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**BASELINE ASSESSMENT REPORT**  
**MATERIALS RECOVERY AND TRANSFER FACILITY**  
**SARSFIELDCOURT INDUSTRIAL ESTATE**  
**GLANMIRE**  
**COUNTY CORK**

**Prepared For: -**

SEHL Recycling (Munster) Limited  
Sarsfieldcourt Industrial Estate  
Glanmire  
Co. Cork

**Prepared By: -**

O'Callaghan Moran & Associates  
Unit 15, Melbourne Business Park  
Model Farm Road  
Cork

**January 2023**

Project	Baseline Assessment Report Sarsfieldcourt Industrial Estate			
Client	Starrus Eco Holdings Ltd.			
Report No	Date	Status	Prepared By	Reviewed By
2113837	20/01/2023	Draft	Martina Gleeson PhD	Jim O'Callaghan MSc
	23/01/2023	Final		

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## 1. INTRODUCTION

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The Starrus Eco Holdings Ltd. (SEHL) installation in Sarsfieldcourt Industrial Estate operates under an Industrial Emission (IE) Licence issued by the Environmental Protection Agency. The Starrus Property Holdings Ltd (SPHL) facility adjacent to the licensed installation operates under a Waste Permit issued by Cork City Council.

This Baseline Assessment is required to support a licence review to extend the IE Licence boundary to encompass the SPHL facility. There will be no change to the types and quantities of waste accepted, the waste processes or the emissions.

### 1.1 Methodology

OCM's assessment followed the guidance in Part 5 of the European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions 2014/C 136/03

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## 2. STAGE 1 & 2 HAZARDOUS SUBSTANCE

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### 2.1 Stage 1 Hazardous Substances Currently Used, Produced and Released

The materials/products used on site include diesel, hydraulic and engine oils, anti-freeze, detergents and disinfectants. All fuel and oils are stored internally in a bunded area in a dedicated shed located on the northern boundary of the installation.

### 2.2 Stage 2 Relevant Hazardous Substances

Based on the quantities on site the only hazardous substance of relevance to the baseline conditions is diesel.

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### 3. STAGE 3 - SITE SPECIFIC POLLUTION POSSIBILITY

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#### 3.1 Site Location

The site is located in Sarsfieldcourt Industrial Estate is approximately 5km north of Glanmire Village. The Industrial Estate is in a rural area where the surrounding land use is primarily agricultural, with some low density residences. The nearest sensitive location (private residence) is a house at Buck Leary's Cross Roads, approximately 170m to the north-west of the site.

#### 3.2 Site Layout

The site covers 22,921m<sup>2</sup> and is made up of two operational areas. The northern area occupies 15,600m<sup>2</sup>. The entrance is off an internal access road within the Industrial Estate and there is one main waste processing handling building, office, weighbridges, an odour control unit, vehicle wash, bin wash, wheel wash, paved open yards, civic amenity area, parking spaces with a landscaped area and a firewater storage tank.

The civic amenity area has its own dedicated entrance for members of the public. There are a number of dedicated closed skips for mixed municipal waste, dry recyclables (cardboard, plastics, metals, papers) and waste electrical and electronic equipment.

The southern area covers 7,800m<sup>2</sup> and contains a recycling building, a site office, a fire water storage tank, generator building, weighbridge and paved storage yards.

#### 3.3 Oil & Chemical Storage

Oils are stored in bunded area constructed and is maintained in accordance with Condition 3.10 of the Licence. The bund, which has a capacity of 32,000 litres, contains a 19,000 litres vehicle refuelling diesel tank, a 2,300 litre waste oil tank, a 2,500 plant refuelling diesel tank and a 1,000 litre IBC (Ad-Blue).

#### 3.4 Accidents & Emergencies

SEHL have adopted an Accident Prevention Policy and prepared a Safety Statement that identifies and evaluates the major on-site potential hazards and describes the control measures in place. An emergency is an accident/incident that has the potential to result in environmental pollution and/or harm to human health. SEHL has prepared an Emergency Response Procedure (ERP) that addresses any emergency/incident that may occur and makes provisions for minimising the effects on the environment, has been prepared and communicated to all staff members.

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#### 4. SITE HISTORY

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Construction of Sarsfieldcourt Industrial Estate began in the late 1980's and it is understood that prior to this the lands were in agricultural use. The first development was in the northern part of the site where the main processing building opened in 2003. The recycling building was constructed in the southern part of the site in 2004.

In 2013 a fire damaged the main processing building and waste acceptance activities were suspended. Firewater generated during the firefighting period was fully retained by the surface / foul drainage system on the site. The Agency subsequently confirmed that it is satisfied that there was no risk of surface or groundwater pollution associated with the fire.

