ATTACHMENT E

ENVIRONMENTAL LIABILITIES RISK ASSESSMENT (ELRA)

global environmental solutions

INERT WASTE RECOVERY FACILITY
HUNTSTOWN QUARRY
FINGLAS, DUBLIN 11

Environmental Liabilities Risk Assessment

Roadstone Wood
The Right Choice

December 2013
SLR Ref: 501.00180.00074 ELRA Rev0

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1.0 INTRODUCTION AND BACKGROUND

1.1 Scope

SLR Consulting Ireland (SLR) was commissioned by Roadstone Wood to prepare an independent Environmental Liabilities Risk Assessment (ELRA) in relation to its proposed Inert Waste Recovery Facility to be established at its existing worked out quarry at Huntstown, Finglas, Dublin 11.

The ELRA has been requested, together with other information, by the Environmental Protection Agency (EPA) in order to ensure that the waste licence application for the proposed facility submitted in 1st November 2013 (Ref. No. W0277-01) complies fully with the requirements of Article 12 of the Waste Management (Licensing) Regulations.

The EPA has requested the following:

"*Prepare a fully detailed and costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities and potential liabilities from past and proposed activities, including those liabilities and costs identified in the CRAMP. Provide evidence that the assessment was prepared or reviewed, and was found to be complete and accurate, by an independent and appropriately qualified consultant or expert*."

This ELRA has been prepared with regard to EPA publications '*Guidelines on Environmental Liability, Risk Assessment, Residuals Management Plans and Financial Provision' (2006)* and *'Draft Guidance on Assessing and Costing Environmental Liabilities' (July 2013).*

1.2 About SLR Consulting

SLR Consulting is a major international multi-disciplinary environmental consultant, employing 900 staff in Ireland, the UK, North America, Australia and South Africa. In Ireland, the company trades as SLR Consulting Ireland, and employs around 30 environmental specialists, engineers and support staff at offices in Dublin and Hillsborough.

Recent Clients of SLR include the European Union, national governments, government departments, international lending agencies, UK and Irish regional and local authorities / agencies, waste treatment technology providers and private sector waste management companies.

SLR employs the largest team of waste management experts in the UK and Europe. Around 150 staff in Ireland and the UK is employed on a full-time basis on waste management projects. Specialist staff are employed across 30 separate technical disciplines.

2.0 SITE DESCRIPTION AND OPERATION

2.1 Site Description

The proposed facility is located entirely within the existing Huntstown Quarry complex, in the townlands of Huntstown and Kilshane, in north County Dublin. It is located approximately 2.5km north-west of the suburb of Finglas, as shown on an extract from the 1:50,000 scale Ordnance Survey Discovery Series map of the area, reproduced as Figure 1.

The application area covers an area of approximately 36.1 hectares (87 acres) and comprises a limestone quarry with perimeter screening / overburden mounds and some existing ancillary site infrastructure (offices, maintenance sheds, hardstand areas, water settlement ponds, fuel storage, etc.) shared with existing quarrying and concrete and asphalt production businesses at the Huntstown Quarry Complex.

Ground levels across the site have been significantly disturbed by previous quarrying activities. The original ground levels around the worked-out quarry vary between approximately 62mOD and 66mOD (Malin) along the eastern face and between 80mOD and 85mOD along the western face. Existing ground levels immediately behind the quarry faces are locally 5m to 10m higher than surrounding ground due to the presence of perimeter screening mounds. The existing quarry void covers an area of approximately 11.2 hectares (27.0 acres) within the waste recovery site and is shown on Photo 1 below, an aerial view of the site as seen on Google Earth.

Photo 1
Aerial View of Site from Google Earth (July 2013)

The existing floor level in the quarry lies at approximately 38mOD to 39mOD and its depth from the original (surrounding) ground level therefore varies from 24m to 28m along its eastern face and 42m to 47m along its western face.

Some restoration work was undertaken at the northern end of the waste recovery site in the period from late 2002 to the end of 2003. At that time, a large volume of inert excavation spoil was imported to site and used to backfill the quarry void in that area. Since that time there has been only minor progress in the site restoration works. It is envisaged that future restoration and backfilling work in this area will proceed in accordance with the terms of a waste licence issued by the Agency.

The proposed recovery of inert soils at the North Quarry will provide for complete backfilling of a large open void above the groundwater table, facilitate the restoration of the worked out lands to agricultural use and improve protection of the underlying groundwater resource, which is currently classified as 'extremely vulnerable' due to the absence of any protective soil cover. Photo 2 below shows the quarry void in December 2013.

Photo 2
View of Northern Quarry Void in December 2013

2.2 Surrounding Land Uses

The waste recovery site is located entirely within an existing quarry complex. The land immediately south-east of the backfill and restoration area is used for the processing of aggregates and manufacture of concrete and asphalt products. The lands immediately to the south of the application area are currently used, or intended to be used, for aggregate extraction, while the lands to the immediate west, north and north-east of the waste recovery site are primarily used for agricultural grassland.

At a greater distance, the Huntstown Power station (operated by Viridian), North Road and recently constructed N2 Dual Carriageway all lie to the east of the waste recovery site. The M50 motorway and the proposed alignment for the Metro West light rail line both lie to the south, while the lands to the south west and west have been developed as light industry and science and technology parks (Ballycoolin Business Park, Rosemount Business Park, Millennium Business

Park and Northwest Business Park). The lands to the north are still used predominantly as agricultural grassland.

Approximately 10 No. residential properties are clustered along the R135 Regional Road (the former N2 National Primary Road, also known as the North Road) to the east of Roadstone Wood's landholding and the Kilshane (or Cappagh) Road to the west. The M50 Motorway is located to the south of the landholding, while the N2 Dual Carriageway linking Dublin and Ashbourne, Co. Meath is located east of it.

Existing land-use in the vicinity of the waste recovery site, including residential and industrial development, is shown on the land-use map in Figure 2.

2.3 Site Operation

2.3.1 Former / Existing Quarry Activities

The excavation and blasting of limestone has been undertaken at the Huntstown Quarry Complex for the past four decades, following grant of an outline permission in or around 1969. It is understood that quarrying at the northern and central areas was commenced at some time in the early-to-mid 1980's, on foot of a planning permission granted in 1982.

A 10 year planning permission (Ref. No. 93A/1134 and P06F.092622) was granted in 1994 to continue quarrying and for production of related concrete materials. Planning permission for the existing construction and demolition waste recycling facility in the centre of the quarry complex was granted in 2002 (Ref. No. F02A/0602 and PL06F.200623). Planning permission was granted in 2004 for continuation of quarrying for a further 10 year period (Ref. No. F03A/1430 and PL06F.206789).

This current proposal to backfill the worked out quarry with in-situ and imported inert soil and stones is part of the quarry restoration works which were previously notified and agreed with Fingal County Council in 2002 in accordance with Condition No. 17 of 1994 planning permission. These works were commenced in the 2002-2003 period, but have progressed only intermittently since that time. Quarry backfilling works have previously been controlled by a series of waste permits issued by Fingal County Council.

Roadstone Wood discharges groundwater from quarry dewatering and process water from aggregate washing and concrete production activities via a series of existing settlement ponds to tributary streams of the Ward and Tolka Rivers. Discharges are controlled by way of a licence originally issued by Dublin County Council in January 1987 and later reviewed and re-issued by Fingal County Council in November 2011 (Ref. WPW/F/0008-01).

2.3.2 Recovery of Inert Soil and Stone

The waste licence application provides for the placement, compaction and capping of approximately 3,840,000m^3 of inert soil and rock. Of this, only a relatively minor quantity, approximately 50,000m^3, will be sourced from existing mounds and stockpiles on site, leaving a net import requirement of approximately 3,790,000m^3.

The inert soil and rock to be re-used and recycled at this facility will be sourced from construction and demolition sites where inspection and/or testing have indicated that no contamination is present. The inert materials will be imported by permitted waste contractors.

It is likely that minor quantities of other inert materials, principally oversize or recovered (i.e. crushed and screened) concrete and bricks will be imported to the waste recovery site and used to construct temporary haul roads as and when required. These materials could be imported directly to site or sourced from an adjoining construction and demolition waste recovery facility which is operated by Roadstone Wood Ltd. within the existing Huntstown Quarry Complex.

2.4 Site Infrastructure

The established site facilities, mobile plant and fixed infrastructure at the proposed waste recovery facility at Huntstown are listed below. Most of the site facilities and infrastructure are

shared with the adjoining / co-located construction material production facility and have been in place for many years. The principal site facilities are located on Figure 3 of this report.

- Buildings: site office, staff welfare facilities, canteen, plant maintenance shed; waste quarantine shed.
- Site Security: security barriers at two site access points manned by security staff on a 24 hour, 7 day a week basis.
- Fixed Infrastructure: paved / unpaved internal road network; paved employee and visitor parking areas, hardstanding, wheelwash; weighbridge, fuel / oil storage facilities.
- Services: overhead electricity wires, water supply pipes (connected to local authority watermain).
- Surface Water: Drains and settlement ponds; septic tank and associated sewerage pipework serving welfare facilities.
- Plant and Machinery: re-fuelling plant; mechanical excavators; bulldozers; pumps.

