

ROADSTONE DUBLIN LTD.

**INERT WASTE RECOVERY FACILITY
FASSAROE, BRAY, CO. WICKLOW**

ENVIRONMENTAL MANAGEMENT PLAN

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CONTENTS

- 1 INTRODUCTION**
 - 1.1 Background
 - 1.2 Purpose and Scope
- 2 SITE MANAGEMENT**
 - 2.1 Site Location and Name
 - 2.2 Licence Holder
 - 2.3 Operator
 - 2.4 Site Description
 - 2.5 Operational Hours
 - 2.6 Permitted Waste
 - 2.7 Design Philosophy
 - 2.8 Life Expectancy
 - 2.9 Site Management and Responsibilities
 - 2.10 Record Keeping
 - 2.11 Annual Report
- 3 SITE INFRASTRUCTURE**
 - 3.1 Site Security
 - 3.2 Site Roads and Parking Areas
 - 3.3 Hardstanding Areas
 - 3.4 Wheelwash and Weighbridge
 - 3.5 Laboratory Testing
 - 3.6 Fuel and Oil Storage
 - 3.7 Waste Inspection and Quarantine Areas
 - 3.8 Traffic Control
 - 3.9 Sewerage and Surface Water Drainage Infrastructure
 - 3.10 Site Services
 - 3.11 Plant Sheds and Equipment Compounds
 - 3.12 Site Accommodation
 - 3.13 C&D Waste Recovery Infrastructure
- 4 DESIGN OF WASTE RECOVERY FACILITY**
 - 4.1 General
 - 4.2 Formation Levels and Gradients
 - 4.3 Capacity and Lifespan
 - 4.4 Capping and Decommissioning
- 5 WASTE HANDLING AND PLACEMENT**
 - 5.1 Soil Recovery Activities
 - 5.2 Construction and Demolition Waste Recovery Activities
- 6 RESTORATION AND AFTERCARE**
- 7 ENVIRONMENTAL CONTROLS**
 - 7.1 General
 - 7.2 Bird Control
 - 7.3 Traffic Control
 - 7.4 Road Cleansing
 - 7.5 Fire Control
- 8 ENVIRONMENTAL MONITORING**
 - 8.1 General
 - 8.2 Dust Monitoring
 - 8.3 Ecological Monitoring
 - 8.4 Groundwater Monitoring
 - 8.5 Meteorological Monitoring
 - 8.6 Noise Monitoring
 - 8.7 Surface Water Monitoring
 - 8.8 Stability and Settlement Monitoring

9 HEALTH AND SAFETY

FIGURES

Figure EMP1	Site Location Plan
Figure EMP2	Licensed Area
Figure EMP3	Site Infrastructure Layout
Figure EMP4	Restoration Surface
Figure EMP5	Environmental Monitoring Locations

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1. INTRODUCTION

1.1 Background

This Environmental Management Plan has been prepared by SLR Consulting Ltd. in support of a Waste Licence Application in respect of a waste licence recovery facility operated by Roadstone Dublin Ltd. on its lands at Fassaroe, Bray, Co. Wicklow. The principal waste activities at the site comprise recovery of construction and demolition waste and restoration / backfilling of a former gravel pit using inert soil and stones. This plan has been prepared having regard to the best operational practice for waste recovery facilities.

1.1 Purpose and Scope

An Environmental Management Plan (EMP) is a working document which accommodates the need for certain matters in respect of the ongoing waste recovery activities to be determined or amended as it progresses through development and implementation stages.

It is envisaged that amendments to the EMP will either be made by the Licensee, subject to approval by the Licensing Authority, or at the request of the Licensing Authority. No operational procedure will be implemented that is not contained within the approved EMP.

A complete copy of the EMP will be kept on site and at the principal office of Wicklow County Council (the Local Authority). The Licensing Authority will be issued with a copy of the EMP and any subsequent modifications thereto.

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2 SITE MANAGEMENT

2.1 Site Location and Name

The location of the site is indicated in Figure EMP1, at National Grid Reference 3237E 2175N. The facility will be known as Fassaroe Waste Recovery Facility.

2.2 Licence Holder

The Waste Licence in respect of waste recovery activities at Fassaroe is held by Roadstone Dublin Ltd. The plan extent of the licensed area is indicated in Figure EMP2.

2.3 Operator

The management and operational responsibilities for the facility are borne by Roadstone Dublin Ltd.

Contact: Mr Mark Prendergast (Recycling Manager)
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2.4 Site Description

The waste licence area comprises approximately 17.9 hectares (43.1 acres). The site comprises a worked-out sand and gravel quarry. An existing construction and demolition waste recycling facility is located in the north western corner of the licenced area. It has been in operation since 2004 and to date has been regulated in accordance with a series of waste permits issued by Wicklow County Council (Ref Nos. ESS 15/8/12 and ESS 15/8/12-339). No quarry backfilling or restoration works have been undertaken at the application site.