In 2017 there was a second fire in the main processing building which damaged the building and required the temporary suspension of waste activities. Firewater generated during the emergency response was contained within the site boundary and subsequently sent off-site for treatment. Groundwater and surface water monitoring carried out after the incident did not identify any impact.

In 2019 there was a fire in the recycling building, which damaged the building and required the temporary cessation of operations until the building was refurbished. The firewater was contained within the site and subsequently sent off site for treatment. Groundwater and surface water monitoring carried out after the incident did not identify any impact.

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## 5. ENVIRONMENTAL SETTING

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### 5.1 Surrounding Land Use

The Industrial Estate is in a rural area where the surrounding land use is primarily agricultural, with some low density residences. There are no hospitals, hotels or holiday accommodation within 1 km of the site. St. Stephen's hospital is approximately 1.2km to the south of the facility. The nearest sensitive location (private residence) is a house at Buck Leary's Cross Roads, approximately 170m to the north-west.

### 5.2 Hydrology

The facility is in the catchment of the Glashaboy River, which is approximately 2 km to the south west of the site boundary. An unnamed tributary of the Glashaboy River is approximately 100 m to the east of the site boundary and receives run-off from the facility and other occupants of the Industrial Estate.

The South Western River Basin District (SWRBD) Plan contains reports on the 'Status' of each Water Body. Status means the condition of the water in a watercourse and is defined by its ecological and chemical status, whichever is worse. Waters are ranked in one of five status classes, High, Good, Moderate, Poor and Bad.

The Glashaboy River is part of the Blackwater Water Management Unit and the stretch adjacent to the site is in the Blackwater Surface Water Body IE\_SW\_18\_2220. The water quality status of the water body is High. The High status is based on the condition of the water in the waterbody.

### 5.3 Geology & Hydrogeology

The site is entirely covered by buildings and concrete paving. The subsoils underlying the site are predominantly sandstone till. The bedrock comprises Devonian mudstone and siltstone from the Ballytrasna Formation. The bedrock aquifer is classified by the GSI as a Locally Important aquifer which is moderately productive only in local zones (LI).

Aquifer vulnerability is defined by the GSI as the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The aquifer vulnerability according to the GSI is considered to be high (H). The direction of groundwater flow is expected to be to the south, towards the Glashaboy River.

### 5.4 Designated Sites

The site is not in a Special Area of Conservation (SAC) or Special Protected Area (SPA). The nearest sites of ecological importance Great Island Channel (pNHA, SAC 001058), Cork Harbour (SPA 004030), Douglas River Estuary (pNHA 001046), Glanmire Wood (pNHA 001054) & Dunkettle Shore (pNHA 001082), which are between 7 and 15 km to the south of the facility.



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## 6. SITE CHARACTERISATION

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### 6.1 Conceptual Site Model

The site is almost completely covered by buildings or paved areas, with the exception of a small grassy area near the carpark. The soils comprise made ground overlying sandstone till. Based on the 'high' aquifer vulnerability ranking the depth of the soils and subsoils is <3m. The bedrock is classified as a locally important aquifer and the direction of groundwater flow is to the south towards the River Glashaboy.

#### 6.1.1 Source-Pathway-Receptor

There is no significant source of hazardous substances at the installation. The potential receptors are the subsoils and the bedrock aquifer. There is no actual pathway between the source and the receptors, and the only potential pathway is damage to the paved floors.

### 6.2 Groundwater Quality

The general quality of the groundwater is good, with no evidence of any impact associated with the operation of the facility. There have been occasional exceedances of nitrate and total coliforms. The likely source of these elevated parameters is agricultural practices within the catchment. The results of the monitoring conducted in 2022 are in Appendix 1.

### 6.3 Soil Quality

There is no information on the soil quality beneath the existing and proposed licensed areas. Based on the site history there is no evidence that hazardous substances have been handled or stored at the site.

## APPENDIX 1

**PART 1**

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**BI-ANNUAL MONITORING REPORT**

**STARRUS ECO HOLDINGS LTD**

**MATERIALS RECOVERY FACILITY**

**SARFIELD COURT, CORK**

**LICENCE NO. W0136-03**

**ROUND 1 2022**

**GROUNDWATER**

**Prepared For: -**

Starrus Eco Holdings Ltd.,  
Fassaroe,  
Bray,  
Co. Wicklow.

**Prepared By: -**

O' Callaghan Moran & Associates,  
Unit 15 Melbourne Business Park,  
Model Farm Road,  
Cork.

