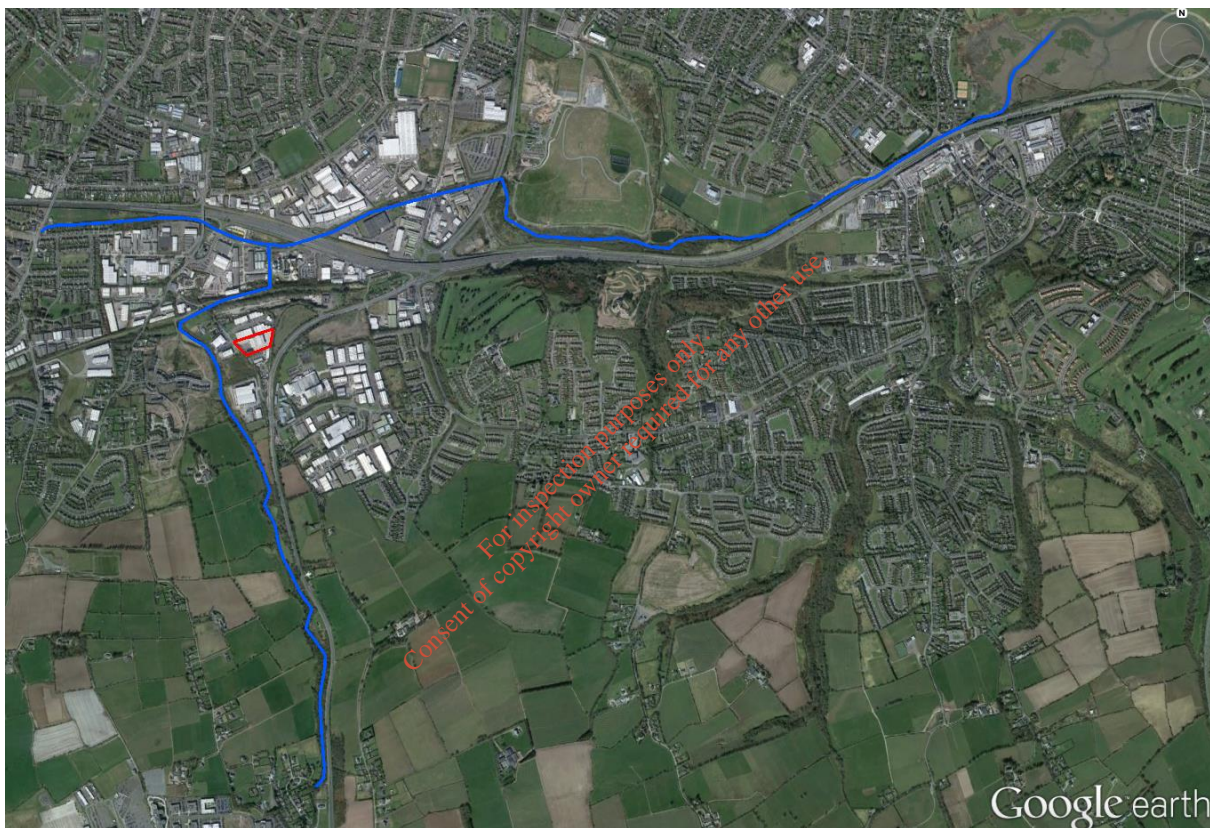
The surface water and foul water drainage infrastructure on site is described in detail in Attachment D.1.(k) of this application. The drainage is purpose built to ensure that:

- foul sewage from the Administration Building is directed to the foul sewer;
- any potentially contaminated water is directed to foul sewer via a hydrocarbon interceptor;
- all roof water is directed to surface water without passing through a hydrocarbon interceptor; and

- all water from clean yard areas is directed to surface water via a hydrocarbon interceptor, that also acts as a silt trap and through a balancing tank that controls run-off during flood events.

### I.2.3. Local Area Hydrology

The site in Forge Hill is located in the catchment of a small stream to the west of the site, which is a tributary of the Tramore River. Much of the catchment area consists of Gyleen Formation sandstone terrain. The upper reaches of the stream are steeply sloping. The stream rises at a point approximately 2 km south of the site, at an elevation of 140m OD. It flows north and passes within approximately 140 m of the site and enters the Tramore River, approximately 370 m north of the facility. The Tramore River enters a tidal basin called the Douglas River. This subsequently flows into Lough Mahon (see Figure I.2.1).



**Figure I.2.1** Local Stream and Tramore River

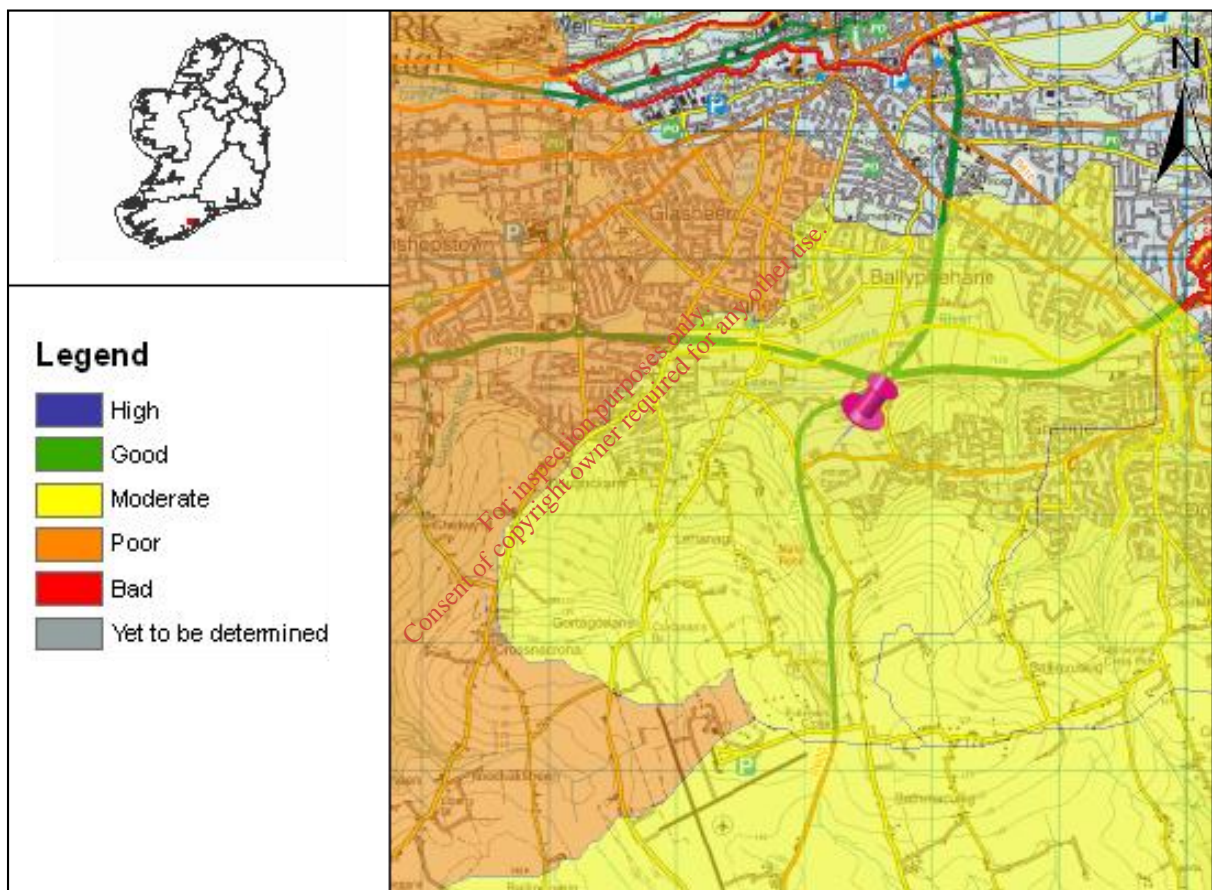
The Tramore River, while not a designated Salmonid Water, has in the past carried stocks of brown trout. The South-Western Regional Fisheries Board carried out electro-fishing of the Tramore River in 1988. Three sites were sampled upstream of Douglas village and downstream of the Forge Hill Industrial Area, beside Togher Industrial Estate and a stream at Brook Avenue. The findings of the survey revealed the absence of fish at the Forge Hill site station and the Togher Industrial Estate station. Brown trout were present at the Brook Avenue station.

#### Existing Water Quality in the Tramore River

The Tramore River flows west to east of Cork City – South Environs and discharges into Cork Harbour. The following table summarises the environmental quality of this section of the Tramore River.

Waterbody Name	Tramore River (Coastal)
Water Management Unit	Lower Lee /Owenboy
Waterbody Code	IE_SW19_1717
Protected Area	Yes
River Status (July 09)	Moderate
River Assessment (River Body)	At risk of not achieving good status
Objective	Restore to good status by 2015
Q value	N/A

**Table I.2.1** Environmental Quality of the Tramore River



**Figure I.2.1** Status of Tramore River in 2009

A status report on the Tramore River taken from the Characteristics Report for the WFD is provided in Attachment I.2.

In summary the Characterisation Report found that:

- The overall ecological status of the river is moderate
- The river is at risk from diffuse sources of pollution
- The river is probably at risk from point sources
- The overall objective for the river is to restore it to 'good status' by 2021.

#### **I.2.4. Existing Surface Water Quality at the Site**

Egan Environmental undertook sampling of the surface water discharge from the site in January 2015. The site was not operational at that time. Samples were collected in laboratory prepared containers with preservatives where necessary. The samples were labelled on-site and shipped same day, under chain of custody, to a UK analytical laboratory (Jones Environmental).

The full laboratory report is presented in Attachment I.2.2. The analysis includes biological oxygen demand (BOD), total suspended solids (TSS), pH, heavy metals, total petroleum hydrocarbons (TPH), mineral oils, fats, oils and greases and ammoniacal nitrogen.

The results are presented in Table I.2(i) in the Waste Licence Application Form. .

The surface water quality monitoring results demonstrate that surface water quality from the site was clean at the time of sampling, with no operations on site.

#### **I.2.5. Historical Surface Water Quality at the Site**

The site was previously operated by Greenstar and Veolia/Ipodec under Waste Licence W173, but was closed in 201Q3 2011. Surface water monitoring was carried out quarterly at the final discharge point (SW-1) in accordance with Condition 8.1 and Schedule D of the licence. This discharge point is the same as the current SW1.

The range of analysis to be carried out included: biochemical oxygen demand (BOD); total suspended solids (TSS); pH; heavy metals; total petroleum hydrocarbons (TPH); mineral oils; fats, oils and greases (OFG) and ammoniacal nitrogen.

According to the 2010 AER, the trigger levels and emission limits set for BOD, total suspended solids and mineral oils were not exceeded and the discharge was said to be in full compliance with the relevant licence conditions.

The AER for 2011 reported that there was no exceedance of trigger levels and ELVs for BOD, TSS and mineral oils with the exception of an elevated TSS level in Q4 2011 when the facility was closed. The AER concluded that the elevated TSS (a reading of 68 compared to the ELV of 60) was possibly due to a disturbance of sediment in the sample chamber when the sample was collected.

The main waste types accepted in 2010 and 2011 were described in the AERs as follows:

- 15 01 06 Segregated mixed packaging – 18,478 tonnes
- 20 03 01 Mixed residual waste (black bin) – 14,580 tonnes
- 20 03 07 Bulky waste – 10,674 tonnes
- 20 03 01 Mixed dry recyclables (green bin) – 8,117 tonnes
- 15 01 01 Segregated cardboard / paper packaging – 3,623 tonnes
- 20 01 01 Paper / cardboard from municipal sources – 2,251 tonnes
- 20 01 08 Commercial Food waste – 2,071 tonnes
- 17 09 04 Mixed C&D waste – 832 tonnes

It is clear that some of the materials previously handled at the site, such as food waste, residual waste and C&D waste, pose a greater risk to the water environment when compared against the current proposal to accept only dry recyclables at the facility.

### I.2.6. Flood Zones

The OPW national flood database<sup>1</sup> was reviewed to determine the presence of flood plains or areas prone to flooding in the vicinity of the site. The site is not located in a flood zone and there are no records of flooding in the area. Historically there has never been any flooding on the site. The OPW database did identify flooding in the Tramore Stream at Kinsale Road on the 30<sup>th</sup> December, 2009. The Tramore Stream is downgradient of the site, and the site at Forge Hill is elevated and unlikely to flood. Also the surface water management system for the site ensures that rainwater is directed to gullies which ultimately discharge to an underground surface water balancing tank. This tank has a pumped discharge which allows control of the rate of surface water discharge during flood events.

### I.2.7. Impacts of the Proposed Operations at the site on Water and Hydrology

In the absence of any mitigation measures Table 8.3 below outlines the potential impacts of the operations on surface water and hydrology.

Description of Area	Potential Impact	Potential Impact
Site Access Roads	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Medium
	Increase in pollution due to spillages	Medium
Weighbridge	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Medium
	Increase in pollution due to spillages	Medium
Staff Parking	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Medium
Waste Processing Buildings	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Medium
	Increase in pollution due to spillages	Medium
Truck Parking Areas	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Medium
	Increase in pollution due to spillages	Medium
Truck & Bin Wash Area	Increase in suspended solids in run-off	Medium
	Increase in hydrocarbons	Medium
	Increase in pollution due to spillages	Medium

**Table I.2.2 Potential Impacts on Surface Water Quality**

Mitigation measures to reduce or remedy these impacts are discussed in the following section.

<sup>1</sup> www.floodhazardmapping.ie

### **I.2.8. Mitigation Measures**

The surface water management system on site will ensure that all surface water is adequately collected, stored and discharged. At the locations on the site where potential pollution may arise the water is directed firstly to an oil/water interceptor and then to foul drain for treatment at a Local Authority waste water treatment plant.

The waste processing building will have ramps on the doors to fully contain all waste and any spills inside the building, thereby preventing the risk of contamination from waste materials.

There are no plans to install diesel or other fuel tanks on site. Trucks will be fuelled off-site. Plant used on site will be filled by mobile tanker either inside the waste processing building or in an area that drains to foul sewer.

Truck or bin washing will be carried at the truck washing station only. Run-off from this area is directed to open gullies that ultimately discharge to the oil/water interceptor prior to discharge to foul sewer. As the facility will only accept dry recyclables, bin and truck washing is unlikely to be necessary on a regular basis.

All oils and lubricants used in the maintenance of the MRF will be stored in a bunded area within the building. The bund will have the capacity to contain 110% volume of the largest drum. Staff will, as part of their induction training, be given a toolbox talk on the control of environmental pollutants on the site.

All empty containers containing hazardous materials e.g. oils and grease will be collected by a permitted waste carrier and disposed of at a licensed waste facility. Records will be kept of the hazardous materials taken off site.