2.5 Operational Hours

The waste recovery activities at the facility comprising

- (i) importation, placement and compaction of inert soils and stones and/or recycled construction and demolition waste and
- (ii) recovery (crushing / screening) of inert construction and demolition waste

extend from 08.00 hours to 18.00 hours each weekday (Monday to Friday) and from 08.00 hours to 13.00 hours on Saturday. No waste recovery activities are undertaken on Sunday or on Bank / Public Holidays.

2.6 Permitted Waste

The inert materials to be accepted at the site for use in backfilling / recovery activities are identified by their European Waste Catalogue reference number below

EWC Code	Description
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics
17 01 07	Mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 05 04	Soil and stones other than those mentioned in 17 05 03
17 05 06	Dredging spoil other than those mentioned in 17 05 05
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
20 02 02	Soil and stones

2.7 Design Philosophy

The quarry backfilling / restoration scheme seeks to apply best environmental and operational practices for waste recovery facilities. To this end, maximum effort is made to ensure that only inert materials (principally soil and stones, with some construction and demolition waste) are imported to and accepted at the site and used for backfilling and recovery purposes.

Any non-hazardous or hazardous waste inadvertently mixed with the inert waste will be segregated and brought to the waste quarantine area for further examination and detailed classification. Any material which is deemed to be either non-hazardous or hazardous shall be removed off-site to a suitably licensed waste disposal or waste recycling facility.

2.8 Life Expectancy

The estimated volume of material to be placed at the site is approximately 375,000m³. Assuming an in-situ compacted density of 2t/m³, the estimated amount of material to be placed at the application site is approximately 750,000 tonnes. Of this, approximately 130,000tonnes will be sourced from existing overburden stockpiles at the site. The duration of backfilling activities at the quarry void will largely be dictated by the rate at which the remaining, approximately 620,000 tonnes of externally sourced inert soil and stone can be sourced and imported to the site.

There are many factors which will influence this, including, but not limited to,

- Availability of acceptable inert materials at construction sites
- Prevailing economic climate
- Construction industry output
- Project location, scale, duration and distance from the facility
- Logistical and/or programming constraints at sites generating inert materials
- Climatic conditions (reduced construction activity in wet weather)
- Availability of hauliers
- Disruptions along the existing local and national road network
- Capacity of earthmoving plant to place and compact materials
- Waste inspection / weighbridge processing constraints

In light of these and other variables, calculation of intake rates and duration is not an exact science. At the present time, assuming 50 working weeks in each calendar year, 5.5 days per working week and 10 hours per working day, it is estimated that the rate of importation of inert materials to the quarry void could vary between 100,000 tonnes and 550,000 tonnes per annum (the maximum equivalent permitted by the recent planning permission issued by Wicklow County Council).

The corresponding duration of backfilling activities could therefore vary from just over 1 year to 7.5 years. Assuming an average importation rate of 200,000 tonnes/year, the expected duration of quarry backfilling activities will be just over 3 years.

Recovery of imported and site-generated C&D waste will continue while backfilling, restoration and aftercare management activities progress at the former quarry. It is however envisaged that recovery of C&D waste will continue for some time following completion of quarry backfilling activities.

2.9 Site Management and Responsibilities

The key staff and their respective responsibilities are highlighted in the table below:-

Name	Position	Duties and Responsibilities
Mark Prendergast	Recycling Manager	Liaison with Regulatory Authorities; Ensuring Compliance with Waste Licence Conditions; Management of Staff (including consultants), Contractors, Plant and Human Resources,
Robert Moore	Facility Manager	Day to day site management Waste classification and testing, Establishment and monitoring of waste handling and acceptance procedures; Environmental monitoring

2.10 Record Keeping

The site records to be maintained on site for the duration of waste recovery activities will include all of those listed in the EPA Waste Licence.

All site procedures, operational plans, environmental and legal consents, Environmental Impact Statement, contract documents (including construction drawings), staff records, external correspondence are maintained by and are the responsibility of the Facility Manager.

Records in respect of waste inspections and compliance / classification testing are maintained by and are the responsibility of the Facility Manager and/or Assistant Facility Manager.

Records in respect of waste processing / acceptance of inert waste at the site are maintained by, and are the responsibility of the Facility Manager and/or Assistant Facility Manager.

Records in respect of environmental monitoring are maintained by, and are the joint responsibility of, the Facility Manager, the internal and external Environmental Consultants.

Site inspections are carried out by the Facility Manager or Assistant Facility Manager on a daily, bi-weekly or weekly basis as activity levels demand. A site inspection report form is completed by the Facility Manager or Assistant Facility Manager in respect of each inspection.

All records are maintained and available for inspection at the site office.

2.11 Annual Report

Roadstone Dublin Ltd., on an annual basis, in January of each year, provides the following information in an Annual Environmental Report (AER) issued to the EPA.

- Reporting period (year)
- Site name, location and licence number
- Facility Manager(s)
- Tonnage and composition of waste processed
- Rejected waste consignments
- Plans showing active and restored areas
- Environmental monitoring records
- Copy of complaints register for reporting period.
- Copy of register of pollution incidents for period
- Copy of accident / incident reports for period.