**29<sup>th</sup> August 2022**

Project	Bi-Annual Monitoring Programme Report - Groundwater			
Client	Starrus Eco Holdings Ltd W0136-03			
Report No	Date	Status	Prepared By	Reviewed By
0480401	04/08/2022	Draft	Dr Martina Gleeson PhD	Mr. Jim O'Callaghan MSc.
0480401		Final	Dr Martina Gleeson PhD	Mr. Jim O'Callaghan MSc

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**APPENDIX 1**           -       Laboratory Results

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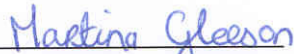
## 1. INTRODUCTION

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Starrus Eco Holdings Ltd (SEHL) appointed O'Callaghan Moran & Associates (OCM) to conduct the bi-annual groundwater monitoring programme at its Materials Recovery Facility (MRF) at Sarsfieldcourt Industrial Estate, Glanmire, County Cork. The programme is carried out in accordance with the conditions set in the Industrial Emissions Licence (Reg. No.W0136-03).

### 1.1 Monitoring and Reporting Requirements

The monitoring and reporting requirements are specified in Schedules D and G and Condition 8.1 of the licence and are presented in Table 1.1. This report was prepared by Dr Martina Gleeson PhD and reviewed by Mr. Jim O'Callaghan MSc. The report is accurate and representative of the monitoring completed in the 1<sup>st</sup> round of bi-annual groundwater monitoring 2022.

  
Martina Gleeson

  
Jim O' Callaghan

**Table 1.1 Monitoring Requirements**

<b>Parameter</b>	<b>Groundwater Sampling Frequency</b>
pH	Biannual
Conductivity	Biannual
Temperature	Biannual
BOD	Biannual
COD	Biannual
Mineral Oils	Biannual
Total Coliforms	Biannual
Faecal Coliforms	Biannual
Total Ammonia as N	Biannual
Nitrate	Biannual
Nitrite	Biannual

## **1.2 Contributors to the Report**

- **OCM** was responsible for the collection of the samples and preparation of this report;
- **Element Materials Technology (EMT)** arranged for carriage of the samples and carried out analysis of the waste water samples at their laboratory in Deeside, UK;
- **Alpha Analytical Services Ltd. (AAS)**, carried out the coliform analysis of the water samples at their laboratory in Fermoy, Co. Cork.



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## 2. GROUNDWATER MONITORING

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### 2.1 Locations & Frequency

Groundwater monitoring is carried out at two locations (W-1 and W-2), which are shown on Figure 2.1. The direction of groundwater flow is from west to east, towards the stream that flows along the eastern side of the industrial estate. W-2 is upgradient and W-1 is downgradient of the site.

### 2.2 Methods

#### 2.2.1 Sampling

The sampling was conducted by OCM on the 24<sup>th</sup> May 2022. Groundwater levels were recorded in each of the wells using an In-Situ Instruments water level probe following which, each well was purged to remove the stagnant water in the well and surrounding gravel pack. Purging is necessary to ensure that the groundwater parameters measured are representative of the formation and not the stagnant water in the monitoring well or surrounding gravel filter.

The pH, electrical conductivity and temperature were measured in-situ using a Hanna Instruments combo pH, electrical conductivity and temperature probe. All field equipment was calibrated and tested prior to the sampling programme; however the pH probe malfunctioned in the field. The samples were stored in cooler boxes to maintain sample temperature below 9°C. All the samples were delivered to Jones within 24 hours and to ALS within 1 hour of sampling. Chain of custody (COC) documentation was included with the samples shipped to the laboratories.

#### 2.2.2 Analysis

The analytical methodologies were all ISO/CEN approved or equivalent.

## 2.3 Results

The analytical results are presented in Table 2.1 and the full laboratory reports are in Appendix 1. There are no trigger levels set in the Licence, but for comparative purposes the Table includes the EPA Interim Guideline Values (IGVs) on groundwater quality. The IGVs are not statutory guidelines but were prepared by the EPA to assist in the assessment of impacts on groundwater quality in the context of the implementation of the Water Framework Directive. The Table also includes the Groundwater Regulations Threshold Value (TV) which were introduced in 2010 (S.I. 9 of 2010) on foot of requirements from the Water Framework Directive.

The IGV represent typical background or unpolluted conditions; however levels higher than the IGV may occur naturally depending on the local geological and hydrogeological conditions. While the TVs are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in non-potable groundwater supplies. Because not all parameters monitored have been assigned a TV, the relevant IGV continues to be used for comparative purposes.