No liquid wastes will be handled on the site and in the event that a waste consignment does contain liquid waste, the material will be put into quarantine and either the supplier of the waste will be contacted to remove the material or Forge Hill Recycling will make provisions to dispose of the material. Records will be made of the waste supplier of the material and they will be contacted by Forge Hill Recycling who will show them their waste acceptance procedures and criteria.

If an incident does occur on-site, for example spillage of a drum of oil, emergency procedures will be put in place to prevent this from reaching any watercourse. Spill kits and pig absorbent booms will be available for minor spillage throughout the plant. Used spill kits/adsorbents will be placed in a hazardous labelled drum for collection by a permitted waste contractor.

In the event of a larger spill the pump on the underground surface water balancing tank will shut off and the shut-off valve at the entrance gate will be closed. The contents of the tank will be pumped to a waste collection tanker by a permitted carrier and disposed of at a licensed facility. All paperwork, waste transfer forms and Trans boundary Frontier Shipment and disposal certificates will be maintained on-site by Forge Hill Recycling Ltd. A root cause assessment will be carried out and procedures/training will be amended to ensure that the risk is significantly reduced.

Because none of the materials / liquids that will be used on site will be corrosive, integrity testing of all the underground pipework will be carried out every 3 years. All storm water, surface water and foul lines will be tested by a contractor. An integrity test will be carried out every 5 years on the underground balancing tank on the site.

Truck movements in and out of the site have the potential to generate dust particularly during extended periods of dry weather. However as part of the maintenance schedule for the site, all hard standing areas will be washed down on a regular basis. The frequency of wash down will increase during periods of extended dry weather. Dust emissions from the traffic movements at the site will cause a **slight negative impact**. Typically local authorities and the Environmental Protection Agency establish limits for dust deposition levels at the site boundaries. This limit is normally 350mg/m<sup>2</sup>/d.

### Odour

For odour, the proportion of lower wind speeds in the area is of concern as dispersal of odours is minimised during these periods. The records for Cork Airport show that calm conditions occur about 0.4% of the year. Dry recyclable material will be handled at this site and the levels of putrescible matter present in the waste stream will be very low. All of the waste handling will be conducted in-doors and given the commercial nature and significant non-organic waste content there is little potential for the generation of odorous compounds. The fast turnaround time for waste will ensure that any putrescible materials are taken off site as soon as possible. The impact of operations on odour generation will be **neutral**. In the event that an odour issue does arise with a particular waste stream or waste source it will be immediately removed from the site. In this scenario the impacts will be **slight and short-term**.

See attached Odour Modelling Report prepared by Awn for further analysis of the potential odour impact associated with the facility

### Litter

All of the waste handling operations will be conducted indoors therefore the likelihood of litter generation is low. Daily litter picking patrols will take place at the boundaries of the site.

It is concluded, therefore, that the potential impact on air quality arising from the recycling of materials at this site will be limited to potential nuisance impacts arising from dust. However a strict regime of waste acceptance, waste handling, a quick turnaround for the waste processing will ensure that the likelihood of dust generation will be small. A review of the windrose shown in Figure 1 shows that south-westerly winds are the dominant wind direction in the area. Any dust generated on the site will be directed away from the nearby residential areas.

Manor Road, the nearest residential area, is upwind of the site so the impacts on air quality will be negligible at that location. The environmental impacts from dust generated at the site are significantly reduced given the screening afforded by trees and hedgerows surrounding the site. This is also the case in terms of potential adverse effects to the nearest residential house located to the north west of the site. Screening to the north-west of the site is well established and, given the south west prevailing winds, nuisance levels of dust deposition at this location resulting from the activities at the site are unlikely.

The site will have 24 hour security and CCTV monitoring. As part of staff training, the staff will be given training in the use of fire extinguishers. A number of suitable type fire extinguishers will be strategically placed around the site to deal with manageable fires. In the event of a fire at the plant, the emergency procedures for the site will be initiated. All valves will be closed off and the local fire brigade will be contacted immediately. The emergency procedures for the site will include contact details for the Garda, Cork County Council, Inland Fisheries Ireland, the fire brigade, and the ambulance services.

Proposed Fire Control measures are detailed in Attachment D.1.(o).

All firewater will be contained within the waste processing buildings as detailed in Attachment D.1(k).

The Stage 1 screening for an Appropriate Assessment included in Attachment B.3.1 has demonstrated that the operations at the site will not have adverse impacts on the nearby Natura 2000 sites.

### I.2.9. Likely Residual Impacts

The presence of the existing surface water management system at the plant, the containment in the waste processing building and the safe disposal of foul water to a municipal foul sewer will ensure that no residual impacts will arise from operations at the site.

The maintenance of an environmental management system for the operations at the site, adequate training and general awareness for the operatives on site will also assist in ensuring that no residual impacts will arise.

The potential impacts identified in Table I.2.2 are re-examined in Table I.2.3 after consideration of the mitigation measures to determine the residual impacts.

Description of Area	Potential Impact	Residual Impacts
Site Access Roads	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Low
	Increase in pollution due to spillages	Low
Weighbridge	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Low
	Increase in pollution due to spillages	Low
Staff Parking	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Low
Waste Processing Buildings	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Low
	Increase in pollution due to spillages	Low
Truck Parking Areas	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Low
	Increase in pollution due to spillages	Low



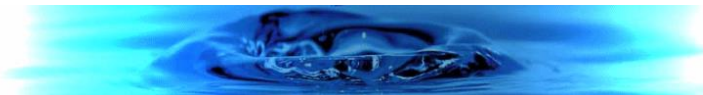
<b>Truck &amp; Bin Wash Area</b>	Increase in suspended solids in run-off	Low
	Increase in hydrocarbons	Low
	Increase in pollution due to spillages	Low

**Table I.2.3** Likely Residual Impacts on Surface Water Quality

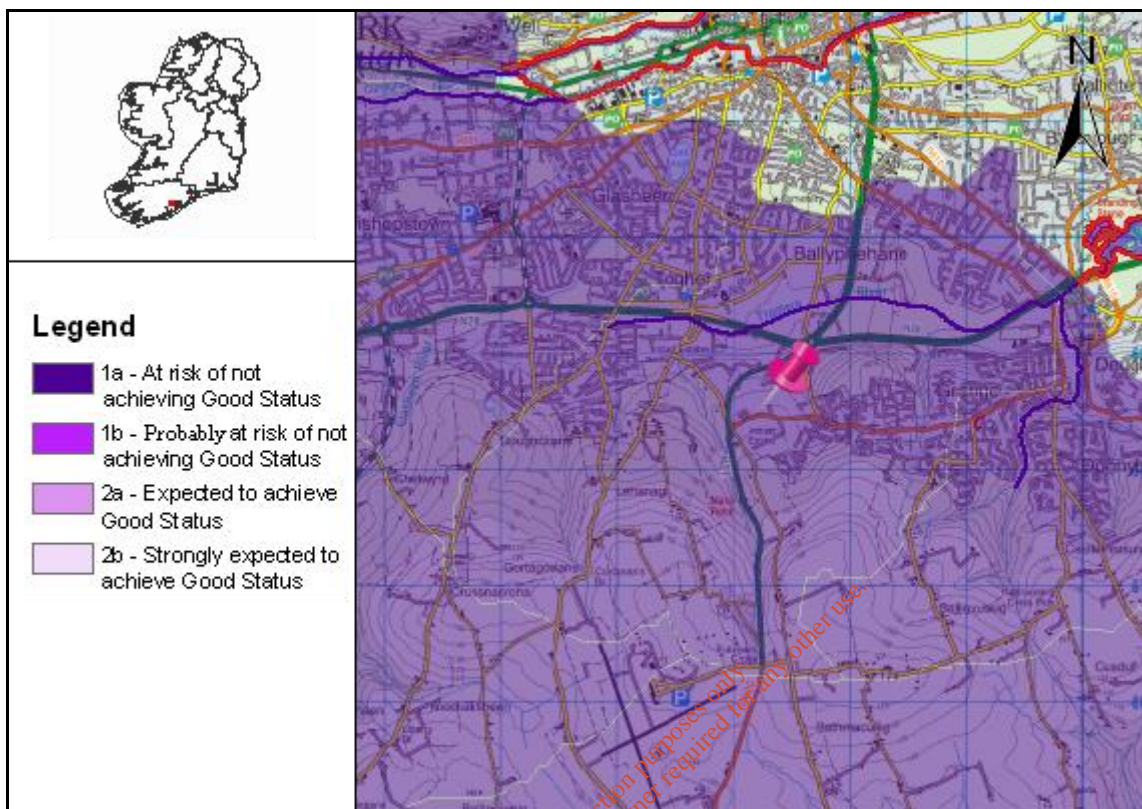
**I.2.10. 'Do Nothing' Scenario**

In the 'do nothing' scenario the site will sit idle and clean surface water will continue to discharge to the stream. No foul water or domestic effluent will be generated. However, the dry recyclables will be processed elsewhere and the opportunity to increase recycling in Cork will be lost.

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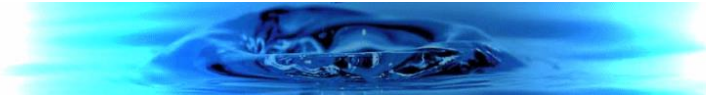
## Full Report for Waterbody Tramore River (Coastal)



River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The WaterMaps viewer is an integral part of the River Basin Management Plan and provides access to information at individual waterbody level and at Water Management Unit level for all the River Basin Districts in Ireland.

The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

You will find brief notes at the bottom of some of the individual report sheets that will help you in interpreting the information presented. More detailed information can be obtained in relation to all aspects of the RBMPs at [www.wfdireland.ie](http://www.wfdireland.ie).



**Summary Information:**

**Water Management Unit:** IE\_SW\_LowerLee/Owenboy

**WaterBody Category:** River Waterbody

**WaterBody Name:** Tramore River (Coastal)

**WaterBody Code:** IE\_SW\_19\_1717

**Overall Status:** Moderate

**Overall Objective:** Restore\_2021

**Overall Risk:** 1a At Risk

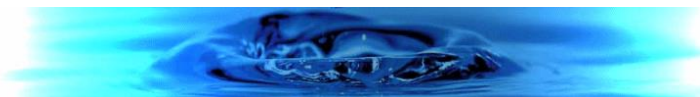
**Heavily Modified:** No



Report data based upon final RBMP, 2009-2015.

The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.

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<b>Status Report</b>	
<b>Water Management Unit:</b>	IE_SW_LowerLee/Owenboy
<b>WaterBody Category:</b>	River Waterbody
<b>WaterBody Name:</b>	Tramore River (Coastal)
<b>WaterBody Code:</b>	IE_SW_19_1717
<b>Overall Status Result:</b>	Moderate
<b>Heavily Modified:</b>	No



	<b>Status Element Description</b>	<b>Result</b>
<b>Status information</b>		
Q	Macroinvertebrate status	N/A
PC	General physico-chemical status	N/A
FPQ	Freshwater Pearl Mussel / Macroinvertebrate status	N/A
DIA	Diatoms status	N/A
HYM	Hydromorphology status	N/A
FIS	Fish status	N/A
SP	Specific Pollutants status (SP)	N/A
ES	Overall ecological status	Moderate
CS	Overall chemical status (PAS)	n/a
EXT	Extrapolated status	YES
MON	Monitored water body	NO
DON	Donor water bodies	SW_19_1968

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n/a - not assessed

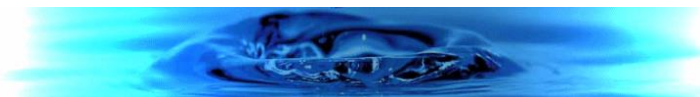
**Status**

By 'Status' we mean the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status. If this has been done the first line of the status report shows the code of the waterbody used to extrapolate.

You can read more about status and how it is measured in our RBMP Document Library at [www.wfdireland.ie](http://www.wfdireland.ie) (Directory 15 Status).

Date Reported to Europe: July 2010

Date Report Created 16/01/2015



**Risk Report**

**Water Management Unit:** IE\_SW\_LowerLee/Owenboy

**WaterBody Category:** River Waterbody

**WaterBody Name:** Tramore River (Coastal)

**WaterBody Code:** IE\_SW\_19\_1717

**Overall Risk Result:** 1a At Risk

**Heavily Modified:** No

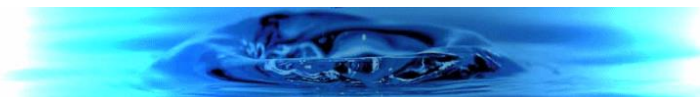


Risk Test Description			Risk
<b>Diffuse Risk Sources</b>			
RD1	EPA diffuse model (2008)	1a	At Risk
RD2a	Road Wash - Soluble Copper	2b	Not At Risk
RD2b	Road Wash - Total Zinc	2b	Not At Risk
RD2c	Road Wash - Total Hydrocarbons	2b	Not At Risk
RD3	Railways	2b	Not At Risk
RD4a	Forestry - Acidification (2008)	2b	Not At Risk
RD4b	Forestry - Suspended Solids (2008)	2b	Not At Risk
RD4c	Forestry - Eutrophication (2008)	2a	Probably Not At Risk
RD5	Overall Unsewered (2008)	2b	Not At Risk
RD5a	Unsewered Areas - Pathogens (2008)	2a	Probably Not At Risk
RD5b	Unsewered Phosphorus (2008)	2b	Not At Risk
RD6a	Arable	2b	Not At Risk
RD6b	Sheep Dip	2b	Not At Risk
RD6c	Forestry - Dangerous Substances	2b	Not At Risk
RDO	Diffuse Overall -Worst Case (2008)	1a	At Risk
<b>Hydrology</b>			
RHY1	Water balance - Abstraction	2b	Not At Risk
<b>Morphological Risk Sources</b>			
RM1	Channelisation (2008)	2b	Not At Risk
RM2	Embankments (2008)	2b	Not At Risk
RM3	Impoundments	2b	Not At Risk
RM4	Water Regulation	2b	Not At Risk
RM5	Intensive Landuse		N/A
RM0	Morphology Overall - Worst Case (2008)	2b	Not At Risk
<b>Overall Risk</b>			

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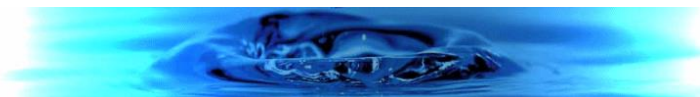


RA	Rivers Overall - Worst Case (2008)	1a	At Risk
<b>Point Risk Sources</b>			
RP1	WWTPs (2008)	2b	Not At Risk
RP2	CSOs	1b	Probably At Risk
RP3	IPPCs (2008)	2b	Not At Risk
RP4	Section 4s (2008)	2b	Not At Risk
RP5	WTPs/Mines/Quarries/Landfills		N/A
RPO	Overall Risk from Point Sources - Worst Case (2008)	1b	Probably At Risk
<b>Q Value</b>			
Q	EPA Q rating and Margaritifera Assessment		N/A
<b>Q/RDI or Point/Diffuse</b>			
QPD	Q class/EPA Diffuse Model or worst case of Point and Diffuse (2008)	1a	At Risk
<b>Rivers Direct Impacts</b>			
RDI1	Rivers Direct Impacts - Dangerous Substances		N/A

### Risk

By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

You can read more about risk assessment in our 'WFD Risk Assessment Update' document in the RBMP document library, and other documents at [www.wfdireland.ie](http://www.wfdireland.ie) (Directory 31 Risk Assessments).



