VOLUME 3

APPENDICES

STARRUS ECO HOLDINGS LTD

MATERIALS RECOVERY FACILITY

MILLENNIUM BUSINESS PARK

BALLYCOOLIN

DUBLIN 11

Prepared For: -

Starrus Eco Holdings Ltd

Millennium Business Park

Ballycoolin

Dublin 11

Prepared By: -

O'Callaghan Moran & Associates

Unit 15

Melbourne Business Park

Model Farm Road

Cork

T12 WR89

March 2023

APPENDIX 1.1

EPA LICENCE

This licence was amended on 24 February 2006 under Section 42B(1) of the Waste Management Acts, 1996 to 2005. The details of Amendment A must be read in conjunction with this licence. The amendment document is entitled "Technical Amendment A".

LICENCE REG NO W0183-01 HAS BEEN TRANSFERRED
Please note that licence Reg No W0183-01 was transferred to Starrus Eco Holdings Limited on 4 March 2014. For further information on this please refer to Transfer Notification on the Agency's website.

This licence was amended on 16 December 2015 under Section 76A(11) of the Waste Management Act 1996 as amended. The details of the Amendment must be read in conjunction with this licence. The amendment document is entitled "IED Amendment".

This licence was amended on 29 June 2016 and 4 March 2020 under Section 96(1) of the Environmental Protection Agency Act 1992 as amended. The details of Amendment B and Amendment C must be read in conjunction with this licence. The amendment documents are entitled "Technical Amendment B" and "Technical Amendment C".

Headquarters,
P.O. Box 3000,
Johnstown Castle Estate,
County Wexford, Ireland

WASTE LICENCE

Waste Licence Register No:	183-1
Licensee:	Greenstar Limited
Location of Facility:	Millennium Business Park, Grange, Ballycoolin, Dublin 11.

Table of Contents

INTRODUCTION

This introduction is not part of the licence and does not purport to be a legal interpretation of the licence.

This licence is for the development of a non-hazardous waste recycling and transfer facility at a greenfield site in the Millennium Business Park, Grange, Ballycoolin, Dublin 11. Greenstar Limited (t/a Greenstar) will be permitted to accept non-hazardous municipal, industrial, commercial, construction and demolition and organic wastes at the facility.

The maximum quantity of waste to be accepted at the facility is 270,000 tonnes per annum. The licence provides for the phased development of the facility which will entail the construction of two main waste handling buildings: a biowaste treatment unit and a waste recovery/transfer building. The biowaste treatment unit can accept a maximum of 50,000 tonnes of biowaste per annum subject to the licensee undertaking an odour impact study and implementing the findings of the study. Up to 220,000 tonnes of non-hazardous waste may be accepted at the waste recovery/transfer building and this building will be developed in three phases.

The licensee must manage and operate the facility to ensure that activities do not cause environmental pollution. The licensee is required to carry out regular environmental monitoring and submit all monitoring results, and a wide range of reports on the operation and management of the facility to the Agency.

The licence sets out in detail the conditions under which Greenstar Limited will operate and manage this facility.

DECISION & REASONS FOR THE DECISION

Reasons for the Decision

The Environmental Protection Agency (the Agency) is satisfied, on the basis of the information available, that the waste activity, or activities, licensed hereunder will comply with the requirements of Section 40(4) of the Waste Management Act, 1996.

In reaching this decision the Agency has considered the application and supporting documentation received from the applicant, all submissions and an objection received and the reports of its inspectors.

Part I Activities Licensed

In pursuance of the powers conferred on it by the Waste Management Act, 1996, the Agency, under Section 40(1) of the said Act hereby grants this Waste Licence to Greenstar Limited to carry on the waste activity/activities listed below at Millennium Business Park, Grange, Ballycoolin, Dublin 11 subject to conditions, with the reasons therefor and the associated schedules attached thereto set out in the licence.

Licensed Waste Disposal Activities, in accordance with the Third Schedule of the Waste Management Act 1996

Class 11.	**Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.**
	This activity is limited to the mixture of wastes at the facility prior to the waste being removed off-site for disposal.
Class 12.	**Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.**
	This activity is limited to the repackaging of wastes at the facility prior to the waste being removed off-site for disposal.
Class 13.	**Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned was produced.**
	This activity is limited to the storage of wastes at the facility prior to being removed off-site for disposal.

Licensed Waste Recovery Activities, in accordance with the Fourth Schedule of the Waste Management Act 1996

Class 2.	**Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes):**
	This activity is limited to the treatment and composting of organic waste at the facility.
Class 3.	**Recycling or reclamation of metals and metal compounds:**
	This activity is limited to the collection, segregation and recovery of waste metals at the facility.
Class 4.	**Recycling or reclamation of other inorganic materials:**
	This activity is limited to the collection, segregation and recovery of inorganic materials (e.g. some construction and demolition wastes, glass, etc) at the facility.
Class 11.	**Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule:**
	This activity is limited to the use of recovered organic wastes as a bulking agent in the on-site composting activities.
Class 12.	**Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule:**
	This activity is limited to the exchange of recovered wastes at the facility.
Class 13.	**Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced:**
	This activity is limited to the storage of wastes at the facility prior to removal off-site for recovery.

INTERPRETATION

All terms in this licence should be interpreted in accordance with the definitions in the Waste Management Act, (the Act), unless otherwise defined in this section.

Aerosol	A suspension of solid or liquid particles in a gaseous medium.
Adequate lighting	20 lux measured at ground level.
Agreement	Agreement in writing.
Animal by-products Regulation	Regulation (EC) No 1774/2002 laying down health rules concerning animal by-products not intended for human consumption (3 October 2002).
Annually	At approximately twelve monthly intervals.
Attachment	Any reference to Attachments in this licence refers to attachments submitted as part of the waste licence application.
Application	The application by the licensee for this waste licence.
Appropriate facility	A waste management facility, duly authorised under relevant law and technically suitable.
BAT	Best Available Technology as defined in Section 5(2) of the Act.
Bi-annually	All or part of a period of six consecutive months.
Bi-monthly	All or part of a period of two consecutive months.
Biodegradable Waste (Biowaste)	Any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food, garden waste, sewage sludge, paper and paperboard.
Condition	A condition of this licence.
Consignment Note	All movements of hazardous waste within Ireland must be accompanied by a "C1" consignment note issued by a local authority under the Waste Management (Movement of Hazardous Waste) Regulations (SI No. 147 of 1998). Transfrontier shipment notification and movement/tracking form numbers are required for all exports of waste from, into or through the state under the Waste Management (Transfrontier Shipment of Waste) Regulations (SI No. 149 of 1998).
Construction and Demolition Waste	All wastes which arise from construction, renovation and demolition activities.
Containment boom	A boom which can contain spillages and prevent them from entering drains or watercourses.
Daytime	8.00 a.m. to 10.00 p.m.
Documentation	Any report, record, result, data, drawing, proposal, interpretation or other document in written or electronic form which is required by this licence.
Drawing	Any reference to a drawing or drawing number means a drawing or drawing number contained in the application, unless otherwise specified in this licence.
Emergency	Those occurrences defined in Condition 8.4.

Emission Limits	Those limits, including concentration limits and deposition levels established in Schedule C: Emission Limits, of this licence.
European Waste Catalogue (EWC)	A harmonised, non-exhaustive list of wastes drawn up by the European Commission and published as Commission Decision 94/3/EC and any subsequent amendment published in the Official Journal of the European Community.
Wastewater	Sewage and drainage from waste transfer building, biowaste treatment building vehicle wash, weighbridges, vehicle cleaning and run-off from hardstanding areas associated with waste handling, storage or processing.
Green waste	Waste wood (excluding timber), plant matter such as grass cuttings, and other vegetation.
Hours of Operation	The hours during which the facility is authorised to be operational. The hours of operation of a facility are usually longer than the hours of waste acceptance to facilitate preparatory and completion works, such as the removal and laying of daily cover. Different activities within the facility, such as the civic waste facility, may have different hours of waste acceptance.
Hours of Waste Acceptance	The hours during which the facility is authorised to accept waste. Different activities within the facility, such as the civic waste facility, may have different hours of waste acceptance.
Industrial Waste	As defined in Section 5(1) of the Act.
Inert waste	Waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater.
Landfill Directive	Council Directive 1999/31/EC
Licence	A Waste Licence issued in accordance with the Act.
Licensee	Greenstar Limited.
Liquid Waste	Any waste in liquid form and containing less than 2% dry matter. Any waste tankered to the facility.
Maintain	Keep in a fit state, including such regular inspection, servicing, calibration and repair as may be necessary to adequately perform its function.
Monthly	A minimum of 12 times per year, at approximately monthly intervals.
Municipal waste	As defined in Section 5(1) of the Act.
Night-time	10.00 p.m. to 8.00 a.m.
Noise Sensitive Location (NSL)	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
Oil Separator	Device installed according to the draft European Standard prEN 858

	(Installations for the separation of light liquids, e.g. oil and petrol).
Recyclable Materials	Those waste types, such as cardboard, batteries, gas cylinders, etc, which may be recycled.
Quarterly	At approximately three monthly intervals.
Sanitary Authority	Fingal County Council.
Sample(s)	Unless the context of this licence indicates to the contrary, samples shall include measurements by electronic instruments.
Specified Emissions	Those emissions listed in Schedule C: Emission Limits, of this licence.
Specified Engineering Works	Those engineering works listed in Schedule B: Specified Engineering Works, of this licence.
Weekly	During all weeks of plant operation, and in the case of emissions, when emissions are taking place with no more than one measurement in any one week.
White Goods	Refrigerators, cookers, ovens and other similar appliances.
EPA Working Day	Refers to the following hours; 9.00 a.m. to 5.30 p.m. Monday to Friday inclusive.

PART II CONDITIONS

CONDITION 1 SCOPE OF THE LICENCE

1.1. Waste activities at the facility shall be restricted to those listed and described in Part I: Activities Licensed and authorised by this licence.

1.2. For the purposes of this licence, the facility is the area of land outlined in red on Drawing No. PP-002 "Site location Map" of the application. Any reference in this licence to "facility" shall mean the area thus outlined in red.

1.3. This licence is for the purposes of waste licensing under the Waste Management Act, 1996 only and nothing in this licence shall be construed as negating the licensee's statutory obligations or requirements under any other enactments or regulations.

1.4. Only those waste categories and quantities listed in Schedule A: Waste Acceptance, shall be accepted at the facility.

1.5. No hazardous wastes, liquid wastes or sewage sludge shall be accepted at the facility.

1.6. Waste Acceptance and Handling Hours

1.6.1. Waste shall be accepted at the facility only between the hours of 6.30am and 7.00pm Monday to Saturday inclusive.

1.6.2. Waste shall be handled only during the hours of 6.00am to 8.00pm Monday to Saturday.

1.6.3. Waste shall not be accepted at the facility on Sundays or Bank Holidays.

1.7 The following shall constitute an incident for the purposes of this licence:

a) an emergency;

b) any emission which does not comply with the requirements of this licence;

c) any exceedance of the daily duty capacity of the waste handling equipment;

d) any trigger level specified in this licence which is attained or exceeded;

e) any indication that environmental pollution has, or may have, taken place; and

f) any rejected load of waste.

1.8. Where the Agency considers that a non-compliance with any condition of this licence has occurred, it may serve a notice on the licensee specifying:

1.8.1. That only those wastes as specified, if any, in the notice are to be accepted at the facility after the date set down in the notice;

1.8.2. That the licensee shall undertake the works stipulated in the notice, and/or otherwise comply with the requirements of the notice as set down therein, within the time-scale contained in the notice; and

1.8.3. That the licensee shall carry out any other requirement specified in the notice.

When the notice has been complied with, the licensee shall provide written confirmation that the requirements of the notice have been carried out. No waste, other than that which is stipulated in the notice, shall be accepted at the facility until written permission is received from the Agency.

1.9. Every plan, programme or proposal submitted to the Agency for its agreement pursuant to any condition of this licence shall include a proposed timescale for its implementation. The Agency may modify or alter any such plan, programme or proposal in so far as it considers such modification or alteration to be necessary and shall notify the licensee in writing of any such modification or alteration. Every such plan, programme or proposal shall be carried out within the timescale fixed by the Agency but shall not be undertaken without the agreement of the Agency. Every such plan, programme or proposal agreed by the Agency shall be covered by the conditions of this licence

Reason: *To clarify the scope of this licence.*

CONDITION 2 MANAGEMENT OF THE FACILITY

2.1 Facility Management

2.1.1 Prior to the commencement of waste activities at the facility, the licensee shall employ a suitably qualified and experienced facility manager who shall be designated as the person in charge. The facility manager or a nominated, suitably qualified and experienced, deputy shall be present on the facility at all times during the hours of waste acceptance and handling specified in Condition 1.6.

2.1.2 Both the facility manager and deputy, and any replacement manager or deputy, shall successfully complete both the FAS Waste Management Training Programme (or equivalent agreed by the Agency) and associated on site assessment appraisal within twelve months of appointment.

2.1.3 The licensee shall ensure that personnel performing specifically assigned tasks shall be qualified on the basis of appropriate education, training and experience, as required and shall be aware of the requirements of this licence.

2.2 Management Structure

2.2.1 Prior to the commencement of waste activities at the facility, the licensee shall submit written details of the management structure of the facility to the Agency. Any proposed replacement in the management structure shall be notified in advance in writing to the Agency. Written details of the management structure shall include the following information:-

a) the names of all persons who are to provide the management and supervision of the waste activities authorised by the licence, in particular the name of the facility manager and any nominated deputies;

b) details of the responsibilities for each individual named under a) above; and

c) details of the relevant education, training and experience held by each of the persons nominated under a) above.

2.3 Environmental Management System (EMS)

2.3.1 The licensee shall establish and maintain an EMS. Within six months of the date of grant of this licence, the licensee shall submit to the Agency for its agreement a proposal for a documented Environmental Management System (EMS) for the facility. Following the agreement of the Agency, the licensee shall establish and

maintain such a system. The EMS shall be updated on an annual basis with amendments being submitted to the Agency for its agreement.

2.3.2 The EMS shall include as a minimum the following elements:

2.3.2.1 Schedule of Environmental Objectives and Targets

The objectives should be specific and the targets measurable. The Schedule shall address a five-year period as a minimum. The Schedule shall include a time-scale for achieving the objectives and targets and shall comply with any other written guidance issued by the Agency.

2.3.2.2 Environmental Management Plan (EMP)

The EMP shall include, as a minimum, the following:

(i) methods by which the objectives and targets will be achieved in the coming year and the designation of responsibility for targets;

(ii) any other items required by written guidance issued by the Agency.

2.3.2.3 Corrective Action Procedures

The Corrective Action Procedures shall detail the corrective actions to be taken should any of the procedures detailed in the EMS not be followed.

2.3.2.4 Awareness and Training Programme

The Awareness and Training Programme shall identify training needs, for personnel who work in or have responsibility for the licensed facility.

2.4 Communications Programme

2.4.1 The licensee shall establish and maintain a Communications Programme to ensure that members of the public can obtain information at the facility, at all reasonable times, concerning the environmental performance of the facility. This shall be established within six months of the date of grant of this licence.

REASON: *To make provision for the proper management of the activity on a planned basis having regard to the desirability of ongoing assessment, recording and reporting of matters affecting the environment.*

CONDITION 3 FACILITY INFRASTRUCTURE

3.1 The licensee shall establish all infrastructure referred to in this licence either prior to the commencement of the licensed activities or as required by the conditions of this licence.

3.2 Specified Engineering Works

3.2.1 The licensee shall submit proposals for all Specified Engineering Works, as defined in *Schedule B: Specified Engineering Works*, of this licence to the Agency for its agreement at least two months prior to the intended date of commencement of any such works. No such works shall be carried out without the prior agreement of the Agency.

3.2.2 All specified engineering works shall be supervised by a competent person(s) and that person, or persons, shall be present at all times during which relevant works are being undertaken.

3.2.3 Following the completion of all specified engineering works, the licensee shall complete a construction quality assurance validation. The validation report shall be made available to the Agency on request. The report shall include the following information:

a) a description of the works;

b) as-built drawings of the works;

c) records and results of all tests carried out (including failures);

d) drawings and sections showing the location of all samples and tests carried out;

e) daily record sheets/diary;

f) name(s) of contractor(s)/individual(s) responsible for undertaking the specified engineering works;

g) name(s) of individual(s) responsible for supervision of works and for quality assurance validation of works;

h) records of any problems and the remedial works carried out to resolve those problems; and

i) any other information requested in writing by the Agency.

3.3 Facility Notice Board

3.3.1 The licensee shall provide and maintain a Facility Notice Board on the facility so that it is legible to persons outside the main entrance to the facility. The minimum dimensions of the board shall be 1200 mm by 750 mm.

3.3.2 The board shall clearly show:

a) the name and telephone number of the facility;

b) the normal hours of opening;

c) the name of the licence holder;

d) an emergency out of hours contact telephone number;

e) the licence reference number; and

f) where environmental information relating to the facility can be obtained.

3.4 Facility Security

3.4.1 Prior to the commencement of waste activities, security fencing/barriers and gates shall be installed and maintained at the facility boundary. The security fence and gates shall be as shown on Drawing No. PP-008 of the application.

3.4.2 The licensee shall remedy any defect in the gates and/or fencing as follows:

a) a temporary repair shall be made by the end of the working day; and,

b) a repair to the standard of the original gates and/or fencing shall be undertaken within three working days.

3.5 Acoustic Barrier

3.5.1 The licensee shall provide a 2.4m high acoustic barrier along all of the boundaries of the facility adjoining the Millennium Business Park (as proposed in the application).

3.6 Facility Roads and Hardstanding

3.6.1 Site roads shall be provided and maintained to ensure the safe movement of vehicles within the facility.

3.6.2 All areas at the facility, other then areas being maintained for planting/landscaping shall be paved.

3.6.3 The licensee shall provide, and maintain an impermeable surface in the areas of the facility shown on Drawing No. PP-006. In addition, any areas used for vehicle parking, maintenance and refuelling, waste handling and/or storage shall be an impermeable surface.

3.7 Facility Office

3.7.1 The licensee shall provide and maintain an office at the facility. The office shall be constructed and maintained in a manner suitable for the processing and storing of documentation.

3.7.2 The licensee shall provide and maintain a working telephone and a method for electronic transfer of information at the facility.

3.8 Waste Quarantine Area

3.8.1 Waste Quarantine Areas shall be provided and maintained in each building at which waste is accepted at the facility.

3.8.2 These areas shall be constructed and maintained in a manner suitable, and be of a size appropriate for the quarantine of waste if required. The waste quarantine areas shall be clearly identified and segregated.

3.8.3 Drainage from these areas shall be directed to the wastewater drainage system.

3.9 Weighbridge and Vehicle Cleaning

3.9.1 The licensee shall provide and maintain two weighbridges at the facility, one for incoming wastes and the other for outgoing wastes.

3.9.2 The licensee shall provide a vehicle cleaning unit at the facility and any drainage from this area shall be directed to the wastewater drainage system.

3.10 Waste handling, ventilation and processing plant

3.10.1 Items of plant deemed critical to the efficient and adequate processing of waste at the facility (including *inter alia* waste loading vehicles and ejector trailers) shall be provided on the following basis:

- 100% duty capacity;
- 50% standby capacity available on a routine basis;
- Provision of contingency arrangements and/or back up and spares in the case of breakdown of critical equipment.

3.10.2 Prior to the commencement of waste activities, the licensee shall provide a report for the agreement of the Agency detailing the duty and standby capacity in tonnes per day, of all waste handling and processing equipment to be used at the facility. These capacities shall be based on the licensed waste intake, *as per Schedule A: Waste Acceptance*, of this licence.

3.10.3 The quantity of waste to be accepted at the facility on a daily basis shall not exceed the duty capacity of the equipment at the facility. Any exceedance of this intake shall be treated as an incident.

3.11 Tank and Drum Storage Areas

3.11.1 All tank and drum storage areas shall be rendered impervious to the materials stored therein.

3.11.2 All tank and drum storage areas shall, as a minimum, be bunded, either locally or remotely, to a volume not less than the greater of the following:

(a) 110% of the capacity of the largest tank or drum within the bunded area; or

(b) 25% of the total volume of substance which could be stored within the bunded area.

3.11.3 All drainage from bunded areas shall be diverted for collection and safe disposal.

3.11.4 All inlets, outlets, vent pipes, valves and gauges must be within the bunded area.

3.11.5 The integrity and water tightness of all the bunds and their resistance to penetration by water or other materials stored therein shall be confirmed by the licensee and shall be reported to the Agency following its installation and prior to its use as a storage area. This confirmation shall be repeated at least once every three years thereafter and reported to the Agency on each occasion.

3.12 Silt Traps and Oil Separators/Interceptors

3.12.1 The licensee shall install and maintain silt traps and oil interceptors at the facility to ensure that all surface water discharges from the facility pass through a silt trap and oil interceptor prior to discharge. The interceptors shall be a Class I interceptor and the silt traps and interceptors shall be in accordance with European Standard EN 858 (installations for the separation of light liquids).

3.13 Drainage system, pipeline testing

3.13.1 Prior to the commencement of waste activities, all foul sewer gullies, drainage grids and manhole covers shall be painted with red squares whilst all surface water discharge gullies, drainage grids and manhole covers shall be painted with blue triangles. These colour codes shall be maintained so as to be visible at all times during facility operation, and any identification designated in this licence (e.g. SW1) shall be inscribed on these manholes.

3.13.2 The drainage system, bunds, silt traps and oil separators shall be inspected weekly, desludged as necessary and properly maintained at all times. All sludge and drainage from these operations shall be collected for safe disposal. A written record shall be kept of the inspections, desludging, cleaning, disposal of associated waste products, maintenance and performance of the interceptors, bunds and drains.

3.13.3 The integrity and water tightness of all underground pipes and tanks and their resistance to penetration by water or other materials carried or stored therein shall be tested and demonstrated by the licensee and shall be reported to the Agency following their installation and prior to their use. This testing shall be carried out by the licensee at least once every three years thereafter and reported to the Agency on each occasion. A written record of all integrity tests and any maintenance or remedial work arising from them shall be maintained by the licensee.

3.13.4 The licensee shall provide on-site storage tanks for the collection and temporary storage of roof water from the biowaste treatment building and materials recovery/transfer building respectively. This water shall be re-used in the process where possible.

3.13.5 The licensee shall provide silt fences/barriers in the surface water collection system up to and until all of the facility has been paved as required by this licence. The licensee shall maintain the silt fences at all times.

3.13.6 Isolation valves shall be provided and maintained on the surface water and wastewater drainage systems.

3.14 Firewater Retention

3.14.1 Prior to the commencement of waste activities the licensee shall provide firewater storage capacity at the facility. The size and nature of the firewater storage shall be agreed in advance by the Agency.

3.15 Waste Acceptance and Handling Areas.

3.15.1 Municipal Waste Area within the waste recovery/transfer building

(i) Prior to the acceptance of municipal waste at the facility, the licensee shall provide a dedicated area for the acceptance and handling of such waste.

(ii) Prior to the acceptance of municipal waste at the facility the licensee shall provide a dedicated system for the control of odour emissions. The licensee shall include details of this odour control system as part of the AER. The licensee shall, at such time as the Agency considers necessary, undertake an assessment of the environmental performance of the odour control system. In the event that the assessment demonstrates that the odour control system is inadequate the licensee shall implement abatement measures, including air extraction and filtration, within a period specified by the Agency.

(iii) The municipal waste area shall be designed to allow for the inspection of all incoming waste loads when tipped.

3.15.2 Construction and Demolition Waste Area within the waste recovery/transfer building

(i) Prior to the acceptance of construction and demolition waste at the facility the licensee shall provide a dedicated area for the acceptance, handling and storage of such waste.

(ii) A localised dust suppression system shall be provided at the construction and demolition waste area.

(iii) Suitably sized waste storage bays and bays for the storage of recovered materials shall be provided.

3.15.3 Commercial and Industrial / Pre-Segregated Waste Acceptance Area within the waste recovery/transfer building

(i) The licensee shall provide an area of suitable size for the acceptance handling and processing of commercial and industrial wastes.

(ii) The licensee shall provide designated areas for the storage of baled materials prior to their removal off-site.

(iii) The licensee shall provide noise and dust control measures at any shredders and/or screens used for processing of commercial and industrial wastes at the facility.

3.15.4 Biowaste treatment facility

(i) Unless otherwise agreed in advance by the Agency, the licensee shall provide a biowaste treatment system as proposed in the waste licence application.

(ii) The biowaste treatment facility shall be constructed on a phased basis. The licensee shall not extend the biowaste treatment operations to accept more than 25,000 tonnes of biowaste per annum until the recommendations of the odour impact report have been implemented as required by Condition 10.3.

(iii) The composting unit shall as a minimum include/consist of the following:

(a) A fully enclosed building for the acceptance, inspection and treatment of all biowaste;

(b) Designated areas for the acceptance, temporary storage and pre-treatment of biodegradable waste, a fully aerated biowaste treatment area and designated areas for the storage of processed compost;

(c) A fully controllable system for the aeration of the biowaste/compost and a sprinkler system for the addition of moisture to the biowaste/compost as required.

(d) An odour abatement system which satisfies the following requirements;

- Installation and maintenance of integrity and negative pressure throughout the building to ensure no significant escape of odours or dust.
- Installation of an odour management system that shall include water scrubber(s) and suitably sized biofilter(s). All emissions from the biofilter(s) shall be discharged via a stack located 16m above ground level.
- Provision of 100% duty capacity and 50% stand by capacity, back ups and spares must be provided for the air handling, ventilation and abatement plant.
- Emissions from the biofilter shall not exceed those ELV's as set out in *Schedule C: Emission Limits*, of this licence.

3.16 Monitoring Infrastructure

3.16.1 Replacement of Infrastructure

(i) Monitoring infrastructure which is damaged or proves to be unsuitable for its purpose shall be replaced within three months of it being damaged or recognised as being unsuitable.

REASON: *To provide appropriate infrastructure for the protection of the environment.*

CONDITION 4 FACILITY OPERATIONS

4.1 All waste acceptance, handling and processing shall be carried out indoors.

4.2 Waste Acceptance and Characterisation Procedures

4.2.1 No Category 1 or Category 2 wastes as defined in animal by-products regulation shall be accepted at the facility.

4.2.2 Prior to commencement of waste acceptance at the facility, the licensee shall establish and maintain detailed written procedures for the acceptance and handling of wastes.

4.2.3 Waste arriving at the facility shall be weighed, documented and directed to the Waste Transfer Building or biowaste treatment building as appropriate. Each load of waste arriving at the Waste Transfer and Biowaste Treatment Buildings shall be inspected upon tipping within this building. Only after such inspections shall the waste be processed for disposal or recovery.

4.2.4 Any waste deemed unsuitable for processing at the facility and/or in contravention of this licence shall be immediately separated and removed from the facility at the earliest possible time. Temporary storage of such wastes shall be in a designated Waste Quarantine Area(s). Waste shall be stored under appropriate conditions in the quarantine area to avoid putrefaction, odour generation, the attraction of vermin and any other nuisance or objectionable condition.

4.2.5 A record of all inspections of incoming waste loads shall be maintained.

4.2.6 Wastes shall be accepted from waste carriers only who are in possession of a current waste collection permit (where required).

4.3 Operational Controls

4.3.1. The floor of the municipal waste area and areas used to off-load waste in the waste transfer building (other than the C&D area) shall be cleared of all waste at the end of the working day. Only non-putrescible waste may be stored overnight in the dedicated storage bays prior to recovery.

4.3.2 The floor of the reception/pre-treatment area within the biowaste treatment building shall be cleared of all waste at the end of the working day.

4.3.3 All waste handling/processing plant shall be cleared of all waste and washed down on a weekly basis.

4.3.4 All pre-treatment of biowaste and compost screening shall be carried out inside the biowaste treatment building.

4.3.5 All wastewater from composting operations shall be collected and re-used in the composting process where possible. Any wastewater from the composting operations that is not re-used shall be either discharged to the wastewater drainage system or tankered off-site for treatment at a location to be agreed in advance by the Agency.

4.3.6 Any biowaste accepted at the facility for composting (other than bulking agents, e.g. woodchip, cardboard) shall be processed and put into the aerated composting area within twenty four hours of its arrival at the facility, subject to review in the event of a nuisance.

4.3.7 The licensee shall ensure that the doors to the biowaste treatment building remain closed at all times other than to facilitate the delivery/removal of wastes from the building.

4.3.8 The licensee shall on a daily basis monitoring and record the temperature and the moisture content of the material at a number of locations to be agreed in advance by the Agency.

4.3.9 Scavenging shall not be permitted at the facility.

4.3.10 Gates shall be locked shut when the facility is unsupervised.

4.3.11 The licensee shall provide and use adequate lighting during the operation of the facility in hours of darkness.

4.3.12 Fuels shall be stored only at appropriately bunded locations on the facility.

4.3.13 All tanks and drums shall be labelled to clearly indicate their contents.

4.4 Compost

4.4.1 In order not to be considered a waste, compost produced by the facility shall comply with the quality standards established in *Schedule F: Standards for Compost Quality*, of this licence. Analysis of the compost shall be in accordance with the requirements of that Schedule.

4.5 Off-site Disposal and Recovery

4.5.1 Waste sent off-site for recovery or disposal shall be conveyed only by a waste contractor agreed by the Agency;

4.5.2 All waste transferred from the facility shall be transferred only to an appropriate facility agreed by the Agency;

4.5.3 All wastes removed off-site for recovery or disposal shall be transported from the facility to the consignee in a manner which will not adversely affect the environment.

4.6 Construction and Demolition Waste Recovery Area

4.6.1 Only Construction and Demolition waste shall be accepted at this Area. Wastes which are capable of being recovered shall be separated and shall be stored temporarily in this area prior to being subjected to other recovery activities at the facility or their transport off-site from the facility.

4.6.2 All stockpiles shall be maintained so as to minimise dust generation.

4.7 Wastewater Management

4.7.1 All wastewater generated at the facility, other than wastewater that is reused at the facility and/or tankered off-site shall be discharged to sewer.

4.8 Maintenance

4.8.1 All treatment/abatement and emission control equipment shall be calibrated and maintained, in accordance with the instructions issued by the manufacturer/supplier or installer. Written records of the calibrations and maintenance shall be made and kept by the licensee.

4.8.2 All tank structures on the facility shall be inspected and certified fit for purpose prior to use and every three years by an independent and appropriately qualified chartered engineer.

4.8.3 The licensee shall maintain and clearly label and name all sampling and monitoring locations.

4.8.4 The licensee shall maintain all waste handling plant accordance with the manufacturers instructions.

4.9 Landscaping

4.9.1 Landscaping of the facility (as proposed in Drawing PP-006 of the waste licence application) shall be carried out within 12 months of the date of grant of this licence.

4.9.2 The licensee shall retain the existing hedgerow network that forms the eastern and northern boundaries of the facility.

4.9.3 The licensee shall carry out an annual review of the existing landscaping/planting programme at the facility and shall carry out any additional planting where deemed necessary.

***REASON**: To provide for appropriate operation of the facility to ensure protection of the environment.*

CONDITION 5 EMISSIONS

5.1. No specified emission from the facility shall exceed the emission limit values set out in *Schedule C: Emission Limits*, of this licence. There shall be no other emissions of environmental significance.

5.2. The licensee shall ensure that the activities shall be carried out in a manner such that emissions do not result in significant impairment of, or significant interference with the environment beyond the facility boundary.

5.3. Emission limits for emissions to atmosphere in this licence shall be interpreted in the following way:-

5.3.1. Non-Continuous Monitoring

(i) For any parameter where, due to sampling/analytical limitations, a 30 minute samples is inappropriate, a suitable sampling period should be employed and the value obtained therein shall not exceed the emission limit value.

(ii) For all other parameters, no 30 minute mean value shall exceed the emission limit value.

(iii) For flow, no hourly or daily mean value shall exceed the emission limit value.

5.4. Emissions to Surface Water

5.4.1. The trigger levels for surface water discharges from the facility measured at monitoring points SW-1 and SW-2 are:

(a) BOD 25mg/l

(b) Suspended Solids 35mg/l

(c) Mineral Oils 5mg/l

5.4.2. No substance shall be discharged in a manner, or at a concentration which, following initial dilution causes tainting of fish or shellfish.

5.5 There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity at the noise sensitive locations.

5.6 No wastewater shall be discharged to surface water.

5.7 Wastewater emissions to Sewer

5.7.1 Unless otherwise agreed in advance by the Agency and the Sanitary Authority, the following shall apply for the discharge of wastewater, which shall be via the wastewater discharge line from the facility. There shall be no other discharge or emission to sewer of environmental significance.

5.7.2 No substance shall be present in emissions to sewer in such concentrations as would constitute a danger to sewer maintenance personnel working in the sewerage system, or as would be damaging to the fabric of the sewer, or as would interfere with the biological functioning of a downstream wastewater treatment works.

5.7.3 The licensee shall permit authorised persons of the Agency and the Sanitary Authority to inspect, examine and test, at all reasonable times, any works and apparatus installed, in connection with the discharge or emission, and to take samples of the discharge or emission.

5.7.4 No discharge or emission to sewer shall take place which might give rise to any reaction within the sewer or to the liberation of by-products which may be of environmental significance.

5.7.5 The licensee shall ensure that the discharge shall not contain dissolved methane, petroleum spirits or organic solvents (including chlorinated organic solvents), at concentrations which would give rise to flammable or explosive vapours in the sewer.

5.7.6 Non-trade effluent wastewater (e.g. firewater, accidental spillage) which occurs on-site shall not be discharged to the sewer without the prior authorisation of the Sanitary Authority.

5.7.7 The licensee shall provide and maintain an inspection chamber in a suitable position in connection with each pipe through which a discharge or emission is being made. Each such inspection chamber or manhole shall be constructed and maintained by the licensee so as to permit the taking of samples of the discharge.

5.7.8 The licensee shall submit monitoring results to the Sanitary Authority on an annual basis.

5.7.9 Materials classifiable as "Hazardous Wastes" under the Waste Management Act, 1996, shall not be discharged to the foul sewer.

5.7.10 Wastewater discharges shall be screened prior to discharge to remove gross solids and avoid blockages in the sewer.

5.8 Emission limit values for wastewater emissions to sewer in this licence shall be interpreted in the following way:-

a) Non-Continuous monitoring.

Eight out of ten consecutive results, calculated as daily mean concentration or mass emission values on the basis of flow proportional composite sampling shall not exceed 1.2 times the emission limit value.

b) No grab sample shall exceed 1.2 times the emission limit value.

REASON: *To control emissions from the facility and provide for the protection of the environment.*

CONDITION 6 NUISANCE CONTROL

6.1 The licensee shall ensure that vermin, birds, flies, mud, dust, litter and odours do not give rise to nuisance at the facility or in the immediate area of the facility. Any method used by the licensee to control any such nuisance shall not cause environmental pollution.

6.2 No wastes shall be stored outdoors, unless agreed in advance by the Agency.

6.3 The road network in the vicinity of the facility shall be kept free from any debris caused by vehicles entering or leaving the facility. Any such debris or deposited materials shall be removed without delay.

6.4 Litter Control

6.4.1 All loose litter or other waste, placed on or in the vicinity of the facility, other than in accordance with the requirements of this licences, shall be removed, subject to the agreement of the landowners, immediately and in any event by 10.00am of the next working day after such waste is discovered.

6.4.2 The licensee shall ensure that all vehicles delivering waste to and removing waste and materials from the facility are appropriately covered.

6.5 Dust/Odour Control

6.5.1 All waste for disposal stored overnight at the facility, shall be stored in suitably covered and enclosed containers within the Waste Transfer Building and shall be removed from the facility within forty eight hours of its arrival at the facility.

6.5.2 In dry weather, site roads and any other areas used by vehicles shall be sprayed with water as and when required to minimise airborne dust nuisance.

6.5.3 In addition to the requirements of Condition 3.15 and prior to the commencement of the waste activities at the facility, the licensee shall install and provide adequate measures for the control of odours and dust emissions, including fugitive dust emissions, from the facility. Such measures shall at a minimum include the following:

6.5.3.1 The doors of the waste transfer building shall be kept closed where possible. The licensee shall, to the satisfaction of the Agency, provide and maintain heavy duty plastic sheeting along the top of the door openings which extends down as far as possible that avoids damage by vehicle movements.

6.5.3.2 Installation of an odour management system in all other areas of the facility not covered under Condition 3.15; and

6.5.3.3 Provision of 100% duty capacity and 50% stand by capacity, back ups and spares must be provided for the air handling, ventilation and abatement plant.

REASON: *To provide for the control of nuisances*

CONDITION 7 MONITORING

7.1 The licensee shall carry out such monitoring and at such locations and frequencies as set out in *Schedule D: Monitoring*, of this licence and as specified in this licence. Unless otherwise specified by this licence, all environmental monitoring shall commence no later than two months after the date of grant of this licence.

7.2 The licensee shall amend the frequency, locations, methods and scope of monitoring as required by this licence only upon the written instruction of the Agency and shall provide such information concerning such amendments as may be requested in writing by the Agency. Such alterations shall be carried out within any timescale nominated by the Agency.

7.3 Monitoring and analysis equipment shall be operated and maintained in accordance with the manufacturers' instructions (if any) so that all monitoring results accurately reflect any emission, discharge or environmental parameter.

7.4 The licensee shall provide safe and permanent access to all on-site sampling and monitoring points and to off-site points as required by the Agency.

7.5 The licensee shall maintain all sampling and monitoring points, and clearly label and name all sampling and monitoring locations, so that they may be used for representative sampling and monitoring.

7.6 The licensee shall install on all emission points such sampling points or equipment, including any data-logging or other electronic communication equipment, as may be required by the Agency. All such equipment shall be consistent with the safe operation of all sampling and monitoring systems.

7.7 All automatic monitors and samplers shall be functioning at all times (except during maintenance and calibration) when the activity is being carried on, unless alternative sampling or monitoring has been agreed, in writing, by the Agency for a limited period. In the event of the malfunction of any continuous monitor, the licensee shall contact the Agency as soon as practicable, and alternative sampling and monitoring facilities shall be put in place. Prior written agreement for the use of alternative equipment, other than in emergency situations, shall be obtained from the Agency.

7.8 Groundwater Monitoring

7.8.1 The licensee shall monitor and record the volume of groundwater being used at the facility on a daily basis.

7.9 Archaeological Assessment

7.9.1 Prior to the development of any undisturbed area, the advice of The Development Applications Section of The Department of the Environment, Heritage and Local Government, (formerly Dúchas) shall be sought. On completion of such development a report of the results of any archaeological monitoring shall be submitted to The Development Applications Section and to the Agency.

7.10 Nuisance Monitoring

7.10.1 The licensee shall, on a daily basis, inspect the facility and its immediate surrounds for nuisances caused by litter, vermin, birds, flies, mud, dust and odours.

7.10.2 The licensee shall on a daily basis inspect the odour and dust control systems in the biowaste treatment building and the waste recovery/transfer building.

7.11 Meteorological Monitoring

7.11.1 The licensee shall provide suitable infrastructure at the facility for the monitoring of wind speed, wind direction and rainfall on a daily basis.

7.12 Compost Quality

7.12.1 Compost quality monitoring shall be undertaken as set out in *Schedule F: Standards for Compost Quality,* of this licence.

7.13 Data Management System

7.13.1 The licensee shall, prior to the commencement of waste activities, develop and establish a Data Management System for collation, archiving, assessing and

graphically presenting the environmental monitoring data generated as a result of this licence.

REASON: *To ensure compliance with the conditions of this licence by provision of a satisfactory system of monitoring of emissions.*

CONDITION 8 CONTINGENCY ARRANGEMENTS

8.1 In the event of an incident the licensee shall immediately:

a) identify the date, time and place of the incident;

b) carry out an immediate investigation to identify the nature, source and cause of the incident and any emission arising therefrom;

c) isolate the source of any such emission;

d) evaluate the environmental pollution, if any, caused by the incident;

e) identify and execute measures to minimise the emissions/malfunction and the effects thereof;

f) provide a proposal to the Agency for its agreement within one month of the incident occurring to:

i) identify and put in place measures to avoid reoccurrence of the incident; and

ii) identify and put in place any other appropriate remedial action.

8.2 The licensee shall, prior to commencement of waste activities at the facility, submit a written Emergency Response Procedure (ERP) to the Agency for its agreement. The ERP shall address any emergency situations which may originate on the facility and shall include provision for minimising the effects of any emergency on the environment. This shall include a risk assessment to determine the requirements at the facility for fire fighting and fire water retention facilities. The Fire Authority shall be consulted by the licensee during this assessment.

8.3 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage at the facility. Once used the absorbent material shall be disposed of at an appropriate facility.

8.4 Emergencies

8.4. 1. In the event of a complete breakdown of equipment or any other occurrence which results in the closure of the transfer station building, any waste arriving at or already collected at the facility shall be transferred directly to appropriate landfill sites or any other appropriate facility until such time as the transfer station building is returned to a fully operational status. Such a breakdown event will be treated as an emergency and rectified as soon as possible.

8.4. 2. All significant spillages occurring at the facility shall be treated as an emergency and immediately cleaned up and dealt with so as to alleviate their effects.

8.4. 3. No waste shall be burnt within the boundaries of the facility. A fire at the facility shall be treated as an emergency and immediate action shall be taken to extinguish it and notify the appropriate authorities.

CONDITION 9 RECORDS

9.1 The licensee shall keep the following documents at the facility office.

a) the current waste licence relating to the facility;

b) the current EMS for the facility;

c) the previous year's AER for the facility; and

d) all written procedures produced by the licensee which relate to the licensed activities.

9.2 The licensee shall maintain a written record for each load of waste arriving at and departing from the facility. The licensee shall record the following:

a) the date;

b) the name of the carrier (including if appropriate, the waste collection permit details);

c) the vehicle registration number;

d) the name of the producer(s)/collector(s) of the waste as appropriate;

e) the name of the waste facility (if appropriate) from which the load originated including the waste licence or waste permit register number;

f) a description of the waste including the associated EWC codes;

g) the quantity of the waste, recorded in tonnes;

h) the name of the person checking the load;

i) where loads or wastes are removed or rejected, details of the date of occurrence, the types of waste and the facility to which they were removed (including the waste licence/permit and/or waste collection permit); and

j) where applicable a consignment note number (including transfrontier shipment notification and movement/tracking form numbers, as appropriate).

9.3 Written Records

The following written records shall be maintained by the licensee:

a) the types and quantities of waste recovered at the facility each year. These records shall include the relevant EWC Codes;

b) all training undertaken by facility staff;

c) results from all integrity tests of bunds and other structures and any maintenance or remedial work arising from them;

d) details of all nuisance inspections; and

e) the names and qualifications of all persons who carry out all sampling and monitoring as required by this licence and who carry out the interpretation of the results of such sampling and monitoring.

9.4 The licensee shall maintain a written record of all complaints relating to the operation of the activity. Each such record shall give details of the following:

a) date and time of the complaint;

b) the name of the complainant;

c) details of the nature of the complaint;

d) actions taken on foot of the complaint and the results of such actions; and,

e) the response made to each complainant.

9.5 A written record shall be kept of each consignment of wastewater removed from the facility. The record shall include the following:

a) the name of the carrier;

b) the date and time of removal of wastewater from the facility;

c) the volume of wastewater, in cubic metres, removed from the facility on each occasion;

d) the name and address of the Waste Water Treatment Plant to which the wastewater was transported; and

e) any incidents or spillages of wastewater during its removal or transportation.

9.6 A written record shall be kept of all inspections of the on-site odour and dust control systems located in the biowaste treatment building and the waste recovery/transfer building.

9.7 A written record shall be kept at the facility of the programme for the control and eradication of vermin and fly infestations at the facility. These records shall include as a minimum the following:

a) the date and time during which spraying of insecticide is carried out;

b) contractor details;

c) contractor logs and site inspection reports;

d) details of the rodenticide(s) and insecticide(s) used;

e) operator training details;

f) details of any infestations;

g) mode, frequency, location and quantity of application; and,

h) measures to contain sprays within the facility boundary.

REASON: *To provide for the keeping of proper records of the operation of the facility.*

CONDITION 10 REPORTS AND NOTIFICATIONS

10.1 Unless otherwise agreed by the Agency, all reports and notifications submitted to the Agency shall:

(a) be sent to the Agency's headquarters;

(b) comprise one original and three copies unless additional copies are required;

(c) be formatted in accordance with any written instruction or guidance issued by the Agency;

(d) include whatever information as is specified in writing by the Agency;

(e) be identified by a unique code, indicate any modification or amendment, and be correctly dated to reflect any such modification or amendment;

(f) be submitted in accordance to the relevant reporting frequencies specified by this licence, such as in *Schedule E: Recording and Report to the Agency*, of this licence;

(g) be accompanied by a written interpretation setting out their significance in the case of all monitoring data; and

(h) be transferred electronically to the Agency's computer system if required by the Agency.

10.2 In the event of an incident occurring on the facility, the licensee shall:

a) notify the Agency as soon as practicable and in any case not later than 10.00 am the following working day after the occurrence of any incident;

b) submit a written record of the incident, including all aspects described in Condition 9.1(a-e), to the Agency as soon as practicable and in any case within five working days after the occurrence of any incident;

c) in the event of any incident which relates to discharges to surface/sewer water, notify the Eastern Regional Fisheries Board as soon as practicable and in any case not later than 10:00am on the following working day after such an incident; and

d) Should any further actions be taken as a result of an incident occurring, the licensee shall forward a written report of those actions to the Agency as soon as practicable and no later than ten days after the initiation of those actions.

10.3 Odour

10.3.1 Prior to the acceptance of biowaste for composting/treatment at the facility the licensee shall submit a report to the Agency for its agreement on the commissioning and operation of the scrubbers/biofilter on a phased basis in order to ensure adequate odour control at the facility.

10.3.2 Following the operation of the biowaste treatment facility for a period of not less than nine months the licensee shall complete an odour impact assessment that shall include the following:

i) Actual odour monitoring (a) of all significant emissions from the biowaste treatment facility (b) at a number of locations along the facility boundary and (c) at nearby sensitive locations to be agreed by the Agency. Prior to carrying out this monitoring, the licensee shall submit the odour sampling programme for agreement by the Agency.

ii) An assessment of any complaints that may have been received during the operation of the facility that may indicate odour emissions from the facility may have caused a nuisance.

iii) Odour impact modelling using actual data which has been obtained at the facility. Such modelling shall be carried out to reflect the tonnages being processed at the time of the monitoring and also for the following annual tonnages: 25,000 tonnes, 37,500 tonnes and 50,000 tonnes.

10.3.3 Based on the results and findings of the odour impact assessment completed as per Condition 10.3.2 the licensee shall submit proposals and recommendations for the potential expansion of the biowaste treatment facility to the Agency for its agreement. This shall include the need to provide proposals for additional odour abatement where necessary.

10.3.4 The licensee shall implement the recommendations of the odour impact assessment within a timeframe agreed in advance by the Agency.

10.4 Within six months of the date of grant of this licence the licensee shall submit a report to the Agency outlining how they intend to ensure that composting activities at the facility shall meet the requirements of the Animal By-Products Regulation.

10.5 Waste Recovery Reports

10.5.1 Within three months of the date of commencement of waste activities at the facility, a report examining waste recovery options shall be submitted to the Agency for its agreement. This report shall address methods to contribute to the achievement of the recovery targets stated in national and European Union waste policies and shall include the following:

a) proposals for the contribution of the facility to the achievement of targets for the reduction of biodegradable waste to landfill as specified in the Landfill Directive;

b) the separation of recyclable materials from the waste;

c) the recovery of Construction and Demolition Waste;

d) the recovery of metal waste and white goods including written procedures for the de-gassing of CFC's from refrigerators;

e) the recovery of commercial waste, including cardboard; and

f) composting of biodegradable or green waste at the facility having regard to good practice and sustainability.

10.6 Restoration and Aftercare

10.6.1 A proposal for a Decommissioning and Aftercare Plan for the facility shall be submitted to the Agency within twelve months of the date of grant of this licence. The licensee shall update this plan when required by the Agency.

10.7 Vermin and Pests

10.7.1 Prior to the commencement of waste activities, the licensee shall submit to the Agency for its agreement a proposal for the control and eradication of vermin and pests at the facility. This proposal should include as a minimum, operator training, details on the rodenticide(s) and insecticide(s) to be used, mode and frequency of application and measures to contain sprays within the facility boundary.

10.8 Monitoring Locations

10.8.1 Prior to the commencement of waste activities, the licensee shall submit to the Agency an appropriately scaled drawing(s) showing all the monitoring locations that are stipulated in this licence. The drawing(s) shall include the reference code of each monitoring point.

10.9 Annual Environmental Report

10.9.1 The licensee shall submit to the Agency for its agreement, within thirteen months from the date of grant of this licence, and one month after the end of each calendar year thereafter, an Annual Environmental Report (AER).

10.9.2 The AER shall include as a minimum the information specified in *Schedule G: Content of Annual Environmental Report*, of this licence and shall be prepared in accordance with any relevant written guidance issued by the Agency.

REASON: *To provide for proper reporting and notification of the Agency.*

CONDITION 11 CHARGES AND FINANCIAL PROVISIONS

11.1 Agency Charges

11.1.1 The licensee shall pay to the Agency an annual contribution of €17,458 or such sum as the Agency from time to time determines, towards the cost of monitoring the activity or otherwise in performing any functions in relation to the activity, as the Agency considers necessary for the performance of its functions under the Waste Management Act, 1996. The licensee shall in 2005 and subsequent years, not later than January 31 of each year, pay to the Agency this amount updated in accordance with changes in the Public Sector Average Earnings Index from the date of the licence to the renewal date. The updated amount shall be notified to the licensee by the Agency. For 2004, the licensee shall pay a pro rata amount from the date of this licence to 31st December. This amount shall be paid to the Agency within one month of the date of grant of this licence.

11.1.2 In the event that the frequency or extent of monitoring or other functions carried out by the Agency needs to be increased the licensee shall contribute such sums as determined by the Agency to defraying its costs in regard to items not covered by the said annual contribution.

11.2 Financial Provision for Closure, Restoration and Aftercare

11.2.1 Prior to the acceptance of any waste at the facility, the licensee shall arrange for a comprehensive and fully costed Environmental Liabilities Risk Assessment of the facility to be carried out. The Environmental Liabilities risk assessment shall have particular regard to any accidents, emergencies, or other incidents, which might occur at the facility and their effect on the environment and shall include the cost of making adequate Financial Provision. The financial provision shall include the costs entered into or incurred in the carrying on of the activities to which this licence relates or will relate including the decommissioning and closure of the facility.

11.2.2 Within three months of agreement of the requirements of Condition 11.2.1, the licensee shall establish and maintain a fund or provide a written guarantee for the costs determined under Condition 11.2.1. The type of fund established and the means of its release/recovery shall be agreed by the Agency prior to its establishment.

11.2.3 The licensee shall within two weeks of purchase, renewal or revision of the financial provision required under Condition 11.2.2, forward to the Agency written proof of such indemnity.

11.2.4 The amount of financial provision, held under Condition 11.2.2 shall be reviewed and revised as necessary, but at least annually. Any proposal for such a revision shall be submitted to the Agency for its agreement.

11.2.5 Unless otherwise agreed any revision to the fund shall be computed using the following formula:

$$Cost = (ECOST \times WPI) + CiCC$$

Where:

Cost = Revised restoration and aftercare cost

ECOST = Existing restoration and aftercare cost

WPI = Appropriate Wholesale Price Index [Capital Goods, Building & Construction (i.e. Materials & Wages) Index], as published by the Central Statistics Office, for the year since last closure calculation/revision.

CiCC = Change in compliance costs as a result of change in site conditions, changes in law, regulations, regulatory authority charges, or other significant changes.

REASON: *To provide for adequate financing for monitoring and financial provisions for measures to protect the environment.*

SCHEDULE A : Waste Acceptance

A.1 Waste Acceptance

Table A.1 Waste Categories and Quantities

Waste Type	Phase I[Note 3]	Phase II[Note 3]
Municipal Waste [Note 1]	65,000	100,000
Commercial & Industrial Waste	70,000	90,000
Construction & Demolition Waste	24,000	30,000
TOTAL [Note2]	159,000	220,000

Note 1: Subject to Condition 3.15.1(i)

Note 2: The amount of each waste stream may be varied providing the total quantity is not exceeded and subject to agreement by the Agency.

Note 3: Phase I follows the provision of 2,960m^2 Materials Recovery Facility and Phase II follows the completion of 1,428m^2 extension to this building.

Waste Type	Phase I[Note 1]	Phase II[Note 2]	Phase III[Note 3]
Biowaste	12,500	25,000	50,000

Note 1: Phase I is defined as the first year of operation following the provision of the 4,405m^2 biowaste treatment building.

Note 2: Phase II is defined as the subsequent years of operation of 4,405m^2 biowaste treatment building.

Note 3: Phase III follows the completion of 1,841m^2 extension to biowaste treatment building. Subject to Condition 10.3

SCHEDULE B : Specified Engineering Works

Specified Engineering Works
Installation of silt traps and oil interceptors and site drainage system.
Installation of dust/odour control/abatement system.
Installation of waste buildings and waste handling, processing, recycling/recovery infrastructure and installation of increased waste processing capacity.
Any other works notified in writing by the Agency.

SCHEDULE C : Emission Limits

C.1 Noise Emissions: (Measured at the monitoring points indicated in *Table D.1.1*).

Day dB(A) L_{Aeq}(30 minutes)	Night dB(A) L_{Aeq}(30 minutes)
55	45

C.2 Dust Deposition Limits: (Measured at the monitoring points indicated in *Table D.1.1*).

Level (mg/m^2 /day)[Note 1]
350

Note 1: 30 day composite sample with the results expressed as mg/m^2 /day.

C.3 Emission Limits for Wastewater Emissions to Sewer

Emission Point Reference No.: SE-1

Maximum volume to be emitted in any one day: 10 m^3

Parameter	Emission Limit Value		
	Grab Sample (mg/l)	Daily Mean Concentration (mg/l)	Daily Mean Loading (kg/day)
BOD	6,000	5,000	50
COD	12,000	10,000	100
Ammoniacal Nitrogen	100	70	0.7
Suspended solids	2,500	2,000	20
Sulphate as (SO_4)	1,000	1,000	10
PH	6-10	6-10	-
Temperature	42°C	42°C	-
Detergents	100	100	1.0
Fats, Oils & Greases	100	100	1.0
Phosphates (as P)	100	100	1.0

C.4 Emission Limit Values from Biowaste Treatment Building

Emission Limit Values from Biowaste Treatment Building

Emission point reference No. BW-1 & BW-2 (emission point(s) from biowaste treatment building)

Parameter	Emission Limit Value
Total Particulates	50 mg/m^3
Ammonia	50 ppm (v/v)
Amines	5 ppm (v/v)
Hydrogen sulphide	5 ppm (v/v)
Mercaptans	5 ppm (v/v)

SCHEDULE D : Monitoring

Monitoring to be carried out as specified below.

D.1 Monitoring Locations

Monitoring locations shall be those as set out in Table D.1.1 and Drawing J10 of the application.

Table D.1.1 Noise, surface water and wastewater Monitoring Locations

NOISE	SURFACE WATER	WASTEWATER	Dust Deposition, PM10 and Micro Organisms [Note 1]
STATIONS	STATIONS	STATIONS	STATIONS
N1 N2 N3 N4[Note 2] N5[Note 2]	SW-1 SW-2	SE-1	DS01 DS02 DS03 DS04

Note 1: Bioaerosol monitoring to be carried out at one upwind and two downwind locations chosen from DS01, DS02, DS03 and DS04
Note 2: Two nearest noise sensitive receptors to be agreed in advance by the Agency.

D.2 Noise

Table D.2.1 Noise Monitoring Frequency and Technique

Parameter	Monitoring Frequency	Analysis Method/Technique
$L(A)_{EQ}$ [30 minutes]	Annual	Standard [Note 1]
$L(A)_{10}$ [30 minutes]	Annual	Standard [Note 1]
$L(A)_{90}$ [30 minutes]	Annual	Standard [Note 1]
Frequency Analysis(1/3 Octave band analysis)	Annual	Standard [Note 1]

Note 1: "International Standards Organisation. ISO 1996. Acoustics - Description and Measurement of Environmental noise. Parts 1, 2 and 3."

D.3 Surface Water Emissions

Table D.3.1 Surface water Monitoring Frequency and Techniques

Parameter	Monitoring Frequency	Analysis Method/Technique
pH	Quarterly	Electrometry
Temperature	Quarterly	Temperature Probe
Biological Oxygen Demand	Quarterly	Standard Methods[Note 1]
Chemical Oxygen Demand	Quarterly	Standard Methods[Note 1]
Suspended Solids	Quarterly	Standard Methods[Note 1]
Electrical Conductivity	Quarterly	Electrometry
Ammoniacal nitrogen	Quartlerly	Standard Methods[Note 1]
Mineral Oils	Quarterly	Standard Methods[Note 1]
Fats, Oils, Grease	Quarterly	Standard Methods[Note 1]

Note 1: "Standards Methods for the Examination of Water and Wastewater", (prepared and published jointly by A.P.H.A., A.W.W.A & W.E.F) 20th Ed., American Public Health Association, 1015 Fifteenth Street, Washington DC 20005, USA.

D.4 Wastewater Emissions

Table D.4.1 Wastewater Monitoring Frequency and Techniques

Parameter	Monitoring Frequency	Analysis Method/Technique
PH	Bi-monthly	Electrometry
Biological Oxygen Demand	Bi-monthly	Standard Methods[Note 1]
Chemical Oxygen Demand	Bi-monthly	Standard Methods[Note 1]
Suspended Solids	Bi-monthly	Standard Methods[Note 1]
Fats, Oils, Grease	Bi-monthly	Standard Methods[Note 1]
Temperature	Bi-monthly	Temperature probe
Sulphates (as SO_4)	Bi-monthly	Standard Methods[Note 1]
Ammoniacal nitrogen	Bi-monthly	Standard Methods[Note 1]
Fats, Oils and Greases	Bi-monthly	Standard Methods[Note 1]
Detergents	Bi-monthly	Standard Methods[Note 1]
Phosphates as P	Bi-monthly	Standard Methods[Note 1]

Note 1: "Standards Methods for the Examination of Water and Wastewater", (prepared and published jointly by A.P.H.A., A.W.W.A & W.E.F) 20th Ed., American Public Health Association, 1015 Fifteenth Street, Washington DC 20005, USA.

D.5 Emissions from Biowaste Treatment Building Unit & Air Quality Monitoring

Table D.5.1 Dust, Odour and Micro-organisms Monitoring Frequency and Technique

Parameter [Note 1]	Monitoring Frequency	Analysis Method/Technique
Dust ($mg/m^2/day$)	Three times a year [Note 2]	Standard Method [Note 3]
Odour	Bi-annually	See Note 4
Airborne Microbes	Annually	Grab sample [Note 5]

Note 1: Meteorological monitoring to be carried out concurrently with all above monitoring.
Note 2: Twice during the period May to September, or as otherwise specified in writing by the Agency.
Note 3: Standard method VDI2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Engineering Institute).
Note 4: Odour measurements shall be by olfactometric measurement and analysis for mercaptans, hydrogen sulphide, ammonia, amines.
Note 5: Enumeration of colonies to be carried out as described in 'Standardised Protocol for the Sampling and Enumeration of Airborn Micro-organisms at composting Facilities' the Composting Association 1999.

Table D.5.2 Emissions to Atmosphere: Abatement/Treatment Control at Biodegradable Waste Treatment Building

Emission Points Reference No.: BW-1 & BW-2 (emission points from the biowaste treatment building stacks located 16m above ground level).

Description of Treatment: Scrubber / Humidifier / Biofilter(s)

Unless agreed otherwise by the Agency, the Loading Rate shall not exceed 100 $m^3/hr/m^3$ of biofilter media and Monitoring and Backup Equipment at the biowaste treatment building shall be as set out below:

Control Parameter	Monitoring Required Note 4	Monitoring Equipment	Backup Equipment
Scrubber			
PH	Daily	pH probe	Spare probe
Biofilter			
Inlet Gas			
Differential Pressure Drop across the filter	Daily	Manometer	Spare manometer
Temperature	Daily	Temperature sensor	-
Inlet and Outlet Gas			
Ammonia	Monthly	Colorimetric Indicator Tubes Note 1	Spare tubes
Hydrogen sulphide	Monthly	Colorimetric Indicator Tubes Note 1	Spare tubes
Mercaptans	Monthly	Colorimetric Indicator Tubes Note 1	Spare tubes
Bed Media			
Condition Note 2	Daily	Visual Inspection	-
Moisture content	Quarterly	Standard laboratory method Note 1	-
PH	Quarterly	pH probe	-
Total viable counts	Bi-Annually	Standard laboratory method Note 1	-
General			
Sprinkler System	Check operation Daily	Visual Inspection	-
Fan	Check operation Daily	Visual Inspection	
Negative Pressure Note 3	Monthly	Air current tubes Note 1	Spare tubes

All measurements shall be made at peak bed loading.

Note 1: Or an equivalent method acceptable to the Agency.

Note 2: The biofilter shall be examined to ensure that no channelling is evident. Turning, restructuring and the addition of supplementary bed materials, or total bed replacement shall be carried out, as required, subject to bed performance.

Note 3: To be carried out on all buildings under negative pressure. A log shall be kept on - site with records of the date and time of analysis, building tested and weather on date of testing.

Note 4: Records shall be kept at the facility of all monitoring and visual checks.

SCHEDULE E : Recording and Reporting to the Agency

Report	Reporting Frequency Note1	Report Submission Date
Environmental Management System Updates	Annually	One month after the end of the year reported on.
Annual Environment Report (AER)	Annually	Thirteen months from the date of grant of licence and one month after the end of each calendar year thereafter.
Record of incidents	As they occur	Within five days of the incident.
Bund, tank and container integrity assessment	Prior to use and every three years thereafter	Six months from the date of grant of licence and one month after end of the three year period being reported on.
Specified Engineering Works reports	As they arise	Prior to the works commencing.
Monitoring of Surface Water Quality	Quarterly	Ten days after end of the quarter being reported on.
Monitoring of Wastewater	Bi-annually	Ten days after end of the period being reported on.
Dust Monitoring	Three times a year	Ten days after the period being reported on
Noise Monitoring	Bi- annually	Ten days after end of the period being reported on..
Any other monitoring	As they occur	Within ten days of obtaining results.

Note 1: Unless altered at the request of the Agency

SCHEDULE F : Standards for Compost Quality

The following criteria are deemed a quality standard for the use of compost as a soil improver and should not be deemed as criteria for fertiliser. In addition N, P, K, NH_4-N, NO_3-N, pH and dry matter content should also be measured.

Compost shall be deemed unsatisfactory if more than 25% of samples fail the criteria below. No sample shall exceed 1.2 times the quality limit values set.

1. Maturity

The state of the curing pile must be conducive to aerobic biological activity.

Compost shall be deemed to be mature if it meets two of the following groups of requirements:

1. Respiration activity after four days AT_4 is $\leq$10mg O_2/g dry matter or Dynamic Respiration Index is $\leq$1,000mg O_2/kg VS/h.
2. Germination of cress (*Lepidium sativum*) seeds and of radish (*Raphanus sativus*) seeds in compost must be greater than 90 percent of the germination rate of the control sample, and the growth rate of plants grown in a mixture of compost and soil must not differ more than 50 percent in comparison with the control sample.
3. Compost must be cured for at least 21 days *and* Compost will not reheat upon standing to greater than 20°C above ambient temperature.
4. If no other determination of maturity is made, the compost must be cured for a six month period. In addition, offensive odours from the compost shall be minimal for the compost to be deemed mature.
5. Or other maturity tests as may be agreed with the Agency.

2. Trace Elements[Note 1&2]

Parameter (mg/kg, dry mass)	**Compost Quality Standards [Note 3]**		**Stabilised Biowaste**
	Class I	Class II	
Cadmium (Cd)	0.7	1.5	5
Chromium (Cr)	100	150	600
Copper (Cu)	100	150	600
Mercury (Hg)	0.5	1	5
Nickel (Ni)	50	75	150
Lead (Pb)	100	150	500
Zinc (Zn)	200	400	1500
Polychlorinated Biphenyls (PCBs)	-	-	0.4
Polynuclear Aromatic Hydrocarbons	-	-	3
Impurities>2mm[Note 4]	<0.5%	<0.5%	<3%
Gravel & Stones [Note 4]	<5%	<5%	-

Note 1: These limits apply to the compost just after the composting phase and prior to mixing with any other materials.
Note 2: The above alone should not be taken as an indication of suitability for addition to soil as the cumulative metal additions to soil should be first calculated.
Note 3: Normalised to 30% organic matter content.
Note 4: Compost must not contain any sharp foreign matter measuring over a 2mm dimension that may cause damage or injury to humans, animals and plants during or resulting from its intended use.

3. Pathogens

Pathogenic organism content must not exceed the following limits:

Salmonella sp.	**Absent in 50g**	**n=5**
Faecal Coliforms	**≤ 1000 Most probable number (MPN) in 1g**	**n=5**

Where n=number of samples to be tested.

4. Monitoring

The licensee shall submit to the Agency for its agreement, prior to commencement of compost operations, details of methods of analyses and methods of sampling.
The analyses shall be carried out on a monthly basis

SCHEDULE G : Content of the Annual Environmental Report

Annual Environmental Report Content
Reporting Period.
Waste activities carried out at the facility.
Quantity and Composition of waste recovered, received and disposed of during the reporting period and each previous year (relevant EWC codes to be used).
Summary report on emissions.
Summary of results and interpretations of environmental monitoring, including a location plan of all monitoring locations.
Resource and energy consumption summary.
Development / Infrastructural works in place and planned, to process waste quantities projected for the following year (including plant operating capacity, provision of adequate standby capacity and provision of contingency, backup and spares in the case of breakdown).
Schedule of Environmental Objectives and Targets for the forthcoming year.
Report on the progress towards achievement of the Environmental Objectives and Targets contained in previous year's report.
Full title and a written summary of any procedures developed by the licensee in the year which relates to the facility operation.
Tank, drum, pipeline and bund testing and inspection report.
Reported Incidents and Complaints summaries.
Review of Nuisance Controls.
Reports on financial provision made under this licence, management and staffing structure of the facility, and a programme for public information.
Volume of rainwater reused at the facility.
Volume of wastewater produced and volume of wastewater transported/discharged off-site.
Any other items specified by the Agency.

Note 1: Content to be revised subject to the agreement of the Agency after cessation of waste acceptance at the facility.

Sealed by the seal of the Agency on this 15th day of April 2004

PRESENT when the seal of the Agency
was affixed hereto:

_____

Padraic Larkin, Director/Authorised Person

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Headquarters
P.O. Box 3000
Johnstown Castle Estate
County Wexford
Ireland

TECHNICAL AMENDMENT B
TO
INDUSTRIAL EMISSIONS LICENCE

Licence Register Number:	W0183-01
Company Registration Number:	527552
Licensee:	Starrus Eco Holdings Limited
Location of Installation:	Millenium Business Park, Grange, Ballycoolin, Dublin 11.

Reasons for the Decision

The Environmental Protection Agency is satisfied, on the basis of the information available, that subject to compliance with the conditions of licence Reg. No. W0183-01 granted on the 15th April 2004, and amended on 24th February 2006 and 16th December 2015, as well as any amendments noted herein, any emissions from the activity will comply with and not contravene any of the requirements of Section 83(5) of the Environmental Protection Agency Act 1992 as amended.

A screening for Appropriate Assessment was undertaken to assess, in view of best scientific knowledge and the conservation objectives of the site, if the activities, individually or in combination with other plans or projects are likely to have a significant effect on any European Site.

The activities are not directly connected with or necessary to the management of any European Site and the Agency considered, for the reasons set out below, that it can be excluded, on the basis of objective information, that the activities, individually or in combination with other plans or projects, will have a significant effect on any European Site and accordingly determined that an Appropriate Assessment of the activities was not required.

This determination is based on the fact that the technical amendment is adding more stringent conditions to the licence resulting in greater licence controls and thus further ensuring that the activity will not have a significant effect on any European Site.

Technical Amendment

In pursuance of the powers conferred on it by Section 96(1)(c) of the Environmental Protection Agency Act 1992 as amended, the Agency amends the licence granted to Starrus Eco Holdings Limited, Unit 6, Ballyogan Business Park, Ballyogan Road, Dublin 18, for an installation located at Millennium Business Park, Grange, Ballycoolin, Dublin 11.

Henceforth, the licence shall be read in conjunction with a Section 76A(11) Amendment issued on 16th December 2015, Amendment A issued on 24th February 2006 and the amendments set out below.

This technical amendment is limited to the following Interpretation and Conditions of Licence Reg. No. W0183-01:

Amendments

Amend the Interpretation as follows:

To be inserted into the Interpretation of the existing licence.

LoW List of Waste

Storage Includes holding of waste

New Conditions or Amended Conditions

Insert New Condition 4.11, to read as follows:

Condition 4. Facility Operations

4.11 Waste Storage

4.11.1 Unless otherwise agreed by the Agency, the maximum quantity of waste stored at the installation at any one time shall be restricted by the Waste Storage Plan as required under Condition 4.12.

Insert New Condition 4.12, to read as follows:

4.12 Waste Storage Plan

4.12.1 The licensee shall, within twelve months of the date of this amendment, establish, maintain and implement a Waste Storage Plan for all waste stored at the installation.

4.12.2 The Waste Storage Plan shall be adequate to ensure compliance with all conditions of this licence.

4.12.3 The Waste Storage Plan shall be to the satisfaction of the Agency at all times.

4.12.4 The Waste Storage Plan shall incorporate:

- the recommendations of the Fire Risk Assessment required by Condition 8.6 of this licence;
- a limit on the total quantity of waste to be stored at the installation at any one time;
- maximum stockpile sizes in designated storage areas including maximum volume, height, length, width and area, and minimum separation distances;
- a limit on the maximum storage or holding period for each type of waste in designated storage areas;
- limitations, as may be necessary, on waste storage arrangements to be used to prevent odour nuisance;
- a drawing or plan of the location of each waste type and the means of storage for each waste type (e.g. as loose waste, baled, in sealed containers);
- details of the drainage system super-imposed on the above drawing or plan; and
- a designated fire quarantine area that is:
  - available at all times to aid separation and management of wastes during a fire incident; and
  - is different to the quarantine area set aside for unacceptable wastes.

4.12.5 Waste storage practices at the installation shall comply with the Waste Storage Plan at all times.

4.12.6 Where bales of waste are stored, the licensee shall maintain and implement a bale identity and tracking system. Each bale shall be labelled with:

- its date of production;
- its content and LoW code; and
- the name of the facility where the bale was produced and its licence register number.

4.12.7 Waste accepted or generated at the installation shall be stored only in designated areas that have been identified in the Waste Storage Plan.

4.12.8 All designated areas for storage of waste shall be:

- clearly labelled;
- appropriately segregated; and
- visibly or physically delineated by walls, dividers, painted lines or marks on the ground or other methods acceptable to the Agency.

4.12.9 The Emergency Response Procedure (as required under Condition 8.2) shall include an up-to-date copy of the Waste Storage Plan.

Insert New Condition 8.6, to read as follows:

Condition 8. Contingency Arrangements

8.6 The licensee shall arrange, within six months of the date of this amendment and every three years thereafter or as directed by the Agency, for the completion, by an independent and appropriately qualified consultant, of a fire risk assessment for the facility. The assessment shall examine all relevant factors on site that impinge on fire risk and prevention. The assessment shall have regard to the EPA Guidance Note: *Fire Safety at Non-Hazardous Waste Transfer Stations, 2013* and the EPA *Guidance on Fire Risk Assessment for Non-Hazardous Waste Facilities, 2016*. Any recommendations in the fire risk assessment report shall be implemented by the licensee within twelve months of the date of this amendment.

Reason: *To provide for the protection of the environment.*

This technical amendment shall be cited as Amendment B, to the licence.

Sealed by the Seal of the Agency on this the 29th day of June, 2016

PRESENT when the seal of the Agency was affixed hereto

Patrick Geoghegan

Patrick Geoghegan, Authorised Person

Headquarters
P.O. Box 3000
Johnstown Castle Estate
County Wexford
Ireland

TECHNICAL AMENDMENT C
TO
INDUSTRIAL EMISSIONS LICENCE

Licence Register Number:	W0183-01
Company Registration Number:	527552
Licensee:	Starrus Eco Holdings Limited
Location of Installation:	Millennium Business Park Grange Ballycoolin Dublin 11

Reasons for the Decision

The Environmental Protection Agency is satisfied, on the basis of the information available, that subject to compliance with the conditions of Licence Reg. No. W0183-01 granted on 15th April 2004, and amended on 24th February 2006, 16th December 2015 and 29th June 2016 as well as any amendments noted herein, any emissions from the activity will comply with and not contravene any of the requirements of Section 83(5) of the Environmental Protection Agency Act 1992 as amended.

A screening for Appropriate Assessment was undertaken to assess, in view of best scientific knowledge and the conservation objectives of the site, if the activity, individually or in combination with other plans or projects is likely to have a significant effect on any European Site. In this context, particular attention was paid to the European Sites at South Dublin Bay and River Tolka Estuary SPA (Site Code: 004024), Malahide Estuary (Broadmeadown/Swords) SPA (Site Code: 004025), North Bull Island SPA (Site Code: 004006), Baldoyle Bay SPA (Site Code: 004016), Rogerstown Estuary SPA (Site Code: 004015), River Water Valley/Carton SAC (Site Code: 001398), Malahide Estuary SAC (Site Code: 000205), South Dublin Bay SAC (Site Code: 000210), North Dublin Bay SAC (Site Code: 000206), Baldoyle Bay SAC (Site Code: 000199) and Rogerstown Estuary SAC (Site Code: 000208).

The activity is not directly connected with or necessary to the management of any European Site and the Agency considered, for the reasons set out below, that it can be excluded, on the basis of objective information, that the activity, individually or in combination with other plans or projects, will have a significant effect on any European Site and accordingly determined that an Appropriate Assessment of the activity was not required. The reasons for this determination are as follows:

- The installation is not located within the above European Sites.
- There will be no emissions of environmental significance from the activity.
- The activity will not result in damage to, or loss of, species and habitats of this European Site.
- The technical amendment, as requested, will not change the nature of the consent.

Technical Amendment

In pursuance of the powers conferred on it by Section 96(1)(b) of the Environmental Protection Agency Act 1992 as amended, the Agency amends the licence, granted to Starrus Eco Holdings Limited, for an installation located at Millenium Business Park, Grange, Ballycoolin, Dublin 11.

Henceforth, the licence shall be read in conjunction with a Section 76A(11) Amendment issued on 16th December 2015, Amendment A issued on 24th February 2006, Amendment B issued on 29th June 2016 and the amendments set out below.

This technical amendment is limited to the following Conditions and Schedule of Licence Reg. No. W0183-01:

Amendments

Introduction

Amend the Introduction to the licence to read as follows:

This introduction is not part of the licence and does not purport to be a legal interpretation of the licence.

This licence is for the development of a non-hazardous waste recycling and transfer facility at a greenfield site in the Millennium Business Park, Grange, Ballycoolin, Dublin 11. Starrus Eco Holdings Limited will be permitted to accept non-hazardous municipal, industrial, commercial and construction and demolition wastes at the facility.

The maximum quantity of waste to be accepted at the facility is 270,000 tonnes per annum at the Waste Transfer and Recovery Buildings.

The licensee must manage and operate the facility to ensure that activities do not cause environmental pollution. The licensee is required to carry out regular environmental monitoring and submit all monitoring results, and a wide range of reports on the operation and management of the facility to the Agency.

The licence sets out in detail the conditions under which Starrus Eco Holdings Limited will operate and manage this facility.

Deleted Conditions

Amend by deleting the following Conditions of the licence:

3.15.4 Biowaste treatment facility

(i) Unless otherwise agreed in advance by the Agency, the licensee shall provide a biowaste treatment system as proposed in the waste licence application.

(ii) The biowaste treatment facility shall be constructed on a phased basis. The licensee shall not extend the biowaste treatment operations to accept more than 25,000 tonnes of biowaste per annum until the recommendations of the odour impact report have been implemented as required by Condition 10.3.

3

(iii) The composting unit shall as a minimum include/consist of the following:

(a) A fully enclosed building for the acceptance, inspection and treatment of all biowaste;

(b) Designated areas for the acceptance, temporary storage and pre-treatment of biodegradable waste, a fully aerated biowaste treatment area and designated areas for the storage of processed compost;

(c) A fully controllable system for the aeration of the biowaste/compost and a sprinkler system for the addition of moisture to the biowaste/compost as required;

(d) An odour abatement system which satisfies the following requirements;

- Installation and maintenance of integrity and negative pressure throughout the building to ensure no significant escape of odours or dust.
- Installation of an odour management system that shall include water scrubber(s) and suitably sized biofilter(s). All emissions from the biofilter(s) shall be discharged via a stack located 16m above ground level.
- Provision of 100% duty capacity and 50% stand by capacity, back ups and spares must be provided for the air handling, ventilation and abatement plant.
- Emissions from the biofilter shall not exceed those ELV's as set out in *Schedule C: Emission Limits,* of this licence.

4.3.2 The floor of the reception/pre-treatment area within the biowaste treatment building shall be cleared of all waste at the end of the working day.

4.3.4 All pre-treatment of biowaste and compost screening shall be carried out inside the biowaste treatment building.

4.3.6 Any biowaste accepted at the facility for composting (other than bulking agents, e.g. woodchip, cardboard) shall be processed and put into the aerated composting area within twenty four hours of its arrival at the facility, subject to review in the event of a nuisance.

4.3.7 The licensee shall ensure that the doors to the biowaste treatment building remain closed at all times other than to facilitate the delivery/removal of wastes from the building.

10.3 Odour

10.3.1 Prior to the acceptance of biowaste for composting/treatment at the facility the licensee shall submit a report to the Agency for its agreement on the commissioning and operation of the scrubbers/biofilter on a phased basis in order to ensure adequate odour control at the facility.

10.3.2 Following the operation of the biowaste treatment facility for a period of not less than nine months the licensee shall complete an odour impact assessment that shall include the following:

(i) Actual odour monitoring (a) of all significant emissions from the biowaste treatment facility (b) at a number of locations along the facility boundary and (c) at nearby sensitive locations to be agreed by the Agency. Prior to carrying out this monitoring, the licensee shall submit the odour sampling programme for agreement by the Agency.

(ii) An assessment of any complaints that may have been received during the operation of the facility that may indicate odour emissions from the facility may have caused a nuisance.

(iii) Odour impact modelling using actual data which has been obtained at the facility. Such modelling shall be carried out to reflect the tonnages being processed at the time of the monitoring and also for the following annual tonnages: 25,000 tonnes, 37,500 tonnes and 50,000 tonnes.

10.3.3 Based on the results and findings of the odour impact assessment completed as per Condition 10.3.2 the licensee shall submit proposals and recommendations for the potential expansion of the biowaste treatment facility to the Agency for its agreement. This shall include the need to provide proposals for additional odour abatement where necessary.

10.3.4 The licensee shall implement the recommendations of the odour impact assessmentwithin a timeframe agreed in advance by the Agency.

10.4 Within six months of the date of grant of this licence the licensee shall submit a report to the Agency outlining how they intend to ensure that composting activities at the facility shall meet the requirements of the Animal By-Products Regulation.

Amended Conditions

Amend Condition 3.13.4 of the licence to read as follows:

3.13.4 The licensee shall provide on-site storage tanks for the collection and temporary storage of roof water from Waste Recovery and Transfer Buildings respectively. This water shall be re-used in the process where possible.

Amend Condition 3.15 of the licence to read as follows:

3.15 Waste Acceptance and Handling Areas.

3.15.1 Municipal Waste Area within the Waste Recovery and Transfer Buildings

(i) Prior to the acceptance of municipal waste at the facility, the licensee shall provide a dedicated area for the acceptance and handling of such waste.

(ii) Prior to the acceptance of municipal waste at the facility the licensee shall provide a dedicated system for the control of odour emissions. The licensee shall include details of this odour control system as part of the AER. The licensee shall, at such time as the Agency considers necessary, undertake an assessment of the environmental performance of the odour control system. In the event that the assessment demonstrates that the odour control system is inadequate the licensee shall implement abatement measures, including air extraction and filtration, within a period specified by the Agency.

(iii) The municipal waste area shall be designed to allow for the inspection of all incoming waste loads when tipped.

3.15.2 Construction and Demolition Waste Area within the Waste Recovery and Transfer Buildings

(i) Prior to the acceptance of construction and demolition waste at the facility the licensee shall provide a dedicated area for the acceptance, handling and storage of such waste.

(ii) A localised dust suppression system shall be provided at the construction and demolition waste area.

(iii) Suitably sized waste storage bays and bays for the storage of recovered materials shall be provided.

3.15.3 Commercial and Industrial / Pre-Segregated Waste Acceptance Area within the Waste Recovery and Transfer Buildings

(i) The licensee shall provide an area of suitable size for the acceptance handling and processing of commercial and industrial wastes.

(ii) The licensee shall provide designated areas for the storage of baled materials prior to their removal off-site.

(iii) The licensee shall provide noise and dust control measures at any shredders and/or screens used for processing of commercial and industrial wastes at the facility.

Amend Condition 4.2.3 of the licence to read as follows:

4.2.3 Waste arriving at the facility shall be weighed, documented and directed to the Waste Recovery and Transfer Buildings. Each load of waste arriving at the Waste Recovery and Transfer Buildings shall be inspected upon tipping within these buildings. Only after such inspections shall the waste be processed for disposal or recovery.

Amend Condition 4.3.1 of the licence to read as follows:

4.3.1 The floor of the municipal waste area and areas used to off-load waste in the Waste Recovery and Transfer Buildings (other than the C&D area) shall be cleared of all waste at the end of the working day. Only non-putrescible waste may be stored overnight in the dedicated storage bays prior to recovery.

Amend Condition 6.5.1 of the licence to read as follows:

6.5.1 All waste for disposal stored overnight at the facility, shall be stored in suitably covered and enclosed containers within the Waste Recovery and Transfer Buildings and shall be removed from the facility within forty eight hours of its arrival at the facility.

Amend Condition 6.5.3.1 of the licence to read as follows:

6.5.3.1 The doors of the Waste Recovery and Transfer Buildings shall be kept closed where possible. The licensee shall, to the satisfaction of the Agency, provide and maintain heavy duty plastic sheeting along the top of the door openings which extends down as far as possible that avoids damage by vehicle movements.

Amend Condition 7.10.2 of the licence to read as follows:

7.10.2 The licensee shall on a daily basis inspect the odour and dust control systems in the Waste Recovery and Transfer Buildings.

Amend Condition 9.6 of the licence to read as follows:

9.6 A written record shall be kept of all inspections of the on-site odour and dust control systems located in the Waste Recovery and Transfer Buildings.

Deleted Schedules

Delete Schedule C.4 Emission Limit Values from Biowaste Treatment Building, of the licence.

C.4 Emission Limit Values from Biowaste Treatment Building

Emission Limit Values from Biowaste Treatment Building

Emission point reference No. BW-1 & BW-2 (emission point(s) from biowaste treatment building)

Parameter	Emission Limit Value
Total Particulates	50 mg/m^3
Ammonia	50 ppm (v/v)
Amines	5 ppm (v/v)
Hydrogen sulphide	5 ppm (v/v)
Mercaptans	5 ppm (v/v)

Delete Schedule D.5 Emissions from Biowaste Treatment Building Unit & Air Quality Monitoring, of the licence.

D.5 Emissions from Biowaste Treatment Building Unit & Air Quality Monitoring

Table D.5.1 Dust, Odour and Micro-organisms Monitoring Frequency and Technique

Parameter Note 1	Monitoring Frequency	Analysis Method/Technique
Dust (mg/m²/day)	Three times a year Note 2	Standard Method Note 3
Odour	Bi-annually	See Note 4
Airborne Microbes	Annually	Grab sample Note 5

Note 1: Meteorological monitoring to be carried out concurrently with all above monitoring.
Note 2: Twice during the period May to September, or as otherwise specified in writing by the Agency.
Note 3: Standard method VDI2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Engineering Institute).
Note 4: Odour measurements shall be by olfactometric measurement and analysis for mercaptans, hydrogen sulphide, ammonia, amines.
Note 5: Enumeration of colonies to be carried out as described in 'Standardised Protocol for the Sampling and Enumeration of Airborn Micro-organisms at composting Facilities' the Composting Association 1999.