Assuming co-located production activities continue following cessation of waste recovery activities at Huntstown, much of this infrastructure (either existing or replaced) will remain in place and continue to be used after that time.

2.5 Storage of Fuels and Other Dangerous Materials

Plant maintained on site will principally comprise mechanical excavators and/or bulldozers. Mobile plant and equipment undertaking quarry backfilling works will be refuelled from mobile, double skin fuel bowsers or at the existing bunded fuel tanks within the Huntstown facility.

There are two large fuel tanks contained by steel bunds located close to the maintenance shed and shown in Photo 3 below. The Road Diesel Tank has a capacity of 44,000 litres and the Marked Diesel (Gasoil) tanks has a capacity of 53,000 litres.

Photo 3
Bunded Fuel Tanks Close Maintenance Shed

All pumps and valves are contained within the bunds and the fuelling area drains to a hydrocarbon interceptor prior to discharge to surface water via the quarry water management system.

Oil and lubricant changes and servicing of wheeled or tracked plant will be undertaken at the existing maintenance sheds. Four tanks are provided in a back room in the maintenance shed as follows:

- 600 gallon (2,730 litres) double skinned steel tank containing diesel engine lubricant
- 600 gallon (2,730 litres) double skinned steel tank containing hydraulic oil
- 300 gallon (1,365 litres) double skinned steel tank containing transmission fluid
- 300 gallon (1,365 litres) double skinned steel tank containing transmission fluid

Two of these tanks are shown on Photo 4 below.

Photo 4
Hydrocarbon Tanks in Maintenance Shed

A 600 gallon (2,730 litres) double skinned steel waste oil tank is provided at the back of the maintenance shed as shown in Photo 5 below. This tank is emptied at intervals by a licensed waste contractor and recovered off-site at a suitably licensed waste facility.

Photo 5
Waste Oil Tank at Back of Maintenance Shed

The maintenance shed also contains a number of 200 litre drums containing various hydrocarbon fluids and gels. These are stored in a bunded area or on bunded pallets as shown on Photo 6 below:

Photo 6
Storage of Drums in Maintenance Shed

2.6 Acceptable Waste Materials

Clean, inert soil and stone is likely to be sourced from greenfield development sites and/or excavations at uncontaminated urban sites. Soil with significant proportions of intermixed construction and demolition waste will not be accepted at the facility.

The total void space to be backfilled and restored is approximately 3,840,000m^3. A target compaction density of 1.9t/m^3 is assumed for tonnage assessment purposes, giving a requirement for approximately 7,295,000 tonnes of inert soil and/or subsoil.

Of the total inert soil requirement, no more than 50,000m^3 (95,000 tonnes) will be sourced from existing stockpiles and mounds around the existing quarry complex. All remaining inert materials to be used in the restoration of the waste recovery site (approximately 7,200,000 tonnes) will be imported from external development or construction sites

In addition to the above, a relatively small quantity of inert construction and demolition waste (principally concrete, block and/or brick) will be imported to construct temporary haul roads across the site as backfilling works proceed.

The duration of backfilling activities at the quarry void will largely be dictated by the rate at which approximately 7,200,000 tonnes of externally sourced inert soil and stone is imported to the site. There are many factors which will influence this in turn, including, but not limited to,

- Availability of acceptable inert materials at construction sites
- Prevailing economic climate
- Construction industry output
- Distance of construction projects from the facility (and scale or duration of same)
- Logistical and/or programming constraints at sites generating inert materials
- Climatic conditions (reduced construction activity in wet weather)
- 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. It is estimated that the importation of inert materials to the quarry will average 400,000 tonnes per annum. The intake at the facility could increase to a maximum of 750,000 tonnes per annum were a large scale infrastructure or development project(s) to proceed within the surrounding catchment area over the operational life of the facility.

At the present time, assuming 50 working weeks in each calendar year, 6 days per working week, 10 hours per working day and an average importation rate of 400,000 tonnes/year, the expected operational life of the facility will be of the order of 18 years. This equates to an average of 1,333 tonnes per day.

In view of the difficult economic climate which exists at the present time, intake tonnages may be lower of the next few years (2014-2015) and over that time, the facility may only operate on an intermittent, project specific basis.

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:

Table 2-1
Inert Materials to be Accepted at Huntstown

EWC Code	Description
17 01 01	Concrete
17 01 02	Bricks
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
20 02 02	Soil and stones

The estimated annual quantities to be recovered are indicated for the five year period 2014-2018 below:-

Table 2-2
Estimated Quantity of Materials to be Accepted at Huntstown

Year	Inert soil / stones for recovery (tonnes / annum)	Total annual quantity of waste (tonnes / annum)
2014	400,000 (e) 750,000 (max)	400,000 (e) 750,000 (max)
2015	400,000 (e) 750,000 (max)	400,000 (e) 750,000 (max)
2016	400,000 (e) 750,000 (max)	400,000 (e) 750,000 (max)
2017	400,000 (e) 750,000 (max)	400,000 (e) 750,000 (max)
2018	400,000 (e) 750,000 (max)	400,000 (e) 750,000 (max)

Note (e) = estimate

A minor proportion of inert soil imported to the proposed facility will comprise organic rich topsoil capable of sustaining vegetation growth. This material will be stockpiled as required pending re-use in restoration of the quarry and the wider site area.

2.7 Environmental Emissions

As the materials used to backfill and restore the waste recovery site are inert and non-biodegradable, they do not generate leachate or landfill gas. Accordingly, waste recovery activities at the site present only very low risk of groundwater contamination, no risk of landfill gas emissions and no risk of bird, litter, odour or vermin nuisance.

Other potential emissions are addressed individually below.

2.7.1 Dust Emissions

Dust will be generated during backfill operations in dry weather and particularly during extended periods of dry weather. Dust emissions will be controlled and minimised by the following measures:

- water will be sprayed from a tractor drawn bowser on dry exposed surfaces (paved roads, unsealed haul roads and hardstand areas)
- dust blows will be partially screened by the quarry side walls as backfilling progresses upwards. As the level of the backfilled materials approaches final surface levels, the site will be seeded with grass on a phased basis, as soon as practicable after placement of cover soils (subsoil and topsoil). This will help to minimise soil erosion and potential dust emissions;
- 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 exposed soil surfaces and stockpiles pending backfilling and restoration to final ground levels;
- all HGV's exiting the site shall be routed through the existing water bath / wheelwash in order to minimise transport of fines by HGVs on the access road and public road network;
- 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 public roads;

- stockpiling of imported soil materials will be minimized. Soils will ideally be placed and compacted in-situ immediately after being imported to site and end tipped. If and when temporary stockpiling of soil is required, it will be placed as far as practicable from nearby residences.

2.7.2 Noise Emissions

Noise at the waste recovery site will be generated by HGV truck movements and by earthworks equipment (bulldozer) during backfilling phase. There are no fixed (point) noise sources at the site.

There will, in a worst case scenario, be a minor incremental increase in noise levels generated at the waste recovery site over and above existing ambient levels (which have reduced slightly in recent years due to scaling back of extraction and concrete production activities). In the medium to long-term, on completion of the quarry restoration works, there will be lower noise emissions from the site.

2.7.3 Emissions to Surface Water

The proposed waste licence facility lies at the edge of the catchment area for the Ward River which runs approximately 4km north of the site. The nearest watercourses to the proposed facility are artificial (man-made) ditches and/or small tributary streams on the eastern side which flow north towards the Ward River.

The only sub-surface water drainage infrastructure at the site exists across the central infrastructure area where aggregate processing and concrete production activities are currently concentrated. Rain falling across the remainder of the application area either

- runs over unsealed ground into the existing quarry void and the pond on the eastern side of the quarry floor
- percolates down through the existing soil / rock at the ground surface as recharge to groundwater, at which point it joins groundwater flow toward the quarry face.

At the present time, groundwater levels at the North Quarry are lowered by means of sumps in the quarry floor. Surface water falling across the quarry and dewatered groundwater are collected in a pond on the eastern side of the quarry floor and pumped to an existing drainage channel / watercourse at original ground surface level via an existing pipe network. Water pumped to this channel is routed via existing settlement lagoons to discharge to a tributary stream which runs northwards out of Roadstone Wood landholding toward the Ward River. This discharge is regulated by way of a discharge licence issued by Fingal County Council.

During the proposed quarry backfilling operations, the upper surface of the backfilled soil will be graded so as to ensure that surface water run-off falling over the quarry footprint falls to sumps at temporary low points within the quarry floor or backfilled material. These temporary sumps will effectively function as primary settlement ponds and water collecting in them will be pumped (causing minimum agitation to ponded water) to the existing drainage channel / watercourse on the eastern side of the quarry. Water pumped to this channel will be routed via the existing settlement lagoons to discharge to the tributary stream which runs north toward the Ward River. Should it ever be necessary, additional settlement ponds and/or an oil interceptor can be provided to achieve discharge emission standards.