**Objectives Report**

**Water Management Unit:** IE\_SW\_LowerLee/Owenboy

**WaterBody Category:** River Waterbody

**WaterBody Name:** Tramore River (Coastal)

**WaterBody Code:** IE\_SW\_19\_1717

**Overall Objective:** Restore\_2021

**Heavily Modified:** No



<b>Objectives Description</b>		<b>Result</b>
<b>Extended timescale information</b>		
E1	Extended timescales due to time requirements to upgrade WWTP discharges	No Status
E2	Extended timescales due to delayed recovery of chemical pollution and chemical status failures	No Status
E3	Extended timescales due to delayed recovery following reduction in agricultural nutrient losses	No Status
E4	Extended timescales due to delayed recovery from physical modifications and physical damage	No Status
E5	Extended timescales due to delayed recovery following implementing forestry acidification measures	No Status
E6	Extended timescales due to physical recovery timescales at mines and contaminated sites	No Status
E7	Extended timescales due to delayed recovery of highly impacted sites	No Status
E8	Extended timescales due to delayed recovery following reduction in agricultural nutrient losses	No Status
E9	Extended timescales due to delayed recovery from nitrogen losses to estuaries	2021
E10	Extended timescales due to delayed recovery following reduction in agricultural nutrient losses	No Status
E11	Extended timescales due to delayed recovery from physical modifications and physical damage (overgrazing)	No Status
E12	Extended timescales due to delayed recovery from physical modifications and physical damage (channelisation)	No Status
E13	Extended timescales from Northern Ireland Environment Agency	No Status
EOV	Overall extended timescale - combination of all extended timescales fields	2021
E14	Extended timescales due to the presence of Freshwater Pearl Mussel populations	No Status
EX15	Extended timescales due to highly impacted sites	No Status
<b>Objectives information</b>		
OB1	Prevent deterioration objective	No Status

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OB2	Restore at least good status objective	Restore_2021
OB3	Reduce chemical pollution objective	No Status
OB4	Protected areas objective	No Status
OB5	Northern Ireland Environment Agency objective	No Status
OBO	Overall objectives	Restore_2021

**Extended timescales**

Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

**Objectives**

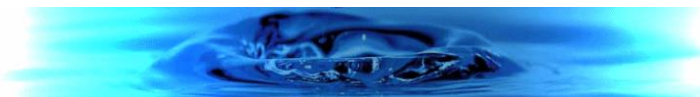
In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

- Prevent Deterioration*
- Restore Good Status*
- Reduce Chemical Pollution*
- Achieve Protected Areas Objectives*

These objectives have been refined based on the measures available to achieve them, the latter's likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.

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**Measures Report**

**Water Management Unit:** IE\_SW\_LowerLee/Owenboy

**WaterBody Category:** River Waterbody

**WaterBody Name:** Tramore River (Coastal)

**WaterBody Code:** IE\_SW\_19\_1717

**Heavily Modified:** No



	<b>Measures Description</b>	<b>Applicable</b>
BC	Total number of basic measures which apply to this waterbody	22
BW	Directive - Bathing Waters Directive	No
BIR	Directive - Birds Directive	No
HAB	Directive - Habitats Directive	No
DW	Directive - Drinking Waters Directive	No
MAE	Directive - Major Accidents and Emergencies Directive	Yes
EIA	Directive - Environmental Impact Assessment Directive	Yes
SS	Directive - Sewage Sludge Directive	Yes
UWT	Directive - Urban Waste Water Treatment Directive	Yes
PPP	Directive - Plant Protection Products Directive	Yes
NIT	Directive - Nitrates Directive	Yes
IPC	Directive - Integrated Pollution Prevention Control Directive	Yes
CR	Other Stipulated Measure - Cost recovery for water use	Yes
SUS	Other Stipulated Measure - Promotion of efficient and sustainable water use	Yes
DWS	Other Stipulated Measure - Protection of drinking water sources	Yes
ABS	Other Stipulated Measure - Control of abstraction and impoundment	Yes
POI	Other Stipulated Measure - Control of point source discharges	Yes
DIF	Other Stipulated Measure - Control of diffuse source discharges	Yes
PS	Other Stipulated Measure - Control of priority substances	Yes
MOD	Other Stipulated Measure - Controls on physical modifications to surface waters	Yes
OA	Other Stipulated Measure - Controls on other activities impacting on water status	Yes
AP	Other Stipulated Measure - Prevention or reduction of the impact of accidental pollution incidents	Yes
TP1	WSIP - Agglomerations with treatment plants requiring capital works	No
TP2	WSIP - Agglomerations with treatment plants requiring further investigation prior to capital works	No
TP3	WSIP - Agglomerations requiring the implementation of actions identified in Shellfish PRPs	No
TP4	WSIP - Agglomerations with treatment plants requiring improved operational performance	No
TP5	WSIP - Agglomerations requiring investigation of CSOs	No
TP6	WSIP - Agglomerations where existing treatment capacity is currently adequate but predicted loadings would result in overloading	No

Date Reported to Europe: July 2010

Date Report Created 16/01/2015



OTS	On-site waste water treatment systems	Yes
FPM	Freshwater Pearl Mussel sub-basin plan	No
SHE	Shellfish Pollution Reduction Plan	Yes
IPR	IPPC licences requiring review	Yes
WPR	Water Pollution Act licences requiring review	Yes
FOR	Forestry guidelines and regulations	Yes
CH1	Chanelisation measures	No
CH2	Chanelisation investigations	No
OG	Overgrazing measures	No
HQW	Protect high quality waters	No

**Measures**

Measures are necessary to ensure that we meet the objectives set out in the previous page of this report. Many measures are already provided for in national legislation and must be implemented. Other measures have been recently introduced or are under preparation. A range of additional potential measures are also being considered but require further development. Any agreed additional measures can be introduced through the update of Water Management Unit Action Plans during the implementation process.

You can read more about Basic Measures in 'River Basin Planning Guidance' and in other documents in our RBMP Document Library at [www.wfdireland.ie](http://www.wfdireland.ie).

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# Jones Environmental Laboratory

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Egan Environmental  
17 Laureston Crescent Tower  
Cork  
Ireland

Tel: +44 (0) 1244 833780  
Fax: +44 (0) 1244 833781



<b>Attention :</b>	Declan Egan
<b>Date :</b>	6th February, 2015
<b>Your reference :</b>	14-016-2
<b>Our reference :</b>	Test Report 15/2837 Batch 1
<b>Location :</b>	Forge Hill, Cork
<b>Date samples received :</b>	27th January, 2015
<b>Status :</b>	Final report
<b>Issue :</b>	1

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One sample were received for analysis on 27th January, 2015 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.  
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## Compiled By:

**Paul Lee-Boden BSc  
Project Manager**

**Bob Millward BSc FRSC  
Principal Chemist**

Jones Environmental Laboratory

**Client Name:** Egan Environmental  
**Reference:** 14-016-2  
**Location:** Forge Hill, Cork  
**Contact:** Declan Egan  
**JE Job No.:** 15/2837

**Report :** Liquid

**Liquids/products:** V=40ml vial, G=glass bottle, P=plastic bottle  
H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.												
Sample ID	14-016-2-SW1									LOD/LOR	Units	Method No.
Depth		Please see attached notes for all abbreviations and acronyms										
COC No / misc												
Containers	V H HN P BOD G											
Sample Date	26/01/2015											
Sample Type	Surface Water											
Batch Number	1											
Date of Receipt	27/01/2015											
Total Aluminium	93									<20	ug/l	TM30/PM14
Total Arsenic	<2.5									<2.5	ug/l	TM30/PM14
Total Cadmium	<0.5									<0.5	ug/l	TM30/PM14
Total Chromium	<1.5									<1.5	ug/l	TM30/PM14
Total Copper	<7									<7	ug/l	TM30/PM14
Total Iron	272									<20	ug/l	TM30/PM14
Total Mercury	<1									<1	ug/l	TM30/PM14
Total Nickel	<2									<2	ug/l	TM30/PM14
Mineral Oil (C10-C40) #	<10									<10	ug/l	TM5/PM30
Fats Oils and Grease #	<10									<10	ug/l	TM5/PM30
TPH CWG												
<b>Aliphatics</b>												
>C5-C6 #	<5									<5	ug/l	TM36/PM12
>C6-C8 #	<5									<5	ug/l	TM36/PM12
>C8-C10 #	<5									<5	ug/l	TM36/PM12
>C10-C12 #	<5									<5	ug/l	TM5/PM30
>C12-C16 #	<10									<10	ug/l	TM5/PM30
>C16-C21 #	<10									<10	ug/l	TM5/PM30
>C21-C35 #	<10									<10	ug/l	TM5/PM30
Total aliphatics C5-35 #	<10									<10	ug/l	TM5/TM36/PM30
<b>Aromatics</b>												
>C5-EC7 #	<5									<5	ug/l	TM36/PM12
>EC7-EC8 #	<5									<5	ug/l	TM36/PM12
>EC8-EC10 #	<5									<5	ug/l	TM36/PM12
>EC10-EC12 #	<5									<5	ug/l	TM5/PM30
>EC12-EC16 #	<10									<10	ug/l	TM5/PM30
>EC16-EC21 #	<10									<10	ug/l	TM5/PM30
>EC21-EC35 #	<10									<10	ug/l	TM5/PM30
Total aromatics C5-35 #	<10									<10	ug/l	TM5/PM30
Total aliphatics and aromatics(C5-35) #	<10									<10	ug/l	TM5/TM36/PM30
MTBE #	<5									<5	ug/l	TM36/PM12
Benzene #	<5									<5	ug/l	TM36/PM12
Toluene #	<5									<5	ug/l	TM36/PM12
Ethylbenzene #	<5									<5	ug/l	TM36/PM12
m/p-Xylene #	<5									<5	ug/l	TM36/PM12
o-Xylene #	<5									<5	ug/l	TM36/PM12
Ammoniacal Nitrogen as N #	<0.03									<0.03	mg/l	TM38/PM0
BOD (Settled) #	<1									<1	mg/l	TM58/PM0
Electrical Conductivity @25C #	510									<2	uS/cm	TM76/PM0

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*Jones Environmental Laboratory*

Client Name: Egan Environmental  
 Reference: 14-016-2  
 Location: Forge Hill, Cork  
 Contact: Declan Egan  
 JE Job No.: 15/2837

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.	1-7											
<b>Sample ID</b>	14-016-2-SW1											
<b>Depth</b>												
<b>COC No / misc</b>												
<b>Containers</b>	V H H N P B O D G											
<b>Sample Date</b>	26/01/2015											
<b>Sample Type</b>	Surface Water											
<b>Batch Number</b>	1											
<b>Date of Receipt</b>	27/01/2015											
										LOD/LOR	Units	Method No.
pH #	8.38									<0.01	pH units	TM73/PM0
Total Suspended Solids #	<10									<10	mg/l	TM37/PM0

Please see attached notes for all abbreviations and acronyms

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# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/2837

## SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

## WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

**ABBREVIATIONS and ACRONYMS USED**

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

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JE Job No: 15/2837

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.				
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM37	Modified USEPA 160.2 .Gravimetric determination of Total Suspended Solids. Sample is filtered and the resulting residue is dried and weighed.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			
TM58	Modified USEPA methods 405.1 and BS 5667-3. Measurement of Biochemical Oxygen Demand.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

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## Attachment I.3 – Assessment of Impact on Sewage Discharge

Attachment D.1(k) provides details of the trade effluent expected to be generated on site and the sewerage infrastructure that is designed to manage that effluent. Irish Water issued a discharge licence for this trade effluent and that licence is included in Attachment B.4.

Schedule A of the discharge licence from Irish Water contains details of required emission limit values, monitoring parameters, frequency and methods, as follows:

### LICENCE NO.: IW-DTS-728357-01 CONDITIONS

#### Schedule A

The Licensee shall discharge trade effluent in compliance with the emission limit values (ELVs) and sample at the prescribed monitoring frequency below.

Parameter	ELV*	ELV*	Monitoring Frequency**	Method
Flow	100 m3 /day		Continuous	On-line continuous flow monitor & recorder
Flow	30 m3 /hour		Continuous	" "
pH	6.0– 9.0		Continuous	On-line pH probe & recorder
Temperature	25 °Celsius		Continuous	On-line Temp probe & recorder
BOD	2000 mg/l	200 kg/day	Monthly	Standard Method
COD	4000 mg/l	400 kg/day	Weekly	Standard Method
Suspended Solids	500 mg/l	50 kg/day	Weekly	Standard Method
VOCs	1 mg/l		Quarterly	Standard Method
Total Nitrogen	100 mg/l		Bi-annually	Standard Method
Sulphates (as SO4)	750 mg/l		Quarterly	Standard Method
Detergents(as MBAS)	10 mg/l		Quarterly	Standard Method
FOG	100 mg/l		Monthly	Standard Method
Total Heavy Metals	1 mg/l		Annually	Standard Method
Mineral Oils	5 mg/l		Bi-annually	Standard Method
Total Hydrocarbons	5 mg/l		Bi-annually	Standard Method
Toxicity***	10 Toxicity Units		As requested	Standard Method

\*

Note: All samples with the exception of Flow, pH and Temperature shall be taken on a 24 hour flow proportionate composite sampling basis. In this regard, a composite sample for testing purposes shall be defined as any sample extracted from the sampling apparatus between 8.00 am and 12.00 noon on any day for which normal operational activities have been ongoing for the previous 24 hours.

\*\*

Note: Sampling shall take place on alternate week days on a rolling basis to ensure representative samples are obtained for site operations which may vary across the working week.

\*\*\*

Note: Toxicity Units (TU) are defined as:  $TU = (100/x \text{ Hour EC50})$  where x is the relevant period of exposure and EC50 is expressed as % vol/vol

The nature of the materials handled at the site pose a very low risk of exceeding these discharge limits. In addition, the Discharge Licence contains many conditions that provide safeguards to protect the foul sewer and the associated treatment plant.

It is assumed that Irish Water and Cork County Council have determined that adherence to these conditions and emission limit values will be sufficient to avoid significant environmental impacts from the foul sewer discharge from the site.

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## **Attachment I.4 – Assessment of Impact of Ground/Groundwater Emissions**

### **I.4.1. Introduction**

This Attachment addresses soils, geology and hydrogeology in the existing environment, identifies potential impacts of the proposed development, and outlines measures to mitigate potential impacts. It was originally prepared by Egan Environmental with later input from SLR Consulting.