**Table 2.1 - Groundwater Quality 24<sup>th</sup> May 2022**

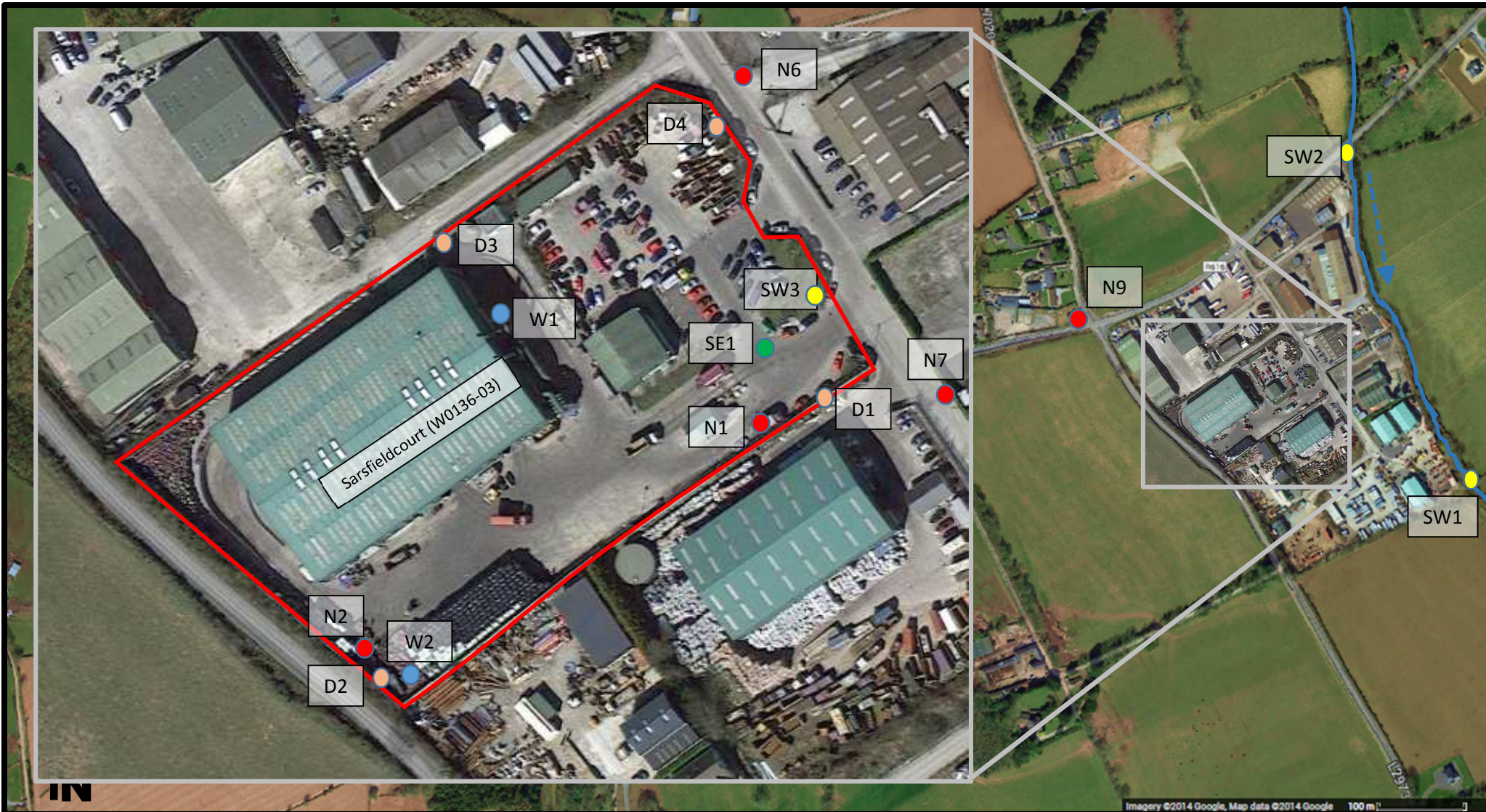
Parameter	Units	W-1 Downgradient	W-2 Upgradient	IGV	TV
<b>Field Readings</b>					
pH	pH units	7.02	7.47	6.5-9.5	-
Conductivity	mS/cm	0.239	0.190	-	0.800-1.875
Temperature	°C	13.1	11.5	25	
<b>Field Readings</b>					
pH	pH units	7.31	6.58	6.5-9.5	-
Conductivity	mS/cm	0.357	0.264	-	0.800-1.875
Ammoniacal Nitrogen (N)	mg/l	<0.03	0.03	-	0.065-0.175
Nitrate as NO <sub>3</sub>	mg/l	33.7	51.3	-	37.5
Nitrite as NO <sub>2</sub>	mg/l	<0.02	<0.02	-	0.375
Mineral Oils	mg/l	<0.01	<0.01	0.01	-
BOD	mg/l	<1	<1	-	-
COD	mg/l	14	<7	-	-
Total Coliforms	MPN/100ml	50	21	0	-
Faecal Coliforms	MPN/100ml	ND	ND	0	

ND – Not Detected

The level of nitrate detected in the upgradient well (W-2) exceeded the TV, high levels of nitrate have been measured in this well since 2015. The total coliform levels were above the IGV in both wells. All other parameters were within or below the IGV and TV ranges.