3 SITE INFRASTRUCTURE

3.1 Site Security

Vehicular access into Roadstone Dublin's landholding and the application site can only be gained via an existing private access road, approximately 930m long, known as Fassaroe Avenue. Aside from this road, there is no other vehicular access to the landholding. At the present time, the entire site boundary is closed off by post and wire fencing and/or hedgerow. Prior to commencement of backfilling and restoration activities, a detailed survey of the entire property boundary will be undertaken and where necessary, existing fences will be repaired and/or replaced and hedgerows will be strengthened or fortified by additional planting.

The only vehicles which will be permitted to access the proposed waste recovery facility will be HGV's carrying inert soil for backfilling and restoration purposes or construction and demolition waste for recovery. Planning permission in respect of the proposed quarry backfilling activity was recently granted by Wicklow County Council. The permission provides for a maximum of 100 daily truck movements each way, in and out of the proposed waste recovery facility. Planning permission for C+D waste recovery activities was previously granted in 2004.

Inert materials are accepted at the site between 08.00 hours and 17.00hours each weekday (Monday to Friday) and 08.00hours to 13.00hours on Saturday. No materials are accepted at any other time including Sundays and Public Holidays. At all other times, the front gates at the access road will be closed, thereby restricting entry.

All heavy good vehicles (HGVs) importing construction and demolition waste or soil and stone to the proposed waste recovery facility are required to pass over the weighbridge at the front of the Fassaroe site. Thereafter, they run over the existing network of internal haul roads toward the waste recovery facility.

On arrival at the Fassaroe site, HGV drivers will identify themselves to the weighbridge clerk before proceeding to the C&D waste recovery facility. The weighbridge clerk shall take a copy of the weigh docket, record the time and date of arrival, the nature and origin of the imported waste, the Client, the truck licence plate number and relevant collection permit details.

3.2 Site Roads and Parking Areas

All trucks delivering inert waste to the proposed waste recovery facility will be confined within the Applicant's landholding. Trucks will initially travel over a paved road surface leading to the existing weighbridge inside the site entrance. Thereafter they will travel over a network of unpaved internal roads to get to the waste recovery facility and the active restoration area or the C&D waste recycling area. Existing paved and unpaved haul roads across the application site are indicated on the site layout drawing in Figure EMP3.

Provision for employee and visitor car parking is currently provided on a paved area adjacent to the existing site office / retail shop, immediately inside the site entrance.

3.3 Hardstanding Areas

A temporary hardstanding area constructed of secondary aggregate is provided at the existing construction and demolition (C&D) waste recovery facility for

- (i) stockpiling and recovery of inert C&D waste imported to site;
- (ii) separation and storage (in skips) of any separated non-inert C&D wastes inadvertently mixed with it (most likely to comprise metal, timber, PVC pipes, plastic etc) and
- (iii) storage of plant, equipment and materials.

The hardstanding area is not sealed and any rain falling over this area either percolates downwards into the underlying soils or runs-off eastwards over the existing ground surface, toward the existing quarry void.

3.4 Wheelwash and Weighbridge

In order to prevent transport of soil across internal haul roads and onto public roads, a temporary wheelwash facility is located along the access route to the waste facility, as shown on the site infrastructure layout in Figure EMP3. All site traffic exiting the waste recovery site is directed through this wheelwash.

In order to track and record the amount of material entering the application site, all HGV traffic importing soil and stones or C+D waste to the waste recovery facility is directed to the existing weighbridge inside the front gate. Any secondary aggregate exported off-site and any non-inert construction and demolition waste dispatched to other licensed waste disposal or recovery facilities is also weighed at the weighbridge. Records of waste and secondary aggregate tonnages are maintained for waste auditing purposes.

3.5 Laboratory Testing

Laboratory testing of soil, surface water, groundwater and leachate is undertaken off-site at an ILAB / UKAS accredited geo-environmental laboratory (currently AIControl Laboratories, Ballycoolin, Co. Dublin). Any validation testing and laboratory testing required to confirm classification of waste as inert is undertaken by the same laboratory. All samples taken on-site will be forwarded to the laboratory on the same day and test results will typically be forwarded to site within seven to ten working days.

No environmental monitoring equipment such as pH and temperature meters, conductivity meters, flow meters and dissolved oxygen meters will be stored at the site office for the duration of the waste recovery activities. Any such equipment is brought to site by an in-house and/or independent environmental consultants as and when required.

3.6 Fuel and Oil Storage

Fuel for plant and equipment working at the facility is stored in existing fuel tanks at maintenance sheds within the Fassaroe complex. These tanks are constructed on a sealed concrete surface and are bunded to 110% of tank storage volume. Plant maintained on site principally comprises mechanical excavators and/or bulldozers, mobile crushing and screening plant. Mobile plant and equipment undertaking quarry backfilling work and/or C&D waste recovery is refuelled from mobile, double skin fuel bowsers or at maintenance sheds within the Fassaroe complex. Oil and lubricant changes and servicing of wheeled or tracked plant is undertaken at the existing maintenance shed.

Re-fuelling of HGV trucks takes place on site at the auto-diesel tanks adjacent to the existing concrete production facility, at the location shown on Figure EMP3. These tanks are constructed on a sealed concrete surface and are bunded to 110% of tank storage volume.