Any suspect contaminated waste imported to the proposed waste facility will be transferred to a covered shed in the south eastern corner of the site. As the floor of the shed is sealed by a concrete slab and as no rainfall will come into contact with consignments of suspected contaminated waste, there is no requirement to install drainage infrastructure to provide for the separate collection and storage of potentially contaminated surface water run-off at the waste inspection and quarantine facility.

In the longer term, toward the end of the quarry backfilling works, the final restoration surface within and around the backfilled quarry void will be modified to ensure that surface water run-off across the area falls eastward toward the tributary stream of the Ward River (refer to the proposed restoration plan in Figure 4).

2.7.4 Emissions to Sewer

There will be no emissions to public (Local Authority) sewers associated with the operation of the proposed waste recovery facility.

Roadstone Wood Ltd. currently has one existing wastewater effluent (septic) tank servicing its existing staff facilities at Huntstown. Any wastewater effluent produced at staff facilities is discharged to the septic tank.

2.8 Site Monitoring

There is an established programme of environmental monitoring in connection with ongoing rock extraction, aggregate processing and concrete / asphalt production activity across the Huntstown Complex. This environmental monitoring programme complies with the requirements of existing planning permissions and discharge licences issued in respect of these activities by Fingal County Council.

In addition, Roadstone Wood operates an environmental management programme to monitor and manage emissions from established operations. Although limit values for environmental emissions arising from these activities are identified by existing consents, it is expected that these limits will also be adopted by the EPA in the event it issues a waste licence in respect of the proposed inert waste recovery facility.

Environmental sampling, monitoring and testing will generally be undertaken by Roadstone Wood's in-house environmental staff. Records of environmental monitoring and testing will be maintained on-site and forwarded to the EPA as required under the terms of the waste licence.

2.8.1 Dust Monitoring

Dust emissions associated with concrete production activities within Roadstone Wood's landholding are monitored on a quarterly (ie. three monthly) basis using Bergerhoff dust gauges at 5 No. locations (designated D1 to D4) close to the site boundary, shown on Figure 5. These gauges are located close to emission sources and potentially sensitive receptors beyond Roadstone Wood's landholding.

It is currently envisaged that the existing dust monitoring stations will remain in place and that one additional dedicated monitoring station (designated D6) will be established for the proposed waste recovery activity. These will be monitored for the duration of the site backfilling and restoration activities and for a short duration thereafter.

2.8.2 Noise Monitoring

Noise emissions associated with ongoing rock extraction, aggregate processing and concrete / asphalt production activities within Roadstone Wood's landholding are monitored on a quarterly (ie. three monthly) basis at 5 No. locations (designated N1 to N5) of which 4 No. are close to the site boundary and 1 No. is at the central infrastructure area.

It is envisaged that the existing noise monitoring regime will continue for the duration of the proposed quarry backfilling activities and for a short period thereafter.

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). Noise monitoring locations are indicated in Figure 5.

2.8.3 Groundwater Monitoring

At the present time, there are 6 No. groundwater monitoring wells installed across the Huntstown Quarry Complex. Of these 2 No. are located in close proximity to boundary of the waste licence application area and 2 No. others at a short distance to the south, at locations shown in Figure 5.

At the present time, it is envisaged that groundwater sampling and testing will be undertaken on a bi-annual basis at the 4 No. groundwater monitoring wells closest to the waste licence application area. Groundwater levels will also be recorded on a bi-annual basis.

Groundwater samples are currently tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site.

It is currently envisaged that the existing groundwater monitoring regime will remain in place for the duration of the quarry backfilling and restoration works. Groundwater sampling and monitoring will continue as long as backfilling activities continue and for a short period thereafter.

2.8.4 Surface Water Monitoring

It is envisaged that surface water sampling and testing will be undertaken on a bi-annual basis (i.e. six monthly) basis at any temporary surface water features which may either be created or form naturally at low points within the waste recovery site.

Surface water sampling and testing will also be undertaken immediately downstream of the existing settlement lagoons beyond the eastern face of the North Quarry and upstream of its discharge to the tributary stream of the Ward River. The proposed surface water monitoring locations across the site are shown on Figure 5.

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.

It is currently envisaged that the surface water monitoring regime will remain in place for the duration of the quarry backfilling and restoration works and for a short period thereafter.

2.8.5 Stability and Settlement Monitoring

On completion of the final phase of restoration, a number of fixed stations will be set into the ground surface across the restored area and will subsequently be surveyed annually, only as and if required by the waste licence. This monitoring will facilitate assessment of the magnitude of settlement and instability (lateral movement), if any, which may arise on completion of the site restoration works.

Temporary slopes in the backfilled soils will be visually inspected on an ongoing basis, at least once a month, by site staff and a record will be kept of same. Should these inspections give cause for concern, an inspection of the affected area will be undertaken by a qualified geotechnical engineer and measures will be implemented to address any instability identified.

Following completion of restoration works and closure of the facility, stability and settlement monitoring will be undertaken as and if required by the waste licence.

2.9 Environmental Management System

All current operations at the site are subject to Roadstone Wood's Environmental Management System (EMS) which is certified to ISO 14001 standard. The existing EMS which operates at the quarry will be extended to minimise and control emissions to the environment during the quarry backfilling and restoration works.

2.10 Compliance History

Previous waste recovery activities at the site have been carried out by Roadstone Wood in compliance with Waste Facility Permits issued by Fingal County Council, including:

- WFP-FG-09-0006-01 issued on 22nd January 2010
- WPT 96 issued on 21st January 2006
- WPT 21 issued in June 2002

2.10.1 Dust Emission Compliance

A dust deposition monitoring program was established at the site in 1996. This comprises five "Bergerhoff-Type Dust Deposit Gauges" at the locations detailed below and shown on Figure 5:

D1 To the east of the existing landholding, adjacent to the site entrance.

D2 To the south-east of the application area.

D3 To the south of the application area.

D4 To the west of the application area.

D5 To the south-east of the existing landholding, north of the southern quarry.

Recorded dust deposition rates are indicated in Table 2-3 at a number of monitoring locations indicated in Figure 5. The results of the dust deposition monitoring programme for 2009 and early 2010 are as follows:

Table 2-3 Dust Deposition Monitoring Results 2009 to 2010

Date	Deposition (mg/m^2/day)				
	D1	D2	D3	D4	D5
February 2009	41	42	73	309	-
March 2009	44	299	58	112	-
April 2009	116	105	41	41	-
May 2009	212	147	70	75	-
June 2009	430*	333	155	161	-
August 2009	242	167	-	-	-
September 2009	177	-	-	-	-
October 2009	360*	220	65	86	-
November 2009	130	119	181	191	-
January 2010	-	-	118	-	-
February 2010	61	81	37	88	-
March 2010	22	92	80	61	-
April 2010	70.5	144.4	71.1	58.3	41.1

** contaminated with organic matter*

This data indicates that total dust deposition rates along the boundary of the site at the time quarrying and production of construction materials was underway was controlled and generally well below the TA Luft threshold limit of 350 mg/m^2/day.

Dust deposition monitoring was also carried out at the site at the time some quarry backfilling and restoration works were being undertaken previously at the northern end of the North Quarry in late 2002 and 2003. At that time, a large volume of inert excavation spoil arising from construction of the Dublin Port Tunnel was imported to site and used to backfill the quarry void in that area.

Table 2-4 Dust Deposition Monitoring Results 2002 to 2003

Date	Deposition (mg/m^2/day)					
	D1	D2	D3	D4	D5	D6
January 2002	-	-	89	98	185	-
February 2002	88	-	106	122	202	-
March 2002	134	-	132	103	176	-

Date	Deposition (mg/m^2/day)					
	D1	D2	D3	D4	D5	D6
April 2002	68	-	110	68	157	-
May 2002	88	-	127	141	189	-
June 2002	94	-	134	102	167	-
July 2002	103	-	97	79	154	-
August 2002	133	-	124	133	187	-
September 2002	-	-	-	240	281	-
October 2002	-	-	160	113	191	-
November 2002	94	-	142	116	77	78
December 2002	62	-	121	67	69	65
January 2003	-	-	-	123	207	160
February 2003	-	-	-	-	100	93
March 2003	-	-	-	142	234	134
April 2003	-	-	70	98	151	156
May 2003	-	-	79	134	187	175
June 2003	-	-	67	157	161	132
July 2003	-	-	82	146	154	165
August 2003	-	-	109	121	135	197
September 2003	-	-	134	167	103	137
October 2003	-	-	116	143	122	176
November 2003	-	-	63	85	142	124
December 2003	-	-	101	132	102	142

This data indicates that total dust deposition rates along the boundary of the site during previous site restoration and recovery activities was controlled and well below the TA Luft threshold limit of 350 mg/m^2/day.

2.10.2 Noise Emission Compliance

Recorded noise levels from established quarrying, aggregate processing and concrete production activities at the Huntstown Quarry complex generally do not exceed recognised threshold emission limits for extractive industry. Where recorded, occasional exceedances in noise level can be attributed to aircraft movements in and out of Dublin Airport (the quarry lies directly beneath a flight path).