Table D.5.2 Emissions to Atmosphere: Abatement/Treatment Control at Biodegradable Waste Treatment Building

Emission Points Reference No.: BW-1 & BW-2 (emission points from the biowaste treatment building stacks located 16m above ground level).

Description of Treatment: Scrubber / Humidifier / Biofilter(s)

Unless agreed otherwise by the Agency, the Loading Rate shall not exceed 100 $m^3/hr/m^3$ of biofilter media and Monitoring and Backup Equipment at the biowaste treatment building shall be as set out below:

Control Parameter	Monitoring Required Note 4	Monitoring Equipment	Backup Equipment
Scrubber			
PH	Daily	pH probe	Spare probe
Biofilter			
Inlet Gas			
Differential Pressure Drop across the filter	Daily	Manometer	Spare manometer
Temperature	Daily	Temperature sensor	-
Inlet and Outlet Gas			
Ammonia	Monthly	Colorimetric Indicator Tubes Note 1	Spare tubes
Hydrogen sulphide	Monthly	Colorimetric Indicator Tubes Note 1	Spare tubes
Mercaptans	Monthly	Colorimetric Indicator Tubes Note 1	Spare tubes
Bed Media			
Condition Note 2	Daily	Visual Inspection	-
Moisture content	Quarterly	Standard laboratory method Note 1	-
PH	Quarterly	pH probe	-
Total viable counts	Bi-Annually	Standard laboratory method Note 1	-

General			
Sprinkler System	Check operation Daily	Visual Inspection	-
Fan	Check operation Daily	Visual Inspection	
Negative Pressure [Note 3]	Monthly	Air current tubes [Note 1]	Spare tubes

All measurements shall be made at peak bed loading.

Note 1: Or an equivalent method acceptable to the Agency.

Note 2: The biofilter shall be examined to ensure that no channelling is evident. Turning, restructuring and the addition of supplementary bed materials, or total bed replacement shall be carried out, as required, subject to bed performance.

Note 3: To be carried out on all buildings under negative pressure. A log shall be kept on - site with records of the date and time of analysis, building tested and weather on date of testing.

Note 4: Records shall be kept at the facility of all monitoring and visual checks.

Delete Schedule F: Standards for Compost Quality, of the licence:

SCHEDULE F : Standards for Compost Quality

The following criteria are deemed a quality standard for the use of compost as a soil improver and should not be deemed as criteria for fertiliser. In addition N, P, K, NH_4-N, NO_3-N, pH and dry matter content should also be measured.

Compost shall be deemed unsatisfactory if more than 25% of samples fail the criteria below. No sample shall exceed 1.2 times the quality limit values set.

1. Maturity

The state of the curing pile must be conducive to aerobic biological activity.

Compost shall be deemed to be mature if it meets two of the following groups of requirements:

1. Respiration activity after four days AT_4 is ≤10mg O_2/g dry matter or Dynamic Respiration Index is ≤1,000mg O_2/kg VS/h.
2. Germination of cress (*Lepidium sativum*) seeds and of radish (*Raphanus sativus*) seeds in compost must be greater than 90 percent of the germination rate of the control sample, and the growth rate of plants grown in a mixture of compost and soil must not differ more than 50 percent in comparison with the control sample.
3. Compost must be cured for at least 21 days *and* Compost will not reheat upon standing to greater than 20°C above ambient temperature.
4. If no other determination of maturity is made, the compost must be cured for a six month period. In addition, offensive odours from the compost shall be minimal for the compost to be deemed mature.
5. Or other maturity tests as may be agreed with the Agency.

2. Trace Elements [Note 1 & 2]

Parameter (mg/kg, dry mass)	Compost Quality Standards [Note 3]		Stabilised Biowaste
	Class I	Class II	
Cadmium (Cd)	0.7	1.5	5
Chromium (Cr)	100	150	600
Copper (Cu)	100	150	600
Mercury (Hg)	0.5	1	5
Nickel (Ni)	50	75	150
Lead (Pb)	100	150	500
Zinc (Zn)	200	400	1500
Polychlorinated Biphenyls (PCBs)	-	-	0.4
Polynuclear Aromatic Hydrocarbons	-	-	3
Impurities>2mm [Note 4]	<0.5%	<0.5%	<3%
Gravel & Stones [Note 4]	<5%	<5%	-

Note 1: These limits apply to the compost just after the composting phase and prior to mixing with any other materials.
Note 2: The above alone should not be taken as an indication of suitability for addition to soil as the cumulative metal additions to soil should be first calculated.
Note 3: Normalised to 30% organic matter content.
Note 4: Compost must not contain any sharp foreign matter measuring over a 2mm dimension that may cause damage or injury to humans, animals and plants during or resulting from its intended use.

3. Pathogens

Pathogenic organism content must not exceed the following limits:

Salmonella sp.	Absent in 50g	n=5
Faecal Coliforms	≤ 1000 Most probable number (MPN) in 1g	n=5

Where n=number of samples to be tested.

4. Monitoring

The licensee shall submit to the Agency for its agreement, prior to commencement of compost operations, details of methods of analyses and methods of sampling.
The analyses shall be carried out on a monthly basis

Amended Schedules

Amend Schedule A: Waste Acceptance, of the existing licence as follows:

SCHEDULE A: Waste Acceptance

A.1 Waste Acceptance

Tabel A.1 Waste Categories and Quantities

Waste Type	Quantity
Municipal Waste [Note 1]	125,000
Commercial and Industrial Waste	100,000
Construction and Demolition Waste	45,000
Total [Note 2]	270,000

Note 1: Subject to Condition 3.15.1(i).
Note 2: The amount of each waste stream may be varied providing the total quantity is not exceeded and subject to agreement by the Agency.

This Technical Amendment shall be cited as Amendment C to the licence.

Sealed by the Seal of the Agency on this the 4th day of March, 2020

PRESENT when the seal of the Agency was affixed hereto

Tara Gillen

Tara Gillen, Authorised Person

APPENDIX 2.1

WASTE STORAGE PLAN


2hr fire wall
Green
Bituminous
>5m
timber
C&I lights
recyclables
C&D lights
lights
steel
plastic
mattresses
Landfill
C&D
soil & stone
heavy skips
Mixture of concrete, bricks, tiles and ceramics
plasterboard
heavy skips
plastics
Tipping area
>5m
>5m
>5m
<5m
5m
<5m
MSW Lights
SRF
Back End Floc 1
Lights
Aluminium
<5m
MSW Lights
Heavies
Compost
MSW Covanta
Steel
Tyre DeRimming Area
Organic Fines
Aluminium
19 05 01
back end floc 2
Granulated Floc
C&I Fines
Optical Rejects
MSW
SRF
MSW
Intake MSW
2hr fire wall
fire break
fire wall
non-combustable material
storage edge

Area	Limit Tonnage	Holding Period for Waste	Max Stockpile Size m3	EWC Code
MP 1				
MSW Lights	100	1-2 days	10m x 8m x 6m	19 12 12
SRF	100	1-2 days	10m x 8m x 6m	19 12 10
Back End Floc 1	50	1-2 days	12m x 8m x 4m	19 02 03
Back End Floc 2	50	1-2 days	6m x 8m x 4m	19 02 03
Granulated Floc	50	1-2 days	13m x 8m x4m	19 12 12
MSW Lights	100	1-2 days	10m x 8m x 6m	19 12 12
Heavies	100	1-2 days	10m x 8m x 6m	19 12 12
SRF	100	1-2 days	10m x 8m x 6m	19 12 10
C&I fines	50	1-2 days	10m x 8m x 6m	19 12 12
digested waste	50	1-2 days	10m x 8m x 6m	19 05 01
MP 2				
MSW Intake	50	1 day	18 x 12 x 6m	20 03 01
MSW	50	1 day	(8x6x6m)(20x10x6m)(4m x 6m x 6m)	19 12 12
Aluminium	5	5 days or until enough for a load	(35 yard skip)(6m x 6m x 6m)	15 01 04
Organic Fines	100	1 day	(8x6x6m)(6x6x6m)	19 12 12
Steel	10	5 days or until enough for a load	35 yard skip	19 12 02
Compost	50	5 days or until enough for a load	20m x 6m x 6m	20 02 01
Optical Rejects	50	5 days or until enough for a load	15m x 6m x 6m	19 12 12
MSW Lights	50	4 days	(6x6x6m)(22x6x6m)	19 12 12
MP3				
Timber	50	4 days or until enough for a load	10m x 8m x 6m	20 01 38
C&D/ Timber	50	4 days or until enough for a load	10m x 8m x 6m	17 09 04
C&I Lights	50	4 days	10m x 8m x 6m	20 03 07
Green/ C&I Lights	50	4 days	10m x 8m x 6m	20 02 01
C&I Lights	50	4 days	10m x 8m x 6m	20 03 07
C&D/ C&I	50	4 days	10m x 8m x 6m	17 09 04
Steel	50	4 days	10m x 8m x 6m	19 12 02
Mattresses x 2	50	5 days or until enough for a load	10m x 8m x 6m	19 12 02
Hard Plastics	50	Until enough for a load	10m x 8m x 6m	15 01 02
C&D	200	4 days	30m x 6m x 6m	17 09 04
Landfill	35	4 days	10m x 6m x 6m	20 03 01
MDF	50	4 days	10m x 6m x 6m	20 01 38
Heavy Skip - Tipping Ar		N/A	6m x 6m x 6m	17 09 04
Light Skip - Tipping Are		N/A	6m x 6m x 6m	20 03 07
bituminous	30	5 days or until enough for a load	6m x 6m x 6m	17 03 02
C&D	400	5 days or until enough for a load	10m x 7m x 6m	17 09 04

Outside Sorage				
SRF Bales Outside	6,200	One month	Area	19 12 10
Batteries	1	Until enough for a load	Quarantine Area	16 06 05
Gas Cylinders	1	Until enough for a load	Quarantine Cage Area	16 05 04
Tyres Derimming Area	20	Until enough for a load	2 x Highsider Skips	16 01 03
WEEE	10	Until enough for a load	WEEE Storage Area	20 01 35
concrete	100	2 weeks	concrete storage bay	17 01 01
Soil and Stone	70	4 days or until enough for a load	6m x 6m x 6m	17 09 04
PVC Plastics	50	4 days	2 x Standard Skips	19 12 04
Rubble	100	4 days or until enough for a load	6m x 6m x 6m	17 09 04

APPENDIX 2.2

ODOUR MANAGEMENT PLAN

Millennium Business Park
Cappagh Road
Dublin 15

Waste Licence No W0183-01

Odour Management Plan

January 2023

1.0 Introduction

The facility is authorised to accept 270,000 tonnes per annum of non-hazardous waste including Municipal Solid Waste (MSW), Organic Waste, including Brown Bin Waste, Dry Recyclables, and Skip Waste. The facility is also authorised for the outdoor storage of wrapped bales of Solid Recovered Fuel (SRF).

The facility has been in operation since July 2006. The waste transfer building was originally designed with two processing lines for C&I and C&D. These lines were removed in 2014 and at present the original shed (MP1/MP2) is operating a transfer station for skip waste following basic segregation and an MSW processing line. This processing line is designed to remove metal, aluminium, organic fines and recycling from the MSW waste. An additional building was added in 2020 specifically for skip waste. This building is designated MP3.

2.0 Potential Odour Sources.

The waste types that are and will be accepted include;

- MSW (Dry commercial, domestic and commercial black bin)
- Source Segregated Biodegradable waste (brown bin – commercial and domestic)
- Mixed Construction & Demolition waste
- Mixed Dry Recyclables
- Wood
- Metal
- C&I Dry Mixed Bulky Waste (dry typically skip waste)
- Solid Recovered Fuel

The potential sources of odour are the domestic and commercial black bin wastes. Odour nuisance is directly associated with the length of time the wastes are on site, and the type of processing and the handling and storage areas. Seasonal factors such as warm weather can also be influential. The waste transport vehicles can also be a source of odour nuisance if not regularly cleaned.

MSW and the MSW line would be the main potential odour source in the facility. MSW, by its very nature, can be the source of odours. The release points for potential odours would be directly correlated to the MSW line.

3.0 Mitigation Measures

Fast turn-around times for the wastes prevents the accumulation of large volumes of odour generating waste at the facility. Condition 6.5.1 of the Licence requires that "*all waste for disposal to be removed from the facility within forty eight hours of its arrival at the facility"*.

SEHL have a waste storage plan in place for the facility which outlines the length of time each waste type may remain on site, the area in the waste transfer building where the waste can be stored and the maximum stock pile size that is permitted on site. By adhering to this plan odour issues can be mitigated.

De-odourising misters are fitted to the entrances of each shed to mitigate and fugitive emissions that may escape when the doors are open. .

- All waste will be bulked up and transferred as soon as possible to designated facilities for processing. All MSW is being processed in the processing line and the segregated fractions are being moved to their destinations as soon as possible after processing. Destinations for MSW can include Waste to Energy, Indaver and Littleton Recycling.

- A maximum of 200 tonnes of MSW will be on the floor at any one time throughout the day.

- Weekly cleaning of all bays inside the MRF is another measure that is in place in order to mitigate against any potential odour.

Any potential odour being produced will be mitigated by the de-odouriser, the timely removal of waste, cleaning down of the storage areas and by completing daily odour checks, which are currently conducted on site.

Emergency/Abnormal Operation:

W0183 is licensed to operate twenty four hours a day, seven days a week. In the event that the site is not operational, security personnel are always onsite. With the site always being manned, the possibility of incidents is reduced. Heat Detection cameras are in place in the shed to give an early warning of a fire.

In the event of an extreme emergency, i.e. fire, the emergency response plan for the site will be put into operation. All staff is trained in the site ERP and the necessary procedures.

4.0 Monitoring

Daily odour assessments are carried out around the facility internally and the boundary having regard for the Air Guidance Note (AG5) Odour Impact Assessment Guidance for EPA Licensed Sites. Daily yard inspections and daily clean down of yard and shed is conducted in order to help mitigate any potential odours.

In the event that complaints are received to the facility, the complaints procedure for the facility is followed.

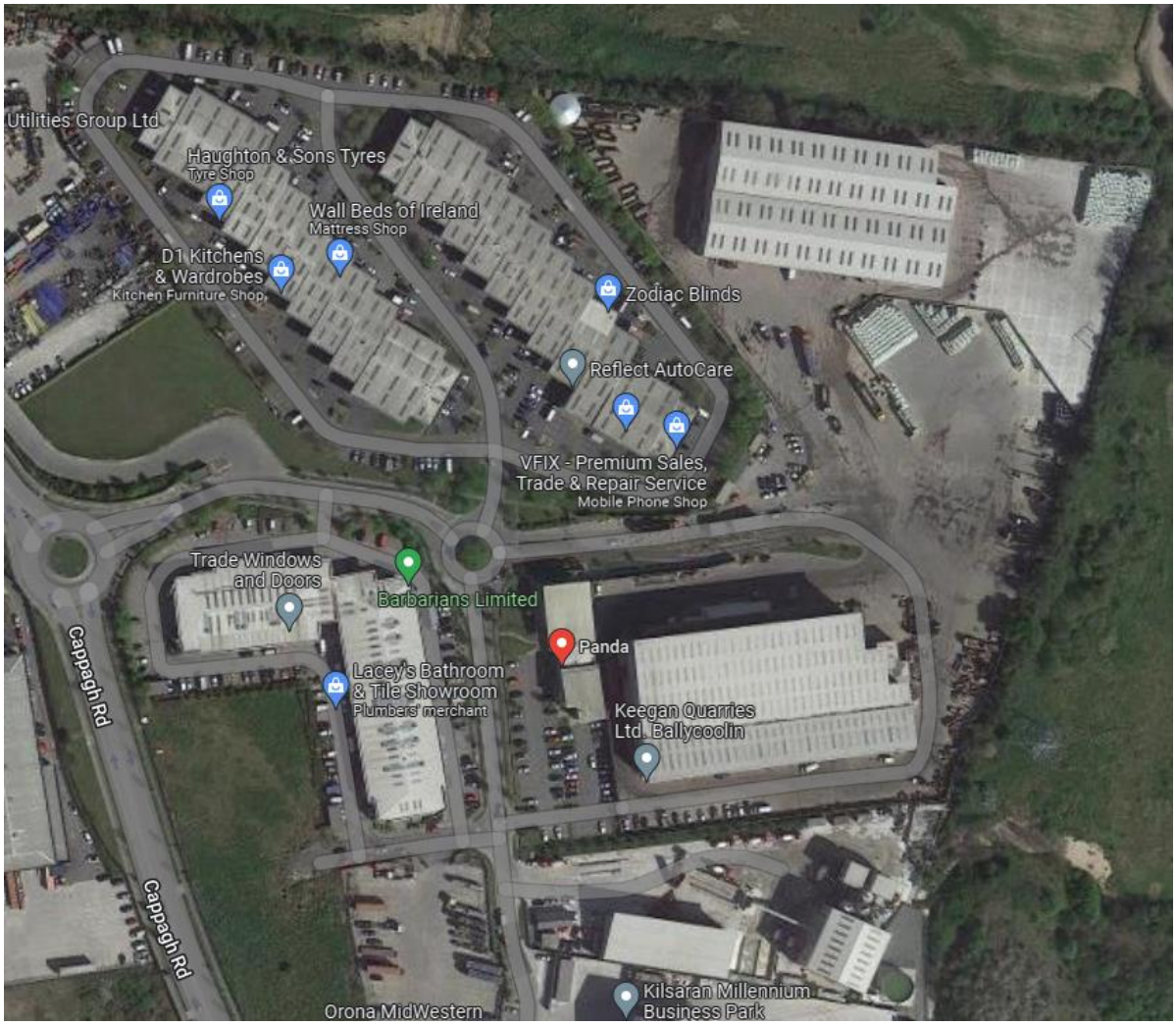
5.0 Communication

Millennium Business Park is managed by a management company which Starrus Eco Holdings maintain an excellent relationship with at all times. The business park is home to numerous businesses in a close proximity to the facility and Starrus Eco Holding Ltd strives to maintain excellent working relationships with all neighbours and possible sensitive receptors. A map of the facility can be seen in Table 1 and the business park can be clearly seen. The nearest sensitive receptors to W0183 are the neighbours in the business park.

6.0 Management Structure

The manager of Millennium Park is responsible for the management and operation of the site in accordance with the licence. The site has a designated EHS Officer who can provide guidance and assistance as appropriate.

Table 1: Map of Facility detailing local sensitive receptors.



APPENDIX 2.3

E R P

Emergency Response Plan

For
Starrus Eco Holdings T/A

Greenstar

Millennium Business Park, Grange, Ballycoolin, Dublin 11.

Section 1.0 INTRODUCTION

This document is a site specific Emergency Plan for **Greenstar,** Millennium Business Park, Grange, Ballycoolin, Dublin 11. It outlines the procedure to be followed in the event of an Emergency.

It contains information on the site facilities, equipment, emergency systems, documents and procedures.

The Emergency Response Plan has been developed having regard for the Agency's Guidance Note *'Fire Safety at Non-Hazardous Waste Transfer Stations'* which is included as Appendix 5 of this document.

Section 2.0 SITE INFORMATION

2.1 Description of Premises

This EPA Licensed site (W0183-01) is located at Millennium Business Park, Grange, Ballycoolin, Dublin 11.

Refer to the site plan in Appendix 1 for site layout Plan and location of emergency systems.

2.1.1 Buildings

a) Main Process Building (MRF)

The main process building is a single storey steel structure with a reinforced concrete floor slab approximately 4600 m^2 in area surrounded by 5m high reinforced concrete walls. These walls have openings for:

- seven roller shutter doors at the front of the building
- two roller shutter doors at the back
- seven personnel doors- three in the front, three in the back and one in the west wall.

In addition to the concrete walls, the sides of the building are clad with composite type panels. The roof of the building is also clad in these panels incorporating polycarbonate roof lighting.

The building includes a:

- Material Receiving area
- Material Dispatch

b) Office Block

The first floor of the office block is of concrete block construction with a Kingspan type cladding.

The facilities in the two - storey building include the following:

First floor

- four offices
- a call centre
- a conference room
- meeting room
- an IT switch room
- one canteen
- open plan office area

Ground floor

- a reception area
- three open plan office areas
- four individuals offices
- ladies and gents WC
- special needs WC
- one canteen

2.1.2 Site Facilities

The following facilities are provided:

- 2 weighbridges and Weighbridge Office
- Concrete yard including skips storage and trucks parking area
- A tarmac car parking area located to the south side of the Office Block.
- Self-bunded diesel fuel storage, capacity 5,000L, is located at the edge of the yard, beside the out-weighbridge.
- Diesel fuel storage, capacity 2,500L, in a reinforced concrete bund, is located at the northeast corner of the site.
- A Generator with 2,500L diesel in an internal tank, stored in a reinforced bund at the west end of the MRF building.
- Staff canteen/ changing rooms located beside in-weighbridge.

2.1.3 Emergency Systems

- Fire detection (smoke aspiration systems) which covers the MRF and offices.
- Two Fire Tender access gates - one on the west side of the site and one on the southeast corner of the site.
- Seven fire hydrants are provided for fire fighting purposes. The hydrants are located adjacent to the Main Recycling Facility (MRF).
- Two fire posts are provided for employees use in fire fighting operations prior to the arrival of the Fire Brigade. Each Fire Post contains the following equipment: Standpipe, Key and Bar, Branch Pipe and three lengths of hose.

Some isolation points are available for:

- Gas: Mains near the weighbridge.
- Electricity: Mains in a secured switch room on the ground floor of the admin building.
- Drainage: There are 2 isolations points for the 2 circuits of water concerned. There is an automatic valve on the surface water and the sewage water outfall. These two valves are controlled from two access points that are respectively at the main gate, at Assembly Point A.
- Water: There are 2 different water circuits, one for the fresh water the other for the fire hydrant water. The manual shut off valves are in the north west corner outside the site boundary (see Appendix 1).

2.2 Access and Egress

There are three security gates in the perimeter of the site.

- Two located on the northwest corner of the site next to the weighbridge,
- The third gate is located at the southeast corner of the site that is accessed through the car park.

Section 3.0: RISK ASSESSMENT METHODOLOGY

3.1 Analysis of the work area

Potential safety hazards are identified based on a practical knowledge of site operations, review of audit reports, legal and regulatory requirements and observation of site work activities.

* All hazards identified will be subject to the Risk Assessment process, which involves:

- Identification of the hazard
- Identification of who may be harmed
- Identification of current control measures
- Assessment of risk (in terms of severity)
- Identification of additional control measures
- Implementation of control measures and reduction of risk

* The following scoring system is applied:

Risk Calculation: PE x FE x NP x MPL = Risk Category

Probability of Exposure (PE)		***Frequency of Exposure (FE)***		***Number of Persons Exposed (NP)***		***Maximum Probable Loss (MPL)***		***Risk Category***	
Very unlikely	0.5	Infrequently	0.1	1-2 persons	1	Fatality	15	Low Risk	000 – 010
Unlikely	1	Annually	0.2	3-7 persons	2	2Limbs/ eyes/ serious condition	08		
Possible	2	Monthly	1.0	8-15 persons	4	1Limb/ eye/ serious condition	04		
Even chance	5	Weekly	1.5	16-50 persons	8	Major Break/ minor illness	02	Medium Risk	011 -50
Probable	08	Daily	2.5	>50 persons	12	Minor Break/ minor illness	01		
Likely	10	Hourly	4.0			Laceration/ Mild ill health	0.5	High Risk	>50
Certain	15	Constantly	5.0			Scratch/ Bruise	0.1		

With the Hazard Risk Number (HRN), and the category of the risk, we can evaluate which hazard is the most critical. Dependent on the severity, appropriate mitigation will be applied in order to decrease the level of risk and decrease the HRN.

3.2 Review

The risk assessment will be reviewed:

- On an annual basis at minimum,
- As a result of the introduction of new operations, equipment and/or personnel,
- Following an accident, incident or non-conformance,
- As a result of a change in legal and regulatory requirements, codes of practice or Greenstar best practice.

3.3 Risks Identification

All risk identified are detailed in the risk assessments, with appropriate control measures specified. The Risk Assessment are retained within Scannell solution ® software.

3.4 Fire Risk Assessment

A Fire Risk Assessment Report was completed on behalf of Greenstar by Cantwell Keogh and Associates at the request of the Agency. The purpose of the document is to review the site and its associated operations in order to identify the level of site compliance to pertinent regulations, codes and guidance and also to propose suitable risk reduction measures where deficiencies are identified.

All recommendations were assessed and where possible these were implemented on site.

Section 4.0 RESPONSIBILITIES

An organogram is presented in Appendix 3 to identify roles and responsibilities on this site.

4.1 Facility Manager/Operations Supervisor

His/her main responsibilities are:

- To assess the suitability of the fire equipment in accordance with site requirements and activities.
- Review the suitability of the fire equipment annually.
- To ensure all new buildings have a valid fire certificate and take the necessary steps to revise and update this document when required,
- To ensure that necessary resources (material and time) are made available for the implementation of the Emergency Plan and the related training.

1. Risk assessment:
   - Ensure a Risk Assessment of the premises is carried out in relation to fire or other emergencies,
   - Update this document as required, but annually as a minimum.

2. Nominate persons with particular responsibilities (e.g. Fire Officers) to be taken in emergency situations. Ensure that there is a Fire Officer responsible for all areas of the site.

3. Ensure that the required Fire Safety Training is carried out and that the Fire Officers fully understand their duties.

4. Report to relevant Department (i.e. HS and or Environment) as soon as possible.

5. Together with the Operations Manager, prepare an Emergency Evacuation Procedure (see section 6.0 of this document),

6. Ensure that all employees are fully aware of the Emergency Evacuation Procedure and that they can evacuate as quickly as possible in the event of an emergency,

7. Organise six monthly fire evacuation drills,

8. Keep a full record of: - All evacuation drills,
   - All responsible persons,

- Fire safety training,
- Records of fire equipment maintenance,

9. Receive reports from fire Officers on particular fire hazards and arrange for the removal of all fire hazards reported,

10. Keep Fire Officers up to date on all matters affecting fire safety,

11. Select a more suitable assembly point in consultation with the Operations Manager and the Fire Officers, if different than the one proposed in this document,,

12. Ensure that fire evacuation notices and maps are complete and posted prominently throughout the building,

13. Ensure there is a sufficient number of Fire Officers appointed,

14. Ensure that there is an effective audible means of raising the alarm in the event of an emergency,

15. Ensure that all fire fighting equipment meets the required standards and that it is maintained and certified as required,

16. Ensure all emergency lighting meets the appropriate standard and that it is certified at the required intervals by a competent person,

17. Liaise with the local Emergency Services on a regular basis, notifying them of details of the Emergency Plan,

18. Coordinate Emergency Response and liaise with the Emergency Services Fire Officer on their arrival,

19. Ensure all Hazards (i.e. Gas, Chemicals etc.) which may pose a threat to the safety of the Emergency Services are identified,

20. Prepare the "Emergency Pack" for the Emergency Services (see section 5.0 of this document)

Following any emergency there is a possible requirement for further specialist assistance as recommended by the Emergency Service. Such assistance will be assessed depending on the emergency situation.

4.2 Fire Officers

1. Ensure all emergency signs are in position,
2. Ensure all corridors, passageways; fire escapes, escape routes and exits are unobstructed,
3. On a daily basis, ensure all fire doors are operable and emergency exit doors are unlocked,
4. Carry out a weekly check of all fire appliances to ensure they are in the correct place and un-discharged,
5. On a daily basis be aware of the number of people within her/his area of control,
6. On hearing the fire alarm ensure that all persons in her/his area are safely evacuated to their designated assembly point,
7. Conduct a roll call at the assembly point and report to the Site Operations Manager
8. Inform the Site Operations Manager of any missing persons and give if possible an indication of their last location.

Section 5.0 EMERGENCY SERVICE SUPPORT

5.1 Emergency Pack

The **Fire Officer** will prepare an **Emergency Information Pack** and store it at the Weighbridge for the Emergency Services. This pack will contain:

1) An outline drawing of the premises showing exits and fire precautions,

2) Information on any special hazards (e.g. Flammable liquids, Chemicals, Gases etc.) and their location,

3) Location of isolation switches,

4) Location of fire hydrants,

5) Location of fire assembly point

5.2 Escape Route Plan

A plan of the premises is available in a visible location to persons entering and exiting the building.

The plan indicates the location escape routes, fire fighting equipment, gas, electricity, the control panel for any fire detection or alarm system, installations such as fuel tanks, boiler houses and other areas of high fire risk by reference to the point at which the plan is displayed.

A floor plan is displayed in a prominent position in each area indicating the escape routes by reference to the point at which the plan is displayed.

A copy of the Plan is included in the Emergency Pack for the Officer in charge of the Emergency Services.

All plans are displayed on durable material, are easily legible and of a suitable scale.

It is the responsibility of the Fire Officer to ensure that this plan is up-to-date, displayed in the appropriate location and revisions communicated to the appropriate staff.

Section 6.0 EMERGENCY PROCEDURE

Condition 8 of the EPA Waste Licence (W0183-01) stipulates that in the event of an emergency, measures should be taken to address the hazard and notify appropriate Authority. To that extent, the Greenstar EHS department should be contacted ASAP but no later than 24H after the emergency arose.

6.1 Emergency definition

An emergency may constitute a fire, an explosion, a spillage, acceptance of an unexpected hazardous or clinical waste, a breakdown of equipment or any of the above that would pose as a risk to human health and safety or to the environment. The previous sentence is not an exhaustive list.

6.2 Incident Investigation

1) Arrange to inspect the area where the incident occurred.
2) Inform the relevant **SEHL** department (Environment and / or HS) and seek advice for any other external communication.
3) Take statements from persons witnessing the incident.
4) Compile all the witness statements in a report.
5) Write a non-conformance report, if applicable.
6) Record the incident in an incident report form.

If applicable, the relevant Authorities will be informed of the incident and/or site closure as well as the reasons for it and corrective/preventive actions to be taken/required to resume normal business.

6.3 **Scenario One:** Fire

Follow the procedure below. The person discovering the fire should:

1) Immediately raise the alarm by giving verbal warning to those nearby or by operating the nearest break glass unit or using an air horn or using the internal radio system.

2) Contact your direct senior person who will escalate the information ASAP to the Fire Officer / Operations Manager or his/her deputy. At that stage, the Fire Officer will decide if the fire brigade should be summoned or not. If the fire brigade should be summoned, the Fire Officer might delegate the call to whoever is deemed competent to do so. This person will immediately contact the Emergency Services by dialling 112 or 999, requesting the fire brigade. He/she will provide the fire brigade with:
   - the address
   - the location of the premises
   - The phone number of the premises
   - And any other relevant information to hand as regards the fire and state of evacuation.

3) On hearing the warning of fire or the fire alarm, all the people in the concerned building should immediately leave by the nearest exit.

Where possible close (but do not lock) doors and windows on your way out.
Any Fire Officer should immediately commence their designated duties.
The Fire Officer will retrieve the fire register and the emergency pack and proceed to the designated assembly point from where he will coordinate the emergency response plan.

4) The site administrative staff and the Operations Manager, if different, will join the Fire Officer to help coordinate the Emergency Response.

5) The Fire Officers will evacuate their respective areas, do a roll call by team at the assembly point and report to the Site Operations Manager.
The assembly point is at the top of the hill, on the grass near the entry gate. If necessary, an intermediate assembly will be designated by the Fire Officer.

6) Fire Officers must inform the Site Operations Manager of any missing persons and if possible their last known whereabouts.

7) The Fire Officer liaise with the Emergency Services on arrival and, using the Emergency Pack, advise the Emergency Services Senior Fire Officer of any additional hazards (i.e. gas bottles, electricity, toxic chemicals, paints etc.)

8) When fire is out and cold, treats residual liquid contaminants as a spillage by using appropriate precautions as toxic/hazardous substances may be present. Appropriate measures are taken to dispose of substances as waste material in a safe and environmentally responsible manner.

No one can re-enter the building until the Fire Officer gives the all clear.

Assembly Point B for the Office Block is at the car park and the Assembly Point A for the Recycling Plant Building is at the weighbridge

6.4 **Scenario Two:** *Spillage Procedure*

1) Raise the alarm by informing the Site Supervisors/Management as soon as possible.

2) If there is release of odour, fumes, smoke, gas or dust, evacuate to a safe distance. Stay upwind in such cases. Keep others away.

3) Immediate priority is to prevent contamination of watercourses, surface water drains, and sensitive areas therefore shut off valves must be activated straight away depending on the quantity of the spillage.

4) **If safe to do so**, use appropriate PPE and contain the spillage using spill containment material (absorbent material and drain covers). Place containment booms around the spillage if appropriate.

5) Clean up the spillage into a suitable designated container. Arrange storage in a safe bunded location until appropriate disposal can be organised in accordance with current legal and regulatory requirements. This will involve the use of specialist licensed contractors to bring the material to a licensed facility.

6) Report the incident to the Greenstar EHS department which will then be reported to the relevant Authority (ies) and / or Agency (ies).

For small spills, (i.e. with diesel spills):

1) Use site absorbent material
2) Collect up such absorbent material after use and store in a labelled container in designated bunded area to await disposal.
3) Storage and disposal prior to consignment off site will be as per No. 5 above and will be in accordance with the current waste Regulations.

6.5 **Scenario Three:** *Handling hazardous and chemical waste*

What to do when unexpected hazardous, chemical, or clinical waste arrives at the site?
All waste accepted at the facility is presumed to be non hazardous until a visual inspection is carried out within the confines of the material recovery building. Greenstar have strict off-site classification methods for commercial customers and clear instruction are given to the general public about the contents of their waste bins and skips.

Actions are taken depending on when the waste is discovered and the ease with which it can be identified.

1. If waste is identified whilst still in the lorry at the weighbridge, the lorry will be turned away at the weighbridge and sent to location of origin. The Waste Rejection Form (EF-06A) shall be completed.

2. If waste is discovered during tipping, the unacceptable waste should be re-loaded into the lorry that delivered it and the waste removed from site and sent back to location of origin. The Waste Rejection Form (EF-06A) shall be completed.

3. Greenstar – Millennium Park are not permitted as per licence (W0183-01) to accept liquid waste, but in the case where a load has been accepted and then found to contain stray drums or containers with liquid contained within them, it is deposited on site:

    a. Machinery will remove the containers/drums ,
    b. Containers/drums removed will be located in the bunded quarantine area and dealt with appropriately.

6.6 **Scenario Four:** Waste rejection at final destination

1) Contact your Greenstar dispatch depot. Give details of waste origin, reason for rejection, facility from which the waste was rejected,
2) Greenstar offices will arrange an alternative appropriate facility to accept the waste,
3) Obtain a rejection note from the facility,
4) Transfer waste to appropriate facility.

6.7 **Scenario Five** *Incident resulting in first aid* requirements

1) Contact first aiders ASAP; See Emergency Contact Numbers IF-15A.

2) Inform management (if not done via first aider himself or other colleague (witness of the incident

6.8 **Scenario six:** Storage of bales on site and the fire risk

It is necessary to take the following precautions to prevent any fire emergences from happening during the repeated handling and storage of bales.

1. The yard supervisor/management must be informed (by radio or phone) if there is an emergency situation.
2. Bales are to be stored away from any main buildings.
3. Bales are stores in 4 designated zones with at least 5m distance between them to decrease chance of fire spreading.
4. Bales are all inspected and counted daily.
5. Any bales that have damage or have not been baled properly are taken back into the shed to be re-baled.
6. If a fire does take hold in or on a bale, the machine driver will take the bale out and place the bale in the middle of the yard and smother the bale with water from a fire hose (if it is safe to do so).
7. Bale storage stocks are kept to minimum stock levels in the shed.

6.9 Firewater Management Procedure after a fire event

1) Raise the alarm: inform the site management as soon as possible.

2) Site management will isolate the area by shutting off the foul or surface water valve if incident is upstream of the valve.

3) Firewater will be diverted to a holding tank in the business park prior to being removed from site.

4) Tankering specialists, McBreen Environmental will be contacted and the firewater will be hauled off site. Regarding disposal, firewater is to be delivered to the nearest WWTP following their approval from Irish Water. McBreen Environmental have been contacted and have agreed to take firewater in the event of an emergency.

5) Immediate priority is to prevent contamination of watercourses and sensitive areas.

6) Report the incident to the Greenstar EHS department and relevant Authority (ies) and / or Agency (ies).

Section 7.0 FIRE FIGHTING EQUIPMENT

7.1 Fire Extinguishers

Area Fire Officer checks fire extinguishers monthly.

Site management records the results of these monthly checks.

A competent person must inspect Fire Extinguishers annually, according to I.S. 291:2002.

Site management records the results of these annual inspections.

7.2 Fire Hydrants

Fire hydrants must be tested annually to ensure the static pressure; the flow rate and the residual pressure are adequate according to BS 9999:2008. This monitoring is recorded during the inspection of the fire fighting equipment.
See location on the site map in Appendix 1.

7.3 Fire Fighting

Life safety is the first priority in the event of a fire.
Fire fighting is of lower priority until the life safety from fire of the occupants is assured.
A fire should be attacked immediately after the alarm is raised **only if it is safe to do so.** Only trained staff will attempt to tackle a fire. Such action should always be done with a buddy system in place.

Always keep the escape route clear; never let the fire get between you and your escape route.

If attempts to extinguish the fire cannot be continued without danger or if they are clearly failing to keep the fire under control, the fire fighter should **withdraw immediately**.

Section 8.0 POLLUTION PREVENTION EQUIPMENT

8.1 Spill Kits/ Oil Dry

Spill kits are strategically located throughout the site in the event of an emergency. A member of the EHS department checks for condition and contents of spill kits weekly. The results of these weekly checks are recorded. Oil dry is also stored on site.

8.2 Bunds (concrete and mobile)

Bunds are positioned under any chemical stored on site. A member of the EHS department checks for condition of bunds weekly. The results of these weekly checks are recorded.
Each bund undergoes a bund integrity test every 3 years to ensure fit for purpose.
The report is approved by a suitably qualified engineer.

8.3 Drainage System with oil interceptor and shut off valves

On site drainage system includes oil interceptors and shut off valves which will be closed in the event of a significant spillage to avoid pollution of surface waters. The oil interceptor is inspected/ cleaned when required. The drainage system is inspected weekly. The results of these weekly checks are recorded.

8.4 Staff Training

All staff (including Agency Staff) are trained in the use of this equipment. Toolbox talks are also given periodically. Training records are kept in the site office.

8.5 PPE (gloves, boots, masks, if needed, face masks, if needed)

Suitable PPE is provided to all staff on site.

Section 9.0 EMERGENCY PLAN REVIEW AND TESTING

9.1 Review

The Fire Officer and a member of the EHS Department will review the Emergency Plan annually for adequacy. The Emergency Plan is revised and updated as required.

9.2 Testing

A bi-annual test is carried out. Improvement opportunities and deficiencies arising from these tests are recorded and integrated into the Emergency Response Plan.

Evacuation drills will form part of the recorded testing process as detailed below:

- Evacuation times
- Operation and effectiveness of emergency systems
- Access and availability of equipment
- Emergency Contacts accuracy
- Emergency Response Team effectiveness
- Training issues
- Communications
- Signage
- Site visitors response/control

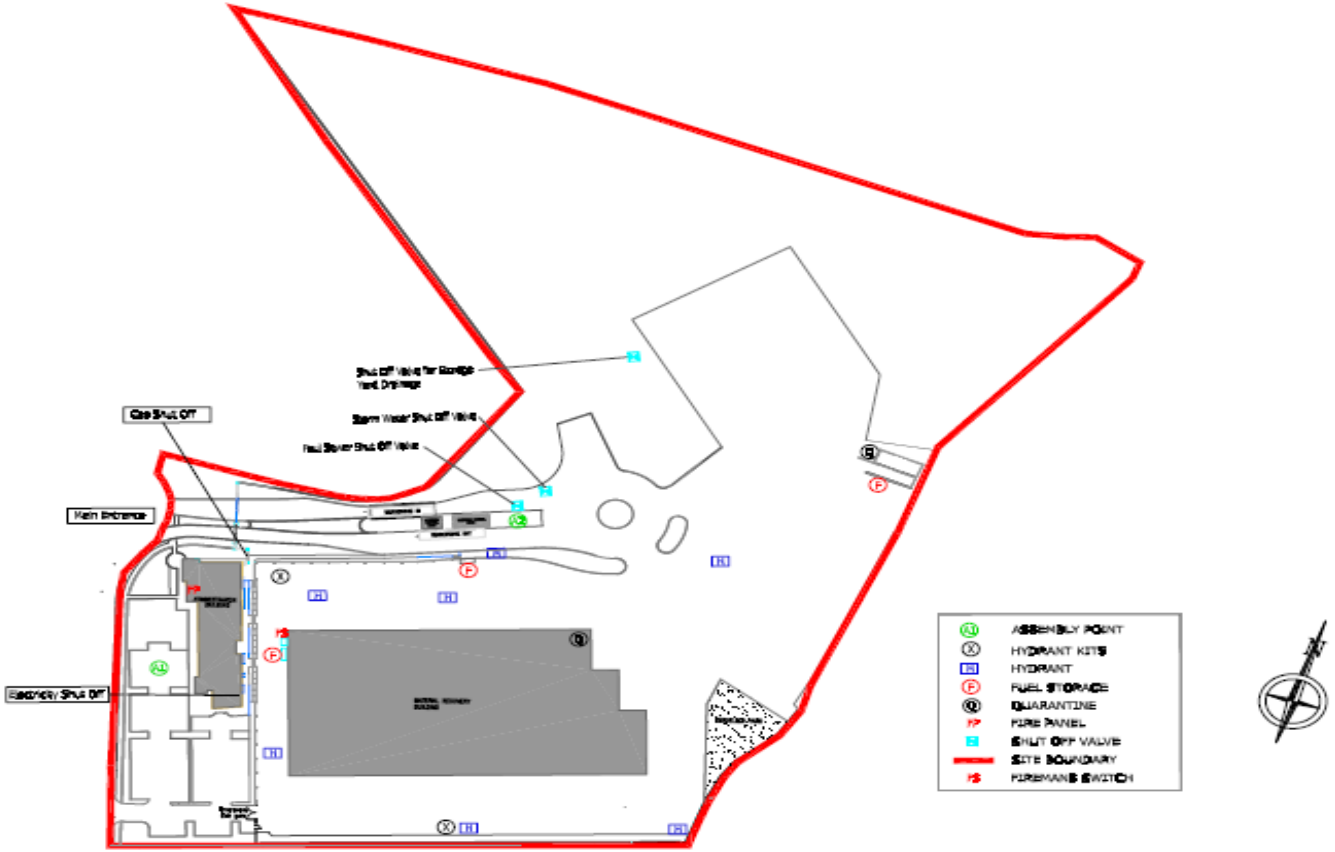
Documented results of the test, together with improvement actions and the proposed timetable, will be communicated to the EHS Department for support and approval.

The emergency pack is retained for communication with emergency services.

The Emergency Response Plan is communicated at each revision to the local Fire Brigade.

Appendix 1: Site Map with Emergency Equipment

Millennium Park - Emergency Response Plan



Appendix 2: Emergency Contact Numbers

External Contracts – Please Refer to IF15-A – Emergency Contact List

Service	Name	Tel	Fax	Location	Availability
Fire Service		999 / 112		Finglas	24 x 7
Ambulance	See Hospital	999 / 112		See hospital	See hospital
Doctor	Dr. Duggan			Blackrock	
Hospital	James Connolly	01-646 5000	01-646 5132	Blanchardstown	24H
Gardai	General	999 / 112			24H
		01-666 7000		Blanchardstown	24H
ESB	ESB Networks	1850 372 999			24 H
Bord Gais	Emergency response	1850 20 50 50			24 hour
	Safety inspection	1850 79 79 79			**M-F** 8 – 8 **Sat** 8-5.30
Environment Protection Agency (EPA)	General	053-9160600 LoCall: 1890 335599	053-9160699	Wexford	Out of hours
	Dublin office	01-268 0100	01-268 0199	Clonskeagh (Richview)	business hours
Health & Safety Authority	Dublin office	LoCall: 1890 289 389	01 614 7020	James Joyce Street Dublin 1	**M-F** 9-5
Local Authority	Fingal County Council	01-8905000	01-8906299	P.O. Box 174, County Hall, Swords, Fingal, Co. Dublin	business hours
		01-8731415			out of hours
Fisheries Board	Eastern Regional Fisheries Board	01-2787022	01-2787025	Blackrock	Business hours

Internal Contacts

Title	Name	Int.	Ext.	Mobile	Location
Operations Manager	Kieran Connor	-	-	086 1725630	Various
Site Operations Supervisor	Keith Cassidy	-	-	086 0484473	Millennium Park
Group Environmental Manager	David Naughton	-	-	086 6045905	Millennium Park
Group Environmental Engineer	Sara Smyth	6236	01 412 4611	086 8569414	Bray
Group Health and Safety Manager	Joe Nicholson	-	-	086 0226109	Millennium Park
Site EHS Officer	Bebhinn Brennan	-	-	086 0145462	Millennium Park/ Cappagh

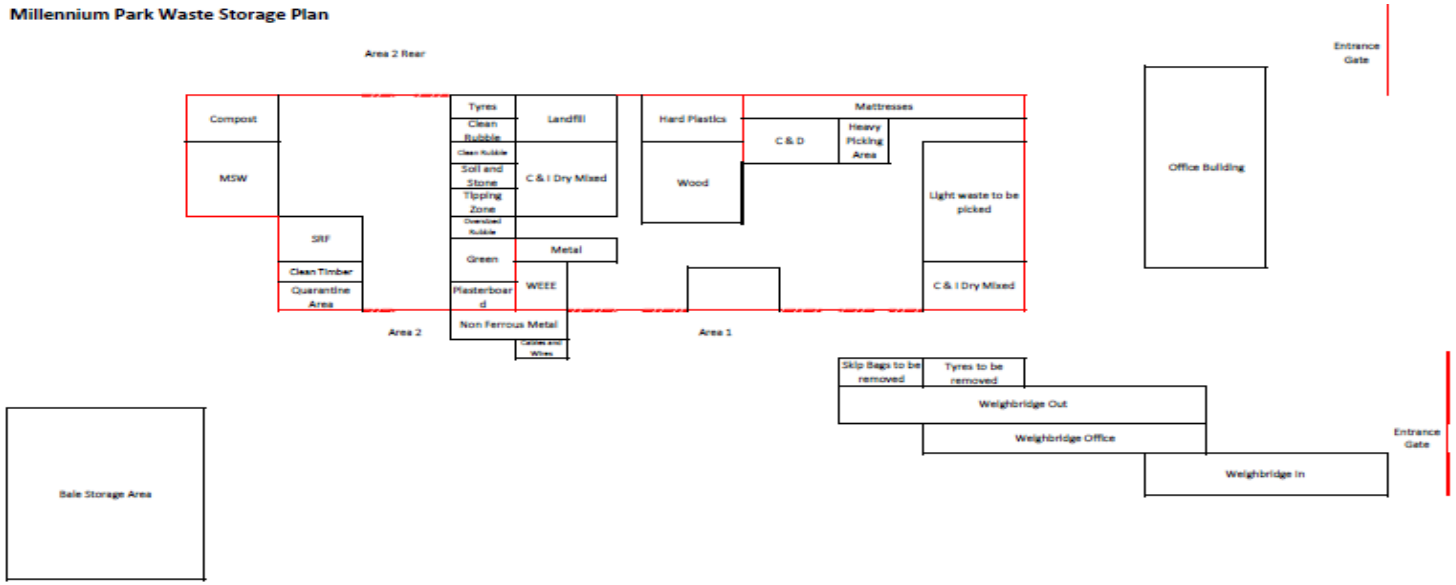
Specialist Services

Service	Original installer	Maintenance company	Maintenance contract in place?	contact name	Contact number
Air con for admin building	Marren Engineering	Marren Engineering	YES	Adrian Mc Cabe or Helen Curran	Routine callouts - 8334144 Emergency callout - **4067434**
Air con for comms room	Trane Air con	Andy Gibbons Air Conditioning	NO	Andy Gibbons	087 2576830
Air con for WB and transport offices	L Lynch & Co.	Andy Gibbons Air Conditioning	NO	Andy Gibbons	087 2576830
Bearings	Various	Fox Engineering	NO	N/A	4693500
CCTV site and MRF	ADT Security	AFC Security	NO	Michael Hanley	086 2791376
Conveyor belt spares	N/A	C&K Fitzpatrick	NO	Brid Fitzpatrick	4589374
Drains	N/A	Horizon Environmental	NO	N/A	
Dust extraction system	Nihot Netherlands	Various	NO	Barry Poldner	+0031 (0) 611912194
Dust suppression system	Mistair UK	Mistair UK	NO	Mike Carter	+44 (7710) 321 331
Electrical spares	N/A	Demesne Electrical	NO	Ian Mc Loughlin	4047700
Electrical system MRF and Admin	Seamus Byrne Electrical	Dale Electrical	NO	Kevin Mc Geough	086-2618850
Fire Hose Reels system (tank, pumps and reels)	L Lynch & Co.	L Lynch & Co. Abacus Fire can change hose reels	NO	Martin O Brian (L Lynch) Martin Prendergast (Abacus)	087-2564309 0872496894
General electrical maintenance (bulbs, fuses minor modifications)	Seamus Byrne Electrical	Dale Electrical	NO	Kevin Mc Geough	086-2618850
General tools	N/A	Multipart Automotive	NO	Liam O Reilly	0868569668

Service	Original installer	Maintenance company	Contract in place?	contact name	Contact number
General water services	L Lynch & Co.	L Lynch & Co.	NO	Martin O Brian	087-2564309
Greenstar sign on MRF building	Taylor Signs	Dale Electrical	NO	Kevin Mc Geough	086-2618850
Husmann compactors	Husmann	Environmental Waste Controls UK	NO	Stuart Mayer	0044 7967 490 209
IT equipment	IT	IT	NO	IT	2947997
Komptech shredder	Komptech	Doyle Equipment	NO	Bernard	087 3800120
Landscaping	N/A	Dowling landscaping	YES	Paul Dowling	087 2454513
Lift	Mid Western lifts	Mid Western lifts	YES	Mary Kirby	8645020
M&J shredders	M&J	Murphy Brothers Ferns	NO	Lorcan Murphy	086 261 3376
Magnets and eddy current separator	Gauss Magentti	Gauss Magentti	NO	Guido De Santis	39 030 3580375
Mobile cold wash	Triace	Triace	NO	Niall Flynn	087-2537193
Office furniture	Alpha Office furniture	Alpha Office furniture	NO	Keith Johnston	087 2325109
Oils and greases EXCEPT M&J shredder grease	Various	Castrol	NO	Peter Dunne	087 2364179
Site lighting	Seamus Byrne Electrical	Dale Electrical	NO	Kevin Mc Geough	086-2618850
Standby generator	FG Wilson	FG Wilson	YES	Sonia Davancaze or Michael Mc Donald	4508322
Telephones	IT	IT	NO	IT	2947997
Truckwash	Triace	Triace	YES	Niall Flynn	087-2537193
Water boilers	Marco Boilers	Marco Boilers	NO	Golden pages	
Weather station	Uisce Technology	Uisce Technology	NO	Audrey Kelly	056 7767485
Weighbridge	Precia Molen	Precia Molen	YES	Michael Furlong	01-8353084

Appendix 3: Waste Storage Plan

Millennium Park Waste Storage Plan



Area	Limit Tonnage	Holding Period for Waste	Max Stockpile Size m3
MSW	100	1 day	10mx16mx4m
Landfill	100	1-2 days	10mx16mx4m
C&I	100	4 days	6mx10mx6m(x2)
Clean Timber	45	4 days or until enough for a load	6mx6mx6m
Wood	45	4 days or until enough for a load	10mx14mx10m
Metal	20	5 days or until enough for a load	4mx6mx6m
Tyres	6	Until enough for a load	4mx6mx6m, 2x20 yard skip
C&D	100	4 days	12mx10mx10m
Green	20	2-3 days or until enough for a load	5mx14mx6m
Mattresses	30		
SRF Bales Outside	3000	One month	
SRF Storage Loose	1000	One month	10mx15mx8m
Cables and Wires	6	Until enough for a load	1 x 14 yard skip
Compost, Brown Bin	25	1 day	10mx8mx4m
Batteries	1	Until enough for a load	Quarantine Area
Gas Cylinders	1	Until enough for a load	Quarantine Area Cage
Oversized Rubble	100	3 days or enough for a load	6mx6mx5m
Clean Rubble	100	3 days or enough for a load	6mx5mx6m (x2)

Appendix 4: Greenstar – Millennium Park Organogram

Please Refer to IF-06C – Greenstar – Millennium Park Organogram

Appendix 5: EPA Guidance Fire at Non Hazardous Waste Transfer Stations.

Fire Safety at Non Hazardous Waste Trar

APPENDIX 2.4

FIRE RISK ASSESSMENT

2021

Fire Risk Assessment

Prepared by: Luke Martin

Engineering a Sustainable Future
Dublin | Cork | Galway | Mullingar | Donegal | London
o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Fire Risk Assessment

Millennium Business Park, Grange, Ballycoolin, Dublin 11

Document Control Sheet

Client:	Starrus Eco Holdings Limited
Document No:	211_128-ORS-XX-XX-RP-EN-13d-001
Date:	9th September 2021

Revision	Status	Author:	Reviewed by:	Approved By:	Issue Date
01	Draft	LM	AK	JB	27/05/2021
02	Final	LM	AK	JB	08/06/2021
03	Final	LM	AK	JB	16/07/2021
04	Final	LM	AK	JB	08/09/2021

Contents

1 Introduction

1.1 Background

Starrus Eco Holdings Limited operates a non-hazardous waste recycling and transfer facility at Millennium Business Park, Grange, Ballycoolin, Dublin 11. The facility operates under Waste Licence **W0183-01**. The main activities carried out at the facility is the processing and treatment of non-hazardous municipal, industrial, commercial, construction & demolition and organic wastes.

1.2 Waste Licence Conditions

Under Industrial Waste Licence **W0183-01**, *Starrus Eco Holdings Limited*. is authorised to accept up to 270,000 tonnes of non-hazardous waste under specified licence conditions aimed at ensuring maximum protection to the environment from site activities.

Of relevance to this report is **Condition 8.2** which states that:

Condition 8: Contingency Arrangements

8.2 The licensee shall, prior to commencement of waste activities at the facility, submit a written Emergency Response Procedure (ERP) to the Agency for its agreement. The ERP shall address any emergency situations which may originate on the facility and shall include provision for minimising the effects of any emergency on the environment. This shall include a risk assessment to determine the requirements at the facility for fire-fighting and fire water retention facilities. The Fire Authority shall be consulted by the licensee during this assessment.

1.3 Objectives

The purpose of this Fire Risk Assessment is to:

- Identify potential fire hazards at the facility.
- Assess the level of provision of early fire detection & warning infrastructure relative to the level of risk of fire at the site.
- Recommend suitable controls to eliminate or reduce the risks of fire hazards.
- Assess the facilities compliance with statutory legislation pertaining to fire safety.
- Provide recommendations of suitable options to ensure adequate firewater retention storage is present on-site at all times.

2 Methodology

2.1 Technical Guidance

The Irish Environmental Protection Agency (EPA) and the UK Environment Agency have issued the following guidance documents tailored specifically to fire safety at waste licensed facilities:

- EPA, (2016) "*Guidance on Fire Risk Assessment for Non-Hazardous Waste Facilities*"
- EPA, (2013) "*Guidance Note – Fire Safety at Non-Hazardous Waste Transfer Stations*"
- EA, (2013) "*Reducing fire risk at sites storing combustible materials: Technical Guidance Note 7.01*"

The UK Waste Industry Safety & Health Forum (WISH) has also published a comprehensive good practice guidance note which provides an added level of detail on fire safety at waste sites:

- WISH, (2017) "*Reducing Fire Risk at Waste Management Sites*"

There are several pieces of statutory legislation pertaining to fire safety which buildings, premises and/or employers must comply with.

- Building Control Act, 2007
- Building Regulations, 1997-2020
- Fire Services Act, 1987 & 2003
- Safety, Health and Welfare at Work Act, 2005

ORS have designed a comprehensive checklist in accordance with these documents to execute a complete review of on-site fire safety and ensure compliance with all statutory legislation.

The UK home office have issued the following document which outlines a Risk Assessment Methodology:

- Department for Communities and Local Government Publications, (2006) "*Fire Safety Risk Assessment: Factories and Warehouses*"

ORS have consulted this document to devise a site-specific risk assessment explained in **section 2.2** & **2.3**.

2.2 Fire Risk Assessment

A Fire Risk Assessment is an organised, methodical inspection of a facility, the activities carried out at the facility and the likelihood of a fire starting or escalating.

For a fire to start it is necessary to have fuel, a source of ignition and oxygen as illustrated in **Figure 2.1**. If any one of these components is absent, a fire will not start.

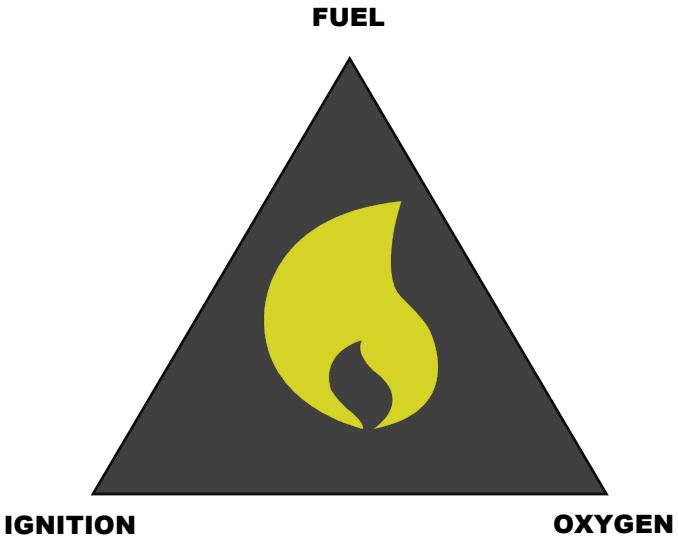


Figure 2.1: The Fire Triangle.

The basic premise of fire safety is to prevent the interaction of the three components of the fire triangle.

The typical steps of a Fire Risk Assessment are outlined as follows:

2.2.1 Step 1: Occupant Characterisation

Quantification and characterisation of all the people who use the facility. This step should pay particular attention to lone working, isolated work areas, people with disabilities and those unfamiliar with the facility.

2.2.2 Step 2: Fire Hazard Identification

Identification of the presence, quantity and location of all possible components of the Fire Triangle on the site.

- Sources of Ignition (naked flames, electrical, gas, oil appliances, plant & machinery)
- Sources of Fuel (Solid/liquid waste, varnishes, solvents, oils, vehicle/heating fuel)
- Sources of Oxygen (Ambient air, HVAC, oxidizing substances, canisters, pyrotechnics)

2.2.3 Step 3: Fire Safety Management

Evaluate, remove, reduce and protect from risks by:

- Removing or reducing the hazards that might cause a fire
- Removed or reduced sources of ignition, fuel and oxygen ensure none of these components are in close proximity to each other
- Fire detection and for warning

- Firefighting equipment
- Escape Routes
- Lighting and emergency lighting
- Adequate signs and notices
- Regular testing and maintaining of safety equipment
- Installation of additional equipment

2.2.4 Step 4: Records and Training

Records must be maintained detailing the following:

- Legislative Compliance
- Fire hazards identified
- Actions taken to reduce the risk to people from the spread of fire and smoke
- Emergency Plan
- Training records of all staff & persons with special responsibilities in event of fire
- Fire Drills

2.2.5 Step 5: Continuous Review

Constant monitoring and updating of the FRA is required particularly in the case of:

- Near misses
- Accident logs
- Previous fire events
- Significant alteration of the facility
- Changes to work practices or activities
- Increase or change of use of hazardous substances
- Failure of fire precautions
- Significant changes to amount or characteristics of occupants

2.2.6 Step 6: Evaluation of Risk Assessment

The risk assessment method applied to this FRA is detailed in **section 2.3**.

- Analysis of all data compiled during site inspection
- Evaluating the risk to building occupants if a fire starts

2.3 Risk Classification

The data derived from the activities detailed in section 2.2 will be used to quantify the risk posed by activities on-site and identify areas of particularly high-risk.

Risk will be assessed as follows:

Likelihood of Fire x Severity of Fire = Fire Risk Rating.

A site-specific risk assessment methodology is outlined in **Table 2.1** and **2.2** below.

Table 2.1: Classification of Likelihood (DoELG, 2010)

Ranking	Likelihood Classification	Description
1.	Extremely Unlikely	May occur in exceptional circumstances. Once every 500 or more years.
2.	Very Unlikely	Is not expected to occur; and/or no recorded incidents or 'anecdotal evidence' and/or very few incidents in associated organisations, facilities or communities; and/or little opportunity, reason or means to occur; may occur once every 100-500 years.
3.	Unlikely	May occur at some time; and / or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity; reason or means to occur; may occur once per 10-100 years.
4.	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years.
5.	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Table 2.2: Severity of Fire (DoELG, 2010)

Ranking	Severity Classification	Description
1.	Minor	Small number of people affected; no fatalities and small number of minor injuries with first- aid treatment. No contamination, localised effects. <€1000 Minor localised disruption to community services or infrastructure (<6 hours).
2.	Limited	Limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration. <€10,000 Normal community functioning with some inconvenience.
3.	Serious	Significant number of people in affected area impacted with single fatality, multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; Evacuation of entire site and neighbouring sites immediately adjacent to the site. External resources required for personal support. Simple contamination, widespread effects or extended duration. €100,000 – €1,000,000 Community only partially functioning, some services available.
4.	Very Serious	More than one fatality, 20-50 serious injuries. Entire site evacuated plus multiple facilities within 0.5km of the site. Heavy contamination, localised effects or extended duration. €1,000,000 – €10,000,000 Community functioning poorly, minimal services available.
5.	Catastrophic	Large numbers of people impacted with significant numbers of fatalities (>20), injuries in the hundreds, more than 2000 evacuated site plus neighbouring facilities within 1km. Very heavy contamination, widespread effects of extended duration. >€10M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

2.4 Risk Evaluation

The resulting risk classifications will be sorted highest to lowest and then incorporated into the Risk Matrix shown in **Table 2.3**.

Table 2.3: Risk Matrix

Likelihood							
	Very Likely	5					
	Likely	4					
	Unlikely	3					
	Very Unlikely	2					
	Extremely Unlikely	1					
			Minor	**Limited**	**Serious**	**Very Serious**	**Catastrophic**
			1	2	3	4	5
			Severity				

3 Site Overview

3.1 Site Location

The site is located within a heavily urbanised, commercial and industrial area known as Millennium Business Park in Ballycoolin with many other licenced facilities in close proximity. The land to the west and south of the site consists of a mixture of commercial and industrial units. The land to the north and east of the site consists of a large quarry, operated by *Roadstone*. The M50 Motorway is located *ca*. 1.34km south of the site. The site is traversed from north-west to south-east by high voltage overhead powerlines (220kV).

The site previously consisted of greenfield pastures prior to its development into a waste transfer facility. In 2004, An Bord Pleanala granted planning permission for the construction of the facility and construction commenced in January 2015. The current licence was granted in April 2015. The facility was commissioned and began accepting waste in July 2006.The total area of the site is *ca.* 4.4 hectares (44,000m^2). An approximate outline of the subject site is provided in **Figure 3.1** below.

Figure 3.1: Site Location - Millennium Business Park, Grange, Ballycoolin, Dublin 11

3.2 Site Layout

The site can be divided into four distinct areas:

(1) **MP-1**: SRF & FLOC processing and storage
(2) **MP-2**: SRF & MSW sorting
(3) **MP-3**: Bulky waste, C&I & C&D processing
(4) **External Yard**: Storage of SRF bales.

The Materials Recovery Building is *ca.* 4226m^2 and comprises **MP-1** and **MP-2** as indicated in **Figure 3.2** below. This was originally designed to accommodate distinct waste handling areas for Commercial and Industrial (C&I) waste, Municipal Solid Waste (MSW) and Construction and Demolition (C&D) waste. Each area has separate access for loading and unloading and waste sorting, processing and storage.

MP-1 is utilised for SRF and FLOC processing. Autoclave-treated FLOC[1] material is delivered to the facility following pre-treatment at a specialist facility and is placed temporarily into stockpiles and fed into a granulator. C&I waste is also delivered to MP-1 and stored in temporary storage bays, pending treatment. This material is then fed into the SRF production line which includes a high speed "Linder" shredder and a baler. The SRF production line traverses both **MP-1** and **MP-2** processing areas. The baled SRF material is then stored in the **External Yard** pending export to cement kilns for co-incineration.

In **MP-2**, mixed MSW is delivered in the waste collection vehicles and off loaded in a designated area inside the building. Large items are removed and the wastes are then processed in an automated processing line to separate out the different waste streams (paper, cardboard, plastic, wood, metal, organics, fines and stone). The recovered materials are sent to authorised facilities for further recycling and the residual non-recyclable heavy waste is sent to landfill, while the non-recyclable light fraction is baled as SRF.

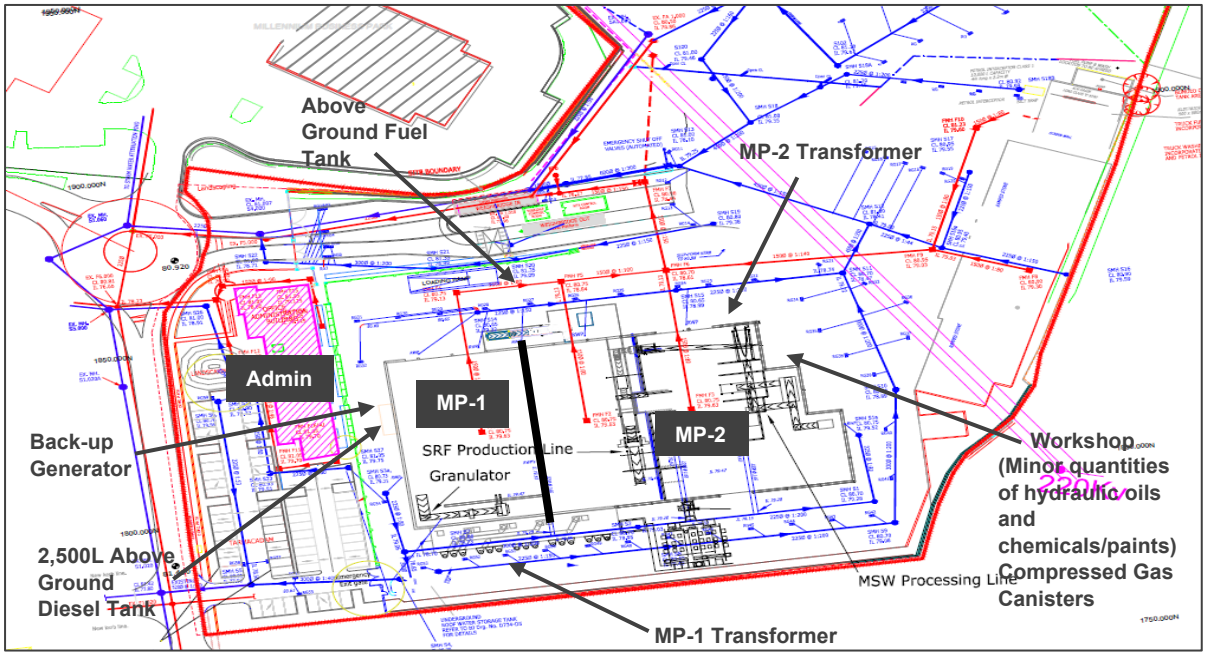


Figure 3.2: Site Layout – MP-1: SRF Processing & Plastic Granulation; and MP-2: SRF & MSW Processing (OCM, 2021)

[1] FLOC material began life as medical/clinical waste such as discarded gloves, sharps etc. This material is pre-treated at a specialist facility, rendering the material non-hazardous, prior to delivery to Millennium Park

MP-3 was granted planning permission by Fingal County Council in September 2018 and commenced operations in 2019. This waste recovery building is *ca.* 4,700m^2 and is used to process bulky wastes and skip wastes, indicated in **Figure 3.3**. Materials are stored in storage bays in a pattern of flammable fractions and non-flammable fractions in order to limit the potential for fire-spread within the building.

The external **Concrete Yard** is located in the space between **MP-1/2** and **MP-3** as indicated in **Figure 3.3**. The site is permitted to temporarily store up to 3,400 SRF bales at the site at any one time, pending export to various cement plants for co-incineration. SRF bales created from other waste sites are imported to the site for temporary storage and stored along-side the SRF bales produced by **MP-1**.

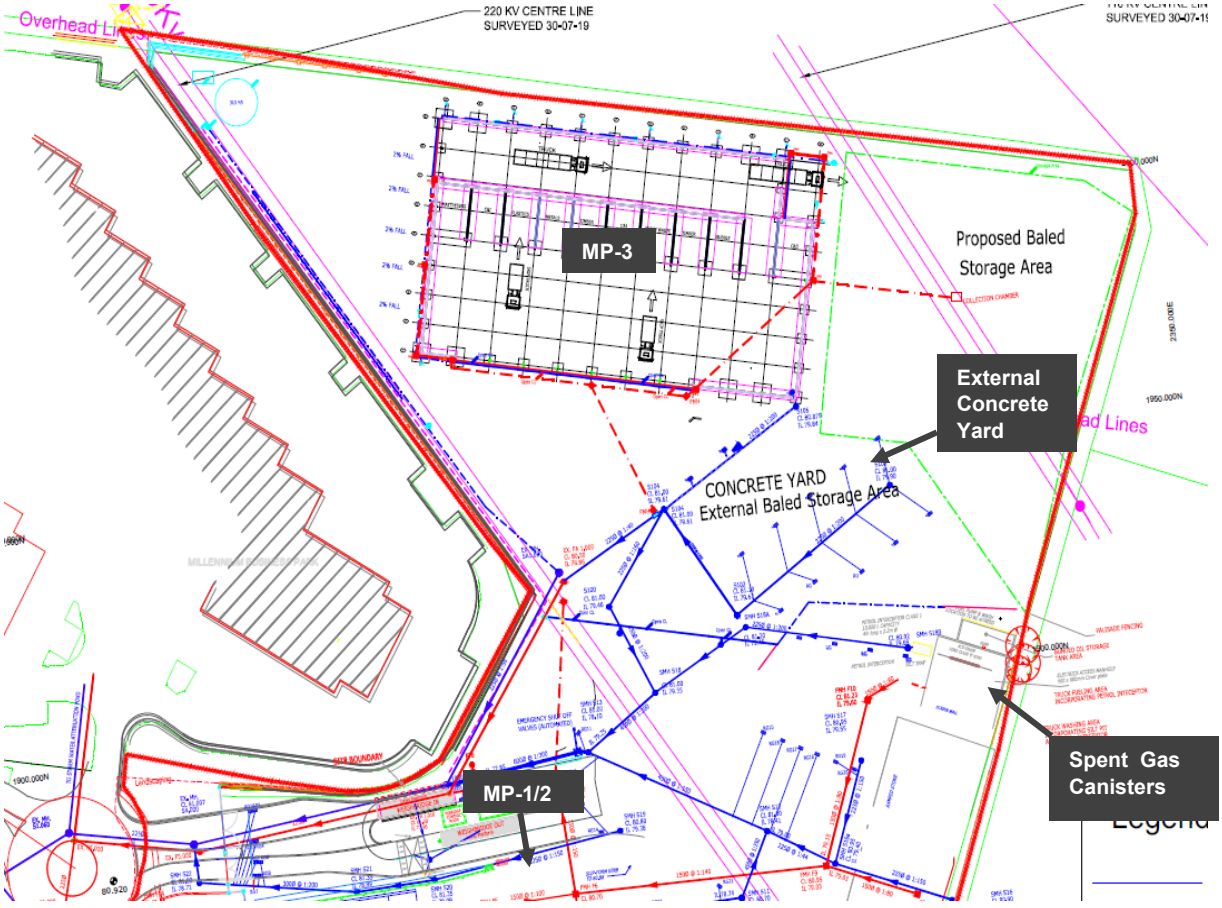


Figure 3.3: Site Layout – MP-3: Bulky Waste & Skip Waste Processing & External Concrete Yard (OCM, 2021)

The natural fall of the site is from north-east to south-west. The storm network is fitted with a 657m^3 capacity attenuation tank located to the west of the site and follows the site gradient towards the southwest. There are petrol interceptors installed towards the east of the site, downstream of the fuel storage area, and towards the west of the site between MP-3 and the site weighbridge.

Full-scale planning drawings detailing the existing site infrastructure are included in **Appendix A**.

3.3 Site Activities

The main activities at the *Starrus Eco Holdings* facility at Millennium Park is the treatment, recycling and recovery of non-hazardous waste for subsequent transfer to suitable facilities for final treatment.

The main elements of the Millennium Park facility consist of the following processes as quoted by the EPA Waste Licence, **W0183-01**:

3.3.1 Disposal Activities

- **Class 11**. Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
    - This activity is limited to the mixture of wastes at the facility prior to the waste being removed off-site for disposal.

- **Class 12**. Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
    - This activity is limited to the repackaging of wastes at the facility prior to the waste being removed off-site for disposal.

- **Class 13**. Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned was produced.
    - This activity is limited to the storage of wastes at the facility prior to being removed off-site for disposal.

3.3.2 Recovery Activities

- **Class 2**. Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes):
    - **This activity is not carried out currently at the facility.**

- **Class 3**. Recycling or reclamation of metals and metal compounds:
    - This activity is limited to the collection, segregation and recovery of waste metals at the facility.

- **Class 4**. Recycling or reclamation of other inorganic materials:
    - This activity is limited to the collection, segregation and recovery of inorganic materials (e.g. some construction and demolition wastes, glass, etc) at the facility.

- **Class 11**. Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule:
    - **This activity is not carried out currently at the facility.**

- **Class 12**. Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule:
    - This activity is limited to the exchange of recovered wastes at the facility.

- **Class 13**. Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced:
    - This activity is limited to the storage of wastes at the facility prior to removal off-site for recovery.

3.4 Plant and Machinery

Plant and machinery is in constant use during operations at the facility. Plant and machinery consists of:

- 2 no. forklifts
- 2 no. Elevated Grabbers
- 1 no. JCB 360º Excavator
- 5 no. front-end loaders
- Multiple articulated tipper lorries (inbound and exported material)
- Multiple Curtain Side lorries (Bale Transport)
- Multiple skip lorries
- 1 no. road sweeper
- Plastic Granulator
- SRF Processing Line
- MSW Processing Line (Hoppers, conveyors, shredders, screens)

3.5 Building Occupants

There are approximately 30 people on-site during any given day of operation consisting of site operatives, administrative staff and managerial staff. There is currently no regular site occupant with a disability.

Visitors unfamiliar to the site are either accompanied by site personnel at all times or are inducted and carry out their scheduled works under a permit-to-work system. It is unlikely that more than 30 persons will occupy the site at any one time.

The site is designed to optimise sightlines between various process areas and is under 24-hour surveillance via CCTV. Incidences of lone working are rare occurrences with all workstations in clear view of adjacent workstations.

4 Fire Hazard Identification

4.1 Sources of Ignition

4.1.1 Fixed Installations

Fixed installations bear the highest risk of ignition on the site due to frictional heat, malfunction or inadvertent placement of unsuitable materials into the unit. As detailed in **section 3.4**, fixed installations present on site include:

- Plastic Granulator
- High Speed “Linder” Shredder (SRF)
- MSW Processing Line (Hoppers, conveyors, shredders, screens, air tables)

There is a plastic granulator located in **MP-1**. The High Speed “Linder” Shredder (SRF) **MP-1** & **MP-2**. The MSW Processing Line is located in **MP-2**. There are no fixed installations within **MP-3**.

4.1.2 Portable Appliances

All portable appliances utilised on site bear a low risk of ignition provided they are subject to regular checks, faulty devices are repaired or replaced, and improper use is avoided. Portable appliances present on site include:

- Portable heaters
- Power Tools
- Air Blower Fans
- Dust Track

The majority Power Tools and industrial appliances are most likely to be found in the maintenance shed, located to the northeast of **MP-2**.

4.1.3 Mobile Plant

Well maintained mobile plant bear a low risk of ignition via frictional heat or malfunction provided they are well-maintained and repaired as required.

- 2 no. forklifts
- 2 no. Elevated Grabbers
- 1 no. JCB 360º Excavator
- 5 no. front-end loaders
- Multiple articulated tipper lorries (inbound and exported material)
- Multiple Curtain Side lorries (Bale Transport)
- Multiple skip lorries
- 1 no. road sweeper

Mobile plant operate in all sections of the site including MP-1/2/3. The road sweeper is deployed twice daily in external areas.

4.1.4 Smoking

Smoking is restricted to a designated area outside, close to the site weighbridge.

4.1.5 Arson

Arson is always a risk due to malicious behaviour or delinquency. Risk is inherently lower at well-maintained facilities, with security present at all times.

4.1.6 Lightning

Each building located on the site is a relatively low-lying structure. The incidence of being struck by lightning is low.

4.2 Sources of Fuel

The following substances which can be classed as fuels are considered further in the Fire Risk Assessment for the site:

- Marked (Green) Diesel
- Diesel
- Loose SRF Stockpiles, Fines stockpiles
- SRF Bales
- Paints/Solvents
- Hydraulic Oil
- Used Absorbents
- Batteries
- Timber Pallets
- Paper/Cardboard
- Plastic

A spent gas cylinder storage cage is located adjacent to the concrete bund. SRF bales are stored in the external concrete yard as indicated in **Figure 3.4**. A self-bunded diesel tank is located adjacent to the back-up generator at **MP-2**. A self-bunded diesel tank is located to the south of the site weighbridge for fuelling site plant. Batteries are not processed on the site but inadvertently arise on site via other waste streams such as MSW and bulky/skip waste. These are stored temporarily in “Battery Bins” and removed to a suitable licence facility periodically.

4.3 Sources of Oxygen

The following substances have the potential to introduce high concentrations of oxygen into the ambient atmosphere which can exacerbate the likelihood of fire:

- Air Compressor
- Air Table Separator
- Plant exhausts

Each of these installations are located throughout **MP-1/2/3**.

5 Fire Safety Management

5.1 Site Specific Fire Hazards

There are no activities carried out on the site which carry an inherent, heightened risk of fire with the exception of the following activities;

(1) Plastic granulator and SRF "Linder" Shredder located in **MP-1/2** – due to frictional forces, it's high operational speeds and the low moisture content.
(2) Lose SRF Stockpiles located in **MP-1** – due to low moisture content and temperatures within the warehouse
(3) Self-heating combustible stockpiles located in **MP-3** – Risk exacerbated by inadvertent placement of ignition sources (e.g., batteries) within the stockpiles.

There are no areas on-site with potentially explosive atmospheres.

5.2 Material Separation

The site is divided into 3 indoor processing areas a large external storage yard with some processing activity as detailed in **figure 3.2 & 3.3**.

EA Guidance on the prevention of fire spread recommends:

- Max height of waste stockpiles 4m, width/length 20m.
- 6m separation distance between combustible waste stockpiles.
- 6m separation distance between waste stockpiles and the site perimeter or adjacent infrastructure/materials.
- Distances may be reduced by using fire walls or bays.

There is generally good separation distances maintained between different processing areas relative to one another. Fire walls and storage bays are utilised to separate processing areas in each building **(MP-1/2/3)**. SRF Stockpiles are stored according EA/WISH standards. Taking the fire triangle into consideration, the proximity of sources of ignition, fuel and oxygen to each other throughout the site are summarised in **Table 5.1**.

Table 5.1: Material Separation of sources of ignition, fuel and oxygen

Building Area	Infrastructure / Activity	Potential Sources			Adequate Distance Maintained?	Fire Triangle Rating
		Ignition	Fuel	Oxygen		
MP-1/MP-2	Storage Bays, feed-hopper, conveyor belts, screens, plant, plastic granulator.	Tong Granulator & SRF "Linder" Shredder (Frictional forces at high speeds)	SRF Fines/Dry material	Ambient Levels	Interaction between potential fuel and ignition source inevitable in "Tong" granulator.	3/3 - The plastic granulator in MP-1 & the SRF Shredder on MP-1/2 presents the greatest fire due to frictional forces, it's high operational speeds and the low moisture content of the plastic fed into the hopper. Risk Mitigated by thermal imaging cameras and automated sprinkler system.
MP-2	MSW Storage Bays, screen, magnet, conveyor belts, separators, plant, trucks	Plant/Machinery due to friction.	MSW	Ambient Levels	Separate waste fractions stored in storage bays which are separated by 6-hour fire-walls.	3/3 - Risk Mitigated by thermal imaging cameras and automated sprinkler system.
MP-3	Bulky Waste/Skip Waste Sorting	Plant/Machinery, Self combustion of waste	Inadvertent acceptance of unsuitable	Ambient Levels	Separate waste fractions stored in	3/3

Building Area	Infrastructure / Activity	Potential Sources			Adequate Distance Maintained?	Fire Triangle Rating
		Ignition	Fuel	Oxygen		
			wastes (e.g. batteries)		storage bays.	
Concrete Yard	SRF Bales, workshop, gas storage, plant movement	Gas Canisters, frictional heat from plant	SRF Bales, gas	Ambient	No	3/3 – Generally good separation distance maintained throughout site. **Exception** – gas storage, and SRF Bale stockpiles along eastern boundary of site.
Mechanical Shed	Maintenance of Plant & Equipment	Gas Canisters, sparks from hot work	Hydraulic Oils, solvents, gas	Ambient	Yes	3/3 Mitigated by good housekeeping and relatively small quantities stored in workshop at any one time.

5.3 Fire Detection & Warning

General fire detection and warning measures maintained throughout the site are as follows:

- Smoke detectors located in in all indoor areas.
- 24 hour, Thermal Imaging CCTV located in **MP-1** & **MP-2**. Inspected annually by *Moran CCTV*.
- Fire Protection system is adequately scaled for the size of the facility.
- Fire alarm system audible throughout all internal waste processing areas
- Emergency lighting is of a sufficient lux (demonstrated during inspection).
- Site occupied by personnel on a 24/7 basis.

All lights & alarms are checked weekly and serviced quarterly.

5.4 Firefighting Equipment

There is adequate firefighting equipment throughout the site, verified by an inspection conducted by the local fire service in 2018. Detailed as follows:

- Fire extinguishers are in good condition, placed at a regular intervals and are readily accessible throughout the site as confirmed by fire service.
- There are hose reels located at adequate intervals throughout the site.
- Fire extinguishers and hose reels are inspected periodically and were service maintenance dates (see **Appendix C**).
- There are electrical isolation switches for each processing area to shut off all fixed installations during emergencies.
- Seven hydrants located on site for fire services to tap into, north, south, east and west of the site. All hydrants free from damage and easily opened.
- There is adequate clearance to fit multiple fire engines on-site.
- There are spill kits located at the Diesel Tank at MP-1 and towards the front of MP-3. Both kits were free from obstruction at the time of inspection.

Panda are in regular contact with the local fire service who are do to complete another site inspection in 2021.

5.5 Escape Routes, Signage & Emergency Lighting

Escape routes are clearly defined and provide all occupants with a reasonable means of escape from each building as verified by an inspection conducted by the local fire service in 2018. Details of site escape routes are as follows:

- All indoor areas are fitted with emergency lighting.
- Emergency escape doors are provided at regular intervals.
- Most emergency escape doors were unobstructed and were easily operably during the site visit.
- Operational escape routes were unobstructed.

Points for review include;

- Some escape routes were obstructed during the site visit. These should be either decommissioned (i.e. signage taken down) or reinstated and obstructions cleared.
- Consider amending Fire Extinguisher & Hose Reels Weekly Checklist to include site signage.