A small bunded tank for waste oils is currently provided at the maintenance shed and is emptied at intervals by a licensed waste contractor and disposed off-site at a suitably licensed waste facility.

3.7 Waste Inspection and Quarantine Area

Any imported waste which, it is suspected, may not comply with waste acceptance criteria for the waste recovery facility, is transferred across the waste site to a covered shed located adjacent to the concrete production facility (refer to Figure EMP3). This shed is a portal frame structure and is constructed over a sealed concrete slab. It serves as the dedicated waste inspection and quarantine facility for the waste recovery operation.

As incipient rainfall does not come into contact with consignments of suspected contaminated waste stored at the covered shed, there is no requirement to install drainage infrastructure to provide for collection and storage of potentially contaminated surface water run-off.

Visual inspection, in-situ monitoring and testing of imported waste materials is undertaken by site staff as inert waste materials are end-tipped at the active backfilling area. Should there be any concern about the nature of the soil materials being end-tipped, it will be re-loaded onto the truck and re-directed to the waste inspection and quarantine facility for closer examination and inspection. Detailed records of all such inspections are kept.

Should inspection or testing of suspect soil waste at the inspection and quarantine facility identify any non-inert material which cannot be accepted and recovered at this site, it will be segregated and temporarily stockpiled (quarantined) pending removal off-site by permitted waste collectors to a suitably licensed permitted waste disposal or recovery facility. Provision will also be made for temporary storage of any separated non-inert construction and demolition waste (including metal, timber, plastic etc.) at the waste inspection area prior to removal off-site to a licensed recovery facility.

3.8 Traffic Control

All traffic to and from the proposed waste facility travels to and from the Fassaroe Junction on the N11 National Primary Road. Traffic from the N11 runs for a short distance (approximately 600m) over the local road network, travelling initially westwards and then turning south on a public road (Kilbride Road) until it comes to a small roundabout junction with Fassaroe Avenue, a private road, approximately 930m long, leading to the entrance to Roadstone Dublin's landholding.

Internally, within Roadstone Dublin's landholding, warning notices, direction signs and speed restriction signs are established along paved and/or unpaved roads leading to and from the waste recovery facility, comprising both the active backfill area and the construction and demolition waste recycling area.

All HGV traffic egressing the application site is required to pass through the temporary wheelwash facility and the existing weighbridge inside the front gates, shown on Figure EMP3.

3.9 Sewerage and Surface Water Drainage Infrastructure

Site staff at the waste recovery facility use toilet, hand washing and welfare facilities provided at established site offices and production facilities elsewhere within the Fassaroe complex.

Rainfall across the waste licence area either runs over the ground surface to the two existing surface ponds in the bottom of the worked out quarry (designated northern and southern ponds) or percolates downwards through the unsealed ground to the underlying groundwater aquifer. Surface water collecting in the southern pond is re-used / re-circulated and used for aggregate processing (washing) at the adjacent facility.

Lowering of Water Level in Northern Pond

As backfilling of the former quarry progresses southwards from the northern end, a number of measures will be adopted to effect a lowering of the water level in the northern pond area prior to the importation and placement of inert fill materials. These include

- (i) minimisation of additional recharge by rainfall by constructing drainage channels around the edge of the pond to collect and divert overground surface water flows to the southern pond;
- (ii) construction of a temporary raised berm along the western and south-eastern boundaries of the southern pond in order to increase the capacity of water which may be pumped there from the northern pond and retained on a short term basis (pending re-use in aggregate production and/or percolation through the floor and sides to the underlying groundwater table) and
- (iii) pumping of water across the Applicant's landholding to the much larger surface water pond to the south of the concrete batching plant.

Consideration will also be given to excavating sumps through the silt layer at the sides/or base of the existing pond in order to enhance the rate of downward percolation / recharge through the unsaturated sand and gravel to the underlying aquifer. However, as the in-situ sand and gravels may be relatively silty, this measure may not enhance the rate at which the water level in the pond can be lowered.

Pumping from the existing surface water pond will be undertaken over an extended period of time, the intention being to gradually reduce the pond footprint and the area of ground under water in front of the backfill area. Importation and placement of inert materials will proceed according as water levels in the pond are lowered and an increased area of ground is exposed in front of the backfill area.

In addition to these measures, slow percolation of water through the floor of the pond also contributes to further lowering of the water level in the pond. Meteorological factors also influence the rate at which water levels fall, with reduced summer rainfall and increased temperatures contributing to reduced recharge and increased evaporation respectively.

Surface Water Management at Waste Inspection and Quarantine Facility

Any suspect contaminated waste imported to this facility is transferred across the application site to a covered shed located adjacent to the concrete production facility. As the floor of the shed is sealed by a concrete slab and as no rainfall comes into contact with consignments of suspected contaminated waste, there is no requirement for drainage infrastructure to provide for collection and storage of potentially contaminated surface water run-off at the waste inspection and quarantine facility.