A baseline noise monitoring survey from 2009/2010 at the Huntstown site is detailed in Table 2-5 overleaf.

Table 2-5 Noise Monitoring Results 2009-2010

Location	Date	Time	Measured Noise Levels – dB(A)		
			L_{Aeq}	L_{AF10}	L_{AF90}
D5	17/09/2009	12:24 – 13:24	51.0	51.9	48.3
N1	19/04/2010	16:21 – 17:21	56.1	56.0	49.6
N2	19/04/2010	12:26 – 13:26	44.8	45.0	41.3
N3	19/04/2010	14:03 – 15:03	42.2	43.3	39.4
N4	19/04/2010	15:12 – 16:12	48.5	49.1	40.9

The noise levels recorded at locations D5 and N1 were mainly due to external traffic on the adjoining national road network (the M50 Motorway, the N2 Dual Carriageway and North Road) as shown by the elevated L_{AF10} readings. Noise levels at all locations were affected by aircraft regularly flying overhead.

Allowing for the external traffic noise and air traffic, the noise monitoring results show that the development complies with Condition No. 9 of Planning Reg. Ref. No. F03A/1430, PL06F.206789 which states that:

'During the operation and restoration phase of the quarries, the noise level from the operations measured at the boundaries of the respective quarry shall not exceed

- an L_{Aeq} T value of 55dB(A) during the period of 0800hrs to 1800hrs Monday to Saturday;
- an L_{Aeq} T value of 45dB(A) at any other time'.

Noise monitoring data indicates that average ambient noise levels around the Huntstown Quarry Complex typically range between 42 dBA L_{Aeq} and 56 dBA L_{Aeq}. These noise levels are consistent with daytime noise levels which would be expected around suburban parts of the Greater Dublin Area. Noise levels to the south and south-east of the site will be higher due to traffic noise from the adjacent M50 Motorway and the N2 Dual Carriageway.

2.10.3 Groundwater Emission Compliance

Groundwater samples were obtained at the site monitoring wells (identified as GW01 – GW06 on Figure 5) in August 2010 and forwarded for hydrochemical analysis. A summary of water quality test parameters is presented in Table 2-6 below.

Table 2-6 Summary of Groundwater Quality (August 2010)

	GW01	GW02	GW03	GW04	GW05	GW06	IGV*
pH	7.34	6.84	7.46	7.32	6.86	7.12	6.5 -9.5
Conductivity	114	229	376	512	681	354	1000
Sodium	24.52	17.89	28.62	25.42	16.89	18.45	150
Potassium	3.54	2.99	4.01	3.12	1.58	2.57	5
Calcium	80.7	75.45	92.52	85.42	68.57	78.45	200
Magnesium	17.54	15.42	20.27	19.85	14.56	20.12	50
Chloride	19.23	24.68	43.11	27.49	19.51	34.16	30
Sulphate	48.96	12.09	17.24	36.11	24.66	18.71	200
Total Alkalinity	301	292	351	332	247	313	NAC
Total Hardness	340	352	440	494	220	252	200

	GW01	GW02	GW03	GW04	GW05	GW06	IGV*
Nitrate	18.66	12.45	24.77	16.62	9.32	6.44	25
Nitrite	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1
Ammoniacal Nitrogen	0.02	0.01	0.04	0.02	0.01	<0.01	0.15
Iron	0.006	<0.001	0.052	<0.001	<0.001	0.067	0.2
Manganese	0.001	<0.001	0.013	<0.001	<0.001	0.021	0.05
Orthophosphate	0.1	0.09	0.06	0.02	<0.01	0.01	0.08
Total Organic Carbon	4.1	4.4	1.5	0.5	3.2	9.9	NAC

Shaded = Maximum admissible concentration exceeded

IGV = Interim Guideline Value for groundwater, as set out in the EPA Publication 'Towards setting Guideline values for the Protection of Groundwater in Ireland'.

The groundwater quality data presented above indicate that the groundwater at Huntstown can be considered to be of good status. Virtually all parameters analysed had ion concentrations lower than the Interim Guideline Values (IGV) set out in the EPA Publication 'Towards setting Guideline values for the Protection of Groundwater in Ireland'.

The guideline value for chloride was exceeded at two locations, but this may be due to proximity to the coast (12-km), and its seawater. All samples exceeded the guideline for hardness, but it should be noted that hardness occurs naturally at high concentrations in limestone bedrock: about 65% of all groundwater samples from the recent national database have hardness in excess of 200 mg/l. Values of orthophosphate exceeding the guideline value may be the result of local fertiliser application.

The hydrochemistry of the groundwater samples indicate hard calcium-magnesium-bicarbonate waters with moderately low sodium and magnesium. This type of water is typical of groundwater from a dolomitised limestone aquifer. Potassium, chloride, ammoniacal nitrogen, nitrite and nitrate are moderate indicating minimal organic contamination. The higher nitrate level at GW01, although still low, is most likely due to its closer proximity to agricultural land. There are a small number of hydrochemical variations between samples taken up gradient and down gradient of the quarried sites. However these are within the normal expected range for this type of aquifer.

2.10.4 Surface Water Emission Compliance

There are currently three monitored discharge points at the Huntstown Quarry complex, as shown on Figure 5 and described below:

- A discharge to the south (from the southern quarry and surrounding areas), into the River Tolka catchment, designated W3. This discharge is not within the catchment for the proposed inert waste recovery facility operation, and so will not be discussed further.
- A discharge from the central quarry, northwards to the Ward catchment, designated W2. This discharge mixes with discharge from the northern quarry and concrete production plant.
- A discharge from settlement ponds which receive influent groundwater and rainwater from the northern quarry and wastewaters from concrete production activities. This discharge ultimately discharge to the Ward River catchment and is designated W1. This discharge is the one of most relevance to the proposed development.

It is envisaged that discharge from the dedicated settlement ponds which only accept inflows from the northern quarry will be commenced when infilling / backfilling using imported inert soil commences. It is envisaged that this discharge will be designated W4.

The quality of the two existing quarry discharges to the Ward River catchment, W1 and W2, are summarised in Table 2-7 overleaf:

Table 2-7 Average / Median Quarry Discharge Monitoring Results

	Year	Number of Samples	pH	BOD*	Suspended Solids	Temp (°C)	Ammonia (NH4)*	Calcium	Phosphorous	Sulphate
W1	2002	17	7.99	<2	13.9	11.3				
	2003	23	7.98	<2	9.4	10.9	<0.1	122	<0.05	161
	2004	21	8.08	<2	12.0	11.5	<0.1	140	<0.05	193
	2005	13	8.04	<2	16.9	10.8	<0.1	137	<0.05	213
	2006	11	8.01	<2	12.1	12.0	<0.1	152	<0.05	214
	2007	11	8.04	<2	20.5	12.8	<0.1	180	<0.05	235
	2008	12	7.97	<2	18.0	10.3	<0.1	160	<0.05	248
	2009	11	7.75	<2	17.9	11.7	<0.1	146	<0.05	236
W2	2003	38	8.15	<2	11.2	10.8	<0.1	160	<0.05	171
	2004	36	8.16	<2	13.2	11.2	<0.1	147	<0.05	160
	2005	25	8.12	<2	16.0	10.3	<0.1	152	<0.05	136
	2006	24	8.17	<2	30.3†	12.4	<0.1	149	<0.05	129
	2007	23	8.22	<2	16.2	14.2	<0.1	162	<0.05	142
	2008	24	8.07	<2	27.9†	13.4	<0.1	131	<0.05	148
	2009	13	7.84	<2	28.2	13.3	<0.1	142	<0.05	168

All values are in mg/l except for pH, which is in pH units

* - Median Values, since most values were below the detection limit

† - outlier values of 534 mg/l and 1200 mg/l were omitted from 2006 and 2008 data, respectively, for suspended solids

It can be seen that the discharge monitoring results are, on average, of acceptable quality. Monitoring of existing discharges from the Huntstown quarry complex is continuing, and will be augmented with at least one additional monitoring location in the future. The additional monitoring point, W4, will provide a representative value for the quality of water collected and discharged from the North Quarry during the infilling operation.

Water quality at both the central and northern quarry sumps was monitored in August 2010. The results are presented in Table 2-8 below, along with the discharge licence limits for the North Quarry:

Table 2-8 Water Quality in Central and Northern Sumps in August 2010

	Central Sump (06/08/2010)	Northern Sump (06/08/2010)	Discharge Limits
Temperature	13.9	16.4	25
pH	7.04	7.11	6 – 9
Conductivity	227	329	-
Sodium	12.56	20.54	-
Potassium	1.21	4.89	-
Calcium	54.3	102.4	-

	Central Sump (06/08/2010)	Northern Sump (06/08/2010)	Discharge Limits
Magnesium	0.95	3.25	-
Chloride	24.7	30.21	-
Sulphate	8.16	19.27	-
Total Alkalinity	151	209	-
Total Hardness	330	430	-
Nitrate	4.66	3.27	-
Nitrite	0.05	<0.05	-
Ammoniacal Nitrogen	0.04	0.02	1
Iron	<0.001	0.016	-
Manganese	<0.001	0.002	-
Orthophosphate	0.07	0.04	-
BOD	2	1	20
DRO	<0.01	<0.01	-
Mineral Oil	<0.01	<0.01	-
Suspended Solids	N/T	N/T	30

Note: Suspended solids were not analysed as tested samples were grab analyses from the top of the sump, (and are not therefore representative of pumped water).