## 2.4 Discussion

High nitrate levels were detected in the upgradient well and the likely source of these elevated results is agricultural practices within the catchment. Total coliforms were detected at very low levels in the two wells, while faecal coliforms were not detected.



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**Legend:**

- Noise Monitoring Location
- Permit Boundary
- Stream
- - - Stream Flow Direction
- Wastewater Monitoring Location
- Dust Monitoring Location
- Groundwater Monitoring Location
- Surface Water Monitoring Location

**Waste Reg.No.W0136-03**

**Figure:**  
**Figure 2.1**

**Scale:**  
NOT TO SCALE

This drawing is the property of O'Callaghan Moran & Associates and shall not be used, reproduced or disclosed to anyone without the prior written permission of O'Callaghan Moran & Associates and shall be returned upon request.

**Client:**  
**Starrus Eco Holdings Ltd**

**Title:**  
**Emissions Monitoring Locations**

# **APPENDIX 1**

Laboratory Results

O'Callaghan Moran & Associates

Unit 15  
Melbourne Business Park  
Model Farm  
Cork  
Ireland



**Attention :** Martina Gleeson  
**Date :** 6th June, 2022  
**Your reference :** 22-048-04  
**Our reference :** Test Report 22/8564 Batch 1  
**Location :** Sarsfieldcourt  
**Date samples received :** 25th May, 2022  
**Status :** Final Report  
**Issue :** 1

Two samples were received for analysis on 25th May, 2022 of which two 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.

**Authorised By:**



**Liza Klebe**

Project Co-ordinator

Please include all sections of this report if it is reproduced







# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/8564

## SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) 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. Asbestos samples are retained for 6 months.

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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. Ash samples are dried at 37°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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually 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.

## STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

## DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

## 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.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

**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.

Laboratory records are kept for a period of no less than 6 years.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

**Measurement Uncertainty**

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

**Customer Provided Information**

Sample ID and depth is information provided by the customer.

**ABBREVIATIONS and ACRONYMS USED**

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology 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
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

## HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 22/8564

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometrically.	PM0	No preparation is required.	Yes			
TM58	APHA SMEWW 5210B:1999 22nd Edition. Comparable with ISO 5815:1989. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as am	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			



# Certificate Of Analysis

O'Callaghan Moran & Associates  
Unit 15  
Melbourne Business Park  
Model Farm Road  
Cork

**Certificate Number:** 61674  
**Certificate Date:** 31-May-22  
**Order No.:** 22-048-04  
**Page:** 1 of 1

**Test Organism**

Coliforms/MPN

Ecoli/MPN

**Test Method**

AAS.M.18 based on The Microbiology of Drinking Water 2016  
Part 4 & IDEXX Colilert procedure

AAS.M.18 based on The Microbiology of Drinking Water 2016  
Part 4 & IDEXX Colilert procedure

Sample Ref.	Description	Condition	Date Received	Test Date	Coliforms/MPN	Ecoli/MPN
019/21/22	W-1	Normal	24/05/22	24/05/22	50/100ml	ND/100ml
020/21/22	W-2	Normal	24/05/22	24/05/22	21/100ml	ND/100ml

ND = Not Detected, <10, <20, etc. = Not Detected @ Dilution -1, etc \* = Not Accredited. U.C = Uncountable

**Signed:**

Patricia Nagle  
Laboratory Manager

This report shall not be reproduced except in full and with the approval of Alpha Analytical Services Ltd.

**Test results relate only to the items tested.**

The within report and analysis shall not be used for the purpose of advertising. Customer information, publicity, litigation or negotiation by the customer with any third party without the consent in writing of the managing director of Alpha Analytical Services Limited. No action or legal proceedings or claim at law, (except in the case of wilful neglect or default) against Alpha Analytical Services Limited shall be constituted by reason of or arising out of the carrying out of any research, investigation, test or analysis by Alpha Analytical Services Limited for and on behalf of the customer referred to above or the publication of results thereof by or in the name of Alpha Analytical Services Limited and further no responsibility is accepted by Alpha Analytical Services Limited towards any third party in respect of any information, reports or results compiled as a result of carrying out of any research investigation, test or analysis by Alpha Analytical Services Limited and any third party relying on such information does so at their own risk absolutely.

Non-perishable samples received for testing or laboratory work shall be disposed of after three months from the date of receipt unless claimed or unless instructions to the contrary have been notified by the sender.