Surface Water Management during Quarry Backfilling

As backfilling of the former quarry proceeds over the short-to-medium term, surface water will continue to be diverted via collector drains to the southern pond or will percolate through the ground to the underlying aquifer. Water collecting in the southern pond will continue to be re-circulated for aggregate processing (washing) at the adjacent plant or will itself discharge through the underlying unsaturated soils to the underlying groundwater aquifer.

Should there be any marked rise in water levels within this pond at any stage, excess water will be pumped to the much larger surface water pond to the south of the concrete batching plant as necessary.

As backfilling and restoration of the former quarry proceeds to its final phase, it is envisaged that surface water in the southern pond and process water from the plant will either be

- (i) pumped / re-circulated to and from the much larger surface water pond to the south of the concrete batching plant or
- (ii) pumped / re-circulated to and from more modest scale replacement settlement ponds to be located on undisturbed ground immediately south of the existing sand washing plant.

During and after the final phase of backfilling, ground contours and/or drainage channels will be modified as necessary to ensure that surface water run-off across the site is re-directed to sumps for pumping to the larger surface water pond or the replacement settlement ponds.

At no time during the backfilling works or the operation of the construction and demolition waste recovery facility will surface water run-off be directed to watercourses or ponds beyond the site boundary.

3.10 Site Services

Electric power, lighting and heating are all provided via the electricity network to the existing site offices at the Fassaroe complex. Permanent telephone (landline), fax and e-mail facilities are all available at the existing site office. Site staff overseeing backfilling and recovery operations at the application site are contactable by mobile phone.

Given the lack of combustible waste materials at this site, it is highly unlikely that a fire will break out during backfilling and recovery operations. Fire extinguishers are kept at the site office to deal with any localised small scale fires which might occur.

The Dublin City Council watermain carrying drinking water from the Roundwood reservoir to the city runs through the middle of the waste site. Apart from internal water supply and wastewater pipework and a short section of buried electrical cable west of the block yard, no other buried services are understood to occur across the application site. Several overhead electricity transmission cables criss-cross the waste site.

3.11 Plant Sheds and Equipment Compounds

Plant and equipment used in the backfilling and/or recovery activities is stored on the temporary hardstanding area at the application site and/or at the existing plant maintenance sheds. Given the restricted access into the Fassaroe site, it is not necessary to provide a secure compound at the waste recovery facility.

No dedicated workshops are provided at the waste recovery facility. Any plant or equipment requiring specialist repair or overhaul is taken to the existing maintenance sheds at the front of the site.

3.12 Site Accommodation

There is a fully serviced permanent site office located at the entrance to the Fassaroe site. This office is used for all administration and management functions for the waste recovery facility. Staff changing, washing and cooking facilities is provided at pre-existing staff facilities at the Fassaroe site.

3.13 C&D Waste Recovery Infrastructure

Inert construction and demolition waste imported to site is recycled at the existing hardstanding area, shown in Figure EMP3. Any metal waste is separated and placed in a skip pending removal off site to a licensed recovery facility. Any other non-inert waste (timber, plastic etc.) is also separated off and placed in a skip pending removal off-site by permitted waste collectors to a licensed disposal or recovery facility.

Construction and demolition waste is recycled by passing it through a mobile crushing plant which is brought to the facility periodically, once sufficient quantity of recycleable material has accumulated. The crushing plant produces a particulate, granular fill which may be used to construct hardstanding areas or temporary haul roads.

A site layout plan, showing the location of all site infrastructure is provided in Figure EMP3.

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4 DESIGN OF WASTE RECOVERY FACILITY

4.1 General

The design of the waste recovery facility has been carried out on the basis that the waste placed within the repository is classified as inert.

4.2 Formation Levels and Gradients

Backfilling of the former quarry has been sub-divided into four separate phases to facilitate progressive restoration and reinstatement to agricultural grassland, refer to Figure EMP4.

Formation levels for backfilling across the former quarry are taken to be equivalent to existing / former ground levels. During each phase of restoration / backfilling, the upper surface of the backfilled materials is graded so as to ensure surface water run-off falls to the floor of the former quarry and thereafter, via a network of drainage channels through the basal silt, toward the southern pond. As the surface water pond on the quarry floor is not hydraulically connected to the groundwater table, no intermediate settling ponds are provided as suspended solids in surface water run-off settle out in the surface water pond.

Temporary access ramps into and out of the active backfilling areas are generally be constructed at a gradient of approximately 1v:10h. Temporary side slopes are constructed at gradients no greater (steeper) than 1v:1.5h in order to ensure stability. On completion, final gradients across the restored ground surface will be very shallow, generally no greater than 1v:15h, as indicated on Figure EMP4.

Surface water ponds occur at a number of locations across the site. In order to ensure proper placement and compaction of the imported soils (in the dry), surface water is gradually pumped out of these ponds to others elsewhere within the Fassaroe complex. Sumps are constructed as required to assist in the collection and removal of surface water from the quarry.

4.3 Capacity and Lifespan

The estimated volume of material to be placed at the application site is approximately 750,000m³. The duration of backfilling activities at the quarry void will largely be dictated by the rate at which approximately 620,000 tonnes of externally sourced inert soil and stone is imported to the site. The waste intake rate is controlled by a number of variables, and as such calculation of intake rates and duration is not an exact science.