The results show that the quality of the water in the two sumps was found to be within the discharge limits specified in the discharge licence.

2.11 Enforcement History

Neither Roadstone Wood Ltd. nor any of its predecessor companies (which includes Roadstone Dublin, Roadstone Provinces and J.A. Wood), has ever been convicted of any offence under the Waste Management Acts 1996-2008, the Environmental Protection Agency Act 2003 or the Air Pollution Act 1987.

The Huntstown site has been operated in compliance with all permits and planning consents and Roadstone Wood has not been subject to enforcement action by the Local Authority.

2.12 Incidents History

To date, there has been no recorded incident of significant environmental pollution at the subject site.

3.0 ENVIRONMENTAL SENSITIVITY

The environmental sensitivity of the waste recovery facility at Huntstown is assessed under four separate headings

(i) Groundwater status and vulnerability

(ii) Proximity and sensitivity of receiving waters

(iii) Human occupation and sensitivity

(iv) Protected ecological sites and species

3.1 Groundwater Status and Vulnerability

The predominant bedrock at Huntstown is limestone, grouped into the Waulsortian, Malahide (Boston Hill) and Tober Colleen Formations. As is typical of Irish bedrock, groundwater flow through these formations is controlled by secondary fissure permeability. The bulk permeability of the formations are relatively high, with groundwater storage and movement mainly constrained to the upper weathered horizons of each unit and to discontinuities (such as such as joints, fractures and faults).

Bedrock aquifer maps published on the GSI website indicate that the Huntstown Quarry complex straddles bedrock formations which are generally considered to be locally important karstified aquifers. Of the three bedrock formations exposed at Huntstown, both the Waulsortian and Malahide (Boston Hill) Formations are considered to be **locally important aquifers**, while the Tober Colleen Formation is considered to be a **poor aquifer**.

The subsoil deposits that overlie the bedrock at Huntstown tend to be relatively thin but play an important role in groundwater recharge. Where the subsoil comprises sand and gravel deposits, it permits a high level of recharge and can provide additional storage to the underlying bedrock aquifer. In the Huntstown area however, the extent and thickness of sand and gravel deposits is insufficient for it to be considered an aquifer in its own right.

A review of the GSI karst database indicates that there are no karst landforms or features within 5 km of the Huntstown Quarry complex.

Groundwater vulnerability maps published on the GSI website indicate that the Huntstown Quarry complex is located within an area with **high to extreme groundwater vulnerability** status. This is principally due to the fact that subsoil has been removed over virtually the entire site.

The quarry excavations have intersected the groundwater table and lowered it around the periphery with the excavation of each quarry bench. There are minor groundwater inflows to each of the quarries that drain to the quarry floor, where they are contained. Water is pumped from the quarry floor as and when required in order to maintain dry conditions on the floor. When pumps are active, the northern quarry has an estimated discharge rate of around 20 l/sec.

The GSI national well database records indicate that there are 12 wells or drillholes within 1 km of the Huntstown Quarry complex. Of these, only 2 appear to be wells used for groundwater abstraction: one is in the Waulsortian Limestone Formation to the west of the site, and one, also in Waulsortian Formation is to the south of the site.

Much of the potable water demand in Huntstown and the surrounding area is satisfied by a Local Authority mains supply. The adjoining Huntstown Power Station sources approximately 150m^3/day of water from an on-site well for operational use.

3.2 Proximity and Sensitivity of Receiving Waters

The Huntstown quarry complex straddles two river catchments, that of the Ward River and that of the Tolka River, with approximately equal areas of the landholding in each. The inert soil recovery facility to be located in the North Quarry lies in the northern part of the landholding, entirely within the Ward River catchment.

The northern portion of the River Ward (known as the Ballystrahan sub-catchment) is classified in the most recent assessment of Ireland's rivers (published by EPA in 2010) as being at 'good' status. Further downstream, the River Ward itself has a median Q-rating of 3 (unsatisfactory). Siltation by agriculture and urban wastewater discharges are believed to be the principal contributors to reduced water quality in the river.

The Draft River Basin Management Plan, prepared for as part of Ireland's obligations under the Water Framework Directive, has also reported the status of the Ward River catchment as 'poor'. In other parts of the Ward catchment, the status of sub-catchments and indicated to range from 'moderate' to 'bad'.

The Office of Public Works website (www.floodmaps.ie) indicates that there is a record of one historic flood event in the vicinity of Huntstown, at Kilshane Cross in November 2002. This flood was attributed to 'runoff from adjacent grasslands', and was not related to quarrying activities at Huntstown.

Surface water run-off and discharges at the Huntstown Quarry complex are managed on a continual basis so that they do not increase the risk of flooding in the surrounding area.

3.3 Human Occupation and Sensitivity

The existing North Quarry and the proposed inert waste recovery facility straddles the townlands of Kilshane and Huntstown in north-west County Dublin. The site is located approximately 2.5 km northwest of Finglas, 2km north-east of Corduff, and 3.5km north-east of Blanchardstown village, Dublin 15. The site is currently accessed from the R135 Regional Road, known locally as the North Road (the former N2 National Primary Road) to the east and by Kilshane Road to the west.

A small number of existing residences are located in close proximity to the proposed inert waste recovery facility. The nearest residential property is located approximately 170m west of the application boundary along the Kilshane Road. A further five residential properties are also located immediately to the west of the site along the Kilshane Road. Within 500m of the site there are a further six residences, all located to the east of the site along the North Road. The existing housing pattern in the vicinity of the site is shown on Figure 6.

3.4 Protected Ecological Sites and Species

The proposed waste recovery site comprises a former worked limestone quarry void and associated perimeter screening and overburden mounds, typically supporting grassland communities, and industrial areas consisting of a variety of buildings, structures and hardstanding areas forming part of the existing ancillary site infrastructure for the quarrying operations as well as for the production of concrete and asphalt.

The northern extent of the former quarry has been in-filled with inert materials forming part of the quarry restoration works but generally these areas support little vegetation except for some pioneer and early colonising plants.

The site is not subject to any statutory nature conservation designation and there are no such sites within a 2km radius.

During the extended Phase 1 Habitat Survey of the site in 2010, no protected or rare species of flora were recorded on, or immediately adjacent to it.

4.0 RISK ASSESSMENT

4.1 Risk Identification

The environmental risks associated with incidents or accidents at the Huntstown Waste Recovery facility have been identified through a site visit, interview with site staff and review of the EIS and Waste Licence application prepared for the facility.

These risks are listed in Table 4-1 below:

Table 4-1
Plausible Risks Identified for the Activity

Risk Ref. No.	Process	Potential Risk
1	Fuel Storage	Fuel spillage during tanker unloading/delivery operations
2	Fuel Storage	Loss from diesel tanks, discharge to surface water
3	Fuel Storage	Loss from diesel tanks, discharge to groundwater
4	Fuel Storage	Fuel bowser spillage, discharge to surface water
5	Fuel Storage	Fuel bowser spillage, discharge to groundwater
6	Storage of Hydrocarbons for Maintenance	Spillage of Engine Oil, Transmission oil and/ or Hydraulic Oil Tanks, discharge to surface water
7	Storage of Hydrocarbons for Maintenance	Spillage of Engine Oil, Transmission oil and/ or Hydraulic Oil Tanks, discharge to groundwater
8	Waste Oil Storage	Waste Oil Tank spillage, discharge to surface water
9	Waste Oil Storage	Waste Oil Tank spillage, discharge to groundwater
10	Hydrocarbon Drum Storage	Drum spillage, discharge to surface water
11	Hydrocarbon Drum Storage	Drum spillage, discharge to groundwater
12	Waste Management Practices	Suspended solids run-off to surface water
13	Waste Management Practices	Non-inert loads contaminating surface water
14	Waste Management Practices	Non-inert loads contaminating groundwater

4.2 Risk Analysis

The risks above were assessed against likelihood and consequence as defined in the EPA draft guidance1 document and reproduced in Tables 4-2 and 4-3 overleaf:

[1] *Draft Guidance on Assessing and Costing Environmental Liabilities' (July 2013).*

Table 4-2
Risk Classification Table - Likelihood

Rating	Likelihood	
	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 4-3
Risk Classification Table - Consequence

Rating	Consequence	
	Category	Description
1	Trivial	No impact or negligible change to the environment
2	Minor	Minor impact/localised or nuisance
3	Moderate	Moderate impact to the environment
4	Major	Severe impact to the environment
5	Massive	Massive impact to a large area, irreversible in the medium term

Table 4-4 overleaf contains the Risk Analysis of the likelihood and consequences of the plausible risks identified above. The effectiveness of mitigation measures are also considered in the analysis.