It is important to note that there are no direct discharges to ground at the site, so this section addresses the risk of impact to the ground and/or groundwater from fugitive emissions from activities at the site. Such fugitive emissions are considered low risk as the nature of the waste materials to be handled at the site pose a low risk of contamination of the water environment and the ground is protected by concrete and tarmacadam surfaces.

### **I.4.2. Soils and Geology Assessment Methodology**

This Assessment was prepared by carrying out a desktop review of published literature / historical data and by the sampling and analysis of an on-site groundwater monitoring well.

### **I.4.3. Local Geology**

Bedrock and the geology maps for Cork City Environs prepared by the Geological Survey of Ireland (GSI) were reviewed by Egan Environmental. The review found that the site is underlain with made ground. The GSI maps as shown in Figure I.4.1, demonstrated that the made ground overlies Devonian Sandstone derived till to a depth of less than 3 m thick.

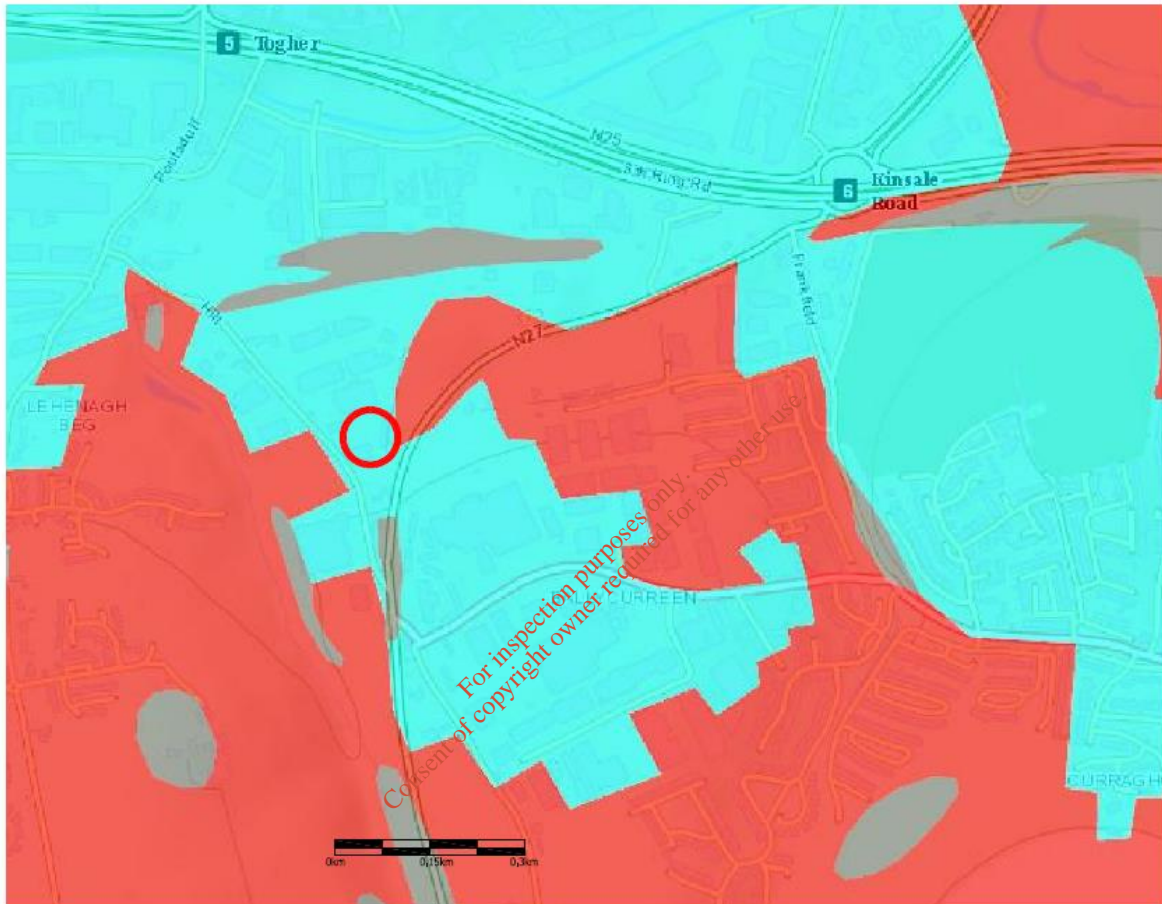
Bedrock comprising mudstones, sandstones and siltstones underlies this till. The subsoils are not significantly water bearing.

The aquifer vulnerability is Extreme due to the thin cover of soil and subsoil.

The site itself is underlain by the Gyleen Formation of the Old Red Sandstone facies. This formation consists of sandstones with mudstones and siltstones. According to the Geological Survey of Ireland the aquifer rating for the Gyleen Formation in South Cork area is rated as locally important, productive only in local zones (LI)..

The local groundwater flow direction is toward the unnamed streams to the west and north of the site. This implies that the groundwater monitoring well (GW1) on site is either up or side gradient of the materials recovery facility.

SUBSOIL GEOLOGY RECORD



**Figure I.4.1** Subsoil Geology

**I.4.4. Regional Bedrock Geology**

The facility is located on the south side of the Tramore River Valley, which runs approximately west to east towards the Douglas Estuary. Outcropping bedrock occurs along this side of the valley as seen just east of the Kinsale Road roundabout. The geology of South Cork is structurally complex and is dominated by Devonian and Carboniferous clastic sediments.

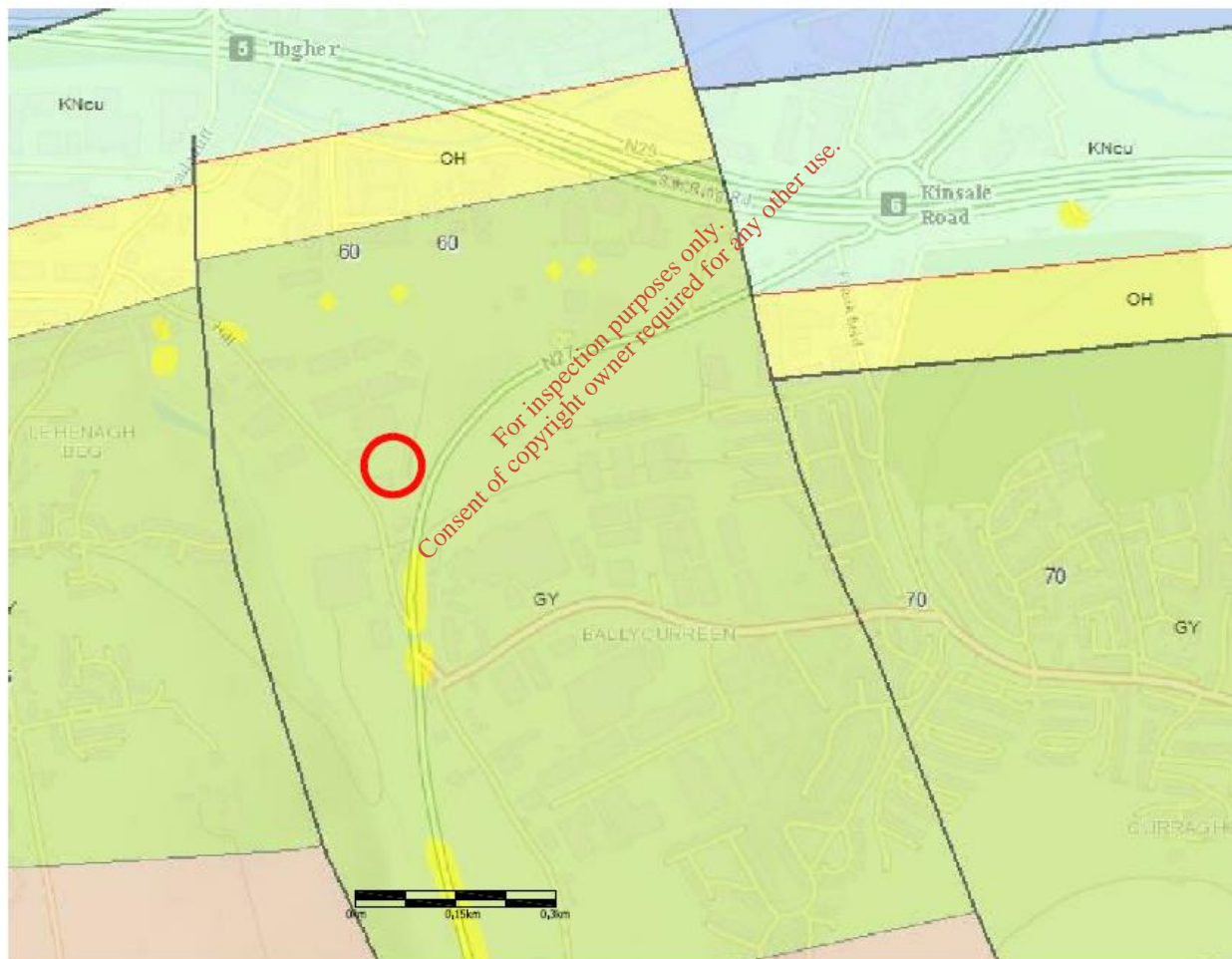
The bedrock geology is characterised by a series of east to west trending fold structures, which run from Middleton in the east to Macroom in the west. The anticlinal limbs of the folds are composed of Devonian rocks of the Old Red Sandstone facies while the core of the synclines is composed of Carboniferous sediments. The bedrock structure was complicated

further by north-northwest south-southeast faulting of the original fold sequence during later deformation events. A geophysical survey carried out at a nearby site has indicated the presence of a fault zone trending east-west located just north of the site. Within the fault zone the rock is highly fractured. To the south of the fault zone the rock comprises the Old Red Sandstone facies. To the north of the fault the bedrock is comprised of blue grey Waulsortian limestone of varying degrees of competence (See Figure I.4.2).

**REGIONAL BEDROCK GEOLOGY**

<p> DESCRIPTION: SANDSTONE WITH MUSTONE AND SILTSTONE UNIT NAME: GYLEEN FORMATION</p> <p> DESCRIPTION: MASSIVE UNBEDDED LIME-MUDSTONE UNIT NAME: WAULSORTIAN LIMESTONES</p> <p> DESCRIPTION: FLASER-BEDDED SANDSTONE AND MUDSTONE UNIT NAME: CUSKINNY MEMBER</p>	<p> DESCRIPTION: FLASER-BEDDED SANDSTONE AND MINOR MUDSTONE UNIT NAME: OLD HEAD SANDSTONE FORMATION</p> <p> DESCRIPTION: SANDSTONE WITH MUSTONE AND SILTSTONE UNIT NAME: GYLEEN FORMATION</p> <p> DESCRIPTION: PURPLE MUDSTONE AND SANDSTONE UNIT NAME: BALLYTRASNA FORMATION</p>
---	--

 LOCATION OF SITE



**Figure I.4.2** Bedrock Geology

#### **I.4.5. Overburden Geology**

The unconsolidated subsoil deposits above the bedrock are primarily concentrated above the Carboniferous limestone bedrock to the north of the site. The high ground comprising the anticlinal limbs of the folded Devonian sandstones have much thinner soil cover and are comprised of free draining sandy clay soils. The subsoil thickness in the vicinity of the site is expected to be in the order of 3 metres. The subsoil and unconsolidated deposits above the Carboniferous bedrock vary greatly in thickness and composition. In particular, the river valleys are comprised of vast thickness of alluvium sands and gravel. Many of the sand and gravel sequences are extensive enough to be considered as valuable groundwater resources. Clayey silts and peat deposits also occur within the Tramore River valley to the north of the site.

#### **I.4.6. Hydrogeology**

The limestone bedrock to the north of the site has been classified as being a regionally important aquifer. Abstraction from wells in the limestone formations is typically in the order of 200 - 1500m<sup>3</sup>/day. A nearby industrial site (approximately 1Km), CMP on the Tramore Road to the north, abstracts 500m<sup>3</sup>/day. This yield is indicative of a regionally important aquifer. The sandstone formations are typically less productive. The Toe Head Formation and the Gyleen Formation have well yields of between 200 - 500m<sup>3</sup>/day. These well yields are based on tests conducted elsewhere.

Based on guidelines produced from the Geological Survey of Ireland a vulnerability rating can be determined for the site. This rating determines the risk of contaminant infiltration to an underlying aquifer and is determined by the depth and type of overburden material at the site. The vulnerability rating for the aquifer underlying the site is considered to be high to extreme. This rating is based on the thickness of subsoils overlying the bedrock at the site, which are believed to be in the order of three metres. However, it is noted that the risk of contaminated material released to the subsurface at the site is minimal and the entire site is hard standing. A full surface water and foul water infrastructure is in place at the site.

#### **I.4.7. Groundwater Quality at the Site**

A condition on the previous Waste Licence for the site (W0173) required the installation of a groundwater monitoring well to ensure compliance with the emission limit values given for groundwater. Egan Environmental took a groundwater sample from this well on 5<sup>th</sup> June 2014 and sent it same day to a UK analytical laboratory, Jones Environmental. The sample was sent under chain of custody and was subject to analysis for the parameters required in the previous waste licence for the site. This borehole is up or side gradient of the waste processing buildings.

The analytical results are presented in Table I.4(i) in the Waste Licence Application Form. .

The full laboratory analytical report for the groundwater sample is presented in Attachment I.4.1 and is summarised below.

- The level of chloride was slightly elevated at 46.7 mg/l
- The levels of cadmium, chromium, copper, iron, mercury and zinc were less than the method detection limit
- With the exception of methyl tertiary butyl ether all of the volatile organic carbons were less than the method detection limits. The level of methyl tertiary butyl ether detected in the sample was 1.4 ug/l. This compound is used as an additive to petrol

but the absence of other chemicals associated with petrol such as benzene, toluene, ethylbenzene and xylene would suggest that this may be a laboratory contaminant

- The levels of all phenols detected are below the method limits of detection for these compounds
- The levels of polynuclear aromatic hydrocarbons (PAH's) detected are below the method limits of detection
- The levels polychlorinated biphenyls (PCB) detected are below the method limits of detection
- The levels of tributyltin, dibutyltin and triphenyltin are below the method limits of detection
- The levels of mineral oils in the groundwater sample was less than the method limit of detection
- The levels of extractable petroleum hydrocarbons are less than the method limit of detection.
- The levels of fats, oils and greases in the sample was less than the method limit of detection
- The chemical oxygen demand of the sample is less than the method limits of detection.

The previous licence for the site did not establish trigger levels for the parameters listed for groundwater monitoring. The EPA has however established Interim Guideline Values (IGV) for groundwater. The European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) established Groundwater Threshold Values (GTV). While these regulations are more appropriate to large scale abstractions of groundwater as a potable supply we have used them for this assessment. The parameters detected in the groundwater (see Table 1.4.1 below) and the corresponding GTV or IGV where available are quoted for comparative purposes.