At the present time, assuming 50 working weeks in each calendar year, 5.5 days per working week and 10 hours per working day, it is estimated that the rate of importation of inert materials to the quarry void could vary between 100,000 tonnes and 550,000 tonnes per annum (the maximum equivalent permitted by the recent planning permission issued by Wicklow County Council).

The corresponding duration of backfilling activities could therefore vary from just over 1 year to 7.5 years. Assuming an average importation rate of 200,000 tonnes/year, the expected duration of quarry backfilling activities will be just over 3 years.

Recovery of imported and site-generated C&D waste will continue while backfilling, restoration and aftercare management activities progress at the former quarry. It is however envisaged that recovery of C&D waste will continue for some time following completion of quarry backfilling activities.

4.4 Capping and Decommissioning

The site will be restored on a phased basis to give a landform similar to that existed prior to extraction of sand and gravel. On completion, the final landform will be profiled to give a domed shape in order to facilitate surface water run-off into the in-situ sand and gravels along the site boundary, refer to final site contour map in Figure EMP4.

A cover layer comprising 150mm of topsoil and approximately 300mm of subsoil shall be placed over the inert backfilled materials on completion of each phase of restoration. This will be immediately planted with grass in order to promote stability and minimise soil erosion and dust generation. The lands will then be progressively returned to use as agricultural grassland.

Topsoil and subsoil is imported to the site on a continual basis and is not used in the general backfilling of the site. The topsoil and subsoil is stockpiled pending re-use in the phased backfilling and restoration of the site. They are stored separately within the application site, away from the active backfilling area and in such location and manner as not to create any temporary adverse visual impact.

On completion of the fourth (and final) phase of the restoration works, all mobile plant and equipment associated with the backfilling, placement and compaction of soil will be removed off site. Any dedicated infrastructure and/or services will also be progressively decommissioned and removed off-site. Any plant and equipment required for C&D waste recovery activities will however remain in place.

Wherever necessary, hardstanding surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use within the Applicant's landholding for construction of haul roads and/or other hardstanding areas. Any materials which are found to exceed inert waste criteria will be transferred-off site to a suitably licensed waste disposal or recovery facility.

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5 WASTE HANDLING AND EMPLACEMENT

Only inert, uncontaminated soils and construction and demolition waste, consistent with the European Waste Catalogue codes indicated in Section 2.6, are accepted at the site.

Inert materials are accepted at the site between 08.00 hours and 18.00hours each weekday and 08.00hours to 13.00hours on Saturday. No materials are accepted at any other time.

5.1 Soil Recovery Activities

Insofar as practicable, the source of each consignment of soil imported to site for backfilling purposes is identified in advance and subject to basic characterisation testing to confirm that soils at that location can be classified as inert. Limit values for inert soils are in accordance with those set by *Council Decision 2003/33 of 19 December 2002 establishing criteria for the acceptance of waste at landfills*. Characterisation testing is generally undertaken by Clients and/or Contractor's forwarding soil to the site.

All inert soils imported to the site are unloaded (end-tipped) from trucks at the active backfilling face. They are visually inspected by site personnel at that point to ensure that there is no intermixed non-hazardous or hazardous waste placed within it. Should there be any concern about the nature of the waste being end-tipped, the suspect material is segregated (if required), re-loaded onto the truck and directed to the waste inspection and quarantine area for closer inspection and classification. A detailed record is kept of all such inspections.

Should inspections and/or subsequent testing indicate that the materials are non-inert and cannot be accepted and recovered at this site, they will be placed in skips and covered pending removal off-site by permitted waste collectors to a suitably licensed / permitted waste disposal or recovery facility.

In addition to the above, a representative sample is taken from one in every 250 loads of inert soil accepted at the facility and subjected to a less extensive scope of testing (compliance testing) focusing on key contaminant indicators. These data shall be used to confirm that the accepted soils are inert and comply with acceptance criteria. Compliance testing is undertaken by the Licensee.

5.2 Construction and Demolition Waste Recovery Activities

The processing and/or recovery of construction and demolition waste activities at the site will be restricted to stones, granular fill, concrete, blocks, bricks and ceramic tiles. If any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) occurs amongst the waste imported to site, it is separated out and temporarily stored in skips prior to removal off-site to appropriately licensed waste disposal or recovery facilities.

All construction and demolition waste forwarded to the site for recovery purposes is pre-sorted at source and should be free of any non-hazardous / hazardous domestic, commercial or industrial wastes. Any consignments of construction and demolition waste which have such materials intermixed in them are immediately rejected and removed off site.

6 RESTORATION AND AFTERCARE

The main waste activity undertaken at the site is the recovery of inert soils in backfilling and restoring a former gravel quarry. The site will be restored on a phased basis to give a landform which merges into the surrounding undulating pastoral landscape, refer to final site contour map in Figure EMP4. Details of the phasing plan are also provided on Figure EMP4.