**PART 2**

Unit 15  
Melbourne Business Park  
Model Farm Road  
Cork



T: 021 434 5366  
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www.ocallaghanmoran.com

**BI-ANNUAL MONITORING REPORT**

**STARRUS ECO HOLDINGS LTD**

**MATERIALS RECOVERY FACILITY**

**SARFIELD COURT, CORK**

**LICENCE NO. W0136-03**

**ROUND 2 2022**

**GROUNDWATER**

**Prepared For: -**

Starrus Eco Holdings Ltd.,  
Fassaroe,  
Bray,  
Co. Wicklow.

**Prepared By: -**

O' Callaghan Moran & Associates,  
Unit 15 Melbourne Business Park,  
Model Farm Road,  
Cork.

**31<sup>st</sup> January 2023**



Project	Bi-Annual Monitoring Programme Report - Groundwater			
Client	Starrus Eco Holdings Ltd W0136-03			
Report No	Date	Status	Prepared By	Reviewed By
0480402	27/01/2023	Draft	Dr Martina Gleeson PhD	Mr. Jim O'Callaghan MSc.
0480402	31/01/2023	Final	Dr Martina Gleeson PhD	Mr. Jim O'Callaghan MSc

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**APPENDIX 1**           -           Laboratory Results

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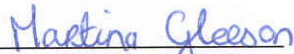
## 1. INTRODUCTION

---

Starrus Eco Holdings Ltd (SEHL) appointed O'Callaghan Moran & Associates (OCM) to conduct the bi-annual groundwater monitoring programme at its Materials Recovery Facility (MRF) at Sarsfieldcourt Industrial Estate, Glanmire, County Cork. The programme is carried out in accordance with the conditions set in the Industrial Emissions Licence (Reg. No.W0136-03).

### 1.1 Monitoring and Reporting Requirements

The monitoring and reporting requirements are specified in Schedules D and G and Condition 8.1 of the licence and are presented in Table 1.1. This report was prepared by Dr Martina Gleeson PhD and reviewed by Mr. Jim O'Callaghan MSc. The report is accurate and representative of the monitoring completed in the 2<sup>nd</sup> round of bi-annual groundwater monitoring 2022.

  
Martina Gleeson

  
Jim O' Callaghan

**Table 1.1 Monitoring Requirements**

<b>Parameter</b>	<b>Groundwater Sampling Frequency</b>
pH	Biannual
Conductivity	Biannual
Temperature	Biannual
BOD	Biannual
COD	Biannual
Mineral Oils	Biannual
Total Coliforms	Biannual
Faecal Coliforms	Biannual
Total Ammonia as N	Biannual
Nitrate	Biannual
Nitrite	Biannual

## **1.2 Contributors to the Report**

- **OCM** was responsible for the collection of the samples and preparation of this report;
- **Element Materials Technology (EMT)** arranged for carriage of the samples and carried out analysis of the waste water samples at their laboratory in Deeside, UK;
- **Alpha Analytical Services Ltd. (AAS)**, carried out the coliform analysis of the water samples at their laboratory in Fermoy, Co. Cork.

---

## 2. GROUNDWATER MONITORING

---

### 2.1 Locations & Frequency

Groundwater monitoring is carried out at two locations (W-1 and W-2), which are shown on Figure 2.1. The direction of groundwater flow is from west to east, towards the stream that flows along the eastern side of the industrial estate. W-2 is upgradient and W-1 is downgradient of the site.

### 2.2 Methods

#### 2.2.1 Sampling

The sampling was conducted by OCM on the 12<sup>th</sup> December 2022. Groundwater levels were recorded in each of the wells using an In-Situ Instruments water level probe following which, each well was purged to remove the stagnant water in the well and surrounding gravel pack. Purging is necessary to ensure that the groundwater parameters measured are representative of the formation and not the stagnant water in the monitoring well or surrounding gravel filter.

The pH, electrical conductivity and temperature were measured in-situ using a Hanna Instruments combo pH, electrical conductivity and temperature probe. All field equipment was calibrated and tested prior to the sampling programme; however the pH probe malfunctioned in the field. The samples were stored in cooler boxes to maintain sample temperature below 9°C. All the samples were delivered to Jones within 24 hours and to ALS within 1 hour of sampling. Chain of custody (COC) documentation was included with the samples shipped to the laboratories.

#### 2.2.2 Analysis

The analytical methodologies were all ISO/CEN approved or equivalent.

## 2.3 Results

The analytical results are presented in Table 2.1 and the full laboratory reports are in Appendix 1. There are no trigger levels set in the Licence, but for comparative purposes the Table includes the EPA Interim Guideline Values (IGVs) on groundwater quality. The IGVs are not statutory guidelines but were prepared by the EPA to assist in the assessment of impacts on groundwater quality in the context of the implementation of the Water Framework Directive. The Table also includes the Groundwater Regulations Threshold Value (TV) which were introduced in 2010 (S.I. 9 of 2010) on foot of requirements from the Water Framework Directive.