Parameters	Unit	Level Detected	GTV	IGV
Barium	mg/l	0.082	-	0.1
Boron	mg/l	0.034	0.75	1.0
Calcium	mg/l	85	-	200
Magnesium	mg/l	13.8	-	50
Manganese	mg/l	0.943	-	0.05
Nickel	mg/l	0.01	-	0.02
Potassium	mg/l	2.0	-	5
Sodium	mg/l	35.9	-	150
Total Phosphorus	mg/l	0.167	-	-
Sulphate	mg/l	50.13	187.5	200
Chloride	mg/l	46.7	187.5	30
TPH	mg/l	<0.01	-	0.01
Total Organic Carbon	mg/l	2.0	-	-
Ammoniacal Nitrogen as N	mg/l	0.05	0.175	0.12
pH	units	6.94		6.5-9.5
Electrical Conductivity	uS/cm	623	1875	1000

**Table 1.4.1** Comparison of results with Groundwater Threshold and Guideline Values

Some of these parameters detected in the groundwater, for example calcium and manganese are naturally occurring compounds and have been detected in the past during sampling. Particular pollutants that may arise due to operations at the site for example TPH, heavy metals and ammoniacal nitrogen are all less than the GTV and/or IGTV.

Historical results from testing of GW1 in 2000 and 2002 are included in Table 4.1 of the FTC EIS included in Attachment B.3(b).1 of this application. It was concluded in that EIS that some slightly elevated parameters including barium, sulphate, nitrate and chloride were likely to be reflective of the general groundwater quality of the area, rather than as a result of site activities. The 2014 results from the same source (GW1) are in a similar range to the historic results. Sulphate and Chloride are very similar, with Barium and oxidised nitrogen at lower levels than found in the historical analyses. Electrical conductivity is also lower in the 2014 sample (623uS/cm versus 792 in 2000 and 847 in 2002), suggesting that the general groundwater quality is now slightly better than in the 2000 to 2002 period.

#### **I.4.8. Impacts of the Proposed Operations on Geology & Groundwater in the absence of mitigation measures**

No excavations or construction will be undertaken at the site. Recycling equipment will be installed within the building. Consequently the proposed operations at the site will have a **negligible impact** on the soil and geology of the site and surrounding area.

In the absence of adequate mitigation measures **significant impacts** to the local groundmass or groundwater could arise from unforeseen incidents such as a spillage of hydrocarbons or a fire.

The leaking of the underground foul sewer pipework could cause a **significant impact** on groundwater quality at the site.

#### **I.4.9. Mitigation measures to reduce or Remedy the Impacts on Geology and Groundwater**

The presence of a full surface water and foul water infrastructure on-site will ensure that any potential pollutants arising from the site operations will not contaminate the groundwater or soil. Consequently the impacts of the operations on site on groundwater and soil will be **negligible**.

Because no excavation or construction will occur at the site there will be **no significant impacts** on the site geology. Consequently no mitigation measures are required.

The mitigation measures proposed to eliminate any potential impacts on groundwater quality are as follows:

- The presence of a surface water management system at the site will ensure that no significant impacts on groundwater quality will occur
- Only non-hazardous recyclable material will be accepted at the site
- There will be no fuel tanks located on the site
- All yard water is collected in the underground pipe network and directed to a hydrocarbon interceptor and silt trap and then to an underground balancing tank prior to discharge to the local stream



- Potentially contaminated water is directed to an oil/water interceptor before discharge to foul sewer
- A full programme of environmental control maintenance will be scheduled on site and records will be maintained in the site office
- Adsorbent material will be placed around the site that will be used in the event of minor spillages of oil
- Training will be provided to the operatives on the use and disposal of the adsorbents
- All bunding and pipework will be subject to integrity and pressure testing once every 3 years
- All waste handling operations will be conducted indoors with full containment of the buildings
- All baled wastes will be stored indoors so no leachate will be generated
- In the event of a fire all the firewater will be contained within the buildings and discharged as appropriate, in consultation with the EPA, the local authority and Irish Water
- Groundwater in the on-site well will be sampled on a bi-annual basis. The groundwater sample will be analysed for the following analytes; ammoniacal nitrogen, heavy metals and total petroleum hydrocarbons. The levels of these analytes in the groundwater are not anticipated to exceed their corresponding Interim Guideline Values. An investigation will be carried out, in the event of an exceedance of the IGVs.

#### **I.4.10. Residual Impacts**

The installation and working of these mitigation measures will ensure that any of the significant impacts identified above will be adequately mitigated. Therefore no residual impacts will arise.

#### **I.4.11. 'Do Nothing' Scenario**

The 'do nothing' scenario will mean that the site will lay idle and no impacts on geology or groundwater will arise.



# Jones Environmental Laboratory

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17 Laureston Crescent Tower  
Cork  
Ireland

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



**Attention :** Declan Egan  
**Date :** 13th June, 2014  
**Your reference :** FH June 2014  
**Our reference :** Test Report 14/6621 Batch 1  
**Location :** FH  
**Date samples received :** 6th June, 2014  
**Status :** Final report  
**Issue :** 1

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One sample were received for analysis on 6th June, 2014. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

## Compiled By:

**Paul Lee-Boden BSc**  
**Project Manager**

**Bob Millward BSc FRSC**  
**Principal Chemist**

Client Name: Egan Environmental  
 Reference: FH June 2014  
 Location: FH  
 Contact: Declan Egan  
 JE Job No.: 14/6621

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.	1-6											
Sample ID	GW1											
Depth												
COC No / misc												
Containers	V H P G											
Sample Date	05/06/2014											
Sample Type	Ground Water											
Batch Number	1											
Date of Receipt	06/06/2014											
										LOD/LOR	Units	Method No.
Dissolved Barium #	82									<3	ug/l	TM30/PM14
Dissolved Boron	34									<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Calcium #	85.0									<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7									<7	ug/l	TM30/PM14
Total Dissolved Iron #	<20									<20	ug/l	TM30/PM14
Dissolved Lead #	<5									<5	ug/l	TM30/PM14
Dissolved Magnesium #	13.8									<0.1	mg/l	TM30/PM14
Dissolved Manganese #	943									<2	ug/l	TM30/PM14
Dissolved Mercury #	<1									<1	ug/l	TM30/PM14
Dissolved Nickel #	10									<2	ug/l	TM30/PM14
Dissolved Potassium #	2.0									<0.1	mg/l	TM30/PM14
Dissolved Sodium #	35.9									<0.1	mg/l	TM30/PM14
Dissolved Zinc #	<3									<3	ug/l	TM30/PM14
Total Phosphorus	167									<5	ug/l	TM30/PM14
VOC TICs	ND										None	TM15/PM10
Methyl Tertiary Butyl Ether #	1.4									<0.1	ug/l	TM15/PM10
Benzene #	<0.5									<0.5	ug/l	TM15/PM10
Toluene #	<0.5									<0.5	ug/l	TM15/PM10
Ethylbenzene #	<0.5									<0.5	ug/l	TM15/PM10
p/m-Xylene #	<1									<1	ug/l	TM15/PM10
o-Xylene #	<0.5									<0.5	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	78									<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	98									<0	%	TM15/PM10
SVOC TICs	ND										None	TM16/PM30
EPH (C8-C40) #	<10									<10	ug/l	TM5/PM30
Mineral Oil (C10-C40) #	<10									<10	ug/l	TM5/PM30
Fats Oils and Grease #	<10									<10	ug/l	TM5/PM30
TPH CWG												
Aliphatics												
>C5-C6 #	<5									<5	ug/l	TM36/PM12
>C6-C8 #	<5									<5	ug/l	TM36/PM12
>C8-C10 #	<5									<5	ug/l	TM36/PM12
>C10-C12 #	<5									<5	ug/l	TM5/PM30
>C12-C16 #	<10									<10	ug/l	TM5/PM30
>C16-C21 #	<10									<10	ug/l	TM5/PM30
>C21-C35 #	<10									<10	ug/l	TM5/PM30
Total aliphatics C5-35 #	<10									<10	ug/l	TM5/TM36/PM30

Please see attached notes for all abbreviations and acronyms

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Client Name: Egan Environmental  
 Reference: FH June 2014  
 Location: FH  
 Contact: Declan Egan  
 JE Job No.: 14/6621

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle  
 H=H<sub>2</sub>SO<sub>4</sub>, Z=ZnAc, N=NaOH, HN=HNO<sub>3</sub>

J E Sample No.	1-6																			
Sample ID	GW1																			
Depth																				
COC No / misc																				
Containers	V H P G																			
Sample Date	05/06/2014																			
Sample Type	Ground Water																			
Batch Number	1																			
Date of Receipt	06/06/2014																			
											LOD/LOR	Units	Method No.							
TPH CWG																				
Aromatics																				
>C5-EC7 #	<5																			
>EC7-EC8 #	<5																			
>EC8-EC10 #	<5																			
>EC10-EC12 #	<5																			
>EC12-EC16 #	<10																			
>EC16-EC21 #	<10																			
>EC21-EC35 #	<10																			
Total aromatics C5-35 #	<10																			
Total aliphatics and aromatics(C5-35) #	<10																			
Sulphate #	50.13																			
Chloride #	46.7																			
Total Oxidised Nitrogen as N #	<0.2																			
Ammoniacal Nitrogen as N #	0.05																			
Ammoniacal Nitrogen as NH3 #	0.07																			
Ammoniacal Nitrogen as NH4 #	0.07																			
Dibutyltin	<0.1																			
Tributyltin	<0.1																			
Triphenyltin	<0.1																			
COD (Settled) #	<7																			
Dissolved Oxygen	2																			
Electrical Conductivity @25C #	623																			
pH #	6.94																			
Total Organic Carbon #	2																			
Total Nitrogen	1.5																			

Please see attached notes for all abbreviations and acronyms

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**Client Name:** Egan Environmental  
**Reference:** FH June 2014  
**Location:** FH  
**Contact:** Declan Egan  
**JE Job No.:** 14/6621

**SVOC Report :** Liquid

J E Sample No.	1-6										LOD/LOR	Units	Method No.
Sample ID	GW1												
Depth													
COC No / misc													
Containers	V H P G												
Sample Date	05/06/2014												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	06/06/2014												
Please see attached notes for all abbreviations and acronyms													
SVOC MS													
<b>Phenols</b>													
2-Chlorophenol #	<1										<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5										<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5										<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5										<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1										<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5										<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1										<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5										<0.5	ug/l	TM16/PM30
4-Methylphenol	<1										<1	ug/l	TM16/PM30
4-Nitrophenol	<10										<10	ug/l	TM16/PM30
Pentachlorophenol	<1										<1	ug/l	TM16/PM30
Phenol	<1										<1	ug/l	TM16/PM30
<b>PAHs</b>													
2-Chloronaphthalene #	<1										<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1										<1	ug/l	TM16/PM30
Naphthalene #	<1										<1	ug/l	TM16/PM30
Acenaphthylene #	<0.5										<0.5	ug/l	TM16/PM30
Acenaphthene #	<1										<1	ug/l	TM16/PM30
Fluorene #	<0.5										<0.5	ug/l	TM16/PM30
Phenanthrene #	<0.5										<0.5	ug/l	TM16/PM30
Anthracene #	<0.5										<0.5	ug/l	TM16/PM30
Fluoranthene #	<0.5										<0.5	ug/l	TM16/PM30
Pyrene #	<0.5										<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<0.5										<0.5	ug/l	TM16/PM30
Chrysene #	<0.5										<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<1										<1	ug/l	TM16/PM30
Benzo(a)pyrene	<1										<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<1										<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<0.5										<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<0.5										<0.5	ug/l	TM16/PM30
<b>Phthalates</b>													
Bis(2-ethylhexyl) phthalate	<5										<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1										<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5										<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1										<1	ug/l	TM16/PM30
Diethyl phthalate #	<1										<1	ug/l	TM16/PM30
Dimethyl phthalate	<1										<1	ug/l	TM16/PM30

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Client Name: Egan Environmental  
 Reference: FH June 2014  
 Location: FH  
 Contact: Declan Egan  
 JE Job No.: 14/6621

SVOC Report : Liquid

J E Sample No.	1-6														
<b>Sample ID</b>	GW1														
<b>Depth</b>															
<b>COC No / misc</b>															
<b>Containers</b>	V H P G														
<b>Sample Date</b>	05/06/2014														
<b>Sample Type</b>	Ground Water														
<b>Batch Number</b>	1														
<b>Date of Receipt</b>	06/06/2014														
											LOD/LOR	Units	Method No.		
SVOC MS															
Other SVOCs															
1,2-Dichlorobenzene #	<1												<1	ug/l	TM16/PM30
1,2,4-Trichlorobenzene #	<1												<1	ug/l	TM16/PM30
1,3-Dichlorobenzene #	<1												<1	ug/l	TM16/PM30
1,4-Dichlorobenzene #	<1												<1	ug/l	TM16/PM30
2-Nitroaniline	<1												<1	ug/l	TM16/PM30
2,4-Dinitrotoluene #	<0.5												<0.5	ug/l	TM16/PM30
2,6-Dinitrotoluene	<1												<1	ug/l	TM16/PM30
3-Nitroaniline	<1												<1	ug/l	TM16/PM30
4-Bromophenylphenylether #	<1												<1	ug/l	TM16/PM30
4-Chloroaniline	<1												<1	ug/l	TM16/PM30
4-Chlorophenylphenylether #	<1												<1	ug/l	TM16/PM30
4-Nitroaniline	<0.5												<0.5	ug/l	TM16/PM30
Azobenzene #	<0.5												<0.5	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane #	<0.5												<0.5	ug/l	TM16/PM30
Bis(2-chloroethyl)ether #	<1												<1	ug/l	TM16/PM30
Carbazole #	<0.5												<0.5	ug/l	TM16/PM30
Dibenzofuran #	<0.5												<0.5	ug/l	TM16/PM30
Hexachlorobenzene #	<1												<1	ug/l	TM16/PM30
Hexachlorobutadiene #	<1												<1	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<1												<1	ug/l	TM16/PM30
Hexachloroethane #	<1												<1	ug/l	TM16/PM30
Isophorone #	<0.5												<0.5	ug/l	TM16/PM30
N-nitrosodi-n-propylamine #	<0.5												<0.5	ug/l	TM16/PM30
Nitrobenzene #	<1												<1	ug/l	TM16/PM30

Please see attached notes for all abbreviations and acronyms

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**Client Name:** Egan Environmental  
**Reference:** FH June 2014  
**Location:** FH  
**Contact:** Declan Egan

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 14/6621						
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Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.



# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 14/6621

## SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

## WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

**ABBREVIATIONS and ACRONYMS USED**

#	UKAS accredited.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
OC	Outside Calibration Range

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JE Job No: 14/6621

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM5	In-House method based on USEPA 8015B. Determination of Extractable Petroleum Hydrocarbons (EPH) in the carbon chain length range of C8-40 by GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS (carbon banding only) on soils. All accreditation is matrix specific.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM5/TM36	TPH CWG by GC-FID	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM15	In-House method based on USEPA 8260. Determination of Volatile Organic compounds (VOCs) by Headspace GC-MS. Accredited to ISO 17025 for soils and waters and MCERTS for Soils. All accreditation is matrix specific. Quantification by Internal Standard method.	PM10	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM15	In-House method based on USEPA 8260. Determination of Volatile Organic compounds (VOCs) by Headspace GC-MS. Accredited to ISO 17025 for soils and waters and MCERTS for Soils. All accreditation is matrix specific. Quantification by Internal Standard method.	PM10	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM16	In-House method based on USEPA 8270. Determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS. Accredited to ISO 17025 for waters. All accreditation is matrix specific. Quantification by Internal Standard method.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM16	In-House method based on USEPA 8270. Determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS. Accredited to ISO 17025 for waters. All accreditation is matrix specific. Quantification by Internal Standard method.	PM30	In-house method based on USEPA 3510. Liquid samples are mixed with solvent and agitated with an automatic magnetic stirrer with a stir bar for 15 minutes to extract organic molecules. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W. ISO 17025 accredited extraction method. All accreditation is matrix specific				
TM30	Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry) using Thermo iCAP 6000 series instrument. Accredited to ISO 17025 for soils and waters and MCERTS accredited for Soils. All accreditation is matrix specific.	PM14	In-house method based on USEPA 3005A. Acid digestion of water samples and analysis by ICP-OES as per method TM030W. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM36	In-House method based on USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-12 by headspace GC-FID. Accredited to ISO 17025 on soil and water samples and MCERTS accredited (carbon banding only) on soils. All accreditation is matrix specific.	PM12	In-house method based on USEPA 5021. Preparation of solid and liquid samples for headspace analysis. Samples are spiked with surrogates to facilitate quantification. ISO 17025 accredited extraction method. All accreditation is matrix specific	Yes			
TM38	Ionic analysis using the Thermo Aquakem Photometric Automatic Analyser. Accredited to ISO17025 and MCERTS for most analytes. All accreditation is matrix specific.	PM0	No preparation is required.	Yes			

JE Job No: 14/6621

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Reported on dry weight basis
TM38/TM125	Total Nitrogen/Organic Nitrogen by calculation	PM0	No preparation is required.				
TM57	COD by Colourimetric measurement	PM0	No preparation is required.	Yes			
TM59	Dissolved oxygen using DO meter	PM0	No preparation is required.				
TM60	TOC/DOC by NDIR	PM0	No preparation is required.	Yes			
TM73	pH in by Metrohm	PM0	No preparation is required.	Yes			
TM76	Electrical Conductivity by Metrohm	PM0	No preparation is required.	Yes			
TM94	Organo Tin by GCMS	PM48	Organo Tin Extraction				

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## Attachment I.5 –Ground and/or Groundwater Contamination

The Forge Hill site was initially developed in 1969 by Howard Rotavators. In 1977, Howard Rotavators leased the site to William O'Brien Plant Hire Ltd, who began waste operations. The O'Brien waste business was acquired by Cleanaway Ireland Ltd and subsequently IPODEC Ireland Ltd. (IpoDec), which was afterwards renamed as Onyx and then Veolia Environmental Services Ireland (VESI). The facility operated under a Waste Permit issued by Cork County Council until September 2003, when a waste licence (ref. no. W0173-01) was obtained for the facility by its operator at the time, IPODEC Ireland Limited.

In 2004, planning permission was granted to redevelop the site which involved the demolition of an existing waste transfer building and offices and the construction of a new waste processing building, office building and an electricity substation. The redevelopment was undertaken in four phases:

- Phase 1 involved the construction of the underground balancing tank and interceptors as well as connecting the foul line to the local sanitary sewer. The works began in April 2004 and were completed in September 2005;
- Phase 2 involved paving the operational yard with reinforced concrete, which required the removal of 10,000 tonnes of subsoil from the site. The soils were tested and characterised as inert before being removed from the facility. Phase 2 began in September 2005 and was completed in November 2006;
- Phase 3 involved the demolition of an old waste transfer and office building, the construction of a new waste processing building (Unit 2), offices and the ESB substation and. These works started in March 2007 and were completed in September 2007. The building demolition involved the removal off site of asbestos roof sheeting.
- Phase 4 involved an extension to Unit 1 and the provision of the car park and the weigh bridge in the northern section of the site. This phase was completed in September 2008.

There is no record of historical incidents which may have led to ground or groundwater contamination at the site.<sup>2</sup>

A review of recent compliance files for the site has been carried out to identify any instances of non-compliance noted in Agency audit/ site inspection reports which could have resulted in adverse environmental impacts on the site.

Agency site audit and site inspection reports dating back to 2007 indicate a number of non-compliances of the terms of the waste licence at the facility. However, these non-compliances can be seen to relate for the most part to the development infrastructure on site as well as the day to day operation of the site.

For example, a number of audit and site inspection reports from before 2008 emphasised to the Agency's concern regarding a lack of progress in the development of additional waste management infrastructure on site. This issue was largely resolved in September 2008 with the completion of additional infrastructure on-site.

---

<sup>2</sup> The historical description of the site presented here is sourced from Section 3.2 of *'Residuals Management Plan, Greenstar Environmental Services, Forge Hill, Cork'*, prepared by O'Callaghan Moran & Associates in September 2011. This is available in EPA compliance files for Licence W0173-01. The original source is likely to be Fehily Timoney and Company, who acted as consultant engineers for IPODEC / ONYX / Veolia during the period in question.

The minor, temporary nature of the non-compliances at the site is indicated by the Agency's response to a request from the operator to suspend monitoring in which it confirmed that there had been no known historical incidents at the facility with the potential to give rise to soil and/or groundwater contamination. The Agency also confirmed that groundwater results to date indicated that there had been no adverse environmental impact associated with facility operations.

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## **Attachment I.6 – Noise Impact**

AWN Consulting has carried out a noise assessment based on proposed operations of the site as a MRF. This report was prepared in April 2015 to be submitted with the waste permit application for the facility and is also relevant to this application. The assessment is included as Attachment I.6.1.

In the noise assessment, AWN took a worst case view and modelled a scenario whereby 13 vehicles arrive in an hour when all equipment is operating. Traffic movements will be certainly less frequent. The likely noise sources contained in Appendix C at the back of the AWN report are similar and more or less equivalent to the plant described in Attachment D.1(d) of this application.

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# FORGE HILL RECYCLING PLANT

## WASTE PERMIT APPLICATION

### NOISE ASSESSMENT SUPPORTING REPORT

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Technical Report Prepared For

**Egan Environmental  
Consultants. Ltd.  
17 Laureston Crescent  
Tower  
Co. Cork**

---

Technical Report Prepared By

**Ronan Murphy BSc MIOA**

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Our Reference

RM/14/8138NR01a

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Date of Issue

7 April 2015

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**Document History**

Document Reference		Original Issue Date	
RM/14/8138NR01		3 February 2015	
Revision Level	Revision Date	Description	Sections Affected
a	7 April 2015	Semantics and typos	2.0, 3.0., 4.0

**Record of Approval**

Details	Written by	Approved by
Signature		
Name	Ronan Murphy	Damian Kelly
Title	Senior Acoustic Consultant	Technical Director (Acoustics)
Date	7 April 2015	7 April 2015

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### EXECUTIVE SUMMARY

This report has been prepared in support of the noise assessment conducted as part of the Forge Hill Recycling Plant Waste Permit application.

It must be noted that although the Environmental Protection Agency (EPA) document “Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)” is not explicitly intended for the assessment of noise from non-scheduled activities, it is envisaged that the subject site may require a licence from the agency at a later stage. As such, the content of the NG4 document is deemed to be highly relevant in this instance and has been followed in conjunction with a review of typical Cork County Council Waste Permit Conditions.

A detailed noise monitoring programme was undertaken in line with the survey requirements outlined in Table 5 Section 7.2 of the EPA NG4 guidance document.

The limits typically conditioned by Cork County Council can be summarised as follows:

- 55 dB  $L_{Aeq,30min}$  during permitted operational hours and 45 dB  $L_{Aeq,30min}$  outside of these periods, and;
- The measurement and detection of tonal and impulsive noise at the nearest noise sensitive locations shall attract penalty of 5dB to be imposed on the measured levels.

It will therefore also be incumbent on applicant to demonstrate that the proposed operations shall not generate noise levels in excess of these limits.

Additionally, reference has also been made to the derivation of limits in accordance with the NG4 document. Section 4.3 of the EPA NG4 document outlines a process where noise limits should be established for a site seeking a licence.

Following the procedure outlined, the site location has been ruled out as a quiet area. Additionally, the results of the baseline survey demonstrate that the measured existing levels exclusive of any site related noise do not meet the criteria outlined for the application of reduced noise limits.

As such the following NG4 limits would be deemed to be relevant if the site were to seek a licence from the Agency at a later date:

Daytime Noise Criterion, dB $L_{Ar,15min}$ <sup>Note1</sup> (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,15min}$ <sup>Note1</sup> (19:00 to 23:00hrs)	Night-time Noise Criterion, dB $L_{Aeq,15min}$ <sup>Note2</sup> (23:00 to 07:00hrs)
55dB	50dB	45dB
Note 1: A tonal penalty of 5dB shall apply to the measured level where tonal character is determined in accordance with ISO1996-2:2007 Note 2: There shall be no clearly audible tonal or impulsive component in the noise emission from the site at any noise sensitive location during the night time period		

A detailed review of predicted site noise emissions has been prepared and presented in the relevant sections of this report, taking into account the current proposals. Noise predictions have been prepared for 4 no. noise sensitive locations in the vicinity of the site.

The worst case noise predictions show that the site operations comply with typical Cork County Council Noise Conditions as well as the NG4 daytime, evening and night-time noise criteria.

Sufficient detail in terms of the assessment approach including assumptions made and noise source data are presented in the relevant sections and appendices of this document.

This report presents the proposed criteria for the site, and details of noise surveys and noise predictions prepared for this assessment. The information contained in this report has been used to populate the relevant sections of the waste permit application form in terms of noise.

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## 1.0 INTRODUCTION

This report has been prepared in support of the Forge Hill Recycling Plant Waste Permit Application.

It must be noted that although the Environmental Protection Agency (EPA) document “*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*” is not explicitly intended for the assessment of noise from non-scheduled activities, it is envisaged that the subject site may require a licence from the agency at a later stage. As such, the content of the NG4 document is deemed to be relevant in this instance and has been referenced in conjunction with relevant Cork County Council Waste Permit noise conditions.

### Baseline Noise Survey

In the first instance, in order to quantify the baseline noise environment, a detailed noise monitoring programme has been undertaken in line with the survey requirements outlined in Table 5 Section 7.2 of the EPA NG4 guidance document.

### Derivation of Noise Criteria

A review of typical Cork County Council Waste Permit Noise Conditions has been undertaken and the relevant limits and periods outlined.

Additionally, the procedure outlined in Section 4.3 of the EPA NG4 document for the identification of quiet areas or areas of low background noise has been followed and appropriate NG4 noise limits identified.

### Assessment of Noise Impact

A detailed 3D noise model of the site has been developed to assess the impact of the current proposals. Detailed comment on the noise model and inputs etc. is presented in Section 4.0.

### Reporting/Licence Application Form

This report presents the proposed criteria for the site, along with details of noise surveys and noise predictions prepared for this assessment. The information contained in this report has been used to populate the relevant sections of the waste permit application form in terms of noise.

A glossary of acoustic terminology used in this report is presented in Appendix A.

## 2.0 BASELINE NOISE SURVEY

Environmental noise surveys were conducted in order to quantify the existing noise environment. The surveys were conducted in accordance with *ISO 1996: Acoustics – Description, measurement and assessment of environmental noise: 2007* in line with the survey requirements outlined in Table 5 Section 7.2 of NG4.

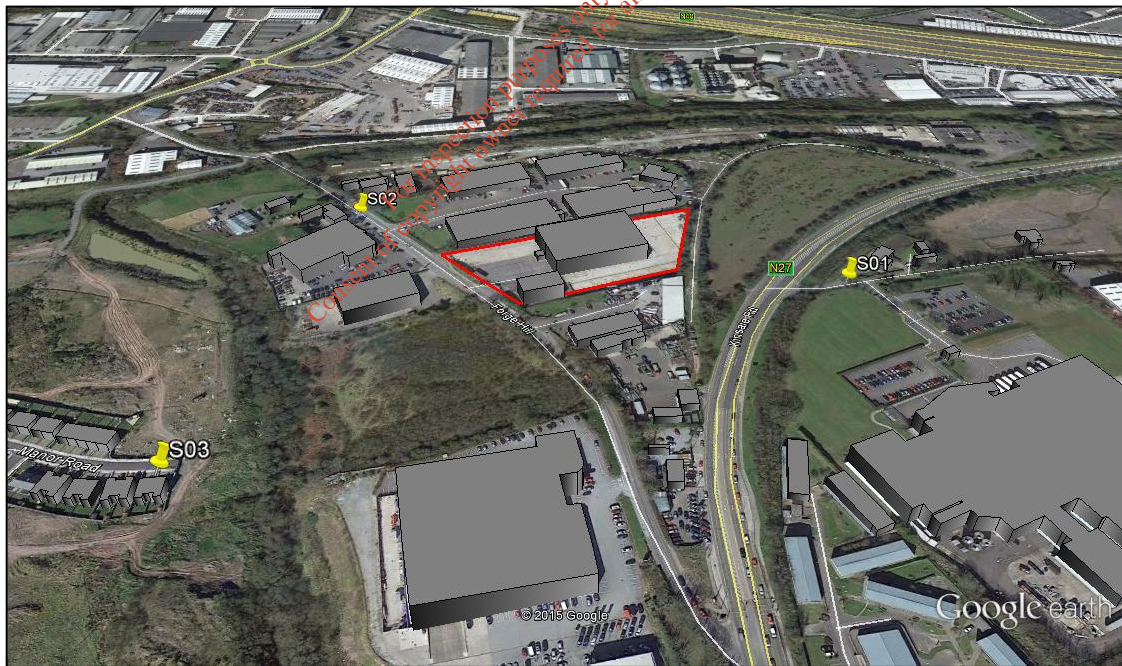
### 2.1 Choice of Noise Monitoring Locations

Noise measurements were conducted at three noise-sensitive locations in the vicinity of the site. These positions have been selected as best representing the nearest noise sensitive locations surrounding the site<sup>1</sup>. The details of the noise sensitive locations are presented in Table 1 below.

Location Reference	Description	Co-Ordinates (Irish Transverse Mercator)	
		E	N
S01	Residential bungalow adjacent to the Ferrero Factory entrance	567,005	568,771
S02	Two storey house on Forge Hill Road	566,693	568,860
S03	Two storey house at No.20 Manor Park	566,632	568,620

**Table 1** Noise Monitoring Locations

The four survey locations are shown on Figure 1.