On completion, the final landform will be profiled to give a domed shape in order to facilitate surface water run-off into the in-situ sand and gravels along and beyond the site boundary. It will then be planted with grass in order to promote stability and minimise soil erosion and dust generation. The restored lands will be progressively returned to use as agricultural grassland.

On completion of the fourth (and final) phase of the restoration works, all mobile plant and equipment associated with the backfilling, placement and compaction of soil will be removed off site. Any dedicated infrastructure and/or services will also be progressively decommissioned and removed off-site. Any plant and equipment required for C&D waste recovery activities will however remain in place.

Wherever necessary, hardstanding surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use within the Applicant's landholding for construction of haul roads and/or other hardstanding areas. Any materials which are found to exceed inert waste criteria will be transferred-off site to a suitably licensed waste disposal or recovery facility.

Following completion of the restoration and site decommissioning works, provision will be made for further, short-term (<1year) environmental monitoring of air, surface water and groundwater.

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7 ENVIRONMENTAL CONTROLS

7.1 General

The ongoing waste recovery activities at the site require a number of environmental controls to eliminate or minimise the nuisance to the public arising from the importation, placement and compaction of inert soils, the importation and recovery of construction and demolition waste and export of processed materials from the site.

7.2 Dust Control

In dry, windy weather conditions, the ongoing recovery activities may give rise to dust blows across, and possibly beyond the application site. In order to control dust emissions, the following measures will be implemented:-

- (i) water from a tractor drawn bowser will be sprayed on dry exposed soil surfaces (including unpaved road surfaces) as and when required;
- (ii) the site shall be restored in a phased manner and each phase shall be grassed as soon as practicable after placement of cover soils in order to minimise soil erosion and potential dust emissions;
- (iii) the area of bare or exposed soils will, insofar as practicable, be kept to a minimum. Consideration will be given to establishing temporary vegetation cover over temporary slopes pending final backfilling and restoration to original ground level;
- (iv) all HGV's exiting the site shall be routed through a temporary wheelwash facility at the end of the internal paved site road (refer to Figure EMP3) in order to minimise transport of fines by HGVs on paved internal site roads and the public road network;
- (v) Stockpiling of imported soils will be minimized. Soils will ideally be placed and compacted in-situ immediately after being unloaded. If and when temporary stockpiling of soils is required, they will be placed as close as practicable to the centre of the site, away from nearby residences.

The amount of dust or fines carried onto the public road network will be further reduced by periodic sweeping of internal paved site roads and the existing local road leading to the site (Fassaroe Avenue).

7.3 Traffic Control

The proposed backfilling operations at the Fassaroe Plant entail the importation of 620,000 tonnes of material required to fill the void. This translates to a total of 31,000 HGV movements at 20 tonnes per load to fill the quarry void. Roadstone Dublin Ltd has defined an optimistic scenario where it would be possible to fill the void at Fassaroe possible to fill the void at Fassaroe in just over a one year period. Although it is likely that it will take longer to fill this void, as a result of depressed market demand at the present time, this scenario has been adopted as the worst case traffic impact scenario.

The quarry backfilling and restoration works will result in an increase in traffic volumes upon Fassaroe Avenue. In the worst case scenario this increase in traffic volumes will result in an additional 20No. HGV vehicles during the peak hour period.

Traffic studies indicate that even in the worst case scenario, there is adequate opportunity scenario for vehicles to enter and exit the residential properties along Fassaroe Avenue without undue delay. As the increase in traffic movements along Fassaroe Avenue will increase the possibility of an accident occurring for vehicles exiting these properties, provision is made for local re-alignment of the road and establishment of a buffer zone outside the properties, thus improving road visibility.

7.4 Road Cleansing

In order to prevent transport of mud and potential contaminants on internal and public roads, a temporary self-contained wheelwash facility is provided along the paved road leading out of the waste recovery area, refer to the site infrastructure layout in Figure EMP3.

The amount of mud carried onto the public road network is further reduced by periodic sweeping of the paved internal access road and the existing local road in front of the site.

7.5 Fire Control

As the materials being placed or recovered at this site are free of flammable materials and biodegradable waste which could create a fire or explosion risk, site activities will not present a fire risk. Accordingly, no specific fire control measures shall be implemented at the site.

Notwithstanding this, the following operational practices are implemented in order to prevent fires at the site:

- (i) smoking at the site and at the temporary dedicated site office is prohibited
- (ii) any biodegradable or flammable waste included in materials imported to site is immediately transferred to the waste quarantine area pending removal off-site to a licensed waste disposal or recovery facility
- (iii) plant and equipment is removed if they exhibit signs of overheating etc.

In the unlikely event that a fire does occur, the local fire stations in Bray and Wicklow will be contacted and emergency response procedures will be implemented. Fire extinguishers (water and foam) will be provided at the temporary dedicated site office to deal with any small outbreaks which may occur.

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8 ENVIRONMENTAL MONITORING

8.1 General

The programme of environmental monitoring at the site complies with the requirements of the waste licence issued by the Environmental Protection Agency.

Environmental sampling, monitoring and testing will largely be undertaken by in-house and independent external consultants as required. Records of environmental monitoring and testing will be maintained on-site and will be forwarded to the EPA as required under the terms of the waste licence.