The IGV represent typical background or unpolluted conditions; however levels higher than the IGV may occur naturally depending on the local geological and hydrogeological conditions. While the TVs are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in non-potable groundwater supplies. Because not all parameters monitored have been assigned a TV, the relevant IGV continues to be used for comparative purposes.

**Table 2.1 - Groundwater Quality 12<sup>th</sup> December 2022**

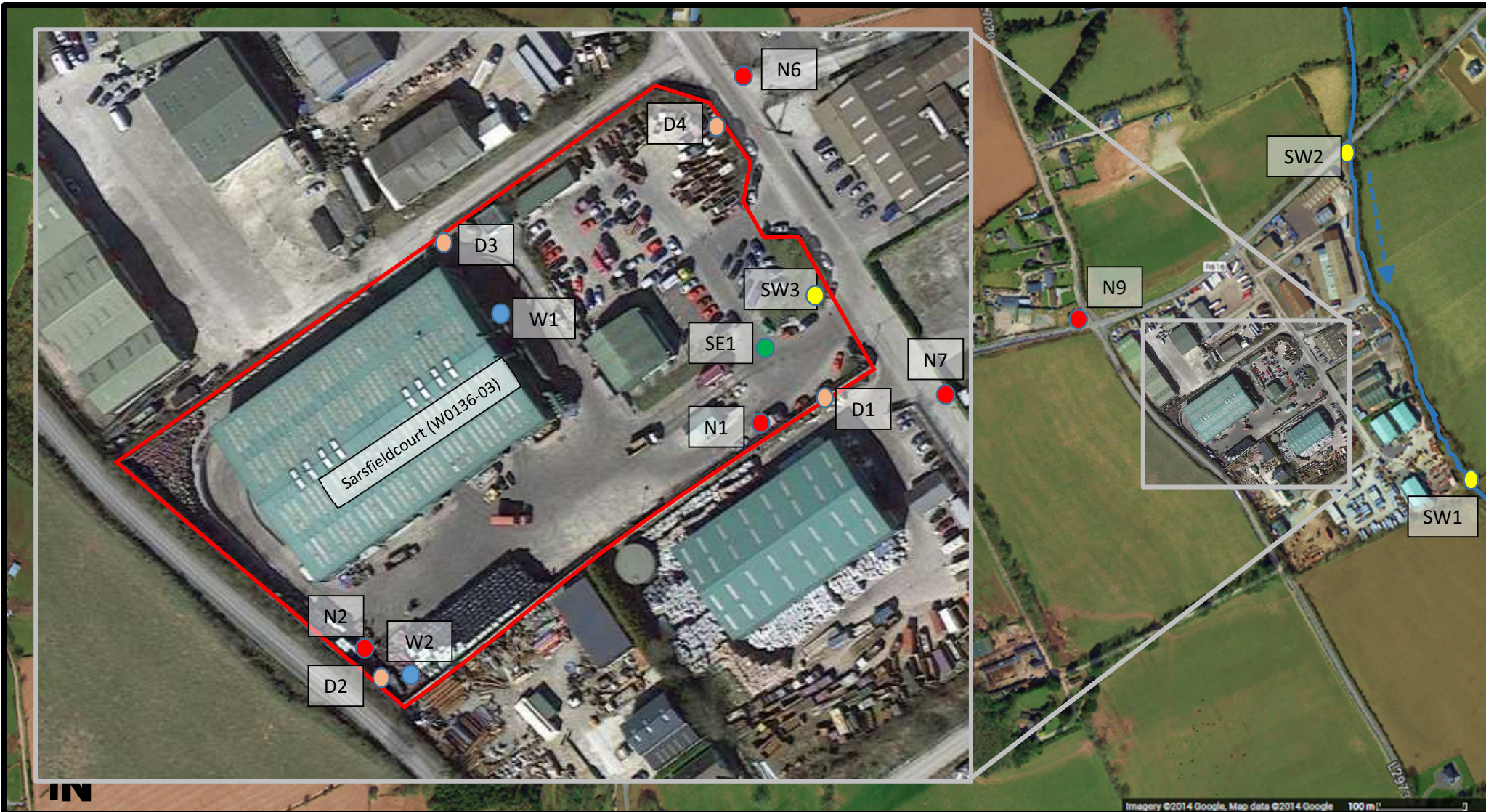
Parameter	Units	W-1 Downgradient	W-2 Upgradient	IGV	TV
<b>Field Readings</b>					
pH	pH units	*	*	6.5-9.5	-
Conductivity	mS/cm	0.350	0.269	-	0.800-1.875
Temperature	°C	13.5	11.74	25	
<b>Field Readings</b>					
pH	pH units	7.34	6.73	6.5-9.5	-
Conductivity	mS/cm	0.361	0.260	-	0.800-1.875
Ammoniacal Nitrogen (N)	mg/l	<0.03	<0.03	-	0.065-0.175
Nitrate as NO <sub>3</sub>	mg/l	17.8	44.3	-	37.5
Nitrite as NO <sub>2</sub>	mg/l	<0.02	<0.02	-	0.375
Mineral Oils	mg/l	<0.01	<0.01	0.01	-
BOD	mg/l	<1	<1	-	-
COD	mg/l	<7	22	-	-
Total Coliforms	MPN/100ml	5	>201	0	-
Faecal Coliforms	MPN/100ml	1	56	0	

\* There was an error with the pH probe in the field.