Table 4-4
Risk Analysis

Risk ID.	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
1	Fuel Storage	Fuel spillage during tanker unloading/delivery operations	Contamination of soil, groundwater and surface water.	4	Tanker volume is limited. Hazardous and persistent material	2	Fuel tanks and all valves are contained within steel bunds.	8
2	Fuel Storage	Loss from diesel tanks, discharge to surface water	Contamination of surface water.	4	Maximum 53,000 litres of diesel. Hazardous and persistent material.	2	Fuel tanks and all valves are contained within steel bunds. Tanks are regularly inspected. Spill can be contained at base of quarry and not pumped to surface water.	8
3	Fuel Storage	Loss from diesel tanks, discharge to groundwater	Contamination of soil and groundwater.	4	Maximum 53,000 litres of diesel. Hazardous and persistent material.	2	Fuel tanks and all valves are contained within steel bunds. Tanks are regularly inspected. Spill can be contained at base of quarry in hydraulic trap.	8
4	Fuel Storage	Fuel bowser spillage, discharge to surface water	Contamination of surface water.	3	Max 10,000 litres of diesel. Hazardous and persistent material.	3	Spill can be contained at base of quarry and not pumped to surface water.	9
5	Fuel Storage	Fuel bowser spillage, discharge to groundwater	Contamination of soil and groundwater.	3	Max 10,000 litres of diesel. Hazardous and persistent material.	3	Spill can be contained at base of quarry in hydraulic trap.	9
6	Storage of Hydrocarbons for Maintenance	Spillage of Engine Oil, Transmission Oil and/ or Hydraulic Oil Tanks, discharge to surface water	Contamination of surface water.	2	Maximum 2,730 litres oil. Hazardous and persistent material.	2	Stored in double-skinned steel tanks in a room with no vehicular access. Tanks are regularly inspected. Floor is not fully bunded. Spill can be contained at base of quarry and not pumped to surface water.	4

Risk ID.	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
7	Storage of Hydrocarbons for Maintenance	Spillage of Engine Oil, Transmission Oil and/ or Hydraulic Oil Tanks, discharge to groundwater	Contamination of soil and groundwater.	2	Maximum 2,730 litres oil. Hazardous and persistent material.	2	Stored in double-skinned steel tanks in a room with no vehicular access. Tanks are regularly inspected. Floor is not fully bunded. Spill can be contained at base of quarry in hydraulic trap.	4
8	Waste Oil Storage	Waste Oil Tank spillage, discharge to surface water	Contamination of surface water.	2	Maximum 2,730 litres oil. Hazardous and persistent material.	3	Double skinned tank (self-bunded) in an area trafficked by cars, but not HGVs. Tanks are regularly inspected. Spill can be contained at base of quarry and not pumped to surface water.	6
9	Waste Oil Storage	Waste Oil Tank spillage, discharge to groundwater	Contamination of soil and groundwater.	2	Maximum 2,730 litres oil. Hazardous and persistent material.	3	Double skinned tank (self-bunded) in an area trafficked by cars, but not HGVs. Tanks are regularly inspected. Spill can be contained at base of quarry in hydraulic trap.	6
10	Hydrocarbon Drum Storage	Drum spillage, discharge to surface water	Contamination of surface water.	1	Maximum 200 litres per drum. Hazardous and persistent material.	2	Drums contained in bunded area or on bunded pallets inside maintenance shed. Spill can be contained at base of quarry and not pumped to surface water.	2
11	Hydrocarbon Drum Storage	Drum spillage, discharge to groundwater	Contamination of soil and groundwater.	1	Maximum 200 litres per drum. Hazardous and persistent material.	2	Drums contained in bunded area or on bunded pallets inside maintenance shed. Spill can be contained at base of quarry in hydraulic trap.	2

Risk ID.	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
12	Waste Management Practices	Suspended solids run-off to surface water	Contamination of surface water.	2	Potential for temporary impairment of surface water body	2	Surface water run-off is pumped from base of quarry rather than direct run-off. Adequate opportunity for settlement prior to discharge.	4
13	Waste Management Practices	Non-inert loads contaminating surface water	Contamination of surface water.	3	Potential for hazardous materials hidden in loads but volumes would have to be low to evade inspections.	2	Waste inspection measures including regular testing as well as profiling of customers minimises the likelihood of missing non-compliant loads. Surface water discharge will be regularly tested. Contamination can be contained at base of quarry and not pumped to surface water.	6
14	Waste Management Practices	Non-inert loads contaminating groundwater	Contamination of soil and groundwater.	3	Potential for hazardous materials hidden in loads but volumes would have to be low to evade inspections.	2	Waste inspection measures including regular testing as well as profiling of customers minimises the likelihood of missing non-compliant loads. Contamination can be contained at base of quarry in hydraulic trap.	6

4.3 Risk Evaluation

The risks presented in the risk analysis are ranked in Table 4-5 below to assist in identifying the risks for prioritisation in the risk treatment process.

Table 4-5
Risk Evaluation Table

Risk ID.	Process	Potential Risks	Consequence Rating	Likelihood Rating	Risk Score
4	Fuel Storage	Fuel bowser spillage, discharge to surface water	3	3	9
5	Fuel Storage	Fuel bowser spillage, discharge to groundwater	3	3	9
1	Fuel Storage	Fuel spillage during tanker unloading/delivery operations	4	2	8
2	Fuel Storage	Loss from diesel tanks, discharge to surface water	4	2	8
3	Fuel Storage	Loss from diesel tanks, discharge to groundwater	4	2	8
8	Waste Oil Storage	Waste Oil Tank spillage, discharge to surface water	2	3	6
9	Waste Oil Storage	Waste Oil Tank spillage, discharge to groundwater	2	3	6
13	Waste Management Practices	Non-inert loads contaminating surface water	3	2	6
14	Waste Management Practices	Non-inert loads contaminating groundwater	3	2	6
6	Storage of Hydrocarbon tanks for Maintenance	Spillage of Engine Oil, Transmission Oil and/ or Hydraulic Oil Tanks, discharge to surface water	2	2	4
7	Storage of Hydrocarbon tanks for Maintenance	Spillage of Engine Oil, Transmission Oil and/ or Hydraulic Oil Tanks, discharge to groundwater	2	2	4
12	Waste Management Practices	Suspended solids run-off to surface water	2	2	4
10	Hydrocarbon Drum Storage	Drum spillage, discharge to surface water	1	2	2
11	Hydrocarbon Drum Storage	Drum spillage, discharge to groundwater	1	2	2

The Risk Matrix is displayed in Table 4-6 below.

In line with the EPA Guidance, the risks have been colour coded in the matrix to provide a broad indication of the critical nature of each risk. The colour code is as follows:

Red – These are considered to be high-level risks requiring priority attention. These risks have the potential to be catastrophic and as such should be addressed quickly.

Amber – These are medium-level risks requiring action, but are not as critical as a red coded risk.

Green - These are lowest-level risks and indicate a need for continuing awareness and monitoring on a regular basis. Whilst they are currently low or minor risks, some have the potential to increase to medium or even high-level risks and must therefore be regularly monitored and if cost effective mitigation can be carried out to reduce the risk even further this should be pursued.

Table 4-6
Risk Matrix

Likelihood						
Very High	5					
High	4					
Medium	3		8, 9	4, 5		
Low	2	10, 11	6, 7, 12	13, 14	1, 2, 3	
Very Low	1					
		Trivial	Minor	Moderate	Major	Massive
		1	2	3	4	5
		Consequence				

All identified risks fall within the green zone in the risk matrix.

4.4 Risk Treatment

Table 4-7 below presents a Statement of Measures where a set of appropriate and achievable mitigation measures are assigned to each risk, with a risk owner responsible for the ongoing management of the risk and a timeframe for implementation of the risk mitigation measure.