**Figure 1** Noise Monitoring Locations (Source: Google Earth)

### 2.2 Survey Periods

Measurements were conducted over the course of the following survey periods:

- Daytime: 13:54hrs to 17:02hrs on 25 November 2014;
- Evening: 21:57hrs to 22:51hrs on 25 November 2014, and;

<sup>1</sup> Please note that noise monitoring results for survey location S03 are deemed to be representative of noise levels at noise sensitive locations R03 and R04 as discussed in section 4.0 below

- Night-time: 22:56hrs on 25 November 2014 to 00:47hrs on 26 November 2014;

The weather throughout the daytime survey periods was dry and calm (<2m/s) with temperatures of approximately 9°C; during the evening survey periods weather conditions were dry, cold (6°C) and calm (< 2m/s) and during the night-time surveys period, the weather was dry, cold (6°C) and calm (<2m/s).

### 2.3 Personnel & Instrumentation

Mr Ronan Murphy (AWN Consulting) conducted the noise level measurements during the various survey periods. The measurements were performed using Brüel & Kjær Type 2260 Modular Precision Sound Analyser (S/N 2248356). Before and after the survey the measurement apparatus was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator (S/N 2205805). Calibration certificates for all equipment can be found in Appendix B.

### 2.4 Procedure

During each of the daytime, evening and night-time periods, measurements were conducted on a cyclical basis. Sample periods were 15 minutes during all surveys. The results were saved to the instrument memory for later analysis where appropriate. Survey personnel noted all primary noise sources contributing to noise build-up.

### 2.5 Results

#### 2.5.1 Location S01

Period/Time		Measured Noise Levels, dB re 2x10 <sup>-5</sup> Pa				
		L <sub>Aeq,15min</sub>	L <sub>Amax</sub>	L <sub>Amin</sub>	L <sub>A10,15min</sub>	L <sub>A90,15min</sub>
Daytime	13:54 – 14:09	71	81	51	74	60
	14:56 – 15:11	71	78	50	74	58
	16:08 – 16:23	71	79	52	75	60
Evening	21:57 – 22:12	68	78	51	72	53
Night-time	22:56 – 23:11	64	78	45	69	47
	23:54 – 00:09	63	77	44	68	46

**Table 2** Noise Monitoring Results – Location S01

The daytime ambient noise levels were of the order of 71dB L<sub>Aeq,15min</sub> while the daytime background noise ranged from 58 to 60dB L<sub>A90,15min</sub>. Road traffic on the adjacent N27 was the dominant intermittent noise source falling in the range of 75 dB L<sub>A10,15min</sub>. Other intermittent noise source included local traffic movements into the adjacent Ferrero factory as well as construction noise (trucks/reversing sirens). Plant noise from the Ferrero factory was also audible at low levels during lulls in traffic.

The evening ambient noise levels were the order of 68dB L<sub>Aeq,15min</sub> while the evening background noise level was the order of 53dB L<sub>A90,15min</sub>. Road traffic on the adjacent N27 was the dominant intermittent noise source falling in the range of 72 dB L<sub>A10,15min</sub>. Other intermittent noise source included local traffic movements into the adjacent Ferrero factory as well as construction noise (trucks/reversing sirens). Plant noise from the Ferrero factory was the dominant continuous noise source.

The night time ambient noise levels were in the range from 63 to 64dB L<sub>Aeq,15min</sub> while the night time background noise ranged from 46 to 47dB L<sub>A90,15min</sub>. Road traffic on the adjacent N27 was the dominant intermittent noise source falling in the range of 68 dB

$L_{A10,15min}$ . Other intermittent noise source included local traffic movements into the adjacent Ferrero factory as well as construction noise (trucks/reversing sirens). Plant noise from the Ferrero factory was the dominant continuous noise source.

No tonal or impulsive noise was recorded during any of the measurements at S01.

### 2.5.2 Location S02

Period/Time		Measured Noise Levels, dB re $2 \times 10^{-5}$ Pa				
		$L_{Aeq,15min}$	$L_{Amax}$	$L_{Amin}$	$L_{A10,15min}$	$L_{A90,15min}$
Daytime	14:15 – 14:30	69	84	48	74	54
	15:16 – 15:31	70	93	48	74	52
	16:27 – 16:42	70	82	52	74	56
Evening	22:16 – 22:31	62	81	46	61	48
Night-time	23:15 – 23:30	60	80	40	57	42
	00:13 – 00:28	64	79	41	69	43

**Table 3** Noise Monitoring Results – Location S02

The daytime ambient noise levels were in the range from 69 to 70dB  $L_{Aeq,15min}$  while the daytime background noise ranged from 52 to 56dB  $L_{A90,15min}$ . Road traffic on the adjacent Forge Hill Road was the dominant intermittent noise source falling in the range of 74 dB  $L_{A10,15min}$ . Other intermittent noise sources included a large tractor and trailer unit pass by, birdsong and a dog barking in a nearby garden. Distant road traffic noise was the dominant continuous noise source.

The evening ambient noise levels were the order of 62dB  $L_{Aeq,15min}$  while the evening background noise was the order of 48dB  $L_{A90,15min}$ . Road traffic on the adjacent Forge Hill Road was the dominant intermittent noise source falling in the range of 61 dB  $L_{A10,15min}$ . Other intermittent noise sources included birdsong and a dog barking in a nearby garden. Distant road traffic noise was the dominant continuous noise source.

The night time ambient noise levels were in the range from 60 to 64dB  $L_{Aeq,15min}$  while the night time background noise ranged from 42 to 43dB  $L_{A90,15min}$ . Road traffic on the adjacent Forge Hill Road was the dominant intermittent noise source falling in the range of 69 dB  $L_{A10,15min}$ . Other intermittent noise sources included birdsong and a dog barking in a nearby garden. During the second night survey, the dog was barking for around 5 minutes. Distant road traffic noise was the dominant continuous noise source.

No tonal or impulsive noise was recorded during any of the measurements at S01.

### 2.5.3 Location S03

Period/Time		Measured Noise Levels, dB re $2 \times 10^{-5}$ Pa				
		$L_{Aeq,15min}$	$L_{Amax}$	$L_{Amin}$	$L_{A10,15min}$	$L_{A90,15min}$
Daytime	14:35 - 14:50	50	63	43	53	45
	15:34 - 15:49	49	63	44	51	47
	16:47 - 17:02	56	80	46	52	47
Evening	22:36 - 22:51	47	66	41	49	43
Night-time	23:34 - 23:49	43	53	37	45	40
	00:32 - 00:47	40	56	34	42	36

**Table 4** Noise Monitoring Results – Location S03

The daytime ambient noise levels were in the range from 49 to 56dB  $L_{Aeq,15min}$  while the daytime background noise ranged from 45 to 47dB  $L_{A90,15min}$ . The dominant intermittent



source of noise during the survey period was chainsaw activity in the distance. During the third daytime survey period, an ice cream van was playing music in the estate nearby resulted in elevated  $L_{Aeq,15min}$  and  $L_{AMax}$  levels. Other intermittent noise sources included birdsong and aircraft overhead. Distant road traffic noise was the dominant continuous noise source.

The evening ambient noise levels were the order of 47dB  $L_{Aeq,15min}$  while the evening background noise was the order of 43dB  $L_{A90,15min}$ . The dominant intermittent source of noise during the survey period was local road traffic in the estate as well a dog barking in a garden nearby. Distant road traffic noise was the dominant continuous noise source. Plant noise from the Ferrero factory was also audible at low levels.

The night time ambient noise levels were in the range from 40 to 43dB  $L_{Aeq,15min}$  while the night time background noise ranged from 36 to 43dB  $L_{A90,15min}$ . The dominant intermittent source of noise during the survey period was local road traffic in the estate as well a dog barking in a garden nearby. Distant road traffic noise was the dominant continuous noise source. Plant noise from the Ferrero factory was also audible at low levels.

No tonal or impulsive noise was recorded during any of the measurements at S03.

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### 3.0 DERIVATION OF NOISE CRITERIA

#### 3.1 Cork County Council Noise Conditions

The limits typically conditioned by Cork County Council is summarised as follows:

- 55 dB  $L_{Aeq,30min}$  during permitted operational hours 45 dB  $L_{Aeq,30min}$  outside of these periods;
- The measurement and detection of tonal and impulsive noise at the nearest noise sensitive locations shall attract penalty of 5dB to be imposed on the measured levels.

It will therefore also be incumbent on applicant to demonstrate that the proposed operations shall not generate noise levels in excess of these limits.

#### 3.2 NG4 Noise Criteria

Section 4.3 of NG4 outlines a process where noise limits should be established for a site seeking a waste licence. Steps 1 to 4 outline the correct procedure for establishing appropriate noise criteria relative to the existing noise climate.

Following the procedure outlined in Section 3.3, the site location has been ruled out as a quiet area. Additionally, the results of the baseline survey completed, demonstrate that the measured existing levels exclusive of any site related noise do not meet the criteria outlined for the application of reduced noise limits.

As such, it has been determined that the following day, evening and night criteria would be appropriate for noise emissions from the site when measured at the nearest noise sensitive locations:

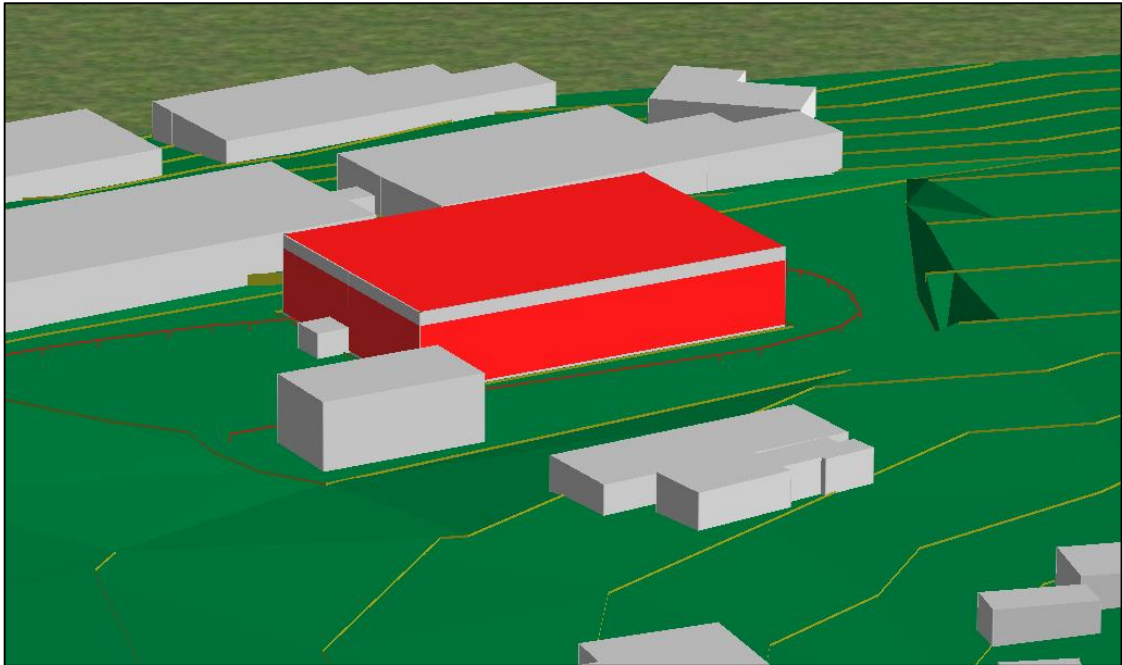
Daytime Noise Criterion, dB $L_{Ar,15minute}$ <sup>Note1</sup> (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,15minute}$ <sup>Note1</sup> (19:00 to 23:00hrs)	Night-time Noise Criterion, dB $L_{Aeq,15minute}$ <sup>Note2</sup> (23:00 to 07:00hrs)
55dB	50dB	45dB
Note 1: A tonal penalty of 5dB shall apply to the measured level where tonal character is determined in accordance with ISO1996-2:2007 Note 2: There shall be no clearly audible tonal or impulsive component in the noise emission from the site at any noise sensitive location during the night time period		

**Table 5** Applicable Noise Criteria

### 4.0 ASSESSMENT OF NOISE IMPACT

This section of the report outlines the detailed noise assessment that has been undertaken as part of this waste permit application.

An industrial noise model, incorporating all proposed plant items associated with the site has been prepared. Figure 2 illustrates the developed noise model for the existing site, including the plant items proposed in relation to this application.



**Figure 2** Noise Model considering proposed noise sources

Noise levels have been predicted at a total of 4 no. locations representing noise sensitive locations in the vicinity of the site. Figure 3 displays these locations relative to the primary noise sources on the site whilst Table 6 details the coordinates of each.

Receptor Reference	Co-Ordinates (Irish Transverse Mercator)	
	E	N
NSL01	567,025	568,789
NSL02	566,685	568,862
NSL03	566,644	568,613
NSL04	566,607	568,644

**Table 6** Noise Model Receptor Coordinates



**Figure 3** Noise Prediction Locations (Background Image: Google Earth)

## 4.1 Noise Propagation Calculation

Brüel & Kjær Predictor Type 7810 is a proprietary noise calculation package for computing noise levels in the vicinity of industrial sites. Calculations are based on ISO 9613: 1996: Acoustics – Attenuation of sound outdoors – Part 2: General method of calculation. This method has the scope to take into account a range of factors affecting sound propagation, including:

- the magnitude of the noise source in terms of sound power;
- the distance between the source and receiver;
- the presence of obstacles such as screens or barriers in the propagation path;
- the presence of reflecting surfaces;
- the hardness of the ground between the source and receiver;
- attenuation due to atmospheric absorption, and;
- meteorological effects such as wind gradient, temperature gradient, humidity (these can have significant impact at distances greater than approximately 400m).

Calculations have been performed in octave bands from 63Hz to 8kHz as well as in overall dB(A) terms.

## 4.2 Brief Description of ISO 9613-2: 1996

ISO 9613-2: 1996 calculates the noise level based on each of the factors discussed previously. However, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level,  $L_{AT(DW)}$ , for the following conditions:

- wind direction at an angle of  $\pm 45^\circ$  to the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and;
- wind speed between approximately 1m/s and 5m/s, measured at a height of 3m to 11m above the ground.

The equations and calculations also hold for average propagation under a well developed moderate ground based temperature inversion, such as commonly occurs on clear calm nights.

The basic formula for calculating  $L_{AT(DW)}$  from any point source at any receiver location is given by:

$$L_{fT(DW)} = L_W + D_c - A \quad \text{Eqn. A}$$

Where:

$L_{fT(DW)}$	is an octave band centre frequency component of $L_{AT(DW)}$ in dB relative to $2 \times 10^{-5} \text{Pa}$ ;
$L_W$	is the octave band sound power of the point source;
$D_c$	is the directivity correction for the point source;
$A$	is the octave band attenuation that occurs during propagation, namely attenuation due to geometric divergence, atmospheric absorption, ground effect, barriers and miscellaneous other effects.