5.6 Fire Spread Limitation

Measures to limit the spread of potential fires were observed as follows:

- There is sufficient distances maintained and/or separation between separate process areas indoors.
- All externally stored SRF bales are stored according to WISH/EA Best practice.
- Storage bays constructed of concrete fire-wall located in all internal treatment buildings. A waste storage plan was provided to ORS on the day of the site inspection and the waste stored in each bay corresponded directly to the outlay on the plan.
- Volume of SRF bales is always kept below the 3,000-tonne temporary storage limit. Volume within storage bays are kept below a safe limit.
- Segregation of different waste streams in external areas is facilitated by skips located in yard areas.
- Penetrations for services are fire stopped
- All storage infrastructure in good condition.

6 Records, Training and Compliance

6.1 Legislative Compliance

6.1.1 Building Control Act & Building Control Regulations

The site is fully compliant with the requirements of the building control act in relation to fire (See Fire Safety Certificate for the site in **Appendix C**).

6.1.2 Fire Services Act 1981 & 2003

The site is fully compliant with the requirements of the Fire Services Act based on the following criteria:

- Hydrants are located on-site, in good working order and painted yellow and labelled. access to them is unobstructed.
- The site was never issued a Fire Safety Notice by the fire services.

6.1.3 Health, Safety & Work Act 2005

The site is fully compliant with the requirements of the Health, Safety & Work Act in relation to fire based on the following criteria:

- The site operator has established a relationship with the local fire brigade and are inspected every 2 years.
- The operator runs fire drills regularly per ERP schedule.
- Visitors to the site are chaperoned at all times.
- The operator has created an Emergency Response Plan with standard operating procedures specifically related to fire (see **Appendix B**).

6.2 Emergency Response Plan

The operator has created an Emergency Response Plan with standard operating procedures specifically related to fire. (see **Appendix B**).

6.3 Training, Maintenance and Inspection Records

Training, maintenance and inspection records were presented for inspection. The following details were confirmed:

- The site operator has established a relationship with the local fire brigade and are inspected every 2 years.
- All site plant and fixed installations are serviced and maintained according to their respective manufacturer's standards.
- The designated fire warden has received the appropriate training to deal with all incidences of fire at the site.

- A detailed procedure on fire is documented within the Emergency Response Plan. There is also a detailed section of the site induction dedicated to fire safety.
- All emergency lighting, alarms and fire suppression infrastructure are serviced periodically
- There is an SOP in place for the documentation of fire incidents. The licensee provided incident logs for inspection. The last incidence of fire was in 2017 and was reported to The Agency via EDEN.
- There is an accident and near miss report folder.
- Fire drills are carried out bi-annually.

7 Fire Risk Assessment

7.1 Fire Risk Assessment Matrix

Table 7.1-7.3 presents a quantitative risk summary posed by site activities ranked from highest risk to lowest. This table is based on the findings of the site inspection and interviews carried out by ORS at the site on the 2nd of April 2021.

Risk is quantified based on the methodology stated in **section 2.3** of this report. Using this methodology, the maximum risk rating assignable is **25** based on a likelihood rating of **5** and a severity rating of **5**. The rationale behind the ratings to assigned to each scenario is detailed a much as possible.

Existing mitigation measures in place at the site are also included in these tables.

7.1.1 MP-1 & MP-2

Table 7.1: Fire Hazards identified in Building MP-1 & MP-2

Hazard ID	Fire Scenario	Likelihood Rating	Basis of Likelihood	Severity Rating	Basis of Severity	Mitigation Measures	Risk Score
1	Fire due to friction, high processing speeds and low calorific value of waste in plastic granulator and the SRF Shredder	4	Low moisture content of material coupled with high operational speeds	3	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	12
2	Fire caused by friction in SRF Baler	2	Lower risk due to much lower speeds of SRF baler	3	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	6
3	Flammable materials inadvertently placed in SRF or MSW Stockpiles	3	High temperatures or friction create a spark and lead to a fire	2	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities.	24 hr surveillance Deluge System Well-trained operatives Fire-fighting hoses + extinguishers readily available	6
4	Self-Combustion of SRF Fines	3	Low Moisture Content coupled with high summertime temperatures/magnification of sunlight	2	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	6
5	Short-circuit of MP-1 or MP-2 Transformer	2	Transformer located external to MP-1 however heat likely to transfer through Kingspan wall of warehouse via radiation and	3	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	24 hr surveillance Deluge System Well-trained operatives	6

			cause loose SRF material to combust.			Fire-fighting hoses + extinguishers readily available	
6	Self-Combustion of MSW Stockpiles	**2**	MSW generally has a higher moisture content making combustion slightly less likely	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	**4**
7	Short-circuit of Back-up Generator and combustion of adjacent Diesel Storage Tank	**2**	Generator and fuel tank located external to MP-1 however heat likely to transfer through Kingspan wall of warehouse via radiation and cause loose SRF material to combust.	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	24 hr surveillance Deluge System Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
8	Arson	**2**	Site under 24-hr surveillance – arson possible but unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	**6**
9	Fires caused by plant	**2**	Plant well-maintained and in good condition	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Maintenance of plant 24 hr surveillance Well-trained operatives Quick response Fire-fighting SOP Sprinkler System	**4**
10	Fire Caused by fixed installations for MSW processing	**2**	Lower likelihood of fire due to higher moisture content of material	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	**4**
11	Lightning Strikes	**1**	Relatively low elevation building, lightning strikes unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	**3**

7.1.2 MP-3

Table 7.2: Fire Hazards identified in Building MP-3

Hazard ID	Fire Scenario	Likelihood Rating	Basis of Likelihood	Severity Rating	Basis of Severity	Mitigation Measures	Risk Score
12	Flammable materials inadvertently placed in SRF or MSW Stockpiles	**3**	High temperatures or friction create a spark and lead to a fire	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities.	24 hr surveillance Intermittent storage of flammable vs non-flammable material, Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
13	Self-Combustion of Semi-Flammable materials	**3**	Low Moisture Content coupled with high summertime temperatures/magnification of sunlight	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	24 hr surveillance Intermittent storage of flammable vs non-flammable material, Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
14	Arson	**2**	Site under 24-hr surveillance – arson possible but unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	**6**
15	Fires caused by plant	**2**	Plant well-maintained and in good condition	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Maintenance of plant 24 hr surveillance Well-trained operatives Quick response Fire-fighting SOP Sprinkler System	**4**

16	Lightning Strikes	**1**	Relatively low elevation building, lightning strikes unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	**3**

7.1.3 External Areas

Table 7.3: Fire Hazards identified in external areas throughout the site

Hazard ID	Fire Scenario	Likelihood Rating	Basis of Likelihood	Severity Rating	Basis of Severity	Mitigation Measures	Risk Score
17	Fire occurring at spent gas cannister storage area to the east of the site and setting adjacent SRF bales ablaze	**4**	High likelihood due to inadequate distances between fuel and ignition sources	**3**	Fatalities possible but unlikely. Fire likely to spread cause substantial air pollution to surrounding industrial estate however is likely to be confined to the bale stockpile east of the site. Financial liability in excess of €100,000	24 hr surveillance Well-trained operatives Fire-fighting hoses + extinguishers readily available	**12**
18	Fire in Mechanical Workshop	**3**	Flammable lubricants, solvents and paints located in the same areas as hot works carried out	**2**	Fire Spread limited due to low quantities of fuel and fire walls	Fire Extinguishers, Fire Detection	**6**
19	Self-Combustion of SRF Stockpiles	**3**	Low Moisture Content coupled with high summertime temperatures	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	24 hr surveillance Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
20	Arson	**2**	Site under 24-hr surveillance – arson possible but unlikely	**3**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	24 hr surveillance Well-trained operatives, Fire-fighting hoses + extinguishers readily available	**6**
21	Fires caused by plant	**2**	Plant well-maintained and in good condition	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Maintenance of plant 24 hr surveillance Well-trained operatives Quick response Fire-fighting SOP Sprinkler System	**4**

7.2 Risk Evaluation

Table 7.4 ranks the risks from highest to lowest according to the risk identification and screening exercise carried out above.

These risks are then represented graphically by Hazard ID in a risk matrix, **Table 5.7**.

Table 7.4: Risk Evaluation – Risk Ratings Ranked from highest to lowest

Hazard ID	Area	Fire Scenario	Likelihood	Consequence	Risk Score
1	MP-1/2	Fire due to friction caused by plastic granulator or the SRF Linder Shredder	4	3	12
17	External Areas	Fire occurring at spent gas cylinder storage area to the east of the site and setting adjacent SRF bales ablaze	4	3	12
2	MP-1	Fire caused by friction or placement of unsuitable objects in SRF Baler	2	**3**	6
3	MP-1/2	Flammable materials inadvertently placed in SRF or MSW Stockpiles	3	**2**	6
4	MP-1	Self-Combustion of SRF Fines	3	**2**	6
5	MP-1/2	Short-circuit of MP-1 or MP-2 Transformer	2	**3**	6
6	MP-2	Self-Combustion of MSW Stockpiles	3	2	6
7	MP-1	Short-circuit of Back-up Generator and combustion of adjacent Diesel Storage Tank	2	3	6
8	MP-1/2	Arson	2	3	6
12	MP-3	Flammable materials inadvertently placed in SRF or MSW Stockpiles	3	**2**	6
13	MP-3	Self-Combustion of Semi-Flammable materials	3	**2**	6
14	MP-3	Arson	2	**3**	6
18	Mech Workshop	Fire in Mechanical Workshop	3	2	6
19	External Areas	Self-Combustion of SRF Stockpiles	3	2	6
20	External Areas	Arson	2	3	6
9	MP-1/2	Fires caused by plant	2	2	4

10	MP-2	Fire Caused by fixed installations for MSW processing	2	2	4
15	MP-3	Fires caused by plant	2	2	4
21	External Areas	Fires caused by plant	2	2	4
11	MP-1/2	Lightning Strikes	1	3	3
16	MP-3	Lightning Strikes	1	3	3

Table 7.5: Fire Risk Matrix for Millennium Park Waste Recovery and Recycling facility.

Likelihood							
	Very Likely	5					
	Likely	4			**1,17**		
	Unlikely	3		**3,4,6,12,13,18,19**			
	Very Unlikely	2		**9,10,15,21**	**2,5,7,8,14,20**		
	Extremely Unlikely	1			**11,16**		
			Minor	**Limited**	**Serious**	**Very Serious**	**Catastrophic**
			1	2	3	4	5
			Severity				

7.3 Risk Summary

Overall the majority of fire scenarios at the site were assigned a risk score of 6 or below which falls into the **low risk** category overall.

A total of 2 fire hazards were assigned a risk score of 12. These hazards are characterized as follows:

- **Hazard ID 1** – The main risk associated with the plastic granulator or the Linder Shredder within the SRF processing line is the interaction between an extremely dry

material within a fast-moving installation with the potential to generate high temperatures.

- **Hazard ID 17** – The main risk associated with this hazard is inadequate separation distances between potential ignition sources (gas cannisters) and potential fuel sources (SRF bales & waste Oil Storage tank).

7.4 Preventative Action

Due to the nature of activities carried out on waste recovery sites the risk is generally higher than that usually experiences in a public setting, on a day-to-day basis.

Such sites are permitted to operate only in full compliance with a list of conditions set out in a licence or permit. The operators of such facilities are obliged to implement safety measures to prevent the occurrence of a multitude of incidents, including fire.

For the vast majority of scenarios explored at the site, the overall risk is considered to be **Low**. Furthermore, the mitigation measures currently in place at the facility were deemed to adequately reduce the risk associated with each scenario.

There were two scenarios which were assigned **moderate** risk scores, both assigned a risk score of 12.

(1) **Hazard ID 1** – The risks associated with the plastic granulator and the SRF Linder Shredder are well-documented and there are adequate mitigation measures in place in order to manage this risk as follows:

a) Supervised at all times when use by well-trained operatives
b) 24/7 thermal imaging CCTV surveillance
c) Emergency Stops
d) Deluge System

(2) **Hazard ID 17** – Proximity of potential fuel and ignition sources at the eastern site boundary. It was noted that there was inadequate separation distances between the spent gas canister storage area (ignition source) and the adjacent stockpile of SRF. The following action is recommended to reduce this risk score:

a) Relocated the spent canister gas storage area to a different area of the site with a minimum separation distance of 15m from potential fuel sources.

8 Conclusions and Recommendations

8.1 Conclusion

The overall fire risk detected at the *Millennium Park* facility was low primarily due to good housekeeping; good source separation of ignition, fuel & oxygen sources; and the comprehensive nature of mitigation measures in place at the site.

Each of these areas have sufficient fire prevention measures in place to reduce the likelihood of a fire and the site is well equipped for early detection and quenching of a fire that may occur, as summarised in **Table 7.1** to **7.3**.

The fire risk was considered to be moderate in two particular areas of the site, MP-1/2 and the external yard towards the eastern site boundary:

- **Hazard ID 1** – The main risk associated with the plastic granulator or the Linder Shredder within the SRF processing line is the interaction between an extremely dry material within a fast-moving installation with the potential to generate high temperatures.
- **Hazard ID 17** – The main risk associated with this hazard is inadequate separation distances between potential ignition sources (gas cannisters) and potential fuel sources (SRF bales).

8.2 Recommendations

(1) **Hazard ID 1** – The risks associated with the plastic granulator and the SRF Linder Shredder are are well-documented and there are adequate mitigation measures in place in order to manage this risk as follows:

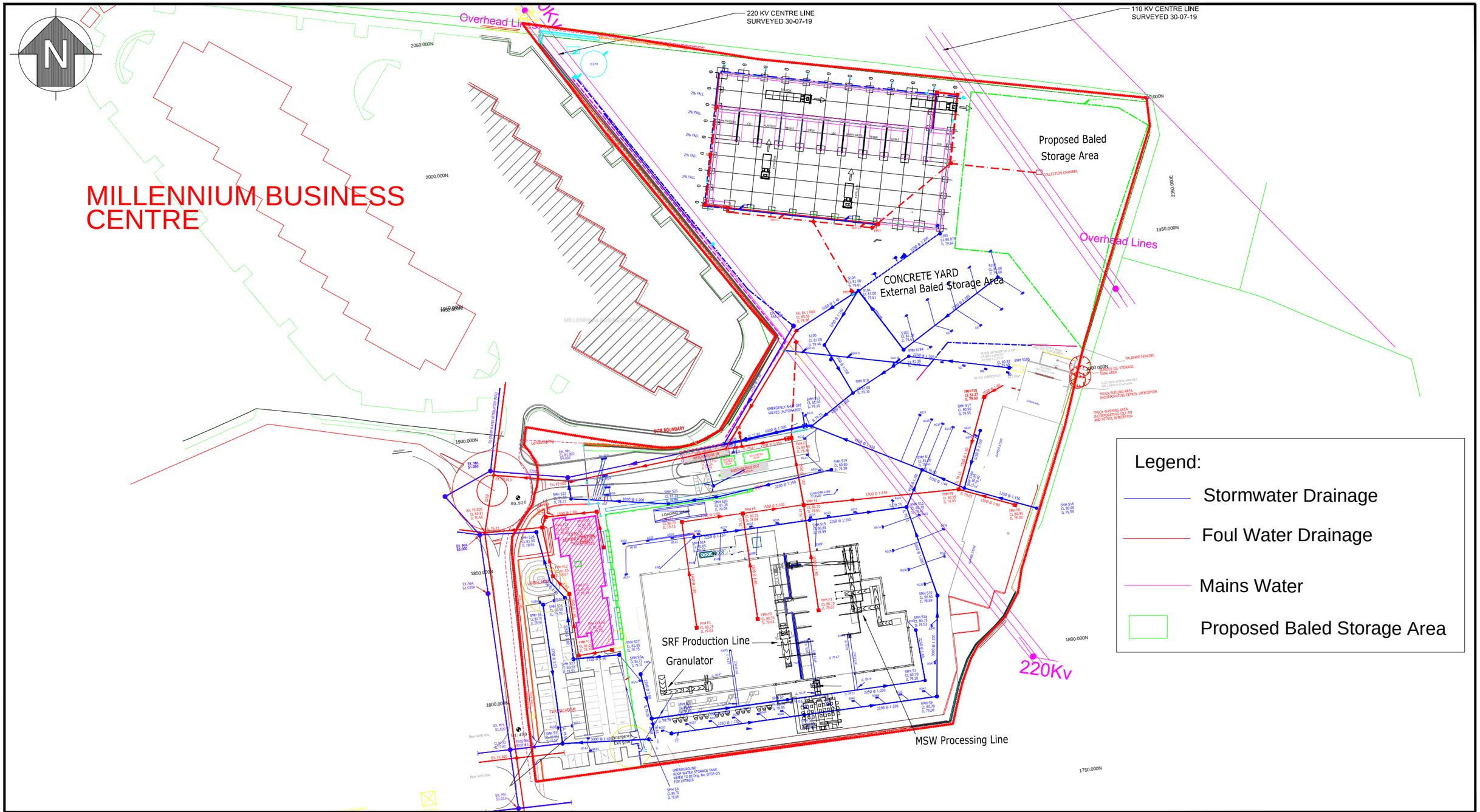
a) Supervised at all times when use by well-trained operatives
b) 24/7 thermal imaging CCTV surveillance
c) Emergency Stops
d) Deluge System

(2) **Hazard ID 17** – Proximity of potential fuel and ignition sources at the eastern site boundary. It was noted that there was inadequate separation distances between the spent gas canister storage area (ignition source) and the adjacent stockpile of SRF and the adjacent Waste Oil Tank. The following action is recommended to reduce this risk score:

a) Relocated the spent canister gas storage area to a different area of the site with a minimum separation distance of 15m from potential fuel sources.

(3) In the interest of clarity, it is recommended that the obsolete emergency exit doors in **MP-1** are decommissioned fully by removing the exit sign entirely.

Appendix A – Site Layout



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

CLIENT

Starrus Eco Holdings Ltd

FIGURE No.

21-138-17-01

TITLE

External Storage/Granulator and SRF Line

Project

Specified Engineering Works

Date

08.03.21

Engineering a Sustainable Future

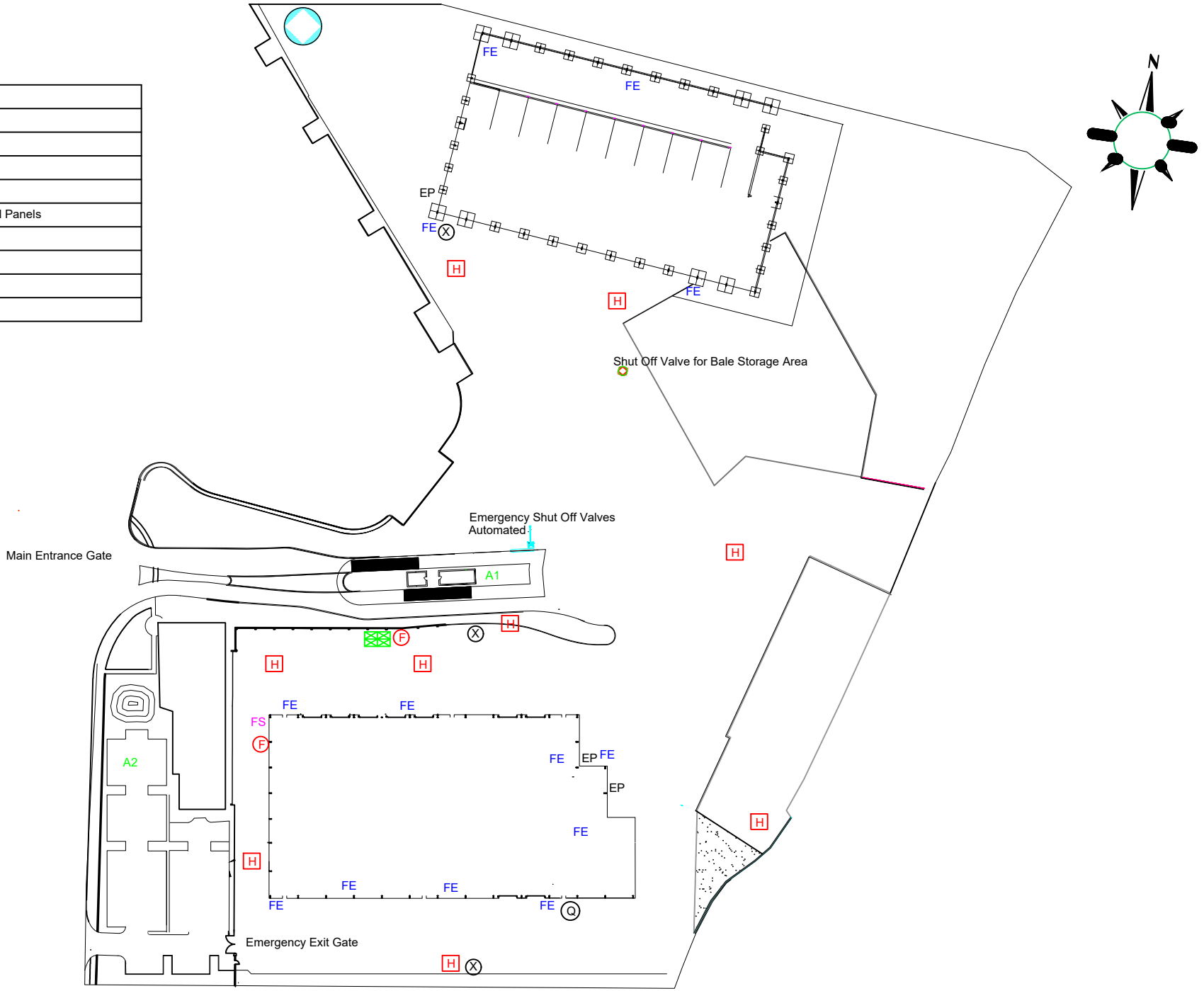
Dublin | Cork | Galway | Mullingar | Donegal | London

o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Appendix B – Excerpt from Emergency Response Plan

Millennium Park - Emergency Response Plan

A1/A2	Assembly Points
(X)	Hydrant Kits
H	Hydrants
(F)	Fuel Storage
(Q)	Quarantine Area
EP	Electrical Control Panels
	Shut Off Valve
FS	Fire Man Switch
	Spill Kits
FE	Fire Equipment



Section 6.0 EMERGENCY PROCEDURE

Condition 8 of the EPA Waste Licence (W0183-01) stipulates that in the event of an emergency, measures should be taken to address the hazard and notify appropriate Authority. To that extent, the Greenstar EHS department should be contacted ASAP but no later than 24H after the emergency arose.

6.1 Emergency definition

An emergency may constitute a fire, an explosion, a spillage, acceptance of an unexpected hazardous or clinical waste, a breakdown of equipment or any of the above that would pose as a risk to human health and safety or to the environment. The previous sentence is not an exhaustive list.

6.2 Incident Investigation

1) Arrange to inspect the area where the incident occurred.
2) Inform the relevant **SEHL** department (Environment and / or HS) and seek advice for any other external communication.
3) Take statements from persons witnessing the incident.
4) Compile all the witness statements in a report.
5) Write a non-conformance report, if applicable.
6) Record the incident in an incident report form.

If applicable, the relevant Authorities will be informed of the incident and/or site closure as well as the reasons for it and corrective/preventive actions to be taken/required to resume normal business.

6.3 **Scenario One:** Fire

Follow the procedure below. The person discovering the fire should:

1) Immediately raise the alarm by giving verbal warning to those nearby or by operating the nearest break glass unit or using an air horn or using the internal radio system.

2) Contact your direct senior person who will escalate the information ASAP to the Fire Officer / Operations Manager or his/her deputy. At that stage, the Fire Officer will decide if the fire brigade should be summoned or not. If the fire brigade should be summoned, the Fire Officer might delegate the call to whoever is deemed competent to do so. This person will immediately contact the Emergency Services by dialling 112 or 999, requesting the fire brigade. He/she will provide the fire brigade with:
   - the address
   - the location of the premises
   - The phone number of the premises
   - And any other relevant information to hand as regards the fire and state of evacuation.

3) On hearing the warning of fire or the fire alarm, all the people in the concerned building should immediately leave by the nearest exit.

Where possible close (but do not lock) doors and windows on your way out.
Any Fire Officer should immediately commence their designated duties.
The Fire Officer will retrieve the fire register and the emergency pack and proceed to the designated assembly point from where he will coordinate the emergency response plan.

4) The site administrative staff and the Operations Manager, if different, will join the Fire Officer to help coordinate the Emergency Response.

5) The Fire Officers will evacuate their respective areas, do a roll call by team at the assembly point and report to the Site Operations Manager.
The assembly point is at the top of the hill, on the grass near the entry gate. If necessary, an intermediate assembly will be designated by the Fire Officer.

6) Fire Officers must inform the Site Operations Manager of any missing persons and if possible their last known whereabouts.

7) The Fire Officer liaise with the Emergency Services on arrival and, using the Emergency Pack, advise the Emergency Services Senior Fire Officer of any additional hazards (i.e. gas bottles, electricity, toxic chemicals, paints etc.)

8) When fire is out and cold, treats residual liquid contaminants as a spillage by using appropriate precautions as toxic/hazardous substances may be present. Appropriate measures are taken to dispose of substances as waste material in a safe and environmentally responsible manner.

No one can re-enter the building until the Fire Officer gives the all clear.

Assembly Point B for the Office Block is at the car park and the Assembly Point A for the Recycling Plant Building is at the weighbridge

Engineering a Sustainable Future

Dublin | Cork | Galway | Mullingar | Donegal | London

o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Appendix C – Fire Extinguisher and Hose Reel Inspections

Doc num: SF073

Issue date: 22/06/2020

Revision: 00

Approved by: P.O'Reilly

Fire Extinguisher& Hose Reels Weekly Checklist

Completed by: _____
Date: _____

Extinguisher Location	Extinguisher No.'s			Exting. in place	Notes	Extinguisher Location	Extinguisher No.'s			Exting. in place	Notes
MP1											
2 x Welders				All ok							
2 x Rear Door (Area 1)				All ok							
2 x Switch Room				All ok							
2 x Rear Door (Area 2)				All ok							
4 x Front of Shed				All ok							
MP2											
2 x Shredder				All ok							
2 x Eddy Current MSW				All ok							
1 x Eddy Current Lights				All ok							
1 x Screener				All ok							
MP3											
2x extinguishers (front of shed LHS)				All ok							
2x extinguishers (front of shed RHS)				All ok							
2x extinguishers (electrical room)				All ok							
2x extinguishers (rear of shed LHS)				All ok							
2x extinguishers (Rear of shed RHS)				All ok							
HOSE REELS				**In Place**	**Condition / Valve ok?**	**Pressure**					**Notes**
MP1											
Front RHS Corner				Ok							
Middle Door Front				Ok							
LHS Side Door Front				Ok							
Welders				Ok							
Middle Door Back				Ok							
Right Door Back				Ok							
MP2 (on plant)											
Reel 1				Ok							
Reel 2				Ok							
Reel 3				Ok							
MP3											
Hose Reel 1				Ok							
Hose Reel 2				Ok							
Hose Reel 3				Ok							
Hose Reel 4				Ok							
Hose Reel 5				Ok							

APPENDIX 2.5

FIREWATER RETENTION ASSESSMENT

Starrus Eco Holdings

Firewater Run-off Retention Assessment

Millennium Business Park, Ballycoolin, Dublin 11

November 2021

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

Firewater Run-off Retention Assessment

Client: Starrus Eco Holdings Ltd

Location: Millennium Business Park,Ballycoolin, Dublin 11

Date: 17th November 2021

Document Control

PROJECT NUMBER: IE2231		DOCUMENT REF: IE2231_Report_5164			
3.0	ISSUE-02	JMC	PMS	JK	17-05-2022
2.0	ISSUE-01	JMC	PMS	JK	31-11-2021
1.0	DRAFT-01	JMC	PMS		10-11-2021
Revision	Purpose Description	Originated	Checked	Reviewed	Date

Contents

Appendices

Appendix E.

ORS Fire Risk Assessment

Appendix G.

Met Eireann DDF Data

1. Introduction

IE Consulting was requested by Starrus Eco Holdings Ltd to undertake a Firewater Runoff Retention Assessment for their existing waste transfer facility at Millennium Business Park, Grange, Ballycoolin, Dublin 11.

This facility is currently licensed by the Environmental Protection Agency (EPA) under Industrial Emissions Licence number W0183-01.

This report presents the findings of a Firewater Runoff Retention Assessment that has been undertaken for the above facility site.

The risk assessment has been undertaken in consideration of the following EPA guidance document:-

'EPA Guidance on Retention Requirements for Firewater Run-off'.

In this regard the required volume of Firewater Runoff Retention for the facility site has been undertaken utilising the EPA Fire Water Risk Assessment (FWRA) tool and applying 'Method 3: General Retention Calculation' to determine the required volume of fire water retention.

This Fire Water Runoff Retention Assessment should be read in conjunction with the 'Fire Risk Assessment Report' prepared by ORS, a copy of which is presented in *Appendix F.*

2. Description of the Facility Site

2.1. General Activity Description

The facility is a non-hazardous waste materials recovery and transfer operation. The site encompasses a total area of approximately 43,836m2, which comprises approximately 8,926m^2 of main materials recovery building (recover buildings MP1+MP2 & MP3), approximately 5,170m^2 of open yard SRF bale storage area and approximately 3200m^2 of office and administration and car parking area. The remaining area of the facility site comprises open yard areas and access roads. The majority of the site area, including the floors of the buildings and the open yard areas are paved with concrete. There is a weighbridge adjacent to the north boundary of the site.

Mixed and sourced separated Household, Commercial and Industrial (C&I) and Construction and Demolition (C&D) wastes are processed on-site to recover materials that are suitable for recycling and to minimise the quantity of treated waste disposed to residual landfill. Hazardous waste is not accepted or processed at the facility site.

The general layout of the facility site is illustrated in *Figure 1* below:

Figure 1 – Facility Site – General Layout

2.2. Emission to Waters

Stormwater runoff generated from the roof areas, car park/access road, open yard and storage areas discharges to the on-site storm water and foul water drainage system which discharges to the public sewerage network at number of separate connection and discharge locations. The stormwater discharge locations from the facility site are shown on *Drawing Number IE2231-002-A, Appendix A.*

All foul waters generated from within the facility are discharged to the on-site foul water drainage system which discharges to the public network. The existing site foul water drainage system is shown on *Drawing Number IE2231-002-A, Appendix A.*

3. Operational Information

The facility site operates 24h per 7 days a week.

Wastes are processed within the material recovery buildings (MP1+MP2 & MP3) where recyclable materials (e.g. plastics, soil, timber, metal, rubble, green waste, solid recovered fuel (SRF)) are removed and the residual waste is sent to landfill. Waste is received from commercial and industrial sources and construction and demolition sources and is delivered to the facility by private individuals, commercial hauliers and facility owned vehicles.

Waste is received in the material recovery building station. Waste received is segregated, processed and recycled within the C&I/SRF building. Hazardous waste is not accepted or processed at the facility. The only material currently being baled on site is solid recovered fuel (SRF). Other recycled material is loaded into bulk ejector trailers and transported to appropriate approved licensed or permitted recycling facilities.

Baled waste is temporarily stored within an open yard storage area prior to being shipped to various ports. The baled waste is temporarily stored within SRF 'Bale Storage Area ' as illustrated in *Figure 1* above.

Other activities and operations undertaken at the facility include the collection of bins and skips and administration of the facility.

4. Firewater Runoff Retention Assessment

The Firewater Runoff Retention Assessment for the facility site has been undertaken on the basis that a significant fire event would occur in isolation in either material recovery buildings MP1+MP2 or MP3, or in the Bale Storage Area and not in combination.

In this regard, separate Firewater Runoff Retention calculations have been undertaken for material recovery building MP1+MP2, material recovery building MP3 and the Bale Storage Area.

4.1. Materials Recovery Building MP1+MP2

The Firewater Runoff Retention assessment for material recovery building MP1+MP2 has been undertaken utilising the EPA Fire Water Risk Assessment (FWRA) tool and applying 'Method 3: General Retention Calculation' to determine the requirement for firewater runoff retention and the volume of firewater retention required. A copy of the FWRA tool utilised for this assessment is presented in *Appendix B*.

The total footprint area of material recovery building MP1+MP2 is 4226m^2.

Significance of Fire Event Tab

Information provided by Starrus Eco Holdings Ltd indicates the maximum volume of waste material that would be held and processed in materials recovery building MP1+MP2 at any one time, comprising materials as listed in current waste storage plan listed in *Table 1* below:

Area	Limit Tonnage	Holding Period for Waste	Max Stockpile Size m3	EWC Code
MP 1				
MSW Lights	100	1-2 days	10m x 8m x 6m	
SRF	100	1-2 days	10m x 8m x 6m	19 12 10
Back End Floc 1	50	1-2 days	12m x 8m x 4m	19 02 03
Back End Floc 2	50	1-2 days	6m x 8m x 4m	19 02 03
Granulated Floc	50	1-2 days	13m x 8m x4m	19 12 12
MSW Lights	100	1-2 days	10m x 8m x 6m	
Heavies	100	1-2 days	10m x 8m x 6m	
SRF	100	1-2 days	10m x 8m x 6m	
C&I fines	50	1-2 days	10m x 8m x 6m	
digested waste	50	1-2 days	10m x 8m x 6m	19 05 01
MP 2				
MSW Intake	50	1 day	18 x 12 x 6m	20 03 01
MSW	50	1 day	(8x6x6m)(20x10x6m)(4m x 6m x 6m)	19 12 12
Aluminium	5	5 days or until enough for a load	(35 yard skip)(6m x 6m x 6m)	15 01 04
Organic Fines	100	1 day	(8x6x6m)(6x6x6m)	19 12 12
Steel	10	5 days or until enough for a load	35 yard skip	19 12 02
Compost	50	5 days or until enough for a load	20m x 6m x 6m	
Optical Rejects	50	5 days or until enough for a load	15m x 6m x 6m	
MSW Lights	50	4 days	(6x6x6m)(22x6x6m)	19 12 12

Table 1 – MP1+MP2 Waste Storage Plan

As listed in *Table 1* above, a maximum waste quantity of 1115 tonnes is stored and processed within materials recovery building MP1+MP2 at any one time. Steel is considered to be a non-flammable and non-combustible material, therefore the maximum waste quantity entered into the 'Significance of Fire Event' tab is **1105 tonnes**, and has been entered as a single quantity under Number 2.3.

Hazard Potential Tab

No specific information or data is available in relation to the Environmental Hazard Statements (H classifications) of the waste material currently stored and processed within materials recovery building MP1+MP2.

In this regard a WGK2 (hazard to waters) classification has been applied to the waste material and has been entered as a single quantity (1105 tonnes) under Number 1.6.

Firewater Runoff Risk Tab

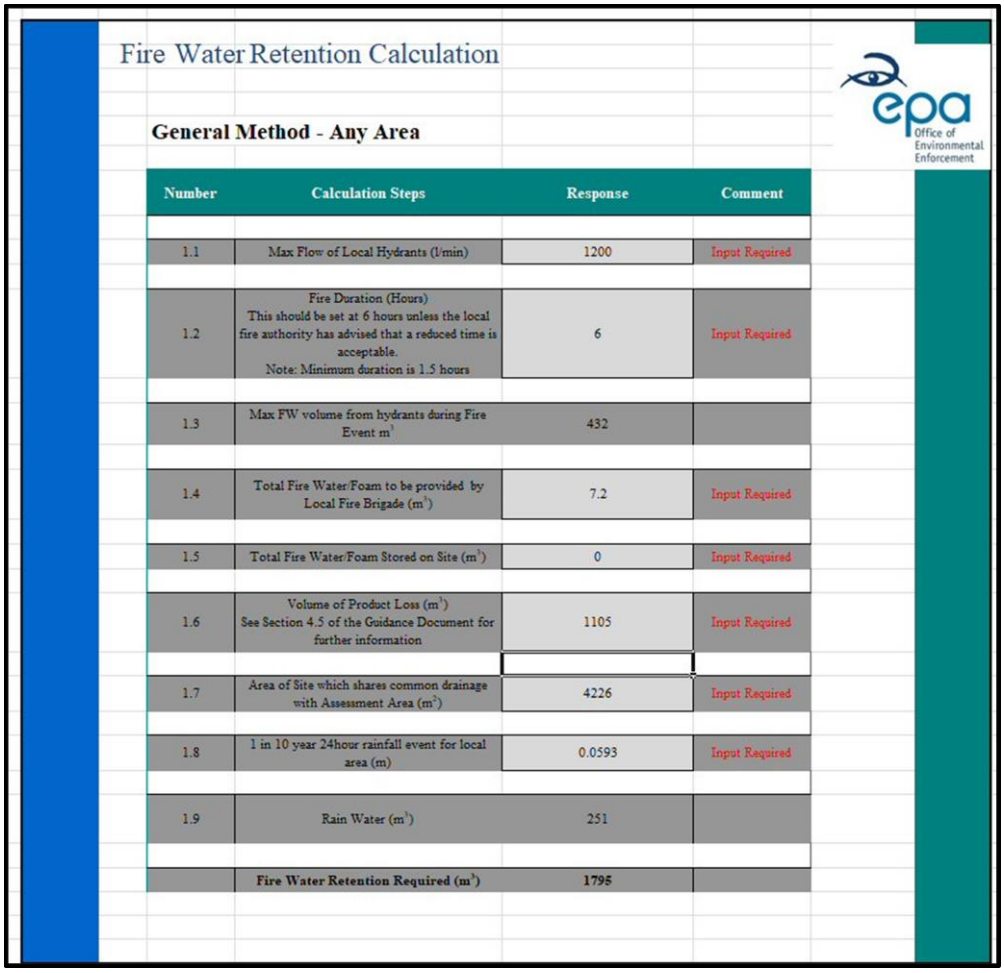
The conclusion of the Firewater Runoff Risk tab indicates that Firewater Retention is required for materials recovery building MP1+MP2.

Method 3 General Calculation Tab

The results of the Firewater Runoff Retention volume calculation for materials recovery building MP1+MP2 is summarised in *Table 2* below (as duplicated from the EPA FWRA tool).

The retention volume calculation assumes the following:

- Maximum flow rate of local mains supplied hydrants = 1200 l/min
- A 6 hour fire duration
- Volume of firewater provide by local fire brigade = 4 No. fire tender @ 1.8m^3/tender = 7.2m^3
- Volume of product loss assumes a density of 1.0 per tonne/m^3 of waste
- The footprint area of materials recovery building MP1+MP2 = 4226m^2
- The 1 in 10 year 24 hour rainfall depth for this geographical region is 59.3mm (see Met Eireann DDF Table, *Appendix G*)



Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1200	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	6	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	432	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	7.2	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	1105	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	4226	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0593	Input Required
1.9	Rain Water (m^3)	251	
	Fire Water Retention Required (m^3)	**1795**	

Table 2 – MP1+MP2 Firewater Retention Requirement

As listed in *Table 2* above, the maximum Firewater Runoff Retention Requirement for materials recovery building MP1+MP2 has been calculated as **1795m^3**.

4.2. Materials Recovery Building MP3

The Firewater Runoff Retention assessment for materials recovery building MP3 has been undertaken utilising the EPA Fire Water Risk Assessment (FWRA) tool and applying 'Method 3: General Retention Calculation' to determine the requirement for firewater runoff retention and the volume of firewater retention required. A copy of the FWRA tool utilised for this assessment is presented in *Appendix C*.

The total footprint area of materials recovery building MP3 is 4700m^2.

Significance of Fire Event Tab

Information provided by Starrus Eco Holdings Ltd indicates the maximum volume of waste material that would be held and processed in materials recovery building MP2 at any one time, comprising materials as listed in current waste storage plan in *Table 3* below:

Area	Limit Tonnage	Holding Period for Waste	Max Stockpile Size m3	EWC Code
MP3				
Timber	50	4 days or until enough for a load	10m x 8m x 6m	20 01 38
C&D/ Timber	50	4 days or until enough for a load	10m x 8m x 6m	17 09 04
C&I Lights	50	4 days	10m x 8m x 6m	20 03 07
Green/ C&I Lights	50	4 days	10m x 8m x 6m	20 02 01
C&I Lights	50	4 days	10m x 8m x 6m	20 03 07
C&D/ C&I	50	4 days	10m x 8m x 6m	17 09 04
Steel	50	4 days	10m x 8m x 6m	19 12 02
Mattresses x 2	50	5 days or until enough for a load	10m x 8m x 6m	19 12 02
Hard Plastics	50	Until enough for a load	10m x 8m x 6m	15 01 02
C&D	200	4 days	30m x 6m x 6m	17 09 04
Landfill	50	4 days	10m x 6m x 6m	20 03 01
MDF	50	4 days	10m x 6m x 6m	20 01 38
PVC Plastics	50	4 days	2 x Standard Skips	19 12 04
Heavy Skip - Tipping		N/A	6m x 6m x 6m	N/A
Light Skip - Tipping A		N/A	6m x 6m x 6m	N/A
Soil and Stone	100	4 days or until enough for a load	6m x 6m x 6m	17 09 04
Rubble	100	4 days or until enough for a load	6m x 6m x 6m	17 09 04

Table 3 – MP3 Waste Storage Plan

As listed in *Table 3* above, a maximum waste quantity of 1050 tonnes is stored and processed within materials recovery building MP3 at any one time. Steel, construction and demolition waste, soil and stone and rubble are considered to be non-flammable and non-combustible materials, therefore the maximum waste quantity entered into the 'Significance of Fire Event' tab is **650 tonnes**, and has been entered as a single quantity under Number 2.3.

Hazard Potential Tab

No specific information or data is available in relation to the Environmental Hazard Statements (H classifications) of the waste material currently stored and processed within materials recovery building MP3.

In this regard a WGK2 (hazard to waters) classification has been applied to the waste material and has been entered as a single quantity (650 tonnes) under Number 1.6.

Firewater Runoff Risk Tab

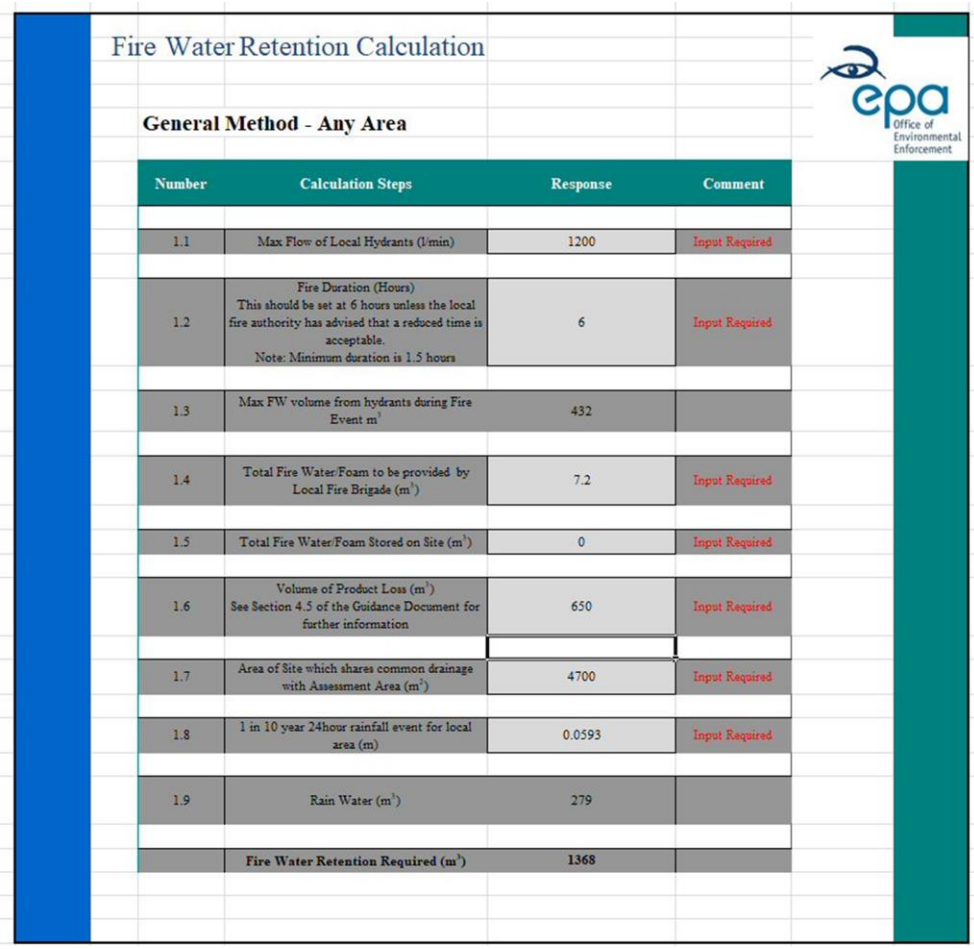
The conclusion of the Firewater Runoff Risk tab indicates that Firewater Retention is required for materials recovery building MP3.

Method 3 General Calculation Tab

The results of the Firewater Runoff Retention volume calculation for materials recovery building MP3 is summarised in *Table 4* below (as duplicated from the EPA FWRA tool).

The retention volume calculation assumes the following:

- Maximum flow rate of local mains supplied hydrants = 1200 l/min
- A 6 hour fire duration
- Volume of firewater provide by local fire brigade = 4 No. fire tender @ 1.8m^3/tender = 7.2m^3
- Volume of product loss assume a density of 1.0 per tonne / m^3 of waste
- The footprint area of materials recovery building MP3 = 4700m^2
- The 1 in 10 year 24 hour rainfall depth for this geographical region is 59.3mm (see Met Eireann DDF Table, *Appendix G*)



Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1200	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	6	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	432	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	7.2	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	650	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	4700	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0593	Input Required
1.9	Rain Water (m^3)	279	
	Fire Water Retention Required (m^3)	**1368**	

Table 4 – MP3 Firewater Retention Requirement

As listed in *Table 4* above, the maximum Firewater Runoff Retention Requirement for materials recovery building MP3 has been calculated as **1368m^3**.

4.3. Bale Storage Area

The Firewater Runoff Retention assessment for the SRF Bale Storage Area has been undertaken utilising the EPA Fire Water Risk Assessment (FWRA) tool and applying 'Method 3: General Retention Calculation' to determine the requirement for firewater runoff retention and the volume of firewater retention required. A copy of the FWRA tool utilised for this assessment is presented in *Appendix C*.

The total footprint area of the Bale Storage Area 1 is 5170m^2.

Significance of Fire Event Tab

Information provided by Starrus Eco Holdings Ltd indicates that the maximum volume of baled SRF waste material that would be stored within the Bale Storage Area at any one time would be 3000 tonnes.

Therefore the maximum waste quantity entered into the 'Significance of Fire Event' tab is **3000 tonnes**, and has been entered as a single quantity under Number 2.3.

Hazard Potential Tab

No specific information or data is available in relation to the Environmental Hazard Statements (H classifications) of the baled SRF waste material currently stored within the Bale Storage Area.

In this regard a WGK2 (hazard to waters) classification has been applied to the waste material and has been entered as a single quantity (3000 tonnes) under Number 1.6.

Firewater Runoff Risk Tab

The conclusion of the Firewater Runoff Risk tab indicates that Firewater Retention is required for the Bale Storage Area.

Method 3 General Calculation Tab

The results of the Firewater Runoff Retention volume calculation for the Bale Storage Area is summarised in *Table 5* below (as duplicated from the EPA FWRA tool).

The retention volume calculation assumes the following:

- Maximum flow rate of local mains supplied hydrants = 1200 l/min
- A 6 hour fire duration
- Volume of firewater provide by local fire brigade = 4 No. fire tender @ 1.8m^3/tender = 7.2m^3
- Volume of product loss assume a density of 1.0 per tonne / m^3 of waste
- The footprint area of the Bale Storage Area = 5170m^2
- The 1 in 10 year 24 hour rainfall depth for this geographical region is 59.3mm (see Met Eireann DDF Table, *Appendix G*)

Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1200	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	6	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	432	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	7.2	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	3000	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	5170	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0593	Input Required
1.9	Rain Water (m^3)	307	
	Fire Water Retention Required (m^3)	**3746**	

Table 5 – Bale Storage Area 1 Firewater Retention Requirement

As listed in *Table 5* above, the maximum Firewater Runoff Retention Requirement for the Bale Storage Area has been calculated as **3746m^3**.

4.4. Summary of Firewater Runoff Retention Requirement

The Firewater Runoff Retention requirement for each area of the facility site is summarised in *Table 6* below:

Facility Site Area	Firewater Runoff Retention Volume Requirement (m^3)
Materials Recovery Building MP1+MP2	1795
Material Recovery Building MP3	1368
Bale Storage Area	3746

Table 6 – Firewater Retention Requirement

5. Provision of Firewater Runoff Retention Volume

As listed in *Table 6* above, on a worst case scenario, and in consideration of a significant fire event within the Bale Storage Area, a total Firewater Runoff Retention volume of 3746m^3 will need to be provided within the overall facility site.

As illustrated in *Figure 2* below, the Bale Storage Area is contained within a retaining wall system. Therefore the occurrence of any fire event within the Bale Storage Area is not expected to impact on any other buildings within the overall facility site.

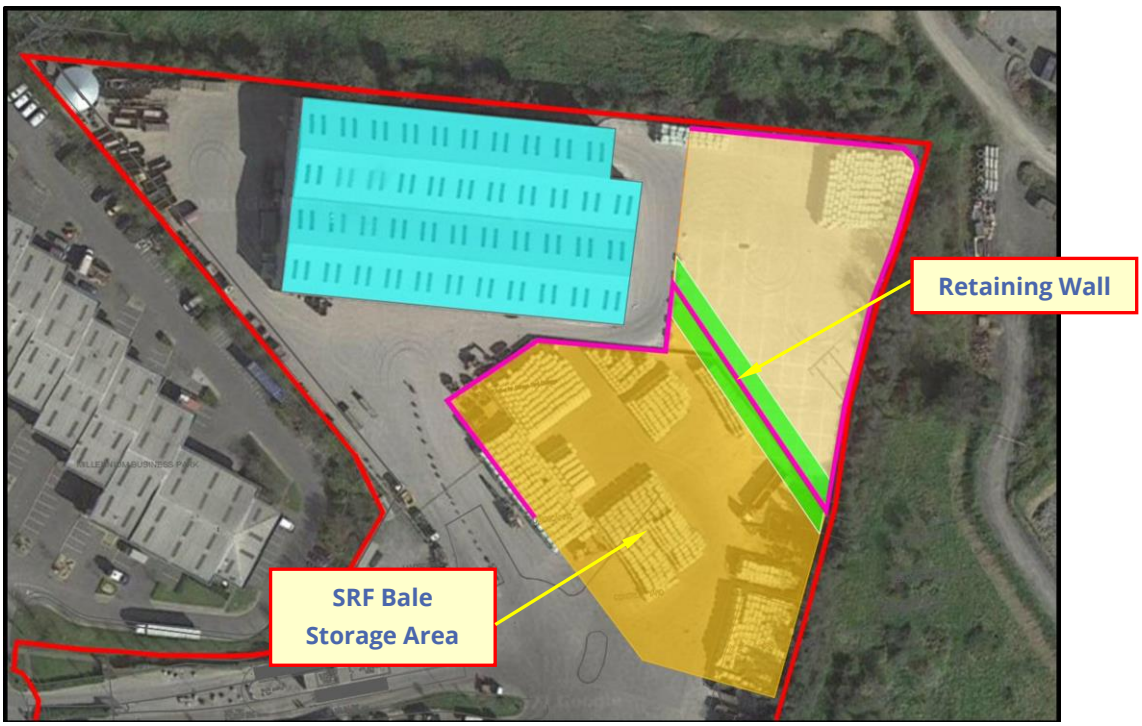


Figure 2

Currently, there are no dedicated on-site facilities for the retention of firewater. It is therefore recommended that site measures be implemented to provide adequate provisions for on-site retention of firewaters. In order to provide the required maximum volume of Firewater Runoff retention within the boundary of the facility site it is proposed to utilise existing external hardstanding yard areas for retention purposes.

As illustrated by the yellow dashed line on *Drawing Number IE2231-002-A, Appendix A*, minimum 0.15m high kerbing is constructed along the perimeter boundary of the facility site. Where minimum 0.15m high kerbing is currently non-existent, remedial works (as summarised in *Section 6* below) shall be undertaken in order to provide containment kerbing.

Utilising existing topographical survey data for the facility site area, a digital surface model (DSM) of the site area was developed in order to calculate the maximum volume of Firewater Runoff that may be retained with the external yard areas of the facility site in consideration of a minimum 0.15m high containment kerbing along the boundary of the site. Utilising the DSM a 3D water depth and volume retention analysis was undertaken utilising an appropriate software package. The results of this analysis indicate that a total Firewater Runoff volume of approximately **4216m^2** (illustrated by blue shaded area on *Drawing Number IE2231-002-A, Appendix A*) can be retained with the external yard area of the facility site, and assuming a retained water depth within varies between 0.15m – 0.098m.

The maximum Firewater Runoff retention volume offered by the external yard area is in excess of the worst case scenario retention volume of **3746m^3** as listed in *Table 2* above.

This assessment and analysis excludes the footprint area of materials recovery buildings MP1+MP2 and MP3 as it is assumed that on a worst case scenario where a significant fire event occurs within the Bale Storage Area, firewater water runoff would be prevented from entering these buildings.

6. Required Remedial Works

In order to provide the required Firewater Runoff Retention volume within the boundary of the facility site as presented above, the following measures and remedial works will need to be implemented:

- Where minimum 0.15m high kerbing is currently non-existent, remedial works shall be undertaken in order to provide containment kerbing.
- Containment booms of minimum 25m length should be stored at the main entrance to the facility site. In the event of a significant fire these booms should be deployed across the main access and egress points from as shown by the solid orange lines on *Drawing Number IE2231-002-A, Appendix A*. The purpose of these containment booms is to prevent any firewaters being conveyed beyond the boundary of the site.

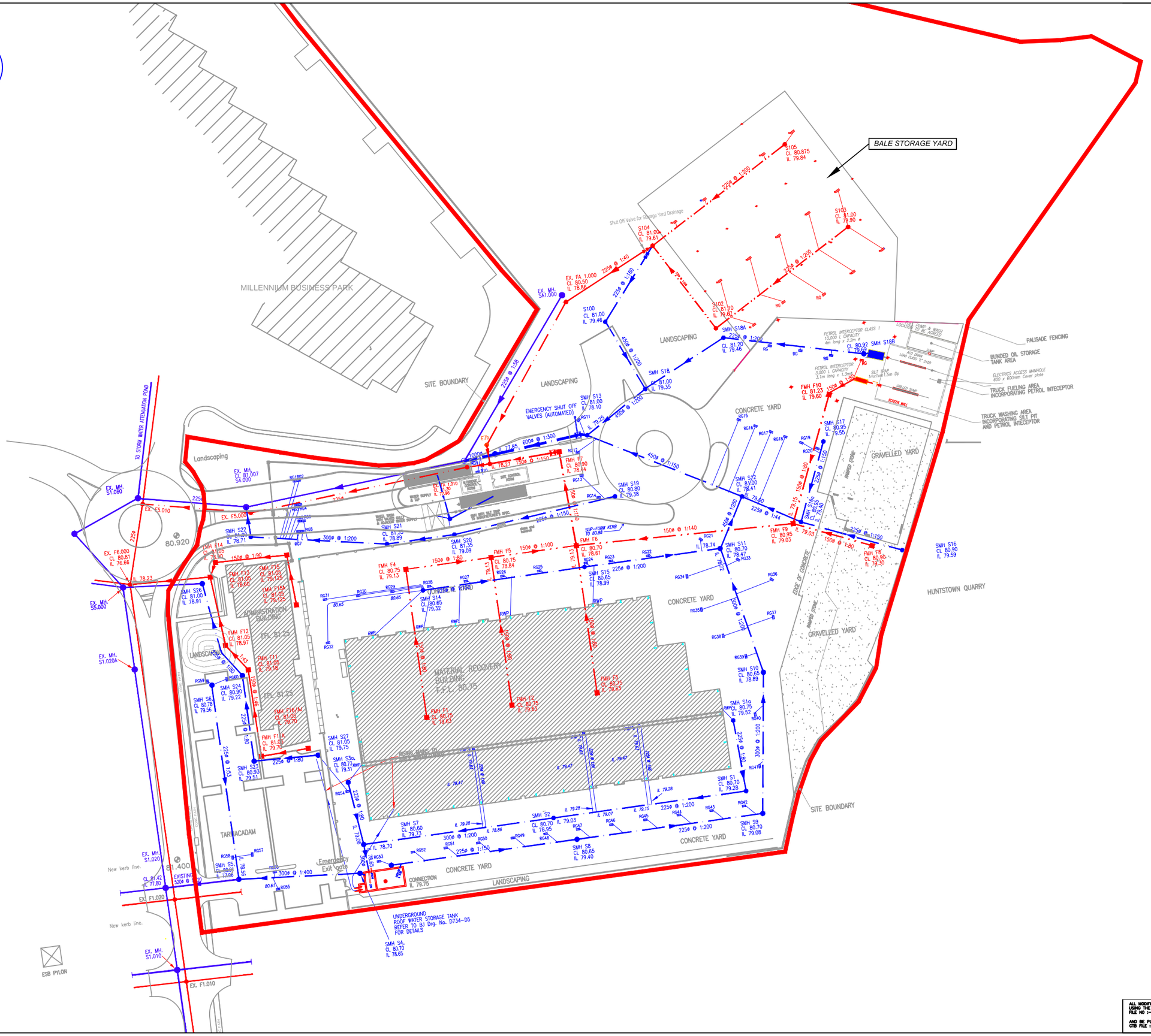
- A minimum 0.15m high ramp should be constructed at the emergency access gate and pedestrian gate between the car park area and the main recovery building should.
- The existing shut off values on the storm and foul water drainage system immediately downstream of the SRF baled storage area should be immediately closed during any fire event.
- An emergency shut off valve should be fitted to existing foul water manhole F5.
- An emergency shut off valve should be fitted to existing stormwater manhole S5.
- The connection from rain water gully 54 (RG54) to existing stormwater manhole S27 should be disconnected and sealed and a new connection formed from RG54 to existing stormwater manhole S3a.

Appendices

Appendix A.

IE2231-001-A

IE2231-002-A



NOTES:–

LEGEND

DENOTES STORMWATER DRAIN

DENOTES FOULWATER SEWER

rev.	date	amendment	drn	ckd
A	22.11.21	CLIENT ISSUE	LM	PMS

greenstar

MILLENNIUM BUSINESS PARK,
BALLYCOOLIN,
DUBLIN 11

FIRE WATER RETENTION RISK ASSESSMENT

EXISTING DRAINAGE LAYOUT

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

TELEPHONE: 059 91 33084
FAX: 059 91 40499
EMAIL: info@iece.ie

DRAWING STATUS: LICENCE	SCALE:	1,000ø A3
	DATUM:	ORDNANCE
	DRAWN:	LM
DRAWING NUMBER: IE2231–001	REV: A	CHECKED: PMS
	APPROVED:	–
	DATE:	22:11:21

ALL MODIFICATIONS TO BE CARRIED OUT USING THE AUTOCAD SYSTEM ONLY
FILE NO :– N:\IE1072–003.DWG

AND BE PLOTTED USING THE FOLLOWING CTB FILE :– F:\IE517–003.CTB

LEGEND:

DENOTES FIREWATER RUNOFF RETAINED WITHIN SITE - MAX DEPTH 0.15M

rev.	date	amendment	drn	chd
A	06.12.21	CLIENT ISSUE	LM	PMS

greenstar

MILLENNIUM BUSINESS PARK,
BALLYCOOLIN,
DUBLIN 11

FIRE WATER RETENTION RISK ASSESSMENT

FIREWATER RETENTION FLOOD EXTENTS

IE CONSULTING
WATER-ENVIRONMENTAL-CIVIL

INNOVATION CENTRE
GREEN ROAD
CARLOW

TELEPHONE: 059 91 33084
FAX: 059 91 40499
EMAIL: info@iece.ie

DRAWING STATUS: LICENCE	SCALE:	1,000@ A3
	DATUM:	ORDNANCE
	DRAWN:	LM
DRAWING NUMBER: IE2331-002	REV: A	CHECKED: PMS
		APPROVED: -
		DATE: 06.12.21

ALL MODIFICATIONS TO BE CARRIED OUT USING THE AUTOCAD SYSTEM ONLY
FILE NO :- N:\IE1072-003.DWG

AND BE PLOTTED USING THE FOLLOWING CTB FILE :- F:\IES17-003.CTB

Appendix B.

Materials Recovery Building MP1+MP2 FWRA Tool

FIRE WATER RETENTION RISK ASSESSMENT

MP1 BUILDING & MP2 BUILDING

Organisation Name	**Starrus Eco Holdings Ltd**	
Licence Number	**W0183-01**	
Completed By	**Name**	Paul McShane
	Position	Senior Hydrological Engineer
	Email	pmcshane@iece.ie
	Direct Tel.	059 91 33084
	Date:	18th November 2021

This Fire Water Retention Risk Assessment Spreadsheet is to be used in conjunction with the EPA Guidance on Retention Requirements for Firewater Run-off. The purpose of this workbook is to determine, at a conservative level, whether firewater retention is required for the facility, and if so the required retention capacity.

SHEET DESCRIPTION	INSTRUCTIONS	COMMENT
Significance of Fire Event	Please enter the fire protection measures that are available in each area of the site and the quantity of flammable and combustible material storage within these areas.	Input Required
Hazard Potential	Please enter the quantities of hazardous substances stored within each "assessment area" of the site. If the site is a licensed waste disposal facility please select "Hazardous" or "Non-Hazardous", or "N/A" if this does not apply.	Input Required
Fire Water Run-Off Risk	This tab will outline the Overall Fire Water Run-Off Risk of each area based on the Significance of a Fire event and the Hazard Potential in each "assessment area". The conclusion as to whether or not the site requires fire water retention is stated here.	Risk Assessment Result
Method 1: Warehouse Retention Calculation	A calculation of the fire water retention required for a warehouse area storage is outlined here. The method is based on the Swiss Federation Firewater Retention Practical Guide.	Input Required
Method 2: Tank Farm / Process Plant Retention Calculation	For other areas, e.g. tank farm, process room, etc. a detailed assessment should be carried out to determine firewater retention volume required. This involves acquiring information on expected fire duration, sprinkler flow rates, etc. See Section 4.3 of the Guidance Report.	Input of Calculation and Support Data
Method 3: General Retention Calculation	A generic calculation can also be used based on first principles of fire water retention. This is a conservative approach to retention volume calculation.	Input Required

Significance of Fire Event

Sample Assessment Area

Number	Fire Protection Measures in this Area	Response		
	1. Fire Prevention Measures			
1.1	Fire Detection and Alarm Systems (FDAS). IS 3218:2013	Yes		
1.2	Automatic Fire Protection	Yes		
	2. Materials Stored	**Tonnes**	**Substance Name(s)**	
	H224 (extremely flammable)	0		Tonnes
	H225 (highly flammable)	0		Tonnes
	H226 (flammable)[1]	0		Tonnes
2.1	**Flammable Liquids Storage**	0		**Tonnes**
	H220 (extremely flammable)	0		Tonnes
	H221 (flammable)	0		Tonnes
2.2	**Flammable Gas Storage**	0		**Tonnes**
	H228 (flammable)	0		Tonnes
2.3	**Flammable Solids Storage**	0		**Tonnes**
	H227 Combustible Liquids	0		Tonnes
	Waste	1105	As Per Table 1	Tonnes
	Packaging (including pallets)	0		Tonnes
	Plastic (if not in packaging above)	0		Tonnes
	Oils/fuels (not classified as flammable)	0		Tonnes
	Process materials (not classified as flammable)	0		Tonnes
	Any other combustible material	0		Tonnes
2.4	**Combustible Materials Storage**	1105		**Tonnes**
	Percent of S1 Storage	3683%		
	Percent of S2 Storage	553%		
	Percent of S3 Storage	553%		

2.0

Fire Significance **S3 - High Significance**

Likelihood	Description
S 1	Low Significance
S 2	Medium Significance
S 3	High Significance

Scoring Details		
Flammable Material Threshold (see Information Tab for Threshold details)	**Fire Protection**	**Significance**
None	N/A	S 1
Lower	FDAS	S 1
Lower	None	S 2
Middle	FDAS Sprinklers	S 1
Middle	FDAS	S 2
Middle	None	S 3
Upper	Any	S 3

Note 1 H226 Flammable Liquids have a large flash point range. Higher flash point flammables (e.g. Diesel - Flash Point 55-56°C) can be considered as combustible for the purpose of this exercise if the material under normal environmental or workplace operational conditions will always be handled at temperatures at least 15ºC below their flashpoint and in consequence will not produce a flammable atmosphere. See *HSG140 - Safe Use and Handling of Flammable Liquids* , UK HSE 2015, for more information. Ambient external temperature in Ireland does not generally exceed 30ºC. See Appendix A of Guidance Report for more information.

FURTHER INFORMATION

Flammable Substance Thresholds (Tonnes)				
Threshold	**Flammable Liquid**	**Flammable Solids**	**Flammable Gas**	**Combustibles**
Upper	≥50	≥10	≥5	≥200
Middle	≥5 - <50	≥0.5 - <10	≥0.1 - <5	≥30 - <200
Lower	≥0.1 - <5	≥0.05 - <0.5	≥0.01 - <0.1	≥2 - <30
None/ Negligible	<0.1	<0.05	<0.01	<2

Hazard Potential

Sample Assessment Area

Number	Material Stored in this Area	Response	Hazard Category
	1. Hazardous Material Storage on Site[1]		
1.1	H400/H410 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.2	H401/411 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.3	H402/412 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.4	H413 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
	Total H400 Equivalent Material	**0**	**H0**
	Note on WGK Classification: Use either H statement or WGK classification of a material. Start with H statement if available, if not available use WGK classification instead. DO NOT ENTER THE SAME MATERIAL UNDER BOTH CLASSIFICATIONS See Appendix A of the Guidance Document for further instruction		
1.5	WGK3 Water Hazardous Material (German Classification) (tonnes)	0	
1.6	WGK2 Water Hazardous Material (German Classification) (tonnes)	1105	
1.7	WGK1 Water Hazardous Material (German Classification - See information tab) (tonnes)	0	
	Total WGK3 Equivalent Material	**110.5**	**H1**
1.8	Laboratories which contain Genetically Modified Micro-Organisms (GMOs) According to Directive 2009/41/EC (Groups 3 & 4) See Appendix A of the Guidance Document for further instruction.	No	H0
1.90	Licensed Hazardous Waste Facility	No	H0
			1

Hazard Potential	Description
H0	No Hazard Potential
H1	Hazard Potential

Scoring Details	
Hazard Potential	**Quantity of Material / Type of Facility**
H0 *No hazard potential*	<1t WGK 3 or Equivalent[3] <1t Toxic (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2]
H1 *Hazard potential*	>1t WGK 3 or Equivalent[3] <1t (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2] Laboratories Which Contain Genetically Modified Micro-Organisms (GMOs) According To Directive 2009/41/EC (Groups 3 & 4) Licenced Waste Storage Facility

Note 1: Hazardous to the Aquatic Environment Equivalent Calculation: 100t H412/H413 = 10t H411 = 1t H400/410

Note 2: WGK Equivalent Calculation: 100t WGK1 = 10t WGK2 = 1t WGK3

Note 3: Fire-fighting foam to be used in this area should be included if relevant hazard classifications apply

Hazard Potential:
The ECHA Chemical Database contains information for the safe handling of hazardous substances and other chemical substances at work. Furthermore the user is offered information on important physical and chemical properties as well as special regulations e.g. GHS classification and labelling according to CLP regulation (pictograms, H phrases, P phrases).

https://echa.europa.eu/

The GESTIS database provides WGK ratings for the majority of substances.

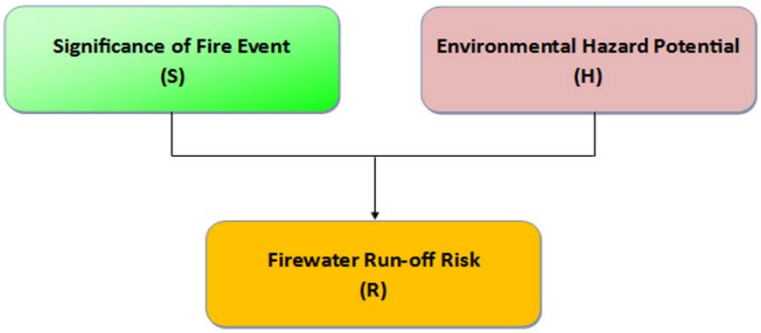
http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

Examples of some commonly used substance on industrial sites in large quantities;

Substance/Material	Flammable or Environmental H-Statements	Water Hazard Class (WGK)
Acetic Acid	**H226:** Flammable liquid and vapour	1
Acetone	**H225:** Highly flammable liquid and vapour	1
Aqueous Ammonia	**H400:** Very toxic to aquatic life	2
Chlorine	**H400:** Very toxic to aquatic life	2
Chromic Acid	**H410:** Very toxic to aquatic life with long lasting effects	3
Copper Sulphate	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	3
Cyclohexane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Diesel	**H226:** Flammable liquid and vapour *(Diesel can be considered combustible liquid for FWRA Tool as per Appendix A, Section 1.2.3) **H411:** Toxic to aquatic life with long lasting effects	2
Ethanol	**H225:** Highly flammable liquid and vapour	1
Heptane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Hydrochloric Acid	No environmental or flammable H-Statement assigned	1
Isopropanol	**H225**: Highly flammable liquid and vapour	1
Isobutanol	**H226:** Flammable liquid and vapour	1
Methanol	**H225:** Highly flammable liquid and vapour	1
Methyl tert-butyl ether (MTBE)	**H225:** Highly flammable liquid and vapour	1
Phenol	**H411:** Toxic to aquatic life with long lasting effects	2
Sodium Nitrite	**H400:** Very toxic to aquatic life	2
Tetrahydrofuran	**H225:** Highly flammable liquid and vapour	1
Toluene	**H225:** Highly flammable liquid and vapour	2
Trichloroacetic Acid	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Trichloroethylene	**H412:** Harmful to aquatic life with long lasting effects.	3
2,2,4-Trimethylpentane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Zinc Chloride	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	3

Overall Fire Water Run-Off Risk

Sample Assessment Area



Sheet Reference	Score
Signficance of Fire Event	S3 - High Significance
Hazard Potential	H1 - Hazard Potential

	H0	H1
S1	R0	R1
S2	R0	R1
S3	R1	R1

	Score
Fire Water Run-Off Risk	R1 - Risk of Environmental Contamination

Risk	Minimum Firewater Retention Measures Required
R0 No Risk	No dedicated firewater retention required.
R1 Risk of Environmental Contamination	Firewater run-off must be retained within the operational site. The retention can be provided by means of the site's drainage system and other suitable infrastructure which is not exclusively foreseen for firewater retention (e.g. storm water ponds / tanks in waste water treatment plants). All elements of the site infrastructure to be used for firewater retention (including shutoff valves) must be regularly inspected to ensure functionality and impermeability. The retention facility must remain impermeable for the duration of the incident up to the removal of the firewater run-off The documented available retention capacity in the existing site infrastructure must be monitored and maintained. Automatic shut-off valves must be maintained and tested. Diversion of firewater to retention facilities must be automatic on activation of the site fire alarm. Onsite bunds cannot be used to provide firewater retention unless the content of a bund is directly involved in the fire event.

Conclusion	
Fire Water Retention Required on Site?	Yes

Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1200	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	6	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	432	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	7.2	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	1105	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	4226	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0593	Input Required
1.9	Rain Water (m^3)	251	
	Fire Water Retention Required (m^3)	**1795**	

Appendix C.

Materials Recovery Building MP3 FWRA Tool

FIRE WATER RETENTION RISK ASSESSMENT

MP3 BUILDING

Organisation Name	**Starrus Eco Holdings Ltd**	
Licence Number	**W0183-01**	
Completed By	**Name**	Paul McShane
	Position	Senior Hydrological Engineer
	Email	pmcshane@iece.ie
	Direct Tel.	059 91 33084
	Date:	18th November 2021

This Fire Water Retention Risk Assessment Spreadsheet is to be used in conjunction with the EPA Guidance on Retention Requirements for Firewater Run-off. The purpose of this workbook is to determine, at a conservative level, whether firewater retention is required for the facility, and if so the required retention capacity.

SHEET DESCRIPTION	INSTRUCTIONS	COMMENT
Significance of Fire Event	Please enter the fire protection measures that are available in each area of the site and the quantity of flammable and combustible material storage within these areas.	Input Required
Hazard Potential	Please enter the quantities of hazardous substances stored within each "assessment area" of the site. If the site is a licensed waste disposal facility please select "Hazardous" or "Non-Hazardous", or "N/A" if this does not apply.	Input Required
Fire Water Run-Off Risk	This tab will outline the Overall Fire Water Run-Off Risk of each area based on the Significance of a Fire event and the Hazard Potential in each "assessment area". The conclusion as to whether or not the site requires fire water retention is stated here.	Risk Assessment Result
Method 1: Warehouse Retention Calculation	A calculation of the fire water retention required for a warehouse area storage is outlined here. The method is based on the Swiss Federation Firewater Retention Practical Guide.	Input Required
Method 2: Tank Farm / Process Plant Retention Calculation	For other areas, e.g. tank farm, process room, etc. a detailed assessment should be carried out to determine firewater retention volume required. This involves acquiring information on expected fire duration, sprinkler flow rates, etc. See Section 4.3 of the Guidance Report.	Input of Calculation and Support Data
Method 3: General Retention Calculation	A generic calculation can also be used based on first principles of fire water retention. This is a conservative approach to retention volume calculation.	Input Required

Significance of Fire Event

Sample Assessment Area

Number	Fire Protection Measures in this Area	Response		
	1. Fire Prevention Measures			
1.1	Fire Detection and Alarm Systems (FDAS). IS 3218:2013	Yes		
1.2	Automatic Fire Protection	Yes		
	2. Materials Stored	**Tonnes**	**Substance Name(s)**	
	H224 (extremely flammable)	0		Tonnes
	H225 (highly flammable)	0		Tonnes
	H226 (flammable)[1]	0		Tonnes
2.1	**Flammable Liquids Storage**	0		**Tonnes**
	H220 (extremely flammable)	0		Tonnes
	H221 (flammable)	0		Tonnes
2.2	**Flammable Gas Storage**	0		**Tonnes**
	H228 (flammable)	0		Tonnes
2.3	**Flammable Solids Storage**	0		**Tonnes**
	H227 Combustible Liquids	0		Tonnes
	Waste	650	As Per Table 3	Tonnes
	Packaging (including pallets)	0		Tonnes
	Plastic (if not in packaging above)	0		Tonnes
	Oils/fuels (not classified as flammable)	0		Tonnes
	Process materials (not classified as flammable)	0		Tonnes
	Any other combustible material	0		Tonnes
2.4	**Combustible Materials Storage**	650		**Tonnes**
	Percent of S1 Storage	2167%		
	Percent of S2 Storage	325%		
	Percent of S3 Storage	325%		

2.0

Fire Significance **S3 - High Significance**

Likelihood	Description
S 1	Low Significance
S 2	Medium Significance
S 3	High Significance

Scoring Details		
Flammable Material Threshold (see Information Tab for Threshold details)	**Fire Protection**	**Significance**
None	N/A	S 1
Lower	FDAS	S 1
Lower	None	S 2
Middle	FDAS Sprinklers	S 1
Middle	FDAS	S 2
Middle	None	S 3
Upper	Any	S 3

Note 1 H226 Flammable Liquids have a large flash point range. Higher flash point flammables (e.g. Diesel - Flash Point 55-56°C) can be considered as combustible for the purpose of this exercise if the material under normal environmental or workplace operational conditions will always be handled at temperatures at least 15ºC below their flashpoint and in consequence will not produce a flammable atmosphere. See *HSG140 - Safe Use and Handling of Flammable Liquids* , UK HSE 2015, for more information. Ambient external temperature in Ireland does not generally exceed 30ºC. See Appendix A of Guidance Report for more information.

FURTHER INFORMATION

Flammable Substance Thresholds (Tonnes)				
Threshold	**Flammable Liquid**	**Flammable Solids**	**Flammable Gas**	**Combustibles**
Upper	≥50	≥10	≥5	≥200
Middle	≥5 - <50	≥0.5 - <10	≥0.1 - <5	≥30 - <200
Lower	≥0.1 - <5	≥0.05 - <0.5	≥0.01 - <0.1	≥2 - <30
None/ Negligible	<0.1	<0.05	<0.01	<2

Hazard Potential

Sample Assessment Area

Number	Material Stored in this Area	Response	Hazard Category
	1. Hazardous Material Storage on Site[1]		
1.1	H400/H410 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.2	H401/411 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.3	H402/412 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.4	H413 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
	Total H400 Equivalent Material	**0**	**H0**
	Note on WGK Classification: Use either H statement or WGK classification of a material. Start with H statement if available, if not available use WGK classification instead. DO NOT ENTER THE SAME MATERIAL UNDER BOTH CLASSIFICATIONS See Appendix A of the Guidance Document for further instruction		
1.5	WGK3 Water Hazardous Material (German Classification) (tonnes)	0	
1.6	WGK2 Water Hazardous Material (German Classification) (tonnes)	650	
1.7	WGK1 Water Hazardous Material (German Classification - See information tab) (tonnes)	0	
	Total WGK3 Equivalent Material	**65**	**H1**
1.8	Laboratories which contain Genetically Modified Micro-Organisms (GMOs) According to Directive 2009/41/EC (Groups 3 & 4) See Appendix A of the Guidance Document for further instruction.	No	H0
1.90	Licensed Hazardous Waste Facility	No	H0
			1

Hazard Potential	Description
H0	No Hazard Potential
H1	Hazard Potential

Scoring Details	
Hazard Potential	**Quantity of Material / Type of Facility**
H0 *No hazard potential*	<1t WGK 3 or Equivalent[3] <1t Toxic (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2]
H1 *Hazard potential*	>1t WGK 3 or Equivalent[3] <1t (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2] Laboratories Which Contain Genetically Modified Micro-Organisms (GMOs) According To Directive 2009/41/EC (Groups 3 & 4) Licenced Waste Storage Facility

Note 1: Hazardous to the Aquatic Environment Equivalent Calculation: 100t H412/H413 = 10t H411 = 1t H400/410

Note 2: WGK Equivalent Calculation: 100t WGK3 = 10t WGK2 = 1t WGK3

Note 3: Fire-fighting foam to be used in this area should be included if relevant hazard classifications apply

Hazard Potential:
The ECHA Chemical Database contains information for the safe handling of hazardous substances and other chemical substances at work. Furthermore the user is offered information on important physical and chemical properties as well as special regulations e.g. GHS classification and labelling according to CLP regulation (pictograms, H phrases, P phrases).

https://echa.europa.eu/

The GESTIS database provides WGK ratings for the majority of substances.

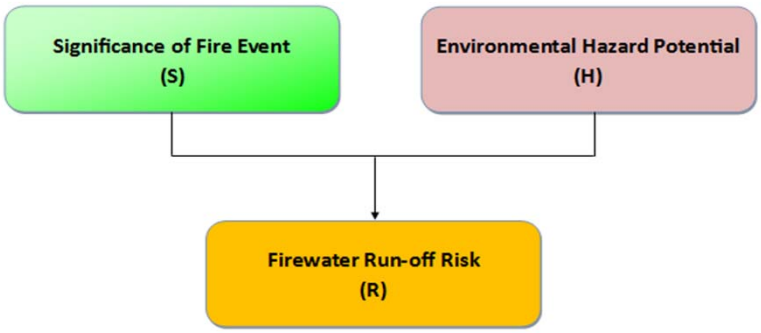
http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

Examples of some commonly used substance on industrial sites in large quantities;

Substance/Material	Flammable or Environmental H-Statements	Water Hazard Class (WGK)
Acetic Acid	**H226:** Flammable liquid and vapour	1
Acetone	**H225:** Highly flammable liquid and vapour	1
Aqueous Ammonia	**H400:** Very toxic to aquatic life	2
Chlorine	**H400:** Very toxic to aquatic life	2
Chromic Acid	**H410:** Very toxic to aquatic life with long lasting effects	3
Copper Sulphate	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	3
Cyclohexane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Diesel	**H226:** Flammable liquid and vapour *(Diesel can be considered combustible liquid for FWRA Tool as per Appendix A, Section 1.2.3) **H411:** Toxic to aquatic life with long lasting effects	2
Ethanol	**H225:** Highly flammable liquid and vapour	1
Heptane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Hydrochloric Acid	No environmental or flammable H-Statement assigned	1
Isopropanol	**H225**: Highly flammable liquid and vapour	1
Isobutanol	**H226:** Flammable liquid and vapour	1
Methanol	**H225:** Highly flammable liquid and vapour	1
Methyl tert-butyl ether (MTBE)	**H225:** Highly flammable liquid and vapour	1
Phenol	**H411:** Toxic to aquatic life with long lasting effects	2
Sodium Nitrite	**H400:** Very toxic to aquatic life	2
Tetrahydrofuran	**H225:** Highly flammable liquid and vapour	1
Toluene	**H225:** Highly flammable liquid and vapour	2
Trichloroacetic Acid	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Trichloroethylene	**H412:** Harmful to aquatic life with long lasting effects.	3
2,2,4-Trimethylpentane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Zinc Chloride	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	3

Overall Fire Water Run-Off Risk

Sample Assessment Area



Sheet Reference	Score
Signficance of Fire Event	S3 - High Significance
Hazard Potential	H1 - Hazard Potential

	H0	H1
S1	R0	R1
S2	R0	R1
S3	R1	R1

	Score
Fire Water Run-Off Risk	R1 - Risk of Environmental Contamination

Risk	Minimum Firewater Retention Measures Required
R0 No Risk	No dedicated firewater retention required.
R1 Risk of Environmental Contamination	Firewater run-off must be retained within the operational site. The retention can be provided by means of the site's drainage system and other suitable infrastructure which is not exclusively foreseen for firewater retention (e.g. storm water ponds / tanks in waste water treatment plants). All elements of the site infrastructure to be used for firewater retention (including shutoff valves) must be regularly inspected to ensure functionality and impermeability. The retention facility must remain impermeable for the duration of the incident up to the removal of the firewater run-off The documented available retention capacity in the existing site infrastructure must be monitored and maintained. Automatic shut-off valves must be maintained and tested. Diversion of firewater to retention facilities must be automatic on activation of the site fire alarm. Onsite bunds cannot be used to provide firewater retention unless the content of a bund is directly involved in the fire event.

Conclusion	
Fire Water Retention Required on Site?	Yes

Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1200	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	6	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	432	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	7.2	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	650	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	4700	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0593	Input Required
1.9	Rain Water (m^3)	279	
	Fire Water Retention Required (m^3)	**1368**	

Appendix D.

Bale Storage Area FWRA Tool

FIRE WATER RETENTION RISK ASSESSMENT

External SRF Bale Storage Area 1

Organisation Name	**Starrus Eco Holdings Ltd**	
Licence Number	**W0183-01**	
Completed By	**Name**	Paul McShane
	Position	Senior Hydrological Engineer
	Email	pmcshane@iece.ie
	Direct Tel.	059 91 33084
	Date:	18th November 2021

This Fire Water Retention Risk Assessment Spreadsheet is to be used in conjunction with the EPA Guidance on Retention Requirements for Firewater Run-off. The purpose of this workbook is to determine, at a conservative level, whether firewater retention is required for the facility, and if so the required retention capacity.