Table 4-7
Statement of Measures

Risk ID.	Potential Risks	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date For Completion	Owner/ Contact person
4	Fuel bowser spillage, discharge to surface water	9	a) Ensure driver adheres to speed limits and drives cautiously. b) Minimise volume in fuel bowser to required amount. c) Inspect and maintain bowser in good condition	a) Better road safety. b) Lower consequence due to reduced hazard. c) Reduced spill hazard	Talk to fuel bowser drivers and observe behaviour. Regularly check integrity of bowser	Immediate	Facility Manager
5	Fuel bowser spillage, discharge to groundwater	9	a) Ensure driver adheres to speed limits and drives cautiously. b) Minimise volume in fuel bowser to required amount. c) Inspect and maintain bowser in good condition	a) Better road safety. b) Lower consequence due to reduced hazard. c) Reduced spill hazard	Talk to fuel bowser drivers and observe behaviour. Regularly check integrity of bowser	Immediate	Facility Manager
1	Fuel spillage during tanker unloading/delivery operations	8	Ensure driver adheres to speed limits and drives cautiously.	Better road safety.	Observe driving behaviour	Immediate	Facility Manager
2	Loss from diesel tanks, discharge to surface water	8	a) Maintain tanks and bunds in good condition. b) Ensure that bund has adequate capacity. c) Ensure that pumps to surface water are switched off as part of Emergency Response Procedure in the event of a major spill.	a) Lower chance of tank or bund failure. b) Lower chance of overspill c) Less chance that contaminated water will be pumped to surface water.	a) Regularly check integrity of tanks and bunds. b) Regularly remove rainwater from bund and send for appropriate disposal. c) Check ERPs	a) Minimum every 3 years b) Minimum every month. c) Immediate	Facility Manager

Risk ID.	Potential Risks	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date For Completion	Owner/ Contact person
			d) Ensure that staff are aware of Emergency Response Procedures.	d) As above	d) Check staff awareness of ERPs	d) Immediate	
3	Loss from diesel tanks, discharge to groundwater	8	a) Ensure that tanks and bunds are in good condition. b) Ensure that bund has adequate capacity. c) Ensure that diesel is contained as part of Emergency Response Procedures (ERPs) in the event of a major spill. d) Ensure that staff are aware of ERPs.	a) Lower chance of tank or bund failure. b) Lower chance of overspill. c) Less chance that contaminated water will discharge to groundwater. d) As above	a) Regularly check integrity of tanks and bunds b) Regularly remove rainwater from bund and send for appropriate disposal. c) Check ERPs d) Check staff awareness of ERPs	a) Minimum every 3 years b) Minimum every month. c) Immediate d) Immediate	Facility Manager
8	Waste Oil Tank spillage, discharge to surface water	6	a) Ensure that waste oil tank is in good condition. b) Provide concrete bund around waste oil tank. c) Ensure that bund has adequate capacity. d) Ensure that pumps to surface water are switched off as part of Emergency Response Procedure in the event of a major spill. e) Ensure that staff are aware of ERPs	a) Lower chance of tank failure. b) Lower chance of impact and provision of better containment. c) Lower chance of overspill. d) Less chance that contaminated water will be pumped to surface water. e) As above.	a) Regularly check integrity of tank b) Construct bund. c) Regularly remove rainwater from bund and send for appropriate disposal. d) Check ERPs e) Check staff awareness of ERPs	a) Minimum every 3 years b) Within 3 months c) Minimum every month. d) Immediate e) Immediate	Facility Manager

Risk ID.	Potential Risks	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date For Completion	Owner/ Contact person
9	Waste Oil Tank spillage, discharge to groundwater	6	a) Ensure that waste oil tank is in good condition. b) Provide concrete bund around waste oil tank. c) Ensure that bund has adequate capacity. d) Ensure that waste oil is contained as part of Emergency Response Procedures (ERPs) in the event of a major spill. e) Ensure that staff are aware of ERPs	a) Lower chance of tank failure. b) Lower chance of impact and provision of better containment. c) Lower chance of overspill. d) Less chance that contaminated water will discharge to groundwater. e) As above.	a) Regularly check integrity of tank. b) Construct bund. c) Regularly remove rainwater from bund and send for appropriate disposal. d) Check ERPs e) Check staff awareness of ERPs	a) Minimum every 3 years b) Within 3 months c) Minimum every month. d) Immediate e) Immediate	Facility Manager
13	Non-inert loads contaminating surface water	6	a) Waste inspection measures, waste acceptance procedures and customer profiling. b) Provision of waste inspection and quarantine areas.	a) Better control on incoming wastes and less likelihood of acceptance of non-compliant loads. b) Better control and safe storage of non-compliant materials.	a) Implement relevant waste acceptance, waste inspection and customer profiling procedures. b) Construct / designate waste inspection and quarantine areas.	a) Upon receipt of waste licence before acceptance of wastes. b) As above	Facility Manager
14	Non-inert loads contaminating groundwater	6	a) Waste inspection measures, waste acceptance procedures and customer profiling. b) Provision of waste inspection and quarantine areas.	a) Better control on incoming wastes and less likelihood of acceptance of non-compliant loads. b) Better control and safe storage of non-compliant materials.	a) Implement relevant waste acceptance, waste inspection and customer profiling procedures. b) Construct / designate waste inspection and quarantine areas.	a) Upon receipt of waste licence before acceptance of wastes. b) As above	Facility Manager

Risk ID.	Potential Risks	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date For Completion	Owner/ Contact person
6	Spillage of Engine Oil, Transmission Oil and/ or Hydraulic Oil Tanks, discharge to surface water	4	a) Ensure that tanks are in good condition. b) Repair walls of tank room to provide additional bunding. c) Ensure that pumps to surface water are switched off as part of Emergency Response Procedure in the event of a major spill. d) Ensure that staff are aware of ERPs	a) Lower chance of tank failure. b) Provision of better containment. c) Less chance that contaminated water will be pumped to surface water. d) As above.	a) Regularly check integrity of tanks. b) Repair gaps in walls of tank room. c) Check ERPs d) Check staff awareness of ERPs	a) Minimum every 3 years b) Within 3 months c) Immediate d) Immediate	Facility Manager
7	Spillage of Engine Oil, Transmission Oil and/ or Hydraulic Oil Tanks, discharge to groundwater	4	a) Ensure that tanks are in good condition. b) Repair walls of tank room to provide additional bunding. c) Ensure that waste oil is contained as part of Emergency Response Procedures in the event of a major spill. d) Ensure that staff are aware of ERPs	a) Lower chance of tank failure. b) Provision of better containment. c) Less chance that contaminated water will discharge to groundwater. d) As above.	a) Regularly check integrity of tanks. b) Repair gaps in walls of tank room. c) Check ERPs d) Check staff awareness of ERPs	a) Minimum every 3 years b) Within 3 months c) Immediate d) Immediate	Facility Manager
12	Suspended solids run-off to surface water	4	Ensure settlement before discharge.	Reduced suspended solids in discharge to surface water.	Maintenance of settlement ponds	Ongoing	Facility Manager
10	Drum spillage, discharge to surface water	2	a) Storage of drums in contained areas.	Containment of spills	a) Drums to be contained in bunded area or on bunded pallets inside maintenance shed.	Immediate	Facility Manager

Risk ID.	Potential Risks	Risk Score	Mitigation Measures to be Taken	Outcome	Action	Date For Completion	Owner/ Contact person
			b) Provision of spill kits.		b) Spill kits in maintenance shed to be adequately maintained.		
11	Drum spillage, discharge to groundwater	2	a) Storage of drums in contained areas. b) Provision of spill kits.	Containment of spills	a) Drums to be contained in bunded area or on bunded pallets inside maintenance shed. b) Spill kits in maintenance shed to be adequately maintained.	Immediate	Facility Manager

4.5 Identification of Worst Case Scenario

The ELRA identifies that the risks with the highest consequences relate to the storage of diesel fuel at the site (Risk I.D. 1, 2 and 3). In a worst case scenario, a large item of plant, such as a loading shovel or bulldozer could potentially crash into the two large fuel tanks and rupture the tanks and the bund. In this event, between 50,000 and 100,000 litres of diesel could be lost to ground. The diesel would migrate above and below ground to a sump at the base of the quarry in the C&D waste recycling area. Successful Emergency Response Procedures would result in containment of the spill in that area and a major clean-up of diesel would be required between the tank storage area and the C&D recycling area.

It is not considered plausible that the diesel would be pumped out of the quarry into the surrounding surface water streams as such a major incident would not go undetected and there would be plenty of time and opportunity to contain the diesel on site. The hydraulic trap that exists at the base of the quarry would ensure that the diesel would not discharge to groundwater.

The fuelling areas on either side of the fuel tanks are dished with drainage to sumps and an interceptor. We understand that this system can contain between 10,000 and 20,000 litres of fuel.

4.6 Quantification and Costing

Site clean-up and remediation costs associated with the potential leak of a maximum of 100,000 litres (c.85 tonnes) of diesel from the fuel tanks, is estimated in Table 4-8 below based on the following assumptions:

- We expect that 30 tonnes of the diesel would be recovered from tanks and sumps either local to the fuel tanks or at the base of the quarry.
- De-watering of the quarry has caused a deep cone of depression in the water table that provides a hydraulic trap that protects the groundwater and surface water from diesel contamination. This allows good control over the clean-up operation.
- We assume that 40% of the soil contamination is to an extent that exceeds the hazardous threshold and 60% is deemed non-hazardous.
- We allow a 20% contingency due to the uncertain nature of the outcome.

Table 4-8
Quantification and Costing of Worst Case Scenario

Task	Description	Quantity (No.)	Measurement Unit	Unit Rate (€)	Cost (€)	Source of Unit Rates
Response to: **Risk I.D. 2 and 3** Major rupture of two large diesel tanks with failure of bunding	Trial Pits	20	pit	150	3,000	SLR
	Soil Monitoring	40	sample	150	6,000	SLR
	Excavation of contaminated soil (haz & non-haz)	1,000	tonnes	10	10,000	Roadstone
	Transport Costs for contaminated soils (haz & non-haz)	1,000	tonnes	12	12,000	Rilta
	Disposal Gate Fee of contaminated soil (haz)	400	tonnes	125	50,000	Rilta
	Disposal Gate Fee of contaminated soil (non-haz)	600	tonnes	60	36,000	Rilta
	Hire of activated carbon pump and treat unit	180	days	450	81,000	SLR
	Vacuum tanker removal of recovered diesel	25	hours	120	3,000	Rilta
	Treatment of recovered diesel	30	tonnes	100	3,000	Rilta
	Removal and disposal of activated carbon	10	tonnes	500	5,000	SLR
	Consultancy Fees (c.15% of total cost)	1	report	35,000	35,000	SLR
				Total (€)	**244,000**	
				Plus Contingency @ 20% (€)	**292,800**	
				Plus VAT @ 23% (€)	**360,144**	

5.0 CONCLUSION

This ELRA concludes that the facility operator should provide financial provision of **€360,144** to cover the worst case environmental pollution incident considered plausible at the Huntstown Waste Recovery Facility.