The estimated accuracy associated with this methodology is shown in Table 7 below:

Height, h*	Distance, d†	
	0 < d < 100m	100m < d < 1,000m
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB

**Table 7** Estimated Accuracy for Broadband Noise of  $L_{AT(DW)}$

\* h is the mean height of the source and receiver.  
 † d is the mean distance between the source and receiver.  
 N.B. These estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.

### 4.3 Initial Configuration of the Noise Model

The input to the noise model comprised an overall site plan, a set of buildings and details of all noise sources. The model has used extrapolated Google Earth Digital Surface Terrain (DTS) output as a base terrain mode. Heights for onsite buildings have been provided by Egan Environmental Consulting Ltd.

In the context of the proposed facility, it is AWN understanding that the only external onsite noise sources will heavy goods vehicles movements into and out of the site.

For internal sources, Materia Environment provided appropriate source noise levels. A worst case reverberant sound pressure level for waste hall was derived using typical sound pressure data provided. Using an in-house database, a suitable sound reduction index value (dB  $R_w$ ) was then applied to each relevant façade and roof breakout point and breakout calculated to the nearest receptor.

Each source also has its own position, height and directivity. Appendix C lists all assessed noise sources and their relevant sound power levels for point source emissions and sound pressure levels for internal sources.

In terms of the calculation, a ground attenuation factor (general method) of 0 (assumes hard intermediate ground cover generally) and no metrological correction was assumed for all calculations.

The following atmospheric attenuation was assumed for all calculations.

Temp (°C)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	80	0.11	0.37	1.02	1.96	3.57	8.79	28.97	104.57

**Table 8** Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

### 4.4 Output of the Noise Model

Predicted noise levels are calculated for a set of receiver points, which can be chosen by the user. The results include an overall level in dB(A) and an A-weighted spectrum for each item. The items in the list can be ranked in order of their contribution, and thus the noisiest items can be identified.

Predictions are also made for a grid of receiver points, and coloured iso-contours of the noise levels are displayed, to give an overall picture of the spatial distribution of noise levels within the grid.

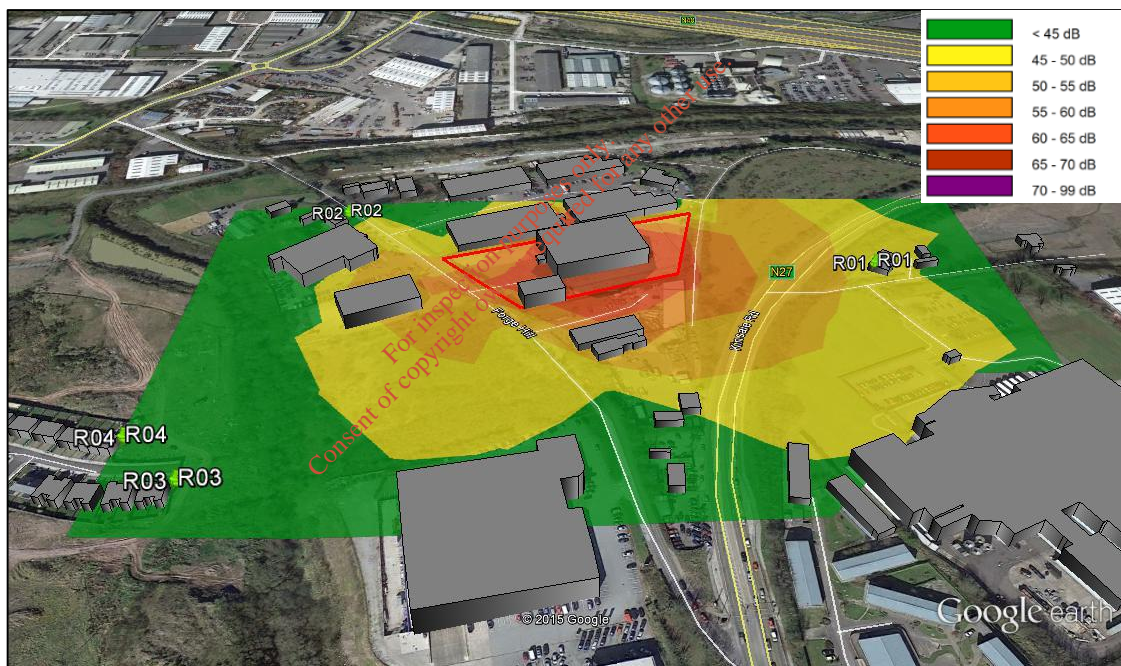
### 4.5 Results of the Noise Model

Predicted plant noise levels for the site are presented below in Table 9.

Name	Height (m)	Predicted Plant Noise Level (L <sub>Aeq,T</sub> )
S01	1.5	41
	4	43
S02	1.5	36
	4	39
S03	1.5	34
	4	36
S04	1.5	32
	4	34

**Table 9** Predicted Plant Noise Levels

Examination of octave band data confirms that the predicted noise levels at the receiver locations are not expected to exhibit any audible tonal component. The relevant noise contour map for the scenario is presented in Figure 4.



**Figure 4** Predicted L<sub>Aeq</sub> Noise Contour

### 4.6 Assessment of Plant Noise Levels

The results of the prediction model are compared to the waste licence noise limits in Table 10.

Reference	Predicted Noise Levels, dB L <sub>Aeq,T</sub>	CCC Waste Permit Limits L <sub>Aeq,T</sub>	NG4 Limit Values dB L <sub>Aeq,T</sub>	Satisfies?
S01	43	55 Daytime/ 45 All other times	55 Daytime/ 50 Evening/ 45 Night-time	✓
S02	39			✓
S03	36			✓
S04	34			✓

**Table 10** Assessment of Predicted Plant Noise Levels vs. EPA Noise Criteria

Predicted plant noise emissions are within the relevant Cork County Council and EPA NG4 limit values at all locations.

Note that in all instances the predicted calculations are worst case using the assumption that receivers are downwind of all sources on site at any one time. In reality this typically will not be the case.

#### **4.7 Mitigation Approach**

Although no mitigation is required it would be recommended that noise from external plant be minimised by purchasing low noise generating equipment and including noise barriers, enclosures and incorporating appropriately specified in-line attenuators for stacks and exhausts where necessary.

Control of impulsive noise shall be controlled by way of shutting down impulsive plant or machinery and restricting impulsive noise generating operations (movement of skips or RORO waste containers) during night time hours.

#### **5.0 CONCLUSIONS**

This report has been prepared in support of the noise assessment conducted as part of the Forge Hill Waste Permit application.

It has been developed with detailed consideration of the content of the Environmental Protection Agency (EPA) document "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)" as it is envisaged that site activities will require such a licence at a later date.

A detailed review of predicted site noise emissions has been prepared and presented in the relevant sections of this report. Noise predictions have been prepared for 4 noise sensitive locations in the vicinity of the site.

The noise predictions show that the site operations comply with relevant limits as specified in typical Cork County Council Waste Permit Conditions. Additionally, the predicted noise levels also comply with the relevant NG4 limits.

## APPENDIX A GLOSSARY OF ACOUSTIC TERMINOLOGY



<b>ambient noise</b>	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
<b>background noise</b>	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ( $L_{AF90,T}$ ).
<b>broadband</b>	Sounds that contain energy distributed across a wide range of frequencies.
<b>dB</b>	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 $\mu$ Pa).
<b>dB <math>L_{pA}</math></b>	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'-weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
<b>Hertz (Hz)</b>	The unit of sound frequency in cycles per second.
<b>impulsive noise</b>	A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.
<b><math>L_{Aeq,T}</math></b>	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the $L_{Aeq}$ value is to either the $L_{AF10}$ or $L_{AF90}$ value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background. As standard it is measured using the fast time weighting constant of 125ms.
<b><math>L_{AFN}</math></b>	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
<b><math>L_{Alep,T}</math></b>	This is the equivalent continuous sound level but measured using the impulse time weighting constant of 35ms. It is a type of average and is used to describe noise that has an impulsive characteristic over the sample period (T).
<b><math>L_{AFmax}</math></b>	The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.



<b>L<sub>AF90</sub></b>	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the “Fast” time weighting.
<b>noise</b>	Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.
<b>noise sensitive location</b>	NSL – Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
<b>octave band</b>	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
<b>sound pressure level</b>	The sound pressure level at a point is defined as: $L_p = 20 \text{Log} \frac{P}{P_0} \text{ dB}$
<b>tonal</b>	Sounds which cover a range of only a few Hz which contains a clearly audible tone i.e. distinguishable, discrete or continuous noise (whine, hiss, screech, or hum etc.) are referred to as being ‘tonal’.
<b>1/3 octave analysis</b>	Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one-third of an octave each.

## APPENDIX B

**EQUIPMENT CALIBRATION CERTIFICATES**

<h3>Certificate of Calibration</h3> <p>Issued by University of Salford (Acoustics Calibration Laboratory) UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801</p>		 <p>UKAS CALIBRATION 0801</p>
<p>Page 1 of 2</p>		
<p><b>APPROVED SIGNATORIES</b></p> <p>Claire Lomax [<input checked="" type="checkbox"/>]    Andy Moorhouse [<input type="checkbox"/>]    <i>Claire Lomax</i></p> <p>Gary Phillips [<input type="checkbox"/>]    Danny McCaul [<input type="checkbox"/>]</p>		
<p><b>acoustic calibration laboratory</b></p> <p>The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acousticlab.salford.ac.uk Tel: 0161 295 3636/0161 295 3717 Fax: 0161 295 4456 e-mail: email@acousticlab.co.uk</p>		

Certificate Number: 01696/2

Date of Issue: 25 February 2014

**VERIFICATION OF A TYPE 1 SOUND LEVEL METER to BS7580  
Part 1**

FOR:	AWN Consulting Limited The Tecpro Building Clonsillaugh Business and Technology Park Dublin 17
FOR THE ATTENTION OF:	Ronan Murphy
CALIBRATION DATE:	25 February 2014
TEST PROCEDURE:	CTP08 (Laboratory Manual)



<b>Sound Level Meter</b>					
Manu:	Bruel & Kjaer	Model:	2250	Serial No:	2248356
<b>Microphone</b>					
Manu:	Bruel & Kjaer	Model:	4189	Serial No:	2237546
<b>Preamp</b>					
Manu:	Bruel & Kjaer	Model:	ZC 0026	Serial No:	-
<b>Associated Calibrator</b>					
Manu:	Bruel & Kjaer	Model:	4231	Serial No:	2205805    Adaptor: UC0210

Test Engineer (initial): *GP*                      Name: Gary Phillips

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides a statement of measurement to recognised national standards, and to the units of measurement realised at the National Physical Laboratory, or other recognised national standards laboratories. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

**APPENDIX B (Cont.)**

**EQUIPMENT CALIBRATION CERTIFICATES**

<p><b>Certificate of Calibration</b>                  Issued by University of Salford (Acoustics Calibration Laboratory)                  UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801</p>		
<p>Page 1 of 2</p>		
<p><b>APPROVED SIGNATORIES</b></p> <p>Claire Lomax <input checked="" type="checkbox"/>    Andy Moorhouse <input type="checkbox"/>                  Gary Phillips <input type="checkbox"/>    Danny McCaul <input type="checkbox"/></p> <p><i>Claire Lomax</i></p>		
<p>acoustic calibration laboratory                  The University of Salford, Salford, Greater Manchester, M5 4WT, UK                  http://www.acoustics.salford.ac.uk                  t: 0161 295 3000/161 295 3599 f: 0161 295 4455 e: c.lomax@salford.ac.uk</p>		

Certificate Number: 01949/2

Date of Issue: 5 August 2014

**CALIBRATION OF A  
SOUND CALIBRATOR**

FOR: AWN Consulting Limited  
 The Recpro Building  
 Clonsillaugh Business and Technology Park  
 Dublin 17

FOR THE ATTENTION OF: Ronan Murphy

DESCRIPTION: Calibrator with housing for one-inch microphones and adaptor type UC 0210 for half-inch microphones.

MANUFACTURER: Bruel & Kjaer

TYPE: 4231

SERIAL NUMBER: 2205805

DATE OF CALIBRATION: 05/08/2014

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial): *GP* Name: Gary Phillips

Calibrations marked 'Not UKAS Accredited' in this certificate have been included for completeness.

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**APPENDIX C**

## LIST OF NOISE SOURCES

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**Noise sources summary sheet (expressed as sound power L<sub>WA</sub>)**

Plant Item	Quantity	Location	Sound Pressure Level, dB L <sub>PA</sub> <sup>2</sup>	Sound Power Level, dB L <sub>WA</sub> <sup>3</sup>	Octave Bands (Hz) Sound Power Levels dB (A weighted) per band							
					63	125	250	500	1000	2000	4000	8000
Bag Opener	1	Internal	75	83	55	69	64	74	81	73	70	68
PPK	1	Internal	85	93	61	78	72	83	90	82	79	76
Ballistics	2	Internal	85	93	61	78	72	83	90	82	79	76
Titechs	6	Internal	85	93	61	78	72	83	90	82	79	76
Conveyors	25	Internal	75	83	55	69	64	74	81	73	70	68
Eddie Current	2	Internal	80	88	58	73	68	79	85	78	74	72
Wind shifter	2	Internal	80	88	58	73	68	79	85	78	74	72
Bailer	2	Internal	85	93	61	78	72	83	90	82	79	76
Trommel	1	Internal	80	88	58	73	68	79	85	78	74	72
Liebherr	2	Internal	80	88	58	73	68	79	85	78	74	72
Loading Shovel	1	Internal	80	88	58	73	68	79	85	78	74	72
Forklift	1	Internal	75	83	55	69	64	74	81	73	70	68
21t artic truck	13 vehicles <sup>4</sup>	External	NA	79	91	81	76	77	73	72	70	62

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<sup>2</sup> Assumed to be dBA@1m per item

<sup>3</sup> Assumes semi hemispherical propagation plane

<sup>4</sup> Assumes 13 vehicles per day. Model L<sub>Aeq</sub> results assume 13 arriving in 1 hour period as worst case.

## **Attachment I.7 –Assessment of Ecological Impacts and Mitigation Measures**

The facility is constructed and was previously operational, so there is no requirement to disturb additional ground or to further disturb ecology in the area.

As all waste materials will be handled indoors and the dust and noise levels will be similar or less than previously experienced at the site, under Waste Licence W0173, there will be no new impacts on ecology in the local area due to dust or noise.

An appropriate assessment screening report was carried out by Glas Ecology in January 2015 and is included in Attachment B.3.1. This addresses any potential impact on Natura 2000 sites and in particular, considers the impact of surface water run-off from the site.

That report concluded that no significant effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites; Cork Harbour SPA and Great Island Channel SAC, and that there is no requirement to carry out a Stage 2 Assessment.

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