SHEET DESCRIPTION	INSTRUCTIONS	COMMENT
Significance of Fire Event	Please enter the fire protection measures that are available in each area of the site and the quantity of flammable and combustible material storage within these areas.	Input Required
Hazard Potential	Please enter the quantities of hazardous substances stored within each "assessment area" of the site. If the site is a licensed waste disposal facility please select "Hazardous" or "Non-Hazardous", or "N/A" if this does not apply.	Input Required
Fire Water Run-Off Risk	This tab will outline the Overall Fire Water Run-Off Risk of each area based on the Significance of a Fire event and the Hazard Potential in each "assessment area". The conclusion as to whether or not the site requires fire water retention is stated here.	Risk Assessment Result
Method 1: Warehouse Retention Calculation	A calculation of the fire water retention required for a warehouse area storage is outlined here. The method is based on the Swiss Federation Firewater Retention Practical Guide.	Input Required
Method 2: Tank Farm / Process Plant Retention Calculation	For other areas, e.g. tank farm, process room, etc. a detailed assessment should be carried out to determine firewater retention volume required. This involves acquiring information on expected fire duration, sprinkler flow rates, etc. See Section 4.3 of the Guidance Report.	Input of Calculation and Support Data
Method 3: General Retention Calculation	A generic calculation can also be used based on first principles of fire water retention. This is a conservative approach to retention volume calculation.	Input Required

Significance of Fire Event

Sample Assessment Area

Number	Fire Protection Measures in this Area	Response		
	1. Fire Prevention Measures			
1.1	Fire Detection and Alarm Systems (FDAS). IS 3218:2013	Yes		
1.2	Automatic Fire Protection	No		
	2. Materials Stored	**Tonnes**	**Substance Name(s)**	
	H224 (extremely flammable)	0		Tonnes
	H225 (highly flammable)	0		Tonnes
	H226 (flammable)[1]	0		Tonnes
2.1	**Flammable Liquids Storage**	0		**Tonnes**
	H220 (extremely flammable)	0		Tonnes
	H221 (flammable)	0		Tonnes
2.2	**Flammable Gas Storage**	0		**Tonnes**
	H228 (flammable)	0		Tonnes
2.3	**Flammable Solids Storage**	0		**Tonnes**
	H227 Combustible Liquids	0		Tonnes
	Waste	3000	SRF Bales	Tonnes
	Packaging (including pallets)	0		Tonnes
	Plastic (if not in packaging above)	0		Tonnes
	Oils/fuels (not classified as flammable)	0		Tonnes
	Process materials (not classified as flammable)	0		Tonnes
	Any other combustible material	0		Tonnes
2.4	**Combustible Materials Storage**	3000		**Tonnes**
	Percent of S1 Storage	150000%		
	Percent of S2 Storage	10000%		
	Percent of S3 Storage	1500%		

2.0

Fire Significance **S3 - High Significance**

Likelihood	Description
S 1	Low Significance
S 2	Medium Significance
S 3	High Significance

Scoring Details		
Flammable Material Threshold (see Information Tab for Threshold details)	**Fire Protection**	**Significance**
None	N/A	S 1
Lower	FDAS	S 1
Lower	None	S 2
Middle	FDAS Sprinklers	S 1
Middle	FDAS	S 2
Middle	None	S 3
Upper	Any	S 3

Note 1 H226 Flammable Liquids have a large flash point range. Higher flash point flammables (e.g. Diesel - Flash Point 55-56°C) can be considered as combustible for the purpose of this exercise if the material under normal environmental or workplace operational conditions will always be handled at temperatures at least 15ºC below their flashpoint and in consequence will not produce a flammable atmosphere. See *HSG140 - Safe Use and Handling of Flammable Liquids* , UK HSE 2015, for more information. Ambient external temperature in Ireland does not generally exceed 30ºC. See Appendix A of Guidance Report for more information.

FURTHER INFORMATION

Flammable Substance Thresholds (Tonnes)				
Threshold	**Flammable Liquid**	**Flammable Solids**	**Flammable Gas**	**Combustibles**
Upper	≥50	≥10	≥5	≥200
Middle	≥5 - <50	≥0.5 - <10	≥0.1 - <5	≥30 - <200
Lower	≥0.1 - <5	≥0.05 - <0.5	≥0.01 - <0.1	≥2 - <30
None/ Negligible	<0.1	<0.05	<0.01	<2

Hazard Potential

Sample Assessment Area

Number	Material Stored in this Area	Response	Hazard Category
	1. Hazardous Material Storage on Site[1]		
1.1	H400/H410 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.2	H401/411 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.3	H402/412 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
1.4	H413 Environmentally Hazardous Material (GHS Classification) (tonnes)	0	
	Total H400 Equivalent Material	**0**	**H0**
	Note on WGK Classification: Use either H statement or WGK classification of a material. Start with H statement if available, if not available use WGK classification instead. DO NOT ENTER THE SAME MATERIAL UNDER BOTH CLASSIFICATIONS See Appendix A of the Guidance Document for further instruction		
1.5	WGK3 Water Hazardous Material (German Classification) (tonnes)	0	
1.6	WGK2 Water Hazardous Material (German Classification) (tonnes)	3000	
1.7	WGK1 Water Hazardous Material (German Classification - See information tab) (tonnes)	0	
	Total WGK3 Equivalent Material	**300**	**H1**
1.8	Laboratories which contain Genetically Modified Micro-Organisms (GMOs) According to Directive 2009/41/EC (Groups 3 & 4) See Appendix A of the Guidance Document for further instruction.	No	H0
1.90	Licensed Hazardous Waste Facility	No	H0
			1

Hazard Potential	Description
H0	No Hazard Potential
H1	Hazard Potential

Scoring Details	
Hazard Potential	**Quantity of Material / Type of Facility**
H0 *No hazard potential*	<1t WGK 3 or Equivalent[3] <1t Toxic (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2]
H1 *Hazard potential*	>1t WGK 3 or Equivalent[3] <1t (H400/H410 Harmful to Aquatic Life) **or** Equivalent[2] Laboratories Which Contain Genetically Modified Micro-Organisms (GMOs) According To Directive 2009/41/EC (Groups 3 & 4) Licenced Waste Storage Facility

Note 1: Hazardous to the Aquatic Environment Equivalent Calculation: 100t H412/H413 = 10t H411 = 1t H400/410

Note 2: WGK Equivalent Calculation: 100t WGK1 = 10t WGK2 = 1t WGK3

Note 3: Fire-fighting foam to be used in this area should be included if relevant hazard classifications apply

Hazard Potential:
The ECHA Chemical Database contains information for the safe handling of hazardous substances and other chemical substances at work. Furthermore the user is offered information on important physical and chemical properties as well as special regulations e.g. GHS classification and labelling according to CLP regulation (pictograms, H phrases, P phrases).

https://echa.europa.eu/

The GESTIS database provides WGK ratings for the majority of substances.

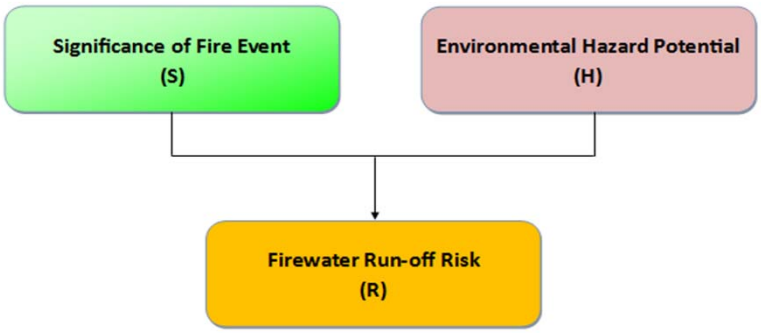
http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

Examples of some commonly used substance on industrial sites in large quantities;

Substance/Material	Flammable or Environmental H-Statements	Water Hazard Class (WGK)
Acetic Acid	**H226:** Flammable liquid and vapour	1
Acetone	**H225:** Highly flammable liquid and vapour	1
Aqueous Ammonia	**H400:** Very toxic to aquatic life	2
Chlorine	**H400:** Very toxic to aquatic life	2
Chromic Acid	**H410:** Very toxic to aquatic life with long lasting effects	3
Copper Sulphate	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	3
Cyclohexane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Diesel	**H226:** Flammable liquid and vapour *(Diesel can be considered combustible liquid for FWRA Tool as per Appendix A, Section 1.2.3) **H411:** Toxic to aquatic life with long lasting effects	2
Ethanol	**H225:** Highly flammable liquid and vapour	1
Heptane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Hydrochloric Acid	No environmental or flammable H-Statement assigned	1
Isopropanol	**H225**: Highly flammable liquid and vapour	1
Isobutanol	**H226:** Flammable liquid and vapour	1
Methanol	**H225:** Highly flammable liquid and vapour	1
Methyl tert-butyl ether (MTBE)	**H225:** Highly flammable liquid and vapour	1
Phenol	**H411:** Toxic to aquatic life with long lasting effects	2
Sodium Nitrite	**H400:** Very toxic to aquatic life	2
Tetrahydrofuran	**H225:** Highly flammable liquid and vapour	1
Toluene	**H225:** Highly flammable liquid and vapour	2
Trichloroacetic Acid	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Trichloroethylene	**H412:** Harmful to aquatic life with long lasting effects.	3
2,2,4-Trimethylpentane	**H225:** Highly flammable liquid and vapour **H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	2
Zinc Chloride	**H400:** Very toxic to aquatic life **H410:** Very toxic to aquatic life with long lasting effects	3

Overall Fire Water Run-Off Risk

Sample Assessment Area



Sheet Reference	Score
Signficance of Fire Event	S3 - High Significance
Hazard Potential	H1 - Hazard Potential

	H0	H1
S1	R0	R1
S2	R0	R1
S3	R1	R1

	Score
Fire Water Run-Off Risk	R1 - Risk of Environmental Contamination

Risk	Minimum Firewater Retention Measures Required
R0 No Risk	No dedicated firewater retention required.
R1 Risk of Environmental Contamination	Firewater run-off must be retained within the operational site. The retention can be provided by means of the site's drainage system and other suitable infrastructure which is not exclusively foreseen for firewater retention (e.g. storm water ponds / tanks in waste water treatment plants). All elements of the site infrastructure to be used for firewater retention (including shutoff valves) must be regularly inspected to ensure functionality and impermeability. The retention facility must remain impermeable for the duration of the incident up to the removal of the firewater run-off The documented available retention capacity in the existing site infrastructure must be monitored and maintained. Automatic shut-off valves must be maintained and tested. Diversion of firewater to retention facilities must be automatic on activation of the site fire alarm. Onsite bunds cannot be used to provide firewater retention unless the content of a bund is directly involved in the fire event.

Conclusion	
Fire Water Retention Required on Site?	Yes

Fire Water Retention Calculation

General Method - Any Area

Number	Calculation Steps	Response	Comment
1.1	Max Flow of Local Hydrants (l/min)	1200	Input Required
1.2	Fire Duration (Hours) This should be set at 6 hours unless the local fire authority has advised that a reduced time is acceptable. Note: Minimum duration is 1.5 hours	6	Input Required
1.3	Max FW volume from hydrants during Fire Event m^3	432	
1.4	Total Fire Water/Foam to be provided by Local Fire Brigade (m^3)	7.2	Input Required
1.5	Total Fire Water/Foam Stored on Site (m^3)	0	Input Required
1.6	Volume of Product Loss (m^3) See Section 4.5 of the Guidance Document for further information	3000	Input Required
1.7	Area of Site which shares common drainage with Assessment Area (m^2)	5170	Input Required
1.8	1 in 10 year 24hour rainfall event for local area (m)	0.0593	Input Required
1.9	Rain Water (m^3)	307	
	Fire Water Retention Required (m^3)	**3746**	

Appendix E.

ORS Fire Risk Assessment

2021

Fire Risk Assessment

Prepared by: Luke Martin

Engineering a Sustainable Future
Dublin | Cork | Galway | Mullingar | Donegal | London
o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Fire Risk Assessment

Millennium Business Park, Grange, Ballycoolin, Dublin 11

Document Control Sheet

Client:	Starrus Eco Holdings Limited
Document No:	211_128-ORS-XX-XX-RP-EN-13d-001
Date:	9th September 2021

Revision	Status	Author:	Reviewed by:	Approved By:	Issue Date
01	Draft	LM	AK	JB	27/05/2021
02	Final	LM	AK	JB	08/06/2021
03	Final	LM	AK	JB	16/07/2021
04	Final	LM	AK	JB	08/09/2021

Contents

1 Introduction

1.1 Background

Starrus Eco Holdings Limited operates a non-hazardous waste recycling and transfer facility at Millennium Business Park, Grange, Ballycoolin, Dublin 11. The facility operates under Waste Licence **W0183-01**. The main activities carried out at the facility is the processing and treatment of non-hazardous municipal, industrial, commercial, construction & demolition and organic wastes.

1.2 Waste Licence Conditions

Under Industrial Waste Licence **W0183-01**, *Starrus Eco Holdings Limited*. is authorised to accept up to 270,000 tonnes of non-hazardous waste under specified licence conditions aimed at ensuring maximum protection to the environment from site activities.

Of relevance to this report is **Condition 8.2** which states that:

Condition 8: Contingency Arrangements

8.2 The licensee shall, prior to commencement of waste activities at the facility, submit a written Emergency Response Procedure (ERP) to the Agency for its agreement. The ERP shall address any emergency situations which may originate on the facility and shall include provision for minimising the effects of any emergency on the environment. This shall include a risk assessment to determine the requirements at the facility for fire-fighting and fire water retention facilities. The Fire Authority shall be consulted by the licensee during this assessment.

1.3 Objectives

The purpose of this Fire Risk Assessment is to:

- Identify potential fire hazards at the facility.
- Assess the level of provision of early fire detection & warning infrastructure relative to the level of risk of fire at the site.
- Recommend suitable controls to eliminate or reduce the risks of fire hazards.
- Assess the facilities compliance with statutory legislation pertaining to fire safety.
- Provide recommendations of suitable options to ensure adequate firewater retention storage is present on-site at all times.

2 Methodology

2.1 Technical Guidance

The Irish Environmental Protection Agency (EPA) and the UK Environment Agency have issued the following guidance documents tailored specifically to fire safety at waste licensed facilities:

- EPA, (2016) "*Guidance on Fire Risk Assessment for Non-Hazardous Waste Facilities*"
- EPA, (2013) "*Guidance Note – Fire Safety at Non-Hazardous Waste Transfer Stations*"
- EA, (2013) "*Reducing fire risk at sites storing combustible materials: Technical Guidance Note 7.01*"

The UK Waste Industry Safety & Health Forum (WISH) has also published a comprehensive good practice guidance note which provides an added level of detail on fire safety at waste sites:

- WISH, (2017) "*Reducing Fire Risk at Waste Management Sites*"

There are several pieces of statutory legislation pertaining to fire safety which buildings, premises and/or employers must comply with.

- Building Control Act, 2007
- Building Regulations, 1997-2020
- Fire Services Act, 1987 & 2003
- Safety, Health and Welfare at Work Act, 2005

ORS have designed a comprehensive checklist in accordance with these documents to execute a complete review of on-site fire safety and ensure compliance with all statutory legislation.

The UK home office have issued the following document which outlines a Risk Assessment Methodology:

- Department for Communities and Local Government Publications, (2006) "*Fire Safety Risk Assessment: Factories and Warehouses*"

ORS have consulted this document to devise a site-specific risk assessment explained in **section 2.2** & **2.3**.

2.2 Fire Risk Assessment

A Fire Risk Assessment is an organised, methodical inspection of a facility, the activities carried out at the facility and the likelihood of a fire starting or escalating.

For a fire to start it is necessary to have fuel, a source of ignition and oxygen as illustrated in **Figure 2.1**. If any one of these components is absent, a fire will not start.

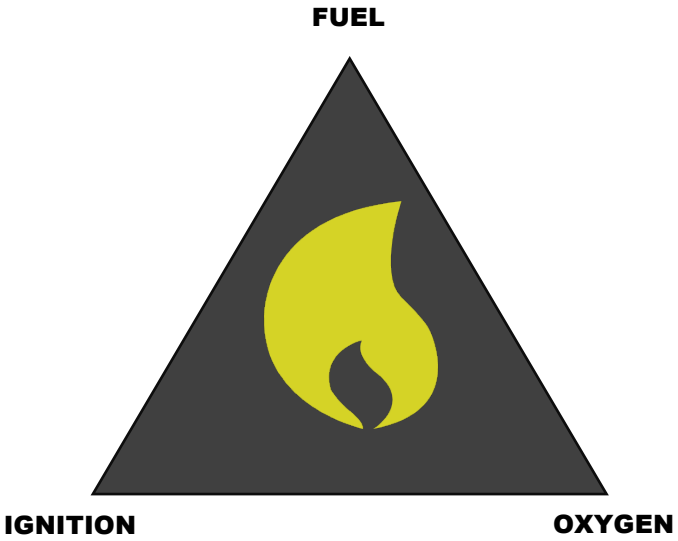


Figure 2.1: The Fire Triangle.

The basic premise of fire safety is to prevent the interaction of the three components of the fire triangle.

The typical steps of a Fire Risk Assessment are outlined as follows:

2.2.1 Step 1: Occupant Characterisation

Quantification and characterisation of all the people who use the facility. This step should pay particular attention to lone working, isolated work areas, people with disabilities and those unfamiliar with the facility.

2.2.2 Step 2: Fire Hazard Identification

Identification of the presence, quantity and location of all possible components of the Fire Triangle on the site.

- Sources of Ignition (naked flames, electrical, gas, oil appliances, plant & machinery)
- Sources of Fuel (Solid/liquid waste, varnishes, solvents, oils, vehicle/heating fuel)
- Sources of Oxygen (Ambient air, HVAC, oxidizing substances, canisters, pyrotechnics)

2.2.3 Step 3: Fire Safety Management

Evaluate, remove, reduce and protect from risks by:

- Removing or reducing the hazards that might cause a fire
- Removed or reduced sources of ignition, fuel and oxygen ensure none of these components are in close proximity to each other
- Fire detection and for warning

- Firefighting equipment
- Escape Routes
- Lighting and emergency lighting
- Adequate signs and notices
- Regular testing and maintaining of safety equipment
- Installation of additional equipment

2.2.4 Step 4: Records and Training

Records must be maintained detailing the following:

- Legislative Compliance
- Fire hazards identified
- Actions taken to reduce the risk to people from the spread of fire and smoke
- Emergency Plan
- Training records of all staff & persons with special responsibilities in event of fire
- Fire Drills

2.2.5 Step 5: Continuous Review

Constant monitoring and updating of the FRA is required particularly in the case of:

- Near misses
- Accident logs
- Previous fire events
- Significant alteration of the facility
- Changes to work practices or activities
- Increase or change of use of hazardous substances
- Failure of fire precautions
- Significant changes to amount or characteristics of occupants

2.2.6 Step 6: Evaluation of Risk Assessment

The risk assessment method applied to this FRA is detailed in **section 2.3**.

- Analysis of all data compiled during site inspection
- Evaluating the risk to building occupants if a fire starts

2.3 Risk Classification

The data derived from the activities detailed in section 2.2 will be used to quantify the risk posed by activities on-site and identify areas of particularly high-risk.

Risk will be assessed as follows:

Likelihood of Fire x Severity of Fire = Fire Risk Rating.

A site-specific risk assessment methodology is outlined in **Table 2.1** and **2.2** below.

Table 2.1: Classification of Likelihood (DoELG, 2010)

Ranking	Likelihood Classification	Description
1.	Extremely Unlikely	May occur in exceptional circumstances. Once every 500 or more years.
2.	Very Unlikely	Is not expected to occur; and/or no recorded incidents or 'anecdotal evidence' and/or very few incidents in associated organisations, facilities or communities; and/or little opportunity, reason or means to occur; may occur once every 100-500 years.
3.	Unlikely	May occur at some time; and / or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity; reason or means to occur; may occur once per 10-100 years.
4.	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years.
5.	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Table 2.2: Severity of Fire (DoELG, 2010)

Ranking	Severity Classification	Description
1.	Minor	Small number of people affected; no fatalities and small number of minor injuries with first- aid treatment. No contamination, localised effects. <€1000 Minor localised disruption to community services or infrastructure (<6 hours).
2.	Limited	Limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration. <€10,000 Normal community functioning with some inconvenience.
3.	Serious	Significant number of people in affected area impacted with single fatality, multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; Evacuation of entire site and neighbouring sites immediately adjacent to the site. External resources required for personal support. Simple contamination, widespread effects or extended duration. €100,000 – €1,000,000 Community only partially functioning, some services available.
4.	Very Serious	More than one fatality, 20-50 serious injuries. Entire site evacuated plus multiple facilities within 0.5km of the site. Heavy contamination, localised effects or extended duration. €1,000,000 – €10,000,000 Community functioning poorly, minimal services available.
5.	Catastrophic	Large numbers of people impacted with significant numbers of fatalities (>20), injuries in the hundreds, more than 2000 evacuated site plus neighbouring facilities within 1km. Very heavy contamination, widespread effects of extended duration. >€10M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

2.4 Risk Evaluation

The resulting risk classifications will be sorted highest to lowest and then incorporated into the Risk Matrix shown in **Table 2.3**.

Table 2.3: Risk Matrix

Likelihood							
	Very Likely	5					
	Likely	4					
	Unlikely	3					
	Very Unlikely	2					
	Extremely Unlikely	1					
			Minor	**Limited**	**Serious**	**Very Serious**	**Catastrophic**
			1	2	3	4	5
			Severity				

3 Site Overview

3.1 Site Location

The site is located within a heavily urbanised, commercial and industrial area known as Millennium Business Park in Ballycoolin with many other licenced facilities in close proximity. The land to the west and south of the site consists of a mixture of commercial and industrial units. The land to the north and east of the site consists of a large quarry, operated by *Roadstone*. The M50 Motorway is located *ca*. 1.34km south of the site. The site is traversed from north-west to south-east by high voltage overhead powerlines (220kV).

The site previously consisted of greenfield pastures prior to its development into a waste transfer facility. In 2004, An Bord Pleanala granted planning permission for the construction of the facility and construction commenced in January 2015. The current licence was granted in April 2015. The facility was commissioned and began accepting waste in July 2006.The total area of the site is *ca.* 4.4 hectares (44,000m^2). An approximate outline of the subject site is provided in **Figure 3.1** below.

Figure 3.1: Site Location - Millennium Business Park, Grange, Ballycoolin, Dublin 11

3.2 Site Layout

The site can be divided into four distinct areas:

(1) **MP-1**: SRF & FLOC processing and storage
(2) **MP-2**: SRF & MSW sorting
(3) **MP-3**: Bulky waste, C&I & C&D processing
(4) **External Yard**: Storage of SRF bales.

The Materials Recovery Building is *ca.* 4226m^2 and comprises **MP-1** and **MP-2** as indicated in **Figure 3.2** below. This was originally designed to accommodate distinct waste handling areas for Commercial and Industrial (C&I) waste, Municipal Solid Waste (MSW) and Construction and Demolition (C&D) waste. Each area has separate access for loading and unloading and waste sorting, processing and storage.

MP-1 is utilised for SRF and FLOC processing. Autoclave-treated FLOC[1] material is delivered to the facility following pre-treatment at a specialist facility and is placed temporarily into stockpiles and fed into a granulator. C&I waste is also delivered to MP-1 and stored in temporary storage bays, pending treatment. This material is then fed into the SRF production line which includes a high speed "Linder" shredder and a baler. The SRF production line traverses both **MP-1** and **MP-2** processing areas. The baled SRF material is then stored in the **External Yard** pending export to cement kilns for co-incineration.

In **MP-2**, mixed MSW is delivered in the waste collection vehicles and off loaded in a designated area inside the building. Large items are removed and the wastes are then processed in an automated processing line to separate out the different waste streams (paper, cardboard, plastic, wood, metal, organics, fines and stone). The recovered materials are sent to authorised facilities for further recycling and the residual non-recyclable heavy waste is sent to landfill, while the non-recyclable light fraction is baled as SRF.

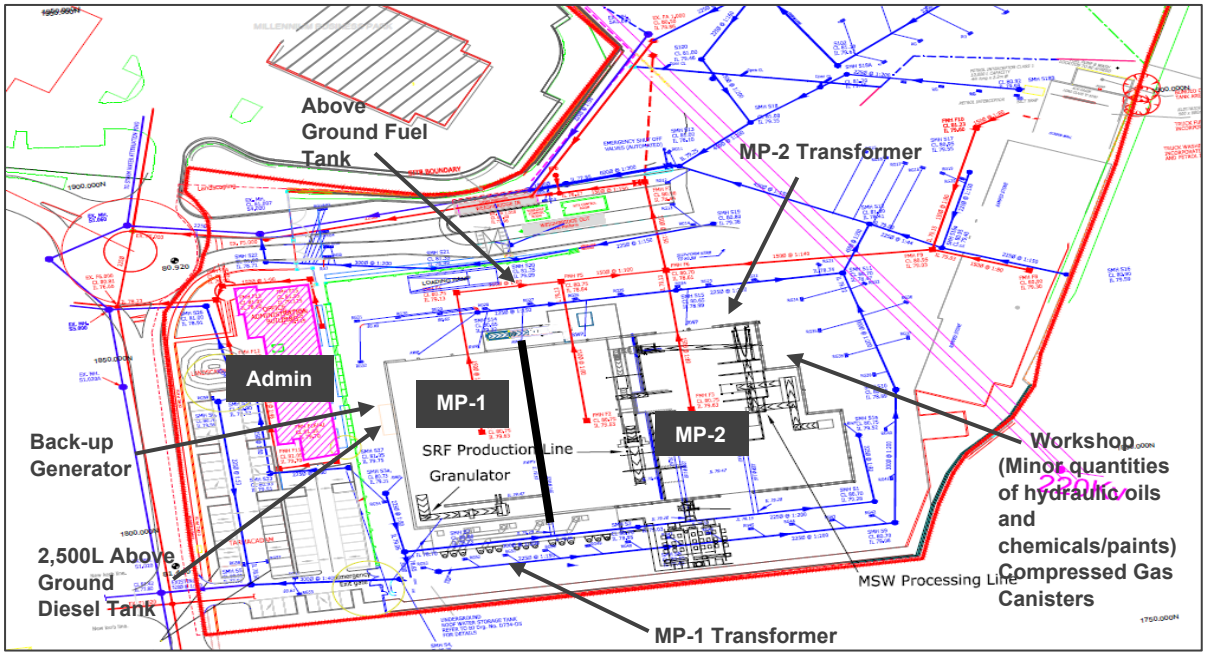


Figure 3.2: Site Layout – MP-1: SRF Processing & Plastic Granulation; and MP-2: SRF & MSW Processing (OCM, 2021)

[1] FLOC material began life as medical/clinical waste such as discarded gloves, sharps etc. This material is pre-treated at a specialist facility, rendering the material non-hazardous, prior to delivery to Millennium Park

MP-3 was granted planning permission by Fingal County Council in September 2018 and commenced operations in 2019. This waste recovery building is *ca.* 4,700m^2 and is used to process bulky wastes and skip wastes, indicated in **Figure 3.3**. Materials are stored in storage bays in a pattern of flammable fractions and non-flammable fractions in order to limit the potential for fire-spread within the building.

The external **Concrete Yard** is located in the space between **MP-1/2** and **MP-3** as indicated in **Figure 3.3**. The site is permitted to temporarily store up to 3,400 SRF bales at the site at any one time, pending export to various cement plants for co-incineration. SRF bales created from other waste sites are imported to the site for temporary storage and stored along-side the SRF bales produced by **MP-1**.

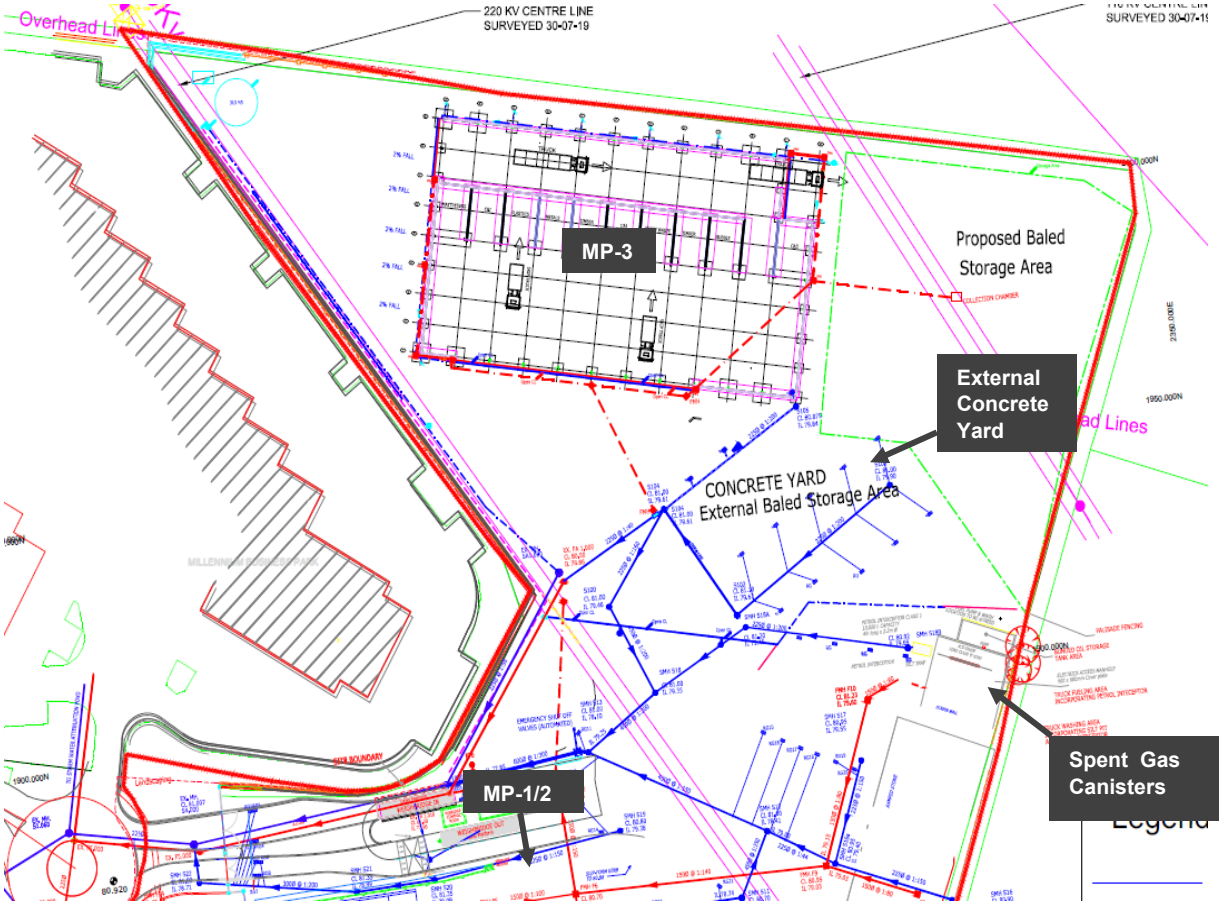


Figure 3.3: Site Layout – MP-3: Bulky Waste & Skip Waste Processing & External Concrete Yard (OCM, 2021)

The natural fall of the site is from north-east to south-west. The storm network is fitted with a 657m^3 capacity attenuation tank located to the west of the site and follows the site gradient towards the southwest. There are petrol interceptors installed towards the east of the site, downstream of the fuel storage area, and towards the west of the site between MP-3 and the site weighbridge.

Full-scale planning drawings detailing the existing site infrastructure are included in **Appendix A**.

3.3 Site Activities

The main activities at the *Starrus Eco Holdings* facility at Millennium Park is the treatment, recycling and recovery of non-hazardous waste for subsequent transfer to suitable facilities for final treatment.

The main elements of the Millennium Park facility consist of the following processes as quoted by the EPA Waste Licence, **W0183-01**:

3.3.1 Disposal Activities

- **Class 11**. Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.
    - This activity is limited to the mixture of wastes at the facility prior to the waste being removed off-site for disposal.

- **Class 12**. Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
    - This activity is limited to the repackaging of wastes at the facility prior to the waste being removed off-site for disposal.

- **Class 13**. Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned was produced.
    - This activity is limited to the storage of wastes at the facility prior to being removed off-site for disposal.

3.3.2 Recovery Activities

- **Class 2**. Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes):
    - **This activity is not carried out currently at the facility.**

- **Class 3**. Recycling or reclamation of metals and metal compounds:
    - This activity is limited to the collection, segregation and recovery of waste metals at the facility.

- **Class 4**. Recycling or reclamation of other inorganic materials:
    - This activity is limited to the collection, segregation and recovery of inorganic materials (e.g. some construction and demolition wastes, glass, etc) at the facility.

- **Class 11**. Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule:
    - **This activity is not carried out currently at the facility.**

- **Class 12**. Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule:
    - This activity is limited to the exchange of recovered wastes at the facility.

- **Class 13**. Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced:
    - This activity is limited to the storage of wastes at the facility prior to removal off-site for recovery.

3.4 Plant and Machinery

Plant and machinery is in constant use during operations at the facility. Plant and machinery consists of:

- 2 no. forklifts
- 2 no. Elevated Grabbers
- 1 no. JCB 360º Excavator
- 5 no. front-end loaders
- Multiple articulated tipper lorries (inbound and exported material)
- Multiple Curtain Side lorries (Bale Transport)
- Multiple skip lorries
- 1 no. road sweeper
- Plastic Granulator
- SRF Processing Line
- MSW Processing Line (Hoppers, conveyors, shredders, screens)

3.5 Building Occupants

There are approximately 30 people on-site during any given day of operation consisting of site operatives, administrative staff and managerial staff. There is currently no regular site occupant with a disability.

Visitors unfamiliar to the site are either accompanied by site personnel at all times or are inducted and carry out their scheduled works under a permit-to-work system. It is unlikely that more than 30 persons will occupy the site at any one time.

The site is designed to optimise sightlines between various process areas and is under 24-hour surveillance via CCTV. Incidences of lone working are rare occurrences with all workstations in clear view of adjacent workstations.

4 Fire Hazard Identification

4.1 Sources of Ignition

4.1.1 Fixed Installations

Fixed installations bear the highest risk of ignition on the site due to frictional heat, malfunction or inadvertent placement of unsuitable materials into the unit. As detailed in **section 3.4**, fixed installations present on site include:

- Plastic Granulator
- High Speed “Linder” Shredder (SRF)
- MSW Processing Line (Hoppers, conveyors, shredders, screens, air tables)

There is a plastic granulator located in **MP-1**. The High Speed “Linder” Shredder (SRF) **MP-1** & **MP-2**. The MSW Processing Line is located in **MP-2**. There are no fixed installations within **MP-3**.

4.1.2 Portable Appliances

All portable appliances utilised on site bear a low risk of ignition provided they are subject to regular checks, faulty devices are repaired or replaced, and improper use is avoided. Portable appliances present on site include:

- Portable heaters
- Power Tools
- Air Blower Fans
- Dust Track

The majority Power Tools and industrial appliances are most likely to be found in the maintenance shed, located to the northeast of **MP-2**.

4.1.3 Mobile Plant

Well maintained mobile plant bear a low risk of ignition via frictional heat or malfunction provided they are well-maintained and repaired as required.

- 2 no. forklifts
- 2 no. Elevated Grabbers
- 1 no. JCB 360º Excavator
- 5 no. front-end loaders
- Multiple articulated tipper lorries (inbound and exported material)
- Multiple Curtain Side lorries (Bale Transport)
- Multiple skip lorries
- 1 no. road sweeper

Mobile plant operate in all sections of the site including MP-1/2/3. The road sweeper is deployed twice daily in external areas.

4.1.4 Smoking

Smoking is restricted to a designated area outside, close to the site weighbridge.

4.1.5 Arson

Arson is always a risk due to malicious behaviour or delinquency. Risk is inherently lower at well-maintained facilities, with security present at all times.

4.1.6 Lightning

Each building located on the site is a relatively low-lying structure. The incidence of being struck by lightning is low.

4.2 Sources of Fuel

The following substances which can be classed as fuels are considered further in the Fire Risk Assessment for the site:

- Marked (Green) Diesel
- Diesel
- Loose SRF Stockpiles, Fines stockpiles
- SRF Bales
- Paints/Solvents
- Hydraulic Oil
- Used Absorbents
- Batteries
- Timber Pallets
- Paper/Cardboard
- Plastic

A spent gas cylinder storage cage is located adjacent to the concrete bund. SRF bales are stored in the external concrete yard as indicated in **Figure 3.4**. A self-bunded diesel tank is located adjacent to the back-up generator at **MP-2**. A self-bunded diesel tank is located to the south of the site weighbridge for fuelling site plant. Batteries are not processed on the site but inadvertently arise on site via other waste streams such as MSW and bulky/skip waste. These are stored temporarily in “Battery Bins” and removed to a suitable licence facility periodically.

4.3 Sources of Oxygen

The following substances have the potential to introduce high concentrations of oxygen into the ambient atmosphere which can exacerbate the likelihood of fire:

- Air Compressor
- Air Table Separator
- Plant exhausts

Each of these installations are located throughout **MP-1/2/3**.

5 Fire Safety Management

5.1 Site Specific Fire Hazards

There are no activities carried out on the site which carry an inherent, heightened risk of fire with the exception of the following activities;

(1) Plastic granulator and SRF "Linder" Shredder located in **MP-1/2** – due to frictional forces, it's high operational speeds and the low moisture content.
(2) Lose SRF Stockpiles located in **MP-1** – due to low moisture content and temperatures within the warehouse
(3) Self-heating combustible stockpiles located in **MP-3** – Risk exacerbated by inadvertent placement of ignition sources (e.g., batteries) within the stockpiles.

There are no areas on-site with potentially explosive atmospheres.

5.2 Material Separation

The site is divided into 3 indoor processing areas a large external storage yard with some processing activity as detailed in **figure 3.2 & 3.3**.

EA Guidance on the prevention of fire spread recommends:

- Max height of waste stockpiles 4m, width/length 20m.
- 6m separation distance between combustible waste stockpiles.
- 6m separation distance between waste stockpiles and the site perimeter or adjacent infrastructure/materials.
- Distances may be reduced by using fire walls or bays.

There is generally good separation distances maintained between different processing areas relative to one another. Fire walls and storage bays are utilised to separate processing areas in each building **(MP-1/2/3)**. SRF Stockpiles are stored according EA/WISH standards. Taking the fire triangle into consideration, the proximity of sources of ignition, fuel and oxygen to each other throughout the site are summarised in **Table 5.1**.

Table 5.1: Material Separation of sources of ignition, fuel and oxygen

Building Area	Infrastructure / Activity	Potential Sources			Adequate Distance Maintained?	Fire Triangle Rating
		Ignition	Fuel	Oxygen		
MP-1/MP-2	Storage Bays, feed-hopper, conveyor belts, screens, plant, plastic granulator.	Tong Granulator & SRF "Linder" Shredder (Frictional forces at high speeds)	SRF Fines/Dry material	Ambient Levels	Interaction between potential fuel and ignition source inevitable in "Tong" granulator.	3/3 - The plastic granulator in MP-1 & the SRF Shredder on MP-1/2 presents the greatest fire due to frictional forces, it's high operational speeds and the low moisture content of the plastic fed into the hopper. Risk Mitigated by thermal imaging cameras and automated sprinkler system.
MP-2	MSW Storage Bays, screen, magnet, conveyor belts, separators, plant, trucks	Plant/Machinery due to friction.	MSW	Ambient Levels	Separate waste fractions stored in storage bays which are separated by 6-hour fire-walls.	3/3 - Risk Mitigated by thermal imaging cameras and automated sprinkler system.
MP-3	Bulky Waste/Skip Waste Sorting	Plant/Machinery, Self combustion of waste	Inadvertent acceptance of unsuitable	Ambient Levels	Separate waste fractions stored in	3/3

Building Area	Infrastructure / Activity	Potential Sources			Adequate Distance Maintained?	Fire Triangle Rating
		Ignition	Fuel	Oxygen		
			wastes (e.g. batteries)		storage bays.	
Concrete Yard	SRF Bales, workshop, gas storage, plant movement	Gas Canisters, frictional heat from plant	SRF Bales, gas	Ambient	No	3/3 – Generally good separation distance maintained throughout site. **Exception** – gas storage, and SRF Bale stockpiles along eastern boundary of site.
Mechanical Shed	Maintenance of Plant & Equipment	Gas Canisters, sparks from hot work	Hydraulic Oils, solvents, gas	Ambient	Yes	3/3 Mitigated by good housekeeping and relatively small quantities stored in workshop at any one time.

5.3 Fire Detection & Warning

General fire detection and warning measures maintained throughout the site are as follows:

- Smoke detectors located in in all indoor areas.
- 24 hour, Thermal Imaging CCTV located in **MP-1** & **MP-2**. Inspected annually by *Moran CCTV*.
- Fire Protection system is adequately scaled for the size of the facility.
- Fire alarm system audible throughout all internal waste processing areas
- Emergency lighting is of a sufficient lux (demonstrated during inspection).
- Site occupied by personnel on a 24/7 basis.

All lights & alarms are checked weekly and serviced quarterly.

5.4 Firefighting Equipment

There is adequate firefighting equipment throughout the site, verified by an inspection conducted by the local fire service in 2018. Detailed as follows:

- Fire extinguishers are in good condition, placed at a regular intervals and are readily accessible throughout the site as confirmed by fire service.
- There are hose reels located at adequate intervals throughout the site.
- Fire extinguishers and hose reels are inspected periodically and were service maintenance dates (see **Appendix C**).
- There are electrical isolation switches for each processing area to shut off all fixed installations during emergencies.
- Seven hydrants located on site for fire services to tap into, north, south, east and west of the site. All hydrants free from damage and easily opened.
- There is adequate clearance to fit multiple fire engines on-site.
- There are spill kits located at the Diesel Tank at MP-1 and towards the front of MP-3. Both kits were free from obstruction at the time of inspection.

Panda are in regular contact with the local fire service who are do to complete another site inspection in 2021.

5.5 Escape Routes, Signage & Emergency Lighting

Escape routes are clearly defined and provide all occupants with a reasonable means of escape from each building as verified by an inspection conducted by the local fire service in 2018. Details of site escape routes are as follows:

- All indoor areas are fitted with emergency lighting.
- Emergency escape doors are provided at regular intervals.
- Most emergency escape doors were unobstructed and were easily operably during the site visit.
- Operational escape routes were unobstructed.

Points for review include;

- Some escape routes were obstructed during the site visit. These should be either decommissioned (i.e. signage taken down) or reinstated and obstructions cleared.
- Consider amending Fire Extinguisher & Hose Reels Weekly Checklist to include site signage.

5.6 Fire Spread Limitation

Measures to limit the spread of potential fires were observed as follows:

- There is sufficient distances maintained and/or separation between separate process areas indoors.
- All externally stored SRF bales are stored according to WISH/EA Best practice.
- Storage bays constructed of concrete fire-wall located in all internal treatment buildings. A waste storage plan was provided to ORS on the day of the site inspection and the waste stored in each bay corresponded directly to the outlay on the plan.
- Volume of SRF bales is always kept below the 3,000-tonne temporary storage limit. Volume within storage bays are kept below a safe limit.
- Segregation of different waste streams in external areas is facilitated by skips located in yard areas.
- Penetrations for services are fire stopped
- All storage infrastructure in good condition.

6 Records, Training and Compliance

6.1 Legislative Compliance

6.1.1 Building Control Act & Building Control Regulations

The site is fully compliant with the requirements of the building control act in relation to fire (See Fire Safety Certificate for the site in **Appendix C**).

6.1.2 Fire Services Act 1981 & 2003

The site is fully compliant with the requirements of the Fire Services Act based on the following criteria:

- Hydrants are located on-site, in good working order and painted yellow and labelled. access to them is unobstructed.
- The site was never issued a Fire Safety Notice by the fire services.

6.1.3 Health, Safety & Work Act 2005

The site is fully compliant with the requirements of the Health, Safety & Work Act in relation to fire based on the following criteria:

- The site operator has established a relationship with the local fire brigade and are inspected every 2 years.
- The operator runs fire drills regularly per ERP schedule.
- Visitors to the site are chaperoned at all times.
- The operator has created an Emergency Response Plan with standard operating procedures specifically related to fire (see **Appendix B**).

6.2 Emergency Response Plan

The operator has created an Emergency Response Plan with standard operating procedures specifically related to fire. (see **Appendix B**).

6.3 Training, Maintenance and Inspection Records

Training, maintenance and inspection records were presented for inspection. The following details were confirmed:

- The site operator has established a relationship with the local fire brigade and are inspected every 2 years.
- All site plant and fixed installations are serviced and maintained according to their respective manufacturer's standards.
- The designated fire warden has received the appropriate training to deal with all incidences of fire at the site.

- A detailed procedure on fire is documented within the Emergency Response Plan. There is also a detailed section of the site induction dedicated to fire safety.
- All emergency lighting, alarms and fire suppression infrastructure are serviced periodically
- There is an SOP in place for the documentation of fire incidents. The licensee provided incident logs for inspection. The last incidence of fire was in 2017 and was reported to The Agency via EDEN.
- There is an accident and near miss report folder.
- Fire drills are carried out bi-annually.

7 Fire Risk Assessment

7.1 Fire Risk Assessment Matrix

Table 7.1-7.3 presents a quantitative risk summary posed by site activities ranked from highest risk to lowest. This table is based on the findings of the site inspection and interviews carried out by ORS at the site on the 2nd of April 2021.

Risk is quantified based on the methodology stated in **section 2.3** of this report. Using this methodology, the maximum risk rating assignable is **25** based on a likelihood rating of **5** and a severity rating of **5**. The rationale behind the ratings to assigned to each scenario is detailed a much as possible.

Existing mitigation measures in place at the site are also included in these tables.

7.1.1 MP-1 & MP-2

Table 7.1: Fire Hazards identified in Building MP-1 & MP-2

Hazard ID	Fire Scenario	Likelihood Rating	Basis of Likelihood	Severity Rating	Basis of Severity	Mitigation Measures	Risk Score
1	Fire due to friction, high processing speeds and low calorific value of waste in plastic granulator and the SRF Shredder	4	Low moisture content of material coupled with high operational speeds	3	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	12
2	Fire caused by friction in SRF Baler	2	Lower risk due to much lower speeds of SRF baler	3	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	6
3	Flammable materials inadvertently placed in SRF or MSW Stockpiles	3	High temperatures or friction create a spark and lead to a fire	2	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities.	24 hr surveillance Deluge System Well-trained operatives Fire-fighting hoses + extinguishers readily available	6
4	Self-Combustion of SRF Fines	3	Low Moisture Content coupled with high summertime temperatures/magnification of sunlight	2	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	6
5	Short-circuit of MP-1 or MP-2 Transformer	2	Transformer located external to MP-1 however heat likely to transfer through Kingspan wall of warehouse via radiation and	3	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	24 hr surveillance Deluge System Well-trained operatives	6

			cause loose SRF material to combust.			Fire-fighting hoses + extinguishers readily available	
6	Self-Combustion of MSW Stockpiles	**2**	MSW generally has a higher moisture content making combustion slightly less likely	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	**4**
7	Short-circuit of Back-up Generator and combustion of adjacent Diesel Storage Tank	**2**	Generator and fuel tank located external to MP-1 however heat likely to transfer through Kingspan wall of warehouse via radiation and cause loose SRF material to combust.	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	24 hr surveillance Deluge System Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
8	Arson	**2**	Site under 24-hr surveillance – arson possible but unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	**6**
9	Fires caused by plant	**2**	Plant well-maintained and in good condition	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Maintenance of plant 24 hr surveillance Well-trained operatives Quick response Fire-fighting SOP Sprinkler System	**4**
10	Fire Caused by fixed installations for MSW processing	**2**	Lower likelihood of fire due to higher moisture content of material	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	**4**
11	Lightning Strikes	**1**	Relatively low elevation building, lightning strikes unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	**3**

7.1.2 MP-3

Table 7.2: Fire Hazards identified in Building MP-3

Hazard ID	Fire Scenario	Likelihood Rating	Basis of Likelihood	Severity Rating	Basis of Severity	Mitigation Measures	Risk Score
12	Flammable materials inadvertently placed in SRF or MSW Stockpiles	**3**	High temperatures or friction create a spark and lead to a fire	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities.	24 hr surveillance Intermittent storage of flammable vs non-flammable material, Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
13	Self-Combustion of Semi-Flammable materials	**3**	Low Moisture Content coupled with high summertime temperatures/magnification of sunlight	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	24 hr surveillance Intermittent storage of flammable vs non-flammable material, Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
14	Arson	**2**	Site under 24-hr surveillance – arson possible but unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Deluge System Well-trained operatives	**6**
15	Fires caused by plant	**2**	Plant well-maintained and in good condition	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Maintenance of plant 24 hr surveillance Well-trained operatives Quick response Fire-fighting SOP Sprinkler System	**4**

16	Lightning Strikes	**1**	Relatively low elevation building, lightning strikes unlikely	**3**	Fatalities possible but unlikely. Fire likely to spread to MP-2 causing upwards of €100,000 worth of damage	Thermal Imaging CCTV, 24 hr surveillance Emergency stops Deluge System Well-trained operatives	**3**

7.1.3 External Areas

Table 7.3: Fire Hazards identified in external areas throughout the site

Hazard ID	Fire Scenario	Likelihood Rating	Basis of Likelihood	Severity Rating	Basis of Severity	Mitigation Measures	Risk Score
17	Fire occurring at spent gas cannister storage area to the east of the site and setting adjacent SRF bales ablaze	**4**	High likelihood due to inadequate distances between fuel and ignition sources	**3**	Fatalities possible but unlikely. Fire likely to spread cause substantial air pollution to surrounding industrial estate however is likely to be confined to the bale stockpile east of the site. Financial liability in excess of €100,000	24 hr surveillance Well-trained operatives Fire-fighting hoses + extinguishers readily available	**12**
18	Fire in Mechanical Workshop	**3**	Flammable lubricants, solvents and paints located in the same areas as hot works carried out	**2**	Fire Spread limited due to low quantities of fuel and fire walls	Fire Extinguishers, Fire Detection	**6**
19	Self-Combustion of SRF Stockpiles	**3**	Low Moisture Content coupled with high summertime temperatures	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	24 hr surveillance Well-trained operatives Fire-fighting hoses + extinguishers readily available	**6**
20	Arson	**2**	Site under 24-hr surveillance – arson possible but unlikely	**3**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	24 hr surveillance Well-trained operatives, Fire-fighting hoses + extinguishers readily available	**6**
21	Fires caused by plant	**2**	Plant well-maintained and in good condition	**2**	Spread of fire from source unlikely due to storage bays & Firewalls – Localised damage amounting to <€10,000, no fatalities, only minor injuries	Maintenance of plant 24 hr surveillance Well-trained operatives Quick response Fire-fighting SOP Sprinkler System	**4**

7.2 Risk Evaluation

Table 7.4 ranks the risks from highest to lowest according to the risk identification and screening exercise carried out above.

These risks are then represented graphically by Hazard ID in a risk matrix, **Table 5.7**.

Table 7.4: Risk Evaluation – Risk Ratings Ranked from highest to lowest

Hazard ID	Area	Fire Scenario	Likelihood	Consequence	Risk Score
1	MP-1/2	Fire due to friction caused by plastic granulator or the SRF Linder Shredder	4	3	12
17	External Areas	Fire occurring at spent gas cylinder storage area to the east of the site and setting adjacent SRF bales ablaze	4	3	12
2	MP-1	Fire caused by friction or placement of unsuitable objects in SRF Baler	2	**3**	6
3	MP-1/2	Flammable materials inadvertently placed in SRF or MSW Stockpiles	3	**2**	6
4	MP-1	Self-Combustion of SRF Fines	3	**2**	6
5	MP-1/2	Short-circuit of MP-1 or MP-2 Transformer	2	**3**	6
6	MP-2	Self-Combustion of MSW Stockpiles	3	2	6
7	MP-1	Short-circuit of Back-up Generator and combustion of adjacent Diesel Storage Tank	2	3	6
8	MP-1/2	Arson	2	3	6
12	MP-3	Flammable materials inadvertently placed in SRF or MSW Stockpiles	3	**2**	6
13	MP-3	Self-Combustion of Semi-Flammable materials	3	**2**	6
14	MP-3	Arson	2	**3**	6
18	Mech Workshop	Fire in Mechanical Workshop	3	2	6
19	External Areas	Self-Combustion of SRF Stockpiles	3	2	6
20	External Areas	Arson	2	3	6
9	MP-1/2	Fires caused by plant	2	2	4

10	MP-2	Fire Caused by fixed installations for MSW processing	2	2	4
15	MP-3	Fires caused by plant	2	2	4
21	External Areas	Fires caused by plant	2	2	4
11	MP-1/2	Lightning Strikes	1	3	3
16	MP-3	Lightning Strikes	1	3	3

Table 7.5: Fire Risk Matrix for Millennium Park Waste Recovery and Recycling facility.

Likelihood							
	Very Likely	5					
	Likely	4			**1,17**		
	Unlikely	3		**3,4,6,12,13,18,19**			
	Very Unlikely	2		**9,10,15,21**	**2,5,7,8,14,20**		
	Extremely Unlikely	1			**11,16**		
			Minor	**Limited**	**Serious**	**Very Serious**	**Catastrophic**
			1	2	3	4	5
			Severity				

7.3 Risk Summary

Overall the majority of fire scenarios at the site were assigned a risk score of 6 or below which falls into the **low risk** category overall.

A total of 2 fire hazards were assigned a risk score of 12. These hazards are characterized as follows:

- **Hazard ID 1** – The main risk associated with the plastic granulator or the Linder Shredder within the SRF processing line is the interaction between an extremely dry

material within a fast-moving installation with the potential to generate high temperatures.

- **Hazard ID 17** – The main risk associated with this hazard is inadequate separation distances between potential ignition sources (gas cannisters) and potential fuel sources (SRF bales & waste Oil Storage tank).

7.4 Preventative Action

Due to the nature of activities carried out on waste recovery sites the risk is generally higher than that usually experiences in a public setting, on a day-to-day basis.

Such sites are permitted to operate only in full compliance with a list of conditions set out in a licence or permit. The operators of such facilities are obliged to implement safety measures to prevent the occurrence of a multitude of incidents, including fire.

For the vast majority of scenarios explored at the site, the overall risk is considered to be **Low**. Furthermore, the mitigation measures currently in place at the facility were deemed to adequately reduce the risk associated with each scenario.

There were two scenarios which were assigned **moderate** risk scores, both assigned a risk score of 12.

(1) **Hazard ID 1** – The risks associated with the plastic granulator and the SRF Linder Shredder are well-documented and there are adequate mitigation measures in place in order to manage this risk as follows:

a) Supervised at all times when use by well-trained operatives
b) 24/7 thermal imaging CCTV surveillance
c) Emergency Stops
d) Deluge System

(2) **Hazard ID 17** – Proximity of potential fuel and ignition sources at the eastern site boundary. It was noted that there was inadequate separation distances between the spent gas canister storage area (ignition source) and the adjacent stockpile of SRF. The following action is recommended to reduce this risk score:

a) Relocated the spent canister gas storage area to a different area of the site with a minimum separation distance of 15m from potential fuel sources.

8 Conclusions and Recommendations

8.1 Conclusion

The overall fire risk detected at the *Millennium Park* facility was low primarily due to good housekeeping; good source separation of ignition, fuel & oxygen sources; and the comprehensive nature of mitigation measures in place at the site.

Each of these areas have sufficient fire prevention measures in place to reduce the likelihood of a fire and the site is well equipped for early detection and quenching of a fire that may occur, as summarised in **Table 7.1** to **7.3**.

The fire risk was considered to be moderate in two particular areas of the site, MP-1/2 and the external yard towards the eastern site boundary:

- **Hazard ID 1** – The main risk associated with the plastic granulator or the Linder Shredder within the SRF processing line is the interaction between an extremely dry material within a fast-moving installation with the potential to generate high temperatures.
- **Hazard ID 17** – The main risk associated with this hazard is inadequate separation distances between potential ignition sources (gas cannisters) and potential fuel sources (SRF bales).

8.2 Recommendations

(1) **Hazard ID 1** – The risks associated with the plastic granulator and the SRF Linder Shredder are are well-documented and there are adequate mitigation measures in place in order to manage this risk as follows:

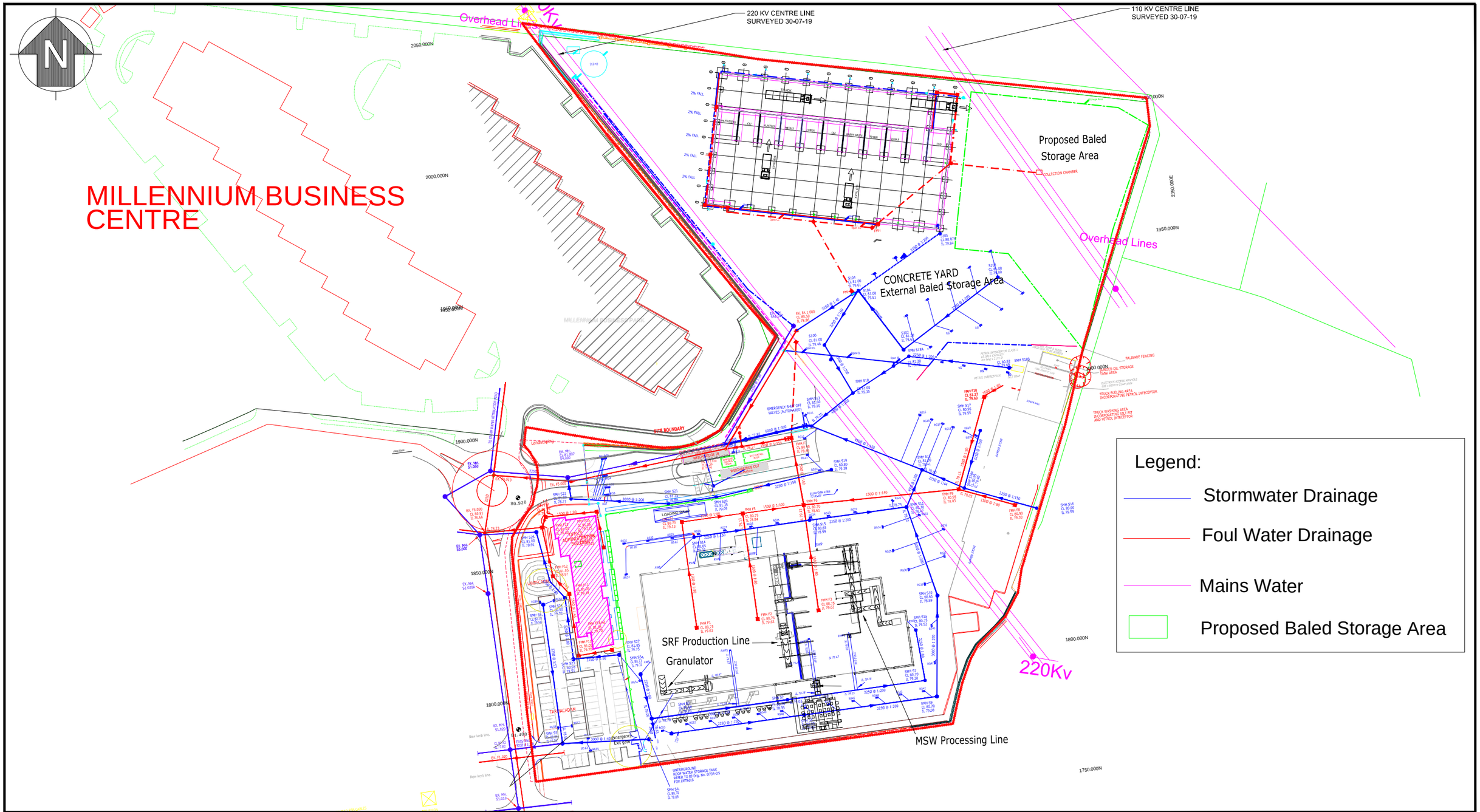
a) Supervised at all times when use by well-trained operatives
b) 24/7 thermal imaging CCTV surveillance
c) Emergency Stops
d) Deluge System

(2) **Hazard ID 17** – Proximity of potential fuel and ignition sources at the eastern site boundary. It was noted that there was inadequate separation distances between the spent gas canister storage area (ignition source) and the adjacent stockpile of SRF and the adjacent Waste Oil Tank. The following action is recommended to reduce this risk score:

a) Relocated the spent canister gas storage area to a different area of the site with a minimum separation distance of 15m from potential fuel sources.

(3) In the interest of clarity, it is recommended that the obsolete emergency exit doors in **MP-1** are decommissioned fully by removing the exit sign entirely.

Appendix A – Site Layout



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

CLIENT

Starrus Eco Holdings Ltd

FIGURE No.

21-138-17-01

TITLE

External Storage/Granulator and SRF Line

Project

Specified Engineering Works

Date

08.03.21

Engineering a Sustainable Future

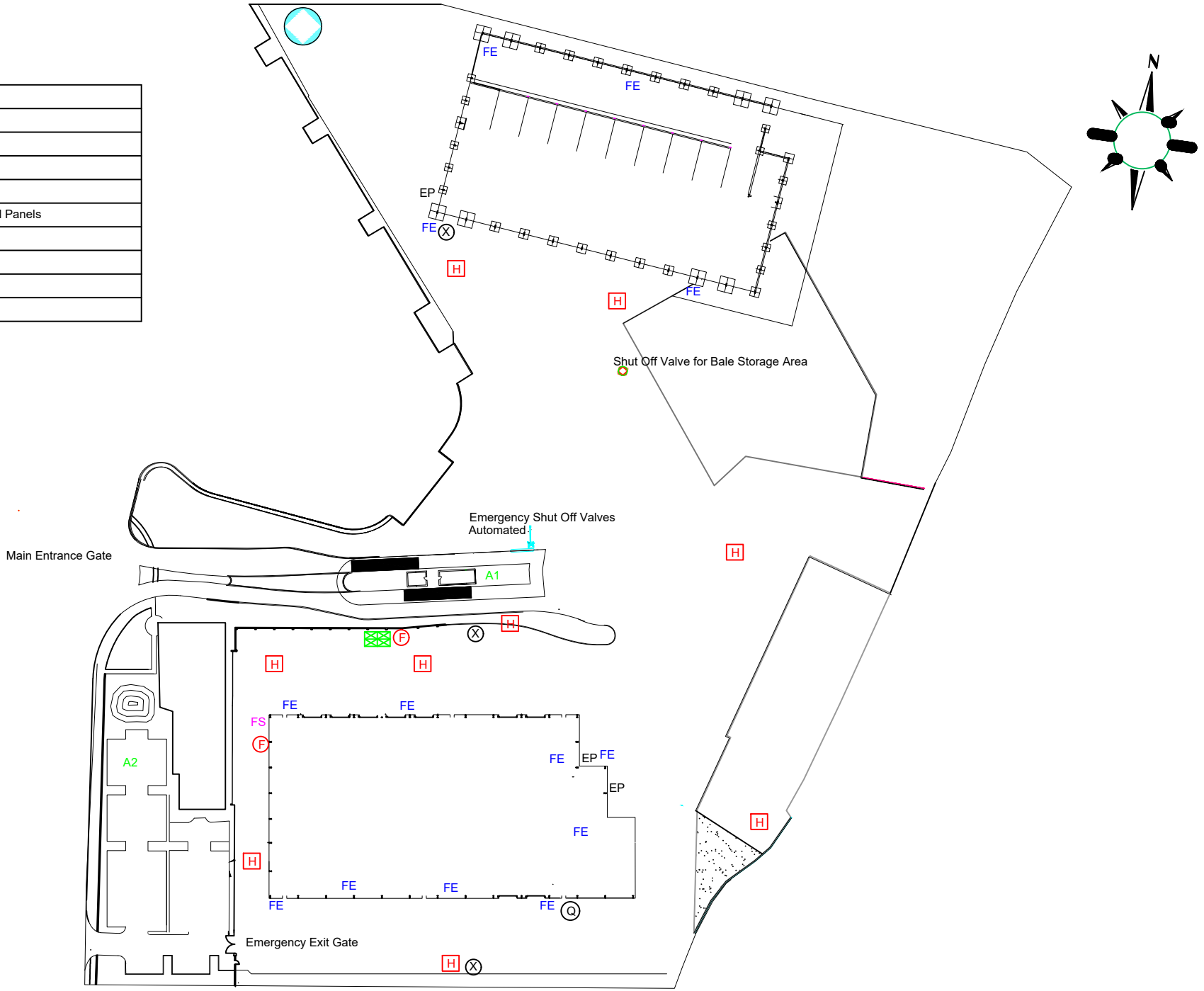
Dublin | Cork | Galway | Mullingar | Donegal | London

o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Appendix B – Excerpt from Emergency Response Plan

Millennium Park - Emergency Response Plan

A1/A2	Assembly Points
(X)	Hydrant Kits
H	Hydrants
(F)	Fuel Storage
(Q)	Quarantine Area
EP	Electrical Control Panels
	Shut Off Valve
FS	Fire Man Switch
	Spill Kits
FE	Fire Equipment



Section 6.0 EMERGENCY PROCEDURE

Condition 8 of the EPA Waste Licence (W0183-01) stipulates that in the event of an emergency, measures should be taken to address the hazard and notify appropriate Authority. To that extent, the Greenstar EHS department should be contacted ASAP but no later than 24H after the emergency arose.

6.1 Emergency definition

An emergency may constitute a fire, an explosion, a spillage, acceptance of an unexpected hazardous or clinical waste, a breakdown of equipment or any of the above that would pose as a risk to human health and safety or to the environment. The previous sentence is not an exhaustive list.

6.2 Incident Investigation

1) Arrange to inspect the area where the incident occurred.
2) Inform the relevant **SEHL** department (Environment and / or HS) and seek advice for any other external communication.
3) Take statements from persons witnessing the incident.
4) Compile all the witness statements in a report.
5) Write a non-conformance report, if applicable.
6) Record the incident in an incident report form.

If applicable, the relevant Authorities will be informed of the incident and/or site closure as well as the reasons for it and corrective/preventive actions to be taken/required to resume normal business.

6.3 **Scenario One:** Fire

Follow the procedure below. The person discovering the fire should:

1) Immediately raise the alarm by giving verbal warning to those nearby or by operating the nearest break glass unit or using an air horn or using the internal radio system.

2) Contact your direct senior person who will escalate the information ASAP to the Fire Officer / Operations Manager or his/her deputy. At that stage, the Fire Officer will decide if the fire brigade should be summoned or not. If the fire brigade should be summoned, the Fire Officer might delegate the call to whoever is deemed competent to do so. This person will immediately contact the Emergency Services by dialling 112 or 999, requesting the fire brigade. He/she will provide the fire brigade with:
   - the address
   - the location of the premises
   - The phone number of the premises
   - And any other relevant information to hand as regards the fire and state of evacuation.

3) On hearing the warning of fire or the fire alarm, all the people in the concerned building should immediately leave by the nearest exit.

Where possible close (but do not lock) doors and windows on your way out.
Any Fire Officer should immediately commence their designated duties.
The Fire Officer will retrieve the fire register and the emergency pack and proceed to the designated assembly point from where he will coordinate the emergency response plan.

4) The site administrative staff and the Operations Manager, if different, will join the Fire Officer to help coordinate the Emergency Response.

5) The Fire Officers will evacuate their respective areas, do a roll call by team at the assembly point and report to the Site Operations Manager.
The assembly point is at the top of the hill, on the grass near the entry gate. If necessary, an intermediate assembly will be designated by the Fire Officer.

6) Fire Officers must inform the Site Operations Manager of any missing persons and if possible their last known whereabouts.

7) The Fire Officer liaise with the Emergency Services on arrival and, using the Emergency Pack, advise the Emergency Services Senior Fire Officer of any additional hazards (i.e. gas bottles, electricity, toxic chemicals, paints etc.)

8) When fire is out and cold, treats residual liquid contaminants as a spillage by using appropriate precautions as toxic/hazardous substances may be present. Appropriate measures are taken to dispose of substances as waste material in a safe and environmentally responsible manner.

No one can re-enter the building until the Fire Officer gives the all clear.

Assembly Point B for the Office Block is at the car park and the Assembly Point A for the Recycling Plant Building is at the weighbridge

Engineering a Sustainable Future

Dublin | Cork | Galway | Mullingar | Donegal | London

o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Appendix C – Fire Extinguisher and Hose Reel Inspections

Doc num: SF073

Issue date: 22/06/2020

Revision: 00

Approved by: P.O'Reilly

Fire Extinguisher& Hose Reels Weekly Checklist

Completed by: _____
Date: _____

Extinguisher Location	Extinguisher No.'s			Exting. in place	Notes	Extinguisher Location	Extinguisher No.'s			Exting. in place	Notes
MP1											
2 x Welders				All ok							
2 x Rear Door (Area 1)				All ok							
2 x Switch Room				All ok							
2 x Rear Door (Area 2)				All ok							
4 x Front of Shed				All ok							
MP2											
2 x Shredder				All ok							
2 x Eddy Current MSW				All ok							
1 x Eddy Current Lights				All ok							
1 x Screener				All ok							
MP3											
2x extinguishers (front of shed LHS)				All ok							
2x extinguishers (front of shed RHS)				All ok							
2x extinguishers (electrical room)				All ok							
2x extinguishers (rear of shed LHS)				All ok							
2x extinguishers (Rear of shed RHS)				All ok							
HOSE REELS				**In Place**	**Condition / Valve ok?**	**Pressure**					**Notes**
MP1											
Front RHS Corner				Ok							
Middle Door Front				Ok							
LHS Side Door Front				Ok							
Welders				Ok							
Middle Door Back				Ok							
Right Door Back				Ok							
MP2 (on plant)											
Reel 1				Ok							
Reel 2				Ok							
Reel 3				Ok							
MP3											
Hose Reel 1				Ok							
Hose Reel 2				Ok							
Hose Reel 3				Ok							
Hose Reel 4				Ok							
Hose Reel 5				Ok							

Appendix F.

Met Eireann DDF Data

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 310432, Northing: 241026,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.6,	3.6,	4.2,	5.1,	5.6,	6.1,	7.6,	9.3,	10.4,	12.0,	13.4,	14.5,	16.2,	17.5,	18.6,	N/A ,
10 mins	3.6,	5.0,	5.8,	7.0,	7.9,	8.5,	10.6,	13.0,	14.5,	16.7,	18.7,	20.2,	22.6,	24.4,	26.0,	N/A ,
15 mins	4.2,	5.9,	6.9,	8.3,	9.3,	10.0,	12.4,	15.2,	17.1,	19.7,	22.0,	23.8,	26.6,	28.7,	30.5,	N/A ,
30 mins	5.5,	7.7,	8.9,	10.7,	11.9,	12.8,	15.8,	19.2,	21.4,	24.5,	27.3,	29.4,	32.7,	35.3,	37.4,	N/A ,
1 hours	7.3,	10.1,	11.6,	13.7,	15.2,	16.3,	20.0,	24.1,	26.8,	30.5,	33.8,	36.4,	40.3,	43.3,	45.8,	N/A ,
2 hours	9.7,	13.2,	15.0,	17.7,	19.5,	20.9,	25.4,	30.3,	33.5,	38.0,	42.0,	45.0,	49.6,	53.2,	56.1,	N/A ,
3 hours	11.4,	15.4,	17.5,	20.5,	22.5,	24.1,	29.1,	34.7,	38.3,	43.2,	47.6,	50.9,	56.0,	59.9,	63.1,	N/A ,
4 hours	12.8,	17.2,	19.4,	22.8,	25.0,	26.7,	32.1,	38.1,	42.0,	47.4,	52.0,	55.6,	61.1,	65.2,	68.7,	N/A ,
6 hours	15.1,	20.0,	22.6,	26.4,	28.9,	30.8,	36.9,	43.6,	47.9,	53.8,	59.0,	63.0,	69.0,	73.6,	77.3,	N/A ,
9 hours	17.7,	23.4,	26.4,	30.6,	33.4,	35.6,	42.4,	49.9,	54.6,	61.2,	66.9,	71.3,	77.9,	82.9,	87.0,	N/A ,
12 hours	19.9,	26.1,	29.4,	34.0,	37.1,	39.4,	46.8,	54.8,	60.0,	67.1,	73.2,	77.8,	84.9,	90.3,	94.7,	N/A ,
18 hours	23.4,	30.5,	34.2,	39.4,	42.9,	45.5,	53.8,	62.7,	68.4,	76.2,	83.0,	88.1,	95.9,	101.8,	106.6,	N/A ,
24 hours	26.3,	34.1,	38.1,	43.8,	47.5,	50.4,	59.3,	69.0,	75.1,	83.5,	90.8,	96.2,	104.5,	110.8,	115.9,	133.4,
2 days	32.6,	41.5,	45.9,	52.3,	56.4,	59.6,	69.3,	79.8,	86.3,	95.2,	102.9,	108.7,	117.3,	123.8,	129.1,	147.1,
3 days	37.7,	47.4,	52.3,	59.2,	63.7,	67.0,	77.5,	88.5,	95.5,	104.9,	112.9,	119.0,	128.0,	134.8,	140.3,	158.9,
4 days	42.1,	52.6,	57.8,	65.2,	69.9,	73.5,	84.6,	96.2,	103.5,	113.3,	121.7,	128.0,	137.3,	144.4,	150.1,	169.2,
6 days	50.0,	61.7,	67.5,	75.6,	80.8,	84.8,	96.8,	109.5,	117.4,	127.9,	136.9,	143.6,	153.6,	161.1,	167.1,	187.3,
8 days	56.8,	69.7,	76.0,	84.8,	90.4,	94.6,	107.6,	121.1,	129.4,	140.7,	150.1,	157.2,	167.7,	175.6,	181.9,	203.1,
10 days	63.2,	77.0,	83.7,	93.1,	99.1,	103.5,	117.3,	131.5,	140.4,	152.1,	162.1,	169.5,	180.5,	188.7,	195.3,	217.3,
12 days	69.1,	83.8,	90.9,	100.8,	107.1,	111.8,	126.3,	141.2,	150.5,	162.8,	173.1,	180.8,	192.3,	200.8,	207.6,	230.4,
16 days	80.0,	96.3,	104.1,	115.0,	121.9,	127.0,	142.7,	158.9,	168.9,	182.1,	193.2,	201.5,	213.7,	222.8,	230.0,	254.2,
20 days	90.1,	107.8,	116.2,	128.0,	135.4,	141.0,	157.8,	175.0,	185.6,	199.7,	211.5,	220.2,	233.1,	242.7,	250.3,	275.7,
25 days	101.9,	121.2,	130.4,	143.1,	151.1,	157.1,	175.2,	193.6,	205.0,	219.9,	232.5,	241.7,	255.4,	265.5,	273.6,	300.4,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

APPENDIX 2.6

ENVIRONMENTAL LIABILITY RISK

Unit 15
Melbourne Business Park
Model Farm Road
Cork

T: 021 434 5366
E: info@ocallaghanmoran.com
www.ocallaghanmoran.com

O'Callaghan Moran & Associates
ENVIRONMENTAL MANAGEMENT FOR BUSINESS

ENVIRONMENTAL LIABILITY

RISK ASSESSMENT

STARRUS ECO HOLDINGS LTD

MATERIALS RECOVERY FACILITY

MILLENNIUM BUSINESS PARK

BALLYCOOLIN

COUNTY DUBLIN

INDUSTRIAL EMISSIONS LICENCE NO. W0183-01

Prepared For: -

Starrus Eco Holdings Ltd
Fassaroe
Bray,
County Wicklow.

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
Rutland Street,
Cork

March 2017

Project	Environmental Liability Risk Assessment			
Client	Starrus Eco Holdings Ltd			
Report No	Date	Status	Prepared By	Reviewed By
17138070101	12/03/2017	Draft	Billy Hamilton BSc, MLitt	Jim O'Callaghan MSc, CEnv, MCIWM, IEMA
	24/03/2017	Final		
	05/04/2017	Final Rev A		

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Activity Details

Starrus Eco Holdings Ltd (SEHL) operates a Materials Recovery & Transfer facility (MRF) at Millennium Business Park, Ballycoolin, Dublin 11 under Industrial Emissions Licence (IED) (W0183-01) issued by the Environmental Protection Agency (Agency) in April 2004.

The installation is currently licensed to accept and process 220,000 tonnes of waste per annum, comprising commercial/industrial non-hazardous waste, municipal waste and construction and demolition wastes. All waste processing takes place inside the waste transfer building, as specified in Condition 4.1 of the Licence. The Agency has granted approval for the outdoor storage of wrapped bales of Solid Recovered Fuel (SRF).

An Environmental Liability Risk Assessment (ELRA) was prepared in 2013. SEHL appointed O'Callaghan Moran & Associates (OCM) to revise and update this ELRA. The methodology followed the EPA Guidance on assessing and costing environmental liabilities (2014).

1.2 Methodology

The assessment was based on the Environmental Protection Agency's (Agency) '*Guidance on assessing and costing environmental liabilities' (March 2014).* The ELRA has been prepared to accurately reflect the risks of unplanned, but plausible incidents occurring.

The assessment included:

- An assessment of site operations, including materials and product handling and storage practices; production processes; process waste management; emission control and management (infrastructural and procedural); accident prevention policy and emergency response procedures
- Determining the environmental setting and the identification of any particular sensitive receptors that could be impacted in the short, medium and long term by the site operations;
- Establishment of the site history and regulatory compliance performance.

2. SCOPING

The ELRA addresses the liabilities from past and present activities. In this regard, all aspects of the historic and the licensable activities licence that pose a plausible risk to the environment are described and evaluated. The ELRA is based on Condition 11.2 of the Licence.

The ELRA is based on current conditions observed during environmental assessment activities and on past conditions as determined be a review of available records.

3. RISK IDENTIFICATION

3.1 Site Operation

3.1.1 Size and Nature of the Activity

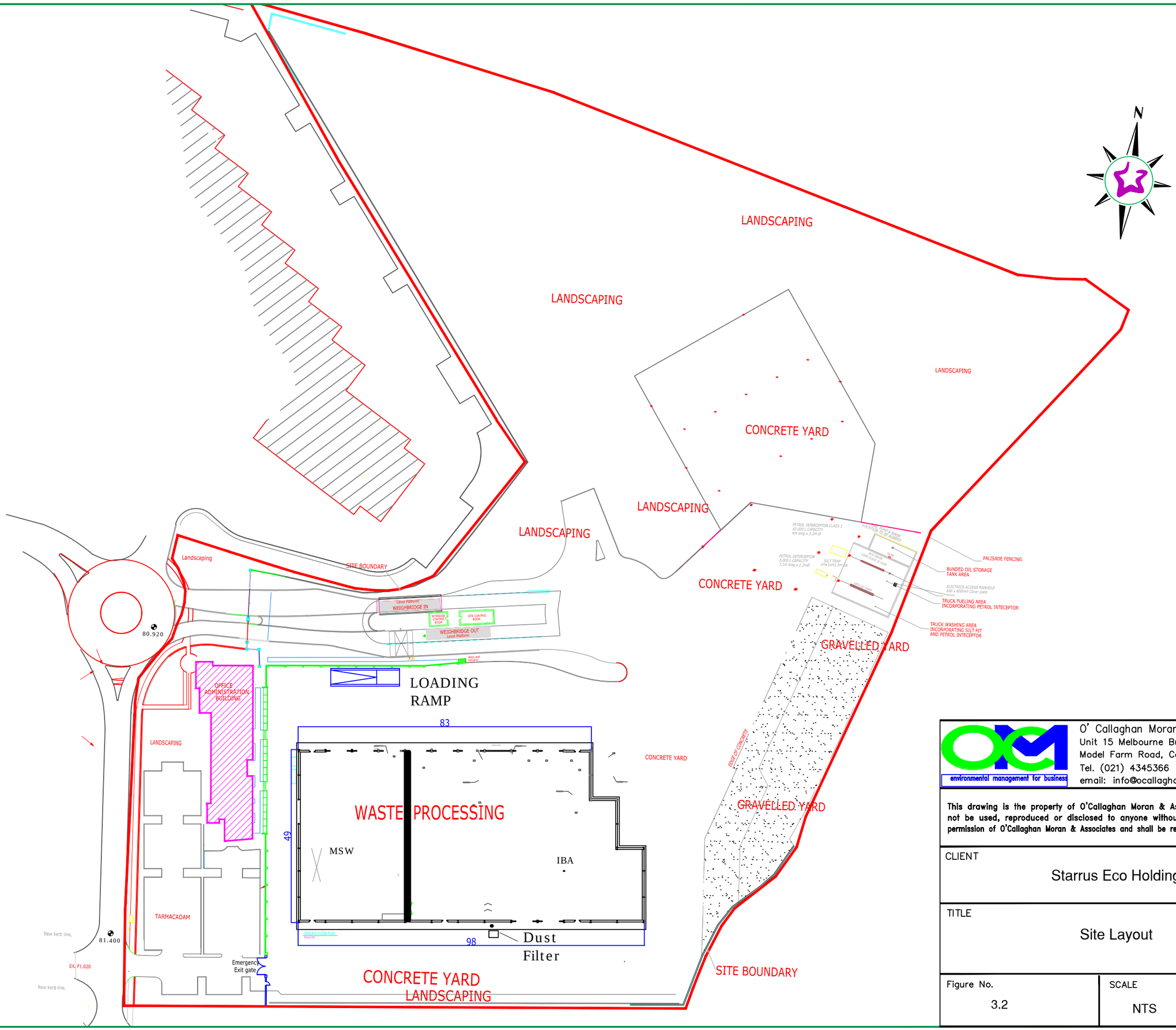
The installation occupies 4.45 hectares (ha) in the east of the Millennium Business Park, Ballycoolin, Dublin 11 (Figure 3.1). It is intended to develop the facility in a number of Phases. Phases 1 and 2 opened in July 2006 and involved the construction of the Materials Recovery Facility (MRF) building and supporting ancillaries as shown on Figure 3.2. The licence allows for the construction of a biowaste treatment building but this has not yet been constructed. The Business Park (Park) is accessed via the Cappagh Road, the entrance to the installation is off an internal road within the Park.

The installation is licenced to accept 220,000 tonnes of non-hazardous municipal, commercial & industrial, and construction & demolition waste per year.

A range of fixed and mobile plant and equipment items are used at the installation and these are listed in Table 3.1.

Table 3.1 Existing Plant

Type of Plant	Number
Front Loading Shovel	1
Forklifts	2
Grab Machine	1
Bag Opener	1
Trommel Screen	1
Overband Magnet	1
Picking Station	1
Round Baler and Wrapper Unit	1
Cardboard Baler	1
Conveyor	1



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

environmental management for business

CLIENT

Starrus Eco Holdings Ltd.

TITLE

Site Layout

Figure No.

3.2

SCALE

NTS

3.1.2 Site History

In 2004, An Bord Pleanala granted planning permission for the construction of the facility and construction began in January 2005 with the construction of Phase 1 and 2. Prior to this construction the installation was agricultural purposes. There is no record or evidence of any previous development on the site.

The Agency granted Greenstar a Waste Licence (Reg No. W0183-01) in April 2004. The Licence was transferred to SEHL on the 4th March 2014. The Licence was transitioned to an Industrial Emissions Licence (IED) on the 16th December 2015.

3.1.3 Site Processes

The installation is licensed to accept the following waste types and quantities, as specified in Schedule A of the Licence

- Municipal Waste (100,000 tonnes),
- Commercial & Industrial (90,000 tonnes),
- Construction & Demolition (30,000 tonnes).

No hazardous wastes or liquid waste are accepted at the facility.

The Materials Recovery building was designed to accommodate distinct waste handling areas for the Commercial and Industrial (C&I) waste, Municipal Solid Waste (MSW) and Construction and Demolition (C&D) waste. Each area has separate access for loading and unloading and waste sorting, processing and storage.

Over time the types of waste accepted and the method of processing changed. In 2014 the C&D and C&I processing line were removed and the processing of C&I and C&D waste ceased. The site continued to accept C&D waste, primarily household skip waste and residual household MSW and food waste. These wastes are bulked up and sent to other waste management facilities for treatment. Loose and baled SRF produced at other waste management facilities is accepted and stored at the site. The loose SRF is stored inside the building, while the bales are stored in a designated open area.

3.2 Site Security

There is 2 m high palisade fence around the perimeter and the site is accessed via security gates.

3.3 Services

The facility obtains water from the mains supply provided by Irish Water. Electricity is provided by the Electricity Supply Board.

3.4 Foul Water Drainage System

Process wastewater (dust/odour suppression mist) and yard run-off is discharged to the wastewater drainage system via a silt trap and oil interceptor. Sanitary waste water is discharged directly to the Park's wastewater drainage system.