SLR also recommends that the waste facility operator adheres to the mitigation measures suggested in Table 4-7 above as these measures will minimise the likelihood and consequence of environmental pollution incidents at the facility.

6.0 CLOSURE

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

This report is for the exclusive use of Roadstone Wood Ltd; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

FIGURES

Figure 1
Site Location Map

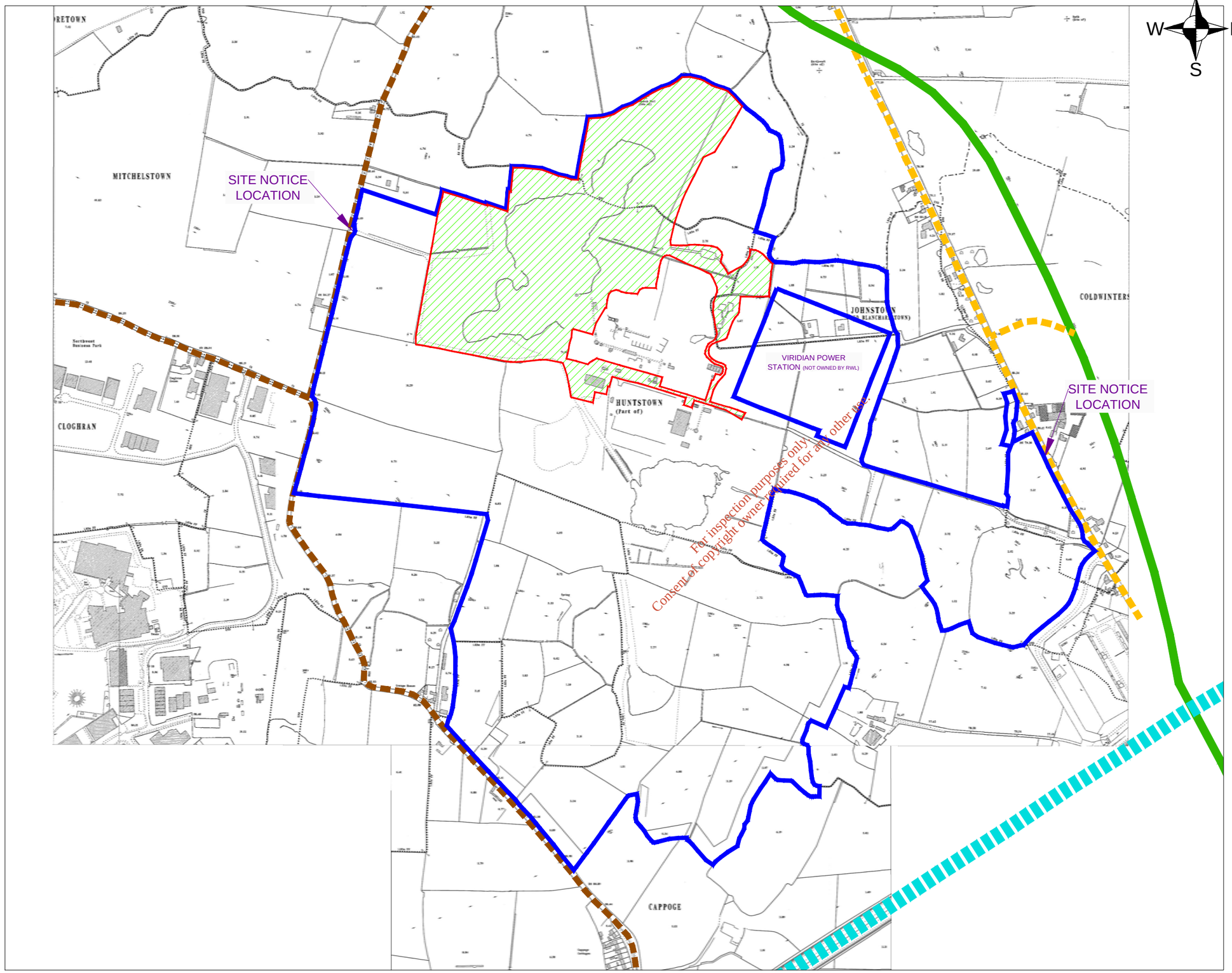
Figure 2
Surrounding Land Use

Figure 3
Existing Site Layout

Figure 4
Restoration Proposals

Figure 5
Environmental Monitoring Locations

Figure 6
Local Residential and Business Locations



NOTES

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A, 3130-B,

2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000713 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- ROADSTONE WOOD LTD. LANDHOLDING (c. 201.8 ha)
- WASTE LICENCE APPLICATION AREA (c. 36.1 ha)
- N2 DUAL CARRIAGEWAY
- NORTH ROAD (R135)
- LOCAL ROAD
- M50 MOTORWAY

Roadstone AWOOD The Right Choice

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ROADSTONE WOOD LTD.
HUNTSTOWN - E.L.R.A.

INERT WASTE RECOVERY FACILITY, ENVIRONMENTAL LIABILITY RISK ASSESSMENT

SITE LOCATION MAP

FIGURE 1

Scale: 1:10,000 @ A3

Date: DECEMBER 2013

0180.00011.00074.18.ELRA.FIG-1.SITE-LOC.R0.dwg

NORTHWEST BUSINESS PARK
KILSHANE ROAD
KILSHANE KENNELS
SITE NOTICE LOCATION
NORTHWEST BUSINESS PARK
MITCHELSTOWN HOUSE
NORTHWEST BUSINESS PARK
STABLES
HOGAN'S CAR SALES & DONNELLY EQUIPMENT
THE OPEN GOLF CENTRE
VIRIDIAN POWER STATION (NOT OWNED BY RWL)
UNIVERSAL FLORAL DISPLAY
BEECH VISTA GARDEN CENTRE
SITE NOTICE LOCATION
VETERINARY CLINIC
MILLENNIUM BUSINESS PARK
BALLYCOOLIN BUSINESS PARK
CAPPAGH ROAD
ESB 220 Kv STATION
ROSEMOUNT BUSINESS PARK
SCRAP YARD

0 100 200 300 400m 600 800 1000
Metres
1:10,000

N
W E
S

NOTES

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A, 3130-B,

2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000713 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- ROADSTONE WOOD LTD. LANDHOLDING (c. 201.8 ha)
- WASTE LICENCE APPLICATION AREA (c. 36.1 ha)
- M50 MOTORWAY
- N2 DUAL CARRIAGEWAY
- LOCAL ROAD
- NORTH ROAD (R135)
- RIGHT OF WAY
- LOCATION OF NEAREST RESIDENCES
- KILSHANE CROSS RECYCLING PARK

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ENVIRONMENTAL LIABILITY
RISK ASSESSMENT

SURROUNDING LAND USE

FIGURE 2

Scale 1:10,000 @ A3
Date DECEMBER 2013

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EXISTING SOIL RECOVERY AREA

SITE ENTRANCE

SETTLEMENT PONDS

EXISTING SHED

WEIGHBRIDGE

LABORATORY

WEIGHBRIDGE OFFICE

SECURITY HUT

MAINTENANCE BUILDING

PORTACABINS

SECURITY HUT

RETAIL CENTRE

CONVEYOR BELT

BLOCK YARD

VIRIDIAN POWER STATION (NOT OWNED BY RWL)

SECURITY HUT

EXISTING C&D RECYCLING AREA

0 50 100 150 200m 300 400 500

Metres
1:5000

N
W E
S

NOTES

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B

2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000713 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

3. TOPOGRAPHIC SURVEY PREPARED BY FUGRO BKS BASED ON MAY 2009 AERIAL PHOTOGRAPHY

LEGEND

- ROADSTONE WOOD LTD. LANDHOLDING (c. 201.8 ha)
- WASTE LICENCE APPLICATION AREA (c. 36.1 ha)
- N2 DUAL CARRIAGEWAY
- NORTH ROAD (R135)
- LOCAL ROAD
- LOCATION OF NEAREST RESIDENCES

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HUNTSTOWN - E.L.R.A.

INERT WASTE RECOVERY FACILITY, ENVIRONMENTAL LIABILITY RISK ASSESSMENT

EXISTING SITE LAYOUT

FIGURE 3

Scale: 1:5,000 @ A3

Date: DECEMBER 2013

0180.00011.00074.18.ELRA.FIG-3.EXIST-SITE-LAYOUT.R0.dwg