The level of nitrate detected in the upgradient well (W-2) exceeded the TV, however high levels of nitrate have been measured in this well since 2015. The total and faecal coliform levels were above the IGV in both wells. All other parameters were within or below the IGV and TV ranges.

## **2.4 Discussion**

High nitrate levels were detected in the upgradient well and the likely source of these elevated results is agricultural practices within the catchment. Total and faecal coliforms were detected in both upgradient and downgradient wells.



O'Callaghan Moran & Associates,  
Unit 15 Melbourne Business Park,  
Model Farm Road, Cork, Ireland.  
Tel. (021) 4345366  
Email: info@ocallaghanmoran.com

**Legend:**

- Noise Monitoring Location
- Permit Boundary
- Stream
- ➔ Stream Flow Direction
- Wastewater Monitoring Location
- Dust Monitoring Location
- Groundwater Monitoring Location
- Surface Water Monitoring Location

**Waste Reg.No.W0136-03**

**Figure:  
Figure 2.1**

**Scale:  
NOT TO SCALE**

This drawing is the property of O'Callaghan Moran & Associates and shall not be used, reproduced or disclosed to anyone without the prior written permission of O'Callaghan Moran & Associates and shall be returned upon request.

**Client:  
Starrus Eco Holdings Ltd**

**Title:  
Emissions Monitoring Locations**



# **APPENDIX 1**

Laboratory Results

O'Callaghan Moran & Associates

Unit 15  
Melbourne Business Park  
Model Farm  
Cork  
Ireland



4225

**Attention :** Martina Gleeson  
**Date :** 21st December, 2022  
**Your reference :** 22-048-04  
**Our reference :** Test Report 22/20601 Batch 1  
**Location :** Sarsfieldcourt  
**Date samples received :** 14th December, 2022  
**Status :** Final Report  
**Issue :** 1

Two samples were received for analysis on 14th December, 2022 of which two 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.

**Authorised By:**



**Bruce Leslie**

Project Manager

Please include all sections of this report if it is reproduced





# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/20601

## SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) 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. Asbestos samples are retained for 6 months.

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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. Ash samples are dried at 37°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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually 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.

## STACK EMISSIONS

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 for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

## DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

## 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.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

Please include all sections of this report if it is reproduced

All solid results are expressed on a dry weight basis unless stated otherwise.

**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.

Laboratory records are kept for a period of no less than 6 years.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

**Measurement Uncertainty**

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

**Customer Provided Information**

Sample ID and depth is information provided by the customer.

**ABBREVIATIONS and ACRONYMS USED**

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology 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
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

## HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.



EMT Job No: 22/20601

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes			
TM57	Modified US EPA Method 410.4. (Rev. 2.0 1993) Comparable with ISO 15705:2002. Chemical Oxygen Demand is determined by hot digestion with Potassium Dichromate and measured spectrophotometrically.	PM0	No preparation is required.	Yes			
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TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			



# Certificate Of Analysis

O'Callaghan Moran & Associates  
Unit 15  
Melbourne Business Park  
Model Farm Road  
Cork

**Certificate Number:** 65706  
**Certificate Date:** 16-Dec-22  
**Order No.:** 22-048-04  
**Page:** 1 of 1

**Test Organism**

Coliforms/MPN

Ecoli/MPN

**Test Method**

AAS.M.18 based on The Microbiology of Drinking Water 2016  
Part 4 & IDEXX Colilert procedure

AAS.M.18 based on The Microbiology of Drinking Water 2016  
Part 4 & IDEXX Colilert procedure

Sample Ref.	Description	Condition	Date Received	Test Date	Coliforms/MPN	Ecoli/MPN
003/50/22	BH-1	Normal	12/12/22	12/12/22	5/100ml	1/100ml
004/50/22	BH-2	Normal	12/12/22	12/12/22	>201/100ml	56/100ml

ND = Not Detected, <10, <20, etc. = Not Detected @ Dilution -1, etc \* = Not Accredited. U.C = Uncountable

Signed:

Emma Casey  
Laboratory Analyst

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**Test results relate only to the items tested.**

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