3.5 Surface Water Drainage System

Rainwater run-off from the building roofs, car parks and areas of the yard where wastes are not stored, used to discharge to the municipal storm water sewer and the quality was monitored at two locations. In 2013, the surface water monitoring identified contamination. As part of the investigation SEHL contacted the Millennium Business Park Management Company who informed it that there was a problem with the flow in the sewer system serving the Business Park, which was causing back flow into the installation resulting in stagnant and nutrient rich water collecting at the monitoring locations.

Responsibility for addressing the drainage problems rests with the Management Company and, pending the resolution, the surface water run-off from the site has been diverted to the foul sewer. Therefore there are currently no emissions to surface water; however it is intended to recommence emissions to the surface water sewer serving the Business Park once the Management Company has resolved the drainage problems.

3.6 Inventory of Raw Materials and Wastes

The materials/products used on-site include diesel, hydraulic and engine oils, and odour control additive. The installation contains two 2,500 litre self-bunded plastic tanks containing diesel. Relatively small volumes of chemicals and hydrocarbons are stored on site, such as paints or white spirit for maintenance purposes, drums of hydraulic oils for maintenance of machinery, engine oils and anti-freeze etc. These materials are stored on pallets in the maintenance shed.

The maximum volume of hazardous materials on site at any one time are indicated in Table 3.2.

Table 3.2 – Volume of Hazardous Materials

Products	Quantity Stored
Diesel	5,000 litres
Engine and Lubricating Oil	200 litres
AdBlu	50 litres

At any one time the maximum amount of waste stored on site is approximately 4,600 tonnes, comprising mainly mixed municipal waste and dry recyclables (Table 3.3).

Table 3.3 – Materials Inventory

Wastes/Products	Quantity Stored
Mixed C & D	100
MMW	100
Organics	25
Batteries	1
Metal	20
Dry Waste	100
Timber	45
Non Ferrous Metals	6
Tyres	6
Cylinders	1
DMR	50
SRF	4000
Mattress	30

3.7 Environmental Emissions

Site operations are a source of noise and the licence specifies noise emission levels for the nearest noise sensitive locations. Operations are also a potential source of dust emissions and the licence specifies measures to control odour and dust emissions. Surface water and waste water emissions discharge to the Irish Water foul sewer.

3.8 Emergency Response

SEHL has adopted an Emergency Response Procedure (ERP) that identifies potential hazards at the site that may cause damage to the environment and also specifies the roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents and to minimise environmental impacts.

3.9 Operator Performance

3.9.1 Environmental Management Systems

SEHL have implemented an Integrated Management System (IMS) in accordance with the requirements of Occupational Health and Safety Assessment Series (OHSAS) 18001:2007 and International Standard Organisation (ISO) 14001:2004 in order to manage the Health, Safety and Environmental performance of their business and to control health and safety risk and to minimise their environmental aspects and impacts.

The IMS has been developed for the achievement of continual improvement taking into account the requirements of the Waste Licence Conditions. SEHL has prepared and effectively implement documented procedures and instructions in accordance with the requirements of both the OHSAS 18001:2007 and ISO 14001:2004.

3.9.2 Facility Management & Staffing Structure

SEHL has prepared a documented Environmental Management Programme (EMP) which serves as a guidance document for installation staff and describes operational control and management practices. The EMP is a core element of the installation's Environmental Management System (EMS). All operatives are provided with the appropriate and necessary training to complete their assigned tasks.

3.9.3 Compliance History

In 2016, the installation received one (1 No.) non-compliance in relation to waste management. In 2017, the installation received one (1 No.) non-compliance in relation to bunding and materials handling.

3.9.4 Enforcement History

The installation has never been the subject of any enforcement action taken by the regulatory authorities.

3.9.4 Incidents History

There were no reportable incidents at the installation in 2016.

3.9.5 Complaints History

SEHL maintains a register of complaints received in accordance with Condition 9.4 of the licence. No complaints were received in 2016.

3.10 Environmental Sensitivity

3.10.1 Surrounding Land Use

The installation is located within an existing business park. The installation is bound to the north and east by a quarry operated by Roadstone Wood and to the west and south by other business premises within Millennium Business Park. The site is traversed from north-west to south-east by the Finglas to Woodlands high voltage (220kV) overhead power lines. The Finglas to Macetown high voltage (100kV) overhead power line runs from east to west along the southern site boundary.

The nearest occupied dwelling, 200 m to the south of the site, is screened by the hedgerow bordering Millennium Business Park as well as screening bordering the residence.

3.10.2 Hydrology

Rainwater run-off from the building roofs, car parks and areas of the yard where wastes are not stored, used to discharge to the municipal storm water sewer and the quality was monitored at two locations. In 2013, the surface water monitoring identified contamination. As part of the investigation SEHL contacted the Millennium Business Park Management Company who informed it that there was a problem with the flow in the sewer system serving the Business Park, which was causing back flow into the installation resulting in stagnant and nutrient rich water collecting at the monitoring locations.

Responsibility for addressing the drainage problems rests with the Management Company and, pending the resolution, the surface water run-off from the site has been diverted to the foul sewer. Therefore there are currently no emissions to surface water; however it is intended to recommence emissions to the surface water sewer serving the Business Park once the Management Company has resolved the drainage problems.

3.10.3 Geology & Hydrogeology.

Geotechnical site investigations undertaken at the Business Park indicate that the overburden ranges in thickness from less than 1.3 m to 8.45 m thick. At the installation, the thickness is thin in the north-western portion of the site and thickens to the east and south. Information from the GSI suggests a similar range in overburden thickness locally in the surrounding area. The overburden comprises sandy gravelly boulder clays.

The bedrock locally comprises calcareous, shale, limestone, conglomerate of the Tober Coleen Formation. Based on data obtained from the GSI the bedrock aquifer is a locally important **(Lm)** aquifer that is productive in local zones. The aquifer vulnerability rating is Extreme (**E**).

3.10.4 Designated Sites

There are no proposed Natural Heritage Area (pNHA) or Special Area of Conservation (SAC), within 10km of the site.

4. RISK ANALYSIS

4.1 Installation Design and Operation

The licence conditions require the provision of mitigation measures, both infrastructural and procedural, that effectively minimise the risk of environmental liabilities associated with unplanned events. Such measures, which are subject to regular review by SEHL include:

- Provision of an appropriately experienced Facility Management Team and implementation of appropriate staff training programmes;
- Implementation of a site specific Environmental Management System (EMS), including an Environmental Management Programme (EMP);
- Adoption of site specific Accident Prevention Policy and Emergency Response Procedures (ERPs), which will be reviewed annually;
- Provision of impermeable concrete surfaces in areas where wastes are stored and handled;
- Provision and maintenance of appropriate spill response and clean-up equipment in areas where there is a risk of spills occurring;
- Regular site inspections.
- Regular site inspections.

4.2 Risk Identification

Environmental liabilities arise from contamination or damage to environmental media (air, surface water, soils and groundwater), which can act as pathways to sensitive receptors. The Agency, in reaching a decision to grant the current Licence concluded that the facility, if designed and operated in accordance with the licence conditions, will not give rise to environmental liabilities.

Therefore, for the purposes of this ELRA, future environmental liabilities are confined to incidents such as fires, explosions, spills and leaks. The receptors that are potentially susceptible to adverse impacts associated with such incidents include, air, soils, groundwater, surface water and nearby commercial activities and residences.

4.3 Plausible Risks

The plausible risks identified at the site are presented in Table 4.4. These take into account the facility history, the controls and mitigating measures that are already in place, with due regard for those controls to contain incidents and for the potential failure of the controls.

Table 4.4 Risks

Risk ID	Process	Potential Hazards/Risks
1	Diesel/Oil Storage	Accidental release of diesel from bulk storage tanks-surface water contamination
2		Accidental release of diesel during deliveries and dispensing-surface water contamination.
3		Accidental release of diesel and oils- soil and groundwater and surface water contamination.
4	Fire in Recycling Buildings/ External Waste Storage Areas	Emissions to air.
5		Firewater run-off to surface water drains-surface water contamination.
6		Firewater infiltration to ground-soil, groundwater and surface water contamination

4.4 Risk Analysis

An assessment of the risks presented by the facility operations was completed taking consideration of site specific characteristics and the Classification Tables for Likelihood and Consequence in the Agency Guidance Document (Ref Table 4.2a and 4.2b).

Table 4.2a – Risk Classification Table (Likelihood)

Risk	Category	Description
1	Very Low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring
5	Very High	Very high chance of hazard occurring

Table 4.2b– Risk Classification Table (Consequence)

Risk	Category	Description
1	Trivial	No damage or negligible change to the environment
2	Minor	Minor/localised impact or nuisance
3	Moderate	Moderate damage to the environment
4	Major	Severe damage to the environment
5	Massive	Massive damage to a large area, irreversible in the medium term

The Risk Analysis Form is presented in Table 4.3. The assignation of the severity rating scores takes into consideration the mitigation measures that are already in place. OCM does not

consider it plausible that all of the containment and control measures already in place would fail at the time of an incident, as this would require:

a) SEHL to wilfully disregard the licence conditions regarding bund integrity testing; accident prevention and emergency response provisions; inspection and repair of paved areas; maintenance of plant and equipment; staff levels and training, and

b) a failure by the Agency to properly regulate the facility to such an extent that allowed all the control and containment measures to fail.

Table 4.6 Risk Analysis Form

Risk ID	Process*	Potential Risks	Environmental Effect	Likelihood	Basis of Likelihood	Consequence	Basis of Severity	Risk Score (Severity x Occurrence)
1	Diesel/Oil Storage	Uncontrolled release from bulk storage tanks that escapes the bunds and enters the surface water drains.	Contamination of the foul water drains	1	The bund design and construction complies with licence requirements and has more than 110% capacity of the tank. The bund is subject to regular visual inspection and routine integrity testing and repaired as required. Drains connect to an oil interceptor and Irish Water Sewer. ERP ensures rapid response to incident. The risk is **Very Low.**	2	All drainage from yards passes through oil interceptor before entering the sewer. The severity of the impact would be M**inor**	2
2	Diesel/Oil Storage	Escape of diesel or oil to surface water drainage system during filling/ dispensing	Contamination of the foul water drains	1	Oil stored in fully bunded area. Documented procedure on refuelling/dispensing and staff fully trained in spill prevention and clean-up. Drains connect to an oil interceptor tank into a holding tank. The APP and ERP minimises the risk of accidents and ensure rapid response to incident. The risk is **Very Low**	2	All drainage from yards passes through oil interceptor to the sewer. The severity of the impact would be M**inor**	2
3	Diesel/Oil Storage	Uncontrolled released from bund or spill during dispensing/refilling storage tanks that leaks through damaged paving or leaks in the surface water drains.	Soil / Groundwater contamination	2	Oil stored in bunded tanks, staff fully trained in spill prevention and clean-up All operational areas are paved with concrete, Routine inspection and repair of damaged paved areas. Routine integrity testing of the drains. The APP and ERP minimises the risk of accidents and ensure rapid response to incident. The risk is **Low**.	1	Subsoils protect the bedrock aquifer. Potable water is obtained from an external source. The severity of the impact would be **Trivia**l	2

Risk ID	Process*	Potential Risks	Environmental Effect	Likelihood	Basis of Likelihood	Consequence	Basis of Severity	Risk Score (Severity x Occurrence)
4	Fire in MRF Building	Smoke emission to air.	Air pollution	5	APP minimises the risk of fire outbreak. However if it occurs the risk of smoke emissions is **Very High**.	1	Smoke presents a potential health risk. Surrounding land use primarily commercial. ERP ensures rapid response to incident Emergency Service Co-ordinator will make decision on the need to evacuate nearby commercial premises. Could be significant disruption during incident, but no long term effect. The severity of the impact would be **Trivial.**	5
5	Fire in MRF Building	Escape of Firewater to surface water drainage system	Surface water contamination	2	Drains connect to an oil interceptor tank and discharges to the sewer. There is a shut off-valve on the outlet pipe to the drain, which in the event of an incident (spill, fire) can be shut to contain run-off inside the site. The risk is **Low**	3	ERP minimises the risk of fire and fire impacts and ensure rapid response to incident. The severity of the environmental impact would be **Moderate.**	6
6	Fire in MRF Building	Firewater leak through damaged paving and damaged surface water drains	Soil / Groundwater contamination	2	Routine inspection and repair of damaged paved areas. Integrity testing of surface water drains and repairs as required. The risk is **Low**	1	Water is supplied locally by Irish Water. The severity of the impact would be **Trivial.**	2

5. RISK EVALUATION

The risks associated with the operation of the installation fall into two categories:

1 Risk of surface water and/ or soil and groundwater contamination associated with diesel storage and handling.

2 Risk of surface water and/or soil and groundwater contamination associated with a fire.

Each of the risks have been ranked to assist in the prioritisation of treatment and these are presented in Table 5.1. Only those risks with a risk score greater than 2 have been included.

Table 5.1 Risk Ranking

Risk ID	Process	Potential Risk	Consequence	Likelihood	Risk Score
4	Fire in MRF	Air Pollution	1	5	5
5	Fire in MRF	Firewater runoff contamination of the surface water drains.	3	2	6

A colour coded risk matrix (Table 5.2) has been prepared to provide a broad indication of the critical nature of each risk and is a visual tool for regular risk reviews since the success of mitigation can be easily identified.

Table 5.2 Risk Matrix

Likelihood

V. High	5	**4**				
High	4					
Medium	3					
Low	2			**5**		
V. Low	1					
Consequence		Trivial	Minor	Moderate	Major	Massive
		1	2	3	4	5

Red – High-level risks requiring priority attention.

.

Amber – Medium-level risks requiring treatment, but not as critical as a High risk .

Green – Lowest-level risks that do not need immediate attention but there is a need for continuing awareness and monitoring on a regular basis.

There are no risks in the red and amber zones that require either priority attention or treatment. The remaining risks are in the green zone indicating a need for continuing awareness and monitoring on a regular basis. A risk treatment programme has been prepared and is presented in Section 6.

6. RISK TREATMENT

The risk management programme for the installation is set out in Table 6.1

Table 6.1 –Risk Management Plan

Risk ID	Potential Risk	Risk Score	Mitigation Measures	Outcome	Action	Person Responsible
4	Smoke from fire causes localised air pollution	5	APP and ERP prepared and staff trained.	While the risk of occurrence is very high, the long term environmental impact would be trivial. No further physical mitigation measures are required.	Staff refresher training on ERP to continue	Facility Manager
5	Firewater runoff contamination of the surface water drains.	6	All drainage passes through interceptor to surface water holding tank. The discharge point is fitted with a shut-off valve. ERP prepared and staff training provided.	Firewater retention assessment not completed. Limited storage within site boundary. Vacuum tankers could empty the tank	Complete firewater retention assessment Implement recommendations of the assessment within 6 months of receipt of Agency approval	Facility Manager

7. IDENTIFICATION OF PLAUSIBLE WORST CASE SCENARIO

The risk analysis identified one (Risk ID 5) with a Moderate consequence and this is considered to be the 'worst case' scenario for the installation. It would have 'knock on' effects in that there would be there would be smoke emissions to air (Risk ID 4).

7.1 Source-Pathway-Receptor

7.1.1 Sources

The source is a fire in the MRF building. The incident generates fumes and contaminated firewater.

7.1.2 Pathways

Potential pathways for the fumes is the atmosphere. The pathway for the contaminated firewater is the paved yard, surface water drains and infiltration through damaged paving.

7.1.3 Receptors

Potential receptors that could be affected by the fumes are installation staff and the occupants of the nearby commercial premises. Given the distance to the nearest private residence it is possible it would have to be evacuated, depending on the wind direction. The potential receptors for the contaminated run-off are the surface water sewer and groundwater.

7.2 Impacts and Remedial Measures

The potential impacts are on human health, surface water, groundwater or soils. The potential remedial measures include spill containment; demolition and removal of damage buildings or tanks, surface water quality monitoring, excavation and removal of contaminated soils and reinstatement, monitoring and possible installation and monitoring of groundwater quality and/or possibly groundwater remediation.

8. QUANTIFICATION & COSTING

The costs, which are presented in Table 8.1, are based on the following assumptions:

- The fire service will be on site within 20 minutes of the alarm being raised. The fire will be fought over one day by two fire crews, with one crew remaining on site for 24 hours after the fire has been extinguished.

- The rates applied for the removal and off-site disposal of wastes and the contaminated firewater run-off are those currently charged by hazardous waste contractors and include transport and treatment costs.

- Following the incident a soils and groundwater assessment will be carried out. It is assumed that groundwater monitoring wells will be required to determine the nature and extent of the impacts.

- Provision is made for surface water quality monitoring.

- It is not possible to quantify the losses to the atmosphere, but an air quality impact assessment will be carried out following the incident to determine the likely extent, if any, of the impacts associated with emissions to air.

Table 8.1 Worst Case Costs

Task	Description	Quantity	Measurement Unit	Unit Rate (€)	Cost (€)	Source of Unit rates
Response to Fire in Shed	Facility Management and Security.	6	Week	6,000	36,000	SEHL
	Fire Services Attendance on Site[1].	2	Day	50,000	100,000	SEHL
	Spill containment consumables (extinguishers, booms).	1	Incident	5,000	5,000	
	Testing of contaminated firewater[2]	4	Sample	250	1,000	OCM
	Transport of contaminated firewater[3]	1530	Tonne	12	18,360	SEHL
	Off-site treatment of fire water.[4]	1530	Tonnes	23	35,190	SEHL
	Demolition of Building	45,000	m^3	16	720,000	EPA Guidance
	Removal and off-site disposal of fire damaged materials[5]	4,484	Tonnes	105	470,820	SEHL
	Plant and Equipment Hire (Crane, Powerhouse)	3	Day Rate	5,000	15,000	OCM
	Removal and disposal non-hazardous building debris[6]	1500	Tonne	102.76	154,140	SEHL
	Cleaning yards	2	Day Rate	500	1,000	SEHL
	Cleaning drains.[7]	Item	Jet Vac	9,750	9,750	SEHL
	Drain integrity survey.	Item		3,500	3,500	OCM
	Air quality assessment.	1	Fees	3,000	3,000	OCM
	Surface water quality monitoring in storm sewer	12	Sample	250	3,000	OCM
	Remedial works on storm sewer serving the Business Park	Item			20,000	OCM
Response to Soil and Groundwater Contamination	Soil borings.	10	Boring	100	1,000	OCM
	Soil monitoring.	20	Sample	200	4,000	OCM
	Soil excavation, transport and disposal[8].	120	Tonnes	250	30,000	EPA Guidance
	Reinstatement of excavated area, including repaving.	120	Tonnes	20	2,400	OCM
	Groundwater wells.	3	Borehole	2,500	7,500	OCM
	Groundwater samples[9].	36	Sample	250	9,000	OCM
	Consultancy Services[10].	40	Day	500	20,000	OCM
Total (€)					1,669,660	
Contingency (20%)[11]					333,932	
Final Total					**2,003,592**	

NOTES

[1] The day rate is significantly higher than that set in the EPA's ELRA guidance on fires at landfills, which is approximately €18,000. Fire will be extinguished within 24 hours, but emergency services will remain on site for another 24 hours.

[2] Includes for laboratory analysis, consultants fees itemised separately

[3] Derived From Firewater Retention Assessment for Sarsfieldcourt (W0136-02), where main processing building is similar size and tonnage on site at any one time is also similar (4300 tonnes).

[4] Includes transport and treatment cost

[5] Based on tonnage on site at any one time and assumes all is fire damaged and it is disposed to indaver

[6] Based on the non-hazardous nature of the waste in the Shed, the debris will be classified as non-hazardous

[7] Includes use of Jet Vac tankers and transport and off-site treatment costs.

[8] Site is paved and subject to regular inspection and repair. Only pathway to soil is damaged paving and leaking drains. Quantity based on and estimated impacted area of 800m2 to a depth of 0.1m

[9] Includes for five years post incident monitoring at quarterly intervals

[10] Includes for Structural Engineer and Environmental Consultant

[11] Based on environmental sensitivity of the site

9. CONCLUSION

This ELRA was carried out in accordance with Agency's Guidance (March 2014). The cost associated with the 'worst case' scenario, is €2,003,592. The immediate cost of responding to an incident and costs of the subsequent post incident remedial works will be recouped from SEHL's insurer.

APPENDIX 2.7

DECOMMISSIONING MANAGEMENT PLAN

Unit 15
Melbourne Business Park
Model Farm Road
Cork

T: 021 434 5366
E: info@ocallaghanmoran.com
www.ocallaghanmoran.com

O'Callaghan Moran & Associates
ENVIRONMENTAL MANAGEMENT FOR BUSINESS

DECOMMISSIONING PLAN

STARRUS ECO HOLDINGS LTD

MATERIALS RECOVERY FACILITY

MILLENNIUM BUSINESS PARK

BALLYCOOLIN

COUNTY DUBLIN

INDUSTRIAL EMISSIONS LICENCE NO. W0183-01

Prepared For: -

Starrus Eco Holdings Ltd
Fassaroe
Bray,
County Wicklow.

Prepared By: -

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

March 2017

Project	Decommissioning Management Plan			
Client	Starrus Eco Holdings Ltd			
Report No	Date	Status	Prepared By	Reviewed By
17138070101	12/03/2017	Draft	Billy Hamilton MLitt	Jim O'Callaghan MSc, CEnv, MCIWM, IEMA
	24/03/2017	Final		
	05/04/2017	Final Rev A		

TABLE OF CONTENTS

PAGE

1. INTRODUCTION

1.1 Activity Details

Starrus Eco Holdings Ltd (SEHL) operates a Materials Recovery & Transfer facility (MRF) at Millennium Business Park, Ballycoolin, Dublin 11 under Industrial Emissions Licence (IED) (W0183-01) issued by the Environmental Protection Agency (Agency) in April 2004.

The installation is currently licensed to accept and process 220,000 tonnes of waste per annum, comprising commercial/industrial non-hazardous waste, municipal waste and construction and demolition wastes. All waste processing takes place inside the waste transfer building, as specified in Condition 4.1 of the Licence. The Agency has granted approval for the outdoor storage of wrapped bales of Solid Recovered Fuel (SRF).

A Closure and Decommissioning Plan (Plan) was prepared in 2013. SEHL appointed O'Callaghan Moran & Associates (OCM) to revise and update this Plan. The methodology followed the EPA Guidance on assessing and costing environmental liabilities (2014).

1.2 Site Description

The installation occupies 4.45 hectares (ha) in the east of the Millennium Business Park, Ballycoolin, Dublin 11 (Figure 1.1). It is intended to develop the facility in a number of Phases. Phases 1 and 2 opened in July 2006 and involved the construction of the Materials Recovery Facility (MRF) building and supporting ancillaries as shown on Figure 1.2. The licence allows for the construction of a biowaste treatment building but this has not yet been constructed. The Business Park (Park) is accessed via the Cappagh Road, the entrance to the installation is off an internal road within the Park.

1.3 Commencement of Operations

In 2004, An Bord Pleanala granted planning permission for the construction of the facility and construction began in January 2005 with the construction of Phase 1 and 2. Prior to this construction the installation was agricultural purposes. There is no record or evidence of any previous development on the site.

The Agency granted Greenstar a Waste Licence (Reg No. W0183-01) in April 2004. The Licence was transferred to SEHL on the 4th March 2014. The Licence was transitioned to an Industrial Emissions Licence (IED) on the 16th December 2015.

1.4 Closure Scenario and Scope

The installation has no defined lifetime and the risk of closure is low. The commercial viability of the installation will be kept under review and, if market conditions dictate the need to close the installation, the Agency will be notified and the Plan will be implemented. Following a planned closure SEHL may, depending, on the future plans for the installation, apply to surrender the licence.

For the purpose of costing this Plan, it has been assumed, in accordance with the Agency's Guidance, that the plant will close unexpectedly and that the Plan will be implemented by third parties contracted by the Agency.

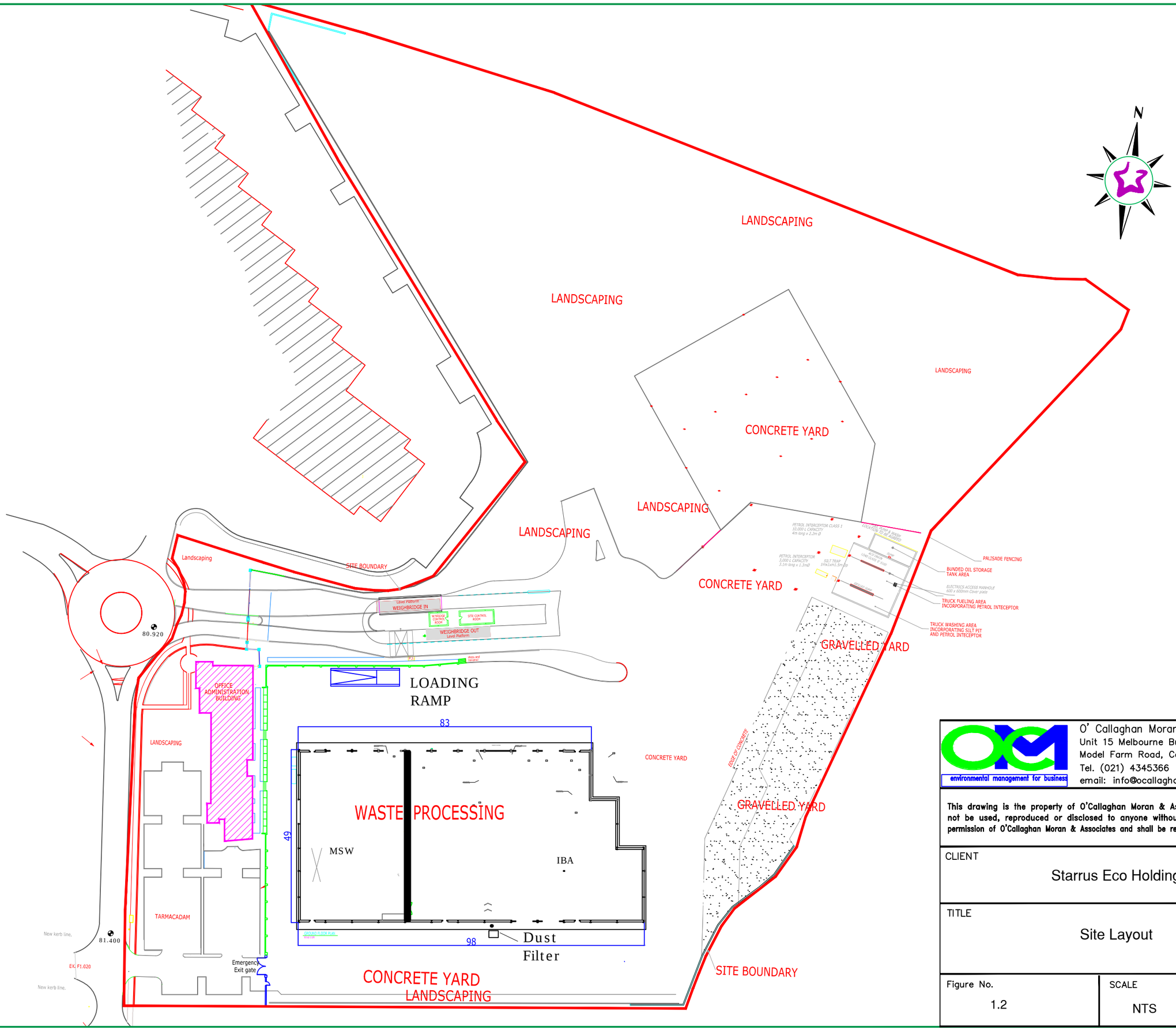
1.5 Restoration and Aftercare Plan

At the time of the preparation of this plan a Restoration and Aftercare Plan was not considered necessary.

1.6 Limitations

The assessment of costs associated with the implementation of the Plan is based on the information available at the time of the report preparation, including the Agency's Guidance, and may be subject to amendment based on future investigations.


305000
306000
307000
308000
309000
310000
311000
312000
313000
314000
315000
316000
244000
243000
242000
241000
240000
239000
238000
N
Site Location
Kilometers
0
5
Gallanstown
Sprickletown
Ward Upper
Broghan
Kilmacree
Kilreesk
Millhead
Pickardstown
Yellow Walls
Cherryhound
Hollywood
Killamonan
Dunbro
St. Margaret's
Teampall Mhaighréide
Callaghwee
Kilmartin
Pigeon River
Hollystown
Dunsoghly
Dunsoghly Castle & Church
Huntstown
Sandyhill
Portmellick
Powerstown
Hollywoodrath
Bay
Killshane
Kilshane Bridge
Newtown
Shanganhill
Harristown
Mooretown
Goddamerdy
Mitchelstown
Cruiserath
Merryfalls
Macetown Middle
Damastown
Tyrrelstown
Burial Ground
Graveyard
Johnstown
Coldwinters
Dubber
Silloge
Ballymun
Hunlstown
Balcurris Construction
Grange
Balseskin
Meakstown
Poppintree
Santry Demesne
Mullhuddart
Mullach Eadrad
Buzzardstown
Ballycoolen
Ballycoolen Cross Roads
Eladdicry Station
Kildonan
Corduff
An Chorr Dhubh
Cappoge
Poppintree Park
Deanestown
Veterinary Research Laboratory
James Connolly Memorial Hospital
St. Mary's Hospital (Cappagh)
Finglas
Fionnghlas
Ballymun
Baile Munna
Glasnevin North
Coolmine
Tiphead
Blanchardstown
Baile Bhlainséil
Abbotstown
Dunsink Observatory
Clonsilla
Cluain Saileach
Tolka River
An Tolcha
The National Food Centre
Scribblestown
Whitehall
Ashtown
Kellystown
Tolka Valley Park
Royal Canal
N3
R108
R102
R103
R121
R122
R104
M50
Under Construction
Details:
Site Location
CLIENT
Starrus Eco Holdings Ltd.
TITLE
Site Location
Figure 1.1
O'Callaghan Moran & Associates,
Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com
Environmental Management for Business
This drawing is the property of O'Callaghan Moran & Associates and shall not be used, produced or disclosed to anyone without the prior written permission at O'Callaghan Moran & Associates and shall be returned upon request.



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

environmental management for business

CLIENT

Starrus Eco Holdings Ltd.

TITLE

Site Layout

Figure No.

1.2

SCALE

NTS

2. SITE EVALUATION

2.1 Operator Performance

2.1.1 Facility Management

SEHL has prepared a documented Environmental Management Programme (EMP) which serves as a guidance document for installation staff and describes operational control and management practices. The EMP is a core element of the installation's Environmental Management System (EMS). All operatives are provided with the appropriate and necessary training to complete their assigned tasks.

2.1.2 Compliance History

In 2016, the installation received one (1 No.) non-compliance in relation to waste management. In 2017, the installation received one (1 No.) non-compliance in relation to bunding and materials handling.

2.1.3 Enforcement History

The installation has never been the subject of any enforcement action taken by the regulatory authorities.

2.1.4 Incidents History

There were no reportable incidents at the installation in 2016.

2.1.5 Complaints History

SEHL maintains a register of complaints received in accordance with Condition 9.4 of the licence. No complaints were received in 2016.

2.2 Environmental Pathways & Sensitivities

2.2.1 Surface Water

Rainwater run-off from the building roofs, car parks and areas of the yard where wastes are not stored, used to discharge to the municipal storm water sewer and the quality was monitored at two locations.

In 2013, the surface water monitoring identified contamination. As part of the investigation SEHL contacted the Millennium Business Park Management Company who informed it that there was a problem with the flow in the sewer system serving the Business Park, which was causing back flow into the installation resulting in stagnant and nutrient rich water collecting at the monitoring locations.

Responsibility for addressing the drainage problems rests with the Management Company and, pending the resolution, the surface water run-off from the site has been diverted to the foul sewer. Therefore there are currently no emissions to surface water; however it is intended to recommence emissions to the surface water sewer serving the Business Park once the Management Company has resolved the drainage problems.

2.2.2 Foul Water

Floor wash water from the Materials Recovery building, wash water from the vehicle cleaning area and run off from hard-standing associated with waste handling, storage and processing discharges to the foul sewer serving the Business Park via a silt trap and oil interceptor.

2.2.3 Geology & Hydrogeology

Geotechnical site investigations undertaken at the Business Park indicate that the subsoils range in thickness from less than 1.3 m to 8.45 m. At the installation, the thickness is thin in the north-western portion of the site and thickens to the east and south. Information from the Geological Survey of Ireland (GSI) suggests a similar range in subsoil thickness locally in the surrounding area. The subsoil comprises sandy gravelly boulder clays.

The bedrock locally comprises calcareous, shale, limestone, conglomerate of the Tober Coleen Formation. Based on data obtained from the GSI the bedrock aquifer is a locally important **(Lm**) aquifer that is productive in local zones. The aquifer vulnerability rating is Extreme (**E**).

2.2.4 Neighbouring Developments

The installation is located within an existing business park. The installation is bound to the north and east by a quarry operated by Roadstone Wood and to the west and south by other business premises within Millennium Business Park. The site is traversed from north-west to south-east by the Finglas to Woodlands high voltage (220kV) overhead power lines. The Finglas to Macetown high voltage (100kV) overhead power line runs from east to west along the southern site boundary.

The nearest occupied dwelling, 200 m to the south of the site, is screened by the hedgerow bordering Millennium Business Park as well as screening bordering the residence.

2.2.5 Designated Sites

There are no Natural Heritage Areas, Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within 10 km of the installation.

2.2.6 Emissions

Site operations are a source of noise and the licence specifies noise emission levels for the nearest noise sensitive locations. Operations are also a potential source of dust emissions and the licence specifies measures to control odour and dust emissions.

There are no environmental emissions to surface water or groundwater. All surface water and foul water is directed to an oil interceptor before discharging to the sewer within the Business Park.

2.3 **Site Processes & Activities**

The installation is licensed to accept the following waste types and quantities, as specified in Schedule A of the Licence

- Municipal Waste (100,000 tonnes),
- Commercial & Industrial (90,000 tonnes),
- Construction & Demolition (30,000 tonnes).

No hazardous wastes or liquid waste are accepted at the facility.

The Materials Recovery building was designed to accommodate distinct waste handling areas for the Commercial and Industrial (C&I) waste, Municipal Solid Waste (MSW) and Construction and Demolition (C&D) waste. Each area has separate access for loading and unloading and waste sorting, processing and storage.

Over time the types of waste accepted and the method of processing changed. In 2014 the C&D and C&I processing line were removed and the processing of C&I and C&D waste ceased. The site continued to accept C&D waste, primarily household skip waste and residual household MSW and food waste. These wastes are bulked up and sent to other waste management facilities for treatment. Loose and baled SRF produced at other waste management facilities is accepted and stored at the site. The loose SRF is stored inside the building, while the bales are stored in a designated open area.

2.4 Plant Inventory

The operational area comprises three adjoining Recycling Buildings (Building No 1, No 2 and No 3) that are used for waste processing and storage; a Workshop; Fabrication Shop; Weighbridge and Weighbridge Office; Office and Canteen; Staff Car Park and open yards that are used for truck parking and skip storage. Details of the site infrastructure are presented in Table 2.1-

Table 2.1 – Site Infrastructure

Ref	Infrastructure	Details
1	Administration Building	Located at the north-eastern boundary.
2	Main Processing Buildings	2533m^2. Reinforced concrete floors precast lower (3.5m high) walls and upper walls and roof composed of metal cladding
3	Workshop	286m^2
4	Fabrication Building	
5	1 No Double Weighbridge	Located close to the facility entrance, with potakabin offices
6	Diesel Storage Tank	1 No. 30,000 litre
7	Kerosene Tank	1 No 200 litre
8	Engine/lubricating oil Tanks	2 No. 1500 litre
9	Electrical Sub-station	
10	Underground wastewater storage tanks	2 No combined capacity 8m^3.
11	Hardstanding	8,605m^2
12	Oil Interceptor	Klargester KF 100 full retention interceptor
13	Puraflow WWTP	No discharge to ground

Installation operations require the use of a range of fixed and mobile plants which are listed in Table 2.2.

Table 2.2 Plant and Equipment

Type of Plant	Number
Front Loading Shovel	1
Forklifts	2
Grab Machine	1

2.5 Inventory of Raw Materials & Wastes

The site contains two 2,500 litre self-bunded plastic tanks containing diesel. Relatively small volumes of chemicals and hydrocarbons are stored on site, such as paints or white spirit for maintenance purposes, drums of hydraulic oils for maintenance of machinery, engine oils and anti-freeze etc. These materials are stored on pallets in the maintenance shed.

At any one time the maximum amount of waste stored on site is 4,600 tonnes, comprising mainly mixed municipal waste and dry recyclables (Table 2.3).

Table 2.3 – Materials Inventory

Wastes/Products	Quantity Stored
Mixed C & D	100
MMW	100
Organics	25
Batteries	1
Metal	20
Dry Waste	100
Timber	45
Non Ferrous Metals	6
Tyres	6
Cylinders	1
DMR	50
SRF	4000
Mattress	30
Diesel	5,000 litres
Engine and Lubricating Oil	200 litres
AdBlu	50 litres

The quantities given in the Table are based on the volumes kept on site at any one time, but in the event of the planned closure the actual quantities should be considerably smaller, as the shutdown would be preceded by a reduction in the on-site inventory.

3. CLOSURE TASKS & PROGRAMMES

3.1 Closure Tasks

3.1.1 Materials Management

A planned shutdown of operations would be carried out after the last batches of waste received at the site had been processed and consigned. It would be preceded by a scaling down of activities, thereby reducing the quantities of materials, particularly fuel and wastes, to be dealt with when implementing the Plan.

The diesel, engine and lubricating oils will be used in the plant and equipment deployed in the decommissioning works. When these are completed, it should be possible to return some of the diesel, engine and hydraulic oils to the suppliers either for resale, or reuse.

A vacuum tanker will empty the oil interceptor and the wastewater storage sumps and the contents will be sent for disposal at a suitably licensed facility.

3.1.2 Buildings

It is not proposed to demolish any of the buildings, but they will be cleaned out and left in situ for future use. Given the nature of the waste handled at the facility, specialist decontamination of the Main Processing Buildings will not be required and the cleaning will primarily involve the use of a road sweeper to clean the floor. Decontamination will not be required in the Workshop.

3.1.3 Plant & Equipment

In the event of a planned closure, the plant and equipment will be either sent to other SEHL installations, sold for use, or scrapped at an approved waste recycling/recovery facility. At the time of the preparation of this Plan it is not possible to accurately quantify every item of plant that would be suitable for resale, as this depends on their future condition. Those items of plant that cannot be sold will be scrapped. All the metal items have a scrap value and therefore the removal of the plant and equipment should be cost neutral.

3.1.4 Interceptors & Drains

All surface water and foul water drainage pipes will be flushed using water. The interceptors and storage tanks will be cleaned and the contents removed off site for treatment.

3.1.5 Services

The telecom and electricity supply services will be disconnected.

3.1.6 Soil & Groundwater Assessment

The objective of the assessment is to determine the impact, if any that licensed activities have had on the baseline soil and groundwater conditions, which were determined by the site investigations completed in 2007, 2008, 2012 and 2015 and by the on-going groundwater monitoring programme.

The scope of the assessment will be agreed in advance with the Agency, but it may comprise the installation of soil borings and groundwater monitoring wells and the collection and testing of soil and groundwater samples. The investigations will be supervised by an experienced geologist who will log the borings in accordance with BS5930, as amended and adopted by the GSI.

The field observations and results of laboratory results will form the basis for the assessment of the significance of the impact, if any, and the need for and extent of any remedial works. If remedial works are considered necessary, a proposed scope will be submitted to the Agency for approval before implementation.

3.1.7 Environmental Monitoring

Monitoring will continue following the closure of the installation and pending the surrender of the Licence. The extent of the monitoring and the frequency may be amended, subject to the Agency's approval, to reflect the fact that the installation is closed.

3.2 Closure Programme

In the event that the entire facility is closed all the operational areas will be decommissioned. The works will be carried out by a third party contracted by the Agency. The decommissioning of the operational area will take approximately 6 weeks (Figure 3.1) and will be carried out in a number of tasks, some of which will happen concurrently.

Figure 3.1 Decommissioning Plan Schedule	**START**	**DURATION**	**Week** 1 2 3 4 5 6 7
Tasks			
Task 1 Removal of wastes and consumables	1	3	
Task 2 Cleaning and removal of plant and equipment	3	2	
Task 3 Empty and clean oil storage	4	1	
Task 4 Clean-out of buildings.	3	3	
Task 5 Empty and clean interceptors	5	1	
Task 6 Wash-out of drains	5	1	
Task 7 Soil and groundwater assessment	4	3	
Task 8 Clean yards	6	1	
Task 9 Disconnecting services	6	1	
Task 10 Closure audit	7	1	

4. CRITERIA FOR SUCCESSFUL CLOSURE

Successful closure will only be complete when:

- All consumables, wastes and residual materials have either been treated onsite, or consigned to appropriately authorised recovery/disposal facilities;
- Records of all wastes, materials and plant removed from the site have been prepared;
- All buildings have been cleaned out and services disconnected;
- A site investigation, if required, confirms that soil and groundwater conditions present no significant environmental risk;
- The environmental monitoring confirms no impact associated with the closure and decommissioning works;
- A Closure Audit has been completed and approved by the Agency.

5. CLOSURE PLAN VALIDATION

5.1 Closure Audit & Validation Report

Following the completion of the site clean out an experienced independent environmental auditor will carry out a Closure Audit, and produce a Validation Report that demonstrates the successful implementation of the Plan. The Closure Audit will address: -

1. Disposal of raw materials;
2. Disposal of wastes;
3. Decommissioning of plant and equipment;
4. Disposal of obsolete equipment;
5. Results of monitoring and testing during the decommissioning period;
6 Soil & Groundwater Assessment, and
7 The need for on-going monitoring, remedial actions or aftercare management.

The Validation Report will describe all of the activities carried out during the Closure Audit, and will contain records of the destinations of all wastes and materials consigned from the site during decommissioning.

6. CLOSURE PLAN COSTING

The costs of a planned closure will be met in full by SEHL. The costs of implementing the Plan in an unplanned closure scenario, where SEHL is not in a position to meet the costs are presented in Table 6.1. The costs are based on the following assumptions:

- The closure will be unforeseen and unexpected with no advance warning that would allow an orderly wind down of activities.

- The entire installation will be decommissioned and cleaned, with all wastes, end of waste and consumables and office equipment removed from the site. The buildings and storage tanks will not be demolished. The mobile plant will be removed from the site and either sold or scrapped.

- The decommissioning and building and plant cleaning will be carried out by appropriately trained and experienced Temporary Site Management Team appointed by the Agency and will be completed in 6 weeks. The Team will include a Site Manager and 3 No operatives to implement the decommissioning and clean out.

- Specialised contractors will be hired in to empty and clean the interceptors and all associated drainage pipework and this is costed separately. The costs are based on those for the decontamination of storage tanks in the Agency's Guidance on Assessing and Costing Environmental Liabilities: Unit rate costs for verification.

- The quantity of materials and wastes on site will be as listed in Table 2.3.

- A soil and groundwater assessment will be carried out. At the time of the preparation of this report there was no evidence of any significant contamination that would require remedial works. It is assumed that any incidents that occur when the site is operational will be investigated and remediated as part of on-going operations.

- The rates applied are a combination of those currently incurred by SEHL and the costs in the EPA's guidance.

- A contingency of 20% is made.

Table 6.1 DMP Costs

	LoW Code	Waste Disposal	Tonnage on site	Disposal Costs per tonne (€)	Processing/ tonne (€)	Loading cost/tonne (€)	Transport cost/tonne (€)	Admin cost/tonne (€)	Total Cost (€)	Potential Value / tonne (€)	Revenue Value (€)
		Alternative Destination	On site							Value/Tn	Value €
Mixed C & D	170904	Thorntons	100	50		1.96	6	1.23	5,919		
MMW	200301	IPR	100	111.5		1.96	8.5	1.23	12,319		
Organics	200108	Thorntons	25	70		1.96	0	1.23	1,830		
Batteries	160601*	Wilton Waste	1	0		1.96	0	1.23	3		0
Metal	191202	Multimetals	20	0		1.96	0	1.23	64	-150	-3,000
Dry Waste	191212	Thorntons	100	82.5		1.96	7.5	1.23	9,319		0
Timber	191207	Thorntons	45	50		1.96	7.5	1.23	2,731		0
Non Ferrous Metals	191203	Multimetals	6	45		1.96	0	1.23	289	-200	-1,200
Tyres	160103	IPR	6	100		1.96	6	1.23	655		0
Cyliners	160505	Calor Gas/Flo Gas	1	0		1.96	0	1.23	3		0
DMR	200301	DCC MRF	50	0		1.96	6	1.23	459	-60	-3,000
SRF	191210	Lagan	4000	45	0.5	1.96	5	1.23	214,756		
Mattress	200307	Thorntons	30	50		1.96	6	1.23	1,776		
Waste Water Holding Tank	161002	Navan WWTP	150	5		1.96	6.5	1.23	2,203		
Drain & Tanks Jet Vac Cleaning									1,880		
Oil Interceptor & Bunds	130503*	Rilta/Enva	20	90			6.5		1,930		
Plant/Building Clean down - 2 men/2 days and Equipment									2,250		
Insurance Cover - E/L P/L - 4 weeks									4,000		
Utility Costs - Electricity & Water - 4 weeks									1,000		
Fuel - Derv				0						-1	0
Fuel - Add Blue										-0.3	0
Fuel - Gas Oil			2	0						-0.7	-1
Surface water monitoring as per schedule c.2.2									592		
Security - Based on current rates - 4 Weeks									24,000		
Tns ex Diesel Diesel & Liquid			4484						287,979		-7,201
Contingency (20%)									57,596		
Total									**345,575**		

Notes

Security

Based on current rates at per day cost

Fuel is maximum purchased litres

Utility based on estimated office power and amenities,
and yard lighting
Liquid Waste loading costs included in
transport costs
No TFS requried, no export from this
facility.

Revenue related product:
There is a real revenue value on these products totalling €7,201 that the EPA can
achieve.
This has not been considered by the EPA
in arriving at total cost.
Also there is potential revenue from sale of yard sheds and plant and equipment which has not
been factored into the costs.
has also not been considered in arriving at
total cost

Weeks			2
Loading/Handling	Loader	1,400	2,800
			0
	Track	800	1,600
	2 Men	1,600	3,200
	Diesel	600	1,200
			8,800
	Tns/Hr	4484	1.96

Admin	Weigh Op	750	1500
	Manager	1000	2000
	Procurement	2,000	2,000
		4484	5500
	Tns/Hr		1.23

Drains/Waste	Weeks		0.4
Water	JetVac incl		
Tank/Bunds	Man Hours	4250	1700
Disposal - Est			
Ltrs	6000	0.03	180
			1880

APPENDIX 5.1

CLIMATE ASSESSMENT

Millennium Park Materials Recovery Facility - Climate Assessment

Prepared for:

O'Callaghan Moran & Associates

March 2023

Final

Prepared by:

Katestone Environmental Pty Ltd
Office 5a, Portlaoise Enterprise Centre, Clonminam Industrial Estate, Portlaoise, Co Laois

www.katestone.global
admin@katestone.global
Ph +353 (87) 365 6879

Document Control

Deliverable #:	DK21029-4
Title:	Millennium Park Materials Recovery Facility - Climate Assessment
Version:	Final
Client:	O'Callaghan Moran & Associates
Document reference:	DK21029-4 OCM Millenium Park MRF Climate Assessment.docx
Prepared by:	Micheal Fogarty, Craig Miller
Reviewed by:	Simon Welchman
Approved by:	
	Simon Welchman
	02/03/23

Disclaimer

http://katestone.com.au/disclaimer/

Copyright

Contents

Tables

Figures

Glossary

Term	Definition
g/s	gram per second
kg	kilogram
kg/m³	Kilogram per cubic meter
km	kilometre
km/hr	kilometre per hour
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metres
m^3/s	cubic metres per second
m³/hr	cubic metres per hour
mg	milligram
Z_0	roughness length
$\mu g/m^3$	micrograms per cubic meter

Abbreviations	Definition
AG4	Air Guidance 4
BAT	Best available techniques
EPA	Environmental Protection Agency
EF	Emission factor
EU	European Union

1. INTRODUCTION

Katestone Environmental Pty Ltd (Katestone) was commissioned by O'Callaghan Moran and Associates (O'Callaghan Moran) on behalf of Starrus Eco Holdings Ltd (Starrus Eco Holdings) to conduct a greenhouse gas (GHG) assessment associated with a proposed development at a material recovery facility (MRF) in Dublin.

The MRF is located at Millennium Park, Ballycoolin, Dublin 11 (site). It is operated in accordance with the conditions of an Industrial Emissions License (IEL) registration W0183-01 which was issued by the Environmental Protection Agency (EPA). The current licence limits the quantity of waste that can be accepted at 270,000 tonnes/annum.

The proposed development involves an increase in facility throughput by 180,000 tonnes/annum to 450,000 tonnes/annum (This is referred to as the do-something scenario). Starrus Eco intends to apply to EPA for an amendment to the IEL to facilitate this increase. An Environmental Impact Assessment Report (EIAR), including an assessment of the project's GHG emissions, is required as supporting documentation for the application.

The MRF serves two functions including:

- The transfer of certain waste streams from collection vehicles to bulk transport vehicles for haulage to material processing facilities
- The segregation of municipal solid waste (MSW) to:
    - Extract organic materials for bio-stabilisation prior to landfilling
    - Produce a range of waste derived fuels for use in cement kilns and in waste-to-energy facilities
    - Remove recyclables including metals, glass and batteries

At present there is insufficient capacity in Dublin to handle and process the waste streams being generated. The proposed development will increase the capacity for waste handling and processing in Dublin. If the proposed development does not proceed (referred to in this report as the do-nothing scenario), then:

- Efficiencies in waste haulage associated with the bulk transportation from the MRF will not be realised
- Unsegregated MSW will be sent to waste-to-energy facilities without segregation of organics/recyclables

The increase in throughput resulting from the proposed development will potentially:

- Increase GHG emissions from road traffic in the study area associated with the haulage of:
    - Incoming waste streams transported to the site
    - Processed material transported from the site
- Increase segregation of MSW which will facilitate:
    - A reduction in GHG emissions from the recycling of metal, glass and batteries instead of combustion in a waste-to-energy facility
    - An increase in GHG emissions from the bio-stabilisation and landfilling of segregated organic material (Irish landfills are not authorised to accept MSW residue unless bio-stabilised)
        - An Increase in GHG emissions from the combustion of other waste streams in municipal waste incinerators and cement kilns.

This report describes the methodologies used to quantify GHG emissions and offsets in the study area and the impact of the proposed development on climate in terms of national GHG emissions.

2. OVERVIEW OF THE MATERIALS RECOVERY FACILITY

2.1 Location

The MRF is located in the eastern part of Millennium Business Park, Co. Dublin. The site and its surrounds are presented in Figure 1. The site is surrounded:

- To the north and east by derelict land and a number of quarry pits
- By enterprises located in Millennium Business Park including:
    - Kilsaran's Millennium Concrete Plant south of the site
    - Mixed use industrial and commercial buildings, split into units west of the site.

Millennium Business Park is surrounded to the north and east by derelict land and a number of quarry pits and to the south and west industrial estates including:

- Northwest Business Park
- Rosemount Business Park
- Keypoint Business Park.

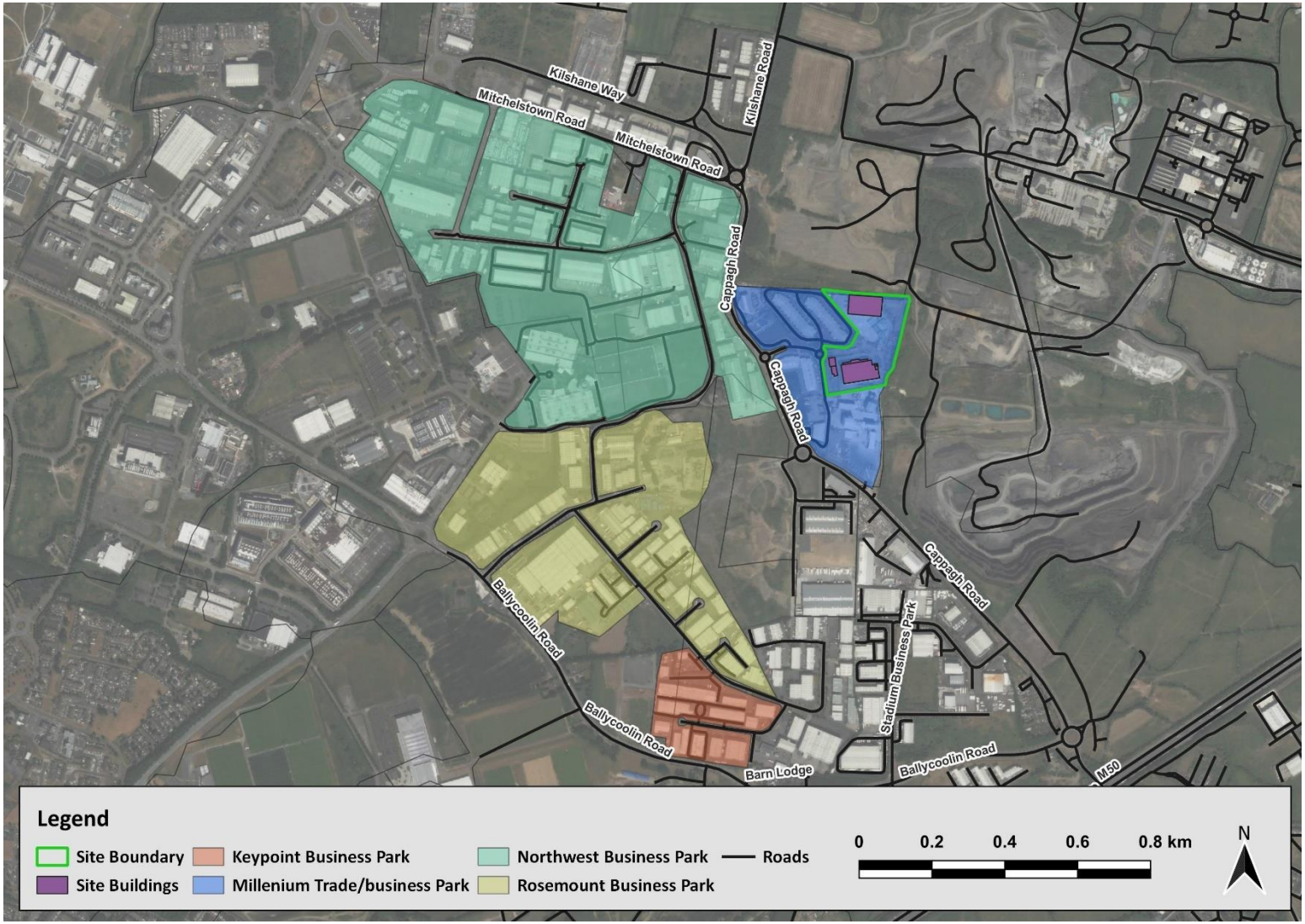


Figure 1 **Material Recovery Facility site boundary (lime green line) and surrounding areas**

2.2 Operation

The MRF serves two functions including:

- The transfer of certain waste streams from collection vehicles to bulk transport vehicles for haulage to material processing facilities
- The segregation of municipal solid waste (MSW).

The material transfer components of the MRF facilitate the transfer of waste streams from collection trucks and skips that operate in Dublin to bulk haulage trucks for transport to approved processing facilities. The only processing of these waste streams that occurs at the site is the unloading from collection trucks and skips, temporary storage and transfer to bulk haulage trucks. The incoming waste streams that will subject these transfers include:

- Brown bin waste
- Dry Mixed recyclables
- Construction and Demolition (C&D)
- Commercial & Industrial (C&I)

MSW accepted at the MRF is segregated into various processed waste categories. On arrival, MSW is unloaded, inspected for contamination and unsuitable materials are moved to a quarantine area. The materials are then processed to remove the organic fraction, metal fraction and recoverable 'lights' (plastics) fraction. Metals are sent for recycling and organic fines fraction sent for bio-stabilisation prior to being landfilled. The recoverable 'lights' are sent to the SRF production line in MP1. The residue is suitable for use as refuse derived fuel (RDF) and is baled in an on-site baler and stored externally.

There are three intake and processing units at the site identified as MP1, MP2 and MP3 at the site. The MP1 and MP2 are two separate units located within the same building. The units are physically separated from each other by a partition within the building.

Incoming material arriving at the site is accepted at the following locations:

- Sterilised non-hazardous plastic medical waste and Solid Recovered Fuel (SRF) are accepted in MP1
- Municipal solid waste (MSW), dry mixed recyclables (DMR), brown bin (food) waste is accepted in MP2
- Construction and Demolition (C&D) and Commercial & Industrial (C&I) wastes are accepted in MP3.

MP1 contains the SRF production line and a granulator for the treatment of non-hazardous plastic medical waste.

MSW, DMR and brown bin waste are unloaded in separate areas of MP2.

2.3 Proposed Development

The proposal seeks an increase in the current IEL limit from 270,000 tonnes of waste received per annum to 450,000 tonnes of waste received per annum The waste streams and current and proposed quantities of each waste stream are presented in Table 1.

Table 1 Current and proposed IEL limit for the Millennium Park MRF

Waste Stream	Current IEL (tonnes/annum)	Proposed additional (tonnes/annum)	Amended IEL (tonnes/annum)
MSW	100,000	66,667	166,667
Biowaste	50,000	33,333	83,333
C&D	30,000	20,000	50,000
C&I	90,000	60,000	150,000
Total	270,000	180,000	450,000

It is expected that the maximum amount of waste that will be received at the site in a normal year will be 400,000 tonnes/annum, however approval is sought for the acceptance of an additional 50,000 tonnes as a contingency measure. This additional 50,000 tonnes/annum is sought as incidents in recent years at waste management facilities in Ireland and in Europe resulted in temporary emergency closures of these facilities. These closures resulted in a requirement for additional capacity at alternative waste management facilities. Approval for an additional 50,000 tonnes/annum above the expected normal maximum operating capacity of the MRF would allow material to be processed at the MRF in the event of the temporary closure of other processing facilities.

The proposed development does not require any additional buildings, plant or equipment for material handling or processing. The additional material can be handled and processed using existing infrastructure.

2.4 GHG Emissions associated with the proposed development

The proposed development will increase GHG emissions associated with road transport in the study area however overall it reduce the number of journeys required by waste collection trucks and skips that would otherwise be required to transport waste outside of Dublin to processing facilities.

The GHG savings associated with the bulk haulage of materials generally occurs outside of the study area for transport associated with the site. The study area has been determined based on the framework described in the Design Manual for Roads and Bridges (DMRB) (Highways England, 2021) and is near the site. The proposed development will result in an increase in GHG emissions in the study area.

The proposed development will result in an increase the throughput of various waste streams and the processing capacity of MSW at the MRF. The increase in throughput resulting from the proposed development will affect greenhouse gas emissions (GHG) as it will:

- Increase road traffic and associated emissions in the study area associated with the haulage of:
    - Incoming waste streams transported to the site
    - Processed material transported from the site
- Increase segregation of MSW which will facilitate:
    - A reduction in GHG emissions from the recycling of metal, glass and batteries instead of combustion in a waste-to-energy facility
    - An increase in GHG emissions from the bio-stabilisation and landfilling of segregated organic material (Irish landfills are not authorised to accept MSW residue unless bio-stabilised)
    - An Increase in GHG emissions from the combustion of other waste streams in:
        - Municipal waste incinerators
        - Cement Kilns.

3. REGULATORY FRAMEWORK AND ASSESSMENT CRITERIA

The specific legislation and guidelines relevant to climate and greenhouse gases that were taken into account in the preparation of this chapter are discussed in this section. These legislation and guidance documents provide the general principles and suitable methods to complete the climate assessment including:

- European Commission (2019) 2030 climate & energy framework.
- European Commission (2013) The EU Strategy on adaptation to climate change.
- European Commission (2021) Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change.
- European Commission (2018) Revised Energy Performance of Buildings Directive (EPBD) (2018/844/EU)
- United Nations (1992) United Nations Framework Convention on Climate Change.
- United Nations (1997) Kyoto Protocol to the United Nations Framework Convention on Climate Change.
- United Nations (2016) The Paris Agreement 'Accord de Paris'. The United Nations Framework Convention on Climate Change (UNFCCC).
- United Nation (1992) United Nations Framework Convention on Climate Change. First steps to a safer future.
- DECC, (2013) National Policy Position on Climate Action and Low Carbon Development (National Policy Position) 2013.
- Department of the Environment, Climate and Communications (2017) National Mitigation Plan.
- Department of the Environment, Climate and Communications (2021) Climate Action Plan 2021 (DECC, 2021)
- Department of the Environment, Climate and Communications (2018) National Adaptation Framework (NAF).
- Department of the Environment, Climate and Communications (2015) Ireland's Transition to a Low Carbon Energy Future 2015-2030.
- Department of Environment, Heritage and Local Government (2016) Climate Action and Low Carbon Development Act 2015, as amended
- Department of the Environment, Climate and Communications (2021), Climate Action and Low Carbon Development (Amendment) Act 2021 (Act 32 of 2021)
- European Commission (2009a) Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020
- EPA (2019) Integrating climatic factors into the strategic environmental assessment process in Ireland - A Guidance Note.
- Fingal County Council (2019) Climate adaption strategy 2019 – 2024.

4. RECEIVING ENVIRONMENT

Ireland's existing long term National Policy Position on Climate Action and Low Carbon Development (DECC, 2013) sets out a low-carbon road map process that will be guided by a long-term low-carbon transition. Key findings include:

- Implementation of "Additional Measures" (including those in the 2019 Climate Action Plan) is projected to save 58 Mt CO_2eq over the period 2021-2030 compared to the "With Existing Measures". This represents a reduction of 1.8% per annum in emissions over the period.
- These projections made in the report indicate that Ireland can meet its non-ETS EU targets over the period 2021 to 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available. Future, more ambitious targets as presented in the European Climate Law and Ireland's Climate Bill will require many (as yet unidentified) additional measures.
- Increased renewable electricity generation, including a projected 5 GW of offshore wind generation, is expected to contribute to a 70% contribution of renewable energy in electricity generation by 2030. Energy industry emissions are projected to decrease by one third by 2030 compared to the most recent figures in 2019.
- The Covid-19 pandemic highlighted the need for homes to become far more efficient, particularly in the context recent regulations to encourage working from home. Implementing the 2019 Climate Action Plan measure for the installation of over 600,000 heat-pumps by 2030 as well as retrofitting 500,000 homes to a B2 equivalent BER will help achieve this.

As well as defining legally binding emission reduction commitments, the Climate Action and Low Carbon Development (Amendment) Act (DECC, 2021) will support Ireland's transition to net-zero and the achievement of a climate neutral economy no later than 2050. It also establishes a legally binding framework with clear targets and commitments, to ensure the necessary structures and processes are in place to deliver our national, EU and international climate goals and obligations in the near and long term.

In light of the increase in ambition under the Climate Action Plan, significant additional measures have been introduced, to be undertaken across the whole of Irish society and across the economy, in order to achieve the level of change required to meet the 2030 target. The Climate Action Plan also assumes full implementation of the 2019 plan. In the medium term, Ireland is still projected to meet its 2030 target under the Climate Action and Low Carbon Development (Amendment) Act.

The binding annual greenhouse gas emission target for Ireland under the EU Effort Sharing Regulation (ESR) EU/2018/842 for non-ETS sectors is a reduction of 30% in emissions by 2030 compared to 2005 levels. This target will be amended following the European Council's decision to increase ambition from its existing EU-wide 2030 target of a 40% reduction to at least 55%, compared to 1990 levels. Annual greenhouse gas emissions for non-ETS sectors were 47,869 Mt CO_2 eq in 2005 (SEAI, 2021). According to Ireland's obligation under the ESR Ireland's greenhouse gas emission target for non-ETS sections is 33,508 kt CO_2 eq in 2030.

The binding annual greenhouse gas emission target for Ireland under the Climate Action and Low Carbon Development (Amendment) Act is a reduction of 51% in emissions by 2030 compared to 2018 levels. Annual greenhouse gas emissions for Ireland were 60,242 kt CO_2-e in 2018 (comprised of 13,441 kt CO_2-e of ETS emissions and 46,801 kt CO_2-e of non-ETS emissions). According to Ireland's obligation under the Climate Action and Low Carbon Development (Amendment) Act Ireland's greenhouse gas emission target is 29,886 kt CO_2-e in 2030.

Ireland's Final Greenhouse Gas Emissions 1990-2020 (EPA, 2022) presents a detailed summary of national emissions for 2020 together with an overview of national emissions from 1990 until 2020. Ireland's national GHG emissions for 2020 were estimated to be 57,716 ktCO2-e (excluding Land Use, Land-use Change and Forestry or LULUCF) with 925.39 ktCO_2-e (1.6%) attributable to the waste sector.

EPA published a report titled *Ireland's Greenhouse Gas Emissions Projections 2020-2040 in 2021* (EPA, 2021). This report provides an assessment of Ireland's total projected greenhouse gas emissions from 2020 to 2040, updated using the latest inventory data for 2020. The report also provides an assessment of Irelands progress towards achieving its emission reduction targets for 2020 and 2030 as set out under the EU Effort Sharing Decision (ESD)[1] and Effort Sharing Regulation (ESR)[2]. Ireland's Greenhouse Gas Emissions Projections 2019-2040 data is presented in EPA (2021b).

The baseline greenhouse gas emissions for the assessment were taken from EPA (2021) and are presented in Table 2. The data reported in 2021, with additional measures, does not include any measures from the Climate Action and Low Carbon Development (Amendment) Act.

Table 2 Baseline greenhouse gas emissions adopted in the assessment

Projected GHG emissions	Year	non-ETS emissions (kt CO_2-e)	Total emissions (kt CO_2-e)
Projected GHG emissions (with existing measures)	2024	42,991	61,727
Projected GHG emissions (with additional measures)	2024	40,044	56,897
Projected GHG emissions (with existing measures)	2039	42,067	62,650
Projected GHG emissions (with additional measures)	2039	33,226	50,623

[1] Decision No 406/2009/EC of 23 April 2009 (EC, 2009)

[2] Regulation (EU) 2018/842 (EC, 2018)

5. GHG ASSESSMENT

5.1 Methodology

The methodologies used to calculate GHG emissions associated with the proposed development are presented in this section including GHG emission from:

- The handling and processing of MSW at the proposed development in Section 5.1.1
- The transportation of waste input materials and outgoing processed materials from the proposed development in Section 5.1.2.

5.1.1 Handling and processing of MSW

The following section describes the methodology that was adopted to assess the potential impact of GHG emissions from the handling and processing of MSW at the proposed development on climate.

The methodology adopted involves:

- Determining the processing process of the MSW:
    - In the do-nothing scenario
    - In the do-something scenario
- Assigning a GHG emission factor to MSW for the:
    - Do-nothing scenario
    - Do-something scenario
- Determining the difference in GHG emissions generated from MSW as part of the:
    - Do-nothing scenario
    - Do-something scenario.

In the do-nothing scenario all MSW would be sent to waste-to-energy facilities in Ireland as:

- There would be no capacity to handle or process this waste in Dublin and to segregate materials and recover valuable waste streams in the MSW
- It is not possible to send MSW directly to landfill in Ireland as all landfills required material to be bio-stabilised before it can be accepted. As there is no capacity in the waste management system to undertake bio-stabilisation at present, the waste cannot be accepted at landfill.

In the do-something scenario the proposed development would facilitate the handling and processing of additional MSW to produce the following outputs:

- Refuse Derived Fuel (RDF) including:
    - SRF
    - RDF
- Separated organic fines
- Separated Metals
- Separated Glass
- Separated Wood.

The SRF would be sent to cement kilns as a source of fuel. The RDF would be sent to waste-to-energy facilities as a source of fuel. The separated organic fines would be sent a dedicated bio-stabilisation facility from which the material would be transferred to landfill. Separated metals and glass would be sent to dedicated recycling facilities. These segregated waste streams would not be possible without the proposed development.

A review of literature was undertaken to determine a suitable emission factor for the waste streams under the do-nothing scenario and the do something scenario.

GHG emission factors for various types of household waste generated in Ireland in 2019 was sourced from a document entitled *The Carbon Footprint of Waste (Ireland)* (ACRplus, 2021). The GHG emission factors were developed by Zero Waste Scotland through life cycle assessment (LCA) of GHG emissions from each waste category. The GHG emission factors are presented for each material category being:

- Generated
- Recycled
- Incinerated
- Landfilled

Emission factors are referred to as carbon factors in ACRplus (2021) and are presented in *Appendix 3 Carbon factors for of household waste generated in Ireland (2019). Unit: tonne CO_2 eq. per tonne of waste*.

The emission factors adopted from Appendix 3 of ACRplus (2021) are for a range mixed and segregated waste categories. The emission factors adopted in this assessment are for the segregated waste categories:

- The emission factors for incineration were applied to the quantity of each waste category:
    - In MSW for the do-nothing scenario
    - In RDF and SRF in the do-something scenario
- Recycling factors were applied to the quantity of each category for which recycling is facilitated in the do-something scenario including:
    - Separated Metals
    - Separated Glass
    - Separated Wood
- Landfilling factors were applied to quantity of bio-stabilised organic materials facilitated in the do-something scenario

The emission factors applied to each waste category for management techniques including incineration and recycling are presented in Table 3. The emission factors were developed by the Zero Waste Scotland's analysis team used insights provided by partners in Ireland alongside default datasets based on the Scottish Carbon Metric and represent life-cycle carbon impact of each waste category (ACRplus, 2021)). A negative value indicates that over the lifecycle of the waste stream the management technique is reduced carbon emissions.

There is no LCA GHG emission factor for bio-stabilised organic wastes presented in ACRplus (2021). The substantial majority of LCA GHG emissions from landfilled organic wastes is due to the biodegradation of the organic material in landfills resulting in the generation of methane (a potent greenhouse gas). The proposed development will facilitate the segregation of a large fraction of the organic material from MSW which will be sent for bio-stabilisation after segregation. The bio-stabilisation of organic waste to the EPA-approved biodegradability

stability[3] standard means that the organic material being landfilled as a result of the proposed development will have virtually no GHG emissions as EPA considers it to have a BMW factor[4] of zero. The use of the LCA GHG emission factor presented in ACRplus (2021) for landfilled organic waste is therefore highly conservative.

In the do-nothing scenario it was assumed that all waste categories would be sent for incineration. Recycling emissions factors were only listed for waste categories that would be segregated and recycled as part of the proposed development including:

- Organic waste
- Metal
- Glass
- Wood
- Hazardous waste

Table 3 Emission factors applied to each waste category for management techniques including incineration and recycling

Waste Category	GHG Emission factor (tCO_2-e/t)		
	Incineration	Recycling	Landfilling
Plastics	1.78		
Organic Waste (Food and Garden)	-0.07		0.64
Paper, Card and Beverage Container	-0.32		
Fines	0.22		
Textiles	0.32		
Nappies	0.22		
Metal	-0.74	-4.04	
Glass	0.03	-0.83	
Wood	-0.34	-0.64	
Hazardous waste	0.39	-0.92	

5.1.2 Traffic

The following section describes the methodology that was adopted to assess the potential impact of GHG emissions from increased local traffic resulting from the proposed development on climate.

The assessment of potential transport related impacts from the proposed developments was conducted using the framework described in the Design Manual for Roads and Bridges (DMRB) (Highways England, 2021). The DMRB provides a framework for assessing, mitigating and reporting the effects of motorway and all-purpose trunk road

[3] All landfills in Ireland are licensed by EPA and every licence requires that all residual MSW components must be bio-stabilised to reduce the decomposition properties of the waste to the EPA-approved biodegradability stability standard. The EPA-approved biodegradability stability standard requires MSW residues to be bio-stabilised to such an extent that offensive odours are minimised and that the respiration activity after four days (AT4) is <10 mg O2/g DM until 1-1-2016, and <7 mg O2/g DM thereafter.

[4] The BMW factor is defined as the proportion of waste that is biodegradable. MSW residual components that have been stabilised to the EPA-approved biodegradability stability have a BMW factor of zero which indicates the material is no longer biodegradable and would therefore have no associated GHG emissions.

projects on climate. The impact of a project on climate can be considered using a scoping assessment described in Highways England (2021). The scoping assessment provides a basis to determine if there is a need to undertake further assessment to consider potential effects of the project on climate.

The scoping assessment methodology described in Highways England (2021) utilises the following traffic scoping criteria that shall be used to determine whether further assessment to consider potential effects of the project on climate during operation:

a) a change of more than 10% in AADT

b) a change of more than 10% to the number of heavy duty vehicles

c) a change in daily average speed of more than 20 km/hr

Highways England (2021) includes the following statements:

> *Where the response to one or more of the scoping assessment questions is 'yes', further assessment shall be undertaken.*
>
> *For operational road user GHG emissions, the study area shall be consistent with the affected road network defined in a project's traffic model.*

All roads that trigger the traffic screening criteria in the air quality assessment and adjoining roads within 200m are defined as the affected road network (ARN) (Highways England, 2019).

If further assessment is required, GHGs from the operational phase of the proposed development must be quantified. The air quality spreadsheet issued by the Highways Agency in England provides a tool for the calculation of emissions of carbon dioxide from road transport (Highways Agency, 2021). The latest version of the air quality spreadsheet issued by the Highways Agency in England is Version 8 (Highways Agency, 2021), which incorporates emissions derived from the Emissions Factor Toolkit Version 10.1 (DEFRA, 2020).

5.2 Input Data

5.2.1 Operations

The quantity of each waste category in MSW was sourced from data published by EPA (RPS, 2018). The composition of MSW and proportion of each waste category based on EPA (2018) is presented in Table 4.

Table 4 Composition of MSW (EPA, 2018)

Waste Type	Proportion of MSW (%)
Plastics	19%
Organic Waste (Food and Garden)	16%
Paper, Card and Beverage Container	15%
Fines	11%
Textiles	10%
Nappies	10%
Metal, Glass and wood	9%
Hazardous waste	2%

A compositional breakdown of metal, glass and wood was reported in RPS (2018) and is presented in Table 5.

Table 5 The fractions of glass, metal and wood in MSW (RPS, 2018)

Waste Type	Proportion of MSW (%)
Glass	3.2%
Metal	4.7%
Wood	1.1%

The proposed development will facilitate and increased MSW processing rate of 66,667 tonnes/annum. The quantities of each waste category of MSW that will be processed as part of the proposed development are presented in Table 6 and are calculated based on the compositions presented in Table 4 and Table 5.

Table 6 The quantities of each waste category of MSW that will be processed as part of the proposed development

Waste Category	Additional quantity processed
	tonnes/annum
Plastics	13,768
Organic Waste (Food and Garden)	11,594
Paper, Card and Beverage Container	10,870
Fines	7,971
Textiles	7,246
Nappies	7,246
Metal	3,406
Glass	2,319
Wood	797
Hazardous waste	1,449

5.2.2 Traffic

Traffic data was obtained from ORS to quantify GHG emissions in the study area at the operational stage of the proposed development under the do-something scenario. The traffic data was provided for road links as presented in Section A1 of Appendix A.

5.3 GHG emission Calculations

5.3.1 GHG emissions - Operations

The GHG emissions calculated for the do-nothing and do-something scenarios for the handling and processing of MSW are presented in Table 7.

The results of the analysis indicated that the processing of MSW facilitated by the proposed development would result in GHG emission reduction of 7,139 tCO_2-e/annum.

Table 7 GHG emissions calculated for the do-nothing and do-something scenarios

Waste Category	GHG Emission emissions (tCO_2-e/t)	
	Do-nothing	Do-something
Plastics	24,507	24,507
Organic Waste (Food and Garden)	-812	7,420
Paper, Card and Beverage Container	-3,478	-3,478
Fines	1,754	1,754
Textiles	2,319	2,319
Nappies	1,594	1,594
Metal	-2,520	-13,759
Glass	70	-1,925
Wood	-271	-510
Hazardous waste	5,65	-1,333
Total	**23,728**	**16,588**

5.3.2 GHG emissions - Traffic

The scoping assessment indicated that no road links trigger the following scoping criteria for:

- An annual average daily traffic (AADT) change of 1,000 or more; or
- A change in speed band; or
- A change in carriageway alignment by >=5mThere will be no changes in speed band or no change in carriageway alignment by >=5m due to the proposed development.

The road links on the ARN are presented in Appendix A1.

The emissions of CO_2 on the road links that trigger the traffic scoping criteria on the ARN were calculated using the air quality spreadsheet issued by the Highways Agency in England (Highways Agency, 2021).

The CO_2 emissions calculated as part of this assessment are a function of the increase in AADT and the length of the road link on the ARN. The increase in CO_2 emissions due to traffic from the proposed development in the opening year and the design year on roads that trigger the scoping requirements of the DMRB Framework are presented in Table 8.

Table 8 **Increase in CO_2 emissions from traffic from the proposed development within the study area in the opening year and the design year on roads that trigger the scoping requirements of the DMRB Framework**

Increase in CO_2 emissions due to traffic from the proposed development
tCO_2-e/annum
107.3

6. ASSESSMENT RESULTS

The GHG emissions that will result from the proposed development are presented here and include:

- Increased emissions from additional traffic associated the proposed development in the traffic study area (Section 5.3.2)
- A net reduction in GHG emissions that will be facilitated by the processing of MSW (Section 5.3.1) at the proposed development based on the difference between GHG emissions calculated for the:
    - Do-something scenario
    - Do-nothing scenario

The GHG emissions that will result from the proposed development are presented in Table 9.

Table 9 GHG emissions that will result from the proposed development

Activity	tCO_2-e/annum
Increase in GHG emissions in the study area	107
Reduction in emissions facilitated by the processing of MSW	-7,139
Net GHG emissions resulting from the proposed development	-7,032

The GHG emissions from the proposed development as a percentage of projected non-ETS emissions in Ireland are presented in Table 10.

The results show that the proposed development will result in a net positive impact on GHG emissions in Ireland in the opening and design years.

Table 10 GHG emissions from the proposed development as a percentage of projected non-ETS emissions in Ireland

Parameter	Opening Year	Design Year
	kt/Year - CO_2e	
Operational Emissions (NET)	-7.03	-7.03
Projected non-ETS GHG emissions (with additional measures)[1]	40,044	33,226
GHG emissions from the proposed development as a percentage of projected non-ETS emissions (with additional measures)	-0.018%	-0.021%

[1] From EPA (2021) Ireland's Greenhouse Gas Emissions Projections. 2020 - 2040

7. CONCLUSIONS

Katestone was commissioned by O'Callaghan Moran on behalf of Starrus Eco Holdings to conduct a climate assessment associated with a proposed development at a MRF located at Millennium Park, Ballycoolin, Dublin 11.

The MRF is operated by Starrus Eco Holdings according to the requirements of an Industrial Emissions License (IEL) to operate the MRF. The IEL was issued by the Environmental Protection Agency (EPA) (Licence registration number W0183-01). It states that the maximum quantity of waste to be accepted at the facility is 270,000 tonnes per annum.

The proposed development involves an increase in facility throughput to 450,000 tonnes/annum. Starrus Eco intends to apply to EPA for an amendment to the IEL to increase the maximum quantity of waste that can be accepted at the facility to 450,000 tonnes per annum. An Environmental Impact Assessment Report (EIAR) is required as supporting documentation for the application.

The results of the assessment show that the proposed development would result in a net reduction in GHG emissions of 7.03 k tCO_2-e/annum.

The reduction in GHG emissions resulting from the proposed development is equivalent to:

- -0.018% of Ireland's non-ETS emissions in the opening year
- -0.021% of Ireland's non-ETS emissions in the design year.

8. REFERENCES

ACRplus, 2021, The Carbon Footprint of Waste (Ireland). December 2021 https://southernwasteregion.ie/sites/default/files/MCLC_2021_Carbon_Footprint_Waste_Ireland.pdf

DECLG (2012) A life cycle assessment of a standard Irish composting process and agricultural use of compost. An rx3 project, funded by the Department of the Environment, Community and Local Government. http://www.cre.ie/web/wp-content/uploads/2010/12/Compost-Life-Cycle.pdf

DEFRA, 2020, Emissions Factors Toolkit v10.1. User Guide. August 2020. https://laqm.defra.gov.uk/documents/EFTv10.1-user-guide-v1.0.pdf

EPA, 2006, W0183-01 Waste Licence. Starrus Eco Holdings Limited, Millennium Business Park, Grange, Ballycoolin, Dublin 11. https://epawebapp.epa.ie/licences/lic_eDMS/090151b280742ac4.pdf

EPA, 2018, What is in our bins? EPA Municipal Waste Characterisation Study 2018. https://www.epa.ie/publications/monitoring--assessment/waste/national-waste-statistics/Packaging-2018-__-Environmental-Protection-Agency,-Ireland.pdf

EPA (2022) Greenhouse gas emissions - Energy https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/energy-/#:~:text=In%202020%2C%20electricity%20generated%20from,from%2037.6%25%20in%202019)

EPE (2013) Protocol for the quantification of greenhouse gas emissions from waste management activities. Version 5. Enterprises Pour L'environment (EPE). https://ghgprotocol.org/sites/default/files/Waste%20Sector%20GHG%20Protocol_Version%205_October%202013_1_0.pdf

Highways England (2019) Design Manual for Roads and Bridges. Volume 11. Part 1. LA 105 Air Quality. Highways England Company Limited (formerly the Highways Agency), Guildford, United Kingdom. Available online: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3

Highways England (2021) Design Manual for Roads and Bridges index GG 000 29 September 2021. https://www.standardsforhighways.co.uk/prod/attachments/066b3135-59f4-4eb4-837a-7c43c6c6a790?inline=true

Highways Agency, 2021, Personal Communication.

IPCC, 2018, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories - Chapter 5 – WASTE https://www.ipcc.ch/site/assets/uploads/2018/03/5_Waste-1.pdf

RPS, 2018, Household Waste Characterisation Campaign - Characterisation of Municipal Waste Final Report. November 2018. https://www.epa.ie/publications/monitoring--assessment/waste/national-waste-statistics/Household_Surveys_Final_Report1.pdf

SEAI (2022) Ireland's Energy Statistics - Conversion factors. https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/

APPENDIX A RESULTS OF THE CLIMATE ASSESSMENT OF ADDITIONAL TRAFFIC IN THE STUDY AREA

A1 INPUT DATA

Traffic data was obtained from ORS to quantify GHG emissions in the study area at the operational stage of the proposed development under the do-something scenario. Traffic data was provided for the following road links:

- North of Greenstar Facility Road Junction
- East of Greenstar Facility Road Junction
- South of Greenstar Facility Road Junction
- West of Greenstar Facility Road Junction
- North of Millennium Business Park - Cappagh Road Roundabout
- East of Millennium Business Park - Cappagh Road Roundabout
- South of Millennium Business Park - Cappagh Road Roundabout
- North of Huntstown Business Park - Cappagh Road Roundabout
- South of Huntstown Business Park - Cappagh Road Roundabout
- West of Huntstown Business Park - Cappagh Road Roundabout
- Northwest of Panda Facility Access Junction
- Southeast of Panda Facility Access Junction
- Southwest Panda Facility Access Junction
- Cappagh Road North of Cappagh Road - Mitchelstown Road Roundabout
- Kilshane Road, north of Cappagh Road - Mitchelstown Road Roundabout
- East of Cappagh Road - Mitchelstown Road Roundabout
- Cappagh Road South of Cappagh Road - Mitchelstown Road Roundabout
- Mitchelstown Road, west of Cappagh Road - Mitchelstown Road Roundabout
- North of Cappagh Road - Ballycoolin Road Roundabout
- East of Cappagh Road - Ballycoolin Road Roundabout
- South of Cappagh Road - Ballycoolin Road Roundabout
- West of Cappagh Road - Ballycoolin Road Roundabout.

A2 SCOPING ASSESSMENT

The scoping assessment was used to determine the road links that make up the ARN due to the additional traffic created by the proposed development.