Monitoring locations are shown on Figure EMP5.

8.2 Dust Monitoring

Dust emissions from activities at the site are measured using Bergerhoff dust gauges at 3 No. locations across the site, shown on Figure EMP5. These gauges are located along the boundary of the site, close to the nearest sensitive receptors, all of which are private residential properties.

The dust monitoring regime will remain in place for the duration of waste recovery activities at the site.

8.3 Ecological Monitoring

In the absence of any rare or vulnerable species of flora or fauna at, or in the immediate vicinity of the site, it is not intended to undertake any ecological monitoring while the waste recovery facility is operational.

8.4 Groundwater Monitoring

Groundwater sampling and testing is undertaken by external consultants on a bi-annual basis at 3 No. groundwater monitoring wells installed within the waste site. Groundwater levels are also recorded on a bi-annual basis. The location of existing groundwater monitoring wells is indicated in Figure EMP5.

Groundwater samples are tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site. Further detail on these data is presented in Section 6 of the Environmental Impact Statement submitted with the Waste Licence Application.

The groundwater monitoring regime will remain in place for the duration of waste recovery activities at the site.

8.5 Meteorological Monitoring

No meteorological monitoring is undertaken at the site. Temperature, rainfall, sunshine, wind speed and direction are recorded at a nearby synoptic weather station in Bray, approximately 2km east of the site. Other climatic data is recorded at the weather station at Casement Aerodrome, Baldonnell approximately 22km west northwest of the site. Representative meteorological data is acquired from weather stations at Naas and Casement Aerodrome, as and if required.

8.6 Noise Monitoring

Noise emissions from waste recovery activities are monitored on a quarterly basis (i.e. three monthly) basis at 4 No. noise sensitive sites within and around the waste site, close to the nearest sensitive receptors, all of which are private residential property. The noise monitoring locations are indicated in Figure 5.

The noise monitoring regime will remain in place for the duration of waste recovery activities at the site.

Noise monitoring will be undertaken using a Larson Davis Model 824 Sound Level Meter, calibrated using a Larson Davies Acoustic Calibrator CAL 200 (or equivalent).

8.7 Surface Water Monitoring

Surface water sampling and testing is undertaken by external consultants on a bi-annual basis (i.e. six monthly) basis at the southern pond on the quarry floor. The location of the proposed surface water monitoring location is indicated on Figure EMP5.

Surface water samples will be tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site. Further detail is presented in Section 6 of the Environmental Impact Statement submitted with the Waste Licence Application.

It is currently envisaged that the surface water monitoring regime will remain in place for as long as these surface water bodies remain at the site (ie. until they are backfilled with inert materials).

8.8 Stability and Settlement Monitoring

On completion of each phase of restoration, a number of fixed stations are set into the ground surface across the restored area and surveyed annually in order to assess the magnitude of settlement and instability (lateral movement), if any, which subsequently arises.

Temporary slopes developed in both natural in-situ soil along the perimeter of the former extraction area and in the backfilled soils are visually inspected on an ongoing basis, at least once a month by site staff and a record is kept of same. Should these inspections give cause for concern, an inspection of the affected area will be undertaken by an appropriately qualified engineer and measures will be implemented to address any instability identified.

Following completion of quarry backfilling works, monitoring will be undertaken as required by the waste licence.

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9 HEALTH AND SAFETY

Details of Health and Safety Procedures implemented are contained in the Health and Safety Plan.

This plan is subject to ongoing development, revision and updating while the waste recovery facility is operational. A copy of the Health and Safety Plan and any additions thereto is provided to all key staff and to sub-contractors. A copy is also available for inspection at the site office.

The Facility Manager is responsible for the on-site implementation of the Health and Safety Plan. Staff are fully briefed on the safety risks and responsibilities associated with ongoing backfilling and recovery activities and shall attend relevant courses on waste management and operations as required. The need for additional training is kept under review.

Safety meetings and briefings shall be held on site at regular intervals. Particular attention is paid to the risks presented by

- moving plant and equipment
- working beneath overhead cables
- slope instability.

All site staff, sub-contractors and hauliers (either site-based or delivering materials to site) are issued with instructions to wear high visibility safety gear, helmets, steel cap boots etc. while on site. Where instructions are not obeyed, a written warning is sent to the relevant employee / sub-contractor / haulier. In the event of further breaches, the employee / sub-contractor / haulier is removed off site.

Site staff, sub-contractors and hauliers are issued with, or required to have, the following personal protective equipment

- High visibility vests
- Necessary safety boots with steel caps and soles – rubbers and leathers.
- Necessary safety hats (with anti-dust visors if necessary)
- Necessary coats / overalls
- Masks
- Goggles
- Wet Gear

In an emergency situation, the 999 emergency call-out number is used. A record book of accidents is maintained by the Facility Manager. In the event of an accident, a written report is prepared and forwarded to the relevant agencies as required by law.

A first aid box is provided on site at the temporary site office at the entrance to / egress from the site.

All personnel involved in waste recovery activities will be offered injections for both Hepatitis and Tetanus.