The scoping assessment indicated that the following road links triggered the scoping criterion as the HDV AADT increased by more than 200 in the opening year (do-something scenario) compared to the opening year (do-nothing scenario):

- East of Greenstar Facility Road Junction

- South of Greenstar Facility Road Junction
- West of Greenstar Facility Road Junction
- North of Millennium Business Park - Cappagh Road Roundabout
- East of Millennium Business Park - Cappagh Road Roundabout
- South of Millennium Business Park - Cappagh Road Roundabout
- North of Huntstown Business Park - Cappagh Road Roundabout
- South of Huntstown Business Park - Cappagh Road Roundabout
- Northwest of Panda Facility Access Junction
- Southeast of Panda Facility Access Junction
- Cappagh Road South of Cappagh Road - Mitchelstown Road Roundabout
- North of Cappagh Road - Ballycoolin Road Roundabout.

The ARN includes the listed road links and 200 m along adjoining road links including:

- 200 m north of Greenstar Facility Road Junction
- 200 m north of Greenstar Facility Road Junction
- 200 m west of Huntstown Business Park - Cappagh Road Roundabout
- 200 m southeast of Panda Facility Access Junction
- 200 m southwest of Panda Facility Access Junction
- 200 m along Cappagh Road, north of Cappagh Road - Mitchelstown Road Roundabout
- 200 m along Kilshane Road, north of Cappagh Road - Mitchelstown Road Roundabout
- 200 m East of Cappagh Road - Mitchelstown Road Roundabout
- 200 m along Mitchelstown Road, west of Cappagh Road - Mitchelstown Road Roundabout
- 200 m east of Cappagh Road - Ballycoolin Road Roundabout
- 200 m south of Cappagh Road - Ballycoolin Road Roundabout
- 200 m west of Cappagh Road - Ballycoolin Road Roundabout.

The ARN is presented in Figure A.1

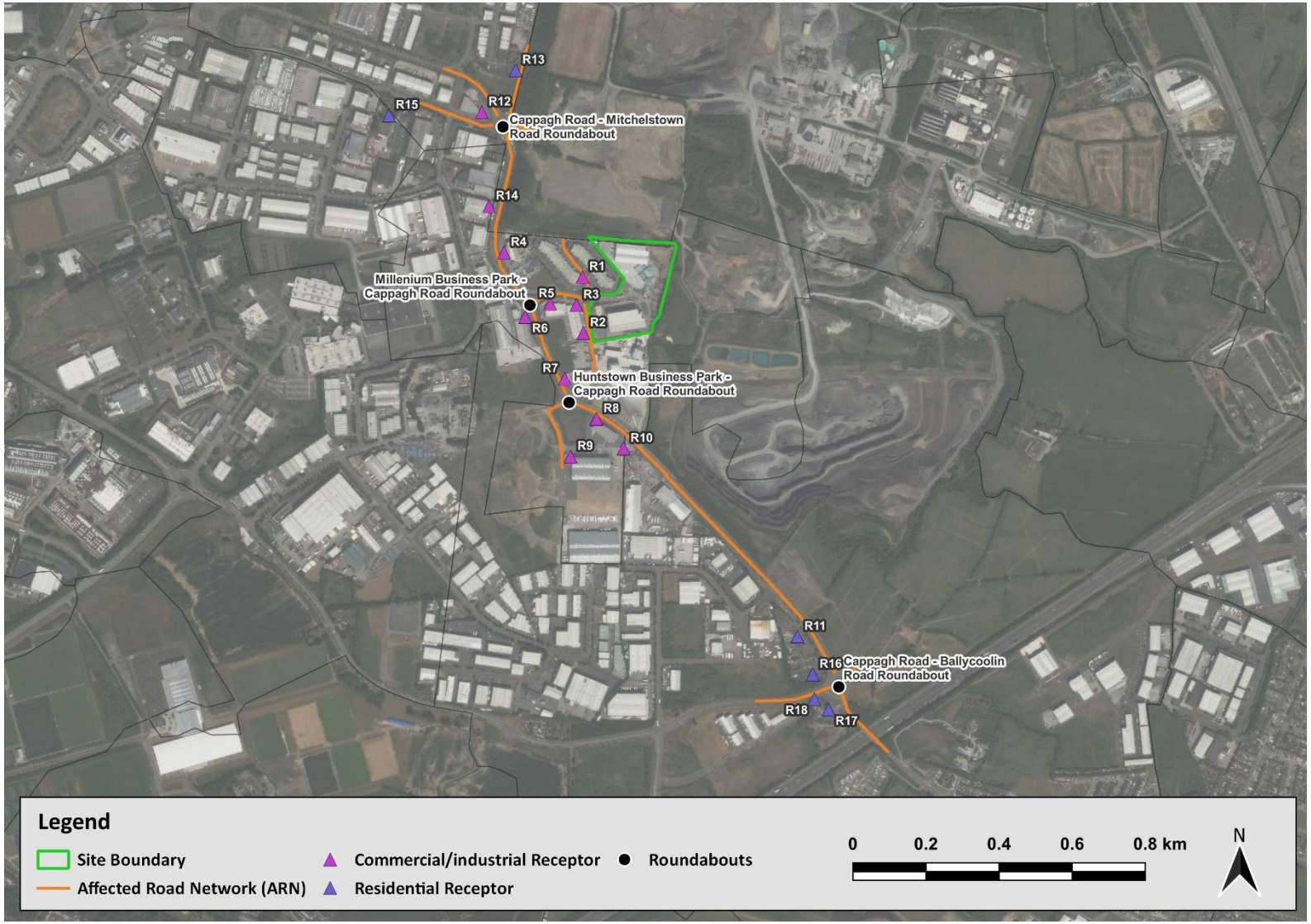


Figure A.1 The Affected Road Network (ARN) determined based on additional traffic resulting from the proposed development

APPENDIX 8.1

APPROPRIATE ASSESSMENT SCREENING

Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89

T: 021 434 5366
E: admin@ocallaghanmoran.com
www.ocallaghanmoran.com

APPROPRIATE ASSESSMENT

STAGE 1 SCREENING

STARRUS ECO HOLDINGS LTD

MILLENNIUM BUSINESS PARK

BALLYCOOLIN

DUBLIN 15

Prepared For: -

Starrus Eco Holdings Ltd
Cappogue
Finglas
Dublin 11

Prepared By: -

O'Callaghan Moran & Associates
Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89

February 2023

Project	Millennium Business Park Licence Review			
Client	Starrus Eco Holdings Limited			
Report No.	Date	Status	Prepared By	Reviewed By
2213801902	26/01/2023	Draft	Austin Hynes MSc	Jim O'Callaghan MSc
	23/02/2023	Final		

TABLE OF CONTENTS

PAGE

1. INTRODUCTION

Starrus Eco Holdings Ltd (SEHL) commissioned O'Callaghan Moran & Associates (OCM) to carry out an Appropriate Assessment Screening of a proposed development at its materials recovery facility at Millennium Business Park, Ballycoolin, Dublin 15. The assessment is required to support a planning application to increase the annual waste intake from 270,000 to 450,000 tonnes.

The Habitats Directive, which is implemented under the European Communities Birds and Natural Habitats) Regulations 2011 (S.I. No 477 of 2011), requires an "appropriate assessment" of the potential impacts any proposed development that may have an impact on the conservation objectives of any Natura 2000 site.

Article 6(3) of the Directive stipulates that *any plan or project not directly connected with or necessary to the management of a Natura 2000 Site, but likely to have a significant effect thereon…shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.*

Guidance documents issued by Department of Environment, Heritage and Local Government (DEHLG) and the National Parks and Wildlife Services (NPWS) recommend that the assessment be completed in a series of Stages, which comprise:

Stage 1: Screening

The purpose of this Stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a Natura 2000 Site in respect of the site's conservation objectives.

Stage 2: Appropriate Assessment

This Stage is required if the Stage 1 Screening exercise identifies that the project is likely to have a significant impact on a Natura 2000 Site.

Stage 3: Assessment of Alternative Solutions.

If Stage 2 determines that the project will have an adverse impact upon the integrity of a Natura 2000 Site, despite the implementation of mitigation measures, it must be objectively concluded that no alternative solutions exist before the plan can proceed.

Stage 4: Compensatory Measures:

Where no alternative solutions are feasible and where adverse impacts remain but imperative reasons of overriding public interest require the implementation of a project an assessment of compensatory measures that will effectively offset the damage to the Natura Site 2000 is required.

1.1 Methodology

The Screening Assessment was based on a site inspection and the nature and scale of the proposed development. It comprised a Source-Pathway-Receptor risk evaluation. This starts with the source i.e. the hazard, which can include air emissions, noise, surface water run-off, wastewater and raw materials and wastes handling and storage. The next step is to identify how a hazard can travel through the environment i.e. the pathway. The final step is to determine the receptors that could be affected by the hazard.

The assessment followed the guidance presented in the DEHLG (2009, revised February 2010) Appropriate Assessment of Plans and Projects in Ireland and the NPWS (2010) Circular NPW 1/10 & PSSP 2/10 Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. The information sources included;

- National Parks & Wildlife Service (NPWS) - www.npws.ie
- Environmental Protection Agency (EPA) – www.epa.ie
- National Biodiversity Data Centre – www.biodiversityireland.ie
- Fingal County Council Development Plan 2017-2023.

2. DESCRIPTION OF PROJECT

2.1 Site Location & Layout

The site in the east of the Millennium Business Park, Ballycoolin, Dublin 15, as shown on Figure 2.1. Millennium Business Park is accessed via the Cappagh Road and the site entrance is off an internal road within the Park. The site occupies 4.45 hectares and comprises the waste recovery and transfer building (4,388m^2), recycling building (4,700m^2),administration building/staff amenity (625m^2), maintenance building (286m^2), two weighbridges and associated control rooms, fuel tanks and bund walls, paved open yards, skip storage, vehicle parking and a vehicle wash.

2.2 Services

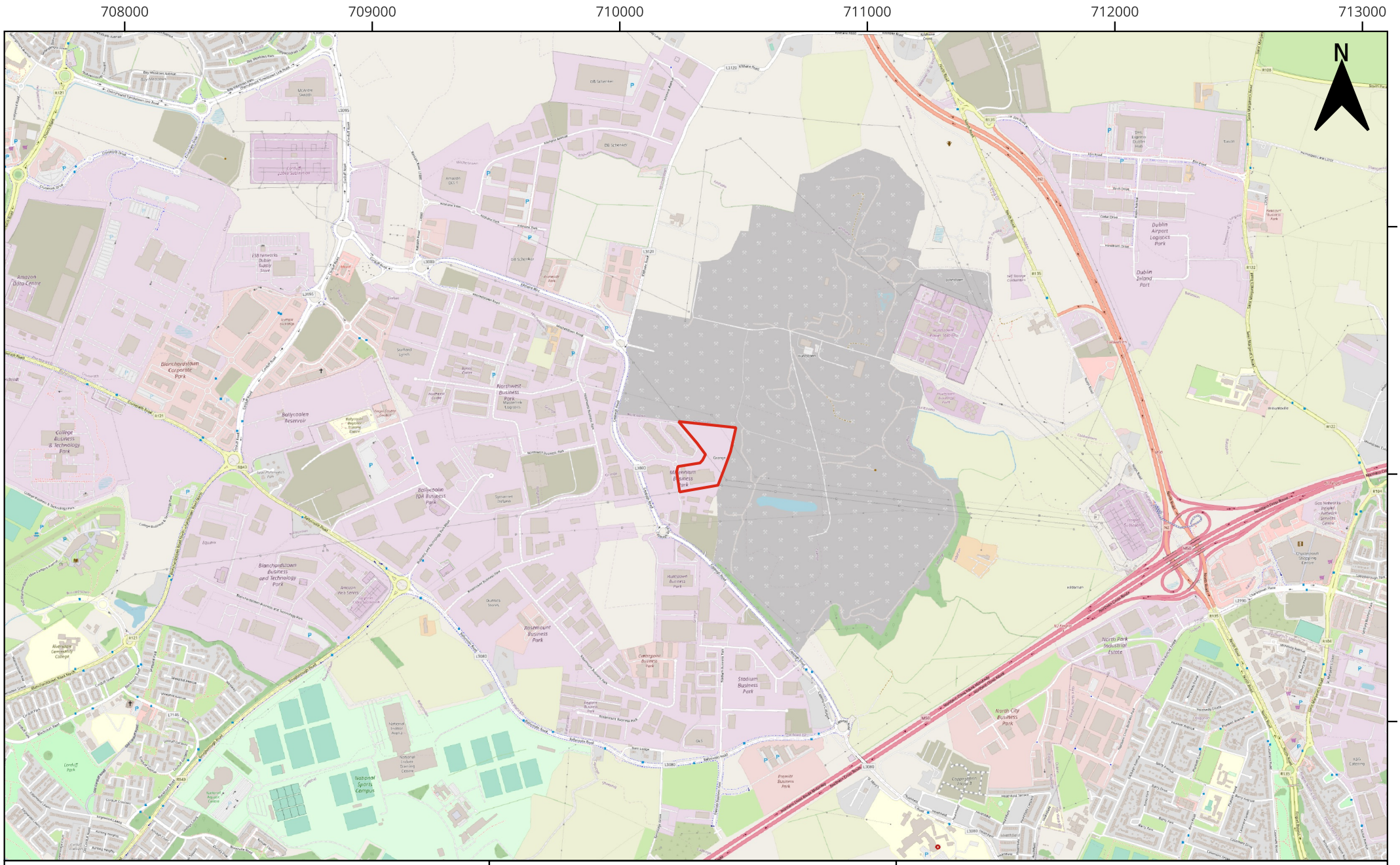
The site has connections to the mains water supply, municipal foul sewer, and electricity and natural gas grids and telecoms systems. Rainwater run-off from the building roofs is harvested for use as 'grey water' in the toilets, with the surplus along with the run-off from the paved yards and wash water from the vehicles wash discharge to the foul sewer serving the Business Park, which connects to the municipal foul sewer. There is a shut off valve on the drainage system that can be closed in the event of an incident that has the potential to contaminate surface water to retain the water inside the site boundary.

2.3 Site Operations

The facility has permission to accept and process 270,000 tonnes of non-hazardous, household, including kerbside collected, residual waste (black bin) and food waste (brown bin), commercial and industrial waste and construction and demolition wastes. Hazardous wastes and liquid waste are not accepted. It operates 24 hours a day, 7 days a week.

The wastes are delivered to and removed from the facility in heavy goods vehicles. All the wastes are weighed at the on-site weighbridge and then are off-loaded inside the buildings, where they are processed to separate the recyclable materials (paper, cardboard, plastic, metal, wood) from the non-recyclables. The processing involves the use of bag shredders, mechanical screens, conveyors, magnets, compactors, mechanical grabs, loading shovels, fork lifts and wrappers.

The recyclables are sent to recycling plants. The non-recyclables are used to produce what is called solid recovered fuel which is sent to incinerators in Ireland and overseas and is also a replacement for fossil fuels in cement kilns. The solid recovered fuel that is exported are formed into bales that are wrapped in plastic sheeting and these are stored in the open yard. The food waste is transferred to biological treatment plants e.g. compost and anaerobic digestion plants.



O'Callaghan Moran & Associates

Unit 15 Melbourne Business Park,
Model Farm Road, Cork.
Tel. (021) 4345366
email: info@ocallaghanmoran.com

Environmental Management for Business

CLIENT

Starrus Eco Holdings Ltd

TITLE

Site Location

DETAILS

Site Boundary

0 200 400 m

FIGURE 2.1

2.4 Environmental Emissions and Controls

Emissions include vehicle exhausts, dust, noise and odours, washwater from the truck wash, sanitary wastewater from the staff toilets and rainwater run-off. The EPA licence sets out the control measures that must be applied to ensure these emissions do not cause pollution. The licence also requires surface water, foul water, dust deposition and noise monitoring at specified monitoring locations and sets emission limits that must not be exceeded.

2.5 Safety and Hazard Control

SEHL has prepared an Accident Prevention Policy to minimise the risk of accidents occurring and an Emergency Response Procedure that specifies roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents and to minimise their associated environmental impacts.

2.6 Accidents & Emergencies

SEHL has, in accordance with the retirements of the EPA licence, completed an Environmental Liability Risk Assessment that has identified the likely accidents that could occur, assessed the associated environmental effects and the required actions to remedy those effects. Based on the types of waste that are and will be accepted and the activities carried out, the only accident that presents a significant risk of environmental pollution is a fire.

2.7 Environmental Setting

2.7.1 Hydrology

The site is in the catchment of the Tolka River, which is approximately 2 kilometres to the south west and south. There are no streams or water courses either on site, or in the surrounding area.

2.7.2 Geology and Hydrogeology

The subsoils beneath the site are between 1.3 and 8.45 m thick and comprise sandy gravelly boulder clays. The bedrock is a calcareous, shale, limestone, conglomerate of the Tober Coleen Formation.

The bedrock Formation and is classified as (Figure 7.2). This type of aquifer is capable of supplying small abstractions (e.g. domestic supplies, small group schemes), or moderate to low yields (<100 m3/d). Groundwater predominantly flows through a limited and poorly-connected network of fractures, fissures and joints.

The bedrock is a Poor Bedrock Aquifer which is Generally Unproductive except for Local Zones. The local direction of groundwater flow is to the south west, but is likely to be greatly influenced by the large scale quarrying to the south (Huntstown Quarry). The aquifer vulnerability to pollution from the ground surface ranges from High to Moderate across the Business Park

2.8 Proposed Development

SEHL proposes to increase the annual waste intake to a maximum of 450,000 tonnes/year, but there will be no change to the types of waste accepted. Normally the annual intake will be 400,000 tonnes and the additional 50,000 tonnes will only be accepted at times when there is a disruption to the national waste management capacity, for example the unexpected closure of other large scale waste treatment plants either in Ireland or overseas.

The development does not require the construction of any new buildings, provision of new equipment, additional staff or alterations to the foul and surface water drainage systems. It will not result in any new emissions surface water, ground and groundwater and will not be a new or additional source of noise and light emissions.

The existing odour management controls can also manage the increased through put, however as a precautionary measure a new odour control system will be installed in the building where the odorous wastes (black and brown bin) are handled. The system will involve the extraction of odorous air from the building and passing it through a dust filter and a carbon filter that will reduce the odours to levels that will not cause an off-site odour nuisance. The design, installation and operation of the system requires approval of the EPA.

3. NATURA 2000 SITES

SACs are selected for the conservation and protection of habitats listed on Annex I and species (other than birds) listed on Annex II of the Habitats Directive, and their habitats. The habitats on Annex I require special conservation measures. SPAs are selected for the conservation and protection of bird species listed on Annex I of the Birds Directive and regularly occurring migratory species, and their habitats, particularly wetlands. The selected habitats and species are termed Qualifying Interests.

A statement of Conservation Objectives is prepared for each designated site, which identifies the qualifying interests or conservation features. The Conservation Objectives are intended to ensure that the relevant habitats and species present on a site are maintained, and where necessary restored, at a Favourable Conservation Status.

Favourable Conservation Status of a habitat, as defined in 2011 Birds and Natural Habitats Regulations, is when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable

Conservation Status of a species is when:

- the Favourable population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats,
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

3.1 Natura 2000 Sites Potentially Affected by the Project

The site is not in either an SAC, or an SPA. There are eleven Natura 2000 sites within 15 km of the site, as listed in Table 3.1 and shown on Figure 3.1.

Table 3.1. Natura 2000 Sites within 15 km of the proposed Development

Site	Code	Distance (km)
South Dublin Bay & Tolka River Estuary SPA	004024	8.7 SE
Rye Water Valley/Carton SAC	001398	10.8 SW
South Dublin Bay SAC	000210	11.2 SE
Malahide Estuary SPA	004025	11.3 NE
Malahide Estuary SAC	000205	11.3 NE
North Dublin Bay SAC	00206	11.4 SE
North Bull Island SPA	004006	11.5 SE
Baldoyle Bay SAC	000199	13.0 E

Baldoyle Bay SPA	004016	13.2 E
Rogerstown Estuary SAC	000208	14.5 NE
Rogerstown Estuary SPA	004015	14.9 NE

3.2 SPAs

Dublin Bay and River Tolka Estuary SPA

The South Dublin Bay and River Tolka Estuary SPA comprises a substantial part of Dublin Bay. It includes the intertidal area between the River Liffey and Dun Laoghaire, and the estuary of the River Tolka to the north of the River Liffey, as well as Booterstown Marsh. A portion of the shallow marine waters of the bay is also included.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/spa/004024 and the information is summarised below.

Qualifying Interests

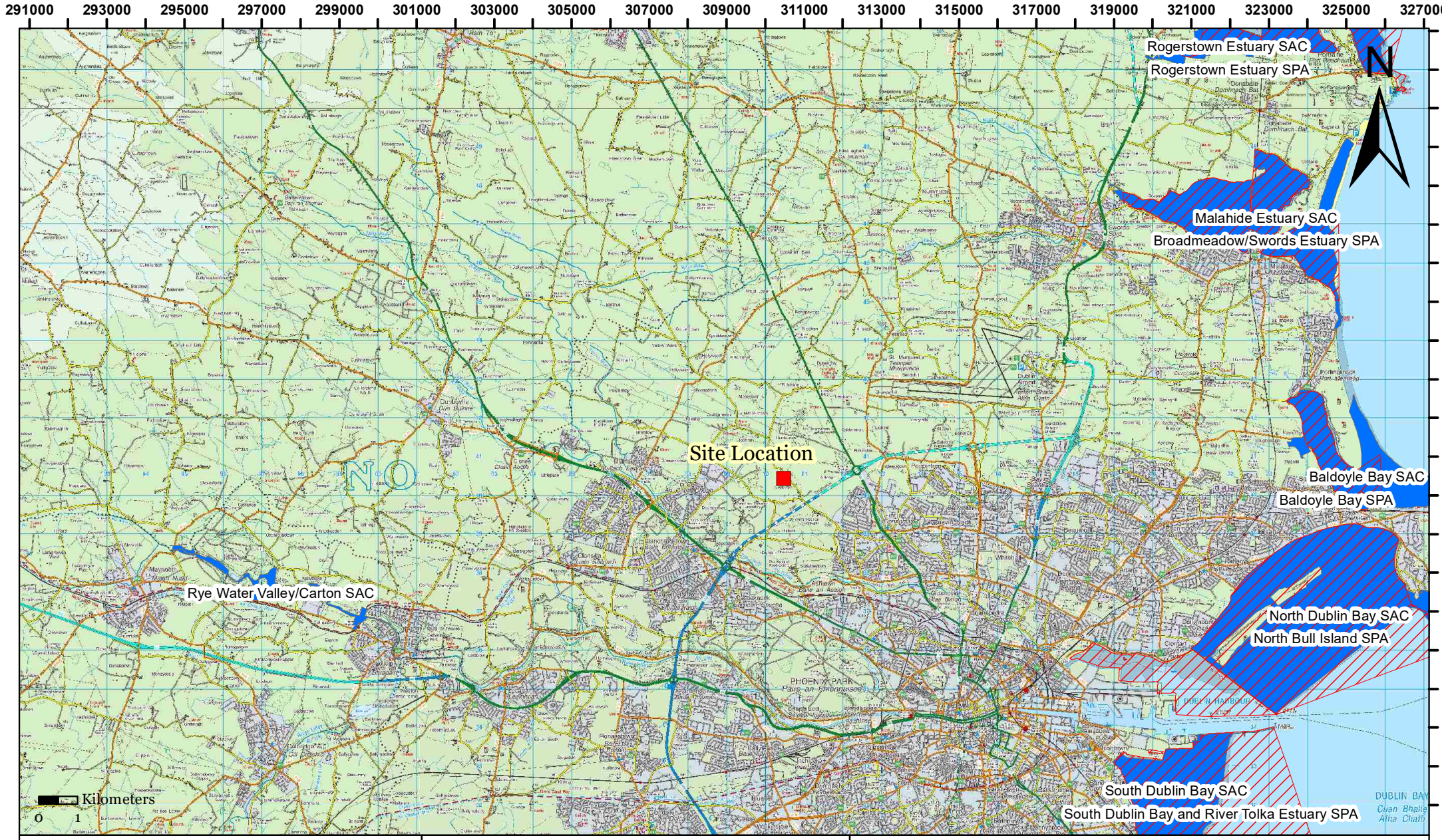
The site is special conservation interest for the following species:

- Light-bellied Brent Goose [A046]
- Oystercatcher [A130]
- Ringed Plover [A137]
- Grey Plover [A141]
- Knot [A143]
- Sanderling [A144]
- Dunlin [A149]
- Bar-tailed Godwit [A157]
- Redshank [A162]
- Black-headed Gull [A179]
- Roseate Tern [A192]
- Common Tern [A193]
- Arctic Tern [A194]
- Wetlands [A999]

The Birds Directive pays particular attention to wetlands, and as these form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is an important site for wintering waterfowl, being an integral part of the internationally important Dublin Bay complex – all counts for wintering waterbirds are five year mean peaks for the period 1995/96 to 1999/2000.

Although birds regularly commute between the south bay and the north bay, recent studies have shown that certain populations which occur in the south bay spend most of their time there. An internationally important population of Light-bellied Brent Goose (368) occurs regularly and newly arrived birds in the autumn feed on the Eelgrass bed at Merrion.



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

CLIENT
Starrus Eco Holdings Ltd

TITLE
Natura 2000 Sites

Details:
- Site Location ING
- SPAs
- SACs

Figure 3.1

The Birds Directive pays particular attention to wetlands, and as these form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is an important site for wintering waterfowl, being an integral part of the internationally important Dublin Bay complex – all counts for wintering waterbirds are five year mean peaks for the period 1995/96 to 1999/2000. Although birds regularly commute between the south bay and the north bay, recent studies have shown that certain populations which occur in the south bay spend most of their time there. An internationally important population of Light-bellied Brent Goose (368) occurs regularly and newly arrived birds in the autumn feed on the Eelgrass bed at Merrion.

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected.

Malahide Estuary SPA

Malahide Estuary is situated in north County. Dublin, between the towns of Malahide and Swords. The site encompasses the estuary, saltmarsh habitats and shallow subtidal areas at the mouth of the estuary. The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/spa/004025 and the information is summarised below.

Qualifying Interests

The site is of special conservation interest for the following species:

- Great Crested Grebe (Podiceps cristatus) [A005]
- Light-bellied Brent Goose (Branta bernicla hrota) [A046]
- Shelduck (Tadorna tadorna) [A048]
- Pintail (Anas acuta) [A054]
- Goldeneye (Bucephala clangula) [A067]
- Red-breasted Merganser (Mergus serrator) [A069]
- Oystercatcher (Haematopus ostralegus) [A130]
- Golden Plover (Pluvialis apricaria) [A140]
- Grey Plover (Pluvialis squatarola) [A141]
- Knot (Calidris canutus) [A143]
- Dunlin (Calidris alpina) [A149]
- Black-tailed Godwit (Limosa limosa) [A156]
- Bar-tailed Godwit (Limosa lapponica) [A157]
- Redshank (Tringa totanus) [A162]
- Wetland and Waterbirds [A999]

The Birds Directive pays particular attention to wetlands, and as these form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected.

North Bull Island SPA

This site covers all of the inner part of north Dublin Bay, with the seaward boundary extending from the Bull Wall lighthouse across to Drumleck Point at Howth Head. The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/spa/004006 and the information is summarised below.

Qualifying Interests

The site is of special conservation interest for the following species:

- Light-bellied Brent Goose (Branta bernicla hrota) [A046]
- Shelduck (Tadorna tadorna) [A048]
- Teal (Anas crecca) [A052]
- Pintail (Anas acuta) [A054]
- Shoveler (Anas clypeata) [A056]
- Oystercatcher (Haematopus ostralegus) [A130]
- Golden Plover (Pluvialis apricaria) [A140]
- Grey Plover (Pluvialis squatarola) [A141]
- Knot (Calidris canutus) [A143]
- Sanderling (Calidris alba) [A144]
- Dunlin (Calidris alpina) [A149]
- Black-tailed Godwit (Limosa limosa) [A156]
- Bar-tailed Godwit (Limosa lapponica) [A157]
- Curlew (Numenius arquata) [A160]
- Redshank (Tringa totanus) [A162]
- Turnstone (Arenaria interpres) [A169]
- Black-headed Gull (Chroicocephalus ridibundus) [A179]
- Wetland and Waterbirds [A999]

The Birds Directive pays particular attention to wetlands, and as these form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected.

Rogerstown Estuary SPA

Rogerstown Estuary is situated about 2 km north of Donabate in north County Dublin. It is a relatively small, funnel shaped estuary separated from the sea by a sand and shingle peninsula; the site extends eastwards to include an area of shallow marine water. The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/spa/004015 and the information is summarised below.

Qualifying Interests

The site is of special conservation interest for the following species:

- Greylag Goose (Anser anser) [A043]
- Light-bellied Brent Goose (Branta bernicla hrota) [A046]
- Shelduck (Tadorna tadorna) [A048]
- Shoveler (Anas clypeata) [A056]
- Oystercatcher (Haematopus ostralegus) [A130]
- Ringed Plover (Charadrius hiaticula) [A137]
- Grey Plover (Pluvialis squatarola) [A141]
- Knot (Calidris canutus) [A143]
- Dunlin (Calidris alpina) [A149]
- Black-tailed Godwit (Limosa limosa) [A156]
- Redshank (Tringa totanus) [A162]
- Wetland and Waterbirds [A999]

The Birds Directive pays particular attention to wetlands, and as these form part of the SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SPA has been selected.

3.3 SACs

South Dublin Bay SAC

This site lies south of the River Liffey in Co. Dublin, and extends from the South Wall to the west pier at Dun Laoghaire. It is an intertidal site with extensive areas of sand and mudflats. The sediments are predominantly sands but grade to sandy muds near the shore at Merrion Gates. The main channel which drains the area is Cockle Lake.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/sac/000210 and the information is summarised below.

Qualifying Interests

The site is selected for the following habitats and/or species listed on Annex I/II of the Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Annual vegetation of drift lines [1210]
- Salicornia and other annuals colonising mud and sand [1310]
- Embryonic shifting dunes [2110]

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Rye Water Valley/Carton SAC

Rye Water Valley/Carton SAC is located between Leixlip and Maynooth, in Counties Meath and Kildare, and extends along the Rye Water, a tributary of the River Liffey.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/sac/001398 and the information is summarised below.

Qualifying Interests

The site is selected for the following habitats and/or species listed on Annex I/II of the Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Petrifying springs with tufa formation (Cratoneurion) [7220]
- Vertigo angustior (Narrow-mouthed Whorl Snail) [1014]
- Vertigo moulinsiana (Desmoulin's Whorl Snail) [1016]

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Malahide Estuary SAC

Malahide Estuary is situated immediately north of Malahide and east of Swords in Co. Dublin. It is the estuary of the River Broadmeadow. The site is divided by a railway viaduct which was built in the 1800s.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/sac/000205 and the information is summarised below.

Qualifying Interests

The site is selected for the following habitats and/or species listed on Annex I/II of the Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]
- Mediterranean salt meadows (Juncetalia maritimi) [1410]
- Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

North Dublin Bay SAC

This site covers the inner part of north Dublin Bay, the seaward boundary extending from the Bull Wall lighthouse across to the Martello Tower at Howth Head. The North Bull Island is the focal point of this site.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/sac/000206 and the information is summarised below.

Qualifying Interests

The site is selected for the following habitats and/or species listed on Annex I/II of the Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Annual vegetation of drift lines [1210]

- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]
- Mediterranean salt meadows (Juncetalia maritimi) [1410]
- Embryonic shifting dunes [2110]
- Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
- Humid dune slacks [2190]
- Petalophyllum ralfsii (Petalwort) [1395]

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Baldoyle Bay SAC

Baldoyle Bay SAC extends from just below Portmarnock village to the west pier at Howth in Co. Dublin. It is a tidal estuarine bay protected from the open sea by a large sand-dune system. Two small rivers, the Mayne and the Sluice, flow into the bay.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/sac/000199 and the information is summarised below.

Qualifying Interests

The site is selected for the following habitats and/or species listed on Annex I / II of the Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]
- Mediterranean salt meadows (Juncetalia maritimi) [1410]

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

Rogerstown Estuary SAC

Rogerstown Estuary is situated about 2 km north of Donabate in Co. Dublin. It is a relatively small, narrow estuary separated from the sea by a sand and shingle bar. The estuary is divided by a causeway and narrow bridge, built in the 1840s to carry the Dublin-Belfast railway line.

The Site Synopsis, which lists the full Qualifying Interests, and the Conservation Objectives are accessible at https://www.npws.ie/protected-sites/sac/000208 and the information is summarised below.

Qualifying Interests

The site is selected for the following habitats and/or species listed on Annex I/II of the Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330]
- Mediterranean salt meadows (Juncetalia maritimi) [1410]
- Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]

Conservation Objectives

The conservation objectives are to maintain or restore the favorable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

3.4 Source-Pathway-Receptor Linkages

Given the distances between the development site and the Natura 2000 Sites there is no potential for noise, light, air emissions and groundwater movement to adversely impact the qualifying interests and conservation objectives of any of the Sites.

The only potential direct connection between the installation and a Natura 2000 site is the surface water run-off to the storm drainage system serving the Business Park. This ultimately enters the River Tolka, whose estuary is part of the Dublin Bay and River Tolka Estuary SPA, which is 8.7 km to the south-east.

4. LIKELY EFFECTS

4.1 Plan or Project

The proposed development involves increasing the annual waste intake from 270,000 to 450,000 tonnes but there will be no change to the types of waste accepted. The development does not require either construction works except the installation of a new odour control system, or the provision of new processing equipment and will not result in any loss of habitats either within, or outside the site boundary. It will not result in any new or additional emissions to surface water, ground and groundwater, or any new noise and light emissions. The odour control system will be a new emission point to air.

4.2 Direct Impacts

The installation is not located within or adjoining to a Natura 2000 Site and the proposed development will not result in any direct habitat loss or fragmentation of any SPA or SAC. There is a surface water pathway between the facility and the South Dublin and River Tolka Estuary SPA and this is the only pathway between the facility and a Natura 2000 Site.

The proposed development will not result in any changes to either the volume or quality of the surface water run-off from the facility. This, in conjunction with the dilution in the Tolka and the distance to the River Tolka Estuary means that the potential for adverse impact on the South Dublin and River Tolka Estuary SPA is not significant.

4.3 Indirect Impacts

The proposed development will not result in any new processes, there will be no changes to the existing emissions, apart from the new odour control system, and it will not give rise to any new direct or indirect emission to surface water, ground, groundwater or the foul sewer and no new or additional noise and light emission. Given the separation distances between the facility and the Natura 2000 Sites the proposed development presents no risk of indirect impacts.

4.4 Cumulative Effects

The proposed development will not contribute to the cumulative effects on the South Dublin and River Tolka SPA or any other Natura 200 Sites.

5. SCREENING CONCLUSION & STATEMENT

5.1 Conclusion

The proposed changes will have no direct or indirect effects on a Natura 2002 Site.

5.2 Statement

The proposed development does not present a risk of significant effects on the Qualifying Interests and Conservation Objectives of any Natura 2000 Sites.

APPENDIX 9.1

AIR QUALITY ASSESSMENT

Millennium Park Materials Recovery Facility - Air Quality Assessment

Prepared for:

O'Callaghan Moran & Associates

March 2023

Final

Prepared by:

Katestone Environmental Pty Ltd
Office 5a, Portlaoise Enterprise Centre, Clonminam Industrial Estate, Portlaoise, Co Laois

www.katestone.global
admin@katestone.global
Ph +353 (87) 365 6879

Document Control

Deliverable #:	DK21029-3
Title:	Millennium Park Materials Recovery Facility - Air Quality Assessment
Version:	Final
Client:	O'Callaghan Moran & Associates
Document reference:	DK21029-3 OCM Millenium Park MRF Air Quality Assessment.docx
Prepared by:	Micheal Fogarty, Paddy McDowell
Reviewed by:	Simon Welchman
Approved by:	
	Simon Welchman
	01/03/23

Disclaimer

http://katestone.com.au/disclaimer/

Copyright

Contents

Tables

Figures

Contour Plates

Glossary

Term	Definition
g/s	gram per second
kg	kilogram
kg/m³	Kilogram per cubic meter
km	kilometre
km/hr	kilometre per hour
m	metre
m/s	metres per second
m^2	square metres
m^3	cubic metres
m^3/s	cubic metres per second
m³/hr	cubic metres per hour
mg	milligram
Z_0	roughness length
ou_E/m^3	European odour unit per cubic meter
ou_E/s	European odour unit per second
µg/m³	micrograms per cubic meter

Abbreviations	Definition
AG4	Air Guidance 4
BAT	Best available techniques
EPA	Environmental Protection Agency
EF	Emission factor
EU	European Union

1. INTRODUCTION

Katestone Environmental Pty Ltd (Katestone) was commissioned by O'Callaghan Moran and Associates (O'Callaghan Moran) on behalf of Starrus Eco Holdings Limited (Starrus Eco Holdings) to conduct an odour impact assessment of a materials recovery facility (MRF) and an air quality assessment of the traffic associated with a proposed development of a MRF located at Millennium Park, Ballycoolin, Dublin 11 (site).

The MRF is operated by Starrus Eco Holdings according to the requirements of an Industrial Emissions License (IEL). The IEL was issued by the Environmental Protection Agency (EPA) (Licence registration number W0183-01). It states that the maximum quantity of waste to be accepted at the facility is 270,000 tonnes per annum.

The proposed development involves an increase in facility throughput to 450,000 tonnes/annum. Starrus Eco intends to apply to EPA for an amendment to the IEL to increase the maximum quantity of waste that can be accepted at the facility to 450,000 tonnes per annum. An Environmental Impact Assessment Report (EIAR) is required as supporting documentation for the application.

The increase in throughput resulting from the proposed development will affect emissions to air from the site as:

- The handling of additional municipal solid waste (MSW) and brown bin waste will result in an increased potential for the generation of odorous emissions
- Increased traffic associated with the transportation of additional waste will affect air quality in close proximity to roads in the vicinity of the site that are utilised by waste vehicles.

An odour control unit will be installed as part of the proposed development to limit odorous emissions from the MRF.

This report describes:

- The odour impact assessment conducted to determine the impact of residual odour emissions from the MRF at sensitive locations in the vicinity of the site
- The air quality impact assessment conducted to determine the impact of emission due to increased traffic on local roads used by site traffic in the areas around the site.

The odour impact assessment described in this report is underpinned by dispersion modelling assessments, which have been conducted in accordance with the Environment Protection Agency's (EPA) Air Guidance note for dispersion modelling (AG4). The assessment of impacts on air quality of traffic associated with the expanded MRF so underpinned by the screening model described in the Design Manual for Roads and Bridges (DMRB) published by the UK Highways Agency.

2. OVERVIEW OF THE MATERIALS RECOVERY FACILITY

2.1 Location

The MRF is located in the eastern part of Millennium Business Park, Co. Dublin. The site and its surrounds are presented in Figure 1. The site is surrounded:

- To the north and east by derelict land and a number of quarry pits
- By enterprises located in Millennium Business Park including:
    - Kilsaran's Millennium Concrete Plant south of the site
    - Mixed use industrial and commercial buildings, split into units west of the site.

Millennium Business Park is surrounded to the north and east by derelict land and a number of quarry pits and to the south and west industrial estates including:

- Northwest Business Park
- Rosemount Business Park
- Keypoint Business Park.

There are a small number of isolated residential houses scattered in the industrial areas. The closest residence to the site was identified in an industrial area and is approximately 700 m northwest of the site boundary. There are a small number of residences located on the Cappagh Road approximately 850 m south of the site boundary.

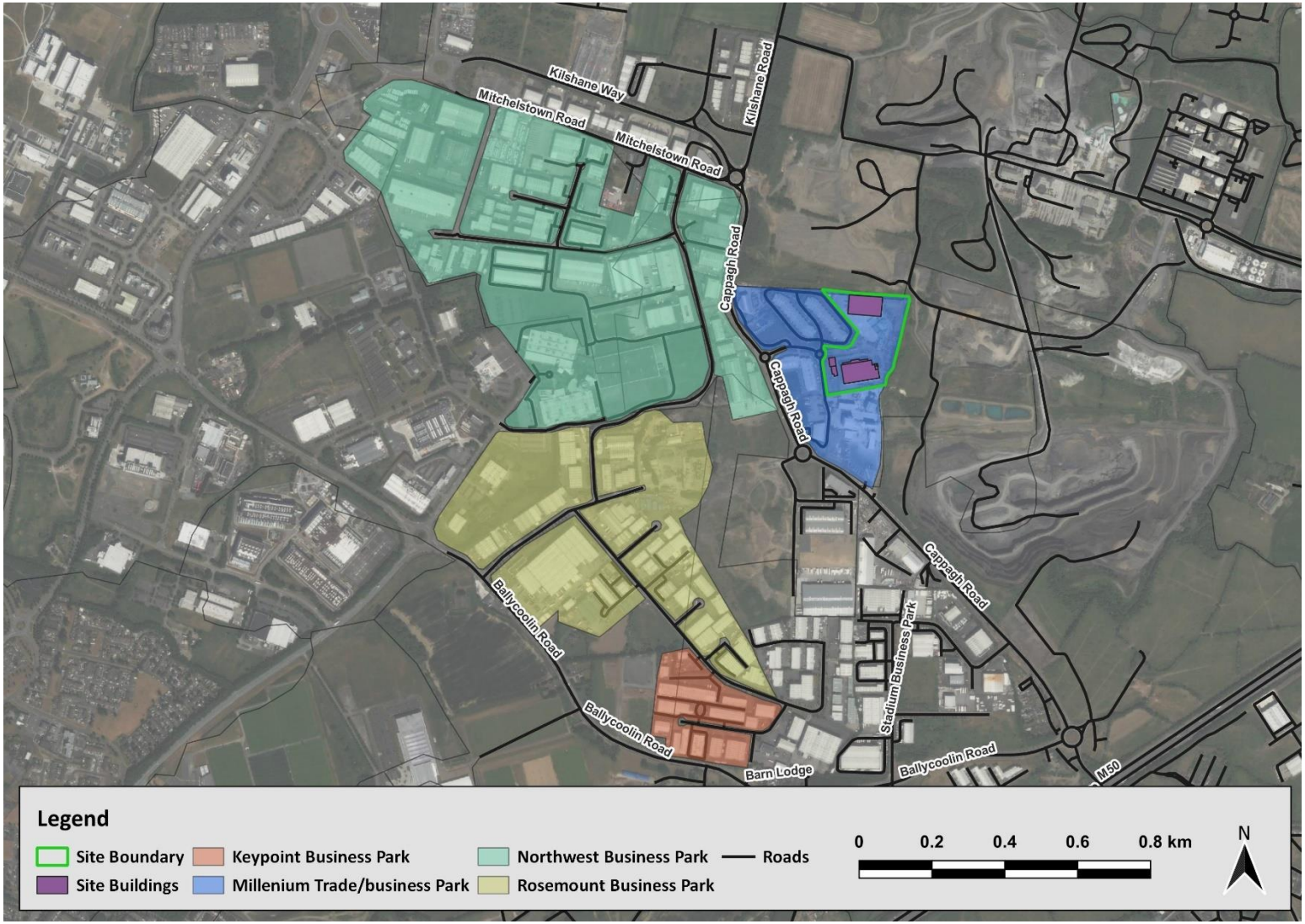


Figure 1 **Material Recovery Facility site boundary (lime green line) and surrounding areas**

2.2 Operation

The layout of the MRF site is presented in Figure 2. There are three units at the site identified as MP1, MP2 and MP3 in Figure 2. The MP1 and MP2 are two separate units located within the same building. The units are physically separated from each other by a partition within the building.

Incoming material arriving at the site is accepted at the following locations:

- Sterilised non-hazardous plastic medical waste and Solid Recovered Fuel (SRF) are accepted in MP1
- Municipal solid waste (MSW), dry mixed recyclables (DMR), brown bin (food) waste is accepted in MP2
- Construction and Demolition (C&D) and Commercial & Industrial (C&I) wastes are accepted in MP3.

MP1 contains the SRF production line and a granulator for the treatment of non-hazardous plastic medical waste.

MSW, DMR and brown bin waste are unloaded in separate areas of MP2. MSW is inspected for contamination and unsuitable materials are moved to a quarantine area. The materials are then processed to remove the organic, metal fraction and recoverable 'lights' (plastics). Metals are sent for recycling, organic fines fraction sent for composting. The recoverable 'lights' are sent to the SRF production line in MP1. The residue is suitable for use as refuse derived fuel (RDF) and is baled in an on-site baler and stored externally.

2.3 Proposed Development

The current licence limit for the MRF is 270,000 tonnes/annum. The proposed development is for the licence limit to be increased to 450,000 tonnes/annum.

It is expected, however, that the maximum amount of waste that will be received at the site will be 400,000 tonnes/annum, however approval is sought for the acceptance of an additional 50,000 tonnes as a contingency measure. This additional 50,000 tonnes/annum is sought as in recent years incidents at waste management facilities in Ireland and in Europe resulted in temporary emergency closures of these waste management facilities. These closures resulted in a requirement for additional capacity at alternative waste management facilities. Approval for an additional 50,000 tonnes/annum above the expected normal maximum operating capacity of the MRF would allow material to be processed at the MRF in the event of the temporary closure of other processing facilities.

The proposed development does not require any additional buildings, plant or equipment for material handling or processing. The additional material can be handled and processed using existing infrastructure. The proposed development includes the installation of an odour control unit at the site.

The odour control unit will be used to treat air exhausted from MP2 as MSW and brown bin waste are handled in this unit.

The air from MP1 and MP3 is not required to be treated in the OCU as it is not expected to be odorous because there are no putrescible organic materials expected in the waste streams being handled in these units including:

- Sterilised non-hazardous plastic medical waste and SRF
- C&D material
- C&I material.

Figure 2 **Material Recovery Facility site plan – identifying the layout of buildings at the site and the location of the proposed OCU.**

3. REGULATORY FRAMEWORK AND ASSESSMENT CRITERIA

3.1 *Environmental Protection Agency Acts 1992 and 2003*

The *Environmental Protection Agency Act 1992 (EPA Act)* and Part 2 of the *Protection of the Environment Act 2003* are collectively referred to as the *Environmental Protection Agency Acts 1992 and 2003*. These Acts provide for the management of air emissions from activities (meaning any process, development or operation) that are listed in the First Schedule of the Acts.

Section 4 (2) of the *Environmental Protection Agency Acts 1992 and 2003* defines Air Pollution as follows:

> *"…the direct or indirect introduction to an environmental medium, as a result of human activity, of substances, heat or noise which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment, and includes -*
>
> *(a) 'air pollution' for the purposes of the Air Pollution Act 1987,*
>
> *(b) ……..*
>
> *(c) ……..."*

The *Air Pollution Act 1987* (AP Act) provides for the control of air pollution and other matters connected with air pollution. Under the AP Act 'pollutant' means any substance that is specified in the First Schedule or any other substance (including a substance which gives rise to odour) or energy which, when emitted into the atmosphere either by itself or in combination with any other substance, may cause air pollution.

Section 4 of the AP Act defines air pollution as follows:

> *"Air pollution" in this Act means a condition of the atmosphere in which a pollutant is present in such a quantity as to be liable to —*
>
> *(i) be injurious to public health, or*
>
> *(ii) have a deleterious effect on flora or fauna or damage property, or*
>
> *(iii) impair or interfere with amenities or with the environment."*

Section 24 of the AP Act details the obligations of the occupier of a premises in respect to preventing emissions, nuisance and what constitutes defences against prosecution:

> *(1) The occupier of any premises, other than a private dwelling, shall use the best practicable means to limit and, if possible, to prevent an emission from such premises.*
>
> *(2) The occupier of any premises shall not cause or permit an emission from such premises in such a quantity, or in such a manner, as to be a nuisance.*
>
> *(3) In any prosecution for a contravention of this section, it shall be a good defence to establish that—*
>
> *(a) the best practicable means have been used to prevent or limit the emission concerned, or*
>
> *(b) the emission concerned was in accordance with a licence under this Act, or*
>
> *(c) the emission concerned was in accordance with an emission limit value, or*

(d) the emission concerned was in accordance with a special control area order in operation in relation to the area concerned, or

(e) in the case of an emission of smoke, the emission concerned was in accordance with regulations under section 25, or

(f) the emission did not cause air pollution.

Section 75 (1) of the *Environmental Protection Agency Acts 1992 and 2003* requires the EPA to publish reasonable and desirable quality objectives to protect the environment, namely:

"The Agency shall, in relation to any environmental medium and without prejudice to its functions under section 103, specify and publish quality objectives which the Agency considers reasonable and desirable for the purposes of environmental protection."

3.2 Air contaminants

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008. It replaced the Framework Directive and the first, second and third Daughter Directives. The fourth Daughter Directive (2004/107/EC) will be included in CAFE at a later stage. The limit and target values for both Directives are outlined below.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) (DEHLG, 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

The limit values of the CAFE Directive that were applied in this assessment are presented in Table 1.

Table 1 Limit values of CAFE Directive 2008/50/EC

Air contaminant	Averaging period	Limit value (µg/m^3)	Basis of application of limit value
CO	8-hour	10000	Maximum
NO_2	1-hour	200	Not to be exceeded more than 18 times in a calendar year
	Annual	40	Average
PM_{10}	24-hour	50	35th Highest
	Annual	40	Average
$PM_{2.5}$	Annual	25	Average
SO_2	1-hour	350	Not to be exceeded more than 24 times in a calendar year
	24-hour	125	Not to be exceeded more than 3 times in a calendar year
	Annual	20	Average

3.3 Odour

In 2020, the EPA issued its updated guidance document air quality impact assessment (known as AG4). Appendix H of this document provides guidance that is specific to the assessment of odour impacts using dispersion modelling techniques.

In relation to the odour assessment criteria, AG4 states:

> *Currently there is no general statutory odour standard in Ireland relating to industrial installations.*
>
> *.....*
>
> *Guidance from the UK (EA, 2011, and adapted for Irish EPA use) recommends that odour standards should vary from 1.5 – 6.0 OUE/m3 as a 98th%ile of one hour averaging periods at the worst-case sensitive receptor based on the offensiveness of the odour and with adjustments for local factors such as population density...*

Table A4 of AG4 contains indicative odour standards based on offensiveness of odour that have been adapted for use in Ireland. Relevant aspects are reproduced as follows:

- The most offensive odours should be assessed against an Indicative Criterion of 1.5 OU_E/m^3 as a 98^{th}%ile of hourly averages at the worst-case sensitive receptor
- Moderately offensive odours should be assessed against an Indicative Criterion of 3.0 OU_E/m^3 as a 98^{th}%ile of hourly averages at the worst-case sensitive receptor
- Less offensive odours should be assessed against an Indicative Criterion of 6.0 OU_E/m^3 as a 98^{th}%ile of hourly averages at the worst-case sensitive receptor.

The industrial sectors that fit into each category are described as follows:

- Most offensive:
    - Processes involving decaying animal or fish remains.
    - Processes involving septic effluent or sludge waste sites including landfills, waste transfer stations and non-green waste composting facilities.
- Moderately offensive
    - Intensive Livestock Rearing
    - Fat Frying / Meat Cooking (Food Processing)
    - Animal Feed
    - Sugar Beet Processing
    - Well aerated green waste composting.
- Less offensive
    - Brewery / Grain / Oats Production
    - Coffee Roasting
    - Bakery
    - Confectionery.

The sources of odour at the MRF fall into the most offensive category based on EPA guidance The odour exposure criterion relevant to operations at the site is C_{98}, 1-hour ≤ 1.5 ou_E/m^3.

4. EXISTING ENVIRONMENT

The site is in an industrial location surrounded by derelict land and a number of quarry pits to the north and east and industrial units to the south and west. There are a small number of isolated residential houses scattered throughout the industrial areas around the site, the closest being approximately 750 m northwest of the site. The Tolka River runs from northwest to southeast approximately 2.6 km south of the site.

The terrain of the site and surrounding area north, west and south is flat. There is a quarry pit located 250 m southeast of the site and a quarry pit located 450 m north of the site that results in a significant depression in terrain levels at these distances and in these directions from the site. The site is at an elevation of approximately 80 metres above sea level.

4.1 Local meteorology

Meteorological parameters recorded at the closest Met Eireann Observation Station to the site at Dublin Airport were extracted and processed to assess meteorological conditions.

The observation station at Dublin Airport is approximately 5.5 km northeast of the site and approximately 64 m above sea level. The terrain surrounding the observation station is relatively flat and used as an airfield. The land between the observation station and the site is also primarily flat. The land surrounding the site and Dublin Airport monitoring station is predominantly comprised of green spaces with industrial development.

The data from the observation station at Dublin Airport is considered representative of the site due to:

- The proximity of the observation station to the site
- The similar nature of the terrain at both locations
- The similar nature of land use at both locations
- The absence of major elevated terrain features between the observation station and the site.

4.1.1 Windspeed and direction

Wind speed and wind direction are important parameters for the transport and dispersion of air pollutants from a source. A wind rose representing the annual distribution of winds at Dublin Airport for each modelled year is presented in Figure 3.

The prevailing wind direction in Ireland is from the southwest. It is clear from Figure 3 that these winds have a strong influence on wind patterns at Dublin Airport. Winds at all times of day are dominated by the prevailing wind directions. During the afternoon, winds are stronger than all other times of day as indicated in the diurnal wind roses (Figure 4).

The seasonal distribution of wind speed and wind direction are presented in Figure 5. The strongest winds at Dublin Airport occur most frequently from south to west during the winter. Winds during summer are lighter than during the other seasons. Some southeasterly winds are observed throughout the year and a small proportion of winds occur from the east and northeast during spring.

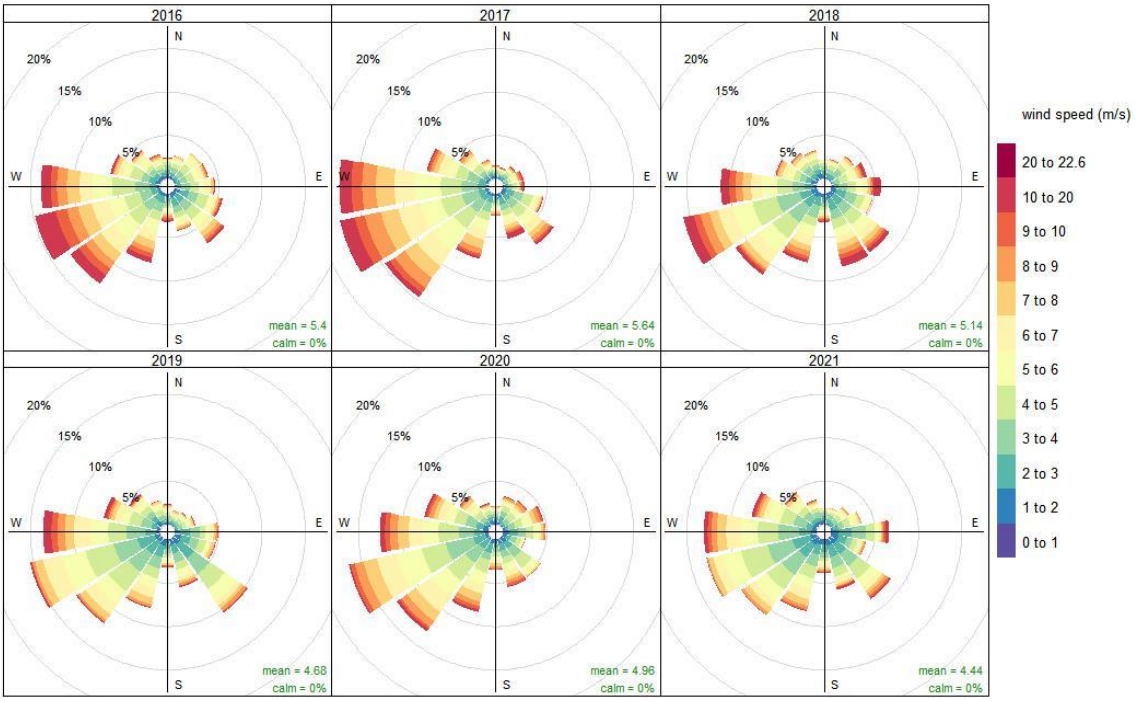


Figure 3 Wind distribution monitored at Dublin Airport for each year between 2016 and 2021

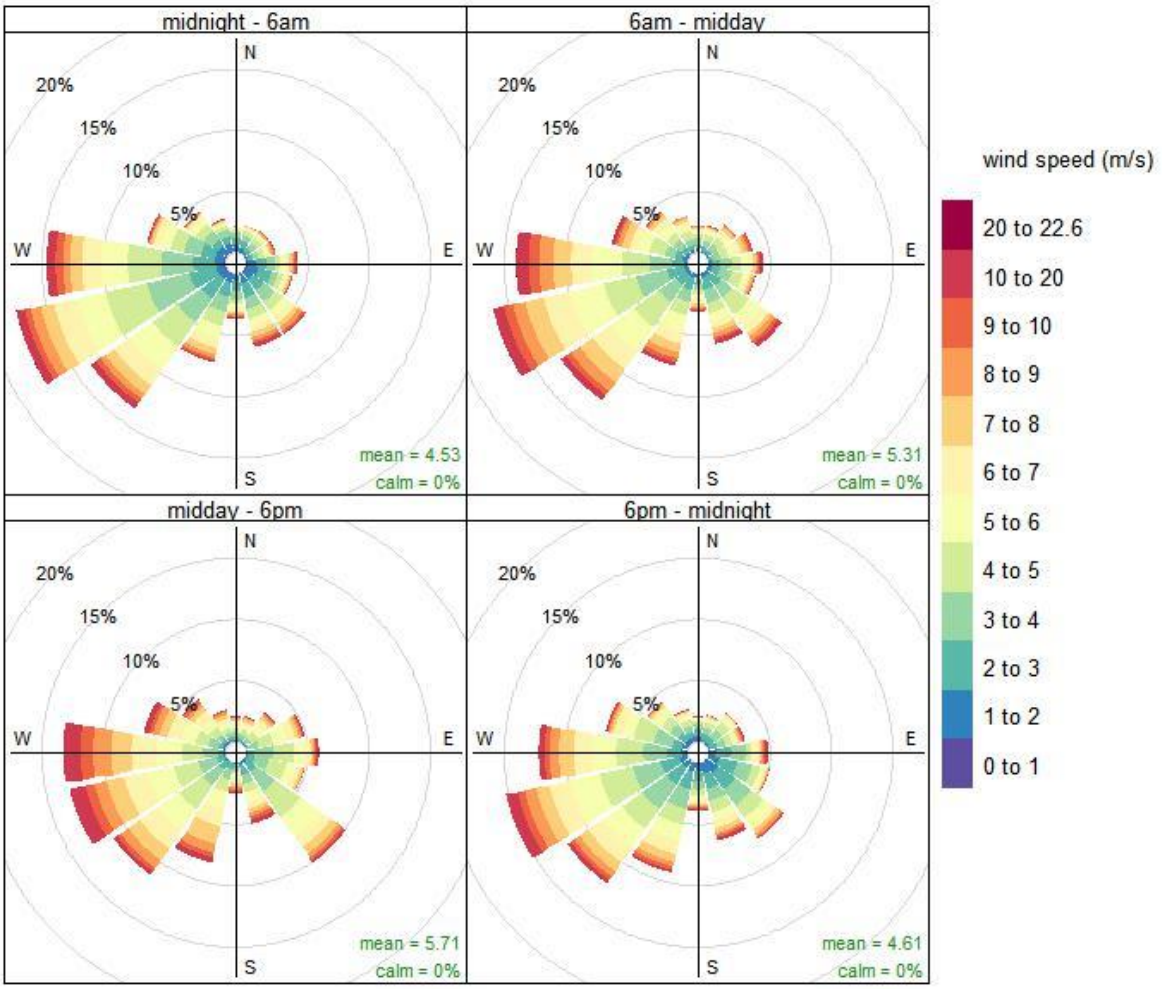


Figure 4 Diurnal wind distribution at Dublin Airport between 2016 and 2021

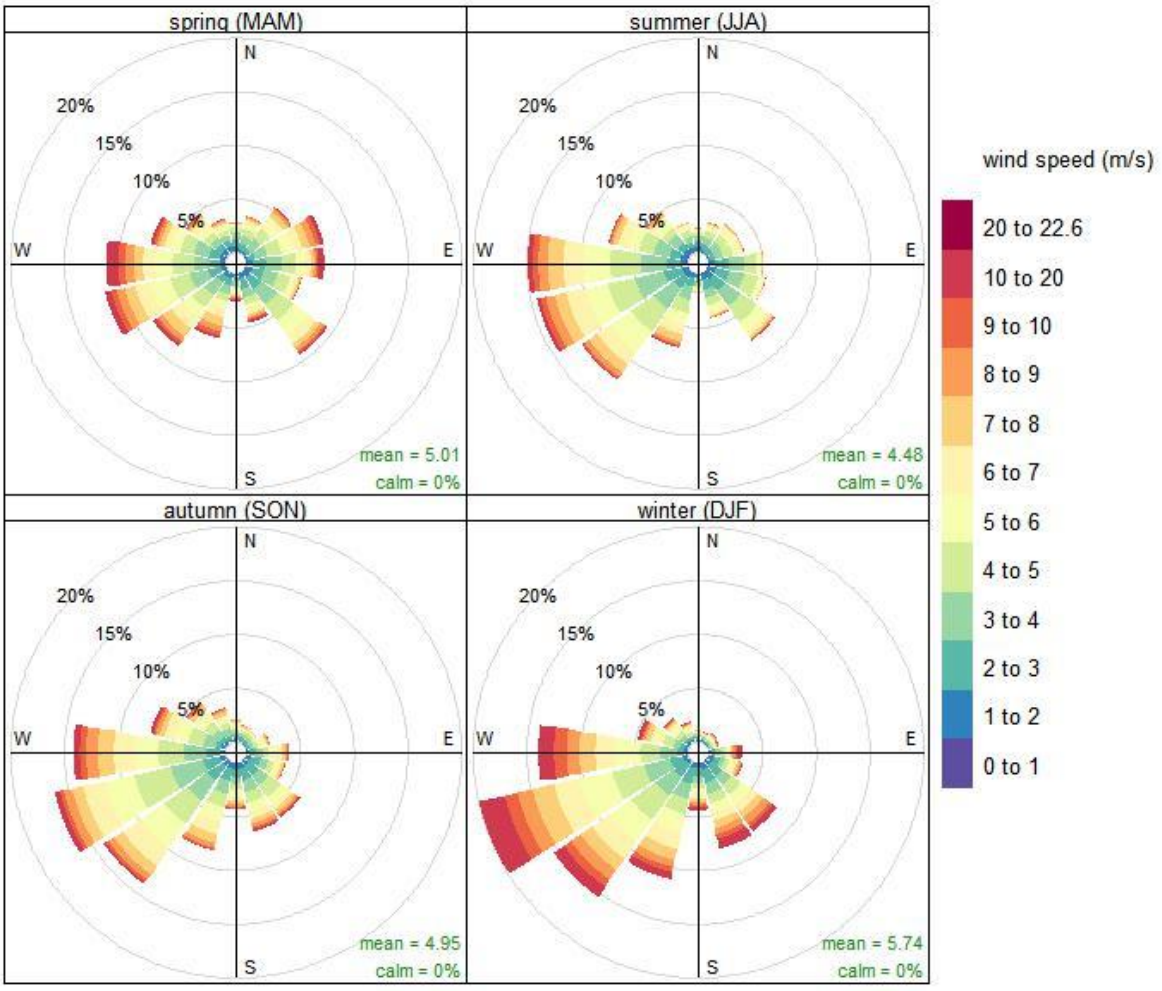


Figure 5 Seasonal wind distribution at Dublin Airport between 2016 and 2021

4.2 Background air quality

Under the Clean Air for Europe Directive, EU member states must designate "Zones" for the purpose of managing air quality. In Ireland, four zones are defined in the *Air Quality Standards Regulations 2011* (DEHLG, 2011). The Proposed Facility is in Zone A, which is Dublin.

Background air quality data for Zone A was obtained from four reports:

- Air Quality in Ireland 2019 – Indicators of Air Quality (EPA, 2020a)
- Air Quality in Ireland 2020 – Indicators of Air Quality (EPA, 2021)
- Air Quality in Ireland 2021 – Indicators of Air Quality (EPA, 2022)

Background air quality data for Zone A measured at:

- Blanchardstown was used to represent ambient levels of NO_2 at the site
- Blanchardstown and Finglas was used to represent ambient levels of PM_{10} and $PM_{2.5}$ at the site
- Winetavern St, Rathmines, Tallaght or Ringsend was used to represent ambient levels of SO_2 at the site

- Winetavern St, Rathmines, Tallaght or Ringsend was used to represent ambient levels of CO at the site.

The monitoring location at Blanchardstown is 3.2 km from the site. It is surrounded by residential areas of Blanchardstown to the southwest and it is within 10 m of a major road that forms part of the M50-M3 Motorway Interchange. Given the proximity to residential areas and a motorway interchange, the data collected at Blanchardstown is considered to be a conservative representation of air quality at the site. The monitoring location at Finglas is also 3.2 km from the site and is surrounded by residential areas and roads typical of a suburban town centre. The air quality at this location is influenced by emissions from road traffic and residential heating and is considered to be a conservative representation of background air quality at the site.

A summary of the background data that is relevant to the site is provided in Table 2. In the three years of reported monitoring there was no exceedance of air quality guideline levels.

Table 2 Ambient background data

Pollutant	Averaging period	Value (µg/m^3)	Source
Nitrogen dioxide	1-hour	164.6	Second highest1-hour average concentration from Blanchardstown between 2019 and 2021
	Annual	31.0	Maximum from Blanchardstown between 2019 and 2021
PM_{10}	24-hour	19.0[1]	Maximum from Blanchardstown or Finglas between 2019 and 2021
	Annual	19.0	Maximum from Blanchardstown or Finglas between 2019 and 2021
$PM_{2.5}$	Annual	9.0	Maximum from Blanchardstown or Finglas between 2019 and 2021
Sulphur Dioxide	1-hour	62.5	Maximum from Winetavern St, Rathmines, Tallaght or Ringsend between 2019 and 2021
	24-hour	44.2	Maximum from Winetavern St, Rathmines, Tallaght or Ringsend between 2019 and 2021
	Annual	5.2	Maximum from Winetavern St, Rathmines, Tallaght or Ringsend between 2019 and 2021
Carbon Monoxide	8-hour Rolling	3,600	Maximum from Winetavern St between 2019 and 2021

Note:

[1] UK DEFRA and EPA advise that the 36th high 24-hour mean process contribution can be added to the annual mean background PM_{10}

5. ODOUR IMPACT ASSESSMENT

5.1 Methodology

The following section describes the modelling methodology that was adopted to assess the potential impacts of odour from the MRF.

The methodology is based on a dispersion modelling study incorporating source characteristics and operational activity data with meteorological data that is representative of the site and surrounding region. The assessment has been prepared in accordance with industry standards, regulatory requirements and best practice approaches.

The assessment methodology has included:

- Selection of relevant odour assessment criteria.
- Derivation of an odour emissions rate for the OCU stack based on its air flow capacity and manufacturer's design odour emission limit.
- Characterisation of meteorological conditions in the region and generation of a representative meteorological dataset using observations from Dublin Airport.
- Dispersion modelling using the regulatory dispersion model, AERMOD, to predict ground-level concentrations of odour across a Cartesian grid that covers the study area and at the closest sensitive receptor locations to the site boundary.
- Comparison of the predicted ground-level concentrations of odour against the relevant odour assessment criterion.

5.2 Meteorological modelling

The EPA's Air Dispersion Modelling Guidance Note (AG4) (EPA, 2020b) states:

> "*The dispersion process is dependent on the underlying meteorological conditions and ensuring that the air dispersion model includes representative meteorological data is critical.*
>
> *The USEPA (24) has defined meteorological representativeness as:*
>
> > *"the extent to which a set of {meteorological} measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application"*
>
> *and has expanded on this definition by outlining the factors to consider in the selection of appropriate meteorological data:*
>
> - *Proximity of the meteorological station to the modelling domain;*
> - *The complexity of the terrain;*
> - *The exposure of the meteorological monitoring site;*
> - *The period of time during which data is collected."*

Data gathered at Dublin Airport is likely to be representative of meteorological conditions at the site as defined in AG4.

AERMET is a general-purpose meteorological preprocessor for organizing meteorological data into a format suitable for use by the AERMOD air quality dispersion model.

The AERMET meteorological pre-processor was configured with surface data from Dublin Airport and upper air data from Castor Bay in Co. Down and used to generate a meteorological file suitable for use in the AERMOD dispersion model.

AERMET requires inputs of roughness length (Z_o), Bowen ratio and Albedo. The AERMET User's Guide stipulates that Z_o should be determined based on land cover within a 1.0 km radius of the meteorological site. If the value of Z_o varies significantly by direction, then sector dependency should be used. Sector width should be >= 30°.

The Bowen ratio and Albedo should be determined based on land cover within a 10 km x 10 km domain. A simple unweighted mean has been used for the Albedo and a weighted geometric mean for the Bowen ratio as required by the AERMET User's Guide (USEPA (2022).

The approach to determine these parameters is described in Appendix A.

5.3 Emissions

The odour emission rate adopted in the odour dispersion modelling assessment and the approach to derive the emission rate are presented in this section.

The odorous waste streams will be handled and processed in the MP2 unit. The MP2 unit will be maintained under negative air pressure with air being exhausted through an odour control unit and vented through an elevated odour exhaust stack located on the eastern side of the MP2 building.

Negative pressure will be maintained in the MP2 section of the building by:

- Having a well-sealed building
- Exhausting air to the OCU at a rate that results in two (2) air changes per hour.

The OCU will be designed to have a maximum exhaust concentration of odour of 1,000 ou_E/m^3.

The odour emission rate adopted in the assessment was calculated as the product of the maximum exhaust concentration of odour of the OCU and the design air flowrate of the exhaust system. The values used to determine the odour emission rate and the odour emission rate adopted in the modelling assessment are presented in Table 3.

Table 3 Odour emission rate adopted in the modelling assessment for the OCU stack

Parameter	Value	Unit	Comment/Reference
Building Volume	27,089	m^3	Supplied by O'Callaghan Moran
Air Changes Per Hour	2		Supplied by O'Callaghan Moran
Air Flowrate	54,178	m^3/h	Calculated
Air Flowrate	15.0	m^3/s	Calculated
Stack Diameter	1.2	m	Supplied by O'Callaghan Moran
Stack exhaust velocity	13.3	m/s	Calculated based on assumed diameter
Modelled Odour Concentration	1,000	ou_E/m^3	Design odour emission limit
Modelled Odour Emission rate	15,049	ou_E/s	Calculated

5.4 Dispersion modelling

The dispersion modelling was conducted in accordance with recognised techniques specified in EPA's AG4 document (EPA, 2020b). AERMOD was used to predict ground-level concentrations of odour and air contaminants across the model domain due to emission sources at the site.

The dispersion modelling assumes that emissions occur 24 hours each day, for all hours of each modelled year.

5.5 Building downwash

When modelling emissions from an industrial installation it should be borne in mind that stacks which are relatively short can be subjected to additional turbulence due to the presence of nearby buildings. Buildings are considered nearby if they are within five times the lesser of the building height or maximum projected building width (but not greater than 800m) (EPA, 2020b).

A plume of a short stack is likely to be down washed if its height is less than two and a half times the height of nearby buildings within a distance of 10 x L from each source, where L is the lesser of the height or width of the building. A Building Profile Input Program (BPIP) was used to determine the effects of buildings at the site on the point sources of emissions at the MRF. The Plume Rise Model Enhancements (PRIME) algorithm is recommended in EPA Guidance for use with AERMOD. PRIME was used in the dispersion modelling assessment to determine the effect of building induced turbulence on plumes from point sources at the MRF.

The PRIME algorithm takes into account the position of each stack relative to each relevant building and the projected shape of each building for 36 wind directions (at 10º intervals). The model determines the change in plume centre-line location with downwind distance based on the slope of the mean streamlines and coupled to a numerical plume rise model.

Six buildings/structures were included in the BPIP program to represent buildings and structures at the MRF. The coordinates used in the configuration of the onsite buildings and structures in the BPIP program are presented in Table 4.

Table 4 The buildings and structures included and configuration of the MRF in BPIP

Building	Easting	Northing	Height (m)
	UTM (m)	UTM (m)	
MP1 and MP2 Building	676720	5920916	17.88
	676803	5920929	
	676805	5920916	
	676812	5920917	
	676814	5920903	
	676822	5920904	
	676826	5920880	
	676728	5920864	
Maintenance	676814	5920903	14
	676812	5920917	
	676809	5920917	
	676809	5920918	
	676816	5920920	
	676818	5920912	
	676821	5920913	
	676822	5920905	
Canopy	676724	5920917	10.71
	676724	5920921	
	676747	5920925	
	676746	5920929	
	676769	5920932	
	676770	5920929	
	676793	5920932	
	676794	5920928	
OCU Housing unit	676818	5920912	10.00
	676816	5920920	
	676820	5920920	
	676821	5920913	
Admin1	676685	5920935	17.88
	676703	5920937	
	676706	5920914	
	676689	5920911	
Admin2	676706	5920914	17.88
	676692	5920912	
	676696	5920890	
	676700	5920891	
	676701	5920885	
	676711	5920887	

5.6 Sensitive receptors

The sensitive receptors that are of interest in relation to odour emissions from the site are located in around the southern portion of the site as it contains the MP2 unit within which odorous materials are handled and processed. The odorous emissions will be treated in the OCU adjacent to the MP2 unit. The closest sensitive odour receptors are presented in Figure 6 and are commercial and industrial premises immediately south and west of the site boundary.

The closest sensitive residential receptors are more than 800 m from the site boundary. These sensitive residential receptors have not been explicitly included in the dispersion model; however, concentrations of odour at these locations can be inferred from the dispersion modelling results, which show that concentrations of odour fall significantly with distance from the site. If concentrations of odour comply with the relevant odour criterion at the modelled sensitive locations in close proximity to the site, then it infers that concentrations of odour comply with the relevant odour criterion at sensitive locations further from the site boundary.

Figure 6 Nearest sensitive odour receptors to the MRF

5.7 Source configuration

The parameters used to characterise the OCU stack in the dispersion modelling assessment are presented in Table 5.

Table 5 Source parameters for the OCU stack at the MRF as modelled

Source Name	Location		Diameter	Height	Temperature	Velocity
	Easting	Northing				
	m	m	m	m	°C	m/s
OCU Stack	676,819	5,920,915	1.2	18	15	13.3

6. TRAFFIC IMAPCT ASSESSMENT

6.1 Methodology

The following section describes the modelling methodology that was adopted to assess the potential impacts of odour from the MRF.

Road transport associated with a development can include emissions of several air pollutants, which are also produced by a wide range of industrial, commercial and domestic processes. The pollutants of most concern near roads are nitrogen dioxide (NO_2) and particles (PM_{10}) in relation to human health and oxides of nitrogen (NO_x) in relation to vegetation and ecosystems.

The assessment of potential transport related air quality impacts from the proposed development was conducted using the screening method set out in the Design Manual for Roads and Bridges (DMRB) (Highways England, 2021).

The DMRB provides a framework for assessing, mitigating and reporting the effects of motorway and all-purpose trunk road projects on air quality by determining whether the impacts of a project on human health or designated habitats can trigger a significant air quality effect. The DMRB describes a methodology for the assessment of air quality from road schemes. Part LA105 of the DMRB sets out the requirements for assessing and reporting the effects of highway projects on air quality. It includes assessment methodologies to consider the impact of traffic emissions from a proposed development on a range of sensitive interests including human health and ecological health including the health of protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.

The methodology includes a scoping approach that can be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year. If a project triggers the traffic scoping criteria, either a simple or detailed assessment shall be required. The DMBR provides a methodology to determine whether a simple or detailed air quality assessment is required and the level of assessment is determined by the level of risk and the stage of assessment for a project.

The scoping assessment methodology described in the DMBR utilises the following traffic scoping criteria that shall be used to determine whether the air quality impacts of a project can be scoped out or require an assessment based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year:

1) annual average daily traffic (AADT) >=1,000; or
2) heavy duty vehicle (HDV) AADT >=200; or
3) a change in speed band; or
4) a change in carriageway alignment by >=5m

The DMRB defines the affected road network (ARN) as all roads that trigger the traffic screening criteria and adjoining roads within 200m.

The proposed development will increase volumes of traffic associated with:

- The transportation of the increased volume of material that will be delivered and processed at the site and ultimately hauled from the site for further processing.

In relation to selecting sensitive receptors to consider potential impacts of emissions on human health Highways England (2019) states:

> *Sensitive receptors shall be chosen within 200m of the ARN and include residential properties, schools and hospitals for the assessment of annual mean air quality thresholds. Where there is a risk of the short-term air quality thresholds being exceeded.*

In relation to selecting sensitive receptors to consider potential impacts of emissions on ecological locations Highways England (2019) states:

> *Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity (known as designated habitats) within 200m of the ARN shall be included in the air quality assessment.*

If the scoping assessment indicates that an assessment is required, Highways England (2019) provides a risk-based mechanism to determine whether a simple or detailed air quality assessment is required. The level of assessment is determined by the level of risk and the stage of assessment for a project.

A simple assessment provides sufficient information to confirm that the project does not result in any exceedances of the air quality thresholds. A detailed level of assessment is more likely where there is a risk of exceeding air quality thresholds and for the detailed design stage of the project lifecycle. To determine whether a simple or detailed air quality assessment is required, the project risk potential (Table 6) and the receiving environment sensitivity (Table 7) must be determined.

Table 6 Project risk potential

Risk	Project examples
High	1) large smart motorway projects, bypass and major motorway junction improvements.
Low	1) junction congestion relief project i.e. small junction improvements, signalling changes; 2) short smart motorway projects.

Table 7 Receiving environment sensitivity

Sensitivity	Features of receiving environment
High	1) large number of receptors (human and / or ecological) within 50m of roads triggering traffic screening criteria; 2) base line monitoring data indicates concentrations above the AQS Objective / EU limit value; 3) monitoring indicates exceedances of short term AQS Objectives / EU limit value; 4) projecting forward monitored concentrations to the opening year, indicates exceedances of AQS Objectives / EU limit value; 5) AQMAs or reported EU limit value exceedances within project's study area.
Medium	1) receptors (human or ecological) within 50m of roads triggering traffic change criteria; 2) base line monitoring data illustrates annual mean NO_2 concentrations >36µg/m³; 3) projections indicate annual mean NO_2 concentrations>36µg/m³ in opening year; 4) AQMAs or EU limit value exceedances within project's study area.
Low	1) few receptors located close to roads triggering traffic change criteria; 2) base line monitoring data illustrates concentrations in base year below an annual mean of 36µg/m³; 3) no AQMAs or EU limit value exceedances within project's study area.

The project risk potential and the receiving environment sensitivity are combined to determine whether a simple or detailed air quality assessment is required based on the framework presented in Table 8. The DMRB states:

> *Low risk projects are likely to result in traffic changes that are localised to the project and high risk projects are likely to impact traffic flows over a much wider area.*

The elements of simple and detailed air quality assessments are presented in Table 9.

Table 8 Framework to determine whether a simple or detailed air quality assessment is required

Risk potential of project	Receiving environment sensitivity		
	High	Medium	Low
High	Detailed	Detailed	Simple
Low	Detailed	Simple	Simple

Table 9 Simple and detailed assessment elements

Aspect	Simple assessment	Detail assessment
Traffic input	1) AADT / AAWT	1) period flows: 2) morning (AM); 3) inter peak period (IP); 4) evening peak period (PM); and 5) overnight period (OP).
Air quality modelling	1) qualitative statement; or 2) where required the Overseeing Organisation's air quality spreadsheet model.	1) detail air quality dispersion model
Receptors	1) a proportionate number of representative receptors which are located in areas with the highest concentrations and largest improvements and worsening as a result of the project.	1) representative; 2) all receptors with the likelihood to exceed air quality threshold.

A simple assessment can be undertaken using the overseeing organisation's air quality spreadsheet. The latest version of the air quality spreadsheet issued by the Highways Agency in England is Version 8 (Highways Agency, 2021), which incorporates emissions derived from the Emissions Factor Toolkit Version 10.1 (DEFRA, 2020).

Highways Agency indicates that the main potential impacts on air quality from increased traffic that results from development is from PM_{10}, NO_2 and NO_x. Levels of sulphur dioxide, carbon monoxide and benzene are highly unlikely to exceed the relevant criteria within the study area due to increased traffic from the proposed development at the operational stage. These pollutants have, therefore, not been considered further.

In relation to $PM_{2.5}$, the DMRB states:

> *There should be no need to model $PM_{2.5}$ as the UK currently meets its legal requirements for the achievement of the $PM_{2.5}$ air quality thresholds and the modelling of PM_{10} can be used to demonstrate that the project does not impact on the $PM_{2.5}$ air quality threshold.*

Ireland meets its legal requirements for $PM_{2.5}$ and, therefore, $PM_{2.5}$ has not been considered further.

6.2 Method for the conversion of NO_x to NO_2

Combustion processes release a group of compounds collectively known as oxides of nitrogen (NO_x). Oxides of nitrogen include both nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O). NO_2 and NO undergo a series of complex reactions in air, that involve NO, ozone (O_3) and nitrogen dioxide NO_2 in the presence of sunlight. The reactions are summarised in Equation 1, 2, and 3 below:

- Equation 1: $NO + O_3 \rightarrow NO_2 + O_2$
- Equation 2: NO_2 + sunlight $\rightarrow NO + O$
- Equation 3: $O + O_2 \rightarrow O_3$

This assessment has characterised the conversion of NO to NO_2 in accordance with the NO_x to NO_2 Conversion Spreadsheet (Version 7.1, June 2019) (Ricardo Energy and Environment, 2019). This spreadsheet requires regional concentrations of ozone, oxides of nitrogen and nitrogen dioxide above the surface layer and the fraction of nitrogen oxides emitted as nitrogen dioxide to be specified. NRA (2011) specifies that the region of the UK that should be selected to best characterise regional concentrations of ozone, oxides of nitrogen and nitrogen dioxide in Ireland is Craigavon in Northern Ireland. The NO_x to NO_2 Conversion Spreadsheet (Version 7.1) specifies

concentrations of ozone, oxides of nitrogen and nitrogen dioxide for Armagh City, Banbridge and Craigavon, which was selected to represent the site of the proposed development in the NO_x to NO_2 Conversion Spreadsheet for this assessment.

The fraction of nitrogen oxides emitted as nitrogen dioxide was determined based on the "All other urban UK traffic" option in the spreadsheet.

6.3 Input Data

Traffic data was obtained from ORS to determine the potential for air quality impacts at the operational stage of the proposed development under the do-something scenario. Traffic data was provided for the following road links:

- North of Greenstar Facility Road Junction
- East of Greenstar Facility Road Junction
- South of Greenstar Facility Road Junction
- West of Greenstar Facility Road Junction
- North of Millennium Business Park - Cappagh Road Roundabout
- East of Millennium Business Park - Cappagh Road Roundabout
- South of Millennium Business Park - Cappagh Road Roundabout
- North of Huntstown Business Park - Cappagh Road Roundabout
- South of Huntstown Business Park - Cappagh Road Roundabout
- West of Huntstown Business Park - Cappagh Road Roundabout
- Northwest of Panda Facility Access Junction
- Southeast of Panda Facility Access Junction
- southwest Panda Facility Access Junction
- Cappagh Road North of Cappagh Road - Mitchelstown Road Roundabout
- Kilshane Road, north of Cappagh Road - Mitchelstown Road Roundabout
- East of Cappagh Road - Mitchelstown Road Roundabout
- Cappagh Road South of Cappagh Road - Mitchelstown Road Roundabout
- Mitchelstown Road, west of Cappagh Road - Mitchelstown Road Roundabout
- North of Cappagh Road - Ballycoolin Road Roundabout
- East of Cappagh Road - Ballycoolin Road Roundabout
- South of Cappagh Road - Ballycoolin Road Roundabout
- West of Cappagh Road - Ballycoolin Road Roundabout.

6.4 Sensitive Receptors

The sensitive receptors that are of interest due to increased traffic due to the proposed development are those that are in close proximity to the road network affected by the operational traffic associated with the proposed development.

The closest residential locations to each road link on the ARN were included in the modelling assessment. Many of the road links on the ARN are not in residential areas. If there are no residential receptors adjacent to a road link, the closest commercial or industrial building to the road link was included in the modelling assessment.

The sensitive receptors included in the modelling assessment of traffic emissions are described in Table 10 and presented in Figure 7.

Table 10 Sensitive receptor locations included in the air quality assessment of traffic impacts.

Receptor	Location		Receptor Description	Road Link on ARN
	Easting	Northing		
	m	m		
R1	676652	5921012	Closest commercial/industrial Building	200 m north of Greenstar Facility Road Junction
R2	676654	5920859	Closest commercial/industrial Building	200 m south of Greenstar Facility Road Junction
R3	676635	5920935	Closest commercial/industrial Building	West of Greenstar Facility Road Junction
R4	676436.8	5921079	Closest commercial/industrial Building	North of Millennium Business Park - Cappagh Road Roundabout
R5	676563.3	5920939	Closest commercial/industrial Building	East of Millennium Business Park - Cappagh Road Roundabout
R6	676495	5920902	Closest commercial/industrial Building	South of Millennium Business Park - Cappagh Road Roundabout
R7	676603.3	5920733	Closest commercial/industrial Building	North of Huntstown Business Park - Cappagh Road Roundabout
R8	676690.1	5920623	Closest commercial/industrial Building	South of Huntstown Business Park - Cappagh Road Roundabout
R9	676618.9	5920520	Closest commercial/industrial Building	West of Huntstown Business Park - Cappagh Road Roundabout
R10	676764	5920542	Closest commercial/industrial Building	Northwest of Panda Facility Access Junction
R11	677239.8	5920026	Closest Residential Receptor	Southeast of Panda Facility Access Junction
R12	676376.2	5921464	Closest commercial/industrial Building	200 m along Cappagh Road, north of Cappagh Road - Mitchelstown Road Roundabout
R13	676468.7	5921579	Closest Residential Receptor	200 m along Kilshane Road, north of Cappagh Road - Mitchelstown Road Roundabout
R14	676396	5921206	Closest commercial/industrial Building	Cappagh Road South of Cappagh Road - Mitchelstown Road Roundabout
R15	676122.2	5921455	Closest Residential Receptor	Mitchelstown Road, west of Cappagh Road - Mitchelstown Road Roundabout
R16	677281.3	5919922	Closest Residential Receptor	North of Cappagh Road - Ballycoolin Road Roundabout
R17	677325	5919826	Closest Residential Receptor	200 m south of Cappagh Road - Ballycoolin Road Roundabout
R18	677286	5919855	Closest Residential Receptor	200 m west of Cappagh Road - Ballycoolin Road Roundabout

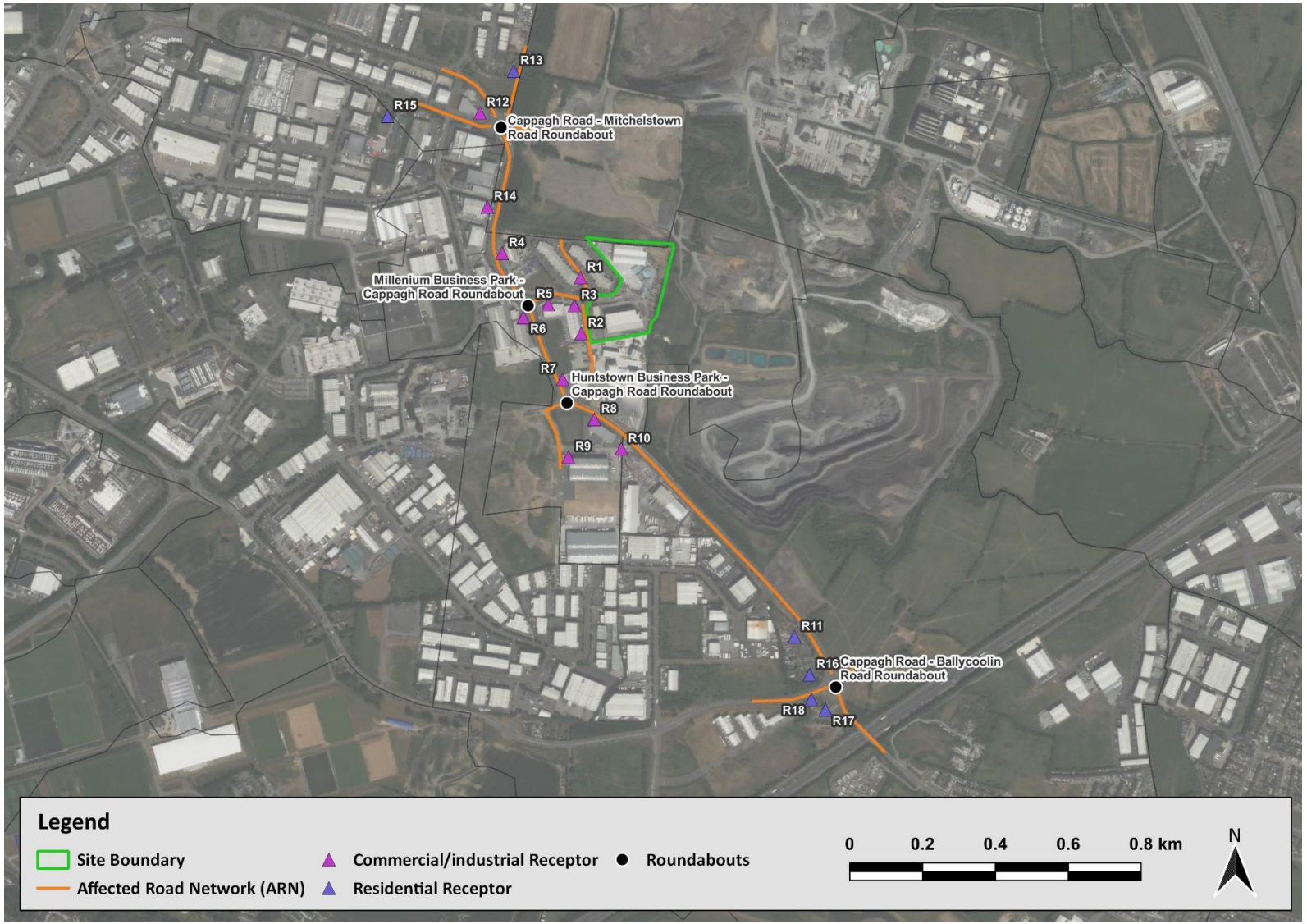


Figure 7 **Sensitive receptor locations included in the assessment of traffic impact on air quality**

7. ASSESSMENT RESULTS

7.1 Odour

Dispersion modelling has been conducted for five years of meteorological data. The following sections present the highest concentrations across the five-year modelled period.

Predicted ground-level concentrations of odour (1-hour average, 98th percentile) at the nearest sensitive receptors due to odorous emissions from the MRF are presented in Table 11 for the five-year period. Plate 1 is a contour plot that presents the highest ground-level concentrations (1-hour average, 98th percentile) across the model domain during the five-year period.

The results show that predicted concentrations **comply** with the odour criterion recommended by EPA for waste facilities of 1.5 ou_E/m^3 at all sensitive receptors included in the modelling assessment.

Table 11 Predicted ground-level concentrations of odour (1-hour average, 98th percentile) at the nearest sensitive receptors due to the MRF

Receptor	1-hour 98th Odour Concentrations (ou_E/m^3)
	Maximum 5-year
DR1	1.3
DR2	0.8
DR3	1.0
DR4	0.7
DR5	1.0
DR6	1.1

7.2 Traffic

The potential for air quality impacts at the operational stage of the proposed development under the do-something scenario are presented in Appendix B and summarised in this section.

The scoping assessment indicated that no road links trigger the following scoping criteria for:

- An annual average daily traffic (AADT) change of 1,000 or more; or
- A change in speed band; or
- A change in carriageway alignment by >=5mThere will be no changes in speed band or no change in carriageway alignment by >=5m due to the proposed development.

The road links on the ARN are presented in Appendix B1.

The project risk potential for each of these road links is low. The receiving environment sensitivity was determined to be low for the following reasons:

- There are few receptors located close to roads triggering traffic change criteria
- The baseline monitoring data illustrates concentrations in base year below an annual mean of 36µg/m³
- No AQMAs or EU limit value exceedances within project's study area.

Combining the project risk potential and the receiving environment sensitivity in the framework described in Table 9 indicates that a simple air quality assessment is required to consider the impacts on the ARN.

The results of the simple assessment are presented for each of the modelled receptors in proximity to the ARN in Section B2 of Appendix B. The magnitude of differences in predicted concentrations of NO_x, PM_{10} and NO_2 between the do-nothing scenarios in the opening and design year and the do-something scenario in the opening and design year form the basis to determine the significance of potential air quality impacts caused by traffic from the the proposed development at the operational stage. The predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic related to the proposed development in isolation and in combination with background are presented in:

- Table B.1 of Appendix B for the do-nothing scenario in the opening year
- Table B.2 of Appendix B for the do-something scenario in the opening year
- Table B.3 of Appendix B for the do-nothing scenario in the design year
- Table B.4 of Appendix B for the do-something scenario in the design year.

The magnitude of change in concentrations of PM_{10} and NO_x between the do-nothing and do-something scenario is presented in

- Table B.5 for the opening year
- Table B.6 for the design year.

The significance of the effects of the changes in concentrations of PM_{10} and NO_x between the do-nothing and do-something scenario is also presented in Table B.5 and Table B.6.

The results show:

- The modelled concentrations of NO_2 and PM_{10} due to traffic from the proposed development in the opening and design years in combination with relevant background concentrations are below the relevant air quality criteria at all modelled sensitive locations.

- The potential impact of additional traffic resulting from the proposed development on air quality at all modelled sensitive locations is imperceptible (less than 0.4 µg/m³ as an annual average concentration for NO_2 and PM_{10}).

8. CONCLUSIONS

Katestone was commissioned by O'Callaghan Moran on behalf of Starrus Eco Holdings to conduct an odour impact assessment of a materials recovery facility (MRF) and an air quality assessment of the traffic associated with a proposed development of a MRF located at Millennium Park, Ballycoolin, Dublin 11.

The MRF is operated by Starrus Eco Holdings according to the requirements of an Industrial Emissions License (IEL) to operate the MRF. The IEL was issued by the Environmental Protection Agency (EPA) (Licence registration number W0183-01). It states that the maximum quantity of waste to be accepted at the facility is 270,000 tonnes per annum.

The proposed development involves an increase in facility throughput to 450,000 tonnes/annum. Starrus Eco intends to apply to EPA for an amendment to the IEL to increase the maximum quantity of waste that can be accepted at the facility to 450,000 tonnes per annum. An Environmental Impact Assessment Report (EIAR) is required as supporting documentation for the application.

The odour impact assessment described in this report is underpinned by dispersion modelling assessments, which have been conducted in accordance with the Environment Protection Agency's (EPA) Air Guidance note for dispersion modelling (AG4). The assessment of impacts on air quality due to traffic associated with the expanded MRF is underpinned by the screening model described in the Design Manual for Roads and Bridges (DMRB) published by the UK Highways Agency.

As part of the proposed development, an odour control unit will be installed at the site with emissions exhausted through an 18 m stack.

The results of the odour impact assessment show that predicted concentrations **comply** with the odour criterion recommended by EPA for waste facilities of 1.5 ou_E/m^3 at all sensitive receptors included in the modelling assessment.

The results of the air quality impact assessment resulting from additional traffic show:

- The modelled concentrations of NO_2 and PM_{10} due to traffic from the proposed development in the opening and design years in combination with relevant background concentrations are below the relevant air quality criteria at all modelled sensitive locations.
- The potential impact of additional traffic resulting from the proposed development on air quality at all modelled sensitive locations is imperceptible (less than 0.4 $\mu g/m^3$ as an annual average concentration for NO_2 and PM_{10}).

9. REFERENCES

DEFRA, 2020, Emissions Factors Toolkit v10.1. User Guide. August 2020. https://laqm.defra.gov.uk/documents/EFTv10.1-user-guide-v1.0.pdf

EPA (2017) Guidelines on the information to be contained in environmental impact assessment reports Draft. August 2017. Environmental Protection Agency. An Ghníomhaireacht um Chaomhnú Comhshaoil PO Box 3000, Johnstown Castle, Co. Wexford, Ireland. http://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf

EPA (2020a) Air Quality in Ireland 2019 - Indicators of Air Quality. Environmental Protection Agency, An Ghníomhaireacht um Chaomhnú Comhshaoil, PO Box 3000, Johnstown Castle Estate, County Wexford, Ireland. https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2019.php

EPA (2020b) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4). Environmental Protection Agency, Johnstown Castle Estate, Wexford, Ireland. https://www.epa.ie/pubs/advice/air/emissions/AG4%20Guidance%20note%20for%20web.pdf

EPA (2021) Air Quality in Ireland 2020 - Indicators of Air Quality. Environmental Protection Agency, An Ghníomhaireacht um Chaomhnú Comhshaoil, PO Box 3000, Johnstown Castle Estate, County Wexford, Ireland. https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2020.php

EPA (2022) Air Quality in Ireland 2020 - Indicators of Air Quality. Environmental Protection Agency, An Ghníomhaireacht um Chaomhnú Comhshaoil, PO Box 3000, Johnstown Castle Estate, County Wexford, Ireland. https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2021.php

Highways England (2019) Design Manual for Roads and Bridges. Volume 11. Part 1. LA 105 Air Quality. Highways England Company Limited (formerly the Highways Agency), Guildford, United Kingdom. Available online: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol11/section3

Highways England (2021) Design Manual for Roads and Bridges index GG 000 29 September 2021. https://www.standardsforhighways.co.uk/prod/attachments/066b3135-59f4-4eb4-837a-7c43c6c6a790?inline=true

Highways Agency, 2021, Personal Communication.

USEPA (2022) User's Guide for the AERMOD Meteorological Preprocessor (AERMET). EPA-454/B-22-006. June 2022. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Quality Assessment Division Research Triangle Park, North Carolina. https://gaftp.epa.gov/Air/aqmg/SCRAM/models/met/aermet/aermet_userguide.pdf

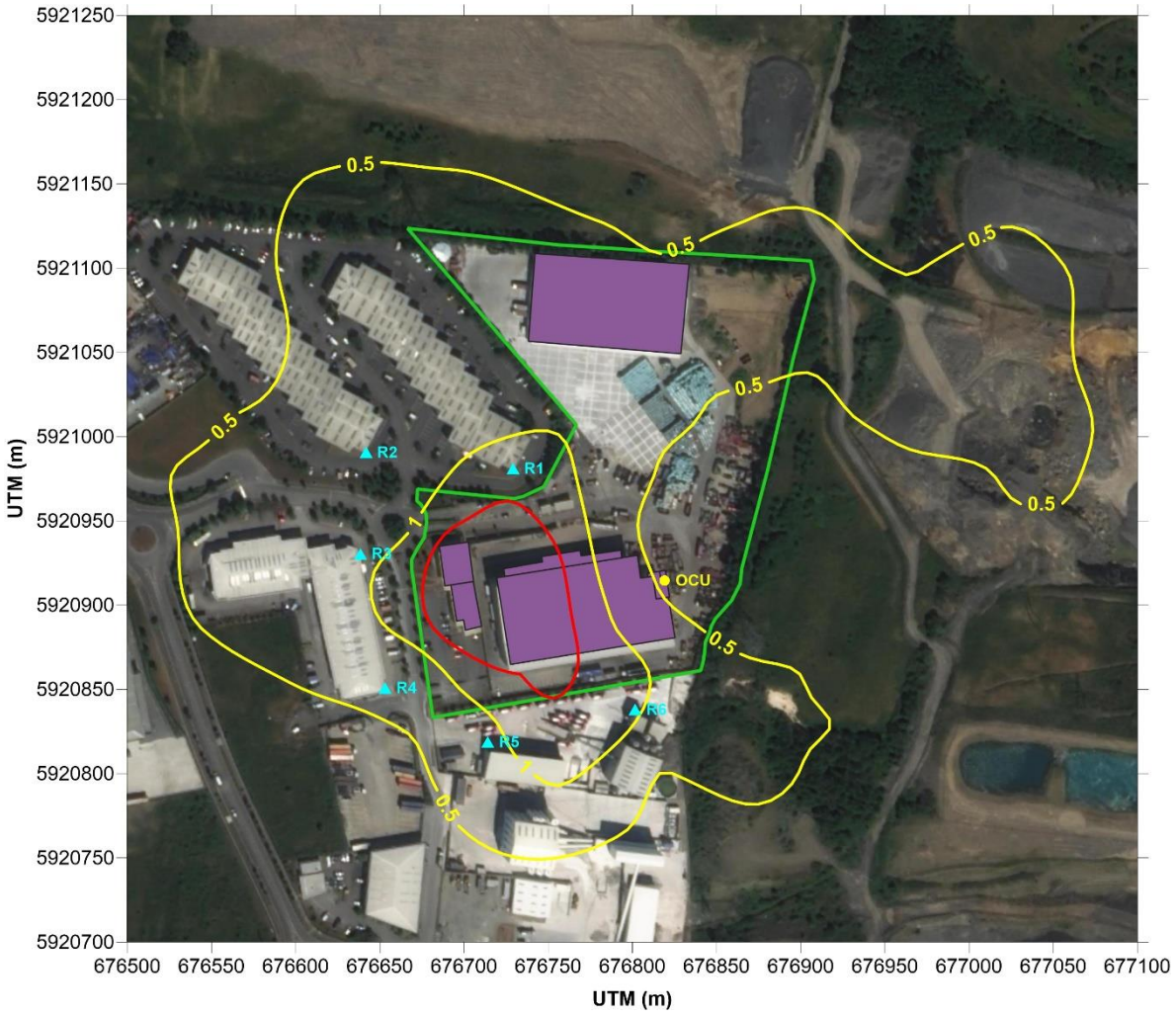


Plate 1	**Highest predicted annual average ground-level concentrations of odour of five modelled years due to the MRF**

Location: Millennium Park, Co. Dublin	**Averaging period:** 1-hour	**Data source:** AERMOD	**Units:** ou_E/m^3
Type: 98th percentile	**Criterion level:** 1.5 ou (Red Line)	**Prepared by:** M Fogarty	**Date:** Jan 2023

APPENDIX A METEOROLOGICAL MODELLING METHODOLOGY

A1 CALCULATION OF Z_0 AND THE ALBEDO AND BOWEN RATIO

According to the AERMET/AERMOD user guides, the Albedo and Bowen ratio should be determined from land use within a 10 km x 10 km rectangle centred on the meteorological station and roughness length, Z_0, should be determined based on land cover within a 1.0 km radius from the meteorological station. If the value of Z0varies significantly by direction, sector dependency should be used with sector width >= 30°. The meteorological data were recorded at Dublin Airport. Details of the meteorological station are listed in Table A.1.

Table A.1 Parameters describing the location of the meteorological station at Dublin Airport

Parameter	Value
Met. station name/identifier	Dublin Airport
Latitude (°)	53.428
Longitude (°)	-6.241
Easting (m)	683301
Northing (m)	5923429
UTM Zone	29 U
Altitude (m, AHD)	71

A1.1 Calculation of Z_0

From the aerial view in Figure A1, the land use within a 1 km radius is predominantly the airport with some cleared land (grassland) and industrial infrastructure (airport hangers, passenger terminals). The sector boundaries, land use, seasonal Z_0 values for each sector and individual sector weights are presented in Table A.2.

Table A.2 Sector boundaries and seasonal Z_o values

Sector	WDir-1	WDir-2	Summer	Autumn	Winter	Spring
A	29	94	0.112	0.112	0.112	0.112
B	94	138	0.070	0.070	0.070	0.070
C	138	225	0.083	0.027	0.009	0.059
D	225	276	0.070	0.070	0.070	0.070
E	276	306	0.082	0.030	0.011	0.061
F	306	338	0.173	0.130	0.097	0.159
G	338	29	0.070	0.070	0.070	0.070

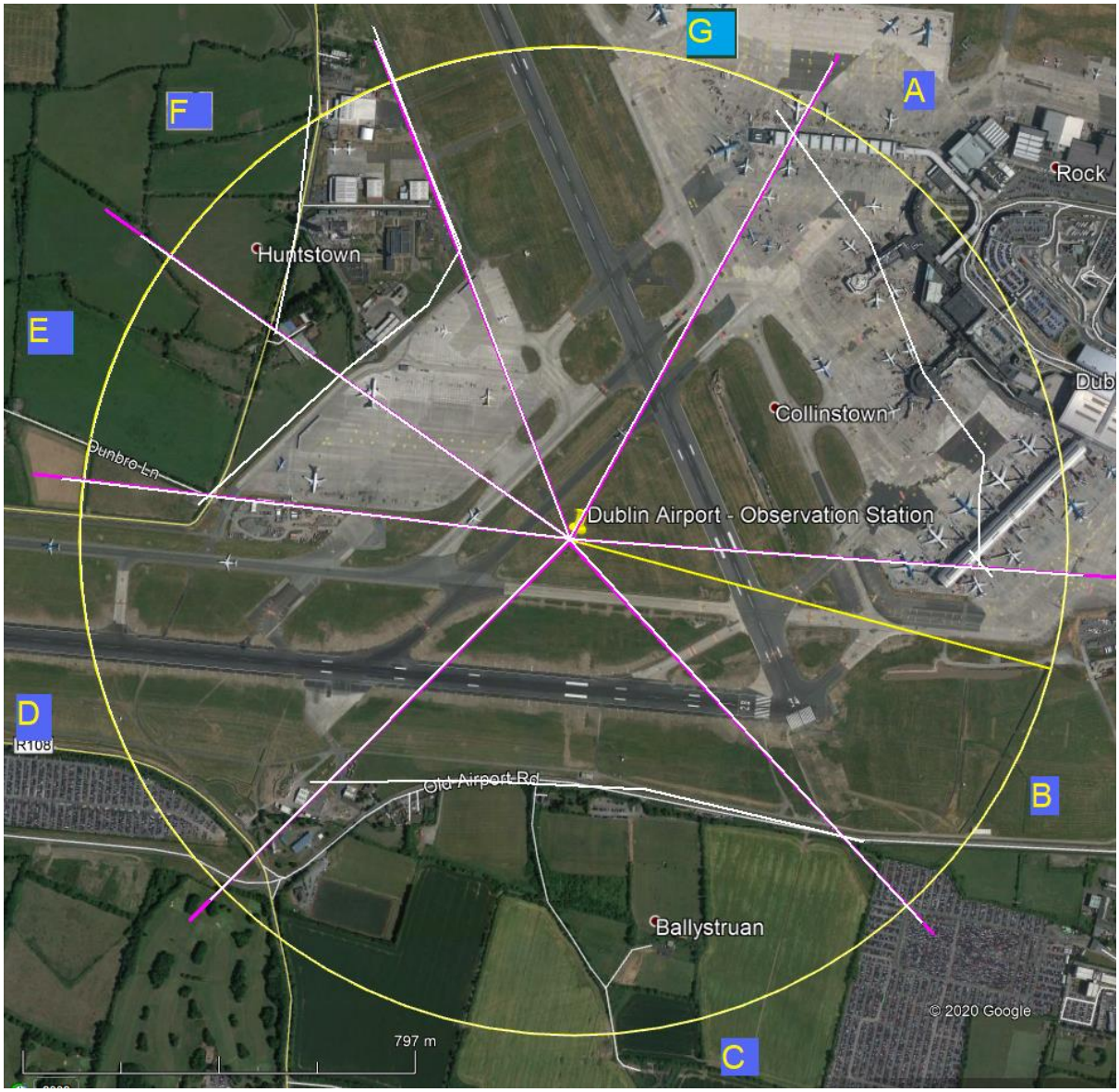


Figure A1 **Land use in the vicinity of the meteorological monitoring site at Dublin Airport**

A1.2 Calculation of Albedo and Bowen Ratio

These should be determined based on land cover within a 10km x 10km domain with no need for sector dependency. A weighted geometric mean should be used to determine the Bowen ratio and a weighted arithmetic mean for the albedo which is subsequently used to calculate the diurnal variation.

From the 10 km aerial view shown in Figure A2, it is evident that the main land use groups are low density residential, industrial/commercial and grass (cleared land). The land use fractions and seasonal Albedo and Bowen ratios are summarized in the Table A.3 and Table A.4.

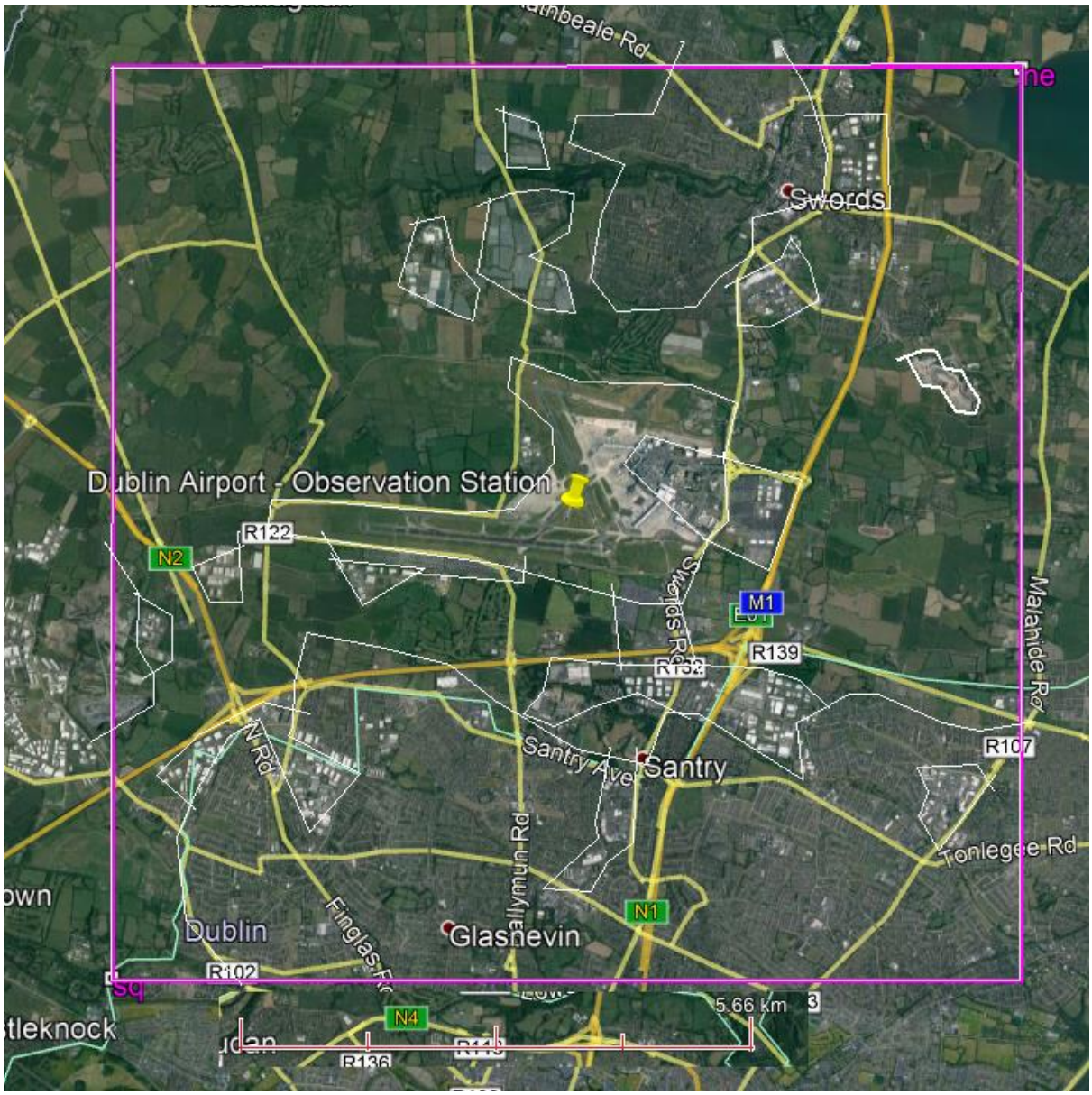


Figure A2 Land cover within a 10km x 10km domain of Dublin Airport monitoring location

Table A.3 Seasonal Albedo values

Land use	Fraction
Airports	0.062
Quarries/Strip mines, gravel	0.007
Low intensity residential	0.304
Industrial/commercial	0.088
Grassland	0.539

Table A.4 Seasonal Bowen Ratio values

Land use	Summer	Autumn	Winter	Spring
Albedo Arithmetic Weighted Average	0.174	0.174	0.191	0.174
Bowen Ratio Geometric Mean	0.883	1.066	1.066	0.608

APPENDIX B RESULTS OF THE AIR QUALITY ASSESSMENT OF ADDITIONAL TRAFFIC

B1 SCOPING ASSESSMENT

The scoping assessment was used to determine the road links that make up the ARN due to the additional traffic created by the proposed development.

The scoping assessment indicated that the following road links triggered the scoping criterion as the HDV AADT increased by more than 200 in the opening year (do-something scenario) compared to the opening year (do-nothing scenario):

- East of Greenstar Facility Road Junction
- South of Greenstar Facility Road Junction
- West of Greenstar Facility Road Junction
- North of Millennium Business Park - Cappagh Road Roundabout
- East of Millennium Business Park - Cappagh Road Roundabout
- South of Millennium Business Park - Cappagh Road Roundabout
- North of Huntstown Business Park - Cappagh Road Roundabout
- South of Huntstown Business Park - Cappagh Road Roundabout
- Northwest of Panda Facility Access Junction
- Southeast of Panda Facility Access Junction
- Cappagh Road South of Cappagh Road - Mitchelstown Road Roundabout
- North of Cappagh Road - Ballycoolin Road Roundabout.

The ARN includes the listed road links and 200 m along adjoining road links including:

- 200 m north of Greenstar Facility Road Junction
- 200 m north of Greenstar Facility Road Junction
- 200 m west of Huntstown Business Park - Cappagh Road Roundabout
- 200 m southeast of Panda Facility Access Junction
- 200 m southwest of Panda Facility Access Junction
- 200 m along Cappagh Road, north of Cappagh Road - Mitchelstown Road Roundabout
- 200 m along Kilshane Road, north of Cappagh Road - Mitchelstown Road Roundabout
- 200 m East of Cappagh Road - Mitchelstown Road Roundabout
- 200 m along Mitchelstown Road, west of Cappagh Road - Mitchelstown Road Roundabout
- 200 m east of Cappagh Road - Ballycoolin Road Roundabout
- 200 m south of Cappagh Road - Ballycoolin Road Roundabout
- 200 m west of Cappagh Road - Ballycoolin Road Roundabout.

The ARN is presented in Figure B.1.

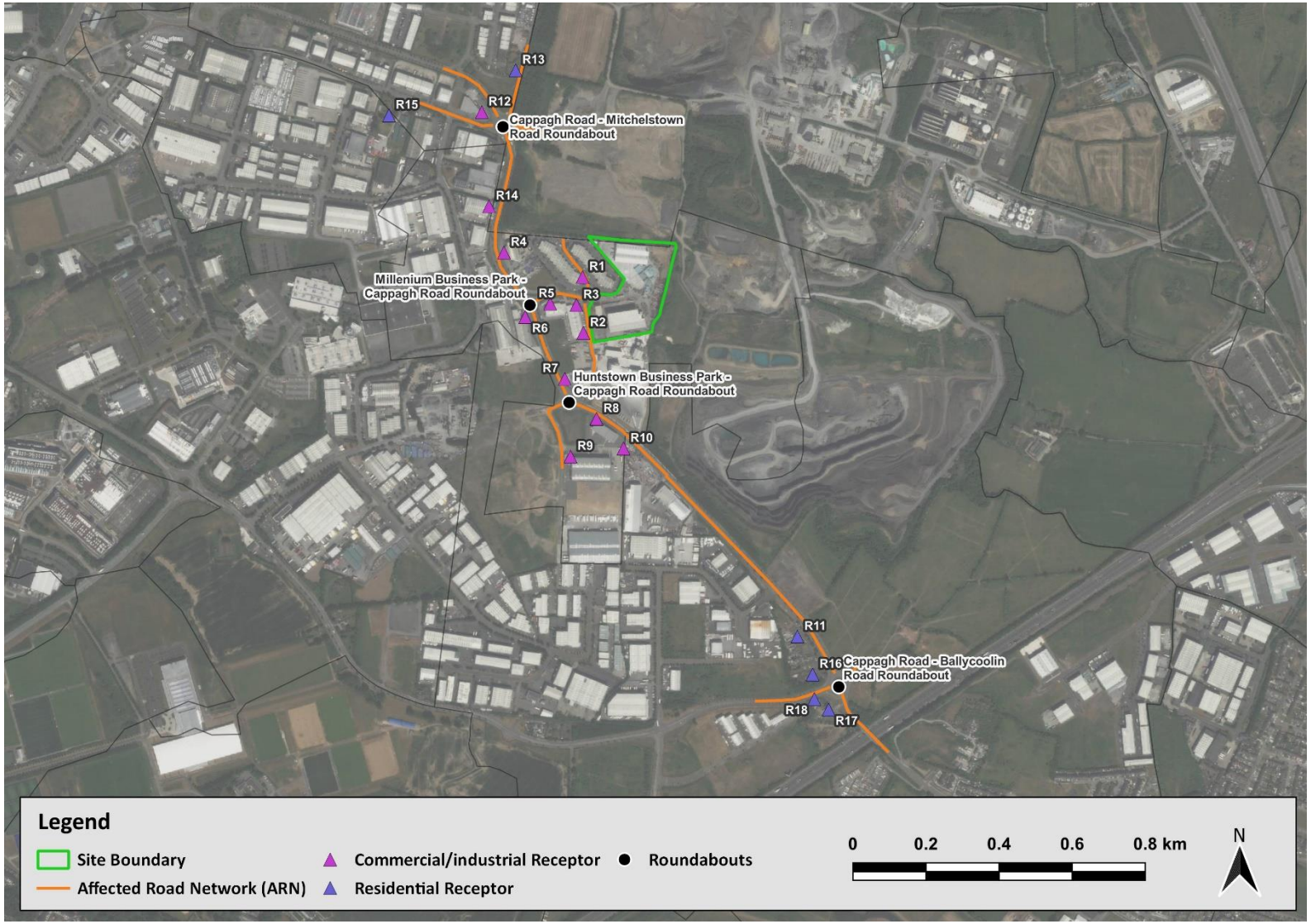


Figure B.1 The Affected Road Network (ARN) determined based on additional traffic resulting from the proposed development

B2 RESULTS OF THE TRAFFIC AIR QUALITY MODELLING ASSESSMENT

Table B.1 **The predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic associated with the proposed development in isolation and in combination with background for the do-something scenario in the opening year**

Receptor ID	Road Contribution			Background		Road + Background	
	NO_x	PM_{10}	NO_2	NO_2	PM_{10}	NO_2	PM_{10}
	µg/m³						
R1	0.9	0.2	0.4	31	19	31.4	19.2
R2	1.0	0.2	0.5	31	19	31.5	19.2
R3	1.8	0.4	0.9	31	19	31.9	19.4
R4	4.6	0.9	2.3	31	19	33.3	19.9
R5	2.1	0.4	1.1	31	19	32.1	19.4
R6	4.8	1.0	2.4	31	19	33.4	20.0
R7	4.8	1.0	2.4	31	19	33.4	20.0
R8	4.0	0.8	2.0	31	19	33.0	19.8
R9	0.4	0.1	0.2	31	19	31.2	19.1
R10	4.0	0.8	2.0	31	19	33.0	19.8
R11	1.6	0.3	0.8	31	19	31.8	19.3
R12	4.6	0.9	2.3	31	19	33.3	19.9
R13	5.1	1.0	2.5	31	19	33.5	20.0
R14	5.0	1.0	2.5	31	19	33.5	20.0
R15	2.4	0.5	1.2	31	19	32.2	19.5
R16	1.6	0.3	0.8	31	19	31.8	19.3
R17	1.9	0.4	1.0	31	19	32.0	19.4
R18	6.0	1.2	3.0	31	19	34.0	20.2

Table B.2 **The predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic associated with the proposed development in isolation and in combination with background for the do-nothing scenario in the design year (2039)**

Receptor ID	Road Contribution			Background		Road + Background	
	NO_x	PM_{10}	NO_2	NO_2	NO_x	PM_{10}	NO_2
	µg/m³						
R1	0.9	0.2	0.4	31	19	31.4	19.2
R2	1.0	0.2	0.5	31	19	31.5	19.2
R3	2.1	0.4	1.1	31	19	32.1	19.4
R4	4.8	1.0	2.4	31	19	33.4	20.0
R5	2.5	0.5	1.2	31	19	32.2	19.5
R6	5.0	1.0	2.4	31	19	33.4	20.0
R7	5.0	1.0	2.4	31	19	33.4	20.0
R8	4.1	0.8	2.0	31	19	33.0	19.8
R9	0.4	0.1	0.2	31	19	31.2	19.1
R10	4.1	0.8	2.0	31	19	33.0	19.8
R11	1.7	0.3	0.8	31	19	31.8	19.3
R12	4.7	1.0	2.3	31	19	33.3	20.0
R13	5.1	1.0	2.5	31	19	33.5	20.0
R14	5.2	1.1	2.6	31	19	33.6	20.1
R15	2.4	0.5	1.2	31	19	32.2	19.5
R16	1.7	0.3	0.8	31	19	31.8	19.3
R17	1.9	0.4	1.0	31	19	32.0	19.4
R18	6.1	1.2	3.0	31	19	34.0	20.2

Table B.3 The predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic associated with the proposed development in isolation and in combination with background for the do-something scenario in the design year (2039)

Receptor ID	Road Contribution			Background		Road + Background	
	NO_x	PM_{10}	NO_2	NO_2	NO_x	PM_{10}	NO_2
	µg/m³						
R1	0.5	0.2	0.3	31.0	19.0	31.3	19.2
R2	0.6	0.2	0.3	31.0	19.0	31.3	19.2
R3	1.1	0.4	0.5	31.0	19.0	31.5	19.4
R4	2.8	1.1	1.3	31.0	19.0	32.3	20.1
R5	1.3	0.5	0.6	31.0	19.0	31.6	19.5
R6	3.0	1.1	1.4	31.0	19.0	32.4	20.1
R7	3.0	1.1	1.4	31.0	19.0	32.4	20.1
R8	2.5	0.9	1.2	31.0	19.0	32.2	19.9
R9	0.3	0.1	0.1	31.0	19.0	31.1	19.1
R10	2.5	0.9	1.2	31.0	19.0	32.2	19.9
R11	1.0	0.4	0.5	31.0	19.0	31.5	19.4
R12	2.8	1.1	1.4	31.0	19.0	32.4	20.1
R13	3.1	1.2	1.5	31.0	19.0	32.5	20.2
R14	3.1	1.1	1.5	31.0	19.0	32.5	20.1
R15	1.5	0.5	0.7	31.0	19.0	31.7	19.5
R16	1.0	0.4	0.5	31.0	19.0	31.5	19.4
R17	1.2	0.4	0.6	31.0	19.0	31.6	19.4
R18	3.7	1.4	1.8	31.0	19.0	32.8	20.4

Table B.4 The predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic associated with the proposed development in isolation and in combination with background for the do-nothing scenario in the opening year

Receptor ID	Road Contribution			Background		Road + Background	
	NO_x	PM_{10}	NO_2	NO_2	NO_x	PM_{10}	NO_2
	µg/m³						
R1	0.5	0.2	0.3	31.0	19.0	31.3	19.2
R2	0.6	0.2	0.3	31.0	19.0	31.3	19.2
R3	1.3	0.5	0.6	31.0	19.0	31.6	19.5
R4	2.9	1.1	1.4	31.0	19.0	32.4	20.1
R5	1.5	0.6	0.7	31.0	19.0	31.7	19.6
R6	3.1	1.1	1.5	31.0	19.0	32.5	20.1
R7	3.0	1.1	1.4	31.0	19.0	32.4	20.1
R8	2.5	0.9	1.2	31.0	19.0	32.2	19.9
R9	0.3	0.1	0.1	31.0	19.0	31.1	19.1
R10	2.5	0.9	1.2	31.0	19.0	32.2	19.9
R11	1.0	0.4	0.5	31.0	19.0	31.5	19.4
R12	2.9	1.1	1.4	31.0	19.0	32.4	20.1
R13	3.2	1.2	1.5	31.0	19.0	32.5	20.2
R14	3.2	1.2	1.5	31.0	19.0	32.5	20.2
R15	1.5	0.6	0.7	31.0	19.0	31.7	19.6
R16	1.0	0.4	0.5	31.0	19.0	31.5	19.4
R17	1.2	0.4	0.6	31.0	19.0	31.6	19.4
R18	3.7	1.4	1.8	31.0	19.0	32.8	20.4

Table B.5 Difference in predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic associated with the proposed development in for the do-nothing and do-something scenario in the opening year and the significance of the changes

Receptor ID	NO_x	PM_{10}	NO_2	PM_{10}	NO_2
	µg/m³			Magnitude of Change	
R1	0.00	0.00	0.00	Imperceptible	Imperceptible
R2	0.00	0.00	0.00	Imperceptible	Imperceptible
R3	0.34	0.07	0.17	Imperceptible	Imperceptible
R4	0.23	0.05	0.12	Imperceptible	Imperceptible
R5	0.34	0.07	0.17	Imperceptible	Imperceptible
R6	0.14	0.03	0.06	Imperceptible	Imperceptible
R7	0.14	0.03	0.07	Imperceptible	Imperceptible
R8	0.12	0.02	0.05	Imperceptible	Imperceptible
R9	0.00	0.00	0.00	Imperceptible	Imperceptible
R10	0.12	0.02	0.06	Imperceptible	Imperceptible
R11	0.05	0.01	0.03	Imperceptible	Imperceptible
R12	0.12	0.02	0.05	Imperceptible	Imperceptible
R13	0.07	0.01	0.03	Imperceptible	Imperceptible
R14	0.23	0.05	0.11	Imperceptible	Imperceptible
R15	0.04	0.01	0.03	Imperceptible	Imperceptible
R16	0.05	0.01	0.03	Imperceptible	Imperceptible
R17	0.02	0.00	0.01	Imperceptible	Imperceptible
R18	0.04	0.01	0.02	Imperceptible	Imperceptible

Table B.6 Difference in predicted concentrations of NO_x, PM_{10} and NO_2 due to traffic associated with the proposed development in for the do-nothing and do-something scenario in the design year and the significance of the changes

Receptor ID	NO_x	PM_{10}	NO_2	PM_{10}	NO_2
	µg/m³			Magnitude of Change	
R1	0.00	0.00	0.00	Imperceptible	Imperceptible
R2	0.00	0.00	0.00	Imperceptible	Imperceptible
R3	0.18	0.07	0.08	Imperceptible	Imperceptible
R4	0.12	0.05	0.06	Imperceptible	Imperceptible
R5	0.18	0.07	0.09	Imperceptible	Imperceptible
R6	0.07	0.03	0.04	Imperceptible	Imperceptible
R7	0.07	0.03	0.03	Imperceptible	Imperceptible
R8	0.06	0.02	0.03	Imperceptible	Imperceptible
R9	0.00	0.00	0.00	Imperceptible	Imperceptible
R10	0.06	0.02	0.03	Imperceptible	Imperceptible
R11	0.03	0.01	0.01	Imperceptible	Imperceptible
R12	0.06	0.02	0.03	Imperceptible	Imperceptible
R13	0.04	0.01	0.02	Imperceptible	Imperceptible
R14	0.12	0.05	0.06	Imperceptible	Imperceptible
R15	0.02	0.01	0.01	Imperceptible	Imperceptible
R16	0.03	0.01	0.02	Imperceptible	Imperceptible
R17	0.01	0.00	0.01	Imperceptible	Imperceptible
R18	0.02	0.01	0.01	Imperceptible	Imperceptible

APPENDIX 10.1

TRAFFIC & TRANSPORT ASSESSMENT

Traffic and Transport Assessment

Prepared by: Laila Donadel

Engineering a Sustainable Future

Dublin | Cork | Galway | Mullingar | Donegal

o: +353 1 5242060 | e: info@ors.ie | w: www.ors.ie

Traffic and Transport Assessment

Proposed Waste Management Capacity Expansion, Millennium Business Park, Cappagh Road, Dublin 11

Document Control Sheet

Client:	Starrus Eco-Holdings Ltd (SEHL) trading as Greenstar
Document No:	211_066-ORS-XX-XX-RP-TR-13g-001

Revision	Status	Author:	Reviewed by:	Approved By:	Issue Date
P01	S2	LD	DJ	AP	06/12/2022
P02	S2	LD	AP	AP	23/02/2023

Contents

Executive Summary

ORS have been commissioned by Starrus Eco Holdings Ltd (SEHL) trading as Greenstar to carry out a Traffic and Transport Assessment (TTA) for the proposed waste management capacity expansion at its existing facility in Ballycoolin, Dublin 11. This document forms part of the planning application and should be read in conjunction with all drawings, reports, specifications, and particulars associated with the planning application.

This TTA will examine existing and proposed traffic conditions and transport activity to determine the effects on the surrounding road network by the proposed warehouse/logistics unit development.

The expansion involves increases in the quantity of waste processed annually at the facility, which will increase traffic to and from the facility but will not require any construction works with the exception of negative air infrastructure or extension to the site area.

Following consultation with Fingal County Council as part of a separate planning application which has since been permitted (ABP Ref. 310332), it was agreed that this study should assess the cumulative impacts of this development on Cappagh Road. Furthermore, this traffic study has been carried out to revise the modelling of the Cappagh Road / Mitchelstown Road Roundabout to take account of the inspector's report under ABP-310332-21 on the nearby Panda Waste planning permission. It was requested that the roundabout should be remodelled to take into account the latest traffic situation that the junction is and will experience following findings from historic 2019 traffic data.

Existing traffic data has been used to enable an accurate assessment of the current conditions and predicted future conditions on Cappagh Road. ORS validated previous traffic counts carried out in March 2020 pre-pandemic for the proposed Panda expansion, FCC planning application reference SID/01/21 & ABP 310332. Traffic counts were factored up by the Traffic Infrastructure Ireland (TII) growth rates to bring them in line with the expected growth in traffic over the years. Fresh automatic junction turning counts (JTC) were also carried out on Thursday the 10th of November 2022, a normal weekday during school term, at the Cappagh Road / Mitchelstown Road Roundabout.

The traffic profile likely to be generated by the proposed increase in capacity was obtained from the existing traffic entering and departing the premises based on the traffic counts obtained in March 2020. The trip rate was then split through the junction in proportion to the existing traffic flows measured on the traffic counts.

The junctions were tested using the Transport Infrastructure Ireland (TII) approved software Junctions 9 for the base year 2023, 5-year and 15-year future design scenarios. Appropriate TII Traffic Growth Factors for Co. Dublin were applied to the traffic flows to ensure that the future growth on the road network has been considered in the analysis.

The Fingal County Council planning website was consulted to include any proposed developments in the area that will affect the road network in the vicinity of the proposed development subject to current planning application or permission not yet enacted.

Following the results of the traffic analysis and the trip generation associated with the proposed increase in capacity, it was observed that the additional traffic along the 6No. junctions in the vicinity of the site will not have a detrimental effect on the capacity of the junctions. The Cappagh Road / Mitchelstown Road Roundabout (site 5) and Cappagh Road / Ballycoolin Road (site 6) will experience capacity issues and delays in the futures years, however, the increase in traffic from the site will account for a maximum 2% of the junction capacity and the inclusion of the proposed increase in tonnage is not the reason for the capacity issues.

1 Introduction

The purpose of this Traffic and Transport Assessment (TTA) is to address the traffic and transport related issues that may arise in relation to a proposal by Starrus Eco-Holdings Ltd (SEHL) trading as Greenstar to increase the annual waste handling throughput at its existing facility in Ballycoolin, Dublin 11. The proposal includes increasing the waste handled at their facility in Millennium Business Park from 270,000 tonnes to 450,000 tonnes per annum.

This report will follow the principles set out in the TII Publication PE-PDV-02045 'Traffic and Transport Assessment Guidelines' and will assess the impact the proposed warehouse, and the associated traffic flows, will have on the public road network in the vicinity of the site.

1.1 Objectives of this TTA

The objective of this report is to assess the impact the proposed increase in material handled by the facility will have on the surrounding road network, with the assessment focusing primarily on the Cappagh Road.

Following consultation with Fingal County Council, the following 6 junctions, shown in **Figure 1.1**, were selected for inclusion in this assessment:

- Site 1 – Roundabout access to the facility
- Site 2 – Millennium Business Park – Cappagh Road roundabout junction
- Site 3 – Huntstown Business Park – Cappagh Road roundabout junction
- Site 4 – Panda facility access road junction
- Site 5 – Cappagh Road – Mitchelstown Road roundabout junction
- Site 6 – Cappagh Road – Ballycoolin Road roundabout junction.

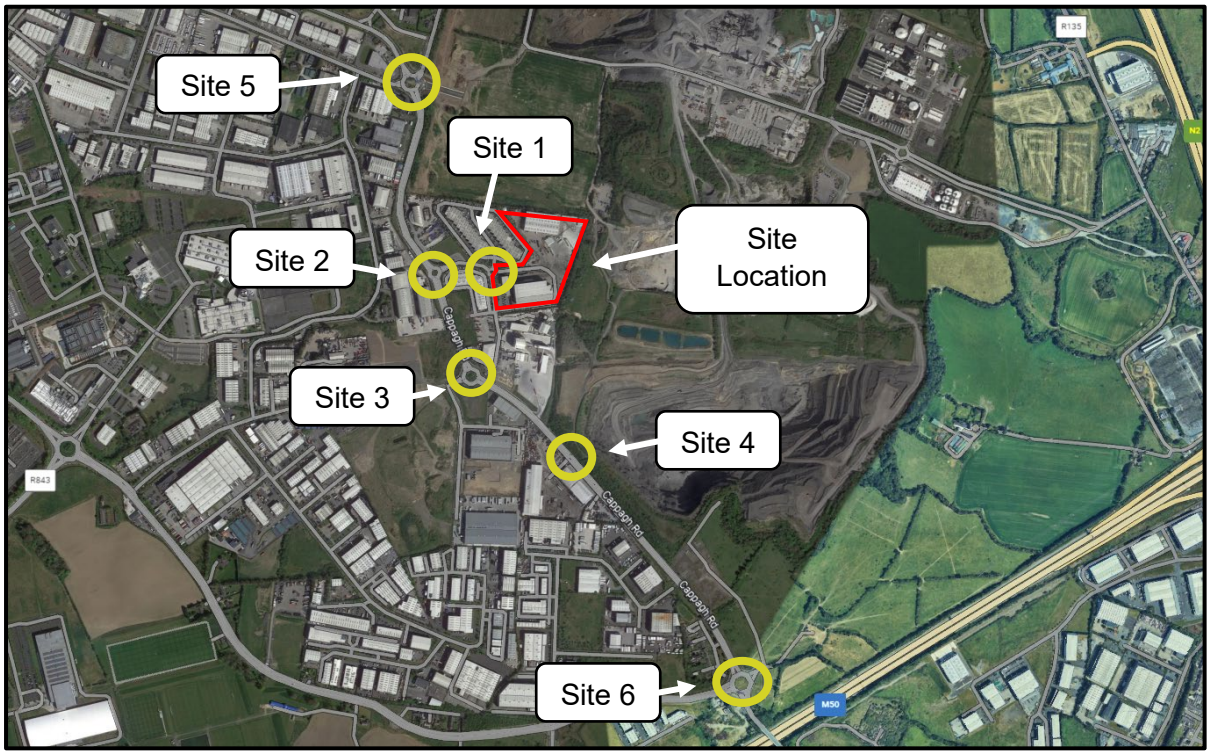


Figure 1.1: Location of the Junction Analysed (Source: Google Earth)

In summary, the objectives of this report are to assess:

- The prevailing traffic conditions on the public road network in the vicinity of the proposed development
- The potential effect on the surrounding road network due to the anticipated traffic generated by the proposed increase in capacity
- The pedestrian and cyclist connectivity in the vicinity of the site
- The parking requirements for the development.

1.2 Methodology

The TII Publication PE-PDV-02045 sets out the methodology to be followed in any given TTA. The methodology that will be used in this assessment follows the guidelines set in this document and can be outlined as follows:

- Traffic data used in this assessment were part of the panning application for the proposed increase in annual waste acceptance at Panda facility (Planning reference number SID/01/21 & SBP Ref. 310332). The 6No. locations traffic counts are from March 2020 pre-pandemic
- The historic traffic counts were factored up using appropriate TII Traffic Growth Factors for Co. Dublin and hence the use of this baseline date is considered acceptable
- Automatic junction turning counts (JTC) have been undertaken by IDASO on the 10th of November 2022 at the Cappagh Road / Mitchelstown Road roundabout, as requested in the inspector's report ABP-310332-21

- The traffic distribution splits on the public road network could be determined from the traffic counts and applied to the anticipated future generated traffic resulting from the proposed development.
- The predicted traffic to be generated by the facility was from the existing traffic entering and departing the premisses based on the traffic counts obtained.
- The effect the proposed development will have on the road network was assessed against the TII threshold and it was found that sites 1 & 2 fall above the TII threshold and site 3, 4, 5& 6 did not fall above the threshold of 5% increase in traffic. However, all junctions were subject of a capacity analysis.
- The junction was modelled using the TII approved software *Junctions 9* (ARCADY & PICADY) for future design years using Central Sensitivity Growth Factors for Co. Dublin to obtain the existing and proposed traffic profiles at the junctions analysed for the base year, 5-year and 15 years after the completion of the development.

1.3 Liaison with Fingal County Council and Review of An Bord Pleanala Inspector Report ABP-310332-21

ORS engaged with Fingal County Council, it was agreed that this study would focus on the cumulative impact of the proposed increase in tonnage at SEHL's Millennium Park facility along Cappagh Road, as described in Section 1.1.

Following the inspector's report ABP-310332-21, this traffic study has included updated review of the Cappagh Road / Mitchelstown Road Roundabout.

2 The Proposed Development

2.1 Development Site Location

The site is located in Millennium Business Park in Ballycoolin, Finglas and is bounded by other existing commercial units and by the internal Business Park roadway to the west and south, and by Huntstown Quarry east and north. The site is accessed via Cappagh Road and the internal Business Park roadway. **Figure 2.1** shows the proposed site location in the Ballycoolin context.

Figure 2.1: Site Location (Source: Google Earth)

2.2 Existing Premises and Land Use

According to the Fingal County Development Plan 2017 – 2023 zoning objectives map, shown in **Figure 2.2**, the site is zoned as GE – General Employment. Sites zoned GE are to 'provide opportunities for general enterprise and employment'.

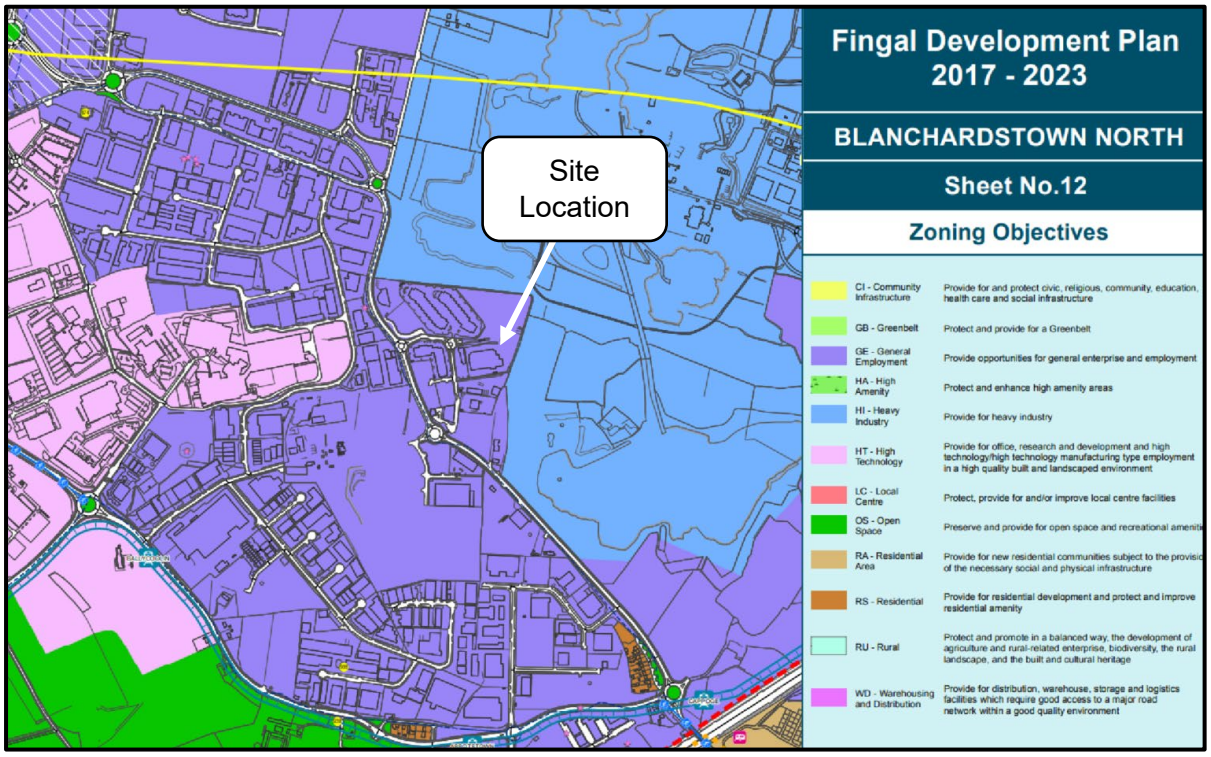


Figure 2.2: Blanchardstown North Zoning Objectives (Source: Fingal Development Plan 2017 - 2023)

2.3 Description of the Proposed Development

The proposal put forward by Starrus Eco Holdings Ltd (SEHL) trading as Greenstar is to increase the annual waste intake limit at the facility. The subject site is located in Ballycoolin, and it is approximately 2.5ha.

The facility aims to increase material handling from 270,000 tonnes per annum to 450,000 tonnes per annum.

The site is equipped to manage this increase without additional construction works; therefore, the main impact of the proposed development will be the increase in traffic with the exception of negative air infrastructure associated with transporting the additional materials to and from the existing facilities along the local road network.

2.4 Accessibility and Parking

Starrus Eco Holdings Ltd (SEHL) trading as Greenstar is located in Millennium Business Park in Ballycoolin, within the Dublin 15 enterprise zone in the Blanchardstown area. The area has a high pedestrian and cyclist connectivity, with footpaths and cycleways on both sides of the road flanked by grass verges and designated pedestrian crossing points connecting both sides of the road.

As can be noted in **Figure 2.1**, the site is situated to the west of the M50 motorway and to the south of the N2 national road which offers great connectivity to various locations in Dublin, within the county and across the country.

2.4.1 Site Access

All traffic associated with the facility travels along Cappagh Road, then turns into the business park access via the Millennium Park roundabout. Once within the park, traffic encounters an existing internal roundabout which traffic can take the 2nd or 3rd exit to access the site.

The HGV traffic solely accesses the site from the second exit where traffic will enter the site through a security gate gaining access to the site, storage, and circulation area. Within the site, all traffic follows the designated one-way system traffic management in place. Private vehicles can also benefit from the above entrance, however, the main access to the facility office is made through a priority T-junction to the southwest of the site, as indicated in **Figure 2.3** below.

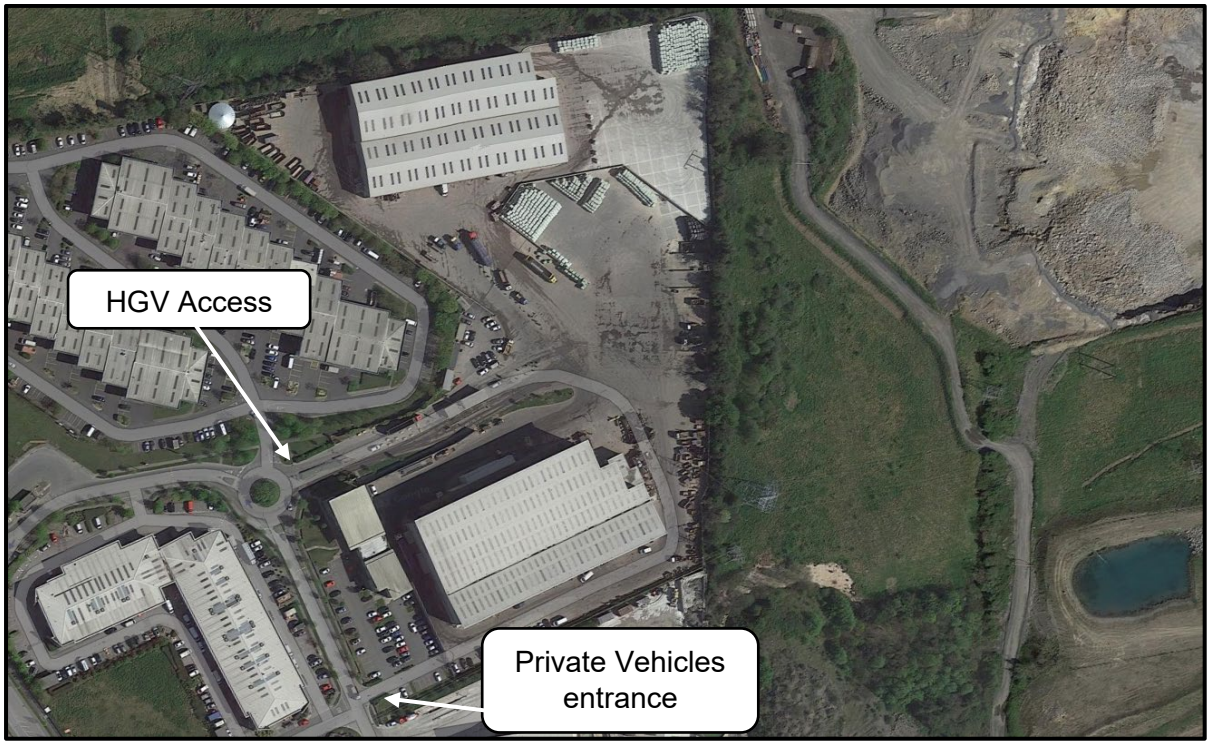


Figure 2.3: Arial view from the site (source: Google Earth)

2.4.2 Internal Road Layout

The main function of the internal road network is to provide a safe and efficient parking and circulatory system that reduces the potential for conflicting movements, which can comfortably accommodate the anticipated volume of arrivals and departures without presenting a safety risk and not having a negative effect on the road network that it connects to.

2.4.3 Servicing Arrangements

The internal road network is primarily designed to accommodate cars and HGVs, which are the main vehicle types that use the site. In addition, the site provides adequate provisions to facilitate the circulation and turning movements of emergency vehicles and bin collection vehicles.

The entrance of the facility is positioned in a way that facilitates minimal turning movements and provides appropriate visibility required.

3 Existing Conditions

3.1 Existing Road Network

All traffic associated with the facility travels along Cappagh Road which provides access to the entrance of the Millennium Business Park. The facility is accessed off an internal road within the business park, a two-way road of approximately 9 metres in width. The road speed limit within the park is 15km/h.

Cappagh Road is located to the west of the site and is a single-lane carriageway with 2-way traffic and has the provision of a central shared lane to facilitate right and left turning movements. The road speed limit is 50km/h.

Site 1 – Roundabout access to the facility is a 4-arm roundabout located within the Millennium Business Park measuring approximately 30 metres in width. All roads are single-lane carriageways. The western arm is the sole access road to the business park.

Site 2 – Millennium Business / Cappagh Road Roundabout is a 3-arm roundabout measuring circa 35m in width. The 2No. arms along Cappagh road have 2-entry lanes and a ghost island. The roundabout is the sole entrance to Millennium Business Park.

Site 3 – Huntstown Business Par / Cappagh Road roundabout is a 3-arm roundabout located to the southwest of the site. The roundabout is approximately 49 metres wide with all arms having the provision of 2-entry lanes and a ghost island.

Site 4 – Cappagh Road access to the Panda facility is a priority T-junction. Cappagh Road in the proximity of the junction has a central right-turning lane to accommodate right-hand turn movements and prevent blocking of straight-on traffic. Cappagh road is approximately 9.9 metres wide at this junction.

Site 5 – Cappagh Road / Mitchelstown Road Roundabout is a 5-arm roundabout with an oval shape measuring approximately 51m and 58m each extend. Four of the five arms have 2-entry lanes. The roundabout is located to the northwest and presently only 4No. arms are in active usage, the fifth one is under construction and will provide access to Huntstown Estate.

Site 6 – Cappagh Road / Ballycoolin Road Roundabout is a 4-arm roundabout measuring circa 58 metres in width, with the fourth arm under construction. The roundabout is located to the south of the site and provides access to Finglas west.

The roads included in this assessment are existing roads in active usage and are part of a wider area; as such, their condition and suitability for purpose are not subject to assessment as part of this report. For visual details, please refer to **Figures 3.1** to **3.7**.

Figure 3.1: View of the Road Network in the Vicinity of the Development (Source: Google Earth)

Figure 3.2: Site 1: Roundabout access to the facility (source: Google Maps Street View)

Figure 3.3: Site 2: Millennium Business Park – Cappagh Road roundabout (Source: Google Maps Street View)

Figure 3.4: Site 3: Huntstown Business Park – Cappagh Road roundabout (Source: Google Maps Street View)

Figure 3.5: Site 4: Cappagh Road access to Panda facility (Source: Google Maps Street View)

Figure 3.6: Site 5: Cappagh Road / Mitchelstown Road Roundabout (Source: Google Street View)

Figure 3.7: Site 6: Cappagh Road – Ballycoolin Road roundabout (Source: Google Street View)

3.2 Pedestrian and Cyclist Connectivity

The wider Blanchardstown 15 area is categorised as the largest commercial and residential centre within the metropolitan area of Fingal. Pedestrian and cyclist facilities are provided on all roads in the vicinity of the site and measure between 2-3 metres. The infrastructure is provided on both sides of the road, flanked by grass verges, to provide a buffer zone between pedestrians/cyclists and vehicles.

Figure 3.8 shows in dashed blue the existing cycling infrastructure in the environs of the site. As can be seen, the main roads near the site have the provision of cycle lanes.

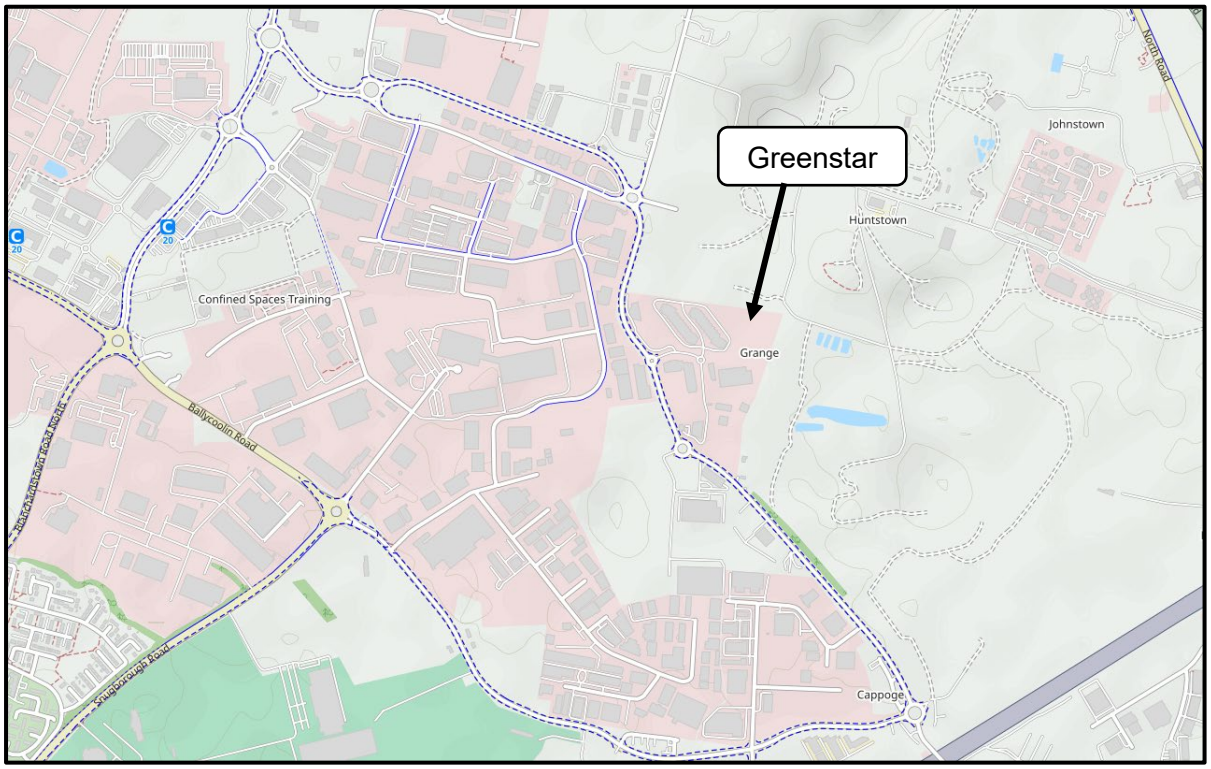


Figure 3.8: Existing Cycle Infrastructure (Source: OpenStreetMap.org)

3.3 Public Transport Provision

The closest bus stops are located within a 5-minute walking distance from facility, with routes to various locations across the Greater Dublin Area, as shown in **Figure 3.9. Table 3.1** summarises the routes and the weekday services of all services available near the site.

Regarding rail services, the closest train station to the site is the Castleknock station, approximately 6.9 km southwest of the site. The station offers the Dublin – Maynooth, Longford and M3 Parkway services, shown in navy in **Figure 3.10,** with a frequency of every 40 minutes during peak hours and every hour at non-peak times.

Figure 3.9: Bus Stops in the Vicinity of the Site (Source: TransporforIreland.ie)

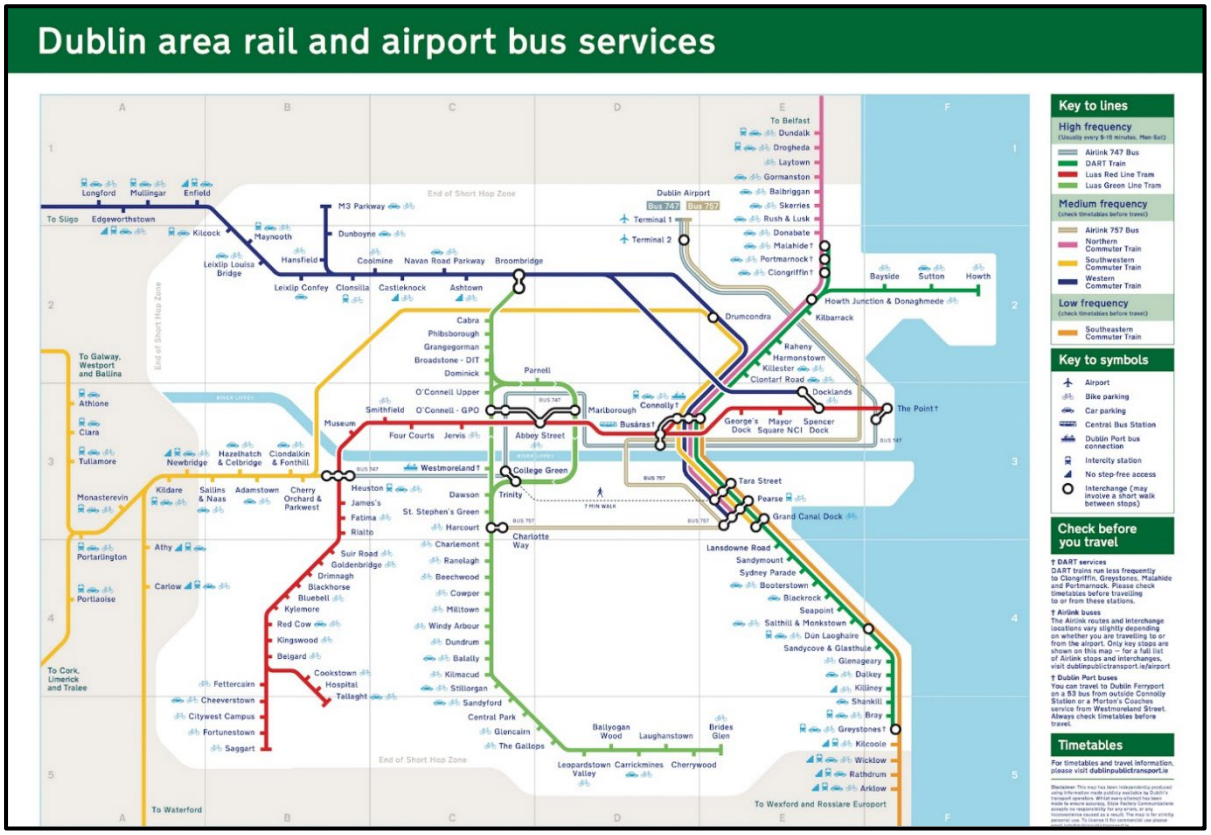


Figure 3.10: Existing Rail Network (Source: Irishrail.ie)

Table 3.1 – Bus Services Available (Source: TFI)			
Route No.	**Bus Operator**	**Direction**	**Weekday Services**
N4	Dublin Bus	Point Village – Blanchardstown Shopping Centre	24 hours bus – every 10mins (day) every 30min (night)
38/38A/38B		Burlington Road – Damastown Drive	Every 20/30 mins
38B			Only during AM peak hours
40D		Parnell Street – Tyrrelstown	Every 30 mins
40E		Broombridge Luas – Tyrrelstown	Every 30 mins
220	Go Ahead Ireland	DCU – Lady's Well Road	Every hour
236		Blanchardstown Shopping Centre - Damastown	Only during AM and PM peak hours
238		Tyrrelstown – Lady's Well Road	Every hour
802	Express Buss	O'Connell Street – Blanchardstown Corporate Park	Only during AM and PM peak hours

3.4 Proposed Transport Infrastructure

The Draft Fingal Development Plan 2023-2029 sets out in the objective CM02 the aim to *'work with the NTA to develop mode share targets for the County to achieve and monitor a transition to more sustainable modes including walking, cycling and public transport, during the lifetime of this Plan".* The document also advocates the need for designing roads to include cycle infrastructure thus, improving the attractiveness of this sustainable means of transportation.

SEHL is located within an area that is assigned a zoning objective of "General Employment" according to the Fingal Development Plan 2017-2023 (FDP). The development plan maintains

a high-level focus on the integration of land use, high quality and sustainable transport prioritising walking, cycling and public transport.

3.4.1 Proposed Pedestrian and Cyclist Infrastructure

The Draft Greater Dublin Area Cycle Network Plan, published in 2021, proposes to expand the urban cycle network to provide new connections between towns in the rural areas of the GDA. The network plan includes primary radial and secondary routes, shown in red and blue, respectively, in **Figure 3.11.** As part of the proposal, it is intended to integrate a cycle lane along Ballycoolin Road, to the south of the site, which is one of the main roads within the Blanchardstown Corporate area. The Draft FDP 2023-2029 documents as policy and objectives to support initiatives towards modal shits.

The new routes and enhancements, such as Tolka Valley Greenway and secondary routes represent an excellent opportunity to provide a safe and attractive cycle route linking the proposed development to the surroundings.

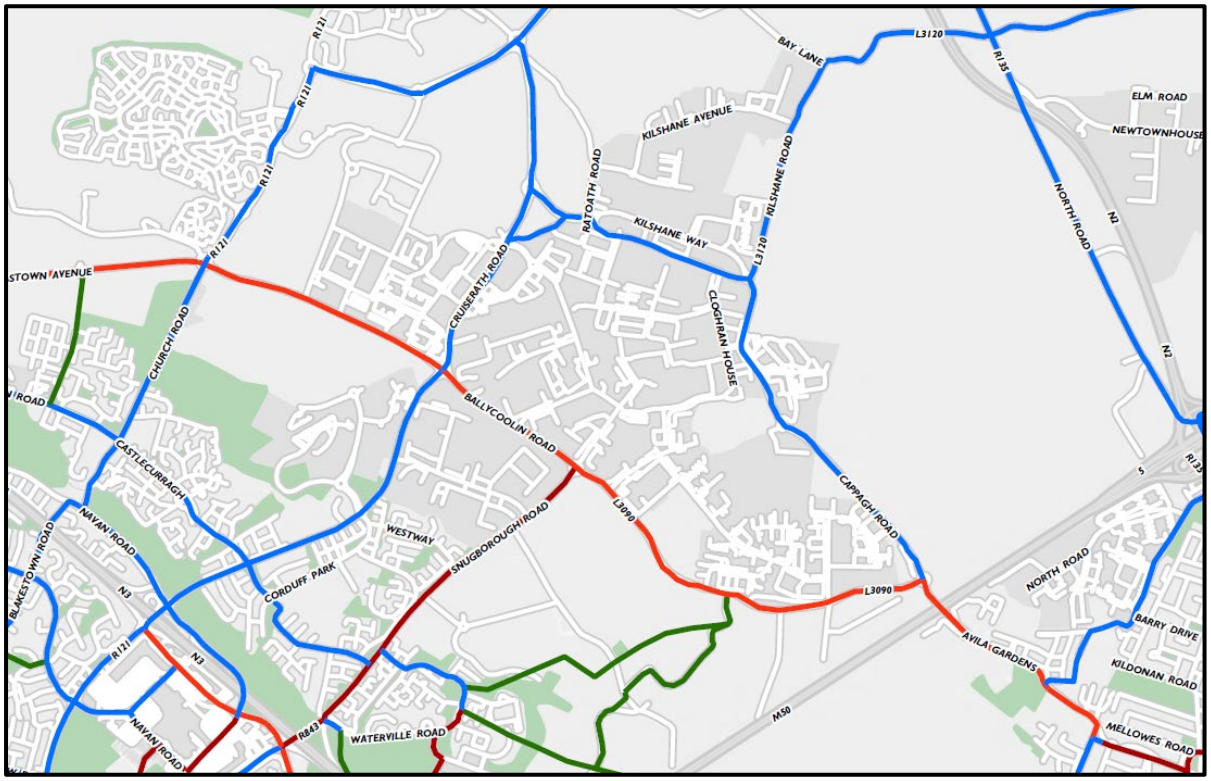


Figure 3.11: Blanchardstown Area Cycle Network (Source: NTA)

3.4.2 Proposed Public Transport Provision

BusConnects Dublin is a major investment programme to improve public transport. It aims to overhaul the current bus system in Dublin through a 10-year programme of integrated actions to deliver a more efficient, reliable, and better bus system for more people.

The BusConnects project aims to build a new network of bus corridors to make journeys faster and more reliable, create a new network of cycle lanes and redesign the Dublin Area bus network to provide a more efficient network with high-frequency spines, new orbital routes and increased services.

The proposed services for the Blanchardstown area are shown in **Figure 3.12.**

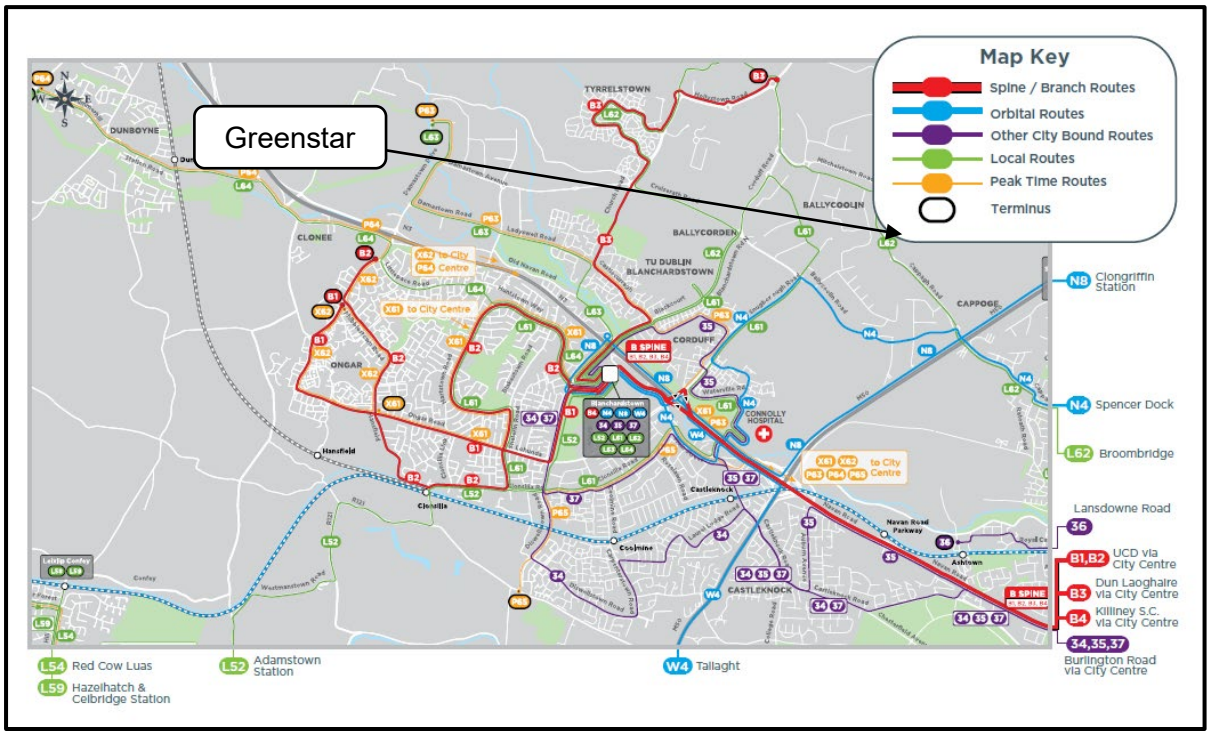


Figure 3.12: Dublin City Area bus routes under the proposed 'BusConnects' Programme (Source: Busconnects.ie)

The Greater Dublin Area Transport Strategy 2022 – 2024 outlines 2No. major proposals regarding rail transportation in the Greater Dublin Area, the MetroLink and DART+ West.

The proposed MetroLink will connect Swords to the Charlemont in 25 minutes and will have the capacity for 20,000 passengers per hour and will provide a key interchange with other transport modes at several locations. The project was submitted to planning application late 2022.

'DART+ West' has elected a preferred route and it is under public consultation. The project seeks to significantly increase rail capacity on the Maynooth and M3 Parkway to city centre rail corridors. The proposals aim to increase from 6No. trains per hour per direction to 12 trains per hour and the passenger capacity is due to increase from 5,000 to 13,200 passengers per hour when the project is concluded.

Figure 3.13 shows the existing and proposed rail services in the Greater Dublin Area.

Figure 3.13: Existing and Proposed Rail Network (Source: GDA Transport Strategy)

3.5 Existing Traffic Flows

As stated previously, this traffic assessment will make use of the traffic counts obtained in 11th of March 2020 pre-pandemic as part of the planning application REF: SID/01/21 and ABP Ref. 310332. The traffic counts were carried out during a 24-hours period and encompass all movements at the 6No. junctions described in **Section 1.1**.

From the traffic data, it could be observed that the morning peak period occur between 08:00 to 09:15 in the morning period and 16:45 to 17:45 in the evening period in sites 2, 3, 4 5 and 6, whereas in site 1 the morning peak occur between 11:45 to 12:45 and 12:45 to 13:30 in the PM peak. **Figures 3.14** and **3.15** show the traffic obtained at the junctions on the day of the counts during peak hours and **Table 3.2** summarises the AM and PM traffic flows.

Table 3.2 – March 2020 Traffic Counts		
Junction	**Peak Time**	
	AM	**PM**
Site 1	380.6	334.4
Site 2	930.5	1113.4
Site 3	759.6	883.4
Site 4	685.7	814.2
Site 5	1535	1776.7
Site 6	1566.4	1651.8

In addition, fresh traffic counts were undertaken at the Cappagh Road/ Mitchelstown Road Roundabout to enable the remodelling of the site 5 to account for the latest traffic scenarios along the roundabout. Junction turning counts (JTC) were then obtained on a Thursday the 10th of November 2022 by a third-party company named IDASO. The traffic counts were carried out during a 12-hour period from 07:00 AM to 07:00 PM and encompass all movements at the junctions. The traffic counts cover movements of pedal cycles, cars, taxis, buses, LGVs and HGVs and the final number of traffic is presented in Passenger Car Unit (PCU). PCU is the impact that a mode of transport has on traffic compared to a single car, e.g., a private car represents 1 PCU whereas an HGV represents 2.3 PCUs.

From the traffic counts obtained in 2022, it could be observed that the morning peak period occur between 07:30 to 08:30 in the morning period and 16:15 to 17:15 in the evening period. The maximum PCU observed in the AM peak was 1776.6 and in the PM, the peak was 1646.4.

Table 3.3 – November 2022 Traffic Counts		
Junction	**Peak Time**	
	07:30 – 08:30	**16:15 – 17:15**
Ste 5 - Cappagh Road / Mitchelstown Road Roundabout	1776.6	1646.4

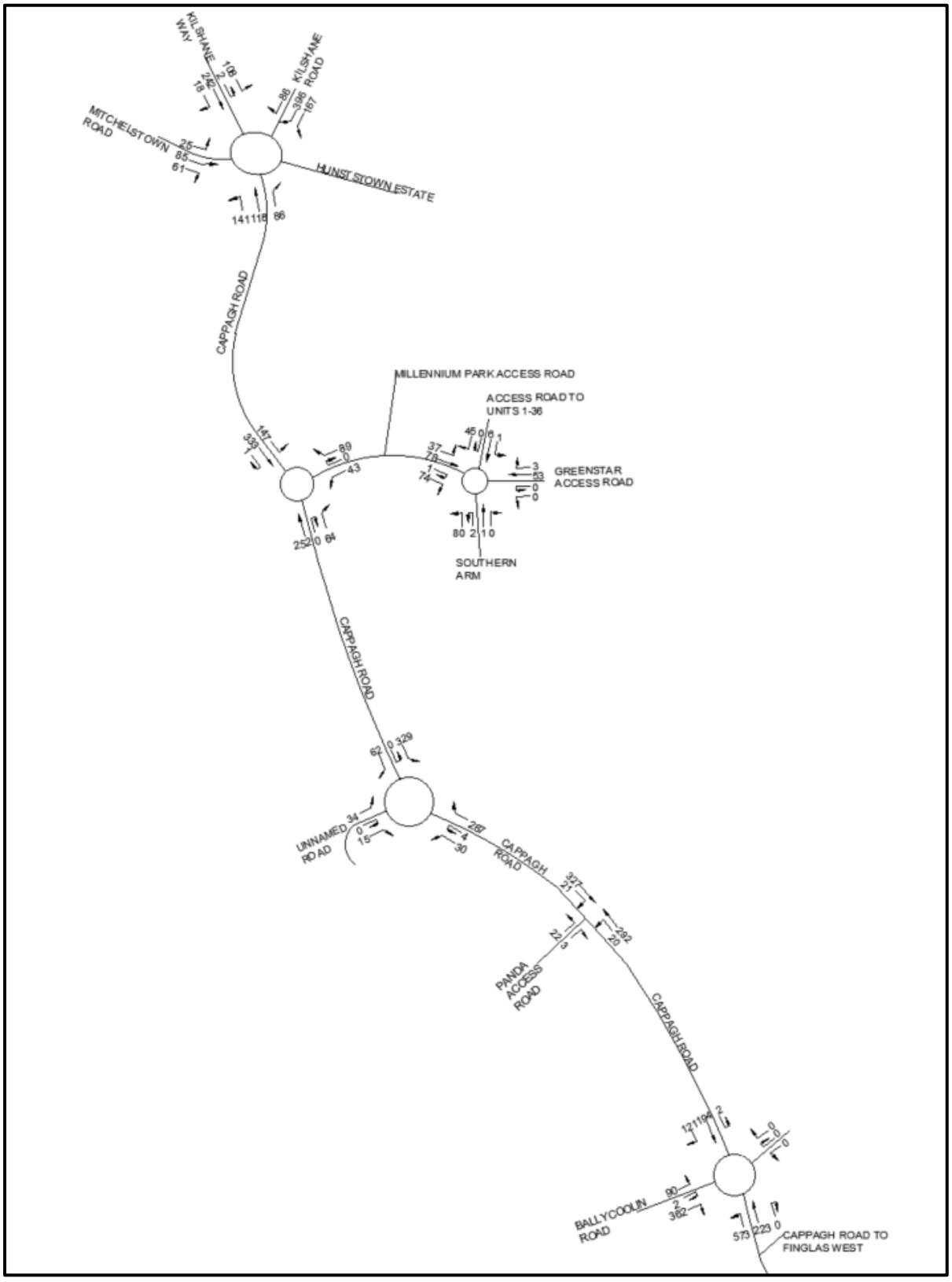


Figure 3.14: AM March 2020 Traffic Flows

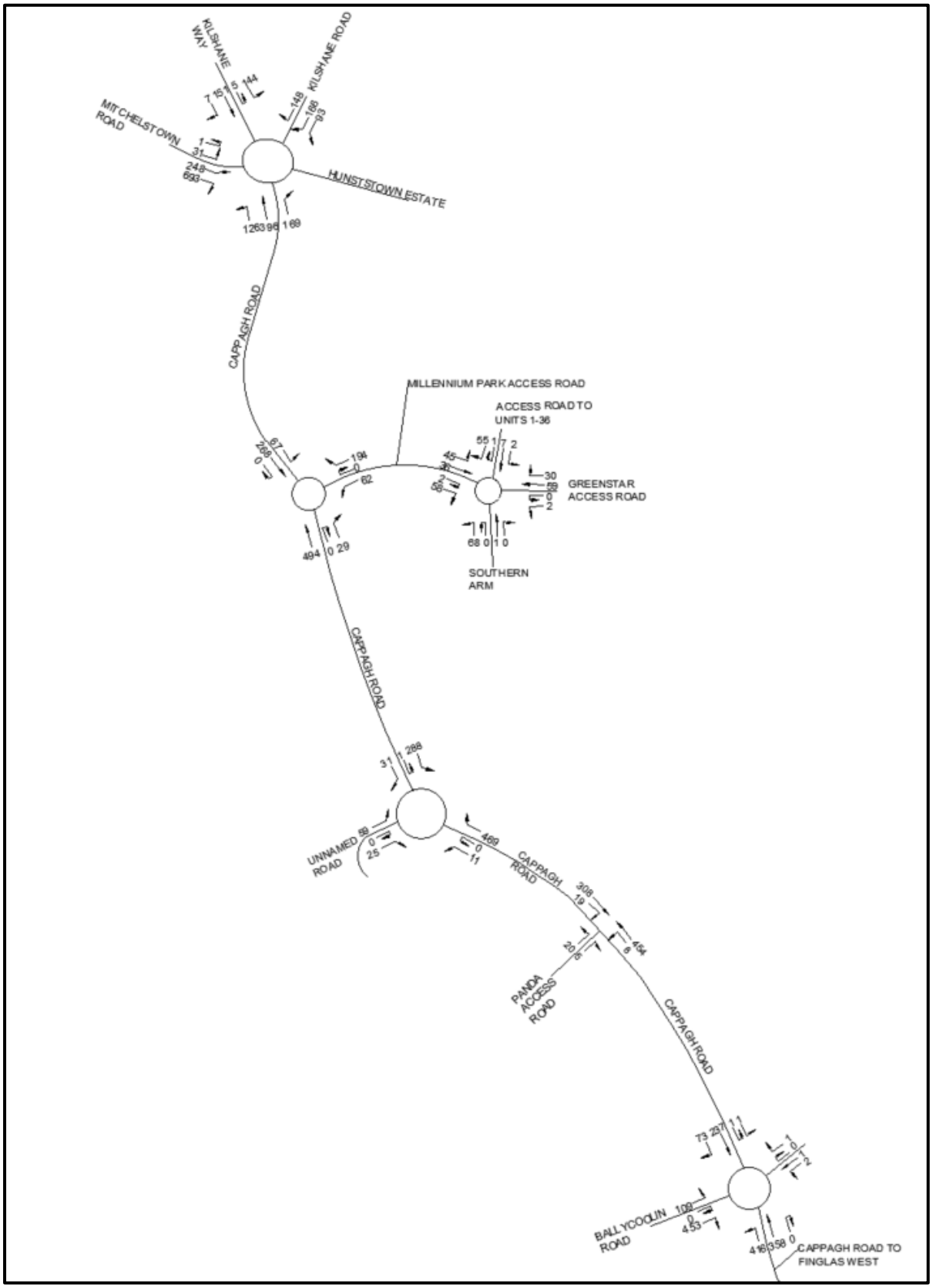


Figure 3.15: PM March 2020 Traffic Flows

3.6 Seasonal Adjustment

As stated previously, automatic traffic counts were undertaken in March 2020 and November 2022. Predicted traffic data from 2020 were assessed against 2022 traffic counts to make any necessary adjustments to the traffic counts obtained, to account for seasonal discrepancies along the road network in the vicinity of the site.

Traffic data at site 5 - Cappagh Road / Mitchelstown Road Roundabout was obtained for the year of 2020 and 2022, prior to and after the COVID-19 pandemic. It was found that the traffic data in 2022 is higher than the predicted 2022 traffic from 2020 figures in the AM peak, therefore, an adjustment factor of 1.11 will be applied to the traffic count data to ensure the data obtained will represent a worst-case scenario in the analysis.

For the remodelling of site 5, an adjustment factor of 1.1 will be applied to the 2022 traffic counts to account for the lower traffic flows than predicted 2022 traffic.

Table 3.2 – Comparative Data

Site Location	2020 Traffic counts	Predicted 2022	2022 Traffic Counts	Comparison
AM	1535	1586	1776.6	11% below 2022 traffic counts
PM	1776.7	1835	1646.4	10% below 2022 projected

3.7 Traffic Collisions Data in the Vicinity of the Site

Data on road collisions near the existing development is outlined in **Figure 3.16**. As can be observed, no incidents of any kind have been recorded in the vicinity.

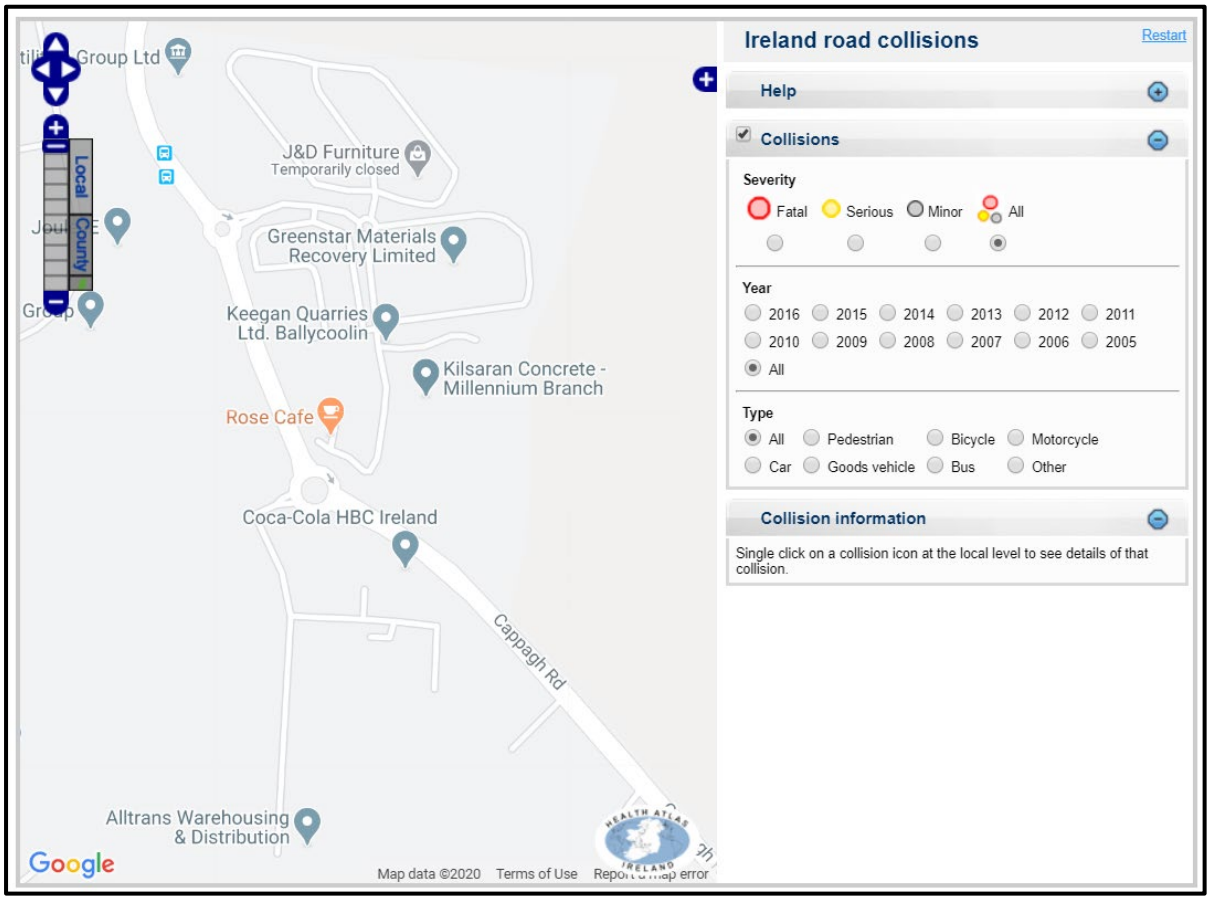


Figure 3.16: Road Collision Data in the Vicinity of the Proposed Development (Source: RSA.ie)

4 Trip Generation, Distribution, and Impact on the Road Network

In order to obtain a trip rate for the proposed development following expansion, the existing traffic entering and departing the premises was assessed based on the traffic counts obtained, and additional traffic was calculated based on comparison of expanded waste volumes versus current waste volumes.

No growth factor was applied on top of 2020 traffic counts as traffic to and from Starrus Eco Holdings Limited (SEHL) trading as Greenstar is established. The extracted portion of the traffic data accounts for traffic to and from the facility and it did not follow the growth expected in the road network.

4.1 Traffic Generation and Distribution Slips

As aforementioned ORS validated traffic counts part of the planning application SID/01/21 & ABP Ref. 310332, with traffic counts carried out in 6No. junctions in March 2020. The site access road junction was one of the 6No. locations. Traffic data at this junction enable the assessment of entering and departing traffic flows from the site.

To determine the worst-case scenario for traffic generation for the site expansion, the existing traffic counts were reviewed, and hourly traffic peaks identified. Morning peak occurred between 8am and 9:15am with the evening peak recorded to be between 4:45pm and 5:45pm.

At site 1, the total traffic through the access roundabout over 24 hours was 3883 PCU, with 587 PCU arriving at the site and 603 PCU departing. Peak hourly traffic occurred between 11:45 and 12:45pm, with 381 PCU recorded through the roundabout and 135 PCU recorded travelling to and from development. However, traffic to and from the facilty between 8:15am and 9:15am was lower, at 86 PCU, while between 4:45pm and 5:45pm this figure fell to 57 PCU, as shown in **Table 4.1** below.

Additional traffic due to the expansion was calculated based on existing traffic figures multiplied by 0.67, since this facility will be expanded from 270,000 tonnes to 450,000 tonnes per annum, an increase of 67%, as illustrated in **Table 4.1** below. This traffic was split through other junctions as per existing traffic splits at these junctions.

Table 4.1 – March 2020 Traffic Counts at Facility Access Junction							
Time Range	Existing traffic				Expansion traffic		
	Total PCU	Departure	Arrivals	Total PCU	Departures	Arrival	Total PCU
00 to 01	1.5	0	0	0	0	0	0
01 to 02	1.5	0	1.5	1.5	0	1	1
02 to 03	19	8	6	14	5.4	4	9.4
03 to 04	12.1	5.3	4.8	10.1	3.6	3.2	6.8
04 to 05	34.8	9.1	4.8	13.9	6.1	3.2	9.3
05 to 06	79	18.8	17.8	36.6	12.6	11.9	24.5
06 to 07	204.5	38.2	41.5	79.7	25.6	27.8	53.4
07 to 08	204.7	46.6	30.9	77.5	31.2	20.7	51.9
08 to 09	286	36	59.1	95.1	24.1	39.6	63.7
09 to 10	301.2	48	39.1	87.1	32.2	26.2	58.4
10 to 11	320	59.5	60.4	119.9	39.9	40.5	80.3
11 to 12	291.7	47.9	52.1	100	32.1	34.9	67
12 to 13	323	48.4	72.9	121.3	32.4	48.8	81.3
13 to 14	265.4	64.8	30.5	95.3	43.4	20.4	63.9
14 to 15	268.4	62.2	57.9	120.1	41.7	38.8	80.5
15 to 16	250	31.8	42.8	74.6	21.3	28.7	50
16 to 17	202.4	33.4	34.2	67.6	22.4	22.9	45.3
17 to 18	164.6	26.1	19.2	45.6	17.5	13.1	30.6
18 to 19	70.6	8.6	9.5	18.1	5.8	6.4	12.1
19 to 20	42.5	6.9	4.6	11.5	4.6	3.1	7.7
20 to 21	10.2	2	3	5	1.3	2	3.4
21 to 22	4.5	1	0	1	0.7	0	0.7
22 to 23	6.3	0	0	0	0	0	0
23 to 00	6.9	0	0	0	0	0	0

4.1.1 Total Traffic Generated from the Site

Based on the traffic count obtained from planning application SID/01/21 & ABP Ref. 310332 and the traffic splits established from traffic flows, the traffic to and from Greenstar is shown in **Table 4.2** below.

Table 4.2 – Expected Trip Rates from the Proposed Expansion			
Time Range	Arrivals	Departures	Total
08:00-09:00	40	24	64
16:00-17:00	18	13	31

4.2 Cumulative Impact

As part of this Traffic Assessment, to assess the existing and expected traffic along the road network in the vicinity of the facility, the Fingal County Council planning website was consulted to include all committed developments in the area.

According to the Fingal County Council planning website, there are 11No. committed developments in the vicinity of the site, as described in **Table 4.3**. As the developments mentioned below are still under planning process or under construction, the proposed traffic profile to be generated were not contained in the traffic counts. Therefore, this Traffic Assessment has included the expected traffic flows in the future year scenarios in the junction modelling to ensure a robust assessment of the future condition of the road network.

Table 4.3 – Committed Developments Adjacent to the Site				
Planning Reference	**Decision Type**	**Description**	**Traffic Generation**	
			AM	**PM**
FW20A/0149	Granted Permission	Construction of a warehouse/light industrial unit at Unit 736	56	46
FW21A/0111	Granted Permission	Permission for a HGV Parking and Tanker Washing Facility	31	32
FW18A/0194	Granted Permission	The construction of 4 no. light industrial units with ancillary offices totalling 1,881m²	8	6
FW17A/0152 / FW17A/0012	Granted Permission	Increase in permitted intake and construction of a fifth arm at Cappagh Road / Mitchelstown Road	143	143
SID/01/21	Approved By An Bord Pleanala	Proposed to increase the annual waste acceptance rate from 250,000 tonnes to 450,000 tonnes at Panda facility	51	41
FW20A/0190 FW21A/0112	Granted Permission	Construction of a warehouse distribution facility building at Unit 638	49	58
FW21A/0146 FW22A/0142	Granted Permission	Construction of 1No. warehouse/logistics unit at Site A (Unit 900)	48	41
FW20A/0102	Granted Permission	Construction of a warehouse/light industrial unit at Unit 637	68	81
FW22A/0038	Granted Permission	Construction of a Warehouse/Logistics unit at Plot 3	58	45
FW22A/0066	Granted Permission	Construction of a high technology manufacturing unit at Site A (Unit 901)	98	102
FW22A/0156	Application Registered	Construction of 6No. warehouses/logistics units at Mooretown	119	117

4.3 Future Year Traffic Growth

Transport Infrastructure Ireland (TII) issues a range of forecasts: low growth, central growth and high growth. The implementation of policies relating to the National Sustainable Mobility Policy will act as a deterrent to high growth in car-based travel. Low growth factors are however likely to be equally unrealistic at present, therefore, this assessment has used central growth factors, which was extracted from the TII Publication PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, published in October 2021, outlined in **Tables 4.4** to **4.7** below.

The data used is for the Dublin Metropolitan Area from 2016 to 2050 and is for light goods vehicles (LGV) and heavy goods vehicles (HGV).

Table 4.4 – Development Location Information

Location of Development	Dublin
Sensitivity Area	Central
Year of Traffic Counts	2020
Year of Assessment	2023
Year of Development Construction	2025

Table 4.5 – TII Annual Growth Rates (Central Growth) For Co. Dublin

Year	LGV	HGV
2016 – 2030	1.0162	1.0295
2030 – 2040	1.0051	1.0136
2040 – 2050	1.0044	1.0162

Table 4.6 – Growth Factors for Future Design Years

	Counts 2020	Year of Assessment 2023	Assumed year of completion 2025	Completion +5	Completion +10
LGV	1.00	1.049	1.084	1.174	1.236
HGV	1.00	1.091	1.156	1.337	1.468

Table 4.7 – Growth Factors for Future Design Years

	Counts 2022	Year of Assessment 2023	Assumed year of completion 2025	Completion +5	Completion +10
LGV	1.00	1.016	1.049	1.137	1.197
HGV	1.00	1.030	1.091	1.262	1.385

4.4 Traffic Impact Assessment

Based on traffic counts obtained at the roundabout, the travel distribution could be established, and the traffic generated by the increase in the annual waste handling throughput at the existing facility will follow the same trend.

As the proposed expansion is expected to be fully operational in 2025, the projected 2025 traffic flows could be calculated using TII's Central Growth Factor for Co. Dublin. Based on the traffic levels expected for 2025, the committed developments in the area and the predicted traffic to and from the site, the impact on the junction could be determined, as shown in **Table 4.9**. **Figures 4.1** to **4.4** show the proportion and the traffic associated with the site during the AM and PM periods.

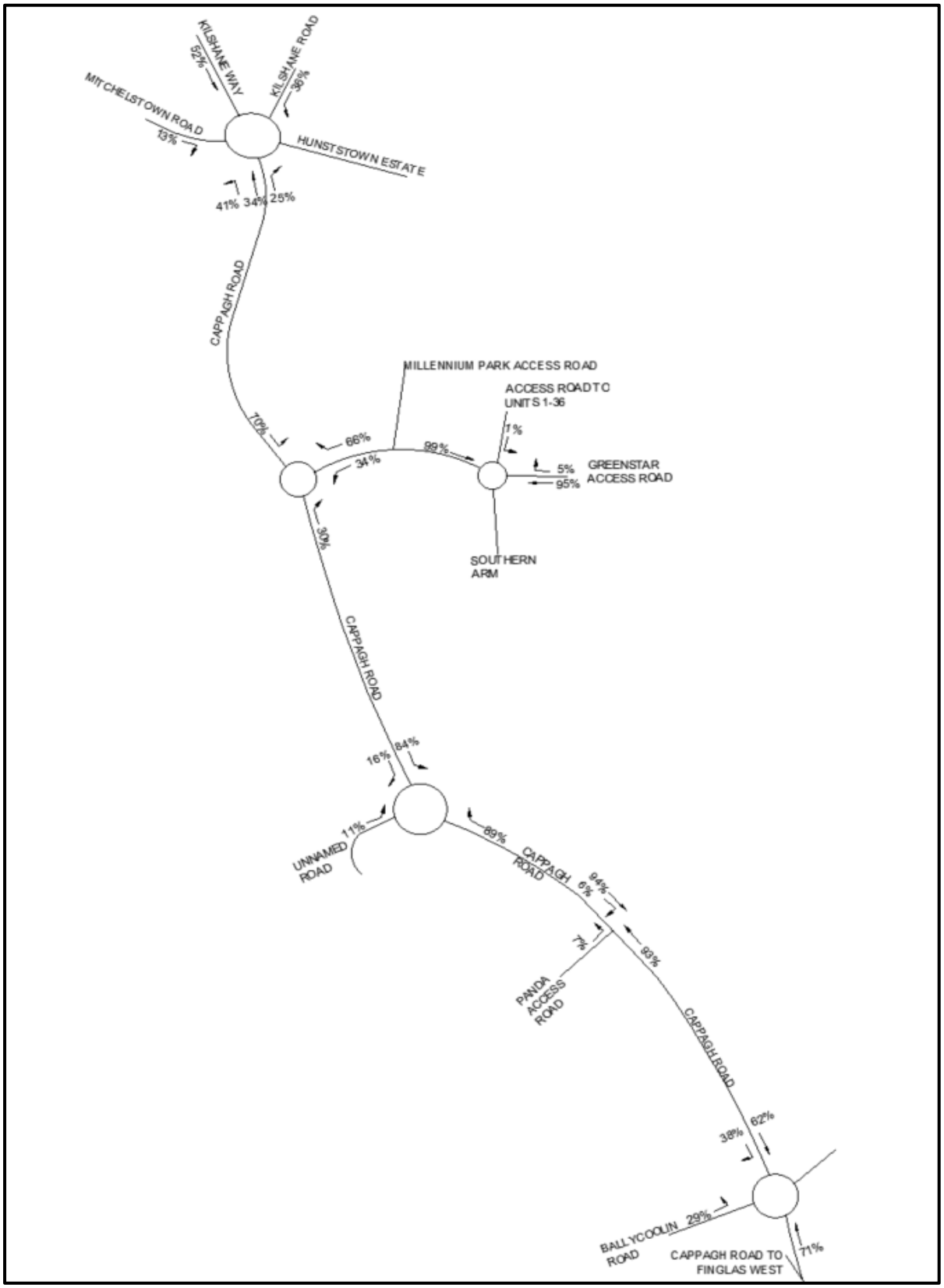


Figure 4.1: Proportion of Traffic Splits at the Junctions Analysed for AM peak

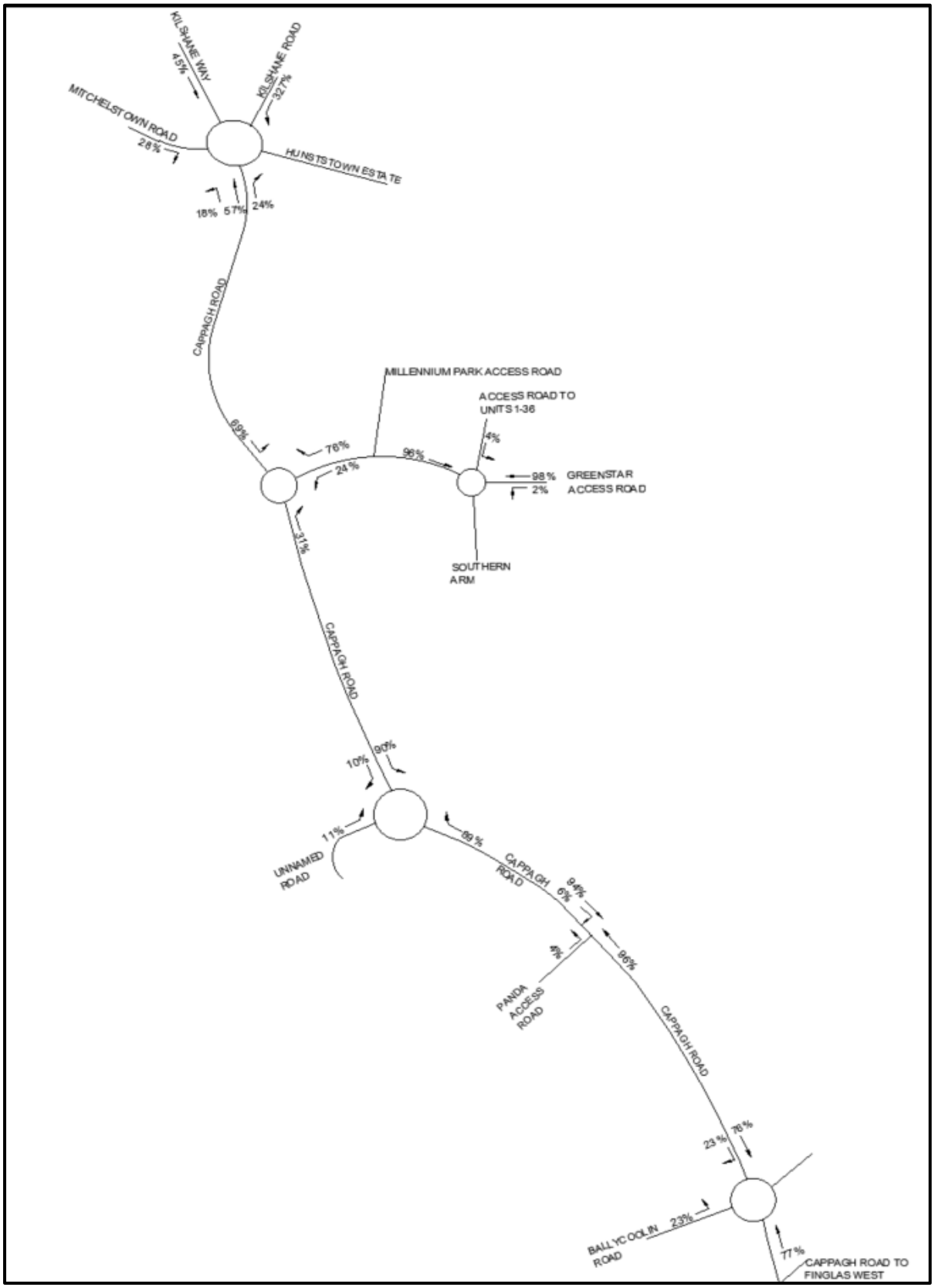


Figure 4.2: Proportion of Traffic Splits at the Junctions Analysed for PM peak

4.4.1 Traffic and Transport Assessment Guidelines

The Fingal Development Plan 2017 – 2023, in objective DMS128, requires a Traffic Assessment to be provided where new developments will have a significant effect on travel demand and the capacity of the surrounding transport network.

The TII Publication PE-PDV-02045 Traffic and Transport Assessment Guidelines, published in May 2014, recommends that junction modelling should be carried out where new traffic exceeds 5% of existing flows if congestion already exists and if traffic generated by the development exceeds 10% where no traffic congestion is present. **Table 4.7** below provides the thresholds for a TTA, and as can be seen, two conditions were met for the proposed expansion.

Table 4.7 – Traffic Management Guidelines Thresholds for Transport Assessments (TII)

YES	Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road.
YES	Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists, or the location is sensitive
N/A	Residential development in excess of 200 dwellings
N/A	Retail and leisure development in excess of 100m^2
N/A	Office, education and hospital development in excess of 2,500m^2
N/A	Industrial development in excess of 5,000m^2
NO	Distribution and warehousing in excess of 10,000m^2

From future traffic projection, it was observed that only Sites 1 & 2 fall above the TII threshold of 5% in junctions where congestion is assumed to exist and 10% increase in traffic on the adjoining road. Although Site 1 - Roundabout Access to the facility experiences no congestion, the traffic generated by the development under simple analyses indicated that the roundabout will exceed the 10% threshold as a result of the low utilisation of the subject junction. The remaining junctions will experience a maximum increase in traffic of 2%. The expected increase in traffic is illustrated in **Table 4.8**.

Table 4.8 – Traffic Impact on the Nearby Junctions								
Junction	**2025 Traffic**		**Traffic from Development**		**Increase in Traffic**		**TII Threshold of 5%**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Site 1 – Roundabout Access to the facility	439	351	64	31	14%	9%	Above	Above
Site 2 – Millennium Business Park/ Cappagh Road Roundabout	1248	1391	64	31	5%	2%	Above	Below
Site 3 – Huntstown Business Park / Cappagh Road Roundabout	1051	1150	19	8	2%	1%	Below	Below
Site 4 – Cappagh Road / Panda Access T-junction	965	1077	19	8	2%	1%	Below	Below
Site 5 – Cappagh Road / Mitchelstown Road Roundabout	2099	2276	45	23	2%	1%	Below	Below
Site 6 – Cappagh Road / Ballycoolin Road Roundabout	1982	1956	19	8	1%	0.5 %	Below	Below

5 Capacity Analysis

5.1 Capacity Analysis Introduction

Capacity assessments were undertaken at the 6No. junctions along Cappagh Road, shown in **Figure 5.1**, to demonstrate that the proposed increase in the annual waste handling throughput at the existing facility will not adversely impact the functionality of the existing junctions, and as requested in the inspector's report ABP-310332-21 to demonstrate the latest traffic situation at the roundabout. The performance of the junction during the AM and PM peak hours was assessed using ARCADY software for roundabouts and PICADY software for priority T-junctions for the following design years:

- 2023, the base year
- 2025, the planned year of the expansion conclusion
- 2030, 5 years after the conclusion
- 2040, 15-year future design scenario.

Figure 5.1 shows the location of the proposed developments and the junctions in which traffic simulations were undertaken in order to obtain Ratio Flow Capacity (RFC) and the queue levels to determine if the junction will cater for the predicted level of traffic by the site when it becomes operational.

The Ratio of Flow to Capacity (RFC) describes the capacity of each approach to the junction and determines if the junction will cater for the predicted level of traffic. An RFC below 0.85 (85%) implies that an approach road is operating satisfactorily well within capacity; between 0.85 to 1.0 RFC means the approach operates well within capacity but at less optimal efficiency; and an RFC above 1.0 means that demand and capacity are equal and no further traffic can progress through the junction.

The queue levels are presented in Passenger Car Unit (PCU) and quantify the total number of vehicles queueing on each arm.

Figure 5.1: Location of Junctions Analysed (Source: Google Earth)

5.2 Traffic Impacts of the Proposed Development on the Local Road Network

As stated in Section 3.5 above, traffic counts were undertaken in March 2020 pre-pandemic at the 6No. junctions in the vicinity of the site and fresh traffic counts were undertaken in November 2022 at Site 5. Central traffic growth rates for Co. Dublin, specified in the TII's Publication PE-PAG-02017 of October 2021, were applied to existing background traffic only and were not applied to the development traffic, since it is limited by development size.

The capacity assessment was modelled for three different scenarios:

- Base-year: 2023 traffic flows modelled according to traffic counts obtained in 2020 and factored up using TII Traffic Growth Rates with seasonal adjustment factor of 1.11 applied in the AM peak.
- Do-nothing: modelled without the intervention of the proposed developments. For this analysis, the traffic counts were factored up using TII's Growth Factor for the design years 2025, 2030 and 2040. The committed developments mentioned in Section 4.2 were added to this analysis.
- Do-something: the impact of the traffic generated by the development were added to the design years 2025, 2030 and 2040. This analysis will enable the comparison with the 'Do-nothing' scenario.

It is worth mentioning that sites 1, 2, 3 & 4 were factored up using growth factors for Dublin Metropolitan Area High Sensitivity Factor for HGV's to obtain a conservative overview for future design years. Sites 5 and 6 showed indications of capacity issues under the

conservative assessment and therefore were modelled using the more accurate approach, using TII's Dublin Metropolitan Area Central Sensitivity Factors for cars.

5.2.1 Site 1 – Roundabout Access to the facility

In the following analysis of the Roundabout access to the facility, the site was accessed for the AM and PM peak and the arms were labelled as follow:

- Arm A: Access Road to Byrne Lifts
- Arm B: Access Road to Starrus Eco Holdings (SEHL) trading as Greenstar
- Arm C: Access Road to Keegan Quarries
- Arm D: Access Road to Cappagh Road

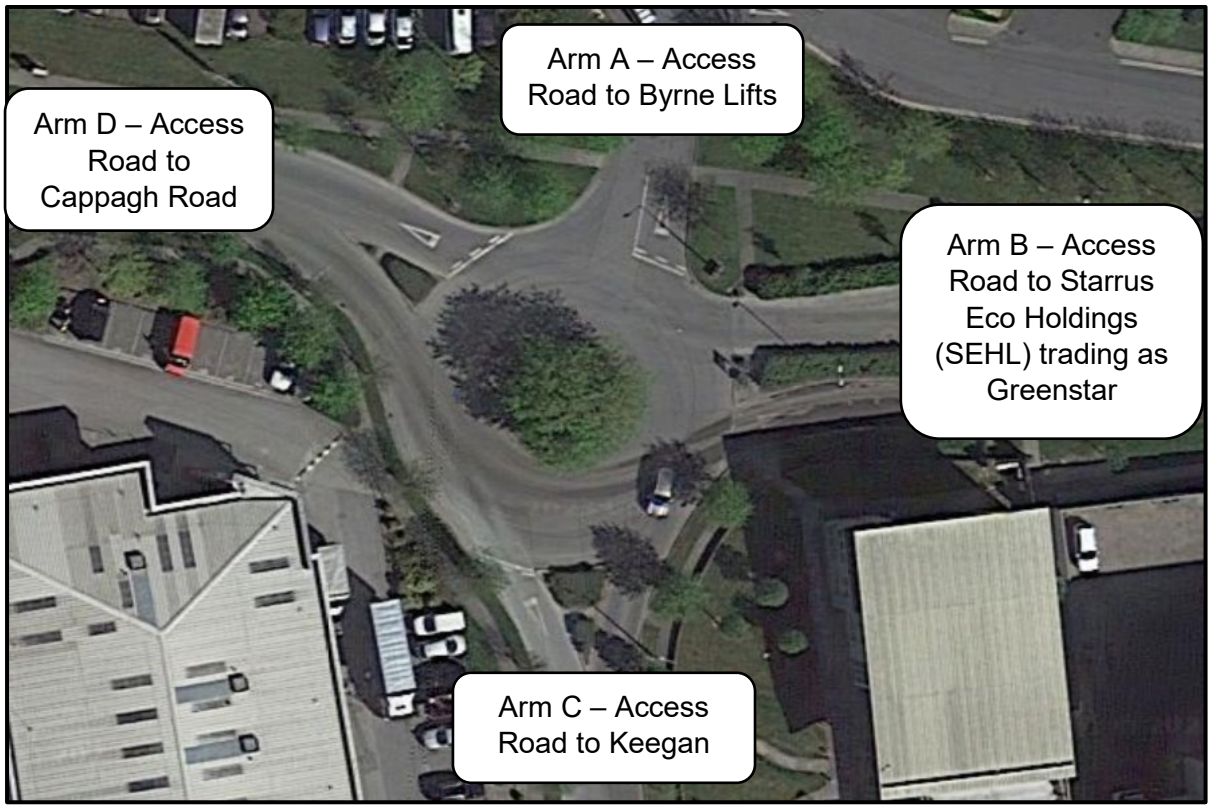


Figure 5.1: Roundabout access to the facility arm names (Source: Google Earth)

From the 2020 traffic counts data, it was observed that the Roundabout access to the facility has a 24-hour daily traffic volume of over 3,800 vehicles recorded and as stated in section 4.4.1 the expected increase in traffic from the proposed expansion falls above the TII threshold of 5% increase in traffic, due to the low utilisation of the junction. From traffic data, it was observed that 99% of traffic entering the site comes from the Cappagh Road / Millennium Park roundabout and 95% of traffic exits the site towards the subject roundabout in the morning period. When looking at the evening period, 95% of traffic comes from the roundabout and 98% leaves the site towards the roundabout.

Table 5.1 shows that for the current year in analysis 7, the junction will operate well below the theoretical capacity of 0.85 RFC. The access route into and out of the facility will be operating satisfactorily within capacity in the long term. There is an increase of 0.06 (6%) in RFC in Arm D – Access Road to Cappagh Road – in the morning period, and 0.02 (2%) RFC in Arm B – Access Road to the facility in the evening period. The inclusion of the proposed development is considered to have a minimal effect on the road network.

Table 5.1 – ARCADY Results for Roundabout access to the facility

		AM		PM	
Analysis	**Arm**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**
1 – 2023, base year + covid factor in AM peak	A	0.1	0.09	0.1	0.09
	B	0.1	0.09	0.1	0.09
	C	0.2	0.13	0.1	0.10
	D	0.5	0.29	0.3	0.21
2 – 2025, do-nothing	A	0.1	0.09	0.1	0.10
	B	0.1	0.10	0.1	0.10
	C	0.2	0.14	0.1	0.10
	D	0.5	0.31	0.3	0.22
3 – 2025, do-something	A	0.1	0.10	0.1	0.10
	B	0.2	0.13	0.2	0.12
	C	0.2	0.14	0.1	0.10
	D	0.6	0.36	0.4	0.24
4 – 2030, do-nothing	A	0.1	0.11	0.1	0.12
	B	0.1	0.12	0.1	0.11
	C	0.2	0.16	0.2	0.12
	D	0.6	0.36	0.4	0.26
5 – 2030, do-something	A	0.1	0.11	0.1	0.12
	B	0.2	0.15	0.2	0.14
	C	0.2	0.16	0.2	0.12
	D	0.8	0.41	0.4	0.28
6 – 2040, do-nothing	A	0.2	0.12	0.2	0.13
	B	0.2	0.13	0.2	0.13
	C	0.2	0.18	0.2	0.13
	D	0.7	0.39	0.4	0.29
7 – 2040, do-something	A	0.2	0.13	0.2	0.13
	B	0.2	0.16	0.2	0.15
	C	0.2	0.18	0.2	0.14
	D	0.9	0.45	0.5	0.30

5.2.2 Site 2 – Millennium Business Park / Cappagh Road Roundabout

In the following analysis of the Millennium Business Park / Cappagh Road Roundabout, the site was accessed for the AM and PM peak and the arms were labelled as follow:

- Arm A: Cappagh Road to the North
- Arm B: Millennium Business Park
- Arm C: Cappagh Road to the South

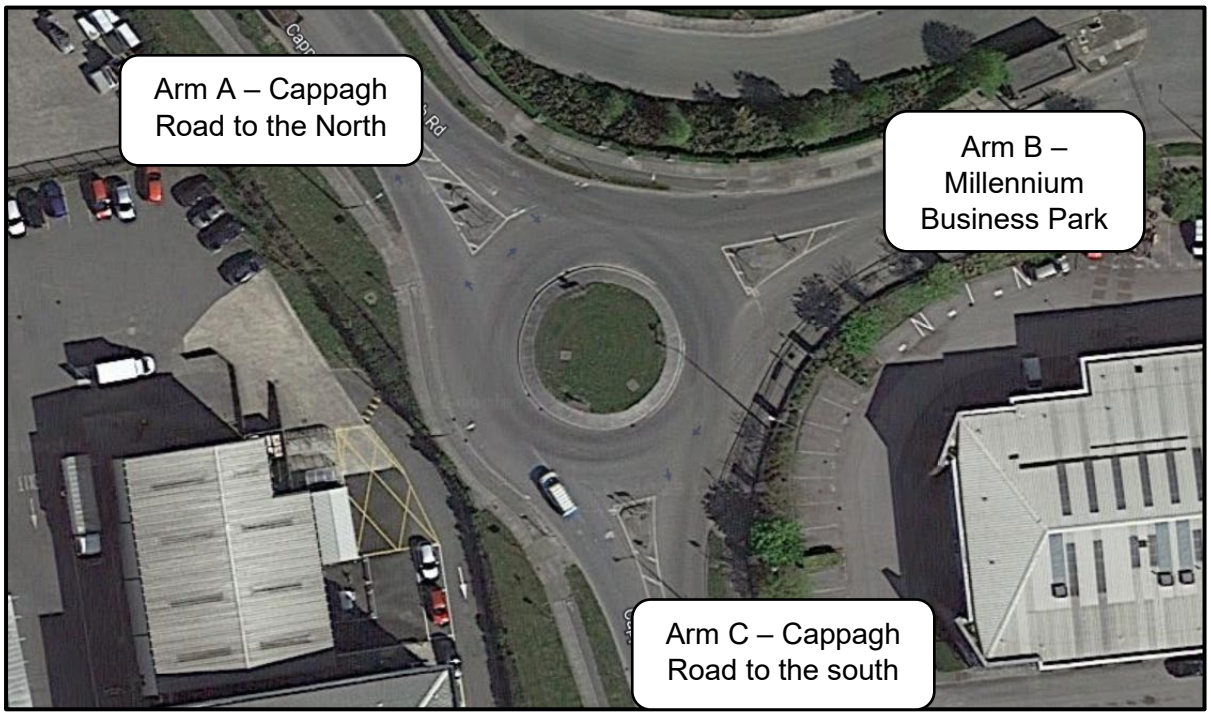


Figure 5.2: Millennium Business Park – Cappagh Road roundabout names (Source: Google Earth)

As can be seen in **Table 5.2** below, the Millennium Park access roundabout will still function below its capacity for the future year of 2040 15-year after the development conclusion where the roundabout will experience a maximum RFC of 0.74 (74%) in Arm A – Cappagh Road North – in the morning period.

The junction recorded a 24-hour traffic volume of over 11,200 vehicles in March 2020 pre-pandemic. The expected increase in traffic from the proposed expansion in the junction accounts for only 5% increase in traffic in peak times, which can be deemed minimal and does not result in any traffic issues at the junction.

Table 5.2 – ARCADY Results for Millennium Business Park / Cappagh Road Roundabout					
		AM		PM	
Analysis	Arm	Queue (PCU)	Rate Flow Capacity (RFC)	Queue (PCU)	Rate Flow Capacity (RFC)
1 – 2023, base year + seasonal adjustment in AM peak	A	0.9	0.46	0.4	0.28
	B	0.4	0.26	0.8	0.42
	C	0.5	0.30	1.0	0.47
2 – 2025, do-nothing	A	1.5	0.57	0.8	0.42
	B	0.5	0.31	1.1	0.51
	C	0.6	0.37	1.3	0.55
3 – 2025, do-something	A	1.6	0.60	0.8	0.43
	B	0.6	0.36	1.3	0.54
	C	0.7	0.38	1.4	0.56
4 – 2030, do-nothing	A	2.1	0.65	1.0	0.47
	B	0.7	0.38	1.7	0.61
	C	0.8	0.42	1.9	0.64
5 – 2030, do-something	A	2.3	0.68	1.0	0.48
	B	0.8	0.43	1.9	0.64
	C	0.8	0.44	2.0	0.65
6 – 2040, do-nothing	A	2.7	0.71	1.1	0.50
	B	0.9	0.44	2.4	0.69
	C	0.9	0.46	2.6	0.71
7 – 2040, do-something	A	3.1	0.74	1.1	0.51
	B	1.0	0.49	2.7	0.72
	C	1.0	0.47	2.7	0.72

5.2.3 Site 3 – Huntstown Business Park / Cappagh Road Roundabout

In the following analysis of the Huntstown Business Park / Cappagh Road Roundabout, the site was accessed for the AM and PM peak and the arms were labelled as follows:

- Arm A: Cappagh Road to the North
- Arm B: Cappagh Road to the South
- Arm C: Pallet Xpress

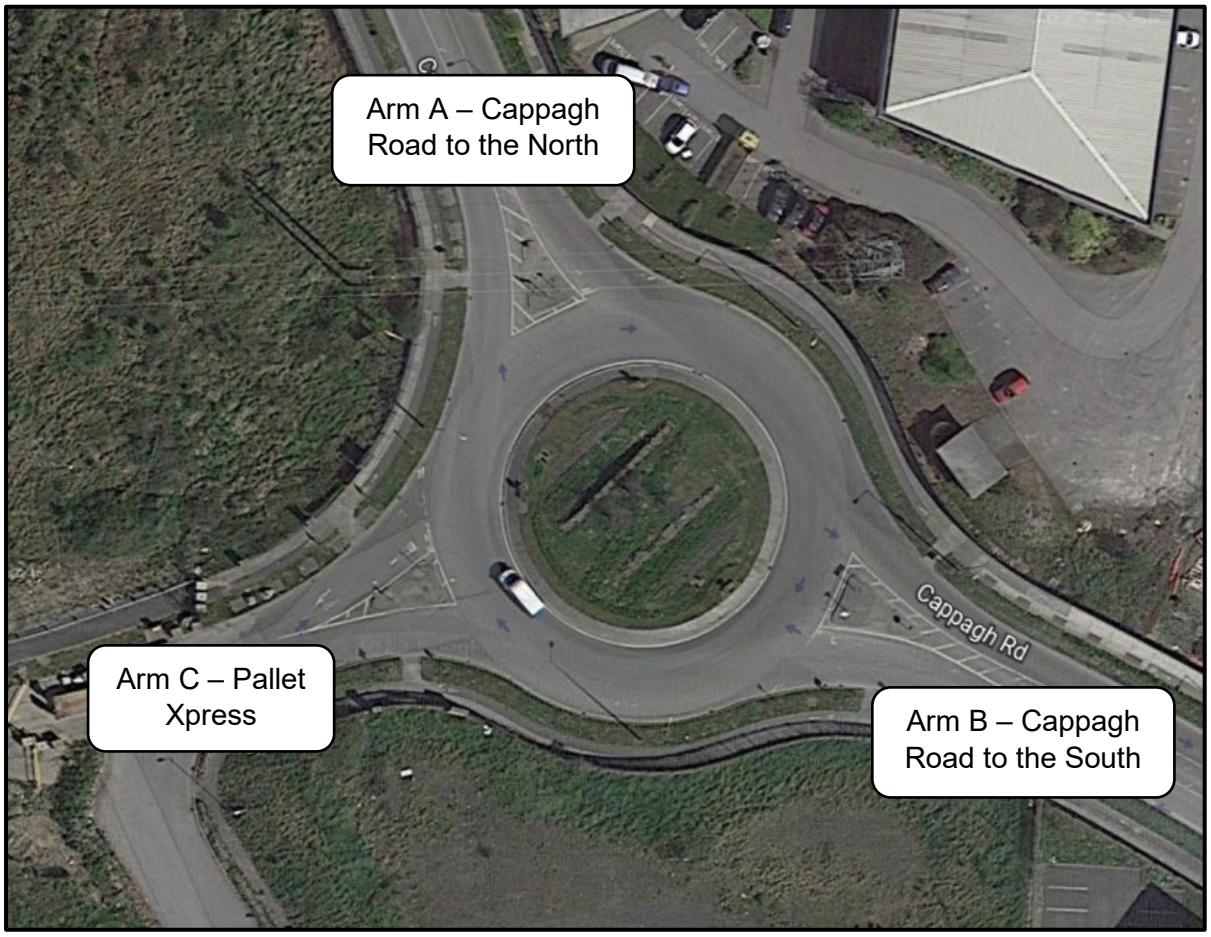


Figure 5.3: Huntstown Business Park – Cappagh Road roundabout names (Source: Google Earth)

Table 5.3 below shows the traffic modelling results for the Huntstown Business Park / Cappagh Road Roundabout located southwest of the facility. The roundabout has a 24-hour daily traffic volume of over 8,700 vehicles recorded and falls below the TII Threshold of 5% increase in traffic.

The roundabout, for the projected the future year of 2040, will still function below its theoretical capacity of 0.85 (85%) RFC, recording a maximum RFC of 0.73 in arm B – Cappagh Road to the south in the evening peak. The incorporation of the additional traffic related to the development expansion at the roundabout will have a negligible impact on the overall traffic observed in the road network.

Table 5.3 – ARCADY Results for Huntstown Business Park / Cappagh Road Roundabout					
		AM		PM	
Analysis	Arm	Queue (PCU)	Rate Flow Capacity (RFC)	Queue (PCU)	Rate Flow Capacity (RFC)
1 – 2023, base year + seasonal adjustment in AM peak	A	0.8	0.42	0.5	0.31
	B	0.6	0.37	1.0	0.49
	C	0.1	0.07	0.1	0.11
2 – 2025, do-nothing	A	1.3	0.54	1.1	0.51
	B	0.9	0.46	1.9	0.64
	C	0.1	0.07	0.2	0.15
3 – 2025, do-something	A	1.3	0.55	1.1	0.51
	B	1.0	0.47	2.0	0.65
	C	0.1	0.07	0.2	0.15
4 – 2030, do-nothing	A	1.7	0.61	1.2	0.52
	B	1.2	0.53	2.2	0.67
	C	0.1	0.09	0.2	0.16
5 – 2030, do-something	A	1.8	0.62	1.2	0.53
	B	1.3	0.54	2.2	0.67
	C	0.1	0.09	0.2	0.16
6 – 2040, do-nothing	A	2.1	0.66	1.4	0.56
	B	1.5	0.57	2.9	0.73
	C	0.1	0.10	0.2	0.18
7 – 2040, do-something	A	2.2	0.67	1.4	0.56
	B	1.5	0.59	2.9	0.73
	C	0.1	0.10	0.2	0.18

5.2.4 Site 4 – Cappagh Road access to Panda facility Priority T-junction

In the following analysis of the Cappagh Road access to Panda facility priority T-junction, the site was accessed for the AM and PM peak and the arms were labelled as follow:

- Arm A: Cappagh Road to the South
- Arm B: Panda Access
- Arm C: Cappagh Road to the North

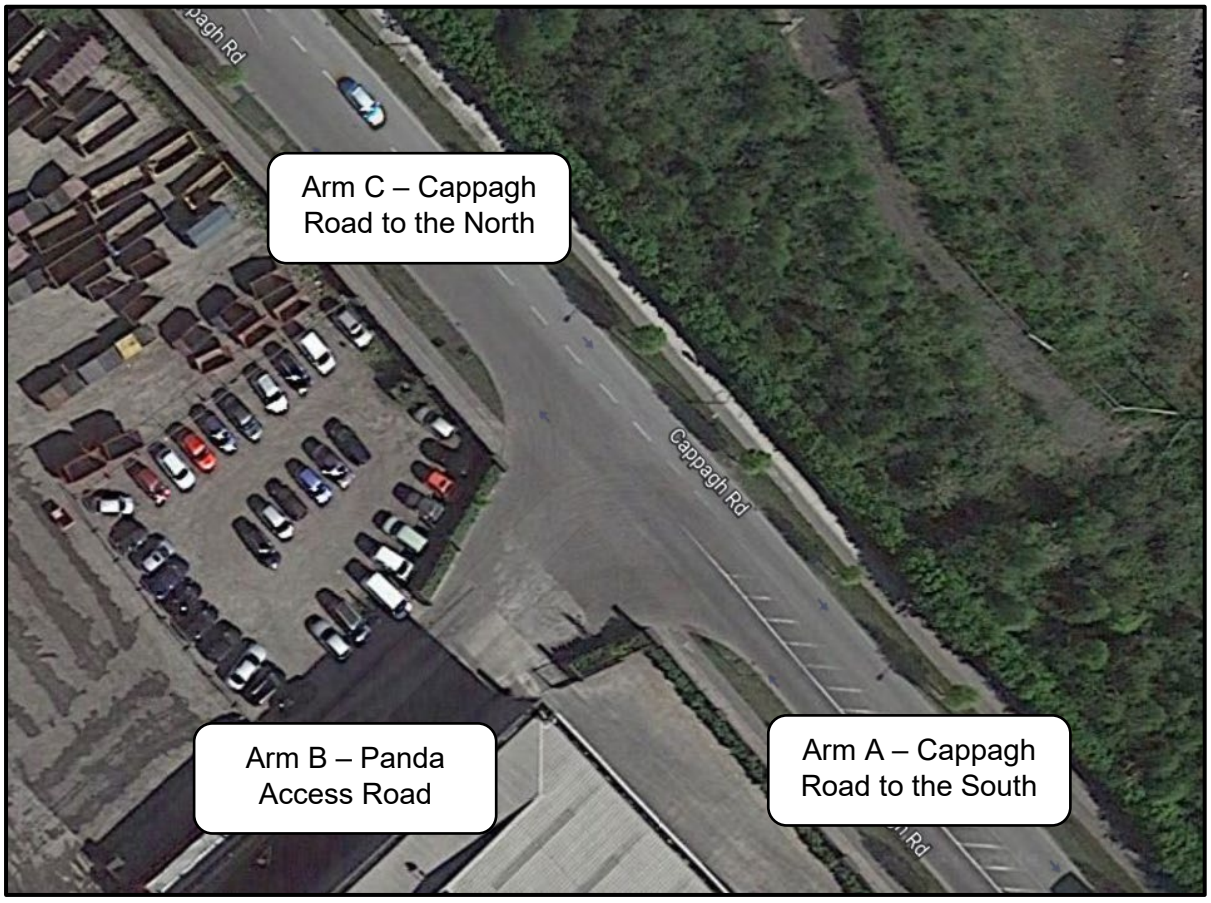


Figure 5.4: Cappagh Road access to Panda facility names (Source: Google Earth)

As can be seen in **Table 5.4** below, the junction is well below capacity for the 2040 design year with the additional traffic from site expansion. The maximum RFC found was 0.13 on Stream B-AC in the evening peak. It can be concluded that the priority T-junction off Cappagh Road will perform satisfactorily in the projected future years.

Table 5.4 – PICADY Results for Cappagh Road access to Panda facility Priority T-junction					
		AM		PM	
Analysis	Arm	Queue (PCU)	Rate Flow Capacity (RFC)	Queue (PCU)	Rate Flow Capacity (RFC)
1 – 2023, base year + seasonal adjustment in AM peak	B-AC	0.1	0.06	0.1	0.06
	C-B	0.1	0.05	0.0	0.04
2 – 2025, do-nothing	B-AC	0.1	0.09	0.1	0.10
	C-B	0.1	0.08	0.1	0.05
3 – 2025, do-something	B-AC	0.1	0.09	0.1	0.10
	C-B	0.1	0.08	0.1	0.05
4 – 2030, do-nothing	B-AC	0.1	0.10	0.1	0.11
	C-B	0.1	0.09	0.1	0.06
5 – 2030, do-something	B-AC	0.1	0.10	0.1	0.11
	C-B	0.1	0.09	0.1	0.06
6 – 2040, do-nothing	B-AC	0.1	0.11	0.1	0.13
	C-B	0.1	0.09	0.1	0.07
7 – 2040, do-something	B-AC	0.1	0.11	0.1	0.13
	C-B	0.1	0.09	0.1	0.07

5.2.5 Site 5 – Cappagh Road / Mitchelstown Roundabout

In the following analysis of the Cappagh Road / Mitchelstown Road roundabout, the junction was assessed for AM and PM peak periods and the arms were labelled as follows:

- Arm 1: Kilshane Way
- Arm 2: Kilshane Road
- Arm 3: Huntstown Estate
- Arm 4: Cappagh Road
- Arm 5: Mitchelstown Road.

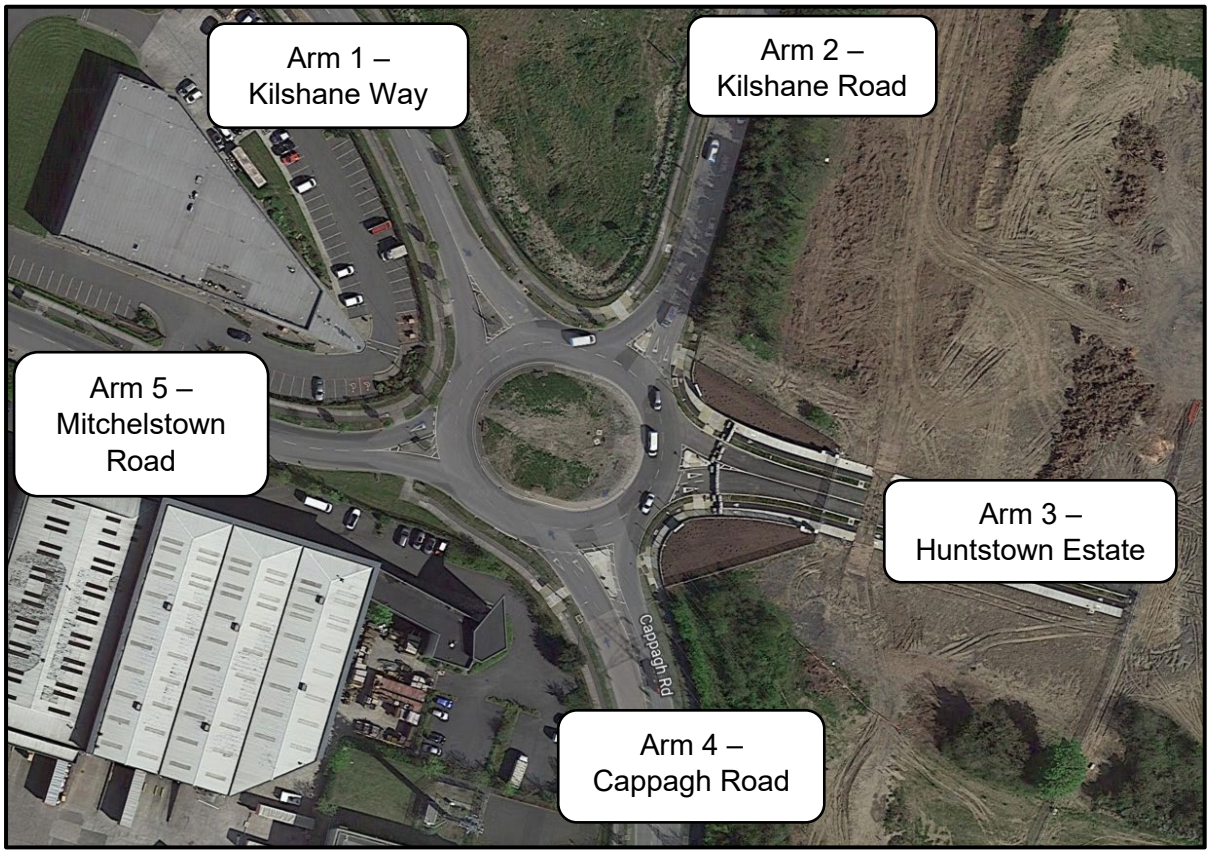


Figure 5.5: Cappagh Road / Mitchelstown Road roundabout arm names (Source: Google Earth)

From the 2020 traffic counts data, it was observed that the Cappagh Road / Mitchelstown Road roundabout has a 12-hour daily traffic volume of over 17,500 vehicles recorded and as stated in section 4.4.1 the expected increase in traffic from the proposed expansion falls below the TII threshold of 5% increase in traffic.

Table 5.5 – ARCADY Results for Cappagh Road / Mitchelstown Road Roundabout

		AM		PM	
Analysis	**Arm**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**
1 – 2023, base year + seasonal adjustment in AM peak	1	0.5	0.30	0.4	0.25
	2	2.9	0.73	0.7	0.39
	3	0.0	0.00	0.0	0.00
	4	0.5	0.31	0.1	0.50
	5	0.2	0.16	0.7	0.40
2 – 2025, do-nothing	1	0.8	0.41	0.9	0.41
	2	8.1	0.89	1.0	0.47
	3	0.1	0.03	0.2	0.09
	4	0.7	0.38	1.6	0.58
	5	0.3	0.21	1.1	0.48
3 – 2025, do-something	1	0.9	0.42	0.9	0.42
	2	9.5	0.91	1.0	0.47
	3	0.1	0.03	0.2	0.09
	4	0.8	0.40	1.7	0.59
	5	0.3	0.21	1.1	0.49
4 – 2030, do-nothing	1	0.9	0.44	1.0	0.44
	2	18.3	0.98	1.2	0.51
	3	0.1	0.04	0.2	0.10
	4	0.8	0.42	1.9	0.63
	5	0.3	0.22	1.3	0.54
5 – 2030 do-something	1	1.0	0.45	1.1	0.45
	2	22.9	1.00	1.2	0.51
	3	0.1	0.4	0.2	0.10
	4	0.9	0.43	2.0	0.64
	5	0.3	0.23	1.4	0.55
6 – 2040, do-nothing	1	1.0	0.46	1.1	0.47
	2	35.2	1.04	1.3	0.54
	3	0.1	0.04	0.2	0.10
	4	0.9	0.44	2.3	0.67
	5	0.4	0.23	1.6	0.58
7 – 2040, do-something	1	1.1	0.47	1.1	0.47
	2	43.1	1.06	1.3	0.54
	3	0.1	0.04	0.2	0.10
	4	1.0	0.45	2.4	0.68
	5	0.4	0.24	1.6	0.59

As can be seen in **Table 5.5** above, the roundabout is currently operating within capacity with a maximum RFC of 0.73 in Arm 2 – Kilshane Road in the morning period. For the future years of 2025 and 2030, the junction is shown to function at capacity without the proposed site expansion operational.

In analysis 6 – the future year 2040 15-year after the assumed conclusion of works and without the proposed site operational, the roundabout in the morning period presents an RFC of 1.04 (104%) in arm 2 with 35.2 PCU queue length. With the proposed traffic from the development added to analysis 7, there is an increase in RFC of 0.02 in arm 2. The effect on the junction is considered to be minimal and does not result in any significant traffic issues at the junction.

When looking at Arms 1, 3, 4 & 5, the above analysis indicated that the remaining arms would operate well within capacity for the future designed year of 2040, presenting a maximum RFC of 0.68 (68%) in Arm 4 – Cappagh Road in the evening period. The impact of the expansion to the Starrus Eco Holdings Limited (SEHL) trading as Greenstar is deemed negligible at the subject junction and the site will not adversely impact the road network.

5.2.6 Site 6 – Cappagh Road / Ballycoolin Road Roundabout

In the following analysis of the Cappagh Road / Ballycoolin Road Roundabout, the site was accessed for the AM and PM peak and the arms were labelled as follow:

- Arm A: Cappagh Road to the North
- Arm B: Future new arm
- Arm C: Cappagh Road to the South
- Arm D: Ballycoolin Road

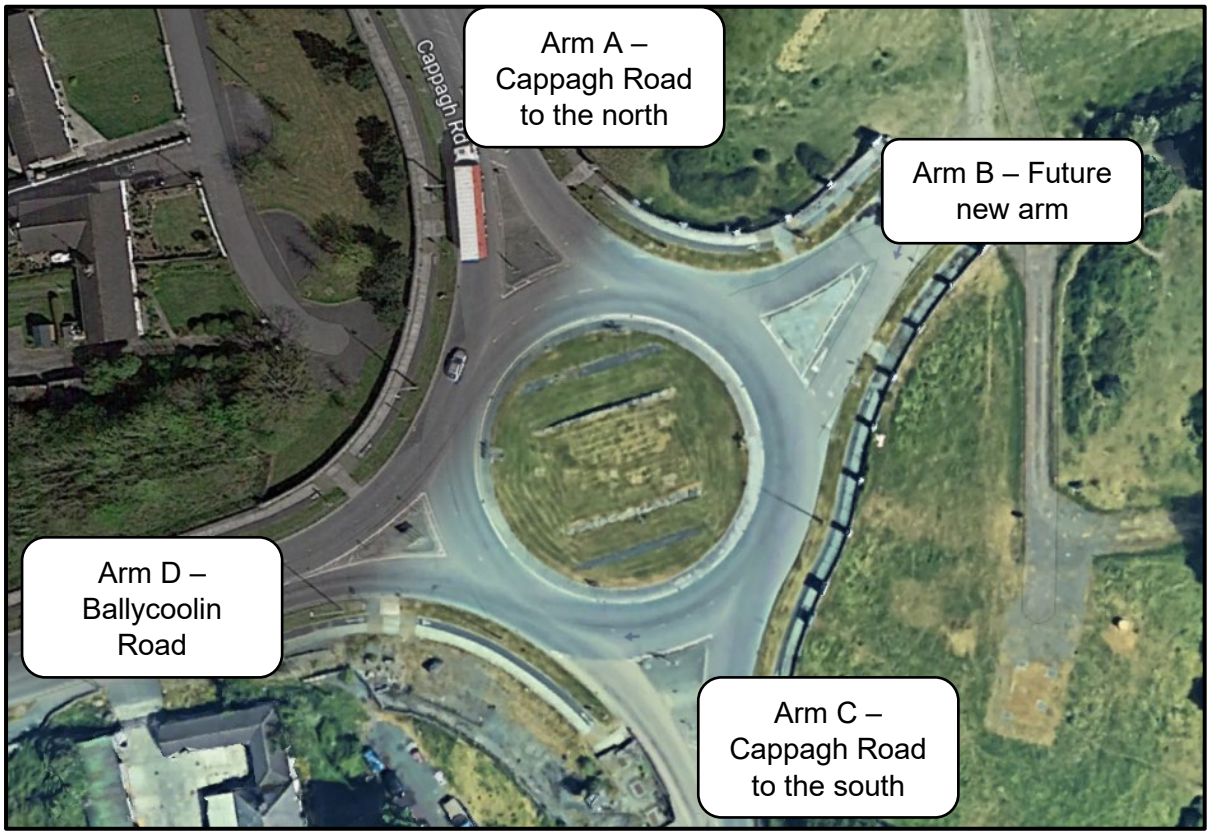


Figure 5.6: Cappagh Road – Ballycoolin Road roundabout arm names (Source: Google Earth)

From March 2020 pre-pandemic traffic counts, the Cappagh Road / Ballycoolin Road roundabout has a 12-hour daily traffic volume of over 17,600 vehicles recorded and as stated in section 4.4.1 the expected increase in traffic from the proposed expansion falls below the TII threshold of 5% increase in traffic.

As can be seen in **Table 5.6** below, the subject roundabout is functioning below its theoretical capacity 0.85 in RFC. For the projected future year of 2025 and 2030 without the additional traffic from the site expansion, Arm C – Cappagh Road to the south is operating at capacity in the morning period, whereas Arms A, B & D function well below capacity.

In analysis 6, for the future year 2040 and without the expected traffic from the development expansion, the junction will function below capacity for the PM period with an RFC of 0.86, and above capacity during the morning period, reaching a maximum RFC of 1.02 (102%) on the stream C – Cappagh Road to the South. With the proposed site traffic added to analysis 7, the effect on the capacity of the junction is very minimal, as the facility will only add a maximum of 27No. vehicles in both the morning period and evening period at the subject junction. Therefore, the impact of proposed traffic generated from the extension to the facility is considered minimal and the proposal will not adversely impact the road network.

Table 5.6 – ARCADY Results for Cappagh Road / Ballycoolin Road Roundabout

		AM		PM	
Analysis	**Arm**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**
1 – 2023, base year + seasonal adjustment in AM peak	A	0.6	0.36	0.5	0.33
	B	0.0	0.00	0.0	0.00
	C	4.1	0.79	2.2	0.67
	D	0.8	0.41	1.0	0.48
2 – 2025, do-nothing	A	1.0	0.48	1.1	0.50
	B	0.0	0.00	0.0	0.00
	C	7.4	0.88	3.3	0.75
	D	0.9	0.45	1.2	0.53
3 – 2025, do-something	A	1.0	0.49	1.1	0.51
	B	0.0	0.00	0.0	0.00
	C	8.0	0.89	3.3	0.76
	D	0.9	0.45	1.2	0.53
4 – 2030, do-nothing	A	1.2	0.52	1.3	0.54
	B	0.0	0.00	0.0	0.00
	C	15.4	0.96	4.7	0.82
	D	1.0	0.49	1.5	0.58
5 – 2030, do-something	A	1.2	0.53	1.3	0.55
	B	0.0	0.00	0.0	0.00
	C	17.2	0.97	4.7	0.82
	D	1.1	0.49	1.5	0.58
6 – 2040, do-nothing	A	1.3	0.55	1.5	0.57
	B	0.0	0.00	0.0	0.00
	C	29.4	1.01	6.2	0.86
	D	1.2	0.52	1.7	0.62
7 – 2040, do-something	A	1.4	0.56	1.5	0.58
	B	0.0	0.00	0.0	0.00
	C	33.1	1.02	6.3	0.86
	D	1.2	0.52	1.7	0.62

5.3 Remodeling of Cappagh Road / Mitchelstown Roundabout – 2022 Traffic Counts

As mentioned previously this additional capacity assessment was conducted based on the inspector's report under ABP-310332-21 for the proposed Panda expansion, planning application reference SID/01/21 & ABP Ref. 310332.

Up-to-date traffic counts and remodelling were conducted on site 5 to take into account the latest traffic situation that the Cappagh Road / Mitchelstown Roundabout is and will experience following findings from historic 2019 traffic data. The capacity assessment was modelled for three different scenarios:

- Base-year: 2023 traffic flows modelled according to traffic counts obtained in November 2022 and factored up using TII Traffic Growth Rates with seasonal adjustment factor of 1.1 applied.
- Do-nothing: modelled without the intervention of the proposed developments. For this analysis, the traffic counts were factored up using TII's Growth Factor for the design years 2025, 2030 and 2040. The committed developments mentioned in Section 4.2 were added to this analysis.
- Do-something: the impact of the traffic generated by the site were added to the design years 2025, 2030 and 2040. This analysis will enable the comparison with the 'Do-nothing' scenario.

In the following analysis of the Cappagh Road / Mitchelstown Road roundabout, the junction was assessed for AM and PM peak periods and the arms were labelled as follows:

- Arm 1: Kilshane Way
- Arm 2: Kilshane Road
- Arm 3: Huntstown Estate
- Arm 4: Cappagh Road
- Arm 5: Mitchelstown Road.

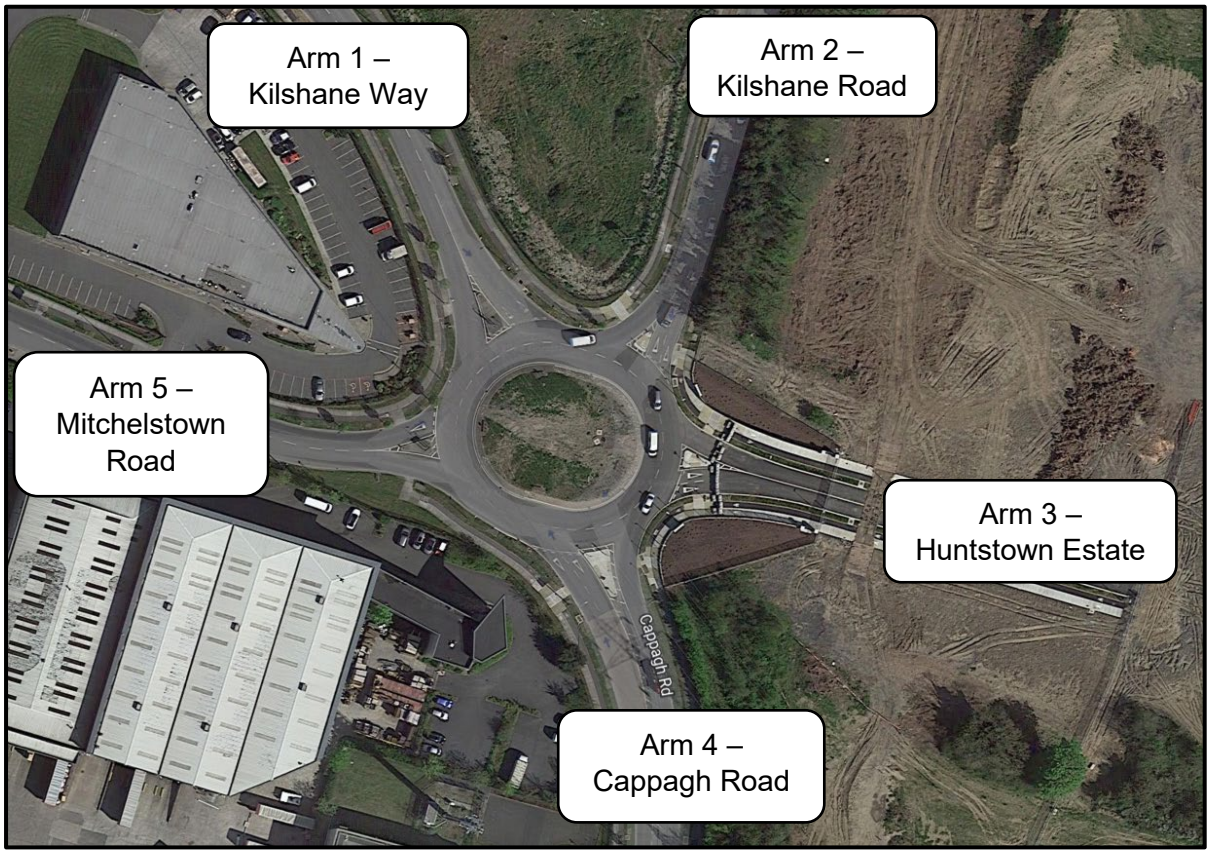


Figure 5.7: Cappagh Road / Mitchelstown Road roundabout arm names (Source: Google Earth)

Table 5.7 overleaf shows the results of the analysis of the junction modelled using ARCADY software for roundabouts.

Table 5.7 – ARCADY Results for Cappagh Road / Mitchelstown Road Roundabout

		AM		PM	
Analysis	**Arm**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**	**Queue (PCU)**	**Rate Flow Capacity (RFC)**
1 – 2023, base year + seasonal adjustment	1	0.6	0.31	0.6	0.35
	2	3.8	0.76	0.5	0.33
	3	0.0	0.00	0.0	0.00
	4	0.6	0.29	0.8	0.43
	5	0.3	0.17	0.6	0.37
2 – 2025, do-nothing	1	1.0	0.43	1.4	0.52
	2	12.2	0.93	0.8	0.40
	3	0.1	0.03	0.2	0.09
	4	0.8	0.37	1.2	0.50
	5	0.4	0.21	0.9	0.44
3 – 2025, do-something	1	1.1	0.44	1.4	0.53
	2	14.7	0.95	0.8	0.41
	3	0.1	0.03	0.2	0.09
	4	0.9	0.38	1.2	0.51
	5	0.4	0.21	0.9	0.44
4 – 2030, do-nothing	1	1.2	0.46	1.4	0.57
	2	30.5	1.02	0.9	0.44
	3	0.1	0.04	0.2	0.10
	4	1.0	0.40	1.3	0.55
	5	0.5	0.22	0.9	0.48
5 – 2030, do-something	1	1.1	0.47	1.7	0.57
	2	36.0	1.04	0.9	0.45
	3	0.1	0.04	0.2	0.10
	4	0.8	0.41	1.4	0.56
	5	0.3	0.23	1.1	0.49
6 – 2040, do-nothing	1	1.3	0.48	1.8	0.60
	2	54.4	1.08	1.0	0.47
	3	0.1	0.04	0.2	0.10
	4	1.0	0.42	1.6	0.58
	5	0.5	0.24	1.2	0.52
7 – 2040, do-something	1	1.3	0.49	1.9	0.60
	2	63.7	1.10	1.0	0.47
	3	0.1	0.04	0.2	0.10
	4	1.1	0.43	1.6	0.59
	5	0.5	0.24	1.2	0.52

The Cappagh Road / Mitchelstown Road roundabout has a 12-hour daily traffic volume of over 16,000 vehicles recorded in the November 2022 traffic counts.

For analysis 1, the roundabout was modelled under current geometry parameters and for the remaining analysis, the addition of Arm 3 was considered, which is the proposed access to Huntstown Estate.

Based on the assumptions stated above and the use of Central Growth Factors for Dublin Metropolitan Area, **Table 5.7** shows the junction modelling results for the Cappagh Road / Mitchelstown Road roundabout for the current year, the proposed year of conclusion, 2025, and future years with and without the inclusion of the proposed expansion.

Table 5.7 shows that for the current year in analysis 1, the junction is operating below the theoretical capacity of 0.85 RFC for both morning and evening periods, with the maximum RFC of 0.76 (76%) in the AM peak in Arm 2 – Kilshane Road. In analysis 2, considering that all committed developments mentioned in Section 4.2 are concluded and operational, the maximum RFC observed at the junction is 0.93 (93%) also in Arm 2. The inclusion of the proposed development in analysis 3 increases the capacity at the junction to a maximum of 0.02 (2%) RFC, which is considered to be negligible.

In analysis 6, for the future year 2040, with the committed developments concluded and without the proposed increase in tonnage from SEHL, the junction is observed to be operating above capacity in the morning period, with a maximum queue of 54.4 PCU and RFC of 1.08 (108%) in Arm 2 – Kilshane Road, whereas when looking at the evening period all arms of the roundabout are shown to be operating satisfactorily well within capacity.

As mentioned previously, the proposed expansion to the site will only add 95No. vehicles in both morning and evening peak times at the subject roundabout, which correspond to an increase of only 2% in the current traffic flows along the junction, which is deemed to be negligible. The inclusion of the proposed works will not result in any significant traffic issues at the junction as the junction will already operate above capacity as shown in **Table 5.7** above.

6 Conclusions

The main conclusions of this study are summarised as follows:

- This TTA report was conducted to accompany the planning application for the proposed increase to the annual waste handling throughput at the Starrus Eco Holdings Limited (SEHL) trading as Greenstar in Ballycoolin, Dublin 11. The proposal includes increasing the waste handled at their existing facility in Millennium Business Park from 270,000 tonnes to 450,000 tonnes per annum.

- The expansions involve increases in the quantity of waste processed annually at the existing facility, which will increase traffic to and from the facility but will not require any construction works with exception of negative air infrastructure or site expansion.

- The key junctions identified by ORS in consultation with Fingal County Council were subject to capacity analysis to examine the potential levels generated from the proposed expansion and the existing road network.

- It was calculated the traffic impact on 6No. junctions in the vicinity of the proposed development in order to estipulate the traffic impact that the development will have in the neighbouring junctions. The analysis found that the TII threshold of 5% of additional traffic where congestion exists and 10% increase in traffic on the adjoining road was met by 2No. out of 6No. junctions. However, the 6No. junctions described in the assessment were assessed to obtain information regarding the capacity of the junctions and how the proposed development will affect the functionality of them and the neighbouring road network.

- The traffic splits in the examined junctions could be calculated from the traffic counts and it is expected that the traffic from the proposed increase in tonnage to SEHL unit will follow the same trend. The trip generation from the development was assessed from historic traffic data undertaken at the entrance of the facility and factored up with the proposed additional proportion. The data was then added to *Junctions 9* software to ascertain the traffic impact the development will have on the surrounding road network.

- The junctions were examined using *Junctions 9* (ARCADY and PICADY) software for the AM and the PM peak conditions under conservative future projections and Central background Traffic Growth for Co. Dublin for the considered year of opening, 2025, 5-years and 15-years after development conclusion.

- From a transportation planning perspective, the proposed increase to the annual waste handling throughput at the existing facility, will not be a significant traffic generator, with a maximum traffic volume added to the roundabout of 95No. vehicles in both AM and PM peak periods and will not adversely impact the future operational capacity of the road network in the vicinity of the roundabout. The Cappagh Road / Mitchelstown Road Roundabout (site 5) and Cappagh Road / Ballycoolin Road (site 6) will experience capacity

issues and delays in futures years, however, the increase in traffic from the site will account for a maximum 2% of the junction capacity and the inclusion of the proposed increase in tonnage is not the reason for the capacity issues.

- Fresh traffic counts were undertaken at site 5 – Cappagh Road / Mitchelstown Road Roundabout to remodel the roundabout taking into account the latest traffic situation that the junction is and will experience, following findings from historic 2019 traffic data.

- Following reassessment of site 5, the roundabout will experience capacity issues and delays in the future design years along Arm 2 – Kilshane Road, however, the inclusion of the additional traffic from the proposal will not be the cause of capacity issues. The proposed increase in tonnage increases the capacity of the roundabout by only 2%, which can be deemed minimal compared to the daily traffic flows observed at the Cappagh Road / Mitchelstown Road Roundabout. When comparing modelling from the historic traffic data and fresh traffic counts, the roundabout is shown to follow same trends for future years.

- In transportation engineering terms, the proposed expansions put forward by the design team will not be a significant traffic generator and will not adversely impact on the operation on the regional road to which they connect. Any capacity issues identified are pre-existing and require attention irrespective of the proposed expansions, which will have minimal impact.

- Future planned infrastructure improvements including additional BusConnects routes and the new MetroLink planned in the area will reduce private vehicular journeys in the vicinity of the site in future years. Increasing adoption of flexible working hours and remote working options are also likely to further reduce the number of vehicles accessing the area at peak times.

Appendix A – Traffic Data

Traffic data available upon request.

Appendix B – *TRICS* Data

TRICS data available upon request.

Appendix C – *Junctions 9* Modelling Data

Junctions 9 data available upon request.